Appendix A

Mitigation Monitoring and Reporting Program

MITIGATION MONITORING AND REPORTING PROGRAM

Solar Infrastructure and Battery Energy Storage System Project

Purpose of Mitigation Monitoring and Reporting Program: The California Environmental Quality Act (CEQA), Public Resources Code (PRC) Section 21081.6, requires that a Mitigation Monitoring and Reporting Program (MMRP) be established upon completing findings. CEQA stipulates that "the public agency shall adopt a reporting or monitoring program for the changes to the project which it has adopted or made a condition of project approval in order to mitigate or avoid significant effects on the environment. The reporting or monitoring program shall be designed to ensure compliance during project implementation."

This MMRP has been prepared for the proposed Solar Infrastructure and Battery Energy Storage System Project ("proposed project") in compliance with Section 21081.6 of the CEQA Guidelines to ensure that all required mitigation measures are implemented and completed according to schedule and maintained in a satisfactory manner during the construction and operation of the project, as required. The University of California, Merced (UC Merced) is the Lead Agency for the proposed project under CEQA and shall administer and implement this MMRP. UC Merced is responsible for reviewing all monitoring reports, enforcement actions, and document disposition. UC Merced shall rely on information provided by the project site observers/monitors (e.g., construction manager, project manager, biologist, archaeologist, etc.) as accurate and up-to-date and shall provide personnel to field check mitigation measure status, as required.

The table below has been prepared to assist the responsible parties in implementing the MMRP. The table identifies individual mitigation measures, monitoring/mitigation timing, the responsible person/agency for implementing the measure, and space to confirm implementation of the mitigation measures. The numbering of mitigation measures follows the numbering sequence found in the Initial Study/Mitigated Negative Declaration (IS/MND).

MITIGATION MONITORING AND REPORTING PROGRAM
Solar Infrastructure and Battery Energy Storage System Project

Mitigation Measure	Monitoring / Mitigation Timing	Reporting / Responsible Party	Verification of Compliance	
			Initials	Date
AESTHETICS				
2009 LRDP MM AES-3a: The University shall design all new aboveground infrastructure on the Campus to the following standards: (a) Screen aboveground infrastructure from view from public rights-of-way or scenic vistas, via landscaping, fencing, or other architectural screening; (b) Require creative design measures to camouflage structures by integrating them with existing buildings and among other existing uses; (c) Locate aboveground infrastructure on sites that are not visible from visually sensitive areas, such as residential communities and open space areas; (d) Require providers to co-locate their structure on a single site, where technically feasible and visually desirable; and (e) Locate antennae and equipment on other existing community facility sites, such as water tanks or utility poles.	Prior to issuance of building permits.	UC Merced.		
2009 LRDP MM AES-4: Prior to issuance of building permits, UC Merced shall ensure the final project plans include the following details: • All outdoor lighting shall be focused and directed to the specific location (e.g., roads, walkways), be shielded to avoid the production of glare, minimize up-light, and light spill. • All light fixtures shall be located, aimed, or shielded so as to minimize stray light trespassing across property boundaries and other sensitive areas.	Prior to issuance of building permits.	UC Merced.		
AIR QUALITY				
2020 LRDP MM AQ-1a: The construction contractors shall be required via contract specifications to use construction equipment rated by the USEPA as meeting Tier 4 (model year 2008 or newer) emission limits for engines between 50 and 750 horsepower.	During construction.	Construction contractor.		
2020 LRDP MM AQ-1b: UC Merced shall include in all construction contracts the measures specified in SJVAPCD Regulation VIII (as it may be amended for application to all construction projects generally) to reduce fugitive dust impacts, including but not limited to the following: • All disturbed areas, including storage piles, which are not being actively utilized for construction purpose, shall be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, or vegetative ground cover.	During construction.	Construction contractor.		

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• All on-site unpaved roads and off-site unpaved access roads shall be effectively stabilized of dust emissions using water or chemical stabilizer/suppressant. • All land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill, and demolition activities shall be effectively controlled of fugitive dust emissions using application of water or by presoaking. • When materials are transported off-site, all material shall be covered, effectively wetted to limit visible dust emissions, or at least 6 inches of freeboard space from the top of the container shall be maintained. • All operations shall limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at least once every 24 hours when operations are occurring. (The use of dry rotary rushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit visible dust emissions. Use of blower devices is expressly forbidden.) • Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, storage piles shall be effectively stabilized of fugitive dust emissions by using sufficient water or chemical stabilizer/ suppressant.				
BIOLOGICAL RESOURCES				
PS MM BIO-1: Western Spadefoot If project related activities commence during the wet season and active dispersal period for western spadefoot (between approximately November 1 and March 31), pre-activity surveys for this species shall be conducted on the project site no more than two weeks prior to the initiation of project related activities to ensure that western spadefoot is not actively using the work area or adjacent areas. Pre-activity surveys shall be conducted by a qualified biologist familiar with all life stages and shall cover all terrestrial and aquatic habitats in the project site that are suitable for western spadefoot. If western spadefoot are observed within the project site during work, specifically within the construction zone, all work shall immediately halt in the vicinity of the animal, and the animal will be allowed to leave the area of its own will. If the animal is in immediate danger, an approved biologist shall be obtained to relocate the animal outside of the construction zone, at a safe distance from all construction-related activities, and within suitable habitat. No one other than an approved biologist shall handle, take, or	Prior to the start of construction activities during the wet season.	Qualified biologist; UC Merced.		

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otherwise harass the animal. No work shall resume until the animal has moved or been removed from areas of potential disturbance so long as the animal is out of harm's way.				
PS MM BIO-2: Northwestern Pond Turtle If possible, all grading and land disturbing activities will be conducted outside of the breeding season for northwestern pond turtle (breeding season is generally April to May; construction activities conducted between June and September will avoid this species breeding seasons) to avoid potential impacts to breeding/dispersing individuals. • If project construction commences during breeding season (April 1 to May 31), then a qualified biologist shall conduct a pre-construction survey for northwestern pond turtle within 24 hours before the start of grading or land-disturbing activities. If the survey shows that there is no evidence of this species, then a letter report will be prepared to document the survey and will be provided to UC Merced, and no additional measures are required. If construction activities do not commence within 24 hours of the survey, or halts for more than seven days, then an additional survey will be required before starting or resuming work. ○ If this species is observed during the survey, no project work shall begin until CDFW has been consulted to determine appropriate mitigation measures. • If northwestern pond turtles are observed within the project site during work, specifically within the construction zone, all work shall immediately halt in the vicinity of the animal, and the animal will be allowed to leave the area of its own will. If the animal is in immediate danger, an approved biologist will be retained and will relocate the animal outside of the construction zone, at a safe distance from all construction-related activities, and within suitable habitat. No one other than an approved biologist shall handle, take, or otherwise harass the animal. No work shall resume until the animal has moved or been removed from areas of potential disturbance so long as the animal is out of harm's way.	Prior to the start of construction during the breeding season (April 1 to May 31).	Qualified biologist; UC Merced.		

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2020 LRDP MM BIO-4: Prior to any new development on previously undisturbed land, and as long as the species is considered a candidate endangered species or in the event that it becomes listed under the CESA, a qualified wildlife biologist shall conduct visual surveys of the development area during the flight season for the Crotch bumble bee (late February through late October). The following methodology shall apply unless the CDFW releases species-specific survey protocol; in this case, CDFW's survey protocol shall apply. • Between two and four evenly spaced presence/absence surveys shall be conducted for the highest detection probability, which, at present time, is the greatest between early spring (late March/early April) and early summer (late June/July). Surveys shall take place when temperatures are above 60°F, preferably on sunny days with low wind speeds (e.g., less than 8 miles per hour) and at least 2 hours after sunrise and 3 hours before sunset. On warm days (e.g., over 85°F), bumble bees will be more active in the mornings and evenings. Surveyors shall conduct transect surveys focusing on detection of foraging bumble bees and underground nests using visual aids such as butterfly binoculars. Even if no Crotch bumble bees are observed, a preconstruction survey will be conducted within 30 days prior to start of construction. If no Crotch bumble bees or potential Crotch bumble bees are detected during the presence/absence surveys or the pre-construction survey, no further mitigation is required. • If Crotch bumble bees or potential Crotch bumble bees are observed within the development area, a plan to protect Crotch bumble bee nests and individuals shall be developed and implemented in consultation with CDFW. The plan shall include, but not be limited to, the following measures: o Specifications for construction timing and sequencing requirements (e.g., avoidance of raking, mowing, tilling, or other ground disturbance until late March to protect overwintering queens);	Prior to the start of construction, between early spring (late March/early April) and early summer (late June/July); and within 30 days prior to construction.	Qualified biologist; UC Merced.		

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○ Preconstruction surveys conducted within 30 days and consistent with any current available CDFW standards prior to the start of ground disturbing activities to identify active nests; ○ Establishment of appropriate no-disturbance buffers for nest sites and construction monitoring by a qualified biologist to ensure compliance; ○ Restrictions associated with construction practices, equipment, or materials that may harm bumble bees (e.g., avoidance of pesticides/herbicides, BMPs to minimize the spread of invasive plant species); ○ Provisions to avoid Crotch bumble bees or potential Crotch bumble bees if observed away from a nest during project activity (e.g., ceasing of project activities until the animal has left the work area on its own volition); and ○ Prescription of an appropriate restoration seed mix targeted for the Crotch bumble bee, including native plant species known to be visited by native bumble bee species and containing a mix of flowering plant species with continual floral availability through the entire active season of the Crotch bumble bee (March to October).				
LRDP MM BIO-9a: Avoid and minimize impacts on native birds protected under the MBTA, including listed species, fully protected species, special-status species of concern, and raptors and passerines. (a) Limit construction to the non-breeding season or, if breeding season work is required, conduct pre-construction (tree, shrub, and ground) nest surveys to identify and avoid active nests or as an option, remove potential breeding habitat during the non-breeding season. (a) If feasible, the applicant shall conduct all construction-related activities including (but not limited to) tree and shrub removal,	Prior to the start of construction during the breeding season (February 15 through August 15 for special-status and non-special-status migratory birds and raptors; February 1 through August 31 for burrowing owl).	Qualified biologist; UC Merced.		

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other vegetation clearing, grading, or other ground disturbing activities during the non-breeding season (between August 16 and • February 14) for special-status and non-special-status migratory birds and raptors. If construction activities are scheduled to occur during the breeding season, a qualified avian biologist, with knowledge of the species to be surveyed, shall be retained to conduct focused nesting surveys within 15 days of the start of ground-disturbing or construction activities and within the appropriate habitat. • Specifically, tree, shrub, and ground nesting surveys for special-status birds (including but not limited to white-tailed kite, northern harrier, burrowing owl, loggerhead shrike, and tricolored blackbird), and other migratory birds and raptors shall be conducted before any construction disturbances occur in or near suitable nesting habitat within 500 feet of the construction work area between February 15 and August 15. • If an active nest is located on or within 500 feet of the project area, CDFW shall be consulted to determine an appropriate no-disturbance buffer around the nest until the nest is no longer active and the young have fledged. No construction shall be allowed within this exclusion area without consulting with CDFW. A wildlife biologist shall monitor the nest site during construction at least once a week, or at a frequency determined by CDFG, to ensure that the nest site is not disturbed and the buffer is maintained. • If the project proponent elects to remove a nest tree, nest trees may only be removed between August 16 and February 28, after the qualified avian biologist has determined that the nests are unoccupied.				

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(b) Minimize impacts to burrowing owl and compensate for habitat loss. • The CDFW 1995 (updated by CDFW 2012) recommends that preconstruction surveys be conducted to locate active burrowing owl burrows in the construction work area and within a 500-foot-wide buffer zone around the construction area. The project proponent or its contractor shall retain a qualified biologist to conduct preconstruction surveys for active burrows according to the CDFW's Staff Report on Burrowing Owl Mitigation (updated by CDFW 2012). The preconstruction surveys shall include a breeding season survey and a wintering season survey. If no burrowing owls are detected, no further mitigation is required. • If active burrowing owls are detected, the following additional measures are required: o Occupied burrows shall not be disturbed during the breeding season (February 1 to August 31), which requires a 250 foot no disturbance buffer. o If owls must be moved away from the project site during the nonbreeding season, passive relocation techniques (e.g., installing one-way doors at burrow entrances) shall be used instead of trapping, as described in CDFW guidelines. At least 1 week will be necessary to complete passive relocation and allow owls to acclimate to alternate burrows. o When destruction of occupied burrows is unavoidable during the nonbreeding season (September 1 to January 31), unsuitable burrows shall be enhanced (enlarged or cleared of debris) or new burrows created (by installing artificial burrows) at a ratio of 2:1 on protected lands				

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approved by the CDFW. Newly created burrows shall follow guidelines established by the CDFW (2012). These guidelines also require compensation for loss of foraging habitat.				
ITP MM BIO-1: Before initiating Covered Activities, Permittee shall designate a representative (Designated Representative) responsible for communications with CDFW and overseeing compliance with the ITP. Permittee shall notify CDFW in writing before starting Covered Activities of the Designated Representative's name, business address, and contact information, and shall notify CDFW in writing if a substitute Designated Representative is selected or identified at any time during the term of the ITP.	Prior to the start of construction.	Designated Representative; UC Merced.		
ITP MM BIO-2: Permittee shall submit to CDFW in writing the name, qualifications, business address, and contact information of Designated Biologist(s) and/or Designated Monitor(s) at least 30 days before starting Covered Activities using the Biologist Resume Form (Attachment 5) or another format containing the same information. CDFW may approve Designated Biologist(s) for one or more Covered Species in the ITP. For example, CDFW may approve a Designated Biologist to implement all Conditions of Approval for CTS or approve a Designated Biologist to implement all Conditions of Approval in the ITP. The Designated Biologist(s) may be assisted by approved individuals identified as a Designated Monitor that may not meet the qualifications to be a Designated Biologist to assist in compliance monitoring and/or implementation of specific Conditions of Approval. Designated Monitor(s) and their specific activities shall be approved in advance and in writing by CDFW. Permittee shall ensure that the Designated Biologist(s) and Designated Monitor(s) are knowledgeable and experienced in the biology and natural history of the Covered Species. The Designated Biologist(s) and Designated Monitor(s) shall be responsible for monitoring Covered Activities to help minimize and fully mitigate or avoid the incidental take of individual Covered Species and to minimize disturbance of Covered Species' habitat. Permittee shall obtain CDFW approval of the Designated Biologist(s) and Designated Monitor(s) in writing before starting Covered Activities, and shall also obtain approval in advance in writing if the Designated Biologist(s) or Designated Monitor(s) must be changed.	At least 30 days prior to the start of construction.	Designated Biologist(s) and/or Designated Monitor(s); UC Merced.		

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ITP MM BIO-3: Permittee shall conduct an education program for all persons employed or otherwise working in the Project Area before they perform any work. The program shall consist of a presentation from the Designated Biologist that includes a discussion of the biology and general behavior of the Covered Species; information about the distribution and habitat needs of the Covered Species; sensitivity of the Covered Species to human activities; the status of the Covered Species pursuant to CESA including legal protection; recovery efforts; penalties for violations; and the Project-specific protective measures described in the ITP. Permittee shall provide interpretation for non-English speaking workers, and the same instruction shall be provided for any new workers before they perform work in the Project Area. Permittee shall prepare and distribute wallet-sized cards or a fact sheet handout containing this information for workers to carry in the Project Area. Upon completion of the program, employees shall sign a form stating they attended the program and understand all protection measures. Permittee shall also maintain a continuous public education program to inform the students, residents, and staff of sensitive resource protection needs.	Prior to the start of construction.	All construction personnel; Designated Biologist; UC Merced.		
ITP MM BIO-4: Permittee shall initiate a trash abatement program before starting Covered Activities and shall continue the program for the duration of the Project. Permittee shall ensure that trash and food items are contained in closed (animal-proof) containers and removed regularly (at least once a week) to avoid attracting opportunistic predators such as ravens, coyotes, and feral dogs.	Prior to the start of construction.	UC Merced.		
ITP MM BIO-5: A Work Area is defined as a discrete construction zone and associated access routes, access points, staging/stockpiling areas within the Project Area where Covered Activities will occur. Permittee shall clearly delineate the boundaries of the Work Area with fencing, stakes, or flags where Covered Activities are planned to occur in the immediate future and before starting Covered Activities. Permittee shall restrict all Covered Activities to within the fenced, staked, or flagged areas. Permittee shall maintain all fencing, stakes, and flags in effective condition until the completion of Covered Activities.	Prior to the start of construction.	UC Merced.		
ITP MM BIO-6: Before starting Covered Activities, Permittee shall clearly delineate habitat of the Covered Species within the Project Area with posted signs, posting stakes, flags, and/or rope or cord and place fencing as necessary to minimize the disturbance of Covered Species' habitat. Permittee shall maintain all fencing, stakes, and flags in effective condition until the completion of Covered Activities.	Prior to the start of construction.	UC Merced.		

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ITP MM BIO-7: The Designated Representative shall notify CDFW 14 calendar days before starting Covered Activities and shall document compliance with all pre-Project Conditions of Approval before starting Covered Activities.	14 days prior to the start of construction.	Designated Representative; UC Merced.		
ITP MM BIO-8: The Designated Biologist shall survey the work site no more than 14 days before the Permittee begins Covered Activities within 1.3 miles of known CTS breeding habitat. These surveys shall provide 100 percent visual coverage of potential habitat (including burrow and crevice openings) within the Work Area and a 50-foot buffer zone around the Work Area. If the Designated Biologist finds any life stages of CTS (adults, eggs, or larvae) the Designated Biologist or Designated Representative shall immediately contact CDFW. The Designated Biologist shall relocate any adult CTS that is found in accordance with the CDFW-approved California Tiger Salamander Relocation Plan and coordinate with CDFW if CTS eggs or larvae are found. The Designated Biologist shall hold the appropriate State and federal Scientific Collecting Permits (SCP) for amphibians to be authorized to capture and handle CTS. The Designated Biologist may be assisted by approved biologists that do not have an SCP; these biologists shall be identified as Designated Monitors. Permittee shall provide the survey results to CDFW in a written report before starting Covered Activities.	Within 14 days prior to the start of construction activities.	Designated biologist and/or designated monitor; UC Merced.		
ITP MM BIO-9: The Designated Biologist shall prepare a CTS relocation plan and submit it to CDFW for approval at least 30 days prior to the beginning of Covered Activities occurring within 1.3 miles of known CTS breeding habitat and before conducting surveys per Condition of Approval California Tiger Salamander Surveys. Covered Activities within these areas may not proceed until the California Tiger Salamander Relocation Plan is approved by CDFW. Permittee shall submit any proposed changes to the California Tiger Salamander Relocation Plan to CDFW in writing and CDFW shall approve proposed changes prior to implementation of any activities pursuant to a modified California Tiger Salamander Relocation Plan.	At least 30 days prior to the start of construction.	Designated biologist; UC Merced.		

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ITP MM BIO-10: During surveys per Condition of Approval California Tiger Salamander Surveys, the Designated Biologist(s) shall flag any small mammal burrows and crevices suitable for CTS occupancy within the Work Area and a 50-foot buffer zone around the Work Area if the burrow/crevice is within 0.25 mile of known or potential CTS breeding habitat. Any small mammal burrows or crevices that cannot be fully avoided by 50 feet regardless of whether the burrow/crevice is in the Work Area or solely within the Work Area's 50-foot buffer zone shall be fully excavated by the Designated Biologist(s) before starting Covered Activities. The Designated Biologist(s) shall relocate any live CTS discovered during burrow excavation in accordance with the CDFW-approved California Tiger Salamander Relocation Plan. Designated Monitor(s) are prohibited from capturing and handling CTS unless specifically approved in writing by CDFW and under the direct supervision of the Designated Biologist(s).	During pre-construction surveys.	Designated biologist; UC Merced.		
ITP MM BIO-11: No later than 48 hours after surveying, flagging, and excavating small mammal burrows/crevices in accordance with Conditions of Approval California Tiger Salamander Surveys and Small Mammal Burrow Surveys and Excavation, Permittee shall install CTS exclusion fencing around the Work Area in upland habitat areas within 1.3 miles of potential or known CTS breeding habitat. Permittee shall maintain the California tiger salamander exclusion fencing throughout all construction activities. CTS exclusion fencing shall be installed under the direct supervision of a Designated Biologist. Permittee shall use wildlife exclusion fencing consisting of a fine (less than 0.4 inch) mesh equipped with one-way exits to avoid entrapment of amphibians inside the fence. Hardware cloth is not permitted. Permittee shall bury fencing to a depth of six inches and fencing shall be a minimum of 3.3 feet tall following installation. The fencing shall include the optional barrier lip designed to prevent species such as California tiger salamander from climbing over. The Permittee shall avoid small mammal burrows to the maximum extent possible during installation of the exclusion fencing. Where burrows cannot be avoided, the Designated Biologist shall excavate them by hand before the fence is installed. The Designated Biologist shall relocate any live CTS discovered during these inspections in accordance with the CDFW-approved California Tiger Salamander Relocation Plan. The Permittee may propose an alternative exclusion fence material and/or installation method for specific locations within the Project Area. Any alternative exclusion fence material and/or installation method shall be submitted to CDFW for written approval and shall be approved prior to its use. Permittee and/or Designated Biologist(s) shall inspect the entire length of the CTS exclusion fence and refuge areas (e.g., cover boards) a minimum of once a week during Covered Activities and during	Within 48 hours after pre-construction surveys and prior to the start of construction.	Designated biologist; UC Merced.		

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periods of inactivity. If Covered Species are found within the interior fence, the Designated Biologist(s) shall relocate them in accordance with the CDFW-approved California Tiger Salamander Relocation Plan.				
ITP MM BIO-12: The Designated Biologist shall conduct preconstruction surveys during the raptor nesting season (February 15 through September 15), within 0.5 mile of Covered Activities. Raptor surveys will be conducted no more than 10 days prior to the start of Covered Activities. The Designated Biologist or Designated Representative shall provide the survey results, including negative findings, to CDFW in a written report within 30 days after the start of Covered Activities.	Within 10 days prior to the start of construction during the raptor nesting season (February 15 through September 15)	Designated biologist; Designated Representative; UC Merced.		
ITP MM BIO-16: Permittee shall develop a salvage plan for succulent owls' clover, San Joaquin Valley Orcutt grass, and Colusa grass and submit it to CDFW for approval at least 30 days prior to beginning Covered Activities within 1,000 feet of known vernal pools, swales, or other wetland habitat. Covered Activities within these areas may not proceed until the Salvage Plan is approved by CDFW.	At least 30 days prior to the start of construction.	Designated biologist; UC Merced.		
ITP MM BIO-17: In areas with intact vernal pool, swale, or wetland habitat the Designated Biologist shall conduct botanical surveys prior to the Permittee beginning Covered Activities. The botanical surveys shall be floristic in nature, cover the entire area of direct and indirect effects, and should be timed appropriately to detect all species which may occur within the Project Area. The Designated Biologist or Designated Representative shall provide the survey results to CDFW in a written report within 30 days after the start of Covered Activities within areas with intact vernal pool, swale, or wetland habitat.	Prior to the start of construction.	Designated biologist; Designated Representative; UC Merced.		
ITP MM BIO-18: Temporary fencing that delineates the Project Area as required by Conditions of Approval Delineation of Work Area Boundaries and Delineation of Habitat shall be placed by the Permittee such that it excludes the greatest number of Covered Species possible. Exact fencing locations shall be determined by the Designated Biologist.	Prior to the start of construction.	Designated biologist; UC Merced.		
ITP MM BIO-19: If any of the plant Covered Species are found in the Project Area, the Designated Biologist shall salvage and transplant them in accordance with the CDFW-approved Salvage Plan.	During construction.	Designated biologist; UC Merced.		

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ITP MM BIO-21: To ensure compliance with the Conditions of Approval of the ITP, the Designated Biologist(s) and/or Designated Monitor(s) shall have authority to immediately stop any activity that is not in compliance with the ITP, and/or order any reasonable measure to avoid the unauthorized take of an individual of the Covered Species, or a species not covered by the ITP. Permittee shall provide unfettered access to the Project Area and otherwise facilitate the Designated Biologist(s) and/or Designated Monitor(s) in the performance of their duties. If the Designated Biologist(s) and/or Designated Monitor(s) are unable to comply with the ITP, then the Designated Biologist(s) and/or Designated Monitor(s) shall notify the CDFW Regional Representative (detailed in the Notices section below) immediately. Permittee shall not enter into any agreement or contract of any kind, including but not limited to non-disclosure agreements and confidentiality agreements, with its contractors and/or the Designated Biologist(s)/Designated Monitor(s) that prohibit or impede open communication with CDFW, including but not limited to providing CDFW staff with the results of any surveys, reports, or studies or notifying CDFW of any non-compliance or take. Failure to notify CDFW of any non-compliance or take or injury of a Covered Species as a result of such agreement or contract may result in CDFW taking actions to prevent or remedy a violation of the ITP.	During construction.	Designated biologist; Designated monitor; UC Merced.		
ITP MM BIO-22: Permittee shall provide CDFW staff with reasonable access to the Project Area and mitigation lands under Permittee control, and shall otherwise fully cooperate with CDFW efforts to verify compliance with or effectiveness of mitigation measures set forth in the ITP.	During construction.	UC Merced.		
ITP MM BIO-23: The Designated Biologist(s) and Designated Monitor(s) shall maintain a construction-monitoring notebook on-site throughout the construction period which shall include a copy of the ITP with attachments and a list of signatures of all personnel who have successfully completed the education program. Permittee shall ensure a copy of the construction-monitoring notebook is available for review in the Project Area upon request by CDFW.	During construction.	Designated biologist; Designated monitor; UC Merced.		
ITP MM BIO-24: Permittee shall prohibit firearms and domestic dogs from the Project Area and access routes during construction activities, except those in the possession of authorized security personnel or local, State, or federal law enforcement officials.	During construction.	UC Merced.		
ITP MM BIO-25: Permittee shall develop and establish leash rules and an animal control program.	During construction.	UC Merced.		

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ITP MM BIO-26: Permittee shall prohibit use of erosion control materials potentially harmful to Covered Species and other species, such as mono-filament netting (erosion control matting) or similar material, in potential Covered Species' habitat. This includes photodegradable or biodegradable synthetic netting.	During construction.	UC Merced.		
ITP MM BIO-27: Permittee shall implement dust control measures during Covered Activities to facilitate visibility for monitoring of the Covered Species by the Designated Biologist. Permittee shall keep the amount of water used to the minimum amount needed, and shall not allow water to form puddles that last more than four (4) hours and watering shall not occur if puddles cannot percolate prior to one (1) hour before dusk.	During construction.	UC Merced.		
ITP MM BIO-28: Project-related personnel shall access the Project Area using existing routes and shall not cross Covered Species' habitat outside of or en route to the Project Area. Permittee shall restrict Project-related vehicle traffic to established roads, staging, and parking areas. Permittee shall ensure that vehicle speeds do not exceed 20 miles per hour to avoid Covered Species on or traversing the roads. Permittee shall strictly prohibit off-road traffic outside the designated Project Area. If Permittee determines construction of routes for travel are necessary outside of the Project Area, the Designated Representative shall contact CDFW for written approval before carrying out such an activity. CDFW may require an amendment to the ITP, if among other reasons, if additional take of Covered Species or Covered Species habitat impacts will occur as a result of the Project modification.	During construction.	Designated Representative; UC Merced.		
ITP MM BIO-29: Permittee shall confine all Project-related parking, storage areas, laydown sites, equipment storage, and any other surface-disturbing activities to the Project Area using, to the extent possible, previously disturbed areas. Additionally, Permittee shall not use or cross Covered Species' habitat outside of the marked Project Area.	During construction.	UC Merced.		
ITP MM BIO-30: Permittee shall immediately stop and following pertinent State and federal statutes and regulations arrange for repair and clean up by qualified individuals of any fuel or hazardous waste leaks or spills at the time of occurrence, or as soon as it is safe to do so. Permittee shall exclude the storage and handling of hazardous materials from the Project Area, except in areas that have completed development and have been determined not to be Covered Species habitat by the Designated Biologist, and shall properly contain and dispose of any unused or leftover hazardous products off-site.	During construction.	Designated biologist; UC Merced.		

Mitigation Measure	Monitoring / Mitigation Timing	Reporting / Responsible Party	Verification of Compliance	
			Initials	Date
ITP MM BIO-31: The Designated Representative shall immediately notify CDFW in writing if it determines that the Permittee is not in compliance with any Condition of Approval of the ITP, including but not limited to any actual or anticipated failure to implement measures within the time periods indicated in the ITP and/or the MMRP. The Designated Representative shall report any non-compliance with the ITP to CDFW within 24 hours.	During construction.	Designated Representative; UC Merced.		
ITP MM BIO-32: Initially, the Designated Biologist shall be on-site daily when Covered Activities occur. If Covered Activities occur in more than one Work Area, a Designated Biologist(s) shall be present on site in all Work Areas to conduct compliance inspections. The Designated Biologist shall conduct compliance inspections to (1) minimize incidental take of the Covered Species and to check for compliance with all mitigation and avoidance measures; (2) prevent unlawful take of species; (3) check for compliance with all measures of the ITP; (4) check all exclusion zones; and (5) ensure that signs, stakes, and fencing are intact, and that Covered Activities are only occurring in the Project Area. The Designated Representative or Designated Biologist shall prepare daily written observation and inspection records summarizing oversight activities and compliance inspections, observations of Covered Species and their sign, survey results, and monitoring activities required by the ITP. Eventually, CDFW may approve, in writing, periodic inspections once Covered Activities are on-going and more routine in nature. To reduce compliance inspections, Permittee shall submit a written request to CDFW, including any additional information that CDFW requests to demonstrate that Covered Activities are on-going and more routine in nature.	During construction.	Designated biologist; UC Merced.		
ITP MM BIO-33: The Designated Biologist shall submit all confirmed Covered Species sightings to the California Natural Diversity Database (CNDDB) within 60 calendar days of the observation. The Designated Biologist(s) shall include the following documented information: the date, time, and location of each occurrence using Global Positioning System (GPS) technology, the name of the party that actually identified the plant or animal, circumstances of the incident, the general condition and health of each individual, any diagnostic markings, sex, age (juvenile or adult), actions undertaken, and habitat description.	Within 60 days of covered species observation during pre-construction surveys and construction.	Designated biologist; UC Merced.		

Mitigation Measure	Monitoring / Mitigation Timing	Reporting / Responsible Party	Verification of Compliance	
			Initials	Date
ITP MM BIO-34: The Designated Representative or Designated Biologist shall compile the observation and inspection records identified in Condition of Approval Compliance Monitoring into a Monthly Compliance Report (MCR) and submit it to CDFW along with a copy of the MMRP table with notes showing the current implementation status of each mitigation measure. Permittee shall submit MCRs to CDFW no more than 15 days after the end of the month. MCRs shall be submitted to CDFW's Central Region Office, Regional Representative, and Headquarters CESA Program. At the time of the ITP's approval, the Central Region Office email is R4CESA@wildlife.ca.gov, with a copy to the Regional Representative Ruby Kwan (Ruby.Kwan@wildlife.ca.gov) and Headquarters CESA Program (CESA@wildlife.ca.gov). CDFW may at any time increase the timing and number of compliance inspections and reports required under this provision depending upon the results of previous compliance inspections. If CDFW determines the reporting schedule must be changed, CDFW will notify Permittee in writing of the new reporting schedule.	During construction, within 15 days after the end of the month.	Designated biologist or Designated Representative; UC Merced.		
ITP MM BIO-35: Permittee shall provide CDFW with an Annual Status Report (ASR) no later than January 31 of every year beginning with issuance of the ITP and continuing until CDFW accepts the Final Mitigation Report identified below. Each ASR shall include, at a minimum: (1) a summary of all MCRs, (2) a general description of the status of the Project Area and Covered Activities, including actual or projected completion dates, if known; (3) a copy of the table in the MMRP with notes showing the current implementation status of each mitigation measure; (4) an assessment of the effectiveness of each completed or partially completed mitigation measure in minimizing and mitigating Project impacts; (5) all available information about Project-related take of the Covered Species; (6) survivorship rates of Swainson's hawk replacement trees pursuant to Condition of Approval Tree Replacement; and (7) information about other Project impacts on the Covered Species. Permittee shall submit ASRs to CDFW's Central Region Office, Regional Representative, and Headquarters CESA Program.	During construction, no later than January 31 of every year.	UC Merced.		

Mitigation Measure	Monitoring / Mitigation Timing	Reporting / Responsible Party	Verification of Compliance	
			Initials	Date
ITP MM BIO-36: Permittee shall immediately notify the Designated Biologist if a Covered Species is killed or taken by a Project-related activity, or if a Covered Species is otherwise found dead or injured within the vicinity of the Project. The Designated Biologist or Designated Representative shall provide initial notification to CDFW by calling the Regional Office at (559) 243-4005 and by email to CDFW's Central Region Office (R4CESA@wildlife.ca.gov) and Regional Representative (Ruby.Kwan@wildlife.ca.gov). The initial notification to CDFW shall include information regarding the location, species, number of animals taken or injured, name of the CDFW-approved facility where the animal was taken, and the ITP Number. Following initial notification, Permittee shall send CDFW a written report within two calendar days. The report shall include the date and time of the finding or incident, location of the animal or carcass, and if possible, provide a photograph, explanation as to cause of take or injury, and any other pertinent information.	During construction.	Designated biologist or Designated Representative; UC Merced.		
ITP MM BIO-37: If CTS is found by any person in the Project Area before or during Covered Activities, the Permittee shall immediately stop all work that could potentially harm the CTS until the Designated Biologist can relocate the CTS to an active rodent burrow system in accordance with the CDFW-approved California Tiger Salamander Relocation Plan. Designated Monitor(s) are prohibited from capturing and handling CTS unless specifically approved in writing by CDFW and under the direct supervision of the Designated Biologist(s).	Prior to and during construction.	Designated biologist; UC Merced.		
ITP MM BIO-39: The Permittee and Designated Biologist(s) shall monitor the National Weather Service 72-hour forecast for the Project Area. If a 70 percent or greater chance of rainfall is predicted within 72 hours, Permittee shall cease all Covered Activities in areas within 1.3 miles of potential or known CTS breeding habitat until no further rain is forecast unless the Work Area has been encircled with CTS exclusion fencing that is in effective condition pursuant to Condition of Approval California Tiger Salamander Exclusion Fencing. In addition, if a 70 percent or greater chance of rainfall is predicted within 72 hours, construction-related traffic moving through areas within 1.3 miles of potential or known CTS breeding habitat but outside of the CTS exclusion fencing (e.g., on roads) shall not occur at night or within two hours of sunrise and sunset unless a Designated Biologist leads the traffic by foot; further traffic shall not exceed 10 mph during daylight hours until no further rain is forecast. If Covered Activities must continue when rain is forecast in Work Areas within 1.3 miles from potential or known CTS breeding habitat, a Designated Biologist shall survey the Project construction footprint before construction begins each day that rain is forecast. If a Designated Monitor is used	During construction, within 72 hours prior to the start of activities.	Designated biologist or Designated monitor; UC Merced.		

Mitigation Measure	Monitoring / Mitigation Timing	Reporting / Responsible Party	Verification of Compliance	
			Initials	Date
to conduct surveys, a Designated Biologist must remain on site to capture and relocate any CTS that are discovered during the surveys. If rain exceeds ¼ inch during a 24-hour period, Permittee shall cease work until no further rain is forecast.				
ITP MM BIO-40: Permittee shall strictly prohibit all night work in areas within 1.3 miles of potential or known CTS breeding habitat when a 70 percent or greater chance of rainfall is predicted within 72 hours of Covered Activities until no further rain is forecast. This restriction is not applicable for areas within 1.3 miles of potential or known CTS breeding habitat once they have been encircled with CTS exclusion fencing pursuant to ITP Condition of Approval California Tiger Salamander Exclusion Fencing and is also not applicable to construction-related traffic led by a Designated Biologist by foot in accordance with Condition of Approval Rain Forecast.	During construction, within 72 hours prior to the start of activities.	Designated biologist; UC Merced.		
ITP MM BIO-41: Permittee shall ensure that soil stockpiles are placed where soil will not pass into potential CTS breeding habitat or into any other "Waters of the State". Permittee shall appropriately protect stockpiles to prevent soil erosion.	During construction.	UC Merced.		
ITP MM BIO-42: Permittee shall construct roadways within 1.3 miles of known or potential CTS breeding habitat without steep curbs, berms, or dikes, which could prevent CTS from exiting the roadway. If curbs are necessary for safety and/or surface runoff, Permittee shall design and construct them to allow CTS to walk over them. If steep dikes are required, Permittee shall design and construct them to include over-side drains or curb/dike breaks spaced at intervals of 25 feet to allow CTS passage.	During construction.	UC Merced.		
ITP MM BIO-43: To ensure that disease is not conveyed between work sites all Designated Biologist(s) and Designated Monitor(s) shall follow the fieldwork code of practice developed by the Declining Amphibian Populations Task Force Fieldwork Code of Practice (Attachment 2). The Designated Biologist(s) and Designated Monitor(s) may substitute a bleach solution (0.5 to 1.0 cup of bleach to 1.0 gallon of water) for the ethanol solution. Care shall be taken so that all traces of the disinfectant are removed before entering the next aquatic habitat.	During construction.	Designated biologist and Designated monitor; UC Merced.		
ITP MM BIO-44: The Designated Biologist shall inspect all open holes, sumps, and trenches within the Project Area at the beginning, middle, and end of each day for trapped animals. To prevent inadvertent entrapment of Covered Species or any other animals, the Designated Biologist shall oversee the covering of all excavated, steep-walled holes or trenches more than two feet deep, or of any depth if they contain water or other material, with plywood or other barrier materials at the close of each working day such that animals are unable to enter and become entrapped. Alternatively,	During construction.	Designated biologist; UC Merced.		

Mitigation Measure	Monitoring / Mitigation Timing	Reporting / Responsible Party	Verification of Compliance	
			Initials	Date
Permittee shall provide earthen escape ramps of no more than 3:1 slope every 200 feet. Before holes or trenches are filled, the Designated Biologist shall thoroughly inspect them for trapped animals. If any worker discovers that Covered Species have become trapped, Permittee shall cease all Covered Activities in the vicinity and notify the Designated Biologist immediately. Project workers and the Designated Biologist shall allow the Covered Species to escape unimpeded if possible. If CTS is discovered in a hole or trench, the Designated Biologist shall relocate CTS as described in the CDFW-approved California Tiger Salamander Relocation Plan, before Covered Activities are allowed to continue. If an injured Covered Species is discovered at any time, the Designated Representative shall contact CDFW's Regional Representative within one working day of the incident pursuant to Condition of Approval Notification of Take.				
ITP MM BIO-45: Workers shall inspect for Covered Species under vehicles and equipment before the vehicles and equipment are moved. If a Covered Species is present, the worker shall notify the Designated Biologist and wait for the Covered Species to move unimpeded to a safe location. Alternatively, especially if the animal is inside the fenced Project Area, the Designated Biologist shall move the Covered Species out of harm's way outside of the Project Area and in compliance with the CDFW-approved California Tiger Salamander Relocation Plan if applicable.	During construction, prior to the use of construction vehicles and equipment.	Designated biologist; UC Merced.		
ITP MM BIO-46: Workers shall thoroughly inspect all construction pipe, culverts, or similar structures with a diameter of three inches or greater that are stored for one or more overnight periods for Covered Species before the pipe is subsequently moved, buried, or capped. If during inspection a Covered Species is discovered inside a pipe, workers shall notify the Designated Biologist and allow the Covered Species to safely escape that section of pipe before moving and utilizing the pipe.	During construction.	Designated biologist; UC Merced.		
ITP MM BIO-47: If a nesting Swainson's hawk is found within 0.5 mile of the Project Area during Raptor Surveys, or if a historic/potential nest becomes occupied, or a nesting Swainson's hawk is found at any time during Covered Activities, the Designated Biologist shall be present daily for the entire duration of Covered Activities during the nesting season (February 15 through September 15) to monitor the behavior of any Swainson's hawk nesting within 500 feet to 0.5 mile of Covered Activities. The Designated Biologist shall have the authority to order the cessation of all activities within 0.5 mile of any Swainson's hawk nest if the birds exhibit distress and/or abnormal nesting behavior (swooping/stooping, excessive vocalization (distress calls), agitation, failure to remain on nest, failure to deliver prey items for an extended time period, etc.) which may cause reproductive failure (nest abandonment and loss of eggs and/or young). Permittee shall	During pre-construction surveys and construction during the nesting season (February 15 through September 15).	Designated biologist; UC Merced.		

Mitigation Measure	Monitoring / Mitigation Timing	Reporting / Responsible Party	Verification of Compliance	
			Initials	Date
not resume Covered Activities until CDFW has been consulted by the Designated Biologist, and both the Designated Biologist and CDFW confirm that the bird's behavior has normato co**MitigatITP MM BIO-48:** The Permittee and Designated Biologist shall ensure that no Covered Activities occur within 500 feet of an active Swainson's hawk nest during the nesting season (February 15 through September 15).	During the nesting season (February 15 through September 15).	Designated biologist; UC Merced.		
ITP MM BIO-49: Permittee shall not remove any historic or active Swainson's hawk nest trees during the nesting season (February 15 through September 15). Permittee shall remove a historic or active Swainson's hawk nest tree only between September 16 and February 14 of any year to avoid impacts to nesting Swainson's hawk.	During the nesting season (February 15 through September 15).	UC Merced.		
ITP MM BIO-50: If Covered Activities affecting Swainson's hawk result in the removal of a Swainson's hawk nest tree in the Project Area, Permittee shall plant native species replacement trees at a 4:1 ratio (four trees for each historic and active nest tree removed) on HM lands in close proximity to suitable foraging habitat. Permittee shall prepare a Swainson's Hawk Nest Tree Replacement Plan and submit it to CDFW for review and written approval. The Swainson's Hawk Nest Tree Replacement Plan shall identify replacement tree locations, planting methods, and any site-specific management activities necessary to ensure the performance criteria of this Condition of Approval are achieved. The HM Lands manager shall monitor the tree survival rates and shall report them in the ASR pursuant to the reporting requirements of Condition of Approval Annual Summary Report. Permittee shall ensure that the number of trees required as compensation under the ITP matches the number of healthy and thriving trees at the end of the initial five-years monitoring period.	During construction.	UC Merced.		
ITP MM BIO-51: If a Covered Species is injured as a result of Covered Activities, the Designated Biologist shall immediately take it to a CDFW-approved wildlife rehabilitation or veterinary facility. Permittee shall identify the facility before starting Covered Activities. Permittee shall bear any costs associated with the care or treatment of such injured Covered Species. Permittee shall notify CDFW of the injury to the Covered Species immediately by telephone and e-mail followed by a written incident report. Notification shall include the date, time, location (GPS coordinates) and circumstances of the incident, and the name of the facility where the animal was taken.	During construction.	Designated biologist; UC Merced.		

Mitigation Measure	Monitoring / Mitigation Timing	Reporting / Responsible Party	Verification of Compliance	
			Initials	Date
ITP MM BIO-52: If a plant Covered Species is destroyed or damaged as a result of Project-related activities outside of the identified Project Area, or because avoidance and minimization measures included in the ITP were not followed, the Permittee shall notify CDFW of the incident immediately, including the extent to which damage to the Covered Species occurred via telephone and email, followed by a written incident report submitted to CDFW. Notification shall include the date, time, location (GPS coordinates), and circumstances of the incident.	During construction.	UC Merced.		
ITP MM BIO-53: Permittee shall not collect inoculum from greater than 10 percent of the area of each donor pool. Permittee shall not collect inoculum from vernal pools within the designated inoculum collection area where CESA-listed (threatened, endangered, or rare) or invasive plants occur. Permittee shall provide a written report to CDFW, including maps, documenting the vernal pools used for inoculum collection.	During construction.	UC Merced.		
ITP MM BIO-62: Upon completion of construction Permittee shall remove from the Project Area and properly dispose of all construction refuse, including, but not limited to, broken equipment parts, wrapping material, cords, cables, wire, rope, strapping, twine, buckets, metal or plastic containers, and boxes.	Following completion of construction.	UC Merced.		
ITP MM BIO-63: No later than 45 days after completion of all mitigation measures, Permittee shall provide CDFW with a Final Mitigation Report. The Designated Biologist shall prepare the Final Mitigation Report which shall include, at a minimum: (1) a summary of all MCRs and all ASRs; (2) a copy of the table in the MMRP with notes showing when each of the mitigation measures was implemented; (3) all available information about Project-related take of the Covered Species; (4) information about other Project impacts on the Covered Species; (5) beginning and ending dates of Covered Activities; (6) an assessment of the effectiveness of the ITP's Conditions of Approval in minimizing and fully mitigating Project impacts of the taking on Covered Species; (7) recommendations on how mitigation measures might be changed to more effectively minimize take and mitigate the impacts of future projects on the Covered Species; and (8) any other pertinent information.	Following completion of all mitigation measures.	Designated biologist; UC Merced.		
ITP MM BIO-64: CDFW accepts as complete the Permittee's Final Mitigation Report required by the ITP.	Following completion of all mitigation measures.	UC Merced.		

Mitigation Measure	Monitoring / Mitigation Timing	Reporting / Responsible Party	Verification of Compliance	
			Initials	Date
CULTURAL RESOURCES				
2009 LRDP MM CUL-2: If buried cultural resources, such as chipped or ground stone, historic debris, building foundations, or non-human bone are inadvertently discovered during ground-disturbing activities on the campus, work will stop in that area and within 100 feet of the find until a qualified archaeologist can assess the significance of the find and, if necessary, develop appropriate treatment measures. Treatment measures typically include development of avoidance strategies or mitigation of impacts through data recovery programs such as excavation or detailed documentation. If cultural resources are discovered during construction activities, the construction contractor and lead contractor compliance inspector will verify that work is halted until appropriate treatment measures are implemented in coordination with the UC Merced.	Immediately upon discovery.	Qualified archaeologist; UC Merced.		
2009 LRDP MM CUL-3: If human remains of Native American origin are discovered during ground-disturbing activities, UC Merced shall comply with State laws relating to the disposition of Native American burials, which falls within the jurisdiction of the Native American Heritage Commission (NAHC; PRC Section 5097). If human remains are discovered or recognized in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until: • the coroner of Merced County has been informed and has determined that no investigation of the cause of death is required; and • if the remains are of Native American origin; o the descendants from the deceased Native Americans have made a recommendation to the land owner or the person responsible for the excavation work, for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods as provided in PRC Section 5097.98; or o the NAHC was unable to identify a descendant, or the descendant failed to make a recommendation within 24 hours after being notified by the NAHC.	Immediately upon discovery.	San Joaquin County; NAHC; Native American Representative; County Coroner.		

Mitigation Measure	Monitoring / Mitigation Timing	Reporting / Responsible Party	Verification of Compliance	
			Initials	Date
GEOLOGY AND SOILS				
2009 LRDP MM CUL-4a: Prior to project construction, construction personnel will be informed of the potential for encountering significant paleontological resources. All construction personnel will be informed of the need to stop work in the vicinity of a potential discovery until a qualified paleontologist has been provided the opportunity to assess the significance of the find and implement appropriate measures to protect or scientifically remove the find. Construction personnel will also be informed of the requirements that unauthorized collection resources are prohibited.	Prior to construction; Immediately upon discovery.	Qualified paleontologist; UC Merced.		
HAZARDS AND HAZARDOUS MATERIALS				
PS MM HAZ-1: Fire Protection Plan Prior to the issuance of building permits, UC Merced shall coordinate with the California Office of the State Fire Marshall and the City of Merced Fire Department (MFD) to prepare a Fire Protection Plan and shall provide appropriate training for fire response personnel in the event of emergency incidents requiring fire suppression or rescue activities during construction and operation. The Fire Protection Plan shall include, but is not limited to, the following measures: • Emergency fire kits shall be kept on-site during construction and operation. All construction, operation, and maintenance personnel shall be trained in basic fire prevention techniques. The training shall include, but is not limited to, the proper use and storage of flammable materials, use of fire extinguishers, and best construction practices to prevent wildland fires during construction. • All heavy equipment shall be required to include mechanisms for fire suppression, including spark arresters or turbo-charging (which eliminates sparks in exhaust) and fire extinguishers. • All areas in which work will be completed using spark-producing equipment, including staging areas and areas slated for development, shall be cleared of dried vegetation and/or all other materials that could serve as fire fuel. These areas shall be kept clear of combustible materials during construction in order to maintain a fire break.	Prior to issuance of building permits.	UC Merced.		

Mitigation Measure	Monitoring / Mitigation Timing	Reporting / Responsible Party	Verification of Compliance	
			Initials	Date
• Work crews shall be required to park vehicles away from flammable vegetation such as dry grass and brush. At the end of each workday, heavy equipment shall be required to be parked over mineral soil, asphalt, or concrete, where available, to reduce the risk of fire. • Smoking shall be prohibited at the project site, except within designated areas. Smoking shall be prohibited within 30 feet of any combustible material storage area (including fuels, gases, and solvents). Smoking shall be prohibited in any location during a Red Flag Warning issued by the National Weather Service for the project area. • All applicable MFD requirements shall be followed to ensure accessibility and ground clearance of emergency vehicles (e.g., fire engines). Security gates shall be approved by the MFD and shall include the installation of a key switch and/or padlock.				

Appendix B

Air Quality and Greenhouse Gas Emissions Technical Report

HELIX Environmental Planning

Solar Infrastructure Expansion and BESS Project

Air Quality and Greenhouse Gas Emissions Technical Report

June 2026 | 08456.00006.001

Prepared for:

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ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
µg/m^3	micrograms per cubic meter
AAM	annual arithmetic mean
AAQS	Ambient Air Quality Standards
AASHTO	American Association of State Highway and Transportation Officials
AB	Assembly Bill
AC	alternating current
ACUPCC	American College and University Presidents Climate Commitment
AIA	Air Impact Assessment
APN	Assessor's Parcel Number
APS	alternative planning strategy
BAAQMD	Bay Area Air Quality Management District
BESS	Battery Energy Storage System
BPS	best performance standards
C_2F_6	hexafluoroethane
CAA	Clean Air Act (Federal)
CAAQS	California Ambient Air Quality Standard
CalEEMod	California Emission Estimator Model
CalEPA	California Environmental Protection Agency
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CCAA	California Clean Air Act
CCAP	Climate Change Action Plan
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CFCs	chlorofluorocarbons
CFR	Code of Federal Regulations
CH_4	methane
City	City of Merced
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
County	Merced County
DC	direct current
DPM	diesel particulate matter
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EMCS	energy management control system
EO	Executive Order

ACRONYMS AND ABBREVIATIONS (cont.)

gen-tie	generation intertie
GHG	greenhouse gas
GWP	global warming potential
H_2S	hydrogen sulfide
HFC	hydrofluorocarbons
IPCC	Intergovernmental Panel on Climate Change
kV	kilovolt
LCFS	Low Carbon Fuel Standard
LEED	Leadership in Energy and Environmental Design
LOS	level of service
LRDP	Long Range Development Plan
MFD	City of Merced Fire Department
mg/m^3	milligrams per cubic meter
MMT	million metric tons
MPO	Metropolitan Planning Organizations
MT	metric tons
MW	megawatt
MWh	megawatt-hours
N_20	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NASA	National Aeronautics and Space Administration
NEO	new employee orientations
NHTSA	National Highway Traffic Safety Administration
NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NO_X	nitrogen oxides
NSO	new student orientations
O_3	ozone
OEHHA	Office of Environmental Health Hazard Assessment
Pb	lead
PFC	perfluorocarbons
PG&E	Pacific Gas and Electric
PM	particulate matter
PM_{10}	Coarse PM, 10 microns or less in diameter
$PM_{2.5}$	Fine PM, 2.5 microns or less in diameter

ACRONYMS AND ABBREVIATIONS (cont.)

ppb	parts per billion
ppm	parts per million
project	Solar Infrastructure Expansion and BESS Project
PV	photovoltaic
Regents	Board of Regents of the University of California
ROG	reactive organic gases
RTP	regional transportation plan
SB	Senate Bill
SCS	Sustainable Communities Strategy
SEIR	Subsequent Environmental Impact Report
SF_6	sulfur hexafluoride
SIP	State Implementation Plans
SJVAB	San Joaquin Valley Air Basin
SJVAPCD	San Joaquin Valley Air Pollution Control District
SLCP	short-lived climate pollutants
SO_2	sulfur dioxide
SOC	Single Occupancy Vehicle
SO_X	sulfur oxides
SR	State Route
TAC	toxic air contaminants
TDM	transportation demand management
tpy	tons per year
UC	University of California
UC Merced	University of California, Merced
UCLC	University Community Land Company
UNFCC	United National Framework Convention on Climate Change
USEPA	U.S. Environmental Protection Agency
VMT	Vehicle Miles Traveled
VOC	volatile organic compounds
WPP	Wholesale Power Program

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EXECUTIVE SUMMARY

This report presents an assessment of potential air quality and greenhouse gas (GHG) emissions impacts during construction and operation of the Solar Infrastructure Expansion and Battery Energy Storage System (BESS) Project (project). This report also summarizes the potential air quality and GHG emissions impacts from the project with those analyzed in the environmental impact evaluation in the 2020 University of California (UC) Merced Long Range Development Plan (LRDP) Subsequent Environmental Impact Report (SEIR) and the 2009 LRDP Environmental Impact Statement (EIS)/Environmental Impact Report (EIR).

The project would remove an existing 1-megawatt (MW) ground-mounted solar photovoltaic (PV) facility and construct a new 6-MW PV facility and a new Battery Energy Storage System with a minimum storage capacity of 3 megawatt-hours (MWh). The project would also include access road improvements, utility improvements, and site fencing.

The project would not conflict with applicable air quality plans, and the project would not result in emissions leading to odors adversely affecting a substantial number of people. The project's construction and operational emissions of criteria pollutants and precursors would be below the San Joaquin Valley Air Pollution Control District (SJVAPCD) thresholds of significance. Although construction impacts from the project would not exceed the SJVAPCD thresholds and would not expose sensitive receptors to substantial pollutant concentrations, as part of the development under the 2020 LRDP, project construction emissions impacts would be potentially significant. With implementation of mitigation measures from the 2020 LRDP requiring U.S. Environmental Protection Agency (USEPA) Tier 4 certified diesel-powered construction equipment, and implementation of fugitive dust control measures, the project air quality-related impacts would be less than significant.

The project would result in a net reduction in operational GHG emissions as a result of the electricity generated by the proposed PV facility. The project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs. Project GHG emissions-related impacts would be less than significant.

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1.0 INTRODUCTION

This report presents an assessment of potential air quality and greenhouse gas (GHG) emissions impacts resulting from construction and operation of the proposed Solar Infrastructure Expansion and Battery Energy Storage System (BESS) Project (project). This report has been prepared to support environmental review in accordance with the California Environmental Quality Act (CEQA; California Public Resources Code [PRC] §21000 et seq.); State CEQA Guidelines (California Code of Regulations [CCR], Title 14, §15000 et seq.). In addition, to support tiering from prior CEQA environmental analysis, this report summarizes the potential air quality and GHG emissions impacts and mitigation measures from the 2020 University of California (UC) Merced Long Range Development Plan (LRDP) Subsequent Environmental Impact Report (SEIR), and the 2009 LRDP Environmental Impact Statement (EIS)/Environmental Impact Report (EIR).

1.1 APPLICABLE PRIOR PROGRAM LEVEL ENVIRONMENTAL ANALYSIS

The UC Merced prepared an LRDP in 2009 that addressed the development of the campus to support an enrollment level of 25,000 students by the year 2030 on an 815-acre site. In March 2009, the Board of Regents of the University of California ("Regents") certified a joint Environmental Impact Statement/Environmental Impact Report (State Clearinghouse No. 2008041009) that analyzed and disclosed the significant environmental impacts from the implementation of an LRDP for the UC Merced campus and approved the UC Merced 2009 LRDP as a guide for physical development to accommodate growth projected through 2030 and beyond. Since then, UC Merced has revised its enrollment projections through 2030 down substantially and has also acquired more land for campus development as a result of the transfer of a portion of the adjoining University Community Land Company (UCLC) property to its former partner, the Virginia Smith Trust. Furthermore, UC Merced plans to accommodate the projected enrollment growth on a smaller developed footprint within the larger campus site.

The UC Merced 2020 LRDP is an updated, comprehensive land use plan that guides physical development on the UC Merced campus to accommodate projected campus population and expanded and new program initiatives. The UC Merced 2020 LRDP SEIR (State Clearinghouse No. 2018041010) was prepared in accordance with Section 15168 of the State CEQA Guidelines and Public Resources Code Section 21094 and provides a programmatic analysis of the overall proposed development and campus population projections in the 2020 LRDP.

Following the certification of the 2020 LRDP SEIR in 2020, UC Merced prepared and circulated an updated supplemental program-level transportation impact analysis of campus growth through 2030 under the 2020 LRDP based on current vehicle miles traveled (VMT) metrics consistent with State CEQA Guidelines Section 15064.3, subdivision (b). The program-level VMT analysis was published in the UC Merced Medical Education Building Project Draft EIR in August 2022, and the Final EIR, including the supplemental VMT transportation analysis, was certified by the University on November 17, 2022. The updated LRDP transportation impact analysis in the UC Merced Medical Education Building Project EIR replaces in full the prior level of service (LOS)-based LRDP transportation impact analysis that was included in the 2020 LRDP SEIR.

1.2 PROJECT BACKGROUND AND PURPOSE

UC Merced adopted the use of solar photovoltaic (PV) facilities as part of its plan for campus development. The campus currently has three existing PV facilities and is served by two redundant Pacific Gas and Electric (PG&E) feeders that supply a 12-kilovolt (kV) on-site distribution system. One of the existing solar PV facilities is a 1-MW ground-mounted, single-axis tracking system that began operating in November 2009. However, due to expected panel degradation, this system is currently operating at less than 80 percent performance (UC Merced 2024).

1.3 PROJECT LOCATION

The approximately 86.7-acre project site is located on the UC Merced campus in the City of Merced (City), Merced County (County), California. The project site encompasses portions of Assessor's Parcel Numbers (APNs) 060-010-007, 060-020-047, 170-220-008, and 170-220-025. The project site is located approximately 4.7 miles east of State Route (SR) 59 and 4.3 miles north of SR 140. The proposed project site is located east of the central portion of the UC Merced campus, off of Cottonwood Loop. The project site is bordered by Cottonwood Loop and Le Grand Canal to the north, Le Grand Canal and central campus to the east, and undeveloped land to the south and west. See Figure 1, *Site and Vicinity Map*, and Figure 2, *Aerial Map*.

1.4 PROJECT DESCRIPTION

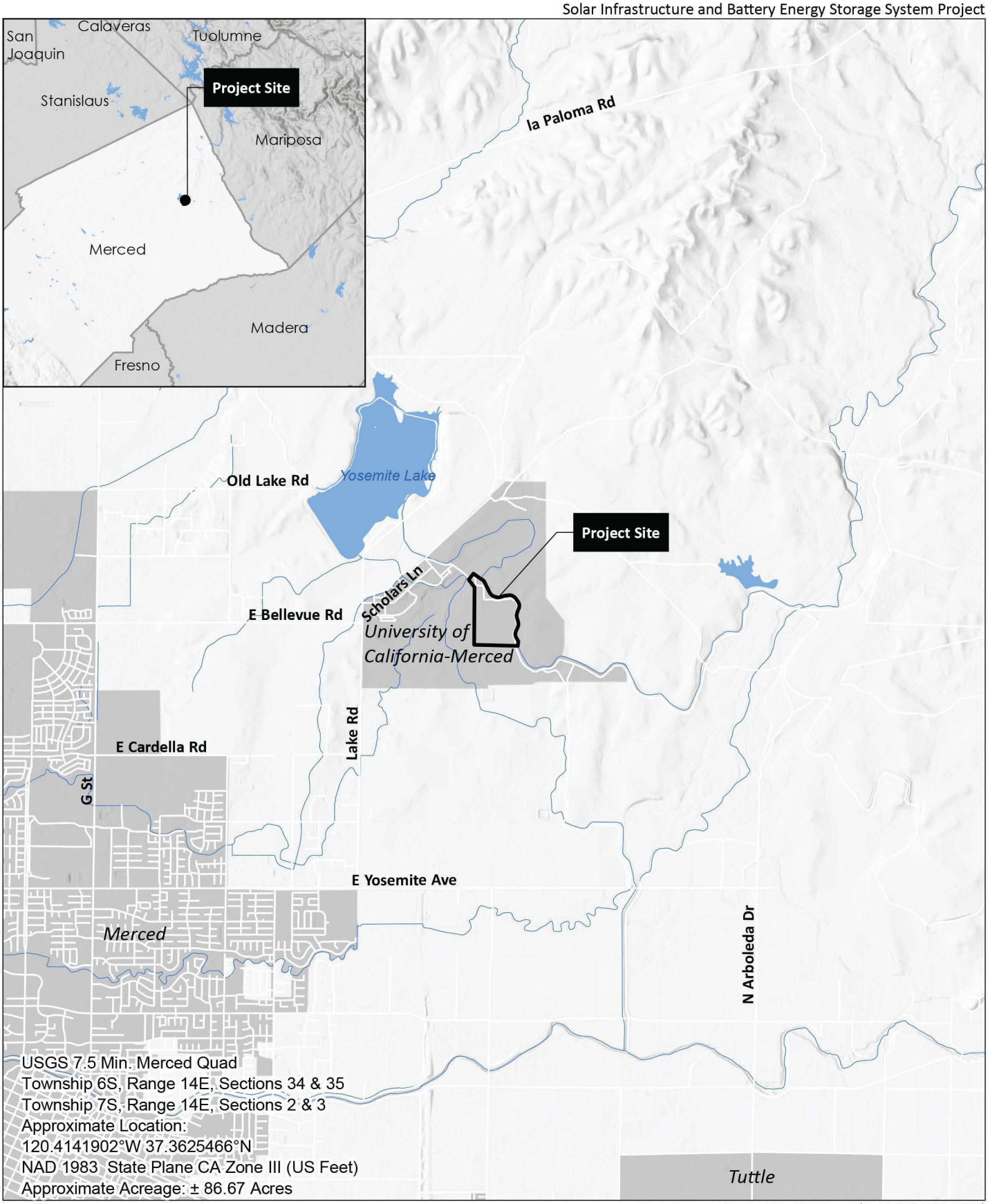
The project would include the demolition of the existing 1-MW ground-mounted PV facility and the construction of an up to 6-MW PV facility and new Battery Energy Storage System with a minimum storage capacity of 3 megawatt-hours (MWh). The project would also include access road improvements, utility improvements, and site fencing. The proposed project components would comprise up to 48.1 acres of the 86.7-acre project site depending on the final project design. See Figure 3, *Conceptual Site Plan*, and Figure 4, *Solar Expansion Area Detail*. Each of the project components are discussed in greater detail below.

1.4.1 Solar Photovoltaic Facility

The project would include the demolition of the existing 1-MW ground-mounted, single-axis tracking PV facility and construction of an up to 6-MW solar PV facility. The proposed PV facility would consist of individual PV modules arranged in rows onto a dual-axis tracking system. Each row (or array) would be connected by low-voltage underground or aboveground electrical wiring to a central inverter station or to string inverters located throughout the facility, where the electricity would be converted from direct current (DC) to alternating current (AC). There is potential for the proposed project to include the integration of dual uses that would allow for seasonal animal grazing on-site, referred to as agrivoltaics. The proposed PV facility components would be located on up to 46.2 acres of the overall 86.7-acre project site.

1.4.2 Battery Energy Storage System

The project would also include construction of a BESS with a minimum storage capacity of 3 MWh, which would store electrical energy generated by the proposed solar PV facility for later use. The BESS would be enclosed in a storage container installed on a concrete pad. It is anticipated that the proposed BESS would deploy lithium-ion, vanadium redox, iron flow, or zinc hybrid batteries. The BESS would



Source: Base Map Layers (Esri, USGS, NGA, NASA)

HELIX Environmental Planning

Site and Vicinity Map

Figure 1



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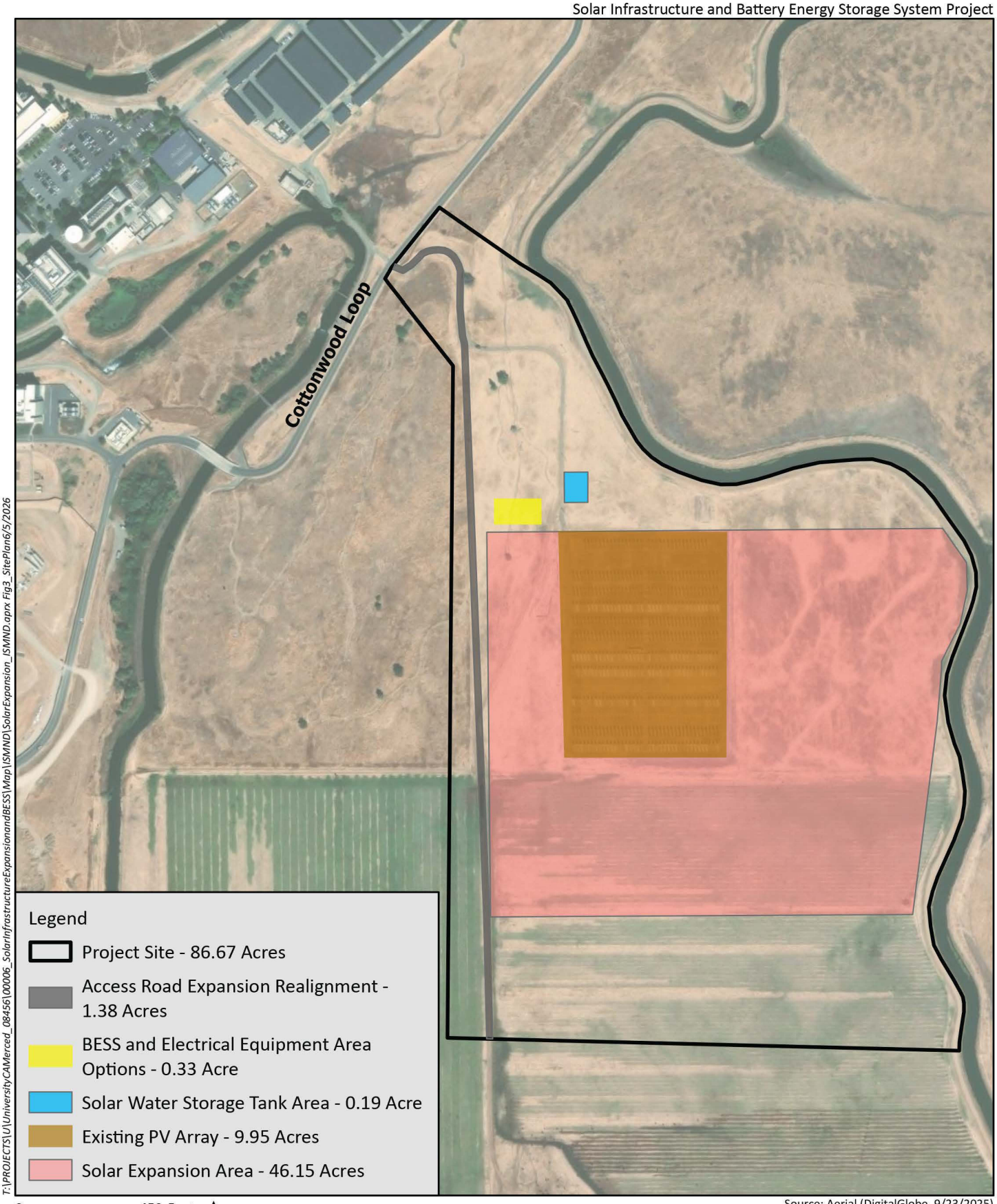
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Source: Aerial (DigitalGlobe, 8/16/2024)

HELIX Environmental Planning

Aerial Map

Figure 2



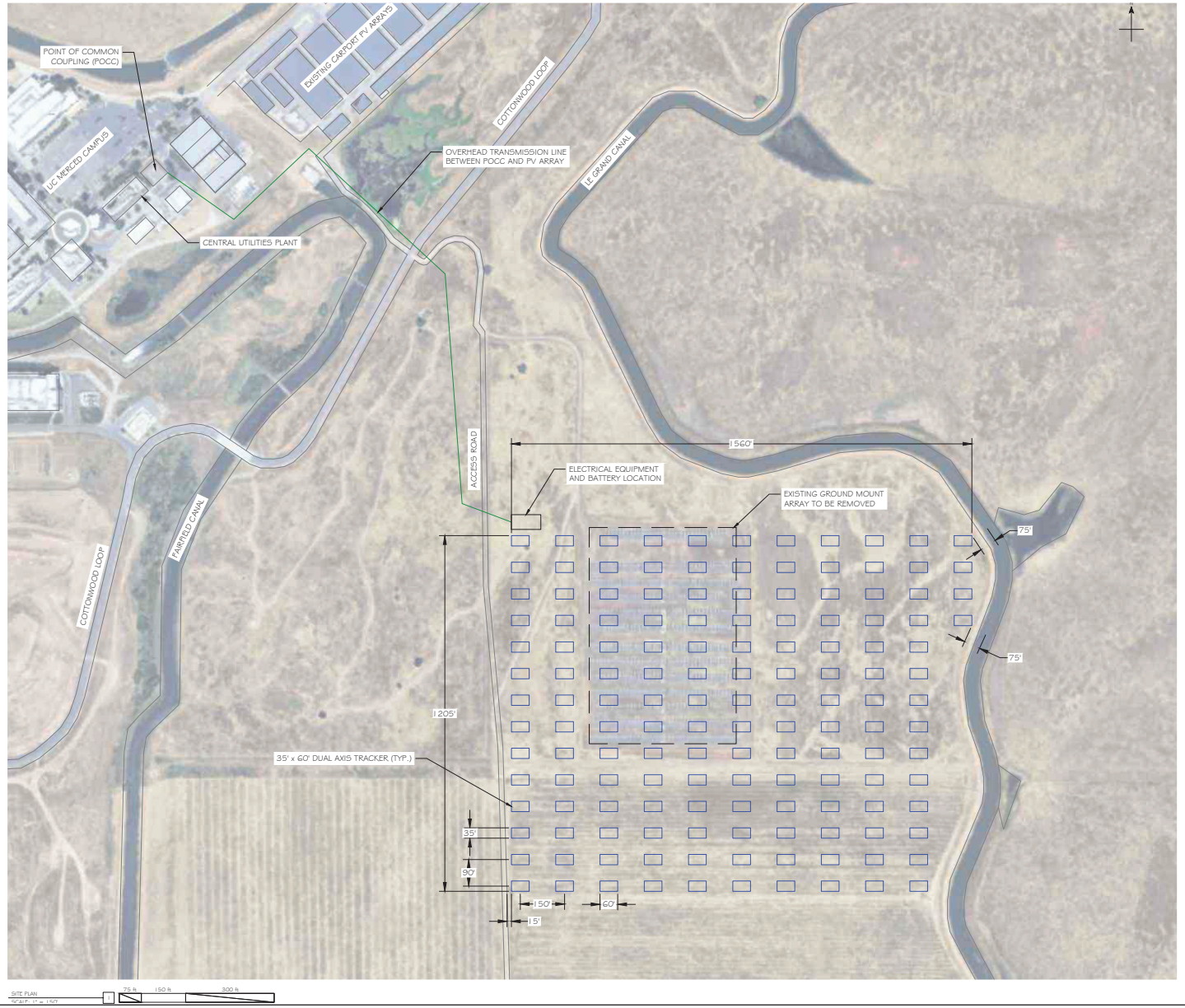
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Source: Aerial (DigitalGlobe, 9/23/2025)

HELIX Environmental Planning

Conceptual Site Plan

Figure 3



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HELIX Environmental Planning

Solar Expansion Area Detail

Figure 4

include fire alarm monitoring for a fire suppression system, and each battery unit would be constantly monitored by a battery management system to ensure safe operations. The battery management system monitors individual cell temperature, voltage, current, charge and discharge parameters, and other metrics to ensure health and safety of the batteries. The battery management system would be designed to address individual or multiple failures as a multi-level safety system and to respond with shutdown of affected cells or power connections and to activate a fire suppression system if necessary. The batteries would be designed to last the lifetime of the project; however, some batteries may be repaired or replaced as part of regular maintenance activities, if needed.

1.4.3 Generation Intertie Line

The proposed BESS would connect to the existing overhead generation intertie (gen-tie) line that currently connects the existing 1-MW solar array facility to the campus's existing Central Utility Plant. No new substation would be constructed.

1.4.4 Utilities

1.4.4.1 Water

The proposed project would include upgrades to the existing fire water storage tank and/or the construction of a new water storage tank on-site to meet water storage requirements for the proposed project. The proposed project would be served by existing water distribution infrastructure.

1.4.4.2 Electricity

A PG&E meter is currently located at each feeder connection point in the campus's existing Central Utility Plant for each of the campus's solar PV systems. The proposed project would interconnect to the existing distribution system and the PG&E utility grid via the existing gen-tie line. The project would require upgrades or modifications to the existing main electrical panels on-site or installation of new panels for operation of the proposed solar PV facility. All major electrical components, including the inverter, isolation transformer, and metering would be contained within the project site, and a system monitoring and data retrieval system would be installed to integrate the project into the campus's energy management control system (EMCS).

1.4.5 Site Access

Access to the project site would be provided by the existing ingress/egress access road off of Cottonwood Loop, which would be improved in accordance with the City of Merced Fire Department (MFD) standards with a minimum width of 22 feet, plus a two-foot-wide shoulder. A portion of the access road within the project site would be reconfigured slightly to accommodate the expanded PV facility; however, the point of access off of Cottonwood Loop would not be altered.

1.4.6 Fencing

The perimeter of the proposed BESS and electrical components would be fenced with six-foot-tall chain-link fencing; however, depending on the final design, fencing may be installed around the perimeter of the site. The proposed fencing may include barbed wire. Following project construction, the undeveloped areas of the fenced portion of the project site would be available for seasonal animal grazing. A locked gate would be located at the entrance to the site to control ingress/egress.

2.0 REGULATORY SETTING

The project site is located within the Merced County portion of the San Joaquin Valley Air Basin (SJVAB). Air quality in the San Joaquin County is regulated by the U.S. Environmental Protection Agency (USEPA) at the federal level, by the California Air Resources Board (CARB) at the State level, and by the San Joaquin Valley Air Pollution Control District (SJVAPCD) at the regional level.

2.1 AIR QUALITY

2.1.1 Air Pollutants of Concern

2.1.2 Criteria Pollutants

Criteria pollutants are defined by state and federal law as a risk to the health and welfare of the general public. In general, criteria air pollutants include the following compounds:

- Ozone (O_3)
- Carbon monoxide (CO)
- Nitrogen dioxide (NO_2)
- Particulate matter (PM), which is further subdivided:
  - Coarse PM, 10 microns or less in diameter (PM_{10})
  - Fine PM, 2.5 microns or less in diameter ($PM_{2.5}$), a subset of PM_{10}.
- Sulfur dioxide (SO_2)
- Lead (Pb)

Criteria pollutants can be emitted directly from sources (primary pollutants; e.g., CO, SO_2, PM_{10}, $PM_{2.5}$, and lead), or they may be formed through chemical and photochemical reactions of precursor pollutants in the atmosphere (secondary pollutants; e.g., ozone, NO_2, PM_{10}, and $PM_{2.5}$). PM_{10} and $PM_{2.5}$ can be both primary and secondary pollutants. The principal precursor pollutants of concern are reactive organic gases ([ROGs] also known as volatile organic compounds [VOCs])[1] and nitrogen oxides (NO_X).

Descriptions of sources and general health effects for each of the criteria air pollutants are shown in **Table 1**, *Summary of Common Sources and Human Health Effects of Criteria Air Pollutants*, based on information provided by CARB and the USEPA (CARB 2026a; USEPA 2026a). Specific adverse health effects on individuals or population groups induced by criteria pollutant emissions are highly dependent on a multitude of interconnected variables such as cumulative concentrations, local meteorology and atmospheric conditions, and the number and characteristics of exposed individuals (e.g., age, gender). Criteria pollutant precursors (ROG and NO_X) affect air quality on a regional scale, typically after significant delay and distance from the pollutant source emissions. Health effects related to ozone and NO_2 are, therefore, the product of emissions generated by numerous sources throughout a region. Emissions of criteria pollutants from vehicles traveling to or from the Project site (mobile emissions) are

[1] CARB defines and uses the term ROGs while the USEPA defines and uses the term VOCs. The compounds included in the lists of ROGs and VOCs and the methods of calculation are slightly different. However, for the purposes of estimating criteria pollutant precursor emissions, the two terms are often used interchangeably.

distributed nonuniformly in location and time throughout the region, wherever the vehicles may travel. As such, specific health effects from these criteria pollutant emissions cannot be meaningfully correlated to the incremental contribution from the Project.

Table 1
SUMMARY OF COMMON SOURCES AND HUMAN HEALTH EFFECTS OF CRITERIA AIR POLLUTANTS

Pollutant	Major Man-Made Sources	Human Health Effects
Carbon Monoxide (CO)	An odorless, colorless gas formed when carbon in fuel is not burned completely; a component of motor vehicle exhaust.	Reduces the ability of blood to deliver oxygen to vital tissues, affecting the cardiovascular and nervous system. Impairs vision, causes dizziness, and can lead to unconsciousness or death.
Nitrogen Dioxide (NO_2)	A reddish-brown gas formed during fuel combustion for motor vehicles and industrial sources. Sources include motor vehicles, electric utilities, and other sources that burn fuel.	Respiratory irritant; aggravates lung and heart problems. Precursor to ozone and acid rain. Contributes to climate change and nutrient overloading, which deteriorates water quality. Causes brown discoloration of the atmosphere.
Ozone (O_3)	Formed by a chemical reaction between reactive organic gases (ROGs) and nitrogen oxides (NO_X) in the presence of sunlight. Common sources of these precursor pollutants include motor vehicle exhaust, industrial emissions, gasoline storage and transport, solvents, paints, and landfills.	Irritates and causes inflammation of the mucous membranes and lung airways; causes wheezing, coughing, and pain when inhaling deeply; decreases lung capacity; aggravates lung and heart problems. Damages plants; reduces crop yield. Damages rubber, some textiles, and dyes.
Particulate Matter (PM_{10} and $PM_{2.5}$)	Produced by power plants, steel mills, chemical plants, unpaved roads and parking lots, wood-burning stoves and fireplaces, automobiles, and other sources.	Increased respiratory symptoms, such as irritation of the airways, coughing, or difficulty breathing; aggravated asthma; development of chronic bronchitis; irregular heartbeat; nonfatal heart attacks; and premature death in people with heart or lung disease. Impairs visibility (haze).
Sulfur Dioxide (SO_2)	A colorless, non-flammable gas formed when fuel containing sulfur is burned, when gasoline is extracted from oil, or when metal is extracted from ore. Examples are petroleum refineries, cement manufacturing, metal processing facilities, locomotives, and ships.	Respiratory irritant. Aggravates lung and heart problems. In the presence of moisture and oxygen, sulfur dioxide converts to sulfuric acid, which can damage marble, iron, and steel. Damages crops and natural vegetation. Impairs visibility. Precursor to acid rain.
Lead	Metallic element emitted from metal refineries, smelters, battery manufacturers, iron and steel producers, use of leaded fuels by racing and aircraft industries.	Anemia, high blood pressure, brain and kidney damage, neurological disorders, cancer, lowered IQ. Affects animals, plants, and aquatic ecosystems.

Source: CARB 2026a; USEPA 2026a

2.1.2.1 Toxic Air Contaminants

The Health and Safety Code (Section 39655, subd. [a]) defines a toxic air contaminant (TAC) as "an air pollutant which may cause or contribute to an increase in mortality or in serious illness, or which may pose a present or potential hazard to human health." A substance that is listed as a hazardous air pollutant pursuant to subsection (b) of Section 112 of the Federal Clean Air Act (CAA) (42 United States Code Section 7412[b]) is a TAC. Under State law, the California Environmental Protection Agency (CalEPA), acting through CARB, is authorized to identify a substance as a TAC if it determines the substance is an air pollutant that may cause or contribute to an increase in mortality or an increase in serious illness, or that may pose a present or potential hazard to human health.

Diesel Particulate Matter

Diesel engines emit a complex mixture of air pollutants, including both gaseous and solid material. The solid material in diesel exhaust is referred to as diesel particulate matter (DPM). Almost all DPM is 10 microns or less in diameter, and 90 percent of DPM is less than 2.5 microns in diameter (CARB 2026b). Because of their extremely small size, these particles can be inhaled and eventually trapped in the bronchial and alveolar regions of the lung. In 1998, CARB identified DPM as a TAC based on published evidence of a relationship between diesel exhaust exposure and lung cancer and other adverse health effects. DPM has a notable effect on California's population—it is estimated that about 70 percent of total known cancer risk related to air toxics in California is attributable to DPM (CARB 2026b).

2.1.3 Federal Air Quality Regulations

2.1.3.1 Federal Clean Air Act

Air quality is defined by ambient air concentrations of specific pollutants identified by the USEPA to be of concern with respect to health and welfare of the public. The USEPA is responsible for enforcing the CAA of 1970 and its 1977 and 1990 Amendments. The CAA required the USEPA to establish National Ambient Air Quality Standards (NAAQS), which identify concentrations of pollutants in the ambient air below which no adverse effects on the public health and welfare are anticipated. In response, the USEPA established both primary and secondary standards for several criteria pollutants. On February 7, 2024, the USEPA announced a final rule to lower the annual arithmetic mean (AAM) primary NAAQS for $PM_{2.5}$ from 12 micrograms per cubic meter ($\mu g/m^3$) to 9 $\mu g/m^3$. The new final rule retains the existing 24-hour primary NAAQS for $PM_{2.5}$ of 35 $\mu g/m^3$ and the existing AAM secondary NAAQS for $PM_{2.5}$ of 15 $\mu g/m^3$ (USEPA 2026b). Table 2, *Ambient Air Quality Standards*, shows the federal and State ambient air quality standards for these pollutants.

Table 2
AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	California Standards	Federal Standards Primary[1,2]	Federal Standards Secondary[3]
O_3	1 Hour	0.09 ppm (180 µg/m^3)	–	–
	8 Hour	0.070 ppm (137 µg/m^3)	0.070 ppm (137 µg/m^3)	Same as Primary
PM_{10}	24 Hour	50 µg/m^3	150 µg/m^3	Same as Primary
	AAM	20 µg/m^3	–	Same as Primary
$PM_{2.5}$	24 Hour	–	35 µg/m^3	Same as Primary
	AAM	12 µg/m^3	9 µg/m^3	15 µg/m^3
CO	1 Hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	–
	8 Hour	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	–
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)	–	–
NO_2	1 Hour	0.18 ppm (339 µg/m^3)	0.100 ppm (188 µg/m^3)	–
	AAM	0.030 ppm (57 µg/m^3)	0.053 ppm (100 µg/m^3)	Same as Primary
SO_2	1 Hour	0.25 ppm (655 µg/m^3)	0.075 ppm (196 µg/m^3)	–
	3 Hour	–	–	0.5 ppm (1,300 µg/m^3)
	24 Hour	0.04 ppm (105 µg/m^3)	–	–
Lead	30-day Avg.	1.5 µg/m^3	–	–
	Calendar Quarter	–	1.5 µg/m^3	Same as Primary
	Rolling 3-month Avg.	–	0.15 µg/m^3	Same as Primary
Visibility Reducing Particles	8 Hour	Extinction coefficient of 0.23 per km – visibility ≥ 10 miles (0.07 per km – ≥30 miles for Lake Tahoe)	No Federal Standards	No Federal Standards
Sulfates	24 Hour	25 µg/m^3	No Federal Standards	No Federal Standards
Hydrogen Sulfide (H_2S)	1 Hour	0.03 ppm (42 µg/m^3)	No Federal Standards	No Federal Standards
Vinyl Chloride	24 Hour	0.01 ppm (26 µg/m^3)	No Federal Standards	No Federal Standards

Source: CARB 2016, USEPA 2026b

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

[3] The AAM primary NAAQS for $PM_{2.5}$ was reduced from 12 µg/m^3 to 9 µg/m^3 by a USEPA final rule issued on February 7, 2024.

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

O_3 = ozone; ppm: parts per million; µg/m^3 = micrograms per cubic meter; PM_{10} = particulate matter with an aerodynamic diameter of 10 microns or less; AAM = Annual Arithmetic Mean; $PM_{2.5}$ = fine particulate matter; CO = carbon monoxide; mg/m^3 = milligrams per cubic meter; NO_2 = nitrogen dioxide; SO_2 = sulfur dioxide; km = kilometer; – = No Standard

The USEPA has classified air basins (or portions thereof) as being in "attainment," "nonattainment," "maintenance," or "unclassified" for each criteria air pollutant, based on whether the NAAQS have been achieved. Upon attainment of a standard for which an area was previously designated nonattainment, the area will be classified as a maintenance area. If an area is designated unclassified, it is because inadequate air quality data were available as a basis for nonattainment or attainment designation. The

project site is located within the SJVAB and, as such, is in an area designated as "nonattainment" for certain pollutants that are regulated under the CAA. Table 3, *San Joaquin Valley Air Basin – Attainment Status,* lists the federal and State attainment status of the SJVAB (including Merced County and the project site) for the NAAQS and the California Ambient Air Quality Standards (CAAQS). As shown in Table 3, the SJVAB is designated as attainment for PM_{10}; attainment/unclassified for CO, NO_2, SO_2; no designation/classification for lead; and in nonattainment for 8-hour ozone and $PM_{2.5}$ with respect to NAAQS. The SJVAB is designated as nonattainment for 1-hour and 8-hour ozone, $PM_{2.5}$, and PM_{10} with respect to CAAQS (SJVAPCD 2026).

Table 3
SAN JOAQUIN VALLEY AIR BASIN – ATTAINMENT STATUS

Pollutant	Federal Standards	State Standards
Ozone – One hour	No Federal Standard	Nonattainment/Severe
Ozone – Eight hour	Nonattainment/Extreme	Nonattainment
PM_{10}	Attainment	Nonattainment
$PM_{2.5}$	Nonattainment	Nonattainment
Carbon Monoxide	Attainment/Unclassified	Attainment/Unclassified
Nitrogen Dioxide	Attainment/Unclassified	Attainment
Sulfur Dioxide	Attainment/Unclassified	Attainment
Lead (Particulate)	No Designation/Unclassified	Attainment
Hydrogen Sulfide	No Federal Standard	Unclassified
Sulfates	No Federal Standard	Attainment
Visibility Reducing Particles	No Federal Standard	Unclassified
Vinyl Chloride	No Federal Standard	Attainment

Source: SJVAPCD 2026

2.1.4 California Air Quality Regulations

2.1.4.1 California Clean Air Act

The federal CAA allows states to adopt ambient air quality standards and other regulations if they are at least as stringent as federal standards. CARB, a part of the CalEPA, is responsible for the coordination and administration of both federal and State air pollution control programs within California, including setting the CAAQS. CARB also conducts research, compiles emission inventories, develops suggested control measures, and provides oversight of local programs. CARB establishes emissions standards for motor vehicles sold in California, consumer products (such as hairspray, aerosol paints, and barbecue lighter fluid), and various types of commercial equipment. It also sets fuel specifications to further reduce vehicular emissions.

In addition to primary and secondary Ambient Air Quality Standards (AAQS), the State has established a set of episode criteria for ozone, CO, NO_2, SO_2, and PM. These criteria refer to episode levels representing periods of short-term exposure to air pollutants that actually threaten public health. As shown in Table 3, the SJVAB is designated as nonattainment for 1-hour and 8-hour ozone, $PM_{2.5}$, and PM_{10} with respect to CAAQS (SJVAPCD 2026).

2.1.4.2 State Implementation Plan

The CAA requires areas with unhealthy levels of ozone, inhalable particulate matter, carbon monoxide, nitrogen dioxide, and sulfur dioxide to develop plans, known as State Implementation Plans (SIPs). SIPs

are comprehensive plans that describe how an area will attain the NAAQS. The 1990 amendments to the CAA set deadlines for attainment based on the severity of an area's air pollution problem.

SIPs are not single documents—they are a compilation of new and previously submitted plans, programs (e.g., monitoring, modeling, permitting), district rules, state regulations and federal controls. Many of California's SIPs rely on a core set of control strategies, including emission standards for cars and heavy trucks, fuel regulations and limits on emissions from consumer products. State law makes CARB the lead agency for all purposes related to the SIP. Local air districts and other agencies prepare SIP elements and submit them to CARB for review and approval. CARB forwards the SIP revisions to the USEPA for approval and publication in the Federal Register. The Code of Federal Regulations (CFR) Title 40, Chapter I, Part 52, Subpart F, Section 52.220 lists all of the items that are included in the California SIP. At any one time, several California submittals are pending USEPA approval (CARB 2009).

2.1.4.3 California Energy Code

California Code of Regulations (CCR) Title 24 Part 6, California's Energy Efficiency Standards for Residential and Nonresidential Buildings, were first established in 1978 in response to a legislative mandate to reduce California's energy consumption. Energy-efficient buildings require less electricity, natural gas, and other fuels. Electricity production from fossil fuels and on-site fuel combustion (typically for space and water heating) results primarily in GHG emissions. The California Energy Code is discussed in further detail in Section 4.2.4 of this report.

2.1.5 Regional Regulations

2.1.5.1 San Joaquin Valley Air Pollution Control District

The SJVAPCD has jurisdiction over most air quality matters within the SJVAB, which includes San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, and Tulare Counties and the valley portion of Kern County. The SJVAPCD regulates most air pollutant sources in the air basin, maintains ambient air quality monitoring stations at numerous locations throughout the air basin, and prepares the air quality management/attainment plans for the SJVAB that are required under the CAA and the California Clean Air Act (CCAA).

Air Quality Plans

The SJVAPCD has developed plans to attain State and federal standards for ozone and particulate matter. The SJVAPCD's air quality plans include emissions inventories to measure the sources of air pollutants, to evaluate how well different control methods have worked, and to show how air pollution will be reduced. The plans also use computer modeling to estimate future levels of pollution and make sure that the San Joaquin Valley will meet air quality goals.

1-Hour Ozone Plan – Although the USEPA revoked its 1979 1-hour ozone standard in June 2005, many planning requirements remain in place, and the SJVAB must still attain this standard before it can rescind CAA Section 185 fees. The SJVAPCD's *2013 Plan for the Revoked 1-hour Ozone Standard* demonstrated attainment of the 1-hour ozone standard by 2017 (SJVAPCD 2015). On July 18, 2016, the USEPA published in the Federal Register the final action to determine that the SJVAB has attained the 1-hour ozone standard. On June 15, 2023, the SJVAPCD adopted the *2023 Maintenance Plan and Redesignation Request for the Revoked 1-hour Ozone Standard* that includes provisions for a

maintenance plan and requirements for meeting all five criteria of Section 107(d)(3)(E) of the CAA (SJVAPCD 2023).

8-Hour Ozone Plan – The SJVAPCD's *2007 Ozone Plan* demonstrates attainment of the 1997 NAAQS 8-hour ozone standard by 2023. The USEPA approved the 2007 Ozone Plan effective April 30, 2012. (SJVAPCD 2015). In June 2016, the SJVAPCD adopted the *2016 Plan for the 2008 8-Hour Ozone Standard* to map strategies for attainment of the updated NAAQS 8-hour ozone standard (SJVAPCD 2016a). The SJVAPCD adopted the *2022 Plan for the 2015 8-Hour Ozone Standard* in December 2022. This Plan satisfies Clean Air Act requirements and ensures expeditious attainment of the 70 parts per billion 8-hour ozone standard (SJVAPCD 2022). On April 24, 2024, the SJVAPCD adopted the *Ozone Contingency State Implementation Plan Revision for the 2008 and 2015 8-Hour Ozone Standards* to address the contingency provisions for the 2008 and 2015 8-hour ozone standards (SJVAPCD 2024a).

PM_{10} Plan – Based on PM_{10} measurements from 2003-2006, USEPA found that the SJVAB has reached federal PM_{10} standards. On September 21, 2007, the SJVAPCD adopted the *2007 PM_{10} Maintenance Plan and Request for Redesignation*. On September 25, 2008, the SJVAB was redesignated to attainment/maintenance (SJVAPCD 2015).

$PM_{2.5}$ Plan – The SJVAPCD's *2008 $PM_{2.5}$ Plan* demonstrated 2014 attainment of USEPA's first $PM_{2.5}$ standard, set in 1997. The USEPA lowered the $PM_{2.5}$ standard in 2006, and the SJVAPCD's *2012 $PM_{2.5}$ Plan* showed attainment of this standard by 2019, with the majority of the SJVAB seeing attainment much sooner (SJVAPCD 2015). The SJVAPCD adopted the *2016 Moderate Area Plan for the 2012 $PM_{2.5}$ Standard* on September 15, 2016. This plan addresses the updated NAAQS 2012 annual $PM_{2.5}$ standard and includes an attainment impracticability demonstration and request for reclassification of the SJVAB from moderate nonattainment to serious nonattainment (SJVAPCD 2016b). These plans came together when the SJVAPCD adopted the *2018 Plan for the 1997, 2006, and 2012 $PM_{2.5}$ Standards* on November 15, 2018. This plan addresses the federal standards for each of those years (SJVAPCD 2018).

The SJVAPCD adopted the *2024 Plan for the 2012 Annual $PM_{2.5}$ Standard* on June 20, 2024, to fulfill the remaining CAA requirements, including the final modeling analysis, attainment strategy and emission reduction commitments, reasonable further progress/quantitative milestones, and contingency measures. This Plan demonstrates expeditious attainment of the 2012 $PM_{2.5}$ standard by 2030 (SJVAPCD 2024b).

SJVAPCD Rules and Regulations

SJVAPCD's primary means of implementing its attainment plans is through its adopted rules and regulations. The project would be subject to the following rules adopted by the SJVAPCD that are designed to reduce and control pollutant emissions throughout the SJVAB.

Regulation VIII (Fugitive PM_{10} Prohibitions) – This regulation implements Rules 8011, 8021, 8031, 8041, 8051, 8061, 8071, and 8081.

- **Rule 3135 (Dust Control Plan Fee)** – This rule recovers District costs for reviewing Dust Control Plan and conducting site inspections. Should a Dust Control Plan be deemed necessary to minimize air quality impacts, the campus could be subject to this rule.

- **Rule 3180 (Administrative Fees for Indirect Source Review)** – This rule applies to development projects subject to Rule 9510 regarding Indirect Source review. When the developer submits an

Air Impact Assessment, in accordance with Rule 9510, an application fee, and potentially an evaluation fee, must be paid to recover District's costs for administering Rule 9510.

- **Rule 4102 (Nuisance)** – This rule applies to any source operation that emits or may emit air contaminants or other materials. In the event that the project or construction of the project creates a public nuisance, it could be in violation and subject to district enforcement action.

- **Rule 4601 (Architectural Coatings)** – This rule limits VOCs from architectural coatings by specifying architectural coatings storage, cleanup, and labeling requirements and applies to any person who supplies, sells, offers for sale, applies, or solicits the application of any architectural coating.

- **Rule 4641 (Cutback, Slow Cure, and Emulsified Asphalt, Paving, and Maintenance Operations)** – Asphalt paving operations are subject to Rule 4641. This rule applies to the manufacture and use of rapid and medium cure cutback asphalt, slow cure asphalt, and emulsified asphalt for paving and maintenance operations. The user or manufacturer of cutback, slow cure, and emulsified asphalt must comply with the recordkeeping requirements specified in Rule 4641.

- **Rule 4702 (Internal Combustion Engines – Phase 2)** – This rule limits the emissions of NO_X, CO, and VOCs emitted from internal combustion engines. The rule is applicable to any internal combustion engine with a rated brake horsepower greater than 50 horsepower. Emission standards for the three pollutants are specified for each category of engine along with compliance dates for each standard. The source must also comply with the monitoring methods and other requirements specified in the rule.

- **Rule 8021 (Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities)** – This rule limits fugitive dust emissions from construction, demolition, excavation, extraction, and other earthmoving activities.

- **Rule 8031 (Bulk Materials)** – This rule details steps to be followed when handling bulk materials, such as utilizing wind barriers, applying water or stabilizers to limit Visible Dust Emissions, and covering materials when storing. This rule is intended to limit fugitive dust emissions from the outdoor handling, storage, and transport of bulk materials.

- **Rule 8041 (Carryout and Trackout)** – This rule applies to sites where carryout and trackout will occur. Earthmoving activities, moving bulk materials, and unpaved roads/and traffic areas subjects the project to this rule, which limits vehicle trips and mandates cleanup of carryout and a Dust Control Plan.

- **Rule 8051 (Open Areas)** – This rule applies to any open area having 0.5 acres or more in urban areas or 3.0 or more acres in rural areas, and therefore applies to campus development under the 2020 LRDP. To limit fugitive dust emissions, the rule mandates at least one of the following: the application of water or dust suppressants, the establishment of vegetation on disturbed areas, and/or the paving, graveling, or application of stabilizers to unvegetated areas.

- **Rule 8061 (Paved and Unpaved Roads)** – This rule limits fugitive dust in relation to roads, requiring compliance with the American Association of State Highway and Transportation Officials (AASHTO) guidelines.

- **Rule 8071 (Unpaved Vehicle/Equipment Traffic Areas)** – In order to limit fugitive dust emissions from unpaved areas, this rule requires compliance with Regulation VIII to limit VDE. The rule also mandates restricted access on disturbed surfaces and reducing such surfaces through vegetative materials, watering, graveling, paving, etc.

- **Rule 9510 (Indirect Source Review)** – This rule fulfills SJVAPCD's emission reduction commitments in the PM_{10} and O_3 attainment plans. Applicants developing property over the limits specified in the rule (e.g., 50 or more residential units) or nonresidential projects emitting more than 2 tons per year (tpy) of operational NO_X or PM_{10} are subject to this rule and must file an Air Impact Assessment (AIA) application prior to applying for final discretionary approval from a lead agency (e.g., tentative tract map).

- The purpose of Rule 9510 is to reduce NO_X and PM_{10} emissions from new development projects. The rule applies to projects that, upon full buildout, will include any one of the following:

    - 50 residential units
    - 2,000 square feet of commercial space
    - 25,000 square feet of light industrial space
    - 20,000 square feet of medical or recreational space
    - 39,000 square feet of general office space
    - 100,000 square feet of heavy industrial space
    - 9,000 square feet of educational space
    - 10,000 square feet of government space
    - 9,000 square feet of any land use not identified above

2.2 GREENHOUSE GASES

2.2.1 Climate Change Overview

Global climate change refers to changes in average climatic conditions on Earth including temperature, wind patterns, precipitation, and storms. Global temperatures are moderated by atmospheric gases. These gases are commonly referred to as GHGs because they function like a greenhouse by letting sunlight in but preventing heat from escaping, thus warming the Earth's atmosphere.

GHGs are emitted by natural processes and human (anthropogenic) activities. Anthropogenic GHG emissions are primarily associated with: (1) the burning of fossil fuels during motorized transport, electricity generation, natural gas consumption, industrial activity, manufacturing, and other activities; (2) deforestation; (3) agricultural activity; and (4) solid waste decomposition.

The temperature record shows a decades-long trend of warming, with Earth's average surface temperature in 2024 confirmed as the warmest on record. Per scientists at the National Aeronautics and Space Administration's (NASA's) Goddard Institute for Space Studies, global temperatures in 2025 were around 2.1 degrees Fahrenheit (°F) higher than the 1951-1980 average and 0.2°F cooler than 2024 (NASA 2026).

The GHGs defined under California's Assembly Bill (AB) 32, described below, include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Each GHG differs in its ability to absorb heat in the atmosphere based on the

lifetime, or persistence, of the gas molecule in the atmosphere. Estimates of GHG emissions are commonly presented in carbon dioxide equivalents (CO_2e), which weigh each gas by its global warming potential (GWP). Expressing GHG emissions in CO_2e takes the contribution of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent to the effect that would occur if only CO_2 were being emitted. GHG emissions quantities in this analysis are presented in metric tons (MT) of CO_2e. For consistency with United Nations Standards, modeling, and reporting of GHGs in California and the U.S. use the GWPs defined in the Intergovernmental Panel on Climate Change's (IPCC) Fourth Assessment Report (IPCC 2007): CO_2 – 1; CH_4 – 25; N_2O – 298.

2.2.2 Types of Greenhouse Gases

Carbon Dioxide. CO_2 is the most important and common anthropogenic GHG. CO_2 is an odorless, colorless GHG. Natural sources include the decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungi; evaporation from oceans; and volcanic outgassing. Anthropogenic sources of CO_2 include burning fuels, such as coal, oil, natural gas, and wood. Data from ice cores indicate that CO_2 concentrations remained steady prior to the current period for approximately 10,000 years. The atmospheric CO_2 concentration in 2010 was 390 ppm, 39 percent above concentration at the start of the Industrial Revolution (about 280 ppm in 1750). As of December 2024, the CO_2 concentration exceeded 425.40 ppm, a 52 percent increase since 1750 (National Oceanic and Atmospheric Administration [NOAA] 2026).

Methane. CH_4 is the main component of natural gas used in homes. A natural source of methane is from the decay of organic matter. Geological deposits known as natural gas fields contain methane, which is extracted for fuel. Other sources are from decay of organic material in landfills, fermentation of manure, and cattle digestion.

Nitrous Oxide. N_2O is produced by both natural and human-related sources. N_2O is emitted during agricultural and industrial activities, as well as during the combustion of fossil fuels and solid waste. Primary human-related sources of N_2O are agricultural soil management, animal manure management, sewage treatment, mobile and stationary combustion of fossil fuel, adipic (fatty) acid production, and nitric acid production.

Hydrofluorocarbons. Fluorocarbons are gases formed synthetically by replacing all hydrogen atoms in methane or ethane with chlorine and/or fluorine atoms. Chlorofluorocarbons (CFCs) are nontoxic, nonflammable, insoluble, and chemically nonreactive in the troposphere (the level of air at Earth's surface). CFCs were first synthesized in 1928 for use as refrigerants, aerosol propellants, and cleaning solvents. They destroy stratospheric ozone; therefore, their production was stopped as required by the 1989 Montreal Protocol.

Sulfur Hexafluoride. SF_6 is an inorganic, odorless, colorless, nontoxic, nonflammable gas. SF_6 is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semi-conductor manufacturing, and as a tracer gas for leak detection.

GHGs have long atmospheric lifetimes that range from one year to several thousand years. Long atmospheric lifetimes allow for GHG emissions to disperse around the globe. Because GHG emissions vary widely in the power of their climatic effects, climate scientists have established a unit called global warming potential (GWP). The GWP of gas is a measure of both potency and lifespan in the atmosphere as compared to CO_2. For example, a gas with a GWP of 10 is 10 times more potent than CO_2 over 100

years. CO_2e is a quantity that enables all GHG emissions to be considered as a group despite their varying GWP. The GWP of each GHG is multiplied by the prevalence of that gas to produce CO_2e.

Historically, GHG emission inventories have been calculated using the GWPs from the IPCC's Second Assessment Report (AR2). In 2007, IPCC updated the GWP values based on the latest science at the time in its Fourth Assessment Report (AR4). In 2013, IPCC again updated the GWP values based on the latest science at the time in its Fifth Assessment Report (AR5) (IPCC 2013). In 2021, IPCC again updated the GWP values based on the latest science in the Sixth Assessment Report (IPCC 2021). However, the United Nations Framework Convention on Climate Change (UNFCCC) reporting guidelines for national inventories require the use of GWP values from the AR5. To comply with international reporting standards under the UNFCCC, official emission estimates for California and the U.S. are reported using AR5 GWP values, as statewide and national GHG inventories have not yet updated their GWP values to the AR6 values. GHG emissions in this analysis are reported using the AR5 GWP values.

By applying the GWP ratios, CO_2e emissions can be tabulated in metric tons (MT) per year. Typically, the GWP ratio corresponding to the warming potential of CO_2 over a 100-year period is used as a baseline. The atmospheric lifetime and GWP of selected GHGs are summarized in Table 4, *Global Warming Potentials and Atmospheric Lifetimes*.

Table 4
GLOBAL WARMING POTENTIALS AND ATMOSPHERIC LIFETIMES

Greenhouse Gas	Atmospheric Lifetime (years)	IPCC SAR GWP	IPCC AR4 GWP	IPCC AR5 GWP	IPCC AR6 GWP
Carbon Dioxide (CO_2)	50-200	1	1	1	1
Methane (CH_4)	12	21	25	28	27
Nitrous Oxide (N_2O)	114	310	298	265	273
HFC-134a	14	1,300	1,430	1,300	1,530
PFC: Tetrafluoromethane (CF_4)	50,000	6,500	7,390	6,630	7,380
PFC: Hexafluoroethane (C_2F_6)	10,000	9,200	12,200	11,100	12,400
Sulfur Hexafluoride (SF_6)	3,200	23,900	22,800	23,500	24,300

Source: IPCC 2021
IPCC = Intergovernmental Panel on Climate Change; GWP = global warming potential; HFC = hydrofluorocarbon; PFC = perfluorocarbon

2.2.3 Federal Greenhouse Gas Regulations

The following Federal regulations may be directly or indirectly applicable to the project.

2.2.3.1 Federal Clean Air Act

The U.S. Supreme Court ruled on April 2, 2007, in Massachusetts v. U.S. Environmental Protection Agency that CO_2 is an air pollutant, as defined under the CAA, and that the USEPA has the authority to regulate emissions of GHGs. In the 2009 greenhouse gas endangerment finding, the USEPA announced that GHGs (including CO_2, CH_4, N_2O, HFC, PFC, and SF_6) threaten the public health and welfare of the American people (USEPA 2026c). This action was a prerequisite to finalizing the USEPA's GHG emissions standards for light-duty vehicles, which were jointly proposed by the USEPA and the United States Department of Transportation's National Highway Traffic Safety Administration (NHTSA).

On June 30, 2022, the U.S. Supreme Court decision published in West Virginia v. U.S. Environmental Protection Agency overturned the USEPA's Clean Power Plan rule, which cited Section 111(d) of the CAA for authority to set limits on CO_2 emissions from existing coal- and natural-gas-fired power plants. The June 30, 2022 decision does not overturn the April 2, 2007 decision; however, it may limit the USEPA's authority to develop rules limiting GHG emissions without clear congressional authorization.

On February 12, 2026, the USEPA rescinded the 2009 greenhouse gas endangerment finding and simultaneously repealed all related federal GHG emissions standards for vehicles (USEPA 2026d).

2.2.4 California Greenhouse Gas Regulations

The following State policies and regulations may be directly or indirectly applicable to the project.

2.2.4.1 Executive Order S-3-05

On June 1, 2005, Executive Order (EO) S-3-05, issued by Governor Schwarzenegger, proclaimed that California is vulnerable to climate change impacts. It declared that increased temperatures could reduce snowpack in the Sierra Nevada, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To avoid or reduce climate change impacts, EO S-3-05 calls for a reduction in GHG emissions to the year 2000 level by 2010, to year 1990 levels by 2020, and to 80 percent below 1990 levels by 2050.

2.2.4.2 Assembly Bill 32 – Global Warming Solution Act of 2006

Approved by Governor Brown on September 27, 2006, AB 32 (the California Global Warming Solutions Act of 2006) requires CARB to develop and enforce regulations for the reporting and verification of statewide GHG emissions. CARB is directed by AB 32 to set a GHG emission limit, based on 1990 levels, to be achieved by 2020. The bill requires CARB to adopt rules and regulations in an open public process to achieve the maximum technologically feasible and cost-effective GHG emission reductions.

2.2.4.3 Executive Order S-01-07

EO S-01-07, issued by Governor Schwarzenegger on January 18, 2007, directs that a statewide goal be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by the year 2020. It orders that a Low Carbon Fuel Standard (LCFS) for transportation fuels be established for California and directs CARB to determine whether an LCFS can be adopted as a discrete early action measure pursuant to AB 32. CARB approved the LCFS as a discrete early action item with a regulation adopted and implemented in April 2010. Although challenged in 2011, the Ninth Circuit reversed the District Court's opinion and rejected arguments that implementing LCFS violates the interstate commerce clause in September 2013. CARB is therefore continuing to implement the LCFS statewide.

2.2.4.4 Senate Bill 375

Approved on September 30, 2008, Senate Bill (SB) 375 (the Sustainable Communities and Climate Protection Act of 2008) supports the State's climate action goals to reduce GHG emissions through coordinated transportation and land use planning with the goal of more sustainable communities.

SB 375 requires CARB to set regional targets for GHG emissions reductions from passenger vehicle use. In 2010, CARB established these targets for 2020 and 2035 for each region covered by one of the State's

Metropolitan Planning Organizations (MPOs). CARB periodically reviews and updates the targets, as needed.

Each of California's MPOs must prepare a Sustainable Communities Strategy (SCS) as an integral part of its regional transportation plan (RTP). The SCS contains land use, housing, and transportation strategies that, if implemented, would allow the region to meet its GHG emission reduction targets. Once adopted by the MPO, the RTP/SCS guides the transportation policies and investments for the region. CARB must review the adopted SCS to confirm and accept the MPOs' determination that the SCS, if implemented, would meet the regional GHG targets. If the combination of measures in the SCS would not meet the regional targets, the MPO must prepare a separate alternative planning strategy (APS) to meet the targets. The APS is not a part of the RTP. Qualified projects consistent with an approved SCS or APS categorized as "transit priority projects" would receive incentives to streamline CEQA processing.

2.2.4.5 Executive Order B-30-15

On April 29, 2015, Governor Brown issued EO B-30-15 establishing a California GHG emission reduction target of 40 percent below 1990 levels by 2030. The EO aligns California's GHG emission reduction targets with those of leading international governments, including the 28-nation European Union. California exceeded the target of reducing GHG emissions to 1990 levels by 2020, as established in AB 32. California's new emission reduction target of 40 percent below 1990 levels by 2030 will make it possible to reach the goal established by EO S-3-05 of reducing emissions 80 percent under 1990 levels by 2050.

2.2.4.6 Senate Bill 350

Approved by Governor Brown on October 7, 2015, SB 350 increases California's renewable electricity procurement goal from 33 percent by 2020 to 50 percent by 2030. This will increase the use of Renewables Portfolio Standard eligible resources, including solar, wind, biomass, and geothermal. In addition, large utilities are required to develop and submit Integrated Resource Plans to detail how each entity will meet their customers resource needs, reduce GHG emissions, and increase the use of clean energy.

2.2.4.7 Senate Bill 32

Signed by Governor Brown on September 8, 2016, SB 32 (Amendments to the California Global Warming Solutions Action of 2006) extends California's GHG reduction programs beyond 2020. SB 32 amended the Health and Safety Code to include Section 38566, which contains language to authorize CARB to achieve a statewide GHG emissions reduction of at least 40 percent below 1990 levels by no later than December 31, 2030. SB 32 codified the targets established by EO B-30-15 for 2030, which set the next interim step in the State's continuing efforts to pursue the long-term target expressed in EO B-30-15 of 80 percent below 1990 emissions levels by 2050.

2.2.4.8 Senate Bill 100

Approved by Governor Brown on September 10, 2018, SB 100 extends the renewable electricity procurement goals and requirements of SB 350. SB 100 requires that all retail sales of electricity to California end-use customers be procured from 100 percent eligible renewable energy resources and zero-carbon resources by the end of 2045.

2.2.4.9 Assembly Bill 1279

Approved by Governor Newsom on September 16, 2022, AB 1279 (the California Climate Crisis Act) declares the policy of the state to achieve net zero GHG emissions as soon as possible, but no later than 2045, and achieve and maintain net negative GHG emissions thereafter, and to ensure that by 2045, statewide anthropogenic GHG emissions are reduced to at least 85 percent below the 1990 levels. AB 1279 anticipates achieving these policies through direct GHG emissions reductions, removal of CO_2 from the atmosphere (carbon capture), and an almost complete transition away from fossil fuels.

2.2.4.10 Senate Bill 905

Approved by Governor Newsom on September 16, 2022, SB 905, Carbon Sequestration: Carbon Capture, Removal, Utilization, and Storage Program, requires CARB to establish a Carbon Capture, Removal, Utilization, and Storage Program to evaluate the efficacy, safety, and viability of carbon capture, utilization, or storage technologies and CO_2 removal technologies and facilitate the capture and sequestration of CO_2 from those technologies, where appropriate. SB 905 is an integral part of achieving the state policies mandated in AB 1279.

2.2.4.11 California Air Resources Board: Scoping Plan

The Scoping Plan is a strategy CARB develops and updates at least once every five years, as required by AB 32. It lays out the transformations needed across California's society and economy to reduce emissions and reach climate targets. The current 2022 Scoping Plan is the third update to the original plan that was adopted in 2008. The initial 2008 Scoping Plan laid out a path to achieve the AB 32 mandate of returning to 1990 levels of GHG emissions by 2020, a reduction of approximately 15 percent below business as usual. The 2008 Scoping Plan included a mix of incentives, regulations, and carbon pricing, laying out the portfolio approach to addressing climate change and clearly making the case for using multiple tools to meet California's GHG emission targets. The 2013 Scoping Plan assessed progress toward achieving the 2020 mandate and made the case for addressing short-lived climate pollutants (SLCPs). The 2017 Scoping Plan also assessed progress toward achieving the 2020 limit and provided a technologically feasible and cost-effective path to achieving the SB 32 mandate of reducing GHGs by at least 40 percent below 1990 levels by 2030. On December 15, 2022, CARB approved the 2022 Scoping Plan for Achieving Carbon Neutrality (2022 Scoping Plan). The 2022 Scoping Plan lays out a path to achieve targets for carbon neutrality and reduce anthropogenic GHG emissions by 85 percent below 1990 levels no later than 2045, as directed by Assembly Bill 1279. The actions and outcomes in the plan will achieve significant reductions in fossil fuel combustion by deploying clean technologies and fuels; further reductions in SLCPs; support for sustainable development; increased action on natural and working lands to reduce emissions and sequester carbon; and the capture and storage of carbon (CARB 2022).

2.2.5 Regional GHG Policies and Plans

2.2.5.1 San Joaquin Valley Air Pollution Control District

In December 2009, SJVAPCD adopted the following guidance documents applicable to the project:

- Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA (SJVAPCD 2009a), and

- District Policy: Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA When Serving as the Lead Agency (SJVAPCD 2009b).

This guidance and policy are the documents referenced in the SJVAPCD's *Guidance for Assessing and Mitigating Air Quality Impacts,* adopted in March 2015 (SJVAPCD 2015). Consistent with the District Guidance and District Policy above, SJVAPCD acknowledges the current absence of numerical thresholds, and recommends a tiered approach to establish the significance of the GHG impacts on the environment:

1. If a project complies with an approved GHG emission reduction plan or GHG mitigation program which avoids or substantially reduces GHG emissions within the geographic area in which the project is located, then the project would be determined to have a less than significant individual and cumulative impact for GHG emissions;

2. If a project does not comply with an approved GHG emission reduction plan or mitigation program, then it would be required to implement best performance standards (BPS); and

3. If a project is not implementing BPS, then it should demonstrate that its GHG emissions would be reduced or mitigated by at least 29 percent, compared to business-as-usual.

SJVAPCD adopted a Climate Change Action Plan (CCAP) in 2008 and issued guidance for development project compliance with the plan in 2009. The guidance adopted an approach that relies on the use of BPS to reduce GHG emissions. Projects implementing BPS would be determined to have a less than cumulatively significant impact. For projects not implementing BPS, demonstration of a 29 percent reduction in project-specific (i.e., operational) GHG emissions from business-as-usual conditions is required to determine that a project would have a less than cumulatively significant impact (SJVAPCD 2009a). Both the SJVAPCD CCAP and the guidance for development project compliance are limited to achieving the State 2020 GHG reduction goals mandated by AB 32. The SJVAPCD CCAP and the guidance for development project compliance do not address California's post-2020 GHG reduction goals.

2.2.6 Local Regulations

2.2.6.1 University of California Sustainable Practices Policy

The UC Sustainable Practices Policy, being most recently updated in April of 2024, guides sustainability efforts across the 10 campuses, five academic health centers and other university facilities in thirteen areas of sustainable practice. The UC Sustainable Practices Policy established goals in 13 areas of sustainable practices: green building, clean energy, climate action, transportation, sustainable operations, zero waste, procurement, foodservice, water, health care, performance assessment, health and well-being, and diversity, equity, inclusion and justice (University of California 2024).

After the certification of the 2020 LRDP SEIR in November of 2020, the UC Office of the President updated its Sustainable Practices Policy. On March 10, 2022, the UC Sustainable Practices Policy was revised to update the following sections with new goals, procedures, and clarifications: Green Building Design, Climate Protection, Sustainable Transportation, Sustainable Water Systems, and Sustainability at UC Health. The 2022 UC Sustainable Practices Policy also added a Health and Well-Being Policy section and made minor clarifications to water and procurement sections.

On May 16, 2023, the UC Sustainable Practices Policy revised the Clean Energy section to indicate that the UC Clean Power Program is already achieving the Clean Electricity goals and to update the goals and timelines around centrally purchased biomethane to reflect current plans. The 2023 UC Sustainable Practices Policy also replaced the former goal of achieving carbon neutrality for Scope 1 emissions (area sources, fleet vehicles, and fugitive emissions) and Scope 2 emissions (electricity) by 2025 with a goal that is aligned with State goals in the most recent 2022 Scoping Plan of achieving carbon neutrality for all scopes, but at a minimum Scope 3 emissions (commuting, water, wastewater, solid waste), by 2045. The 2023 UC Sustainable Practices Policy set a new long-term reduction target of 90 percent below 2019 levels by 2045 for all scopes of emissions, which is more aggressive than the reduction targets established in AB 1279. After 2045, the 2023 UC Sustainable Practices Policy requires that any residual emissions beyond the 90 percent reduction will be negated by carbon removal to achieve complete carbon neutrality in alignment with the State's goals and the 2022 Scoping Plan. The 2023 UC Sustainable Practices Policy reflected the UC's desire to prioritize direct, total emissions reductions to support the achievement of the State's updated reduction targets established in AB 1279, signed into law in September 2022, that requires that statewide anthropogenic GHG emissions be reduced to at least 85 percent below 1990 levels. As part of the update to the 2023 UC Sustainable Practices Policy, UC Merced is required to prepare a decarbonization study by January 1, 2025, that will be used to establish new interim GHG emissions reduction targets for 2030, 2035, and 2040. These planning efforts are still currently underway.

On April 10, 2024, the UC Sustainable Practices Policy was updated to remove references to carbon offset purchases that are no longer used for policy compliance.

2.2.6.2 American College and University Presidents Climate Commitment

The University of California has also signed the American College and University Presidents Climate Commitment (ACUPCC). Each signatory commits to completing an inventory of GHG emissions within one year, and to developing, within two years, an institutional plan to achieve climate neutrality as soon as possible. The commitment also includes specific interim actions, including requiring that new campus construction will be built to at least the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) Silver standard or equivalent; purchasing Energy Star appliances; offsetting GHG emissions generated by institutional air travel; encouraging and providing access to public transportation; purchasing or producing at least 15 percent of the institution's electricity consumption from renewable sources; supporting climate and sustainability shareholder proposals at companies where the institution's endowment is invested; and adopting measures to reduce waste.

2.2.6.3 UC Merced Sustainability Strategic Plan 2017-2022

In 2017, UC Merced released a Sustainability Strategic Plan to describe its approach to achieving its sustainability goals (UC Merced 2017). The ambitious central focus of the plan is the achievement of zero net energy usage, zero landfill waste, and zero net GHG emissions by 2020. Not only does the plan provide campus principles related to sustainability, but it also provides insight into the specific actions that will allow UC Merced to maintain its principles and meet its goals, even as the campus rapidly expands. Many of the actions laid out in the plan indirectly benefit GHG reduction efforts but the action items listed below focus specifically on GHG reduction on the campus.

- Goal Transportation: Increase alternative modes of transportation usage among campus constituency and reduce the carbon footprint of transportation, parking, and fleet services.

- Action 3: GHG Reduction: Develop GHG emission reduction goals for campus fleet.

- Goal Climate Protection: Achieve carbon neutrality by 2020.
    - Action 2: Renewables: Utilize renewable power options to mitigate and reduce GHG impact.

2.2.6.4 UC Merced Climate Action Plan

The first UC Merced Climate Action Plan was adopted in 2009 to promote two long-term campus goals: (1) to reach zero net energy by 2020; and (2) to be climate neutral, with respect to on- and off-campus emissions. In 2018, UC Merced developed an updated CAP which builds on the previous CAP and extends out to 2025. The 2018 CAP notes that UC Merced's' approach to mitigating its climate effects is to:

- Save as much energy as is economically feasible
- Generate from on-site renewable sources as much energy as is consumed annually (net zero energy)
- Continue participating in the University's Wholesale Power Program which will bring the campus 97 percent clean energy through the grid by 2020
- Offset remaining GHG emissions, prioritizing onsite and regional offsets (climate neutrality)

The 2018 CAP describes the current energy saving infrastructure at the campus, which consists of central cooling, thermal energy storage, and central heating for primary academic buildings, and notes that UC Merced intends to continue this basic strategy to provide heating and cooling to future campus development. Regarding the new building design, the 2018 CAP notes that UC Merced has committed to energy efficient design (that all new buildings will be designed to consume half the energy and demand of other University buildings in California, surpass Title 24 by 20 percent, and achieve all LEED credits for optimizing energy efficiency). UC Merced also implements a number of programs to inform and sensitize building occupants to energy consumption and conservation and implements a building maintenance program to optimize building operations. UC Merced is also pursuing a small number of building energy efficiency projects to further reduce energy use.

In view of its goal to achieve Net Zero Energy by 2020 for on-campus facilities, UC Merced developed a 1 megawatt (MW) solar photovoltaic array. The array produces about 12 percent of the total annual campus electricity consumed and 22 percent of the peak load. A second 4.2 MW solar array project was completed and became operational in January 2019. UC Merced is also pursuing a landfill gas-to-energy project with Merced County Regional Waste Management Authority whereby landfill gas that is currently burnt off at the Highway 59 landfill would be piped to the campus and used in microturbines to generate electricity and for hot water generation that would serve a portion of the campus; the project would allow UC Merced to discontinue its use of three hot water boilers that operate on natural gas. UC Merced is one of 10 campuses that is provided electricity by the University under its Wholesale Power Program (WPP). In furtherance of its commitment to be net zero by 2020, by 2021, 100 percent of the electricity provided to the campus via the grid under the WPP will be clean renewable energy (UC Merced 2018). UC Merced is working on an updated CAP to be approved by 2026 with interim targets for GHG reduction.

2.2.6.5 UC Merced Transportation Demand Management Program

The Campus implements a number of transportation demand management (TDM) measures to minimize vehicle trips and associated air emissions, including GHG emissions. Existing and future TDM measures are listed below (UC Merced 2020).

Existing TDM programs

- Subsidized transit
- Ridesharing and Carsharing opportunities
- Carpool and vanpool incentives
- Emergency Ride Home Program (for employees)
- Bicycle incentives
- Marketing/Educational campaigns focused on alternative transportation options
- Increased the number of clean air commuter permits for eligible carpools to promote ridesharing
- Secured grants to fund purchase of fuel efficient and low emission fleet vehicles
- Electric charging stations in the North Bowl, LeGrand and Library Lots
- Annual surveying of campus community commuting patterns
- Information table at both New Student Orientations (NSO) and New Employee Orientations (NEO)
- ZipCar self-service, on-demand car sharing & Zimride rideshare and commute programs

Programs Under Development

- Bicycle program
- Refinement of marketing and advertising campaign of "UC Merced Commuter Club" to increase participation in alternative transportation initiatives
- Increase the number of electric charging stations for electric carts

Future Goals

- Expansion of hybrid and/or battery-operated fleet
- Reduction of Single Occupancy Vehicle (SOC) VMT rates through aggressive marketing and development of incentives to participate in alternative transportation programs (i.e. message boards, departmental competitions)

- Adapt a clean-fleet procurement policy
- Standardize fleet ordering cycles
- Zero-emission vehicle incentives

3.0 EXISTING CONDITIONS

3.1 CLIMATE AND METEROLOGY

The project site is located within the Merced County portion of the SJVAB. The SJVAB enjoys an inland Mediterranean climate, averaging more than 260 sunny days per year. The valley floor is characterized by warm, dry summers and cooler winters. Average daily temperatures in the basin range from 44.6 degrees °F in January to 76.7°F in July. Summer highs often exceed 100°F, averaging in the low 90s in the northern valley and high 90s to the south. Maximum temperatures of 90°F or greater occur about 88 days per year. Although the SJVAB enjoys a high frequency of sunshine, a reduction in sunshine occurs during December and January because of fog and intermittent stormy weather. Temperatures of 32°F and below occur about 22 days per year. Nearly 90 percent of the annual precipitation falls in the six months between November and April (UC Merced 2020).

3.2 SENSITIVE RECEPTORS

CARB and the Office of Environmental Health Hazard Assessment (OEHHA) have identified the following groups of individuals as the most likely to be affected by air pollution: adults over 65, children under 14, infants (including in utero in the third trimester of pregnancy), and persons with cardiovascular and chronic respiratory diseases such as asthma, emphysema, and bronchitis, known as sensitive receptors (CARB 2005; OEHHA 2015). Some land uses are considered more sensitive to air pollution than others due to the types of population groups or activities involved and are referred to as sensitive receptor locations. Examples of these sensitive receptor locations are residences, schools, hospitals, and daycare centers.

The closest existing sensitive receptor locations to the project site are UC Merced student housing buildings located 2,100 feet (0.4 mile) west of the project site. The nearest off-campus sensitive receptor locations to the project site is a single-family residence located on Lake Road, approximately 4,620 feet (0.9 mile) west of the project site There are no off-campus residences, schools, hospitals, or daycare centers within a mile of the project site.

3.3 EXISTING AIR QUALITY

3.3.1 Criteria Pollutants

3.3.1.1 Attainment Designations

As shown in Table 3, the SJVAB is designated as nonattainment for 8-hour ozone and $PM_{2.5}$ with respect to NAAQS. The SJVAB is designated as nonattainment for 1-hour and 8-hour ozone, $PM_{2.5}$, and PM_{10} with respect to CAAQS (SJVAPCD 2026).

3.3.1.2 Monitored Air Quality

The SJVAPCD maintains monitoring stations to measure ambient concentrations of pollutants in Merced County. The closest monitoring station to the project is located at 2334 M Street in the City of Merced, approximately 5 miles southwest of the project site. This station monitors ambient pollutant concentrations of PM_{10} and $PM_{2.5}$. The next nearest monitoring station to the site with data for ozone and NO_2 is located at 385 South Coffee Avenue in the City of Merced, approximately 5.4 miles south of the project site. Table 5, *Air Quality Monitoring Data*, presents a summary of the ambient pollutant concentrations monitored at the two air quality monitoring stations during the most recent three years (2022 through 2024) for which the SJVAPCD has reported data (CARB 2026c).

Table 5
AIR QUALITY MONITORING DATA

Pollutant Standard	2022	2023	2024
Ozone (O_3) – 385 South Coffee Avenue Station			
Maximum concentration 1-hour period (ppm)	0.096	0.096	*
Maximum concentration 8-hour period (ppm)	0.083	0.079	*
Days above 1-hour state standard (>0.09 ppm)	3	1	*
Days above 8-hour state/federal standard (>0.070 ppm)	9	13	*
Coarse Particulate Matter (PM_{10}) – 2334 M Street Station			
Maximum 24-hour concentration (µg/m^3)	100.5	109.3	109.3
Measured Days above 24-hr state standard (>50 µg/m^3)	60	50	50
Measured Days above 24-hr federal standard (>150 µg/m^3)	0	0	0
Annual average (µg/m^3)	*	32.0	31.7
Exceed state annual standard (20 µg/m^3)	*	Yes	Yes
Fine Particulate Matter ($PM_{2.5}$) – 2334 M Street Station			
Maximum 24-hour concentration (µg/m^3)	43.7	38.5	51.5
Measured Days above 24-hour federal standard (>35 µg/m^3)	4	2	4
Annual average (µg/m^3)	10.5	9.6	7.8
Exceed state and federal annual standard (12 µg/m^3)	No	No	No
Nitrogen Dioxide (NO_2) – 385 South Coffee Avenue Station			
Maximum 1-hour concentration (ppm)	0.039	0.037	*
Days above state 1-hour standard (0.18 ppm)	0	0	*
Days above federal 1-hour standard (0.100 ppm)	0	0	*
Annual average (ppm)	0.007	0.006	*
Exceed annual federal standard (0.053 ppm)	No	No	*
Exceed annual state standard (0.030 ppm)	No	No	*

Source: CARB 2026c
ppb = parts per billion; ppm = parts per million; µg/m^3 = micrograms per cubic meter, * = insufficient data available.

As shown in Table 5, the 1- and 8-hour ozone NAAQS and CAAQS were exceeded on multiple day in 2022 and 2023; the 24-hour PM_{10} CAAQS was exceeded on multiple day in 2023 through 2024; and the annual PM_{10} CAAQS was exceeded in 2023 and 2024.

3.3.2 Greenhouse Gases

3.3.2.1 Worldwide GHG Inventory

In 2022, total GHG emissions worldwide were estimated at 50,115 million metric tons (MMT) of CO_2e emissions (Climate Watch 2026). By country, the U.S. contributed the second largest portion (11.2 percent) of global GHG emissions, behind the largest contributor, China (with 25.4 percent of global emissions). The total U.S. GHG emissions were 5,600 MMT CO_2e in 2020 (Climate Watch 2026). On a national level, approximately 90.4 percent of GHG emissions were associated with energy, including transportation energy (Climate Watch 2026).

3.3.2.2 California GHG Inventory

CARB performed Statewide inventories for the years 2000-2022, as shown in Table 6, *California Greenhouse Gas Emissions by Sector*. The inventory is divided into five broad sectors of economic activity: agriculture, commercial and residential, electricity generation, industrial, and transportation. Emissions are quantified in MMT CO_2e.

Table 6
CALIFORNIA GREENHOUSE GAS EMISSIONS BY SECTOR

Sector	Emissions (MMT CO_2e)			
	1990	2000	2020	2022
Agriculture and Forestry	18.9 (4%)	30.8 (7%)	31.4 (9%)	29.8 (8%)
Commercial and Residential	44.1 (10%)	44.3 (10%)	39.0 (11%)	39.5 (11%)
Electricity Generation	110.5 (26%)	104.7 (22%)	59.5 (16%)	59.8 (16%)
High Global Warming Potential	-	6.6 (1%)	21.3 (6%)	21.3 (6%)
Industrial	105.3 (24%)	92.8 (20%)	73.6 (20%)	72.7 (20%)
Recycling and Waste	-	7.0 (2%)	8.5 (2%)	8.2 (2%)
Transportation	150.6 (35%)	176.7 (38%)	135.2 (37%)	139.9 (38%)
Unspecified Remaining	1.3 (<1%)	0.0 (0%)	0.0 (0%)	0.0 (0%)
Total	**430.7**	**462.9**	**368.5**	**371.1**

Source: CARB 2007 and CARB 2026d
MMT = million metric tons; CO_2e = carbon dioxide equivalent

As shown in Table 6, Statewide GHG source emissions totaled 430.7 MMT CO_2e in 1990, 462.9 MMT CO_2e in 2000, 368.5 MMT CO_2e in 2020, and 371.1 MMT CO_2e in 2022. Transportation-related emissions consistently contribute the most GHG emissions, followed by electricity generation and industrial emissions (CARB 2007, 2026d).

4.0 METHODOLOGY AND SIGNIFICANCE CRITERIA

4.1 METHODOLOGY

Criteria pollutant and precursor emissions, and GHG emissions for the project construction activities and long-term operation were calculated using the California Emissions Estimator Model (CalEEMod), Version 2022.1. CalEEMod is a Statewide land use emissions computer model designed to provide a

uniform platform for government agencies, land use planners, and environmental professionals to quantify potential criteria pollutant emissions associated with both construction and operations from a variety of land use projects. The model was developed for the California Air Pollution Control Officers Association (CAPCOA) in collaboration with the California air districts. CalEEMod allows for the use of default data (e.g., emission factors, trip lengths, meteorology, source inventory) provided by the various California air districts to account for local requirements and conditions, and/or user-defined inputs. The model calculates emissions of criteria pollutants, Ozone precursors, and GHGs. The calculation methodology and input data used in CalEEMod can be found in the CalEEMod User's Guide Appendices A, C, and D (CAPCOA 2022). The input data and subsequent construction and operation emission estimates for the proposed project are discussed below. The CalEEMod output report is included in Appendix A, *CalEEMod Output*, of this report.

4.1.1 Construction Emissions

CalEEMod has the capability to calculate reductions in construction emissions from the effects of dust control, diesel-engine classifications, and other selected emissions reduction measures. In compliance with SJVAPCD Rule 8021, *Construction, Demolition, Excavation, Extraction, and other Earth Moving Activities*, fugitive dust emissions calculations assume application of water on exposed surfaces a minimum of two times per day. CalEEMod estimates construction emissions for each year of construction activity based on the annual construction equipment profile and other factors determined as needed to complete all phases of construction by the target completion year. As such, each year of construction activity has varying quantities of GHG emissions.

4.1.1.1 Construction Activities

Project construction was modeled assuming a January 2027 start date and completing in September 2027. As such, the emission forecasts provided herein reflect a specific set of conservative assumptions based on the expected construction scenario wherein a relatively large amount of construction activity is occurring in a relatively intensive manner. Because of this conservative assumption, actual emissions could be less than those forecasted. If construction is delayed or occurs over a longer time period, emissions could be reduced because of (1) a more modern and cleaner-burning construction equipment fleet mix than assumed in the modeling; and/or (2) a less intensive buildout schedule (i.e., fewer daily emissions occurring over a longer time interval).

Construction activities would include: existing panel removal; site preparation (clearing and grubbing), grading; support, panel, and inverter installation; and BESS installation and grid tie. Construction was assumed to occur five days per week with equipment operating for up to eight hours per day. The construction activity schedule was estimated using data provided by the project engineer and is outlined in Table 7, *Project Construction Schedule*.

Table 7
PROJECT CONSTRUCTION SCHEDULE

Construction Activity	Construction Start Date	Construction End Date	Number of Working Days
Existing Panel Removal	1/1/2027	1/14/2027	10
Site Preparation	1/15/2027	3/11/2027	40
Grading	3/12/2027	6/24/2027	75
Support, Panel, and Inverter Installation	6/25/2027	9/24/2027	66

Construction Activity	Construction Start Date	Construction End Date	Number of Working Days
BESS Installation and Grid Tie	7/25/2027	9/24/2027	45

Source: CalEEMod (Appendix A)

4.1.1.2 Construction Off-Road Equipment

Construction equipment for each construction activity was estimated based on similar previous large-scale solar projects, on CalEEMod defaults (for site preparation and grading) and on input from the project engineer. Table 8, *Project Construction Equipment*, presents a summary of the assumed equipment that would be involved in each activity of construction. Off-highway trucks included in the modeling would be water trucks.

Table 8
PROJECT CONSTRUCTION EQUIPMENT

Construction Activity	Equipment	Number
Existing Panel Removal	Rough Terrain Forklifts	2
	Skid Steer Loaders	1
	Water Trucks	1
Site Preparation	Rubber Tired Dozers	4
	Tractors/Loader/Backhoes	4
	Graders	1
	Rollers	1
	Rough Terrain Forklifts	1
	Water Trucks	2
Grading	Graders	1
	Excavators	2
	Tractors/Loader/Backhoes	2
	Scrapers	2
	Rubber Tired Dozers	1
	Water Trucks	2
Support, Panel, and Inverter Installation	Generator Sets	1
	Welders	2
	Skid Steer Loaders	1
	Rough Terrain Forklifts	2
	Bore/Drill Rigs	1
	Vibratory Pile Drivers	1
	Excavators/Trenchers	1
	Water Trucks	1
BESS Installation and Grid Tie	Cranes	1
	Forklifts	1
	Tractors/Loader/Backhoes	1
	Aerial Lists	1

Source: CalEEMod (Appendix A)

4.1.1.3 Construction On-Road Trips

Worker trips would vary by activity and would range from 10 to 40 one-way trips per day. Worker trip lengths were estimated using CalEEMod default values. Removal of existing panels would require up to 40 truckloads (approximately 8 one-way truck trips per day). Old panels and inverters were

conservatively assumed to be hauled to warehouse facilities for eventual recycling in Stockton, and approximately 70 miles one-way per trip. Based on the disturbed area and estimates from the project engineer, approximately 3,880 truckloads of vegetation, old fencing, and other debris would be hauled from the project site (approximately 97 one-way trips per day). The CalEEMod default trip distance of 20 miles was used for debris haul truck trips. Soil movement during grading for the access road, solar array area, and BESS pad was assumed to be balanced on site (no import or export of soil. However, an import of 1,200 cubic yards of aggregate was assumed to be imported during grading for application on the project access road, resulting in approximately 2 one-way haul trip trips per day. The aggregate import haul distance assumed the CalEEMod default of 20miles. Up to 16 truckloads per day (32 one-way trips) of solar panels and other supplies would be imported during installation of supports, panels, and inverters. Up to 4 truckloads per day (8 one-way trips) would be required for import of equipment and supplies during installation of the BESS and grid tie. All panels, inverters, BESS equipment, and other solar array supplies were conservatively assumed to be hauled from warehouse facilities in Stockton, an approximately 70 miles one-way per trip.

4.1.2 Operational Assumptions

One to two workers would be on-site periodically for maintenance and repairs, up to 24 days in a year. Up to 10 workers would be on-site once annually for module washing and vegetation management over a two-week period. The project would require approximately 250,000 gallons per year of water for panel washing and livestock drinking water.

4.2 SIGNIFICANCE CRITERIA

4.2.1 Air Quality

Impacts to air quality were analyzed in Chapter 4.1, *Air Quality,* of the 2020 LRDP SEIR. The 2020 LRDP SEIR uses significance criteria derived from Appendix G of the State CEQA Guidelines and noted that a project would have a significant air quality environmental impact if it would:

1. Conflict with or obstruct implementation of the applicable air quality plan; or
2. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or State ambient air quality standard; or
3. Expose sensitive receptors to substantial pollutant concentrations; or
4. Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

The proposed project would have a significant air quality impact if the project resulted in new or substantially more severe impact beyond what was evaluated in the 2020 LRDP SEIR.

The SJVAPCD has established significant thresholds to assess the impacts of project-related air pollutant emissions. The significance thresholds are updated, as needed, to appropriately represent the most current technical information and attainment status in the SJVAB. Table 9, *SJVAPCD Air Quality Significance Thresholds*, presents the most current significance thresholds, including thresholds for construction and operational emissions and maximum incremental cancer risk and hazard indices for

TACs. A project with emission rates and risk values below these thresholds is generally considered to have a less than significant impact on air quality.

Table 9
SJVAPCD AIR QUALITY SIGNIFICANCE THRESHOLDS

Mass Daily Thresholds (tons per year)		
Pollutant	**Construction**	**Operation**
ROG	10	10
NO_X	10	10
CO	100	100
PM_{10}	15	15
$PM_{2.5}$	15	15
SO_X	27	27
Toxic Air Contaminants		
TACs	Maximum Incremental Cancer Risk ≥ 10 in 1 million Chronic & Acute Hazard Index ≥ 1.0 (project increment)	

Source: SJVAPCD 2015
ROG = reactive organic gas; NO_X = nitrogen oxides; CO = carbon monoxide; PM_{10} = coarse particulate matter with a diameter of 10 microns or less; $PM_{2.5}$ = fine particulate matter with a diameter of 2.5 microns or less; SO_X = sulfur oxides; TACs = toxic air contaminants; NO_2 = nitrogen dioxide; ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter

As set forth in the SJVAPCD *Guidance for Assessing and Mitigating Air Quality Impacts*, any proposed project that would individually have a significant air quality impact would also be considered to have a significant cumulative air quality impact. Impacts of local pollutants (CO, TACs) are cumulatively significant when modeling shows that the combined emissions from the project and other existing and planned projects would exceed air quality standards.

4.2.2 Greenhouse Gases

Given the relatively small levels of emissions generated by a project in relationship to the total amount of GHG emissions generated on a national or global basis, individual projects are not expected to result in significant, direct impacts with respect to climate change. However, given the magnitude of the impact of GHG emissions on the global climate, GHG emissions from new development could result in significant, cumulative impacts with respect to climate change. Thus, the potential for a significant GHG impact is limited to cumulative impacts.

Impacts from GHG emissions were analyzed in Chapter 4.3, *Greenhouse Gas Emissions,* of the 2020 LRDP SEIR. The 2020 LRDP SEIR uses significance criteria derived from Appendix G of the State CEQA Guidelines and noted that a project would have a significant GHG emissions impact if it would:

1. Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?

2. Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs?

5.0 AIR QUALITY IMPACT ANALYSIS

This section evaluates potential impacts related to air pollutant emissions resulting from implementation of the project. Is it assumed that the project would have a significant air quality impact if the project resulted in new, additional impacts beyond what was evaluated in the 2020 LRDP SEIR. Project-level air quality modeling was completed as part of this analysis. Complete modeling results are included in Appendix A of this report.

5.1 ISSUE 1: CONSISTENCY WITH AIR QUALITY PLANS

5.1.1 Analysis in the Previously Adopted 2020 LRDP SEIR

Impacts to air quality were analyzed in Section 4.1, *Air Quality*, of the 2020 LRDP SEIR. The 2020 LRDP SEIR noted that for air quality planning purposes, the SJVAPCD creates emission inventories based on existing and foreseeable future land uses within its jurisdiction. If a new project is consistent with the planned land use designation that was considered in the development of an air quality management plan, the proposed project would not conflict and would not obstruct implementation of the applicable air quality management plan.

The 2020 LRDP SEIR also concluded that because a higher level of growth at the campus has been accounted for and included in the air quality planning efforts of the region, implementation of the 2020 LRDP would not conflict with or obstruct implementation of the applicable air quality plan. Although the emissions associated with campus operation at full development under the 2020 LRDP would result in a significant and unavoidable impact as discussed under Issue 2, the effect of campus buildout under the 2020 LRDP with respect to the regional air quality management plan would, of itself, be less than significant.

5.1.2 Impacts

As discussed in Section 2.1 of this report, the SJVAPCD has adopted several attainment plans that outline long-term strategies designed to achieve compliance with the State and federal ambient air quality standards. SJVAPCD has established thresholds of significance for a project's criteria pollutant and precursor emissions for both temporary construction-related emissions and long-term operational-related emissions. These significance thresholds have been established to assist lead agencies in determining whether a project may have a significant air quality impact. A project with emissions lower than the thresholds would not conflict with or obstruct implementation of the district's air quality plans for attainment of the applicable NAAQS and CAAQS. As discussed under Issue 2 below, the project would not exceed the temporary construction-related or long-term operational-related thresholds of significance for criteria pollutants and precursor emissions.

The project would not result in growth in the numbers of students and faculty at UC Merced. During project construction and for annual vegetation maintenance and panel washing, short-term, temporary jobs would be created; however, it is anticipated that the majority of the labor force would be sourced from within the County. Therefore, the growth associated with the project has been accounted for and included in the air quality planning efforts of the region and implementation of the project would not conflict with or obstruct implementation of the applicable air quality plan.

5.1.3 Significance of Impacts

As discussed under Issue 2 below, the project would not exceed the temporary construction-related or long-term operational-related thresholds of significance for criteria pollutants and precursor emissions. Additionally, the growth and capacity associated with the project has been accounted for and included in the air quality planning efforts of the region and implementation of the proposed project would not conflict with or obstruct implementation of the applicable air quality plan. The impact would be less than significant.

5.2 ISSUE 2: CUMULATIVELY CONSIDERABLE NET INCREASE OF NONATTAINMENT CRITERIA POLLUTANTS

5.2.1 Analysis in the Previously Adopted 2020 LRDP SEIR

5.2.1.1 Construction Emissions

Impacts to air quality were analyzed in Section 4.1, *Air Quality*, of the 2020 LRDP SEIR. The 2020 LRDP SEIR concluded that based on the construction schedule for the 2020 LRDP, SJVAPCD thresholds are not anticipated to be exceeded; however, should a number of projects be constructed concurrently on campus, it is possible that the SJVAPCD threshold for NO_X could be exceeded. LRDP Mitigation Measure AQ-1a, requiring Tier 4 equipment reduced exhaust emissions, would be implemented during construction to minimize NO_X emissions. Additionally, LRDP Mitigation Measure AQ-1b, requiring reduced fugitive dust emissions, would be implemented to reduce emissions of dust during construction of projects on campus. The impact from construction under the 2020 LRDP would be less than significant with implementation of LRDP Mitigation Measures AQ-1a and AQ-1b.

Campus construction under the 2020 LRDP would occur between 2021 and 2030, and construction activities would be located in the central portions of the campus site in the area designated CMU on the land use diagram. At this time, there are no foreseeable construction projects that would be under construction near the campus between 2021 and 2030. Therefore, there is no potential for campus construction emissions, especially of pollutants such as PM_{10} and $PM_{2.5}$, and construction TACs to combine with emissions of these pollutants from other nearby construction projects. There would be no cumulative impact related to construction emissions.

5.2.1.2 Operational Emissions

The 2020 LRDP SEIR concluded that the projects operational ROG and NO_X emissions would exceed the SJVAPCD thresholds. LRDP Mitigation Measures AQ-2a and AQ-2b would be implemented to reduce the increase in the campus's operational emissions of ROG and NO_X. LRDP Mitigation Measure AQ-2a would require UC Merced to promote the use of alternative transportation, alternative fuel vehicles, and to improve traffic flow; however, the reduction from this mitigation measure is not quantifiable and it is unlikely it would reduce emissions below the SJVAPCD threshold. LRDP Mitigation Measure AQ-2b includes measures to reduce ROG emissions and recommends the use of solar water heating systems to reduce the combustion of natural gas for water heating. With the implementation of LRDP Mitigation Measures AQ-2a and AQ-2b, campus operations would still result in annual emissions that exceed the SJVAPCD threshold for NO_X and the impact from operation under the 2020 LRDP would remain significant and unavoidable.

As noted above, campus operation would result in annual emissions that exceed the SJVAPCD threshold for NO_X with implementation of LRDP Mitigation Measures AQ-2a and AQ-2b. Other developments under the City's General Plan would also result in new trips that would increase vehicle emissions. Therefore, cumulative operational emissions would be significant and the project's contribution to the impact would be cumulatively considerable.

5.2.2 Impacts

By its very nature, air pollution is largely a cumulative impact. The nonattainment status of regional pollutants is a result of past and present development within the region. The project would generate criteria pollutants and precursors in the short-term during construction and in the long-term during operation. To determine whether a project would result in cumulatively considerable emissions that would violate an air quality standard or contribute substantially to an existing or projected air quality violation, a project's emissions are evaluated based on the quantitative emission thresholds established by the SJVAPCD.

5.2.2.1 Construction Emissions

The project construction emissions were estimated using the CalEEMod model as described in Section 4.1 of this report. The complete CalEEMod output files are included in Appendix A of this report. The emissions generated from construction activities include:

- Dust (including PM_{10} and $PM_{2.5}$), primarily from fugitive sources such as soil disturbance and vehicle travel over paved and unpaved surfaces; and

- Combustion emissions of air pollutants (including ROG, NO_X, PM_{10}, $PM_{2.5}$, CO, and sulfur oxides [SO_X]), primarily from operation of heavy off-road equipment and haul trucks.

The results of the project construction emissions modeling is shown below in Table 10, *Annual Construction Criteria Pollutant and Precursor Emissions*. The data shown assumes application of water on exposed surfaces a minimum of two times per day in compliance with SJVAPCD Rule 8021, *Construction, Demolition, Excavation, Extraction, and other Earth Moving Activities*. As shown in Table 10, the project's individual construction emissions would not exceed SJVAPCD thresholds.

Table 10
ANNUAL CONSTRUCTION CRITERIA POLLUTANT AND PRECURSOR EMISSIONS

Year	Pollutant Emissions (tons per year)					
	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
2027	0.4	3.1	3.4	<0.1	2.0	0.4
SJVAPCD Threshold	*10*	*10*	*100*	*27*	*15*	*15*
Significant Impact?	***No***	***No***	***No***	***No***	***No***	***No***

Source: CalEEMod (Appendix A); Threshold: SJVAPCD 2015
ROG = reactive organic gas; NO_X = nitrogen oxides; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter 10 microns or less in diameter; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter; SJVAPCD = San Joaquin Valley Air Pollution Control District

Although construction of the proposed project on the individual level would not exceed SJVAPCD thresholds, 2020 LRDP Mitigation Measure AQ-1a and Mitigation Measure AQ-1b would be implemented to reduce potential cumulative impacts from project construction in combination with

other UC Merced development projects. 2020 LRDP Mitigation Measure AQ-1a would ensure construction equipment rated by the USEPA as meeting Tier 4 (model year 2008 or newer) emission limits for engines between 50 and 750 horsepower is used by the construction contractor. Additionally, 2020 LRDP Mitigation Measure AQ-1b would ensure compliance with SJVAPCD Regulation VIII, *Fugitive PM_{10} Prohibitions* and to reduce fugitive dust impacts.

5.2.2.2 Operational Emissions

Project operational emissions were estimated using CalEEMod as described in Section 4.1 of this report. The model output is provided in Appendix A of this report. Annual project operational emissions for all criteria pollutants and precursors would be far below 1 tpy and would not exceed the SJVAPCD operational thresholds which range from 10 to 100 tpy.

5.2.3 Significance of Impacts

The project's construction and operational emissions would be below the SJVAPCD thresholds of significance, and with implementation of 2020 LRDP Mitigation Measures AQ-1a and AQ-1b, the cumulative impact would be less than significant.

Mitigation Measures

The following 2020 LRDP SEIR Mitigation Measures would be applicable to the proposed project:

2020 LRDP MM AQ-1a: The construction contractors shall be required via contract specifications to use construction equipment rated by the USEPA as meeting Tier 4 (model year 2008 or newer) emission limits for engines between 50 and 750 horsepower.

2020 LRDP MM AQ-1b: UC Merced shall include in all construction contracts the measures specified in SJVAPCD Regulation VIII (as it may be amended for application to all construction projects generally) to reduce fugitive dust impacts, including but not limited to the following:

- All disturbed areas, including storage piles, which are not being actively utilized for construction purpose, shall be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, or vegetative ground cover.
- All on-site unpaved roads and off-site unpaved access roads shall be effectively stabilized of dust emissions using water or chemical stabilizer/suppressant.
- All land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill, and demolition activities shall be effectively controlled of fugitive dust emissions using application of water or by presoaking.
- When materials are transported off-site, all material shall be covered, effectively wetted to limit visible dust emissions, or at least 6 inches of freeboard space from the top of the container shall be maintained.
- All operations shall limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at least once every 24 hours when operations are occurring. (The use of dry rotary

rushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit visible dust emissions. Use of blower devices is expressly forbidden.)

- Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, storage piles shall be effectively stabilized of fugitive dust emissions by using sufficient water or chemical stabilizer/ suppressant.

5.3 ISSUE 3: IMPACTS TO SENSITIVE RECEPTORS

5.3.1 Analysis in the Previously Adopted 2020 LRDP SEIR

Impacts to air quality were analyzed in Section 4.1, *Air Quality*, of the 2020 LRDP SEIR. The 2020 LRDP SEIR concluded that although campus development under the 2020 LRDP would include sources that would result in TAC emissions, adequate information with respect to these sources was not available to allow for the quantification and evaluation or potential human health risk. However, based on data from other UC campuses such as UC Davis, it is anticipated that the human health risk from the development of the campus under the 2020 LRDP would not result in a significant human health risk on or off site. Human health risk from TAC emissions were not discussed further in the 2020 LRDP SEIR.

The 2020 LRDP SEIR also concluded that CO emitted by traffic generated under the 2020 LRDP is the criteria pollutant that would have the potential to result in substantial concentrations. To analyze the potential for the project to cause or contribute to high CO concentrations, a CO screening guidance provided by the Bay Area Air Quality Management District (BAAQMD) was used. This guidance provides that a project would have a less than significant impact with respect to CO levels if the addition of project traffic would not increase the total traffic at any affected intersection to more than 44,000 vehicles per hour. Buildout under 2020 LRDP would generate a relatively small amount of new traffic: 8,406 total daily trips or 739 AM peak hour trips and 808 PM peak hour trips. The Traffic Impact Assessment prepared for the 2020 LRDP showed that the cumulative traffic volumes at all intersections affected by the project would be less than 44,000 vehicles per hour. Therefore, the project would not result in the violation of the CO standards and would not expose sensitive receptors to substantial CO concentrations. The impact would be less than significant.

5.3.2 Impacts

5.3.2.1 Construction Activities

Fugitive Dust

As discussed in Section 5.2 of this report, construction of the project would not result in emissions of PM in excess of the SJVAPCD thresholds. As discussed under Issue 2, above, 2020 LRDP Mitigation Measure AQ-1b would be implemented to ensure compliance with SJVAPCD Regulation VIII, *Fugitive PM_{10} Prohibitions* and to reduce fugitive dust impacts.

Toxic Air Contaminants (DPM)

Implementation of the project would result in the use of heavy-duty construction equipment, haul trucks, and construction worker vehicles. These vehicles and equipment could generate the TAC DPM. Generation of DPM from construction projects typically occurs in a localized area (e.g., at the project site) for a short period of time. Because construction activities and subsequent emissions vary

depending on the phase of construction (e.g., grading, building construction), the construction-related emissions to which nearby receptors are exposed would also vary throughout the construction period. During some equipment-intensive phases, such as grading, construction-related emissions would be higher than other less equipment-intensive phases such as building construction. Concentrations of mobile-source DPM emissions are typically reduced by 70 percent at approximately 500 feet (CARB 2005). The use of heavy diesel-powered construction equipment would occur 2,100 feet or more from the closest sensitive receptor location. In addition, as discussed under Issue 2, LRDP Mitigation Measure AQ-1a would be implemented to ensure project diesel-powered construction equipment would comply with the USEPA Tier 4 (model year 2008 or newer) emission limits for engines between 50 and 750 horsepower is used by the construction contractor. USEPA Tier 4 certified engines reduce emissions of DPM by 90 percent or more compared to Tier 0 engines.

Considering this information, the short duration of construction activity, the highly dispersive nature of DPM and the distance to the closest sensitive receptor locations, construction of the project would expose off-site sensitive receptors to substantial DPM concentrations.

5.3.2.2 Operational Activities

CO Hotspots

Vehicle exhaust is the primary source of CO in California. In an urban setting, the highest CO concentrations are generally found near congested intersections. Under typical meteorological conditions, CO concentrations tend to decrease as distance from the emissions source (i.e., congested intersection) increases. Project-generated traffic has the potential of contributing to localized "hot spots" of CO off-site. As discussed in Section 4.1, above, operation of the project would require one to two workers on-site periodically for maintenance and repairs, up to 24 days in a year, and up to 10 workers on-site once annually for module washing and vegetation management over a two-week period. Therefore, the project would contribute minimal traffic to area roadways the long-term operation of the project would not result in the violation of the CO standards and would not expose sensitive receptors to substantial CO concentrations.

5.3.3 Significance of Impacts

With implementation of 2020 LRDP Mitigation Measures AQ-1b and AQ-1b, the project would not expose sensitive receptors to substantial pollutant concentrations, including short term construction emission of fugitive dust and DPM. The impact would be less than significant.

5.4 ISSUE 4: OTHER EMISSIONS (SUCH AS THOSE LEADING TO ODORS)

5.4.1 Analysis in the Previously Adopted 2020 LRDP SEIR

Impacts to air quality were analyzed in Section 4.1, *Air Quality*, of the 2020 LRDP SEIR. The 2020 LRDP SEIR concluded that construction activities under the 2020 LRDP would require the use of diesel-fueled equipment which has associated odors; however, the odors are not pervasive enough to cause objectionable odors adversely affecting a substantial number of people. The 2020 LRDP SEIR also concluded that operation of facilities under the 2020 LRDP are not considered a significant source of

odors. Therefore, construction and operation of the 2020 LRDP would not result in odors adversely affecting a substantial number of people and the impact would be less than significant.

5.4.2 Impacts

Emissions from construction equipment, such as diesel exhaust, may generate odors; however, these odors would be temporary, intermittent, and not expected to affect a substantial number of people. Additionally, noxious odors would be confined to the immediate vicinity of construction equipment and would cease when construction activity ends.

The SJVAPCD has developed screening distances for common sources of operational odors, including Wastewater Treatment Facility; Sanitary Landfill; Transfer Station; Composting Facility; Petroleum Refinery; Asphalt Batch Plant; Chemical Manufacturing; Fiberglass Manufacturing; Painting/Coating Operations (e.g., auto body shops); Food Processing Facility; Feed Lot/Dairy; and Rendering Plant (SJVAPCD 2015). The proposed project would include construction of a PV facility and BESS and would not include any of these uses nor are there any of these land uses in the project vicinity.

5.4.3 Significance of Impacts

Implementation of the project would not result in other emissions (such as those leading to odors) adversely affecting a substantial number of people. The impact would be less than significant.

6.0 GREENHOUSE GAS IMPACT ANALYSIS

This section evaluates potential impacts related to GHG emissions resulting from implementation of the project. Is it assumed that the proposed project would have a significant impact from GHG emissions if the project resulted in new, additional impacts beyond what was evaluated in the 2020 LRDP SEIR. Project-level GHG modeling was completed as part of this analysis. Complete modeling results are included in Appendix A of this report.

6.1 ISSUE 1: GREENHOUSE GAS EMISSIONS

6.1.1 Analysis in the Previously Adopted 2020 LRDP SEIR

6.1.1.1 Construction Emissions

GHG emissions impacts were analyzed in Section 4.3, *Greenhouse Gas Emissions*, of the 2020 LRDP SEIR. The 2020 LRDP SEIR concluded that approximately 6,118 MT CO_2e of GHG emissions would be emitted during the approximately 10-year project construction period, which is about 612 MT CO_2e/year. Neither UC Merced nor any of the air districts, including SJVAPCD, has set forth quantitative thresholds for the evaluation of construction-phase GHG emissions. Construction GHG estimates were presented for informational purposes only.

6.1.1.2 Operational Emissions

The 2020 LRDP SEIR concluded that area sources and commuting are the top two sources of GHG emissions at the campus. The 2020 LRDP SEIR also concluded that compliance with the UC Sustainable Practices Policy will have the effect of reducing UC Merced's total emissions. Further, the campus's

Sustainability Strategic Plan and the CAP, which are aligned with the UC Sustainable Practices Policy, include numerous provisions that will substantially reduce the increase in the campus's GHG emissions, as the campus grows.

- The plans encourage the use of transit and alternative transportation modes, which has helped and will continue to reduce transportation-related GHG emissions, relative to the emissions that would occur without these plans.
- Individual projects under the 2020 LRDP would implement GHG emission reduction strategies consistent with the applicable provisions of the UC Sustainable Practices Policy, which include green building design, sustainable building operations, sustainable transportation, and sustainable water systems.
- UC Merced will also implement other campus-wide energy saving programs.

The 2020 LRDP SEIR reports UC Merced historic, existing and projected 2020 and 2030 emissions both in terms of both total emissions as well as per capita emissions. It also reports UC Merced's 2030 targets both in terms of a total emissions target and a per capita target; these targets are used in this SEIR as thresholds of significance. The campus's per capita emissions in 2030 would be well below the per capita target for 2030. However, if the campus's total emissions in 2030 are compared to the corresponding total emissions target, the emissions would exceed the target. The campus's total emissions in 2030 would be about 10,137 MT CO_2e/year. To be compliant with SB 32, the campus's 2030 emissions would need to be about 3,300 MT CO_2e/year. As the campus's emissions would exceed this target, this represents a significant impact.

LRDP Mitigation Measure GHG-1a requires UC Merced to implement additional measures to reduce its emissions, and if adequate reductions are not achieved, the mitigation measure requires UC Merced to purchase GHG offsets. LRDP Mitigation Measure GHG-2b requires the implementation of LRDP Mitigation Measure AQ-2a and LRDP Mitigation Measure AQ-2b. Both measures would reduce GHG emissions. LRDP Mitigation Measure GHG-1c commits UC Merced to continue to evaluate and implement new technologies that would reduce its emissions. With implementation of LRDP Mitigation Measures GHG-1a through GHG-1c, the impact would be less than significant.

6.1.2 Impacts

6.1.2.1 Construction Emissions

Neither UC Merced nor the SJVAPCD have adopted quantitative thresholds for the evaluation of construction-phase GHG emissions. Construction GHG estimates are disclosed for informational purposes. Project construction GHG emissions were estimated using CalEEMod as described in Section 4.1 of this report. The complete CalEEMod output files are included in Appendix A of this report. The modeling shows that short-term construction of the project would result in a total of 998 MT of CO_2e during 2027.

6.1.2.2 Operational Emissions

Project operational GHG emissions were estimated using CalEEMod as described in Section 4.1 of this report. The project operational GHG emissions for the anticipated first full year of operation (2028) are shown in Table 11*, Annual Operational GHG Emissions*.

Table 11
ANNUAL OPERATIONAL GHG EMISSIONS

Emission Source	2029 Emissions (MT CO_2e per year)
Mobile	1.57
Area	0.00
Energy	0.00
Water	0.04
Waste	0.00
Refrigerants	0.00
Total	**1.62**

Source: CalEEMod (Appendix A)
GHG = greenhouse gas; MT = metric tons; CO_2e = carbon dioxide equivalent

The project would generate power from renewable sources, reducing the use of power from the state's electricity grid which is partially generated using fossil fuels. Therefore, the project would result in a net decrease in regional GHG emissions. The project's GHG reductions would gradually diminish over time as the State's clean energy procurement policies and net zero GHG emissions goal are implemented. Using the National Laboratory of the Rockies' PVWatts Calculator, a 6 MW PV facility using 2-axis tracking and located near Merced would generate 14,192 MWh of electricity per year (National Laboratory of the Rockies 2026). The PVWatts report is included as Appendix B, *Solar Calculations*, to this report. Using the CalEEMod default GHG emissions intensity factors for PG&E, the project's electricity generation would reduce statewide energy source GHG emissions by 1,326 MT CO_2e in 2028, resulting in a net project operation GHG reduction of 1,324.4 MT CO_2e in 2028.

6.1.3 Significance of Impacts

The project would result in a net reduction of GHG emissions because of the electricity generated by the proposed PV facility. Therefore, the impact would be less than significant.

6.2 ISSUE 2: CONFLICT WITH APPLICABLE PLANS ADOPTED FOR THE PURPOSE OF REDUCING GHG EMISSIONS

6.2.1 Analysis in the Previously Adopted 2020 LRDP SEIR

6.2.1.1 State Laws

GHG emissions impacts were analyzed in Chapter 4.3, *Greenhouse Gas Emissions*, of the 2020 LRDP SEIR. The 2020 LRDP SEIR concluded that UC Merced would implement LRDP Mitigation Measures GHG-1a, 1b, and 1c to reduce its total emissions such that they are below 3,300 MT CO_2e/year, a target emissions level that is 40 percent less than the campus's 2020 emissions target. Therefore, with the implementation of LRDP Mitigation Measure GHG-2, which implements Mitigation Measures GHG-1a through 1-c, campus development under the 2020 LRDP would not conflict with the State laws and regulations related to GHG emissions. The impact would be less than significant with implementation of LRDP Mitigation Measure GHG-2.

6.2.1.2 UC Plans and Policies

The 2020 LRDP is a projected development program for the Merced campus for the years 2020 through 2030. Under the plan, the campus is anticipated to add about 1.83 million square feet of building space by 2030. The campus population is projected to increase to about 17,400 persons by 2030. The addition of building space would increase the use of energy on the campus and the additional population would result in more persons commuting to the campus. Increased on-campus population would also increase water use, wastewater generation and solid waste generation. All of these changes would have the potential to increase the campus's GHG emissions. However, as under existing conditions, campus development under the 2020 LRDP would continue to be completed in a manner that it is compliant with the UC Sustainable Practices Policy, UC Merced Sustainability Strategic Plan, and the UC Merced CAP.

The 2020 LRDP SEIR concluded campus projects under the 2020 LRDP would continue to achieve a minimum of a Silver rating under the LEED Green Building Rating System. UC Merced would continue to develop on-site renewable energy sources, procure clean energy, and obtain offsets as necessary, in compliance with LRDP Mitigation Measure GHG-1a. It would also continue to implement and expand TDM programs to minimize the increase in commuting and other emissions in compliance with LRDP Mitigation Measures AQ-2a and -2b, and evaluate and implement new technologies that reduce emissions, pursuant to LRDP Mitigation Measure GHG-1c. Therefore, with implementation of LRDP Mitigation Measure GHG-2, which implements LRDP Mitigation Measures GHG-1a through GHG-1c, the 2020 LRDP would not conflict with the UC Sustainable Practices Policy, or the UC Merced plans adopted to reduce GHG emissions. The impact would be less than significant with implementation of LRDP Mitigation Measure GHG-2.

6.2.2 Impacts

There are numerous State plans, policies, and regulations adopted for the purpose of reducing GHG emissions. Statewide plans and regulations such as GHG emissions standards for vehicles (AB 1493), the LCFS are being implemented at the Statewide level; as such, compliance at the project level is not addressed. Therefore, the project would not conflict with those plans and regulations.

The 2018 CAP notes that one approach to mitigating its climate effects is to generate from on-site renewable sources as much energy as is consumed annually (net zero energy). The UC Sustainable Practices Policy notes that 100 percent of the power that will be needed by the campus at buildout of the 2020 LRDP will be obtained from a number of renewable and alternative technologies, including wind turbines, fuel cells, and PV systems. As such, the proposed project would comply with the 2018 CAP and further the goals of the UC Sustainable Practices Policy, which establishes goals for green building, clean energy, transportation, climate protection, facilities operations, zero waste, procurement, food service, and water systems. Operation of the project would support the UC Sustainable Practices Policy requirements regarding energy efficiency and UC Merced's goals to build all-electric facilities in support of campus-wide decarbonization.

As also discussed in Section 6.1, above, operation of the project would result in a net reduction in GHG emissions. The project would support State policies for the procurement of renewable energy for the state's electricity grid, and the project would support the State goal of net zero GHG emission by 2045. Therefore, the project would not conflict with the CARB's 2022 Scoping plan or other State GHG emissions reduction plans, policies and regulations.

6.2.3 Significance of Impacts

The project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs, and the impact would be less than significant.

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Appendix A

CalEEMod Output

UC Merced Solar Detailed Report

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8.5.2. Area Sources

8.5.2.3. Architectural Coatings

8.5.4. Water and Waste Water

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	UC Merced Solar
Construction Start Date	1/1/2027
Operational Year	2028
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	2.80000
Precipitation (days)	23.4000
Location	37.36131837106507, -120.41352199241317
County	Merced
City	Unincorporated
Air District	San Joaquin Valley APCD
Air Basin	San Joaquin Valley
TAZ	2307
EDFZ	5
Electric Utility	Pacific Gas & Electric Company
Gas Utility	Pacific Gas & Electric
App Version	2022.1.1.43

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
Other Non-Asphalt Surfaces	48.6300	Acre	48.6300	0.00000	0.00000	—	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Unmit.	3.95644	30.6734	34.7932	0.09974	1.21782	13.9303	14.7640	1.12061	1.65016	2.71806	12,018.9
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Unmit.	5.59974	53.4899	50.9147	0.14103	2.01586	69.5735	71.5894	1.86485	11.5211	13.3859	17,412.9
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.92324	16.9922	18.6511	0.05099	0.61505	10.5940	11.2091	0.56793	1.83036	2.39829	6,025.37
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.35099	3.10107	3.40383	0.00931	0.11225	1.93341	2.04565	0.10365	0.33404	0.43769	997.569

2.2. Construction Emissions by Year

2.2.1. Total Construction Emissions by Year, Unmitigated

Includes both onsite and offsite emissions.

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
2027	3.95644	30.6734	34.7932	0.09974	1.21782	13.9303	14.7640	1.12061	1.65016	2.71806	12,018.9

Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
2027	5.59974	53.4899	50.9147	0.14103	2.01586	69.5735	71.5894	1.86485	11.5211	13.3859	17,412.9
Average Daily	—	—	—	—	—	—	—	—	—	—	—
2027	1.92324	16.9922	18.6511	0.05099	0.61505	10.5940	11.2091	0.56793	1.83036	2.39829	6,025.37
Annual	—	—	—	—	—	—	—	—	—	—	—
2027	0.35099	3.10107	3.40383	0.00931	0.11225	1.93341	2.04565	0.10365	0.33404	0.43769	997.569

2.2.2. Onsite Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
2027	3.83500	30.4437	33.2220	0.08556	1.21517	3.58978	4.80495	1.11796	1.42502	2.54298	9,296.05
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
2027	5.34905	45.2431	47.9108	0.09612	1.88755	10.4469	12.3345	1.73654	5.27840	7.01494	10,446.9
Average Daily	—	—	—	—	—	—	—	—	—	—	—
2027	1.82101	15.3100	17.5665	0.04031	0.58898	1.88250	2.47147	0.54186	0.87127	1.41313	4,354.96
Annual	—	—	—	—	—	—	—	—	—	—	—
2027	0.33234	2.79408	3.20589	0.00736	0.10749	0.34356	0.45104	0.09889	0.15901	0.25790	721.013

2.2.3. Offsite Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
2027	0.32003	3.91139	3.61703	0.03086	0.06173	13.9303	13.9920	0.06173	1.65016	1.71189	4,673.97

Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
2027	0.25069	8.24677	3.00387	0.04491	0.12831	59.1266	59.2549	0.12831	6.24267	6.37098	6,966.04
Average Daily	—	—	—	—	—	—	—	—	—	—	—
2027	0.10222	1.68215	1.08458	0.01068	0.02607	8.71151	8.73758	0.02607	0.95909	0.98516	1,670.42
Annual	—	—	—	—	—	—	—	—	—	—	—
2027	0.01866	0.30699	0.19794	0.00195	0.00476	1.58985	1.59461	0.00476	0.17503	0.17979	276.556

2.3. Operations Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.16964	0.00529	0.03548	0.00010	0.00009	0.00785	0.00794	0.00009	0.00200	0.00209	10.2889
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.16939	0.00596	0.02815	0.00009	0.00009	0.00785	0.00794	0.00009	0.00200	0.00209	9.56445
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.16941	0.00566	0.02916	0.00009	0.00009	0.00774	0.00783	0.00009	0.00197	0.00206	9.75529
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.03092	0.00103	0.00532	0.00002	0.00002	0.00141	0.00143	0.00002	0.00036	0.00038	1.61510

2.4. Operations Emissions by Sector, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.00304	0.00529	0.03548	0.00010	0.00009	0.00785	0.00794	0.00009	0.00200	0.00209	10.0433

Area	0.16660	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	0.00000
Energy	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	0.00000
Water	—	—	—	—	—	—	—	—	—	—	0.24561
Waste	—	—	—	—	—	—	—	—	—	—	0.00000
Total	0.16964	0.00529	0.03548	0.00010	0.00009	0.00785	0.00794	0.00009	0.00200	0.00209	10.2889
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.00278	0.00596	0.02815	0.00009	0.00009	0.00785	0.00794	0.00009	0.00200	0.00209	9.31884
Area	0.16660	—	—	—	—	—	—	—	—	—	—
Energy	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	0.00000
Water	—	—	—	—	—	—	—	—	—	—	0.24561
Waste	—	—	—	—	—	—	—	—	—	—	0.00000
Total	0.16939	0.00596	0.02815	0.00009	0.00009	0.00785	0.00794	0.00009	0.00200	0.00209	9.56445
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.00280	0.00566	0.02916	0.00009	0.00009	0.00774	0.00783	0.00009	0.00197	0.00206	9.50968
Area	0.16660	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	0.00000
Energy	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	0.00000
Water	—	—	—	—	—	—	—	—	—	—	0.24561
Waste	—	—	—	—	—	—	—	—	—	—	0.00000
Total	0.16941	0.00566	0.02916	0.00009	0.00009	0.00774	0.00783	0.00009	0.00197	0.00206	9.75529
Annual	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.00051	0.00103	0.00532	0.00002	0.00002	0.00141	0.00143	0.00002	0.00036	0.00038	1.57444
Area	0.03040	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	0.00000
Energy	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	0.00000
Water	—	—	—	—	—	—	—	—	—	—	0.04066
Waste	—	—	—	—	—	—	—	—	—	—	0.00000
Total	0.03092	0.00103	0.00532	0.00002	0.00002	0.00141	0.00143	0.00002	0.00036	0.00038	1.61510

3. Construction Emissions Details

3.1. Existing Panel Removal (2027)

3.1.1. Onsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.65762	5.43733	8.82900	0.02119	0.15106	—	0.15106	0.13897	—	0.13897	2,302.02
Demolition	—	—	—	—	—	0.00000	0.00000	—	0.00000	0.00000	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01802	0.14897	0.24189	0.00058	0.00414	—	0.00414	0.00381	—	0.00381	63.0690
Demolition	—	—	—	—	—	0.00000	0.00000	—	0.00000	0.00000	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.00329	0.02719	0.04414	0.00011	0.00076	—	0.00076	0.00069	—	0.00069	10.4418
Demolition	—	—	—	—	—	0.00000	0.00000	—	0.00000	0.00000	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

3.1.2. Offsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04226	0.03774	0.40906	0.00000	0.00000	0.07666	0.07666	0.00000	0.01797	0.01797	73.6254
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.01817	2.01926	0.24392	0.01252	0.03704	5.46205	5.49909	0.03704	0.63503	0.67207	1,903.61
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00118	0.00094	0.01160	0.00000	0.00000	0.00207	0.00207	0.00000	0.00048	0.00048	2.08371
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00051	0.05418	0.00663	0.00034	0.00101	0.14080	0.14181	0.00101	0.01649	0.01751	52.1936
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00021	0.00017	0.00212	0.00000	0.00000	0.00038	0.00038	0.00000	0.00009	0.00009	0.34498
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00009	0.00989	0.00121	0.00006	0.00019	0.02570	0.02588	0.00019	0.00301	0.00319	8.64125

3.2. Site Preparation (2027)

3.2.1. Onsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	5.34905	45.2431	47.9108	0.09612	1.88755	—	1.88755	1.73654	—	1.73654	10,446.9
Dust From Material Movement	—	—	—	—	—	10.4469	10.4469	—	5.27840	5.27840	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.58620	4.95815	5.25050	0.01053	0.20685	—	0.20685	0.19031	—	0.19031	1,144.86
Dust From Material Movement	—	—	—	—	—	1.14487	1.14487	—	0.57845	0.57845	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.10698	0.90486	0.95822	0.00192	0.03775	—	0.03775	0.03473	—	0.03473	189.545
Dust From Material Movement	—	—	—	—	—	0.20894	0.20894	—	0.10557	0.10557	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

3.2.2. Offsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.13735	0.12267	1.32943	0.00000	0.00000	0.24914	0.24914	0.00000	0.05840	0.05840	239.282
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.11334	8.12410	1.67443	0.04491	0.12831	58.8775	59.0058	0.12831	6.18427	6.31258	6,726.75
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01529	0.01228	0.15084	0.00000	0.00000	0.02689	0.02689	0.00000	0.00630	0.00630	27.0883
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.01312	0.86992	0.18116	0.00492	0.01406	6.04891	6.06297	0.01406	0.63714	0.65120	737.514
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00279	0.00224	0.02753	0.00000	0.00000	0.00491	0.00491	0.00000	0.00115	0.00115	4.48477

Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00240	0.15876	0.03306	0.00090	0.00257	1.10393	1.10649	0.00257	0.11628	0.11884	122.104

3.3. Grading (2027)

3.3.1. Onsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.83500	30.4437	33.2220	0.08556	1.21517	—	1.21517	1.11796	—	1.11796	9,296.05
Dust From Material Movement	—	—	—	—	—	3.58978	3.58978	—	1.42502	1.42502	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.83500	30.4437	33.2220	0.08556	1.21517	—	1.21517	1.11796	—	1.11796	9,296.05
Dust From Material Movement	—	—	—	—	—	3.58978	3.58978	—	1.42502	1.42502	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.78801	6.25555	6.82643	0.01758	0.24969	—	0.24969	0.22972	—	0.22972	1,910.15
Dust From Material Movement	—	—	—	—	—	0.73763	0.73763	—	0.29281	0.29281	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.14381	1.14164	1.24582	0.00321	0.04557	—	0.04557	0.04192	—	0.04192	316.247
Dust From Material Movement	—	—	—	—	—	0.13462	0.13462	—	0.05344	0.05344	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

3.3.2. Offsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.11888	0.07311	1.34085	0.00000	0.00000	0.19165	0.19165	0.00000	0.04492	0.04492	206.648
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00256	0.15662	0.03377	0.00093	0.00265	1.21397	1.21661	0.00265	0.12751	0.13016	138.886
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.10566	0.09436	1.02264	0.00000	0.00000	0.19165	0.19165	0.00000	0.04492	0.04492	184.063
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00234	0.16751	0.03452	0.00093	0.00265	1.21397	1.21661	0.00265	0.12751	0.13016	138.696
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02205	0.01771	0.21756	0.00000	0.00000	0.03879	0.03879	0.00000	0.00908	0.00908	39.0696
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00051	0.03363	0.00700	0.00019	0.00054	0.23385	0.23439	0.00054	0.02463	0.02518	28.5121
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00402	0.00323	0.03970	0.00000	0.00000	0.00708	0.00708	0.00000	0.00166	0.00166	6.46842
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00009	0.00614	0.00128	0.00003	0.00010	0.04268	0.04278	0.00010	0.00450	0.00459	4.72051

3.4. Panel Installation (2027)

3.4.1. Onsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.98504	18.0011	24.4037	0.05427	0.57558	—	0.57558	0.52953	—	0.52953	5,759.03
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.35894	3.25500	4.41273	0.00981	0.10408	—	0.10408	0.09575	—	0.09575	1,041.36
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.06551	0.59404	0.80532	0.00179	0.01899	—	0.01899	0.01747	—	0.01747	172.409
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

3.4.2. Offsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.19021	0.11698	2.14536	0.00000	0.00000	0.30664	0.30664	0.00000	0.07188	0.07188	330.637
Vendor	0.05820	3.00746	0.66245	0.02469	0.04938	10.8253	10.8747	0.04938	1.24538	1.29476	3,395.32
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03105	0.02493	0.30633	0.00000	0.00000	0.05461	0.05461	0.00000	0.01279	0.01279	55.0100
Vendor	0.01040	0.56684	0.12029	0.00446	0.00893	1.84067	1.84960	0.00893	0.21322	0.22215	613.174
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00567	0.00455	0.05590	0.00000	0.00000	0.00997	0.00997	0.00000	0.00233	0.00233	9.10754
Vendor	0.00190	0.10345	0.02195	0.00081	0.00163	0.33592	0.33755	0.00163	0.03891	0.04054	101.518
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

3.5. BESS Installation & Grid Tie (2027)

3.5.1. Onsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.56655	5.61590	6.77248	0.01460	0.19640	—	0.19640	0.18069	—	0.18069	1,585.89
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.06985	0.69237	0.83496	0.00180	0.02421	—	0.02421	0.02228	—	0.02228	195.520
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01275	0.12636	0.15238	0.00033	0.00442	—	0.00442	0.00407	—	0.00407	32.3706
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

3.5.2. Offsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05706	0.03509	0.64361	0.00000	0.00000	0.09199	0.09199	0.00000	0.02156	0.02156	99.1912
Vendor	0.01455	0.75186	0.16561	0.00617	0.01235	2.70633	2.71868	0.01235	0.31134	0.32369	848.829
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00635	0.00510	0.06266	0.00000	0.00000	0.01117	0.01117	0.00000	0.00262	0.00262	11.2521
Vendor	0.00177	0.09662	0.02050	0.00076	0.00152	0.31375	0.31527	0.00152	0.03634	0.03787	104.518
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00116	0.00093	0.01144	0.00000	0.00000	0.00204	0.00204	0.00000	0.00048	0.00048	1.86291
Vendor	0.00032	0.01763	0.00374	0.00014	0.00028	0.05726	0.05754	0.00028	0.00663	0.00691	17.3042
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—

Other Non-Asphalt Surfaces	0.00304	0.00529	0.03548	0.00010	0.00009	0.00785	0.00794	0.00009	0.00200	0.00209	10.0433
Total	0.00304	0.00529	0.03548	0.00010	0.00009	0.00785	0.00794	0.00009	0.00200	0.00209	10.0433
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	0.00278	0.00596	0.02815	0.00009	0.00009	0.00785	0.00794	0.00009	0.00200	0.00209	9.31884
Total	0.00278	0.00596	0.02815	0.00009	0.00009	0.00785	0.00794	0.00009	0.00200	0.00209	9.31884
Annual	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	0.00051	0.00103	0.00532	0.00002	0.00002	0.00141	0.00143	0.00002	0.00036	0.00038	1.57444
Total	0.00051	0.00103	0.00532	0.00002	0.00002	0.00141	0.00143	0.00002	0.00036	0.00038	1.57444

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00000
Total	—	—	—	—	—	—	—	—	—	—	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00000
Total	—	—	—	—	—	—	—	—	—	—	0.00000

Annual	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00000
Total	—	—	—	—	—	—	—	—	—	—	0.00000

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	0.00000
Total	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	0.00000
Total	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	0.00000
Total	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	0.00000

4.3. Area Emissions by Source

4.3.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.16660	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.00000	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	0.00000
Total	0.16660	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.16660	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.00000	—	—	—	—	—	—	—	—	—	—
Total	0.16660	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.03040	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.00000	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	0.00000
Total	0.03040	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	0.00000

4.4. Water Emissions by Land Use

4.4.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—

Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.24561
Total	—	—	—	—	—	—	—	—	—	—	0.24561
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.24561
Total	—	—	—	—	—	—	—	—	—	—	0.24561
Annual	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.04066
Total	—	—	—	—	—	—	—	—	—	—	0.04066

4.5. Waste Emissions by Land Use

4.5.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00000
Total	—	—	—	—	—	—	—	—	—	—	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00000
Total	—	—	—	—	—	—	—	—	—	—	0.00000

Annual	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00000
Total	—	—	—	—	—	—	—	—	—	—	0.00000

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—

Total	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—

Annual	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Existing Panel Removal	Demolition	1/1/2027	1/14/2027	5.00000	10.00000	—
Site Preparation	Site Preparation	1/15/2027	3/11/2027	5.00000	40.0000	—
Grading	Grading	3/12/2027	6/24/2027	5.00000	75.0000	—
Panel Installation	Building Construction	6/25/2027	9/24/2027	5.00000	66.0000	—
BESS Installation & Grid Tie	Building Construction	7/25/2027	9/24/2027	5.00000	45.0000	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Existing Panel Removal	Rough Terrain Forklifts	Diesel	Average	2.00000	8.00000	96.0000	0.40000
Existing Panel Removal	Skid Steer Loaders	Diesel	Average	1.000000	8.00000	71.0000	0.37000
Existing Panel Removal	Off-Highway Trucks	Diesel	Average	1.000000	8.00000	376.000	0.38000
Site Preparation	Rubber Tired Dozers	Diesel	Average	4.00000	8.00000	367.000	0.40000
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Average	4.00000	8.00000	84.0000	0.37000
Site Preparation	Graders	Diesel	Average	1.000000	8.00000	148.000	0.41000
Site Preparation	Rollers	Diesel	Average	1.000000	8.00000	36.0000	0.38000
Site Preparation	Rough Terrain Forklifts	Diesel	Average	1.000000	8.00000	96.0000	0.40000
Site Preparation	Off-Highway Trucks	Diesel	Average	2.00000	8.00000	376.000	0.38000
Grading	Graders	Diesel	Average	1.000000	8.00000	148.000	0.41000

Grading	Excavators	Diesel	Average	2.00000	8.00000	36.0000	0.38000
Grading	Tractors/Loaders/Backhoes	Diesel	Average	2.00000	8.00000	84.0000	0.37000
Grading	Scrapers	Diesel	Average	2.00000	8.00000	423.000	0.48000
Grading	Rubber Tired Dozers	Diesel	Average	1.000000	8.00000	367.000	0.40000
Grading	Off-Highway Trucks	Diesel	Average	2.00000	8.00000	376.000	0.38000
Panel Installation	Generator Sets	Diesel	Average	1.000000	8.00000	14.0000	0.74000
Panel Installation	Cranes	Diesel	Average	2.00000	8.00000	367.000	0.29000
Panel Installation	Welders	Diesel	Average	1.000000	8.00000	46.0000	0.45000
Panel Installation	Skid Steer Loaders	Diesel	Average	2.00000	8.00000	71.0000	0.37000
Panel Installation	Rough Terrain Forklifts	Diesel	Average	2.00000	8.00000	96.0000	0.40000
Panel Installation	Bore/Drill Rigs	Diesel	Average	2.00000	8.00000	83.0000	0.50000
Panel Installation	Excavators	Diesel	Average	1.000000	8.00000	36.0000	0.38000
Panel Installation	Off-Highway Trucks	Diesel	Average	1.000000	8.00000	376.000	0.38000
BESS Installation & Grid Tie	Cranes	Diesel	Average	1.000000	8.00000	367.000	0.29000
BESS Installation & Grid Tie	Forklifts	Diesel	Average	1.000000	8.00000	82.0000	0.20000
BESS Installation & Grid Tie	Tractors/Loaders/Backhoes	Diesel	Average	1.000000	8.00000	84.0000	0.37000
BESS Installation & Grid Tie	Aerial Lifts	Diesel	Average	1.000000	8.00000	46.0000	0.31000

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Existing Panel Removal	Worker	10.00000	10.8500	LDA,LDT1,LDT2
Existing Panel Removal	Vendor	—	8.27000	HHDT,MHDT
Existing Panel Removal	Hauling	8.00000	70.0000	HHDT

Existing Panel Removal	Onsite truck	—	—	HHDT
Site Preparation	Worker	32.5000	10.8500	LDA,LDT1,LDT2
Site Preparation	Vendor	—	8.27000	HHDT,MHDT
Site Preparation	Hauling	97.0000	20.0000	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Grading	Worker	25.0000	10.8500	LDA,LDT1,LDT2
Grading	Vendor	—	8.27000	HHDT,MHDT
Grading	Hauling	2.00000	20.0000	HHDT
Grading	Onsite truck	—	—	HHDT
Panel Installation	Worker	40.0000	10.8500	LDA,LDT1,LDT2
Panel Installation	Vendor	16.0000	70.0000	HHDT,MHDT
Panel Installation	Hauling	0.00000	20.0000	HHDT
Panel Installation	Onsite truck	—	—	HHDT
BESS Installation & Grid Tie	Worker	12.0000	10.8500	LDA,LDT1,LDT2
BESS Installation & Grid Tie	Vendor	4.00000	70.0000	HHDT,MHDT
BESS Installation & Grid Tie	Hauling	0.00000	20.0000	HHDT
BESS Installation & Grid Tie	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Non-applicable. No control strategies activated by user.

5.5. Architectural Coatings

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (Cubic Yards)	Material Exported (Cubic Yards)	Acres Graded (acres)	Material Demolished (sq. ft.)	Acres Paved (acres)

Existing Panel Removal	0.00000	0.00000	0.00000	—	0.00000
Site Preparation	—	31,040.0	100.0000	0.00000	0.00000
Grading	1,200.00	—	225.000	0.00000	0.00000

5.6.2. Construction Earthmoving Control Strategies

Control Strategies Applied	Frequency (per day)	PM10 Reduction	PM2.5 Reduction
Water Exposed Area	2	61%	61%
Water Demolished Area	2	36%	36%

5.7. Construction Paving

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2027	0.00000	203.983	0.03300	0.00400

5.9. Operational Mobile Sources

5.9.1. Unmitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Other Non-Asphalt Surfaces	0.68082	0.68082	0.68082	248.499	10.9592	10.9592	10.9592	4,000.12

5.10. Operational Area Sources

5.10.1. Hearths

Land Use	Hearth Type	Unmitigated (number)	Mitigated (number)
Other Non-Asphalt Surfaces	Wood Fireplaces	0	0

Other Non-Asphalt Surfaces	Gas Fireplaces	0	0
Other Non-Asphalt Surfaces	Propane Fireplaces	0	0
Other Non-Asphalt Surfaces	Electric Fireplaces	0	0
Other Non-Asphalt Surfaces	No Fireplaces	0	0
Other Non-Asphalt Surfaces	Conventional Wood Stoves	0	0
Other Non-Asphalt Surfaces	Catalytic Wood Stoves	0	0
Other Non-Asphalt Surfaces	Non-Catalytic Wood Stoves	0	0
Other Non-Asphalt Surfaces	Pellet Wood Stoves	0	0

5.10.2. Architectural Coatings

Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
0.00000	0.00000	0.00000	0.00000	0.00000

5.10.3. Landscape Equipment

Season	Unit	Value
Snow Days	day/yr	0.00000
Summer Days	day/yr	180.000

5.11. Operational Energy Consumption

5.11.1. Unmitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
Other Non-Asphalt Surfaces	0.00000	203.983	0.0330	0.0040	0.00000

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
Other Non-Asphalt Surfaces	0.00000	250,000

5.13. Operational Waste Generation

5.13.1. Unmitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
Other Non-Asphalt Surfaces	0.00000	0.00000

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

5.16.2. Process Boilers

5.17. User Defined

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will continue to rise strongly through 2050 and then plateau around 2100.

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	28.7500	annual days of extreme heat
Extreme Precipitation	1.80000	annual days with precipitation above 20 mm
Sea Level Rise	—	meters of inundation depth
Wildfire	26.3000	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (Radke et al., 2017, CEC-500-2017-008), and consider inundation location and depth for the San Francisco Bay, the Sacramento-San Joaquin River Delta and California coast resulting different increments of sea level rise coupled with extreme storm events. Users may select from four scenarios to view the range in potential inundation depth for the grid cell. The four scenarios are: No rise, 0.5 meter, 1.0 meter, 1.41 meters

Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	3	0	0	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	N/A	N/A	N/A	N/A
Flooding	0	0	0	N/A
Drought	0	0	0	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	0	0	0	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	3	1	1	3
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	N/A	N/A	N/A	N/A
Flooding	1	1	1	2
Drought	1	1	1	2
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	1	1	1	2

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	74.1008
AQ-PM	59.7013
AQ-DPM	16.1419
Drinking Water	71.5749
Lead Risk Housing	71.0145
Pesticides	78.7931
Toxic Releases	17.4794
Traffic	3.08750
Effect Indicators	—
CleanUp Sites	5.63643
Groundwater	76.5731
Haz Waste Facilities/Generators	0.00000
Impaired Water Bodies	33.1583
Solid Waste	52.8981
Sensitive Population	—
Asthma	82.6147

Cardio-vascular	52.9163
Low Birth Weights	37.5802
Socioeconomic Factor Indicators	—
Education	97.8740
Housing	34.8035
Linguistic	97.4286
Poverty	88.4296
Unemployment	95.8615

7.2. Healthy Places Index Scores

The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Economic	—
Above Poverty	7.506736815
Employed	7.750545361
Median HI	9.842166046
Education	—
Bachelor's or higher	13.1271654
High school enrollment	23.00782754
Preschool enrollment	76.63287566
Transportation	—
Auto Access	40.90850764
Active commuting	35.86552034
Social	—
2-parent households	49.18516617
Voting	14.52585654
Neighborhood	—
Alcohol availability	59.52778134

Park access	27.39638137
Retail density	2.669061979
Supermarket access	2.399589375
Tree canopy	54.21532144
Housing	—
Homeownership	45.79751059
Housing habitability	36.84075452
Low-inc homeowner severe housing cost burden	42.38419094
Low-inc renter severe housing cost burden	62.8127807
Uncrowded housing	24.18837418
Health Outcomes	—
Insured adults	20.69806236
Arthritis	0.0
Asthma ER Admissions	1.5
High Blood Pressure	0.0
Cancer (excluding skin)	0.0
Asthma	0.0
Coronary Heart Disease	0.0
Chronic Obstructive Pulmonary Disease	0.0
Diagnosed Diabetes	0.0
Life Expectancy at Birth	75.4
Cognitively Disabled	8.5
Physically Disabled	9.6
Heart Attack ER Admissions	0.0
Mental Health Not Good	0.0
Chronic Kidney Disease	0.0
Obesity	0.0
Pedestrian Injuries	68.8

Physical Health Not Good	0.0
Stroke	0.0
Health Risk Behaviors	—
Binge Drinking	0.0
Current Smoker	0.0
No Leisure Time for Physical Activity	0.0
Climate Change Exposures	—
Wildfire Risk	0.0
SLR Inundation Area	0.0
Children	26.6
Elderly	63.3
English Speaking	7.6
Foreign-born	83.3
Outdoor Workers	1.4
Climate Change Adaptive Capacity	—
Impervious Surface Cover	88.5
Traffic Density	3.5
Traffic Access	0.0
Other Indices	—
Hardship	96.0
Other Decision Support	—
2016 Voting	45.9

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	74.0000
Healthy Places Index Score for Project Location (b)	14.0000
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	Yes

Project Located in a Low-Income Community (Assembly Bill 1550)	Yes
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

8.1. Justifications

Screen	Justification
Construction: Construction Phases	Project timeline per project team and assumptions from similar solar projects. No paving and no architectural coatings.
Construction: Off-Road Equipment	Equipment for existing panel removal, installation of panel and skids, and installation of BESS estimated based on input from project team and assumptions from similar solar projects. Off-Road Trucks = water trucks. Bore/Drill Rigs = vibratory pile driver for installation of panel piles and bore rigs for installation of overhead power poles.
Construction: Trips and VMT	80 one-way haul truck trips (8 trips per day) added to Existing Panel Removal for transport of old panels and transformers to Stockton (70 miles one-way distance). 40 one-way worker commute trips per day added to Panel Installation. 16 one-way vendor trips added to Panel Installation for delivery of panels and supplies from Stockton (70 miles one-way distance). 12 one-way worker commute trips per day added to BESS Installation & Grid Tie. 4 one-way vendor trips per day added to BESS Installation & Grid Tie for delivery of battery systems and supplies from Stockton (70 miles one-way distance).
Construction: On-Road Fugitive Dust	0.4 miles of travel on unpaved access road assumed for all haul truck and vendor trips.
Operations: Vehicle Data	Maximum daily worker trips = 4 for periodic maintenance and 20 for annual module washing and vegetation management: 248 trips per year = 0.679 trips per day average.
Operations: Architectural Coatings	No operational architectural coating.

Operations: Water and Waste Water	250,000 gallons per water used for panel washing and livestock drinking water.

8.4. Construction

8.4.1. Construction Phases

Phase Type	Phase Name	Model Parameter	Default Value	New Value
Site Preparation	Site Preparation	Start Date	3/13/2027	1/15/2027
Site Preparation	Site Preparation	End Date	4/24/2027	3/11/2027
Site Preparation	Site Preparation	Work Days per Phase	30.0000	40.0000
Grading	Grading	Start Date	4/25/2027	3/12/2027
Grading	Grading	End Date	8/8/2027	6/24/2027

8.4.2. Off-Road Equipment

Phase Name	Equipment Type	Model Parameter	Default Value	New Value
Existing Panel Removal	Off-Highway Trucks	Number per Day	2.00000	1.000000
Site Preparation	Rubber Tired Dozers	Number per Day	3.00000	4.00000
Panel Installation	Cranes	Number per Day	1.000000	2.00000
Panel Installation	Cranes	Hours Per Day	7.00000	8.00000
Panel Installation	Bore/Drill Rigs	Number per Day	1.000000	2.00000
BESS Installation & Grid Tie	Cranes	Hours Per Day	7.00000	8.00000
BESS Installation & Grid Tie	Forklifts	Number per Day	3.00000	1.000000
BESS Installation & Grid Tie	Tractors/Loaders/Backhoes	Number per Day	3.00000	1.000000
BESS Installation & Grid Tie	Tractors/Loaders/Backhoes	Hours Per Day	7.00000	8.00000

8.4.6. Trips and VMT

Phase Name	Trip Type	Model Parameter	Default Value	New Value
Existing Panel Removal	Hauling	One-Way Trips per Day	0.00000	8.00000

Existing Panel Removal	Hauling	Miles per Trip	20.0000	70.0000
Panel Installation	Worker	One-Way Trips per Day	0.00000	40.0000
Panel Installation	Vendor	One-Way Trips per Day	0.00000	16.0000
Panel Installation	Vendor	Miles per Trip	8.27000	70.0000
BESS Installation & Grid Tie	Worker	One-Way Trips per Day	0.00000	12.0000
BESS Installation & Grid Tie	Vendor	One-Way Trips per Day	0.00000	4.00000
BESS Installation & Grid Tie	Vendor	Miles per Trip	8.27000	70.0000

8.4.7. On-Road Fugitive Dust

Phase Name	Model Parameter	Units	Default Value	New Value
Existing Panel Removal	Hauling Trip Paved	%	100.0000	99.4000
Site Preparation	Hauling Trip Paved	%	100.0000	98.0000
Grading	Hauling Trip Paved	%	100.0000	98.0000
Panel Installation	Vendor Trip Paved	%	100.0000	99.4000
BESS Installation & Grid Tie	Vendor Trip Paved	%	100.0000	99.4000

8.5. Operations

8.5.1. Mobile Sources

8.5.1.1. Vehicle Data

Land Use	Model Parameter	Units	Default Value	New Value
Other Non-Asphalt Surfaces	Weekday Trip Rate	size/day	0.00000	0.01400
Other Non-Asphalt Surfaces	Saturday Trip Rate	size/day	0.00000	0.01400
Other Non-Asphalt Surfaces	Sunday Trip Rate	size/day	0.00000	0.01400

8.5.2. Area Sources

8.5.2.3. Architectural Coatings

Model Parameter	Units	Default Value	New Value
Parking Area	sq ft	127,099	0.00000

8.5.4. Water and Waste Water

Land Use	Model Parameter	Units	Default Value	New Value
Other Non-Asphalt Surfaces	Outdoor Water	gal/year	0.00000	250,000

Appendix B

Solar Calculations

Enhance PVWatts® with features tailored to your specific needs!
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Caution: Photovoltaic system performance predictions calculated by PVWatts® include many inherent assumptions and uncertainties and do not reflect variations between PV technologies nor site-specific characteristics except as represented by PVWatts® inputs. For example, PV modules with better performance are not differentiated within PVWatts® from lesser performing modules. Both NLR and private companies provide more sophisticated PV modeling tools (such as the System Advisor Model at //sam.nlr.gov) that allow for more precise and complex modeling of PV systems.

The expected range is based on 30 years of actual weather data at the given location and is intended to provide an indication of the variation you might see. For more information, please refer to this NLR report: The Error Report.

Disclaimer: The PVWatts® Model ("Model") is provided by the National Lab of the Rockies ("NLR"), which is operated by the Alliance for Energy Innovation, LLC ("Alliance") for the U.S. Department Of Energy ("DOE") and may be used for any purpose whatsoever.

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The energy output range is based on analysis of 30 years of historical weather data, and is intended to provide an indication of the possible interannual variability in generation for a Fixed (open rack) PV system at this location.

RESULTS

14,192,051 kWh/Year*

System output may range from 13,120,551 to 14,613,555 kWh per year near this location.

Month	Solar Radiation (kWh / m^2 / day)	AC Energy (kWh)
January	4.73	696,760
February	6.02	786,974
March	8.00	1,152,749
April	9.14	1,262,916
May	10.81	1,519,680
June	12.21	1,629,610
July	12.20	1,649,215
August	10.97	1,481,056
September	10.25	1,366,505
October	8.02	1,122,479
November	6.02	836,712
December	4.75	687,394
Annual	**8.59**	**14,192,050**

Location and Station Identification

Requested Location	5200 Lake Rd, Merced, CA 95343
Solar Resource Data Location	NSRDB Lat/Lng: 37.37, -120.42
Latitude	37.37° N
Longitude	120.42° W

PV System Specifications

DC System Size	6000 kW
Module Type	Standard
Array Type	2-Axis Tracking
System Losses	14.08%
Array Tilt	0°
Array Azimuth	180°
DC to AC Size Ratio	1.2
Inverter Efficiency	96%
Ground Coverage Ratio	0.4
Albedo	*From weather file*
Bifacial	No (0)

Monthly Irradiance Loss	Jan	Feb	Mar	Apr	May	June
	0%	0%	0%	0%	0%	0%
	July	Aug	Sept	Oct	Nov	Dec
	0%	0%	0%	0%	0%	0%

Performance Metrics

DC Capacity Factor	27.0%

Appendix C

Biological Resources Assessment

University of California, Merced Solar Infrastructure and Battery Energy Storage System Project

Biological Resources Assessment

June 2026 | 08456.00006.001

Prepared for:

University of California, Merced
5200 Lake Road
Merced, CA 95343

Prepared by:

HELIX Environmental Planning, Inc.
1180 Iron Point Road, Suite 130
Folsom, CA 95630

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ACRONYMS AND ABBREVIATIONS

AOA	Academic Office Annex
ARD	Aquatic Resources Delineation
BESS	battery energy storage system
BRA	Biological Resources Assessment
CAPE	Center for Analytic Political Engagement
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CRPR	California Rare Plant Rank
CSA	California Special Animals
CWA	Clean Water Act
DBH	Diameter at Breast Height
EIR	Environmental Impact Report
EPA	Environmental Protection Agency
FESA	Federal Endangered Species Act
FGC	Fish and Game Code
GPS	Global Positioning System
HELIX	HELIX Environmental Planning, Inc.
HCP	Habitat Conservation Plan
HUC	Hydrologic Unit Code
IPaC	Information for Planning and Consultation
LRDP	Long-Range Development Plan
MBTA	Migratory Bird Treaty Act
MW	megawatt
MM	Mitigation Measure
MSL	Mean Sea Level
NCCP	Natural Community Conservation Plan
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NPPA	Native Plant Protection Act
NRCS	Natural Resources Conservation Service

ACRONYMS AND ABBREVIATIONS (cont.)

PCE	Primary Constituent Elements
Project	Solar Infrastructure and Battery Energy Storage System Project
RWQCB	Regional Water Quality Control Board
SAA	Streambed Alteration Agreement
Sf	Square feet
SSC	Species of Special Concern
SWRCB	State Water Resources Control Board
UC	University of California
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

EXECUTIVE SUMMARY

HELIX Environmental Planning, Inc. (HELIX) conducted a Biological Resources Assessment (BRA) for the proposed Solar Infrastructure and Battery Energy Storage System Project (Project). The proposed Project (Study Area) encompasses 86.67 acres and is located in the eastern portion of the University of California (UC), Merced campus adjacent to Cottonwood Lane. Approximately 48.63 acres of the total 86.67-acre Study Area would be impacted by the Project and is defined as the Project Impact Area.

The purpose of this BRA is to assess general biological resources that occur within the Study Area, suitability of habitats to support special-status plant and wildlife species, presence of sensitive vegetation communities and/or habitats, analyze any potential impacts to biological resources that could occur as a result of the proposed Project, and identify mitigation measures to avoid and/or reduce any such impacts to the extent feasible.

Vegetation communities present within the Study Area include pasture, seasonal wetland, annual grassland, ruderal, and urban. Surrounding land uses include two canals, regional parks, grazing/grassland, row crop and orchard agriculture, and UC Merced student services and UC Merced classroom and office buildings.

Known or potential biological resources in the Study Area include the following:

- Potential habitat for federally and State listed special-status plant species;
- Potential habitat for special-status invertebrates, including Crotch's bumble bee (*Bombus crotchii*), Conservancy fairy shrimp (*Branchinecta conservatio*), vernal pool fairy shrimp (*Branchinecta lynchi*), and vernal pool tadpole shrimp (*Lepidurus packardi*);
- Potential habitat for special-status herpetofauna, including California tiger salamander (*Ambystoma californiense*), western spadefoot (*Spea hammondii*), and northwestern pond turtle (*Actinemys marmorata*);
- Potential habitat for special-status birds and nesting migratory birds, including burrowing owl (*Athene cunicularia*) and Swainson's hawk (*Buteo swainsoni*); and
- Potential habitat for special-status mammals, including San Joaquin kit fox (*Vulpes macrotis mutica*) and American badger (*Taxidea taxus*).

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1.0 INTRODUCTION

This report summarizes the findings of a Biological Resources Assessment (BRA) completed by HELIX Environmental Planning, Inc. (HELIX) for the proposed Solar Infrastructure and Battery Energy Storage System Project (Project) located on the University of California (UC), Merced campus. This document addresses physical features, plant communities present, and common plant and wildlife species occurring or potentially occurring in the 86.67-acre Project site (Study Area). The Study Area is partially developed with an existing solar facility, surrounded by pasturelands and areas of undeveloped land. Habitats within the Study Area are assessed for their suitability to support special-status species, sensitive habitats are identified and quantified, and mitigation measures are identified to avoid and/or reduce any such impacts to the extent feasible. Project demolition, construction, and operation activities are anticipated to impact 48.63 acres of the 86.67-acre Study Area.

1.1 PROJECT LOCATION

The 86.67-acre Study Area is in the eastern portion of the UC Merced campus, along Cottonwood Lane. The Study Area is located in Township 6 South, Range 14 East, Sections 34 and 35, and Township 7 South, Range 14 East and Sections 2 and 3 of the U.S. Geological Survey (USGS) *Merced, California* 7.5-minute quadrangle map. The approximate center of the Study Area is at latitude 37.362547 and longitude -120.414190.

A site and vicinity map of the Study Area is included as Figure 1; a topographic map of the Study Area is included as Figure 2; and an aerial image of the Study Area is included as Figure 3.

1.2 PROJECT DESCRIPTION

The proposed Project would include the demolition of the existing 1-Megawatt (MW) ground-mounted, single-axis tracking system and construction of an up-to-6-MW solar photovoltaic (PV) facility. The proposed solar PV facility would consist of individual PV modules arranged in rows onto either a single-axis tracker racking system or fixed-tilt racking system. Each row (or array) would be connected by low-voltage underground or aboveground electrical wiring to a central inverter station or to string inverters located throughout the facility, where the electricity would be converted from direct current (DC) to alternating current (AC). It is anticipated that the maximum height of the PV modules would be up to 31 feet at full tilt. There is potential for the proposed project to include the integration of dual-use solar that would allow for seasonal animal grazing on-site, referred to as agrivoltaics.

The project would construct a battery energy storage system (BESS) with a minimum storage capacity of 3 MWh and would also include access road improvements, utility improvements, and site fencing.

2.0 REGULATORY SETTING

Federal, State, and local environmental laws, regulations, and policies relevant to the California Environmental Quality Act (CEQA) review process are summarized below. The applicable CEQA significance criteria are also included in this section.

2.1 FEDERAL REGULATIONS

2.1.1 Federal Endangered Species Act

The U.S. Congress passed the Federal Endangered Species Act (FESA) in 1973 to protect those species that are endangered or threatened with extinction. FESA is intended to operate in conjunction with the National Environmental Policy Act (NEPA) to help protect the ecosystems upon which endangered and threatened species depend.

FESA prohibits the "take" of endangered or threatened wildlife species. "Take" is defined to include harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, or collecting wildlife species or any attempt to engage in such conduct (FESA Section 3 [(3) (19)]). Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns (50 CFR §17.3). Harass is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns (50 CFR §17.3). Actions that result in take can result in civil or criminal penalties.

In the context of the proposed Project, FESA consultation with the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS) would be initiated if development resulted in take of a threatened or endangered species or if issuance of a Section 404 permit or other federal agency action could result in take of an endangered species or adversely modify critical habitat of such a species.

2.1.2 Migratory Bird Treaty Act

Raptors (birds of prey), migratory birds, and other avian species are protected by several state and federal laws. The federal Migratory Bird Treaty Act (MBTA) prohibits the killing, possessing, or trading of migratory birds except in accordance with regulations prescribed by the Secretary of Interior.

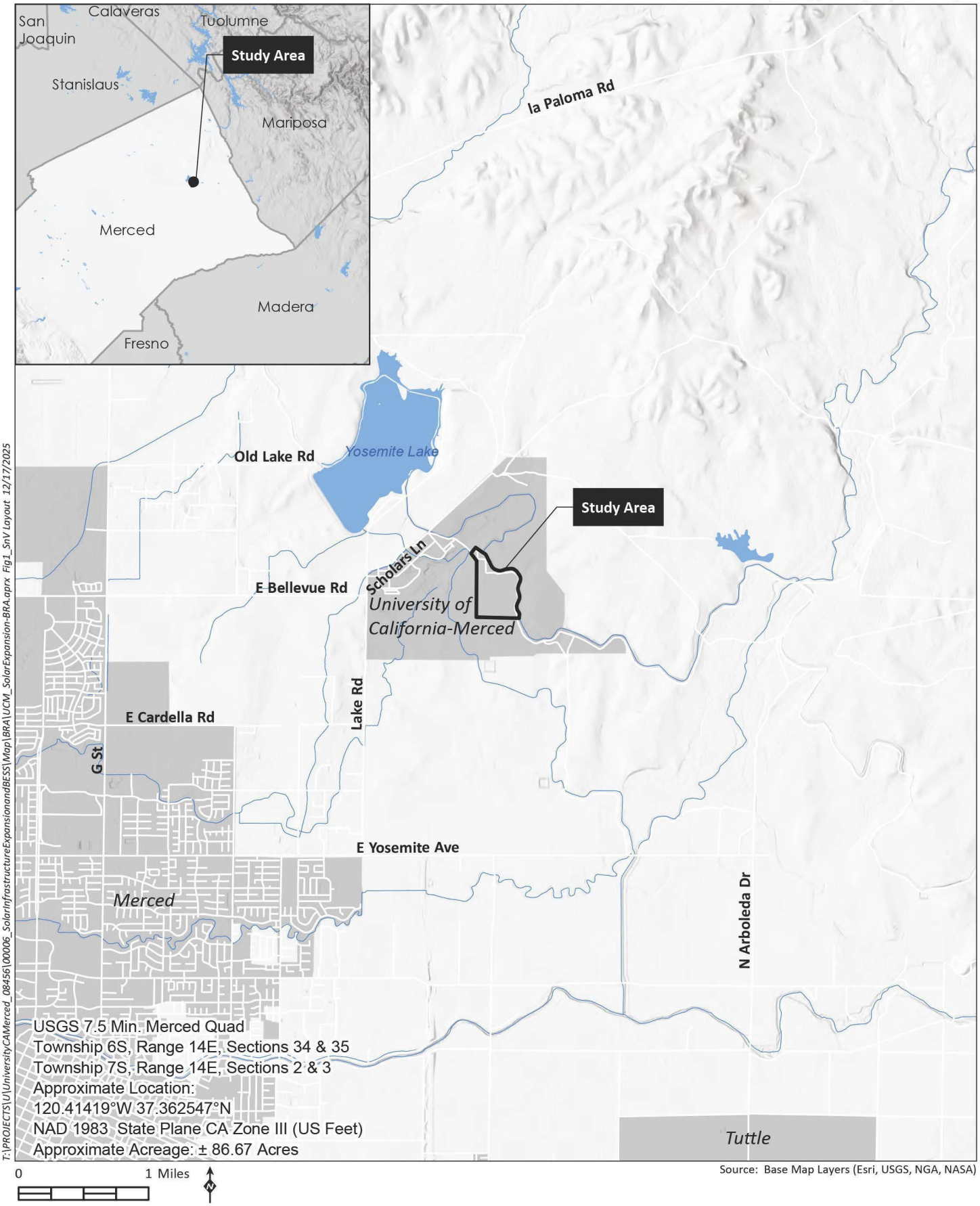
2.1.3 The Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (Eagle Act) prohibits the taking or possession of and commerce in bald and golden eagles with limited exceptions. Under the Eagle Act, it is a violation to "*take, possess, sell, purchase, barter, offer to sell, transport, export or import, at any time or in any manner, any bald eagle commonly known as the American eagle, or golden eagle, alive or dead, or any part, nest, or egg, thereof.*" Take is defined to include pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest, and disturb. Disturb is further defined in 50 CFR Part 22.3 as "*to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.*"

2.2 STATE JURISDICTION

2.2.1 California Endangered Species Act

The State of California enacted the California Endangered Species Act (CESA) in 1984. CESA is similar to the FESA but pertains to State-listed endangered and threatened species. CESA requires state agencies to consult with the California Department of Fish and Wildlife (CDFW), when preparing CEQA

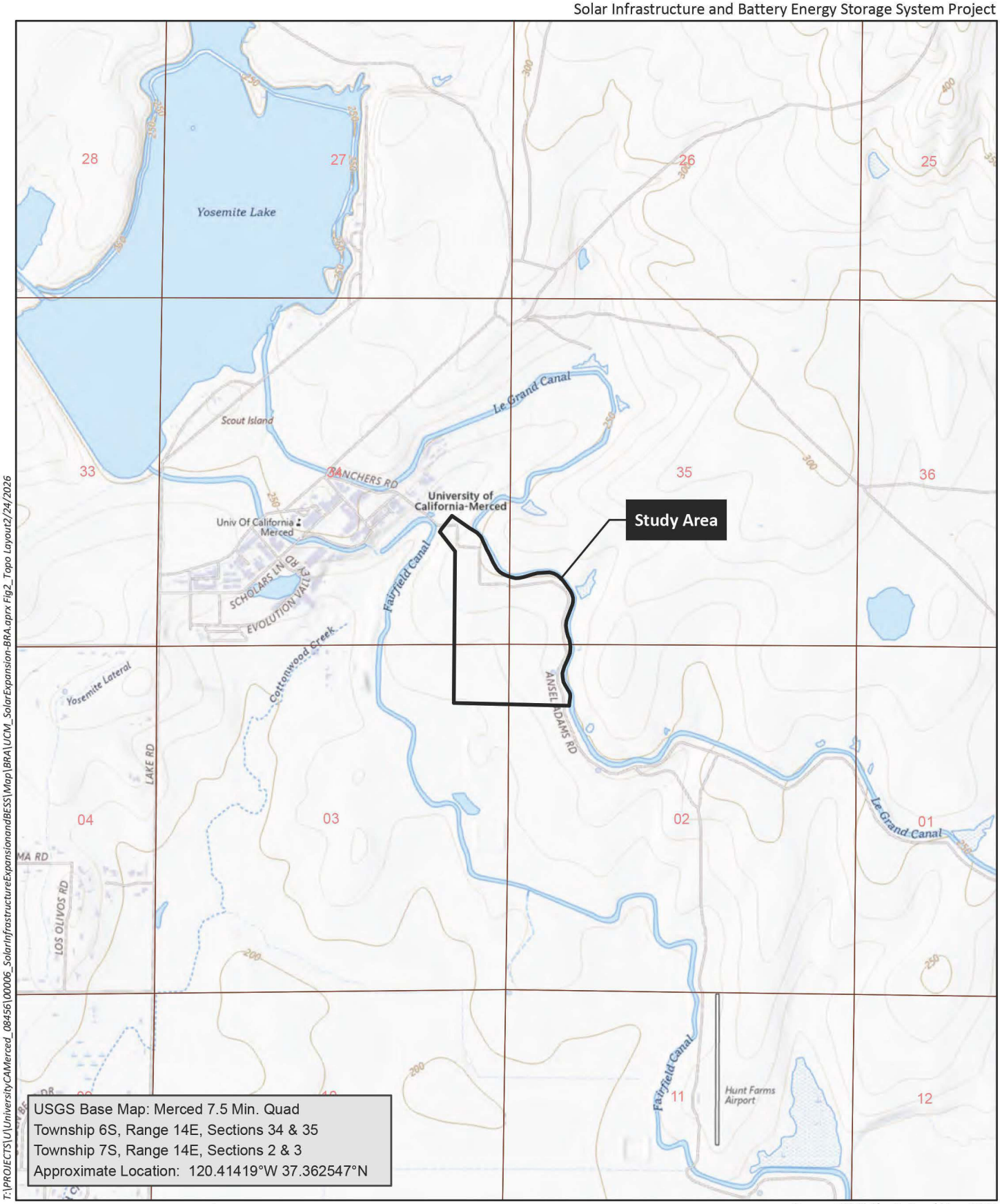


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HELIX Environmental Planning

Site and Vicinity Map

Figure 1



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USGS Base Map: Merced 7.5 Min. Quad
Township 6S, Range 14E, Sections 34 & 35
Township 7S, Range 14E, Sections 2 & 3
Approximate Location: 120.41419°W 37.362547°N

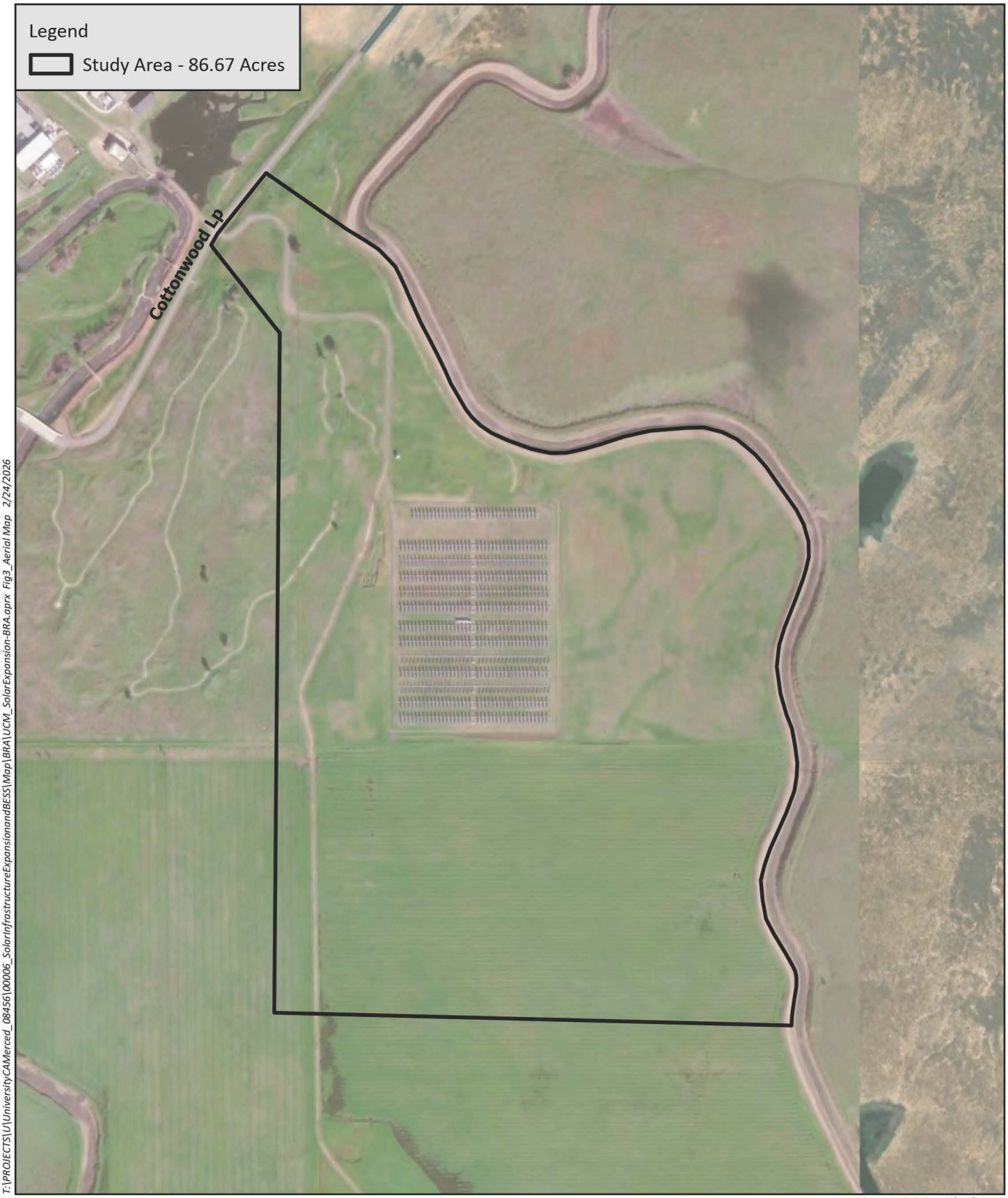
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Source: USGS, The National Map, 2025

HELIX Environmental Planning

USGS Topographic Map

Figure 2



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0 450 Feet

Source: Aerial (DigitalGlobe, 8/16/2024)

HELIX Environmental Planning

Aerial Map

Figure 3

documents. The purpose is to ensure that the State lead agency actions do not jeopardize the continued existence of a listed species or result in the destruction, or adverse modification of habitat essential to the continued existence of those species, if there are reasonable and prudent alternatives available (Fish and Game Code (FGC) §2080). CESA directs agencies to consult with CDFW on projects or actions that could affect listed species, directs CDFW to determine whether jeopardy would occur, and allows CDFW to identify "reasonable and prudent alternatives" to the Project consistent with conserving the species. CESA allows CDFW to authorize exceptions to the State's prohibition against take of a listed species if the "take" of a listed species is incidental to carrying out an otherwise lawful project that has been approved under CEQA (Fish & Game Code § 2081).

2.2.2 California Department of Fish and Game Codes

California Fish and Game Code Sections 3503 and 3800 prohibit the possession, take, or needless destruction of birds, their nests, and eggs, and the salvage of dead nongame birds. California Fish and Game Code Subsection 3503.5 protects all birds in the orders of Falconiformes and Strigiformes (birds of prey). Fish and Game Code Section 3513 states that it is unlawful to take or possess any migratory nongame bird as designated in the Migratory Bird Treaty Act or any part of such migratory nongame bird except as provided by rules and regulations adopted by the Secretary of the Interior under provisions of the Migratory Bird Treaty Act. The Attorney General of California has released an opinion that the Fish and Game Code prohibits incidental take.

2.2.3 Native Plant Protection Act

The Native Plant Protection Act (NPPA), enacted in 1977, allows the Fish and Game Commission to designate plants as rare or endangered. There are 64 species, subspecies, and varieties of plants protected under the NPPA. The NPPA prohibits take of endangered or rare native plants, with some exceptions for agricultural and nursery operations and emergencies. Vegetation removal from canals, roads, and other sites, changes in land use, and certain other situations require proper advance notification to CDFW.

2.2.4 California Environmental Quality Act

Under the California Environmental Quality Act of 1970 (CEQA; Public Resources Code Section 21000 et seq.), lead agencies analyze whether projects would have a substantial adverse effect on a candidate, sensitive, or special-status species (Public Resources Code Section 21001(c)). These "special-status" species generally include those listed under FESA and CESA, and species that are not currently protected by statute or regulation but would be considered rare, threatened, or endangered under the criteria included in CEQA Guidelines Section 15380. Therefore, species that are considered rare are addressed under CEQA regardless of whether they are afforded protection through any other statute or regulation. The California Native Plant Society (CNPS) inventories the native flora of California and ranks species according to rarity; plants ranked as 1A, 1B, 2A, 2B, and 3 are generally considered special-status species under CEQA.[1]

Although threatened and endangered species are protected by specific federal and state statutes, CEQA Guidelines Section 15380(d) provides that a species not listed on the federal or state list of protected species may be considered rare if it can be shown to meet certain specified criteria. These criteria have

[1] The California Rare Plant Rank system can be found at: http://www.cnps.org/cnps/rareplants/ranking.php.

been modeled after the definition in FESA and the section of the California Fish and Game Code dealing with rare or endangered plants and animals.

2.2.5 Nesting Birds

California Fish and Game Code Sections 3503 and 3800 prohibit the possession, take, or needless destruction of birds, their nests, and eggs, and the salvage of dead nongame birds. California Fish and Game Code Subsection 3503.5 protects all birds in the orders of Falconiformes and Strigiformes (birds of prey). Fish and Game Code Section 3513 states that it is unlawful to take or possess any migratory nongame bird as designated in the Migratory Bird Treaty Act or any part of such migratory nongame bird except as provided by rules and regulations adopted by the Secretary of the Interior under provisions of the Migratory Bird Treaty Act. The Attorney General of California has released an opinion that the Fish and Game Code prohibits incidental take.

2.3 JURISDICTIONAL WATERS

2.3.1 Federal Jurisdiction

On May 25, 2023, the United States (U.S.) Supreme Court issued a decision in the case of Sackett v. Environmental Protection Agency (Supreme Court of the United States 2023), which will ultimately influence how federal waters are defined. The May 25, 2023, Supreme Court decision in Sackett v. Environmental Protection Agency determined that “the CWA extends to only those ‘wetlands with a continuous surface connection to bodies that are “waters of the U.S.” in their own right,’ so that they are ‘indistinguishable’ from those waters.” The U.S. Environmental Protection Agency (USEPA) and the U.S. Army Corps of Engineers (USACE) after review of the decision issued a final rule to replace the 2023 rule that amends the "Revised Definition of “Waters of the U.S.” to conform key aspects of the regulatory text to the U.S. Supreme Court's May 25, 2023 decision in the case of *Sackett v. Environmental Protection Agency*.

Unless considered an exempt activity under Section 404(f) of the Federal Clean Water Act, any person, firm, or agency planning to alter or work in “waters of the U.S.,” including the discharge of dredged or fill material, must first obtain authorization from the USACE under Section 404 of the Clean Water Act (CWA; 33 USC 1344). Permits, licenses, variances, or similar authorization may also be required by other federal, state, and local statutes. Section 10 of the Rivers and Harbors Act prohibits the obstruction or alteration of navigable waters of the U.S. without a permit from USACE (33 USC 403). Activities exempted under Section 404(f) are not exempted within navigable waters under Section 10.

The Clean Water Act (33 United States Code [USC] 1251-1376) provides guidance for the restoration and maintenance of the chemical, physical, and biological integrity of the nation’s waters.

Section 401 requires that an applicant for a federal license or permit that allows activities resulting in a discharge to waters of the U.S. obtain a state certification that the discharge complies with other provisions of CWA. The Regional Water Quality Control Board (RWQCB) administers the certification program in California and may require State Water Quality Certification before other permits are issued.

Section 402 establishes a permitting system for the discharge of any pollutant (except dredged or fill material) into waters of the U.S.

Section 404 establishes a permit program administered by USACE that regulates the discharge of dredged or fill material into waters of the U.S. (including wetlands). Implementing regulations by USACE are found at 33 CFR Parts 320-332. The Section 404 (b)(1) Guidelines were developed by the USEPA in conjunction with USACE (40 CFR Part 230), allowing the discharge of dredged or fill material for non-water dependent uses into special aquatic sites only if there were no practicable alternative that would have less adverse impacts.

2.3.2 State Jurisdiction

2.3.2.1 Regional Water Quality Control Board

Any action requiring a CWA Section 404 permit, or a Rivers and Harbors Act Section 10 permit, must also obtain a CWA Section 401 Water Quality Certification. The State of California Water Quality Certification (WQC) Program was formally initiated by the State Water Resources Control Board (SWRCB) in 1990 under the requirements stipulated by section 401 of the Federal CWA. Although the CWA is a Federal law, Section 401 of the CWA recognizes that states have the primary authority and responsibility for setting water quality standards. In California, under Section 401, the State and Regional Water Boards are the authorities that certify that the issuance of a federal license or permit does not violate California's water quality standards (i.e., that they do not violate Porter-Cologne and the Water Code). The WQC Program currently issues the WQC for discharges requiring USACE's permits for fill and dredge discharges within waters of the U.S. and now also implements the State's wetland protection and hydromodification regulation program under the Porter-Cologne Water Quality Control Act.

On May 28, 2020, the SWRCB implemented the State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State (Procedures) for inclusion in the forthcoming Water Quality Control Plan for Inland Surface Waters and Enclosed Bays and Estuaries and Ocean Waters of California (SWRCB 2019). The Procedures consist of four major elements:

I. A wetland definition;

II. A framework for determining if a feature that meets the wetland definition is a water of the State;

III. Wetland delineation procedures; and

IV. Procedures for the submittal, review, and approval of applications for Water Quality Certifications and Waste Discharge Requirements for dredge or fill activities.

Under the Procedures and the State Water Code (Water Code §13050(e)), "waters of the State" are defined as "any surface water or groundwater, including saline waters, within the boundaries of the State." Unless excluded by the Procedures, any activity that could result in discharge of dredged or fill material to waters of the State, which includes waters of the U.S. and non-federal waters of the State, requires filing of an application under the Procedures.

More specifically, a wetland is defined as: "*An area is wetland if, under normal circumstances, (1) the area has continuous or recurrent saturation of the upper substrate caused by groundwater, or shallow surface water, or both; (2) the duration of such saturation is sufficient to cause anaerobic conditions in the upper substrate; and (3) the area's vegetation is dominated by hydrophytes or the area lacks vegetation*." The wetland definition encompasses the full range of wetland types commonly recognized

in California, including some features not protected under federal law, and reflects current scientific understanding of the formation and functioning of wetlands (SWRCB 2019).

The Porter-Cologne Water Quality Control Act (Porter-Cologne Act, Water Code Section 13000 *et seq*.) is California's statutory authority for the protection of water quality in conjunction with the federal CWA. The Porter-Cologne Act requires the SWRCB and RWQCBs under CWA to adopt and periodically update water quality control plans or basin plans. Basin plans are plans in which beneficial uses, water quality objectives, and implementation programs are established for each of the nine regions in California. The Porter-Cologne Act also requires dischargers of pollutants or dredged or fill material to notify the RWQCBs of such activities by filing Reports of Waste Discharge and authorizes the SWRCB and RWQCBs to issue and enforce waste discharge requirements, National Pollutant Discharge Elimination System (NPDES) permits, Section 401 water quality certifications, or other approvals.

2.3.2.2 California Department of Fish and Wildlife

CDFW is a trustee agency that has jurisdiction under Section 1600 *et seq.* of the California FGC. Under Sections 1602 and 1603, a private party must notify CDFW if a proposed project will "*substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake designated by the department, or use any material from the streambeds…except when the department has been notified pursuant to Section 1601.*" Additionally, CDFW asserts jurisdiction over native riparian habitat adjacent to aquatic features, including native trees over four inches in diameter at breast height (DBH). If an existing fish or wildlife resource may be substantially adversely affected by the activity, CDFW may propose reasonable measures that will allow the protection of those resources. If these measures are agreeable to the parties involved, they may enter into an agreement with CDFW identifying the approved activities and associated mitigation measures. Generally, CDFW recommends submitting an application for a Streambed Alteration Agreement (SAA) for any work done within the lateral limit of water flow or the edge of riparian vegetation, whichever is greater.

2.4 CEQA SIGNIFICANCE

Section 15064.7 of the State CEQA Guidelines encourages local agencies to develop and publish the thresholds that the agency uses in determining the significance of environmental effects caused by projects under its review. However, agencies may also rely on the guidance provided by the expanded Initial Study Checklist, contained in Appendix G of the State CEQA Guidelines. Appendix G provides examples of impacts that would normally be considered significant. Based on these examples, impacts to biological resources would normally be considered significant if the project would:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS;

- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by CDFW or USFWS;

- Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;

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

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

- Conflict with the provisions of an adopted Habitat Conservation Plan (HCP), Natural Community Conservation Plan (NCCP), or other approved local, regional or state habitat conservation plan.

An evaluation of whether or not an impact on biological resources would be substantial must consider both the resource itself and how that resource fits into a regional or local context. Substantial impacts would be those that would diminish, or result in the loss of an important biological resource, or those that would obviously, conflict with local, state, or federal resource conservation plans, goals, or regulations. Impacts are sometimes locally important but not significant, according to CEQA. The reason for this is that although the impacts would result in an adverse alteration of existing conditions, they would not substantially diminish, or result in the permanent loss of, an important resource on a population-wide or region-wide basis.

2.4.1 California Native Plant Society

The CNPS maintains a rank of plant species native to California that have low population numbers, limited distribution, or are otherwise threatened with extinction. This information is published in the Inventory of Rare and Endangered Vascular Plants of California. Potential impacts to populations of CNPS-ranked plants receive consideration under CEQA review. The following identifies the definitions of the CNPS Rare Plant Ranking System (CRPR):

Rank 1A: Plants presumed Extinct in California and either rare or extinct elsewhere

Rank 1B: Plants Rare, Threatened, or Endangered in California and elsewhere

Rank 2A: Plants presumed extirpated in California but common elsewhere

Rank 2B: Plants Rare, Threatened, or Endangered in California, but more common elsewhere

Rank 3: Plants about which we need more information – A Review List

Rank 4: Plants of limited distribution – A Watch List

All plants appearing on CNPS Ranks 1 or 2 are considered to meet CEQA Guidelines Section 15380 criteria. While only some of the plants Ranked 3 and 4 meet the definitions of threatened or endangered species, the CNPS recommends that all Rank 3 and Rank 4 plants be evaluated for consideration under CEQA. CRPR rank 4 taxa do not meet CEQA standards and thresholds for impact considerations (CNPS 2020) unless a CRPR rank 4 taxa is documented in a region outside of its known range; CRPR rank 4 taxa does not generally warrant further CEQA analysis for impact consideration although CNPS recommends that rank 4 taxa be analyzed during the CEQA process. Furthermore, the CNPS CRPR include levels of threat for each species. These threat ranks include the following:

0.1 -Seriously threatened in California (over 80 percent of occurrences threatened/high degree and immediacy of threat);

0.2 - Moderately threatened in California (20 to 80 percent occurrences threatened/moderate degree and immediacy of threat); and

0.3 - Not very threatened in California (less than 20 percent of occurrences threatened/low degree and immediacy of threat or no current threats known).

Threat ranks do not designate a change of environmental protections, so that each species (i.e., CRPR 1B.1, CRPR 1B.2, CRPR 1B.3, etc.) should be fully considered during preparation of environmental documents under the CEQA process.

2.4.2 California Department of Fish and Wildlife Species of Concern

Some additional fish, amphibian, reptile, bird, and mammal species may receive consideration by CDFW and lead agencies during the CEQA process, in addition to species that are formally listed under FESA and CESA or are fully protected. These species are included on the *Special Animals List*, which is maintained by CDFW. This list tracks species in California whose numbers, reproductive success, or habitat may be in decline. In addition to "Species of Special Concern" (SSC), the *Special Animals List* includes species that are tracked in the California Natural Diversity Database (CNDDB) but warrant no legal protection. These species are identified as "California Special Animals" (CSA).

2.5 UC MERCED POLICIES AND REGULATIONS

2.5.1 Incidental Take Permit 2081-2009-010-04 (Amendment No. 4)

A CESA Incidental Take Permit (ITP) No. 2081-2009-010-04 (Amendment No. 4) has been issued for the University of California, Merced Campus and Community North Project, which includes the Solar Infrastructure and BESS Project impact footprint in the boundary covered by the ITP. On March 30, 2011, the CDFW issued the original ITP No. 2081-2009-010-04, followed by three amendments. The original ITP's effective date was March 30, 2011, which remains the effective date for the original take authorization. This Amended ITP is effective as of the date signed by CDFW on December 9, 2025. Unless renewed by CDFW, this ITP's authorization to take the Covered Species shall expire on February 28, 2036. This ITP covers the following species:

1. California tiger salamander (*Ambystoma californiense*; Threatened)
2. Swainson's hawk (*Buteo swainsoni*; Threatened)
3. Succulent owl's clover (*Castilleja campestris* ssp. *Succulenta*; Endangered)
4. Colusa grass (*Neostapfia colusana*; Endangered)
5. San Joaquin Valley Orcutt grass (*Orcuttia inaequalis*; Endangered)
6. San Joaquin kit fox (*Vulpes macrotis mutica*; Threatened)

Mitigation measures provided in this ITP have been incorporated into this BRA, referenced below and provided in Appendix E, to mitigate impacts to California tiger salamander, Swainson's hawk, succulent owl's clover, and San Joaquin kit fox. Habitat is not present in the Study Area for Colusa grass or San Joaquin Valley Orcutt grass.

2.5.2 USACE Permit No. SPK-1999-00203

On April 29, 2009, the USACE took jurisdiction over the permitted activity and authorized work that would result in the discharge of fill into 77.79 acres of waters of the U.S. for the University of California Merced Campus and Community North Project (SPK-1999-00203; USACE 2022). The University of California Merced Campus and Community North Project was subsequently modified and the permit updated and extended on March 5, 2012, September 10, 2015, April 18, 2017, and April 21, 2022. The time limit for completing the work covered under SPK-1999-00203 has been extended through May 1, 2030, and the size of the University of California Merced Campus and Community North Project was expanded from 833 acres to 1,026 acres. The current Study Area falls within the area permitted under SPK-1999-00203 and would be considered a covered activity under SPK-1999-00203.

2.5.3 UC Merced 2020 Long-Range Development Plan

UC Merced updated their earlier 2009 Long-Range Development Plan (LRDP) in 2020 with further clarification of the administration's plans for growth and development of the campus community. The 2020 LRDP is a comprehensive land use plan that guides physical development on the UC Merced campus to accommodate the revised projected campus population and expanded and new program initiatives. A Subsequent Environmental Impact Report (SEIR) was certified by the UC Regents (State Clearinghouse No. 2018041010) for the UC Merced 2020 LRDP in accordance with CEQA Guidelines Section 15168. The 2020 LRDP SEIR provides a programmatic analysis of the proposed development and projected campus population outlined in the 2020 LRDP. The Project tiers from the 2020 LRDP SEIR and 2009 LRDP Environmental Impact Statement/Environmental Impact Report (EIS/EIR). This BRA identifies mitigation measures from the 2020 LRDP SEIR and 2009 LRDP EIS/EIR that are applicable to the proposed Project, and identifies new Project-specific mitigation measures, where necessary, to reduce potential impacts on biological resources to a less-than-significant level.

3.0 METHODS

3.1 DATABASE AND LITERATURE REVIEW

Before conducting the field survey, background research was conducted to inform and create target species lists to focus the survey efforts. Accessible information in public databases pertaining to natural resources in the region of the Study Area were queried. The following site-specific published information was reviewed for this BRA:

- California Department of Fish and Wildlife (CDFW). 2025. *California Natural Diversity Database* (CNDDB). [Accessed October 27, 2025];
- California Native Plant Society (CNPS). 2025. *Inventory of Rare and Endangered Plants* (online edition, v9.5.1) For *Merced, Winton, Yosemite Lake, Haystack Mtn., Planada, Atwater, Sandy Mush, El Nido,* and *Plainsburg* USGS 7.5-minute series quadrangles, Sacramento, CA. [Accessed October 27, 2025];
- USDA, NRCS. 2025. *Web Soil Survey*. Available online at: http://websoilsurvey.sc.egov.usda.gov. [Accessed October 27, 2025];

- USDA Climate Data and Summary Reports from AgACIS (NRCS 2025b); and
- U.S. Fish and Wildlife Service (USFWS). 2025. *Information for Planning and Consultation* (IPaC) for *the UC Merced Solar Expansion Project.* [Accessed October 27, 2025].

Before the biological field survey, information obtained from the queries (Appendix A) were reviewed and compiled into a table (Appendix B) to provide target lists to inform the field survey efforts and evaluate the potential for each special-status species to occur.

Special-status species are plant and wildlife species that have been afforded special recognition by federal, State, or local resource agencies or organizations. They are generally of relatively limited distribution and may require specialized habitat conditions. Special-status species are defined as meeting one or more of the following criteria:

- Listed or proposed for listing under CESA or FESA;
- Protected under other regulations (e.g., Migratory Bird Treaty Act);
- Included on the CDFW Special Animals List;
- Identified as Rare Plant Rank 1 to 3 by CNPS;
- Receive consideration during environmental review under CEQA.

3.2 BIOLOGICAL SURVEYS

3.2.1 Biological Reconnaissance Survey

Biological reconnaissance surveys of the Study Area were conducted on November 11, 2025, and May 19, 2026, by HELIX Senior Scientist Patrick Martin. The Study Area was systematically surveyed on foot and aided by binoculars to ensure complete coverage, with special attention given to identifying those portions of the Study Area with the potential for supporting special-status species and sensitive habitats. During the field surveys, the biologists recorded plant and animal species observed (Appendix D of this BRA) and characterized biological communities occurring within the Study Area according to *A Guide to Wildlife Habitats of California* (Mayer and Laudenslayer 1988). Plant nomenclature is taken from *The Jepson Manual: Vascular Plants of California, second edition* (Baldwin et al. 2012). Focused or USFWS or CDFW protocol surveys for wildlife species were not conducted during the site survey.

3.2.2 Aquatic Resources Delineation

HELIX wetland scientists conducted an Aquatic Resources Delineation of the Study Area, on November 11, 2025. Fieldwork for the jurisdictional delineation was conducted by HELIX biologists Patrick Martin and Sophia Drewelow. Mapping of aquatic resources followed the mapping guidelines stipulated by the USACE (February 10, 2016) *USACE Updated Map and Drawing Standards for the South Pacific Division Regulatory Program* and was consistent with the State Water Resources Control Board (April 6, 2021) *Procedures for Discharges of Dredged or Fill Material to Waters of the State* (Section III, *Wetland Delineation*). HELIX followed the USACE Wetlands Delineation Manual (USACE 1987), the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0; USACE 2008), and the *National Ordinary High Water Mark (OHWM) Field Delineation Manual for Rivers*

and Streams (Version: Final). The results of the Aquatic Resources Delineation are addressed in Section 4.5.1, Aquatic Resources.

4.0 RESULTS

4.1 SITE DESCRIPTION

The 86.67-acre Study Area is partially developed with an approximately 10-acre, 1-MW ground-mount solar array site which was built in 2009. A chain-link fence surrounds the perimeter of the existing solar array. An approximately 0.25-mile-long access road off of Cottonwood Loop provides access to the existing solar array. The remaining portion of the Study Area is undeveloped land that supports primarily annual herbaceous vegetation, isolated wetlands, and pasture. Based on a review of historical imagery of the Study Area, the northern half of the Study Area was rough graded during construction of the existing solar array, and the southern half of the site was previously an irrigated pasture; however, while cattle still graze the Study Area, the pasture no longer appears to be actively irrigated.

4.2 PHYSICAL FEATURES

4.2.1 Topography and Drainage

The terrain in the Study Area is slightly sloped with higher elevations on the northern and eastern portions of the Study Area and the lowest elevation in the southwestern corner of the Study Area. Study Area elevation ranges from 230 to 252 feet above mean sea level (msl).

The Study Area is in the Middle San Joaquin-Lower Chowchilla Watershed (USGS Hydrologic Unit Code [HUC8] 18040001). The Study Area abuts the Le Grand Canal levee and slopes toward the Fairfield Canal to the east of the Study Area; however, the Study Area is not directly hydrologically connected to either canal and is hydrologically isolated. Fairfield Canal and Le Grand Canal are both hydrologically connected to Yosemite Lake located to the north of the Study Area.

4.2.2 Soils

A total of four soil map units (NRCS 2025a) are mapped within the Study Area including: Corning gravelly loam, 0 to 8 percent slopes; Corning gravelly sandy loam, 0 to 8 percent slopes; Montpellier coarse sandy loam, 0 to 3 percent slopes; and Redding gravelly loam, 0 to 15 percent slopes, dry; (Figure 4, *Soils Map*). Water is also mapped in the Study Area. The general characteristics and properties associated with these soil types are described below. Most of the soil in the Study Area is considered to be moderately to strongly acidic and are either alluvial in origin or support duripan vernal pools (NRCS 2025a).

- Corning gravelly loam, 0 to 8 percent slopes, occurs on stream terraces between 80 to 1,000 feet elevation and consists of gravelly alluvium derived from igneous, metamorphic and sedimentary rock. A typical soil profile is gravelly loam from 0 to 15 inches, cobbly clay from 15 to 30 inches and stratified gravelly sandy loam to gravely clay loam from 30 to 60 inches. This soil unit is a well-drained soil with no frequency of ponding or flooding. The depth to water table is more than 80 inches and a restrictive layer is located at greater than 80 inches. Minor components of this soil unit are considered hydric (NRCS 2025a).

- Corning gravelly sandy loam, 0 to 8 percent slopes, occurs on stream terraces between 80 to 1,000 feet elevation and consists of gravelly alluvium derived from igneous, metamorphic and sedimentary rock. A typical soil profile is gravelly sandy loam from 0 to 15 inches, cobbly clay from 15 to 30 inches and stratified gravelly sandy loam to gravely clay loam from 30 to 60 inches. This soil unit is a well-drained soil with no frequency of ponding or flooding. The depth to water table is more than 80 inches and a restrictive layer is located at greater than 80 inches. Minor components of this soil unit are considered hydric (NRCS 2025a).

- Montpellier coarse sandy loam, 0 to 3 percent slopes, occurs on fan remnants between 110 to 520 feet elevation and consists of alluvium derived from granite rock. A typical soil profile is coarse sandy loam from 0 to 21, sandy clay loam from 21 to 40 and coarse sandy loam from 40 to 60 inches. This soil unit is a well-drained soil with no frequency of ponding or flooding. The depth to water table is more than 80 inches and a restrictive layer is located at greater than 80 inches. This soil unit is not considered hydric (NRCS 2025a).

- Redding gravelly loam, 0 to 8 percent slopes, dry occurs on fan remnants between 90 to 750 feet elevation. This soil unit consists of a complex layer of igneous, metamorphic and sedimentary rock over clayey and cemented layers. A typical soil profile is gravely loam from 0 to 17 inches, clay from 17 to 22 inches, and cemented gravelly material from 22 to 60 inches. This soil unit is a moderately well-drained soil with no frequency of ponding or flooding. The depth to water table ranges from 5 to 39 inches and a duripan restrictive layer is located about 20 to 39 inches below the mineral surface. Minor components of this soil unit are considered hydric (NRCS 2025a).

4.2.3 Climate

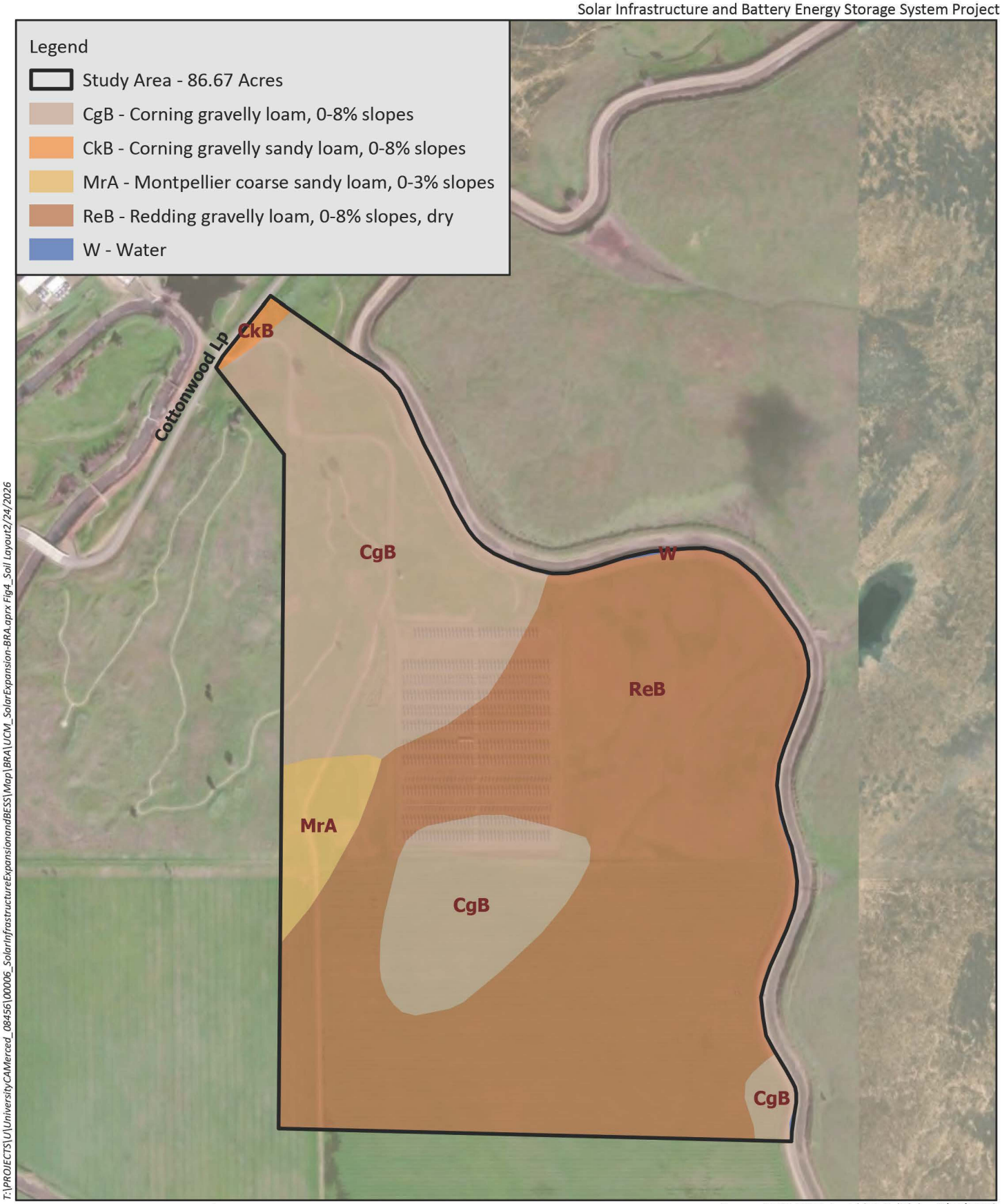
The climate of Merced County is Mediterranean, characterized by wet, cool winters and dry, hot summers. The nearest weather station to the Study Area is at the Merced Municipal Airport in Merced, California. Average daily maximum and minimum temperatures are 97° and 63° Fahrenheit (F) in July and 56° and 37° F in January (NRCS 2025b). The average annual precipitation is 11.24 inches, with precipitation occurring as rainfall from October through May. The weather station received approximately 4.89 inches of rainfall for this rain season through November 2025, starting in October 2025 (NRCS 2025b), which is 269 percent of an average rain year. In the previous year, the weather station received approximately 8.93 inches of rainfall for this rain season through 2024, starting in October 2024 (NRCS 2025b), which is 79 percent of an average rain year.

4.3 VEGETATION COMMUNITIES

Upland vegetation communities that occur within the Study Area include pasture, annual grassland, ruderal, and urban (Figure 5, *Biological Communities*). These habitat types are discussed below. A comprehensive list of all plant and wildlife species observed within the Study Area is provided in Appendix C. Representative site photographs are included in Appendix D.

4.3.1 Pasture

Approximately 35.76 acres of pasture occur in the Study Area, which is a managed and irrigated vegetation community used to provide forage for cattle. The pasture community consists of a fenced area where cattle are grazed. This vegetation community is predominantly comprised of grasses and



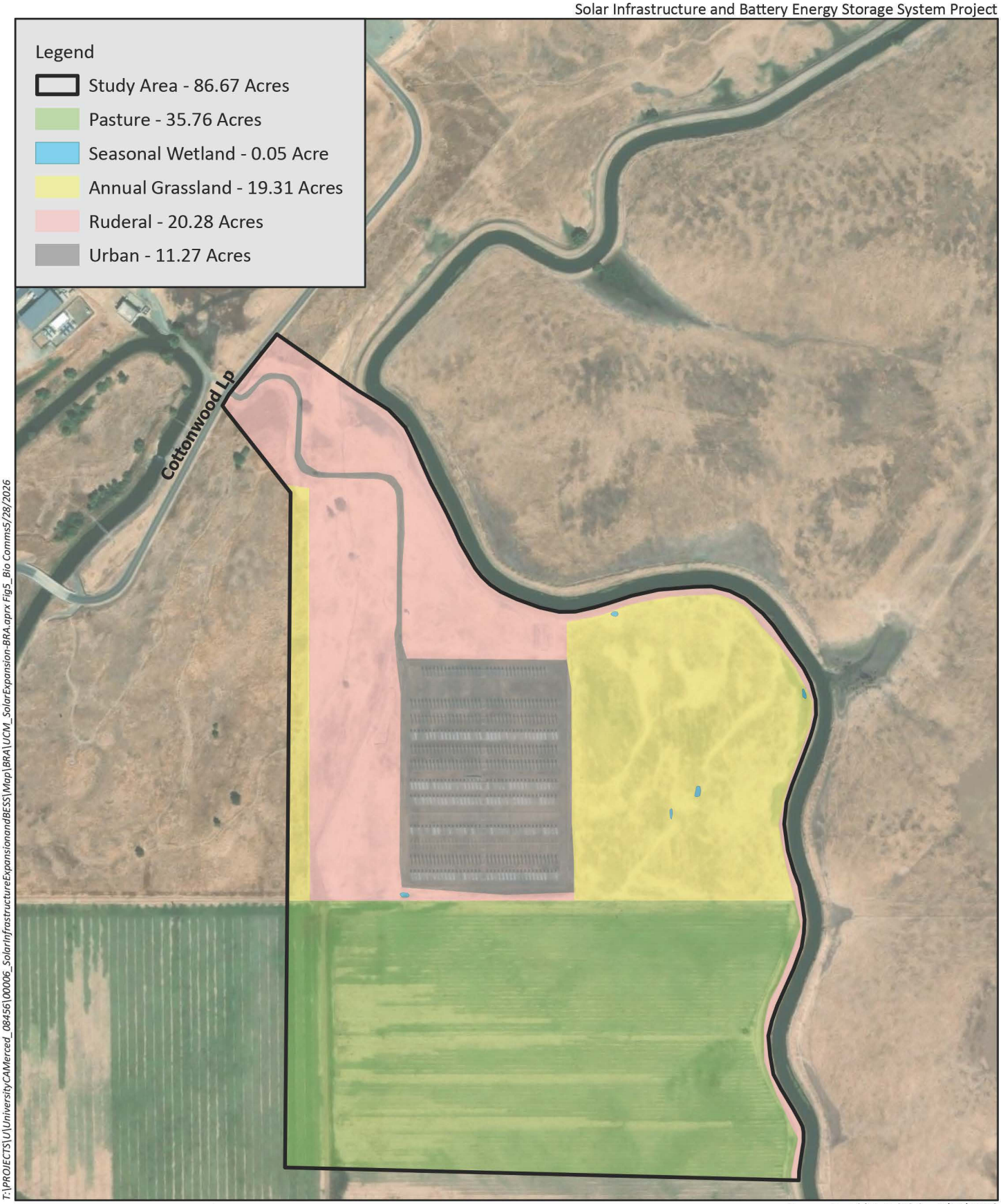
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Source: NRCS, 2025; Aerial (DigitalGlobe, 8/16/2024)

HELIX Environmental Planning

Soils Map

Figure 4



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Source: Aerial (DigitalGlobe, 8/16/2024)

HELIX Environmental Planning

Biological Communities

Figure 5

forbs and is more heavily grazed than the surrounding grassland communities. Common species observed in pasture within the Study Area include Bermudagrass (*Cynodon dactylon*), subterranean clover (*Trifolium subterraneum*), and soft brome (*Bromus hordeaceus*). Pasture exhibits evidence of agricultural use (e.g., discing/furrowing) or other levels of disturbance to support livestock grazing.

4.3.2 Annual Grassland

Approximately 19.31 acres of annual grassland occurs in the Study Area. Non-native annual grassland habitats are open grasslands composed primarily of non-native annual plant species. Species of grasses are the predominant component within this habitat type, with herbaceous plant species also present to varying degrees. Many of these species also occur as understory plants in oak woodland and other adjacent vegetation communities. Structure in non-native annual grasslands depends largely on weather patterns and livestock grazing; dramatic differences in physiognomy, both between seasons and between years, are characteristic of this habitat. Introduced annual grasses are typically the dominant plant species in this habitat.

Common plant species observed within this habitat type in the Study Area include wild oats (*Avena barbata*), ripgut brome (*Bromus diandrus*), Bermudagrass, subterranean clover, narrow tarweed (*Holocarpha virgata*), soft brome, and rattail sixweeks grass (*Festuca myuros*). Annual grasslands may provide habitat for many wildlife species including foraging habitat for small burrowing rodents, foraging for nesting raptors, in addition to herpetofauna. Wildlife species observed using annual grassland habitat during the site visit included species such as horned lark (*Eremophila alpestris*), burrowing owl (*Athene cunicularia*), ferruginous hawk (*Buteo regalis*), western meadowlark (*Sturnella neglecta*), and coyote (*Canis latrans*).

4.3.3 Ruderal

Approximately 20.28 acres of ruderal land occur in the Study Area. Ruderal areas have been subject to past or on-going human disturbance but retain a soil substrate. If vegetated, there is no recognizable plant community, and the species assemblage depends on local colonization potential. Ruderal and disturbed areas include weedy open areas where the natural vegetation has been removed. Ruderal and disturbed areas are not described in treatments of plant communities; however, species found in adjacent habitats such as annual grassland are found in ruderal areas in the Study Area. Isolated trees found in the Study Area include argyle apple (*Eucalyptus cinerea*), red ironbark (*Eucalyptus sideroxylon*), and stone pine (*Pinus pinea*). The ruderal areas are located along the northwestern portion of the Study Area and are associated with areas that experience frequent disturbance from site maintenance, such as vegetation management, or are heavily disturbed from past projects.

4.3.4 Urban

A total of 11.27 acres of urban lands occur within the Study Area and is made up of paved surfaces, compacted dirt surfaces and graveled/cobbled or disturbed surfaces that lack native plant assemblages. Urban lands are often comprised of little to no vegetation and typically contain built structures and/or maintained surfaces such as roads, graveled areas, or parking lots. Vegetation that does occur within this habitat type is often ornamental, rather than invasive or noxious weeds such as in ruderal habitat types. Developed habitat generally does not provide habitat for native plants and wildlife, however, urban lands may provide nesting habitat for avian species such as European starlings (*Sturnus vulgaris*) and black phoebe (*Sayornis nigricans*).

4.4 SPECIAL-STATUS SPECIES

Sensitive plant and wildlife species identified during database queries were evaluated for their potential to occur within the Study Area based on the results of the field survey and criteria described below. The likelihood for a species to occur was classified as having either no, low, moderate, or high potential to occur within the Study Area by evaluating criteria based on the distance of the nearest documented occurrence, presence and condition of suitable habitat, age of the most recent documented occurrence, and presence of mapped critical habitat.

No Potential:

- The Study Area is outside the known distribution of the species, or
- There is no suitable habitat present for the species, or
- The species is not known to occur within five miles of the Study Area, and its dispersal capability is less than five miles.

Low Potential:

- There are no documented occurrences within five miles of the Study Area, and the existing habitat is of low or marginal quality, or
- All documented occurrences within five miles of the Study Area are believed to be extirpated, and existing habitat is of low or marginal quality, or
- Extant occurrences are documented within five miles of the Study Area, and the most recent occurrence is greater than or equal to 25 years old.

Moderate Potential:

- Documented occurrences are reported within five miles of the Study Area, the most recent occurrence is less than 25 but greater than 10 years old, and suitable habitat is present; or
- Critical habitat is mapped within the Study Area, all Primary Constituent Elements (PCEs) are present within the Study Area, and suitable habitat is present.

High Potential:

- There are extant occurrences within one mile of the Study Area, the most recent occurrence is less than 10 years old, and there is suitable habitat within the Study Area; or
- Critical habitat is mapped within the Study Area, documented occurrences are present within one mile of the Study Area, suitable habitat is present, and all PCEs are present within the Study Area.

The potential for each species to occur was determined and is summarized in Appendix B. Detailed descriptions of the species for which a high or moderate potential to occur was assigned are discussed in greater detail below.

4.4.1 Listed and Special-Status Plants

According to the database query, 27 listed and/or special-status plants have the potential to occur in the vicinity of the Study Area (USFWS 2025; CDFW 2025; CNPS 2025). Based on field observations, published information, and literature review, five special-status plants have the potential to occur within the Study

Area: Henderson's bent grass (*Agrostis hendersonii*), succulent owl's clover (*Castilleja campestris* var. *succulenta*), dwarf downingia (*Downingia pusilla*), spiny-sepaled button-celery (*Eryngium spinosepalum*), and shining navarretia (*Navarretia nigelliformis* ssp. *radians*). These species are described in more detail below. Special-status plant species with potential to occur in the Study Area include herbaceous species typically associated with annual grasslands or mesic sites in acidic soils. Habitat is not present in the Study Area for species that require vernal pools or deep aquatic habitat or alkaline soils, which are not present in the Study Area. The Study Area contains only small and shallow seasonal wetlands with moderately to strongly acidic soil in shallow alluvial to loam soil over a duripan.

Henderson's Bent Grass

Federal status – None
State status – None
Other – CRPR 3.2

Species Description

Henderson's bent grass is an annual herb found on mesic sites in valley and foothill grassland, including vernal pools from 70 to 305 meters elevation. This species blooms from April through May (CNPS 2025).

Survey History

Henderson's bent grass was not detected during reconnaissance level surveys in the Study Area in November 2025. This species is an annual herb that blooms from April to May and would not have been identifiable during the site visits during November 2025 but would have been identifiable during the survey conducted on May 19, 2026. This species was not observed in the Study Area. There are two CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025). Both CNDDB records are located 3.9 miles to the northeast of the Study Area and are presumed extant. The record from 1999 documents this species in a vernal pool surrounded by annual grassland (CDFW 2025).

Habitat Suitability

Habitat for this species is present in the annual grassland and seasonal wetlands in the Study Area where mesic sites are present. Based on a review of historical aerials of the Study Area, vernal pools and other seasonal wetlands occurred in the Study Area and appeared to support water through July 2011, but these wetland features no longer appear to be present in the Study Area. The remnant seasonal wetlands within the Study Area provide some potential habitat for this species.

Potential for Adverse Impacts

Habitat for Henderson's bent grass is present in the Study Area, however a survey that was conducted during the blooming season for this species on May 19, 2026, was negative and this special-status species is presumed to be absent from the Study Area. There is no potential for project-related activities to adversely impact Henderson's bent grass, and no further mitigation is recommended.

Succulent Owl's Clover

Federal status – Threatened
State status – Endangered
Other – CRPR 1B.2

Species Description

Succulent owl's clover is an annual herb found in vernal pools from 50 to 750 meters elevation. This species blooms from April through May (CNPS 2025).

Survey History

Succulent owl's clover was not detected during reconnaissance level surveys in the Study Area in November 2025 but would have been identifiable during the survey conducted on May 19, 2026. This species was not observed in the Study Area. This species is an annual herb that blooms from April to May and would not have been identifiable during the site visit in November 2025. There are 20 CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025). The nearest CNDDB record is located 0.5 mile to the east of the Study Area in a wetland reserve. The record documents hundreds of plants in vernal pools in 1999, 2017, and 2019 (CDFW 2025).

Habitat Suitability

Vernal pool habitat is not present in the Study Area; however, shallow seasonal wetlands within the Study Area could provide marginal habitat for this species. In a review of historic aerials of the Study Area, vernal pools and other seasonal wetlands occurred in the Study Area and appeared to support water through July 2011, but these wetland features no longer appear to be present in the Study Area. Remnant seasonal wetlands in the Study Area provide potential habitat for this species.

Potential for Adverse Impacts

Habitat for succulent owl's clover is present in the Study Area, however a survey that was conducted during the blooming season for this species on May 19, 2026, was negative and this special-status species is presumed to be absent from the Study Area. There is no potential for project-related activities to adversely impact succulent owl's clover, and no further mitigation is recommended.

Dwarf Downingia

Federal status – None
State status – None
Other – CRPR 2B.2

Species Description

Dwarf downingia is an annual herb found in vernal pools and mesic microsites from 1 to 445 meters elevation. This species blooms from March through May (CNPS 2025).

Survey History

Dwarf downingia was not detected during reconnaissance level surveys in the Study Area in November 2025 but would have been identifiable during the survey conducted on May 19, 2026. This species was not observed in the Study Area. This species is an annual herb that blooms from March to May and would not have been identifiable during the site visit in November 2025. There are two CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025). The nearest CNDDB record is located 0.4 mile to the north of the Study Area. The record documents hundreds of plants of this species in vernal pools during surveys in 1999, and they are presumed extant (CDFW 2025).

Habitat Suitability

Vernal pool habitat is not present in the Study Area; however, shallow seasonal wetlands or other mesic microsites in annual grassland within the Study Area could provide habitat for this species. Historical aerials of the Study Area show vernal pools and other seasonal wetlands occurred in the Study Area and appeared to support water through July 2011, but these wetland features no longer appear to be present in the Study Area. However, remnant seasonal wetland habitats in the Study Area still provide potential habitat for this species.

Potential for Adverse Impacts

Habitat for dwarf downingia is present in the Study Area, however a survey that was conducted during the blooming season for this species on May 19, 2026, was negative and this special-status species is presumed to be absent from the Study Area. There is no potential for project-related activities to adversely impact dwarf downingia, and no further mitigation is recommended.

Spiny-sepaled Button-celery

Federal status – None
State status – None
Other – CRPR 1B.2

Species Description

Spiny-sepaled button-celery is an annual or perennial herb found in valley and foothill grasslands and vernal pools from 80 to 975 meters elevation. This species blooms from April through June (CNPS 2025).

Survey History

Spiny-sepaled button-celery was not detected during the reconnaissance level survey of the Study Area in November 2025. This species is an annual herb that blooms from April to June and would not have been identifiable during the site visit in November 2025. Great Valley button-celery was observed in the Study Area, which has spiny bracts on the margin and spines abaxial surface, where spiny-sepaled button-celery has no or few abaxial bract spines (Jepson eFlora 2026). There are five CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025). The nearest CNDDB records are located 1.5 miles to the east and south of the Study Area. The records have limited information but show this species occurring in vernal pools associated with Rascal Creek and tributaries in 2001 (CDFW 2025).

Habitat Suitability

Vernal pool habitat is not present in the Study Area; however, shallow seasonal wetlands or other mesic microsites in annual grassland within the Study Area could provide habitat for this species. Historical aerials of the Study Area show vernal pools and other seasonal wetlands occurred in the Study Area and appeared to support water through July 2011, but these wetland features no longer appear to be present. However, the remnant seasonal wetlands could still provide potential habitat for this species.

Potential for Adverse Impacts

Habitat for spiny-sepaled button-celery is present in the Study Area, however a survey that was conducted during the blooming season for this species on May 19, 2026, was negative and this special-status species is presumed to be absent from the Study Area. There is no potential for project-related activities to adversely impact spiny-sepaled button-celery, and no further mitigation is recommended.

Shining Navarretia

Federal status – None
State status – None
Other – CRPR 1B.2

Species Description

Shining navarretia is an annual herb found in vernal pools and on clay soils in cismontane woodland and valley and foothill grassland from 65 to 1,000 meters elevation. This species blooms from April through July (CNPS 2025). This species does not appear to be limited to vernal pools, and it may occur in upland or non-wetland habitats (CDFW 2025).

Survey History

Shining navarretia was not detected during reconnaissance level surveys in the Study Area in November 2025. This species is an annual herb that blooms from April to July and would not have been identifiable during the survey in November 2025 but would have been identifiable during the survey conducted on May 19, 2026. This species was not observed in the Study Area. There are 23 CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025). The nearest CNDDB record is located 0.8 mile to the southwest of the Study Area as recently as 2001. The record documents this species in annual grassland (CDFW 2025).

Habitat Suitability

Vernal pool habitat is not present in the Study Area; however, shallow seasonal wetlands or other mesic microsites in annual grassland within the Study Area could provide habitat for this species. This species may also occur in upland habitats adjacent to wetland habitats.

Potential for Adverse Impacts

Habitat for shining navarretia is present in the Study Area, however a survey that was conducted during the blooming season for this species on May 19, 2026, was negative and this special-status species is presumed to be absent from the Study Area. There is no potential for project-related activities to adversely impact shining navarretia, and no further mitigation is recommended.

4.4.2 Listed and Special-Status Wildlife

According to the database query, 24 listed and/or special-status wildlife species have the potential to occur on-site or in the vicinity of the Study Area (CDFW 2025; USFWS 2025). Based on field observations, published information, and literature review, 11 special-status wildlife species have the potential to occur within the Study Area: Crotch's bumble bee (*Bombus crotchii*), Conservancy fairy shrimp (B*ranchinecta conservatio*), vernal pool fairy shrimp (*Branchinecta lynchi*), vernal pool tadpole shrimp (*Lepidurus packardi*), California tiger salamander (*Ambystoma californiense*), western spadefoot (*Spea hammondii*), northwestern pond turtle (*Actinemys marmorata*), burrowing owl (*Athene cunicularia*), Swainson's hawk (*Buteo swainsoni*), San Joaquin kit fox (*Vulpes macrotis mutica*), and American badger (*Taxidea taxus*). These species are discussed in more detail below. In addition to these special-status wildlife species, other migratory birds and raptors protected under federal, State, and local laws/policies also have the potential to occur within the Study Area. The Study Area is not located within federally designated critical habitat for any wildlife species.

Mountain plover (*Anarhynchus montanus*; CDFW SSC), merlin (*Falco columbarius;* CDFW Watch List), and ferruginous hawk (*Buteo regalis;* CDFW Watch List) bird species have a low potential to occur in the Study Area since wintering habitat is present. Tricolored blackbird (*Agelaius tricolor*) also has a low potential to occur in the Study Area but will not nest in the Study Area since nesting habitat is absent. However, this species may nest in wetland areas near the Study Area and forage in the Study Area and surrounding grassland habitats. Mountain plover, merlin, and ferruginous hawk only winter in California and will not nest in the Study Area. Impacts to potential foraging habitat for mountain plover, merlin, ferruginous hawk, and tricolored blackbird that could occur because of the proposed Project are considered less than significant because of the abundance of suitable foraging habitat for these species in the Project region and because these species are highly mobile and would be able to avoid contact with construction equipment and personnel and any operational staff or ongoing maintenance operations. Since potential impacts to mountain plover, merlin, ferruginous hawk, and tricolored blackbird from the Project is considered less than significant, these species are not discussed further in this report.

Crotch's Bumble Bee

Federal status – None
State status – CESA Candidate Endangered

Species Description

Crotch's bumble bee occurs in grassland, scrub and other arid habitats. New colonies are initiated by solitary queens, generally in the early spring, which typically occupy abandoned rodent burrows (CDFW 2019). This species is a generalist forager and has been reported to visit a wide variety of flowering plants. Food plants include *Asclepias* spp., *Antirrhinum* spp., *Clarkia* spp., *Eschscholzia* spp., *Eriogonum* spp., *Chaenactis* spp., *Lupinus* spp., *Medicago* spp., *Phacelia* spp., and *Salvia* spp. (Koch *et al.* 2012). The flight period for queens in California is from February to October. New queens hibernate over the winter and initiate a new colony the following spring (CDFW 2019). This species is rare throughout its range and in decline in the Central Valley and Southern California (CDFW 2019). The current known range of this species follows a small strip from western Trinity County south to Tehama County and along the entire Central Valley and Coastal California south of Monterey to the southernmost portions of the State. The

range is generally bound on the east by the high Sierra Nevada range and areas east of Bishop, Ridgecrest, and the Salton Sea (CDFW 2023).

Survey History

Crotch's bumble bee was not observed in the Study Area during biological surveys in November 2025, however, focused or protocol surveys for bumble bees were not conducted as part of the reconnaissance level survey. There are two CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025). The nearest CNDDB record is located 1.6 miles to the east of the Study Area. The record documents one female observed in March 2024 (CDFW 2025).

Habitat Suitability

The annual grassland and ruderal areas in the Study Area provide potential habitat for Crotch's bumble bee where foraging habitat and small mammal burrows are present. Urban areas are subjected to routine management activities associated with landscape maintenance or weed control that make these areas unsuitable habitat for this species. Ground squirrel burrows along the Le Grand Canal levees and other areas in annual grassland and ruderal areas were observed within the Study Area that provide potential nesting/refuge habitat within the Study Area for this species.

Potential for Adverse Effects

There is potential for direct and indirect effects to Crotch's bumble bee if this species were to utilize the Study Area for nesting, overwintering, or foraging during the implementation of this Project. Project implementation would eliminate potential suitable nesting, foraging, or overwintering habitat for this species. The Project has the potential for adverse effects to ground nesting bumble bee species through ground disturbance if the species were present within the Study Area. Destruction of habitat for this species may occur because of ground clearing and grading of the site. If ground nests were present within the Study Area, then excavation and destruction of those nests through grading activities would be considered significant impact.

Implementation of the recommended mitigation measure from the 2020 LRDP SEIR for Crotch's bumble bee contained in Section 5.1, Mitigation for Crotch's Bumble Bee, would reduce potential impacts to Crotch's bumble bee to less than significant.

Conservancy Fairy Shrimp

Federal status – Endangered
State status – none

Species Description

The Conservancy pool fairy shrimp varies in size, ranging from 14 to 27 millimeters (0.6 to 1.1 inch) in length and is found in large clay bottomed vernal pools to vernal lakes with turbid water in grasslands (USFWS 2005). The historical distribution of this species is unknown, and it is currently distributed throughout the Central Valley and southern coastal regions of California, with 10 known populations (USFWS 2005). It is most frequently found in pools that range in elevation between 5 and 1,700 meters above msl (USFWS 2005). Conservancy fairy shrimp reproduce by depositing fertilized eggs in vernal pools, and as the pools dry out, the eggs desiccate and form cysts, allowing them to withstand heat,

cold, and prolonged desiccation. They remain in the dry pool bed until it rains and other environmental stimuli cause them to hatch (USFWS 2005). The average time to maturity is 37 days and 46 days to reproduce and an overall lifespan of 114 days (USFWS 2005).

Survey History

Protocol surveys are required to identify presence or absence of this species. These surveys have not been conducted within the Study Area as part of this biological resources assessment. There are five CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025). The nearest CNDDB record is located 2.4 miles to the east of the Study Area. The record documents one individual in a shallow vernal pool as recently as 2009 (CDFW 2025).

Habitat Suitability

Suitable vernal pool habitat is not present in the Study Area. However shallow seasonal wetlands within the Study Area could provide marginal habitat for this species. Conservancy fairy shrimp is currently known to occur in a wide range of vernal pool habitats and one of the known populations is located at UC Merced (USFWS 2005) and includes the Merced Vernal Pools and Grassland Reserve (CNDDB 2025). Within California, the species is found in 10 known populations limited to the Central Valley. Dispersal may occur between disconnected pools through avian transport. Large vernal pools or other wetland complexes east of the Study Area in the Merced Vernal Pools and Grassland Reserve may also provide habitat for this species, which are located within 250 feet of the Study Area.

Potential for Adverse Effects

The Project has the potential for adverse effects to Conservancy fairy shrimp through habitat disturbance if the species is found within the seasonal wetlands located in the Study Area. Destruction of habitat for this species may occur because of ground disturbance and/or siltation into wetlands. Destruction or siltation into these habitats would be considered a significant impact and be considered take of a federally listed species.

Although this species may occur within the seasonal wetlands delineated on-site, UC Merced has already fully compensated for the loss of habitat for these species. As reflected in the 2020 LRDP SEIR, the University has acquired nearly 24,000 acres of Conservation Lands that would protect 1,006 acres of occupied habitat for vernal pool fairy shrimp. Mitigation ratios achieved for direct and indirect impacts are 8:1 for Tier 1(a) Conservation lands and 16:1 with the addition of the Tier 2 Conservation Lands, substantially above the 3:1 minimum target specified in the 2002 BO. Similarly, 14 acres of occupied habitat for vernal pool tadpole shrimp are being protected, reflecting a mitigation ratio of 3.5:1, which is above the 3:1 minimum target specified in the Conservation Measures in the 2002 BO. Therefore, the proposed Project's impact on vernal pool fairy shrimp and vernal pool tadpole shrimp is accounted for under the impacts of the 2020 LRDP and fully compensated by the mitigation that has been already implemented.

Vernal Pool Fairy Shrimp

Federal status – Threatened
State status – none

Species Description

The vernal pool fairy shrimp varies in size, ranging from 11 to 25 millimeters (0.4 to 1.0 inch) in length and are found in vernal pools, vernal swales and other ephemeral water bodies near the middle of California's Central Valley (USFWS 2005). It is most frequently found in pools measuring less than 0.05 acre; although the species has been collected from vernal pools exceeding 25 acres. These are most commonly in grass or mud bottomed swales or basalt flow depression pools in unplowed grasslands (USFWS 2005). Vernal pool fairy shrimp reproduce by depositing fertilized eggs in vernal pools, and as the pools dry out, the eggs desiccate and form cysts, allowing them to withstand heat, cold, and prolonged desiccation. They remain in the dry pool bed until it rains and other environmental stimuli cause them to hatch (USFWS 2005). The average time to maturity is forty-one days, although in warmer pools, it can be as little as eighteen (Eriksen and Belk 1999). Within California, the species is found from the vicinity of Red Bluff in Shasta County southward through much of the Central Valley. The southernmost known populations of vernal pool fairy shrimp occur in the Santa Rosa Plateau in Riverside County (Eriksen and Belk 1999). Dispersal may continue between disconnected pools through avian transport.

Survey History

Protocol surveys are required to identify presence or absence of this species. These surveys have not been conducted within the Study Area as part of this biological resources assessment. There are 46 CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025). The nearest CNDDB record is located east of the Study Area along the Fairfield Canal that abuts the Study Area. The record documents this species in vernal pools and swales from 2001 (CDFW 2025).

Habitat Suitability

Shallow seasonal wetlands within the Study Area could provide marginal habitat for this species. Vernal pool fairy shrimp are currently known to occur in a wide range of vernal pool habitats in the southern and Central Valley areas of California (USFWS 2005). Large vernal pools or other wetland complexes east of the Study Area in the Merced Vernal Pools and Grassland Reserve may also provide habitat for this species, which are located within 250 feet of the Study Area.

Potential for Adverse Effects

The Project has the potential for adverse effects to vernal pool fairy shrimp through habitat disturbance if the species is found within the seasonal wetlands located in the Study Area. Destruction of habitat for this species may occur because of ground disturbance and/or siltation into wetlands. Destruction or siltation into these habitats would be considered a significant impact and be considered take of a federally listed species.

Although this species may occur within the seasonal wetlands delineated on-site, UC Merced has already fully compensated for the loss of habitat for these species. As reflected in the 2020 LRDP SEIR, the University has acquired nearly 24,000 acres of Conservation Lands that would protect 1,006 acres of occupied habitat for vernal pool fairy shrimp. Mitigation ratios achieved for direct and indirect impacts are 8:1 for Tier 1(a) Conservation lands and 16:1 with the addition of the Tier 2 Conservation Lands, substantially above the 3:1 minimum target specified in the 2002 BO. Similarly, 14 acres of occupied habitat for vernal pool tadpole shrimp are being protected, reflecting a mitigation ratio of 3.5:1, which is above the 3:1 minimum target specified in the Conservation Measures in the 2002 BO. Therefore, the

proposed Project's impact on vernal pool fairy shrimp and vernal pool tadpole shrimp is accounted for under the impacts of the 2020 LRDP and fully compensated by the mitigation that has been already implemented.

Vernal Pool Tadpole Shrimp

Federal status – Endangered
State status – none

Species Description

The vernal pool tadpole shrimp is a small freshwater crustacean that occupies unplowed freshwater vernal pools from 54 square feet to 89 acres, containing clear- to highly turbid water. Its known range is within the Central Valley of California and in the San Francisco Bay area. Vernal pool tadpole shrimp take a minimum of 25 days to mature and the mean age at first reproduction is 54 days (USFWS 2005). Vernal pool tadpole shrimp rely on motile species such as birds, mammals, and amphibians for dispersal. Shrimp eggs are transported in the stomachs of waterfowl and amphibians, and in small clumps of vernal pool soil attached to mammalian hooves and hair, bird feet, and feathers. Dispersal distances have not been measured but will likely equate with movement distances of the egg-transporting animals (Silveira 1998). As such, connectivity of upland and aquatic habitat between vernal pools or other wetted habitats will benefit shrimp dispersal by increasing the opportunities for egg transport by mammals and amphibians. Dispersal may continue between disconnected pools through avian transport.

Survey History

Protocol surveys are required to identify presence or absence of this species. These surveys have not been conducted within the Study Area as part of this BRA. There are 14 CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025). The nearest CNDDB record is located one mile to the southeast of the Study Area. The record documents 179 vernal pools occupied by this species during surveys in 2001 (CDFW 2025).

Habitat Suitability

Shallow seasonal wetlands within the Study Area could provide marginal habitat for this species. The seasonal wetlands found within the Study Area may provide suitable habitat for this species. Large vernal pools or other wetland complexes east of the Study Area in the Merced Vernal Pools and Grassland Reserve may also provide habitat for this species, which are located within 250 feet of the Study Area.

Potential for Adverse Effects

The Project has the potential for adverse effects to vernal pool tadpole shrimp through habitat disturbance if the species is found within the seasonal wetlands located in the Study Area. Destruction of habitat for this species may occur because of ground disturbance and/or siltation into wetlands. Destruction or siltation of these habitats would be considered a significant impact and be considered take of a federally listed species.

Although this species may occur within the seasonal wetlands delineated on-site, UC Merced has already fully compensated for the loss of habitat for these species. As reflected in the 2020 LRDP SEIR, the University has acquired nearly 24,000 acres of Conservation Lands that would protect 1,006 acres of occupied habitat for vernal pool fairy shrimp. Mitigation ratios achieved for direct and indirect impacts are 8:1 for Tier 1(a) Conservation lands and 16:1 with the addition of the Tier 2 Conservation Lands, substantially above the 3:1 minimum target specified in the 2002 BO. Similarly, 14 acres of occupied habitat for vernal pool tadpole shrimp are being protected, reflecting a mitigation ratio of 3.5:1, which is above the 3:1 minimum target specified in the Conservation Measures in the 2002 BO. Therefore, the proposed Project's impact on vernal pool fairy shrimp and vernal pool tadpole shrimp is accounted for under the impacts of the 2020 LRDP and fully compensated by the mitigation that has been already implemented.

California Tiger Salamander

Federal status – Threatened
State status – Threatened

Species Description

The historic range of California tiger salamander (CTS) included the San Joaquin-Sacramento River Valleys, bordering foothills and coastal valleys in what was considered a contiguous distribution (USFWS 2017). Currently, the population extends from Petaluma in Sonoma County (Sonoma DPS), east to the Colusa and Yolo County line, with an isolated population near Gray Lodge Wildlife Area north of the Sutter Buttes, and south through the Central Valley to Santa Barbara County (Santa Barbara DPS) (Jennings and Hayes 1994). Today the species is known to occur in about 23 counties and is found primarily in low elevation grassland-oak woodland plant communities of Central California (USFWS 2017).

CTS occupies a distinct habitat of both aquatic and terrestrial components that consist of aquatic breeding and non-breeding areas embedded within a matrix of habitats used for dispersal, or refugia. Breeding aquatic habitat consists typically of ephemeral freshwater bodies, such as ponds, vernal pools, constructed ponds, and other stock ponds. Permanent bodies of water are occasionally used for breeding, but permanent water bodies must be free of potential predators to eggs and larva, such as fish and American bullfrog (*Lithobates catesbeianus*). Non-breeding habitat is located in uplands away from ponds, typically in mammal burrows, where CTS will spend most of their life (USFWS 2017). A complex of upland habitat with burrowing mammals and breeding ponds are necessary habitat components required for this species to persist (USFWS 2017). During the onset of fall precipitation, CTS will emerge from their burrows and migrate to breeding habitat. Eggs are laid along the margins of ponds individually or in small clusters on vegetation or other debris (Jennings and Hayes 1994). The breeding season typically occurs from November through April (USFWS 2017) and is likely influenced by local precipitation and ambient temperature. Females typically lay eggs between December and early April. Larvae typically metamorphose in three to six months and juveniles begin to move out of the natal pond in late spring or early summer, and rarely overwinter (USFWS 2017). When juveniles leave their natal ponds, they distribute into uplands in search of suitable underground refugia, which typically consists of mammal burrows excavated by California ground squirrel and Botta's pocket gopher (USFWS 2017). Very little is known of CTS behavior while underground.

Survey History

No CTS were observed in the Study Area during the reconnaissance-level biological survey conducted in November 2025. There are 14 CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025). The nearest CNDDB record is located 0.7 mile to the west of the Study Area. The record documents a subadult and adult in aquatic habitat surrounded by annual grassland with burrows in 2000 (CDFW 2025). There are several other records east the Study Area in the Merced Vernal Pools and Grassland Reserve with potential breeding habitat visible on aerial imagery (Google Earth 2025). The Study Area is not located within federally designated critical habitat for CTS.

Habitat Suitability

Suitable upland habitat is present in small mammal burrows in the Study Area, which are heavily concentrated along the levee of the Le Grand Canal. Suitable burrows for this species are also found throughout the rest of the Study Area, but they are less abundant. Suitable aquatic habitat is not present in the Study Area since the seasonal wetlands within the Study Area are too shallow and do not appear to remain inundated for a long enough duration to support the larval development of this species. In 2011, a large apparent vernal pool is visible on aerial imagery, however, it is not regularly inundated after 2011 (Google Earth 2025), and no evidence of this feature was observed during the site visit on November 11, 2025.

Potential for Adverse Effects

CTS has been documented west of the Study Area, but this species was not observed during a biological reconnaissance level survey in November 2025. If present in the Study Area, this species would be found either dispersing through upland areas or found in small mammal burrows. Aquatic breeding habitat is not present in the Study Area since only shallow seasonal wetlands were observed in the Study Area. At the time of Project implementation, impacts on CTS could include harm as a result of coming into contact with equipment or personnel, loss of habitat, displacement from current habitat. Impacts that could harm CTS or result in loss of individuals or permanent loss of habitat would be considered potentially significant.

Implementation of the mitigation measures for CTS contained in Section 5.3, Mitigation for Special-Status Amphibians, and contained in Appendix E from the ITP No. 2081-2009-010-04 (Amendment No. 4) would reduce potential impacts to CTS to less than significant.

Western Spadefoot

Federal status – Proposed Threatened
State status – CDFW Species of Special Concern

Species Description

Western spadefoot, a species that is proposed for listing as a threatened species under the ESA and a CDFW species of special concern, occurs in a variety of habitats including mixed woodlands, grasslands, coastal sage scrub, chaparral, sandy washes, and playas. It breeds in vernal pools, depressional wetlands, puddles, and other ephemeral water features including altered or constructed features, often after heavy rains. Breeding sites must remain inundated for at least 3–11 weeks for larvae to mature with water temperatures maintained between 48–86 degrees Fahrenheit (USFWS 2023a). Spadefoots

are primarily terrestrial and require upland habitats for feeding and for constructing burrows for long dry-season dormancy (USFWS 2023a). Spadefoots typically burrow up to 3 feet below the surface and require sandy or friable soils which facilitate digging and water absorption (USFWS 2023a). Dispersal through uplands may vary between wet and dry years but they may travel up to 262 meters in a dry year and up to 605 meters in a wet year (USFWS 2023a).

Survey History

Western spadefoot was not observed in the Study Area during biological surveys in November 2025, however, focused or protocol surveys for western spadefoot were not conducted as part of this reconnaissance level survey. There is one CNDDB reported occurrence of this species within a five-mile radius of the Study Area located 2.5 miles to the southeast of the Study Area. The record documents this species in "pools" along Le Grand Canal during surveys in 2001 (CDFW 2025).

Habitat Suitability

Shallow seasonal wetlands within the Study Area could provide marginal breeding habitat. If present, this species is most likely to disperse through upland habitats in the Study Area. Sandy loam soil along levees could support burrow excavation by this species, for estivation during dry months. However, most upland habitats in the Study Area provide very little cover for this species since soils are shallow and underlain by a hardpan and there is no leaf litter or other vegetative cover or debris for this species to hide under. However, the Study Area is located within the suggested upland dispersal limits of large suitable breeding wetland habitat and upland annual grassland habitat east of the Study Area in the Merced Vernal Pools and Grassland Reserve.

Potential for Adverse Effects

Western spadefoot has not been documented in the Study Area, and it was not observed during biological surveys in 2025. If present within the Study Area, impacts to western spadefoot could include harm as a result of coming into contact with construction equipment or personnel, loss of habitat, displacement from current habitat, or loss of eggs and larval western spadefoot. Impacts that could harm western spadefoot or result in loss of individuals or permanent loss of habitat would be considered potentially significant. Temporary loss of habitat is not considered a significant impact. The Le Grand Canal, Fairfield Canal and wetlands in the Merced Vernal Pools and Grassland Reserve, which provide potential aquatic habitat, are not in the impact footprint of this Project.

Implementation of the recommended mitigation measure for special-status amphibians contained in Section 5.3, Mitigation for Special-Status Amphibians, would reduce potential impacts to western spadefoot to less than significant.

Northwestern Pond Turtle

Federal status – Proposed Threatened
State status – CDFW Species of Special Concern

Species Description

Northwestern pond turtle is a federally proposed threatened species and a CDFW species of special concern. They occur in a variety of aquatic habitats; typically, semi-permanent ponds, lakes, streams,

irrigation ditches, canals, marshes, or pools in intermittent drainages. It prefers areas lined with abundant vegetation and either rocky or muddy substrates. It requires basking sites such as logs, rocks, cattail mats or exposed banks. The species is active from February to November, and breeding occurs from April to May. Females typically nest in compact and dry soils 3 to 400 meters from water, with a preference for south facing slopes between 0 and 60 degrees with little vegetation cover; however, pond turtles occurring in forested areas will select nest sites under forest canopy that is more open. Overwintering occurs in upland terrestrial habitats close to water sources in open areas (up to 500 meters from water), in which they will bury themselves under loose soil where leaf litter is present (USFWS 2023b).

Survey History

Northwestern pond turtle was not observed in the Study Area during biological surveys in November 2025, however, focused or protocol surveys for northwestern pond turtle were not conducted as part of this reconnaissance level survey. There are no CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025.

Habitat Suitability

Suitable aquatic habitat for this species is not present in the Study Area; however, aquatic habitat is present in the Le Grand Canal and Fairfield Canal adjacent to the Study Area. Nesting or egg-laying habitat is present in upland habitats that include annual grassland, ruderal and urban habitats near the canals. Upland habitats may also provide habitat for northwestern pond turtles seeking refuge after aquatic habitats become dry prior to the onset of the rainy season. However, upland habitats in the Study Area provide very little cover for this species since soils are shallow and there is no leaf litter or other vegetative cover for this species to hide under. However, the Study Area is located within the suggested upland dispersal limits of northwestern pond turtle, which abuts Le Grand Canal and is approximately 139 meters from the Fairfield Canal.

Potential for Adverse Effects

Northwestern pond turtle has not been documented in the Study Area, and it was not observed during biological survey in 2025. If present within the Study Area, impacts to northwestern pond turtle could include harm as a result of coming into contact with construction equipment or personnel, loss of habitat, displacement from current habitat, or loss of a nest and juvenile northwestern pond turtles. Impacts that could harm northwestern pond turtles or result in loss of a nest or permanent loss of habitat would be considered potentially significant. Temporary loss of habitat is not considered a significant impact. The Le Grand Canal and Fairfield Canal, which provide potential aquatic habitat, are not in the impact footprint of this Project.

Implementation of the recommended mitigation measure for special-status reptiles contained in Section 5.4, Mitigation for Northwestern Pond Turtle, would reduce potential impacts to northwestern pond turtle to less than significant.

Burrowing Owl

Federal status – None
State status – Candidate for listing under CESA; and Protected by Section 3503 of the CFGC

Species Description

Burrowing owls are often found in open, dry grasslands, agricultural and range lands, and desert habitats. They can also inhabit grass, forb, and shrub stages of pinyon and ponderosa pine habitats. Burrowing owls occur at elevations ranging from 60 meters below msl to over 2,745 meters above msl. In California, the highest elevation where burrowing owls are known to occur is 1,615 meters above msl in Lassen County. In addition to natural habitats, burrowing owls can be found in urban habitats such as at the margins of airports and golf courses and in vacant urban lots. Burrowing owls forage in adjacent grasslands and other suitable habitats primarily for insects and small mammals, and less often for reptiles, amphibians, and other small birds. In the Central Valley of California, foraging occurs between 400 and 3,000 meters of the nest (Rosenberg *et al.* 2009).

Burrowing owls nest in burrows in the ground and commonly perch on fence posts or mounds near the burrow. The burrowing owls often use ground squirrel burrows, badger dens, or artificial burrows such as abandoned pipes or culverts.

Survey History

One burrowing owl was observed in the Study Area during the reconnaissance-level biological survey on November 11, 2025. This burrowing owl was observed in annual grassland near burrows but was not associated with any single burrow. One burrowing owl pellet was observed near this owl. Several artificial burrows were observed in the Study Area near the existing solar array, which may provide habitat for this species in addition to California ground squirrel burrows along the levees. There are two CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025). The nearest CNDDB record is located 0.6 mile to the west of the Study Area. The record documents several active burrows observed during the winter in 2000. However, only burrowing owl sign was documented, and no burrowing owls were observed as part of this record (CDFW 2025).

Habitat Suitability

Suitable habitat for burrowing owl is present in the Study Area in annual grassland and ruderal habitats and other open areas where suitable refuge sites are present, such as small mammal burrows, culverts, or other underground cavities. Burrowing owls could either occur nesting or wintering in California ground squirrel burrows in the Study Area or in suitable annual grassland habitat adjacent to the Study Area.

Potential for Adverse Effects

The proposed Project has the potential for adverse effects to burrowing owl through nest disturbance, leading to the destruction of eggs or nestlings if this species nests in the Study Area. Dispersing non-breeding adults could readily avoid contact with equipment or personnel by moving out of the work area and thus this would not be considered a potentially significant impact to the species. Eggs and young still dependent on the nest would be susceptible to injury or mortality through physical contact or through nest abandonment caused by displacement of adults. Needless destruction of eggs or young would be a violation of CESA and Fish and Game Code and be considered a significant impact.

Implementation of the mitigation measure MM BIO-9 for burrowing owls from the 2020 LRDP SEIR contained in Section 5.5, Mitigation for Special-Status and Non-Special Status Migratory Birds, would reduce potential impacts to burrowing owl to less than significant.

Swainson's Hawk

Federal status – None
State status – Threatened and Protected by Section 3503 of the CFGC

Species Description

Swainson's hawk is a California threatened species. This hawk migrates from their wintering grounds in the La Pampas Region in Argentina to their breeding grounds in western North America, including the Central Valley of California, from early March through early April. On breeding grounds, Swainson's hawk prefer open habitats, including mixed and short grass grasslands, with scattered trees or shrubs for perching; dry grasslands; irrigated meadows; and edges between two habitat types. Breeding occurs from late March to late August, peaking in late May through July (Zeiner *et al.* 1990). In the Central Valley of California, Swainson's hawk nest in stands with few trees in juniper-sage flats, riparian woodlands, and oak woodlands. This species nests in proximity to suitable foraging habitat, which can be located within a 10-mile radius of an active nesting site. Swainson's hawks leave their breeding grounds to return to their wintering grounds in late August or early September.

Survey History

Swainson's hawk was not observed in the Study Area during biological surveys in November 2025, however, focused or protocol surveys for Swainson's hawk were not conducted as part of this reconnaissance level survey. Additionally, Swainson's hawk is migratory and is typically absent from California in November. There are two CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025). The nearest CNDDB record is located along the northern boundary of the Study Area. The record documents a nest tree that was removed in 2016 (CDFW 2025).

Habitat Suitability

Trees present in ruderal areas of the Study Area provide suitable nesting habitat for the species. Ruderal areas, pasture, and annual grassland provide foraging habitat where small mammal prey is abundant. Suitable foraging habitat is also abundant in the surrounding area especially in the Merced Vernal Pools and Grassland Reserve east of the Study Area.

Potential for Adverse Effects

In the absence of mitigation measures, Project construction activities have the potential to affect Swainson's hawk if it were to nest within or near the Study Area. If Swainson's hawk were to nest within or adjacent to the Project, impacts to nesting could occur through noise, vibration, and the presence of construction equipment and personnel. Potential impacts to nesting Swainson's hawk would be a significant impact. Loss of foraging habitat within the Study Area because of Project development could also be a potentially significant impact. Eggs and young still dependent on the nest would be susceptible to injury or mortality through physical contact or through nest abandonment caused by displacement of adults. Needless destruction of eggs or young would be a violation of CESA, Fish and Game Code and a significant impact.

Implementation of the mitigation measure contained in Section 5.5, Mitigation for Special-Status and Non-Special Status Migratory Birds and contained in Appendix E from the ITP No. 2081-2009-010-04 (Amendment No. 4) would reduce potential impacts to Swainson's hawk to less than significant.

San Joaquin Kit Fox

Federal status – Endangered
State status – Threatened

Species Description

San Joaquin kit fox inhabits a wide range of open and shrubby habitats, including grassland, scrublands, and agricultural areas where dens are available (e.g., unplowed fields, row crops, vineyards, or orchards), non-irrigated pastures, vernal pool grasslands, playas, and alkali meadows. San Joaquin kit fox dens are typically located on slopes less than 40 degrees, and pupping dens are usually on level ground; den entrances are typically 8 to 10 inches in diameter. San Joaquin kit foxes use many dens in a season, and occupied dens often show no signs of use. Common signs of use include a dirt ramp leading to the entrance, flattened grass around the entrance, scat, tracks, and prey remains (USFWS 2010).

The largest extant populations of San Joaquin kit fox are at the western margins of the Central Valley and the eastern Coast Ranges. Population centers occur in western Kern County (Elk Hills and Pixley National Wildlife Refuge), eastern San Luis Obispo County (Carrizo Plain), western Fresno County and eastern San Benito County (Ciervo-Panoche Natural Area), Southern Monterey County (Fort Hunter-Liggett and Camp Roberts), western Merced County, and eastern Contra Costa County. These population centers generally form a meta-population lying west of Interstate 5 and/or south of Allensworth, with only isolated occurrences in the remainder of the valley (USFWS 2010).

Survey History

San Joaquin kit fox was not observed in the Study Area during the biological survey in November 2025, however, focused or protocol surveys for San Joaquin kit fox were not conducted as part of this reconnaissance level survey. Coyote (*Canis latrans*) was observed in the Study Area on November 11, 2025, which is a potential competitor and predator of San Joaquin kit fox. There are two CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025). The nearest CNDDB record is located 1.8 miles to east of the Study Area. The record documents one individual observed foraging in annual grassland in 1999 (CDFW 2025).

Habitat Suitability

Habitat for San Joaquin kit fox is present throughout the Study Area where friable soil and small mammal prey are present. Habitat is present along the Le Grand Canal levee, which could provide denning, dispersal, and foraging habitat for this species. Additionally, this species could use canals as dispersal routes through the region to access adjacent habitats. The Study Area is not within known satellite or core populations (USFWS 2020), and this species is unlikely to den in the Study Area. However, the Study Area is within a linkage area for this species between core population areas (USFWS 2010) and suitable habitat is abundant east of the Study Area where this species was documented in 1999 (CDFW 2025). Suitable foraging habitat is also abundant in the surrounding area especially in the Merced Vernal Pools and Grassland Reserve east of the Study Area.

Potential for Adverse Effects

Development of the Study Area from suitable foraging and dispersal habitat would not eliminate the potential for San Joaquin kit fox to use the Project for foraging and dispersal and would not constitute a

significant impact to this species. Because San Joaquin kit fox is a highly mobile animal and the Study Area does provide suitable foraging and dispersal habitat. There is a low potential for San Joaquin kit fox to den in the Study Area prior to commencement of the Project. This species is most likely to occur in the Study Area as transient individuals either foraging or dispersing through the Study Area during construction, and operation. In the absence of proposed mitigation measures, the Project would have a low potential for adverse effects on San Joaquin kit fox which would be a significant impact.

Implementation of the mitigation measure for San Joaquin kit fox contained in Section 5.6, Mitigation for San Joaquin Kit Fox, and contained in Appendix E from the ITP No. 2081-2009-010-04 (Amendment No. 4) would reduce potential impacts to San Joaquin kit fox to less than significant.

American Badger

Federal status – None
State status – CDFW Species of Special Concern

Species Description

American badger occurs throughout most of California in a wide range of habitats but prefers open stages of forest and scrub habitats with friable soils. American badger dens are typically located in open areas with sparse vegetation. American badger will use many dens in a season, reusing the same den or excavating new dens each night. Common signs of use include a dirt ramp leading to the entrance, flattened grass around the entrance, scat, and tracks. The home range of a badger typically ranges from 400 to 600 acres but may range to as high as 1,549 acres (Zeiner *et al.* 1990).

Survey History

American badger was not observed in the Study Area during biological surveys in November 2025, however, focused or protocol surveys for American badger were not conducted as part of this reconnaissance level survey. There are no CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025).

Habitat Suitability

Habitat for American badger is present throughout the Study Area where friable soil and small mammal prey are present. Habitat is present along the Le Grand Canal levee, which could provide denning, dispersal, and foraging habitat for this species. Additionally, this species could use canals as dispersal routes through the region to access adjacent habitats, such as the Merced Vernal Pools and Grassland Reserve. In the absence of records in the CNDDB, the Study Area is within the known range of American badger, and the Study Area is situated in suitable habitat and is located adjacent to the Merced Vernal Pools and Grassland Reserve which provides expansive habitat for this species and additional linkage to other areas with suitable habitat.

Potential for Adverse Effects

Development of the Study Area from suitable foraging and dispersal habitat would not eliminate the potential for American badger to use the Project for foraging and dispersal and would not constitute a significant impact to this species. Because American badger is a highly mobile animal and the Study Area does provide suitable foraging and dispersal habitat. There is a low potential for American badger to den

in the Study Area prior to commencement of the Project. This species is most likely to occur in the Study Area as transient individuals either foraging or dispersing through the Study Area during construction, and operation. In the absence of proposed mitigation measures, the Project would have a low potential for adverse effects on American badger which would be a significant impact.

Implementation of the recommended mitigation measure for American badger contained in Section 5.7, Mitigation for American Badger, would reduce potential impacts to American badger to less than significant.

4.4.2.1 Birds

Nesting Migratory Birds and Raptors

Migratory birds are protected under the MBTA of 1918 (16 U.S.C. 703-711). The MBTA makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed under 50 CFR 10; this also includes feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 CFR 21). Additionally, Section 3503 of the California Fish and Game Code states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Section 3503.5 specifically states that it is unlawful to take, possess, or destroy any raptors (i.e., hawks, owls, eagles, and falcons), including their nests or eggs; Section 3513 specifically states that it is unlawful to take or possess any migratory nongame bird as designated in the MBTA or any part of such migratory nongame bird except as provided by rules and regulations adopted by the Secretary of the Interior under provisions of the MBTA.

A number of migratory birds and raptors have the potential to nest in or adjacent to the Study Area. Suitable nest locations within and adjacent to the Study Area include trees, grass, artificial structures, and bare ground. Nesting birds could potentially be impacted by Project construction including removal of nesting habitat, increases in construction noise, human activity, and vibration that could result in impacts to active nests or nest abandonment.

Implementation of the mitigation measure MM BIO-9 for nesting birds from the 2020 LRDP SEIR contained in Section 5.5, Mitigation for Special-Status and Non-Special Status Migratory Birds, would reduce potential impacts to nesting migratory birds and raptors to less than significant.

4.5 SENSITIVE HABITATS

Sensitive habitats include those that are of special concern to resource agencies or those that are protected under CEQA, Section 1600 of the FGC (i.e., riparian areas) and/or Sections 401 and 404 of the CWA, which include wetlands and other waters of the U.S. Sensitive habitats identified within the Study Area are discussed below.

4.5.1 Aquatic Resources

A total of 0.05 acre of aquatic resources have been delineated in the Study Area (Figure 5). Aquatic resources in the Study Area include seasonal wetlands (0.05 acre). Other waters were not detected in the Study Area.

4.5.1.1 Seasonal Wetland

A total of 0.05 acre of seasonal wetlands were mapped within the Study Area, consisting of five seasonal wetlands. Seasonal wetlands collect surface runoff from surrounding terrain and are shallow depressions that stay inundated for a long enough duration to form hydric soil and support a dominance of hydrophytic vegetation. Hydrophytic vegetation observed in the seasonal wetlands at the time of the aquatic resources delineation included Italian ryegrass (*Festuca perennis*), Mediterranean barley (*Hordeum marinum*), woolly marbles (*Psilocarphus brevissimus*), and Great Valley button-celery. The seasonal wetlands within the Study Area are isolated, and they are not part of a larger wetland complex.

4.5.2 Wildlife Migration Corridors

Wildlife corridors link areas of suitable wildlife habitat that are otherwise separated by rugged terrain, changes in vegetation, or human disturbance. This fragmentation of habitat can also occur when a portion of one or more habitats is converted into another habitat; for instance, when woodland or scrub habitat is altered or converted into grasslands after a disturbance such as fire, mudslide, or construction activities. Wildlife corridors mitigate the effects of this fragmentation by (1) allowing animals to move between remaining habitats thereby permitting depleted populations to be replenished and promoting genetic exchange; (2) providing escape routes from fire, predators, and human disturbances, thus reducing the risk of catastrophic events (such as fire or disease) on population or local species extinction; and (3) serving as travel routes for individual animals as they move within their home ranges in search of food, water, mates, and other needs.

The Study Area is located within a partially developed area of the UC Merced campus surrounded by roadways and campus development. The Merced Vernal Pools and Grassland Reserve occurs adjacent to the Study Area and east of the Le Grand Canal. The Study Area provides limited habitat for species, such as grassland species, which may provide foraging habitat for raptors or refuge habitat for amphibians. The levees of the Le Grand Canal may also provide dispersal routes for mammal species. However, the Le Grand Canal levees will not be disturbed and wildlife species will not be prevented from passing through the Study Area or the adjacent Merced Vernal Pools and Grassland Reserve. Implementation of the proposed Project would not significantly affect any documented or observed wildlife migration corridors.

4.5.3 Trees

A total of four trees are present within the Study Area consisting of one argyle apple, one red ironbark, and two stone pine trees. These trees were planted during previous development within the Study Area, and if their removal is determined to be necessary for the Project, then mitigation for these trees is not expected since these trees are planted as part of past landscaping activities, and they are not native to California or North America and no impacts to native or protected trees will occur because of this Project. However, mitigation measures to reduce impacts to nesting migratory birds from Section 5.5, Mitigation for Special-Status and Non-Special Status Migratory Birds, would be implemented prior to any tree removal.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The Study Area consists of pasture, seasonal wetland, annual grassland, ruderal, and urban habitats. Table 1, *Impacts to Vegetation Communities*, below provides a summary of anticipated permanent impacts to vegetation communities that will occur as a result of the Project. See Figure 6, *Impacts to Biological Communities,* for a breakdown of Project footprint impacts and habitats by location.

Table 1
IMPACTS TO VEGETATION COMMUNITIES

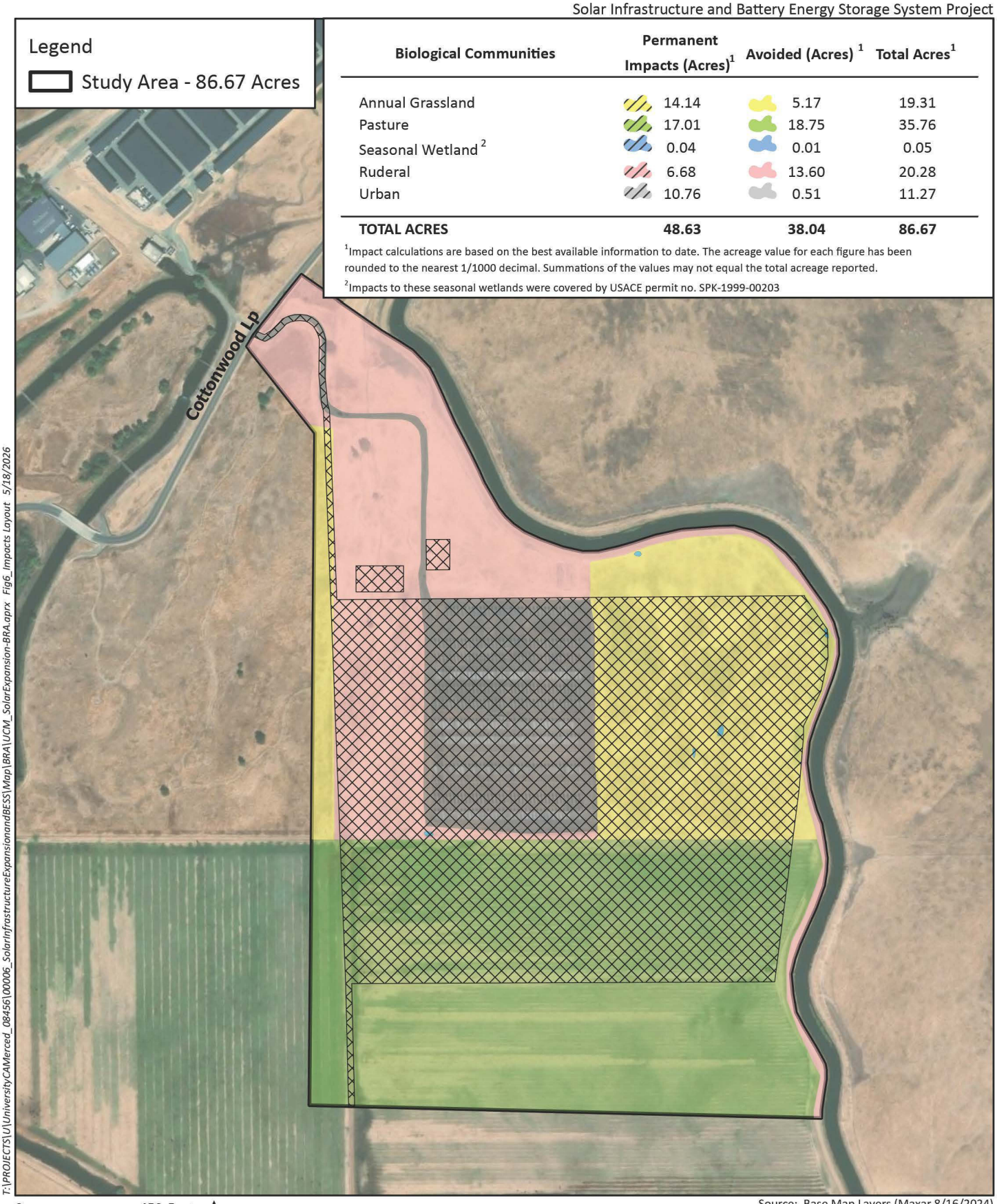
Biological Community	Land Cover Permanently Impacted by Project (Acres)	Avoided (Acres)	Total (Acres)
Annual Grassland	14.14	5.17	19.31
Pasture	17.01	18.75	35.76
Seasonal Wetland	0.04	0.01	0.05
Ruderal	6.68	13.60	20.28
Urban	10.76	0.51	11.27
TOTAL	**48.63**	**38.04**	**86.67**

The Study Area provides potential habitat for rare plants, Crotch's bumble bee, vernal pool branchiopods, California tiger salamander, western spadefoot, northwestern pond turtle, burrowing owl, Swainson's hawk, American badger, San Joaquin kit fox, and could support nesting bird species protected by the federal MBTA and California Fish and Game Codes. The 2020 LRDP SEIR contains mitigation measures to mitigate impacts to Crotch's bumble bee (MM BIO-4a) and to mitigate impacts and habitat loss to special-status and non-special-status nesting birds (MM BIO-9), including Swainson's hawk and burrowing owl, which are included below. Additionally, measures from the ITP No. 2081-2009-010-04 (Amendment No. 4) have been provided for CTS, Swainson's hawk, succulent owl's clover, and San Joaquin kit fox, referenced below and provided in Appendix E. Project-specific mitigation measures have been provided to reduce impacts to less than significant levels for species not provided measures in the 2020 LRDP SEIR or in the ITP. Measures provided in Sections 5.1 through 5.9 below should be implemented prior to construction to reduce impacts to biological resources with the potential to occur in the Project footprint to a less-than-significant level.

5.1 MITIGATION FOR CROTCH'S BUMBLE BEE

Crotch's bumble bee has potential to occur in the Study Area. To avoid potential impacts to this species, the 2020 LRDP SEIR MM BIO-4a is recommended. The following measure, 2020 LRDP SEIR MM BIO-4a, will avoid or reduce potential Project-related impacts to Crotch's bumble bee to less than significant.

- Prior to any new development on previously undisturbed land, and as long as the species is considered a candidate endangered species or in the event that it becomes listed under the CESA, a qualified wildlife biologist shall conduct visual surveys of the development area during the flight season for the Crotch bumble bee (late February through late October). The following methodology shall apply unless the CDFW releases species-specific survey protocol; in this case, CDFW's survey protocol shall apply.



Biological Communities	Permanent Impacts (Acres)[1]	Avoided (Acres) [1]	Total Acres[1]
Annual Grassland	14.14	5.17	19.31
Pasture	17.01	18.75	35.76
Seasonal Wetland [2]	0.04	0.01	0.05
Ruderal	6.68	13.60	20.28
Urban	10.76	0.51	11.27
TOTAL ACRES	**48.63**	**38.04**	**86.67**

[1]Impact calculations are based on the best available information to date. The acreage value for each figure has been rounded to the nearest 1/1000 decimal. Summations of the values may not equal the total acreage reported.

[2]Impacts to these seasonal wetlands were covered by USACE permit no. SPK-1999-00203

T:\PROJECTS\U\UniversityCAMerced_08456\00006_SolarInfrastructureExpansionandBESS\Map\BRA\UCM_SolarExpansion-BRA.aprx Fig6_Impacts Layout 5/18/2026

0 450 Feet

Source: Base Map Layers (Maxar 8/16/2024)

HELIX Environmental Planning

Impacts to Biological Communities

Figure 6

- Between two and four evenly spaced presence/absence surveys shall be conducted for the highest detection probability, which, at present time, is the greatest between early spring (late March/early April) and early summer (late June/July). Surveys shall take place when temperatures are above 60°F, preferably on sunny days with low wind speeds (e.g., less than 8 miles per hour) and at least 2 hours after sunrise and 3 hours before sunset. On warm days (e.g., over 85°F), bumble bees will be more active in the mornings and evenings. Surveyors shall conduct transect surveys focusing on detection of foraging bumble bees and underground nests using visual aids such as butterfly binoculars. Even if no Crotch bumble bees are observed, a preconstruction survey will be conducted within 30 days prior to start of construction. If no Crotch bumble bees or potential Crotch bumble bees are detected during the presence/absence surveys or the pre-construction survey, no further mitigation is required.

- If Crotch bumble bees or potential Crotch bumble bees are observed within the development area, a plan to protect Crotch bumble bee nests and individuals shall be developed and implemented in consultation with CDFW. The plan shall include, but not be limited to, the following measures:

    - Specifications for construction timing and sequencing requirements (e.g., avoidance of raking, mowing, tilling, or other ground disturbance until late March to protect overwintering queens);

    - Preconstruction surveys conducted within 30 days and consistent with any current available CDFW standards prior to the start of ground disturbing activities to identify active nests;

    - Establishment of appropriate no-disturbance buffers for nest sites and construction monitoring by a qualified biologist to ensure compliance;

    - Restrictions associated with construction practices, equipment, or materials that may harm bumble bees (e.g., avoidance of pesticides/herbicides, BMPs to minimize the spread of invasive plant species);

    - Provisions to avoid Crotch bumble bees or potential Crotch bumble bees if observed away from a nest during project activity (e.g., ceasing of project activities until the animal has left the work area on its own volition); and

    - Prescription of an appropriate restoration seed mix targeted for the Crotch bumble bee, including native plant species known to be visited by native bumble bee species and containing a mix of flowering plant species with continual floral availability through the entire active season of the Crotch bumble bee (March to October).

5.2 MITIGATION FOR VERNAL POOL BRANCHIOPODS

Listed vernal pool invertebrates (conservancy fairy shrimp, vernal pool fairy shrimp and vernal pool tadpole shrimp) have the potential to be present in seasonal wetland habitat in the Study Area or in vernal pool habitat within 250 feet from the Study Area.

Although this species may occur within the seasonal wetlands delineated on-site, UC Merced has already fully compensated for the loss of habitat for these species. As reflected in the 2020 LRDP SEIR, the University has acquired nearly 24,000 acres of Conservation Lands that would protect 1,006 acres of occupied habitat for vernal pool fairy shrimp. Mitigation ratios achieved for direct and indirect impacts are 8:1 for Tier 1(a) Conservation lands and 16:1 with the addition of the Tier 2 Conservation Lands, substantially above the 3:1 minimum target specified in the 2002 BO. Similarly, 14 acres of occupied habitat for vernal pool tadpole shrimp are being protected, reflecting a mitigation ratio of 3.5:1, which is above the 3:1 minimum target specified in the Conservation Measures in the 2002 BO. Therefore, the proposed Project's impact on vernal pool fairy shrimp and vernal pool tadpole shrimp is accounted for under the impacts of the 2020 LRDP and fully compensated by the mitigation that has been already implemented. No further mitigation measures are recommended.

5.3 MITIGATION FOR SPECIAL-STATUS AMPHIBIANS

5.3.1 California Tiger Salamander

The Study Area provides suitable habitat for California tiger salamander. In the absence of mitigation measures, potential adverse effects to CTS could include take of individuals using aquatic habitat for breeding or refuge and upland areas for dispersal and/or refugia during project-related activities. Impacts that could harm California tiger salamander would be considered potentially significant. Implementation of mitigation measures 1 – 3; 8 – 11; 37, 39 – 43, which are provided in the ITP No. 2081-2009-010-04 (Amendment No. 4) presented in Appendix E, in addition to general mitigation measures 4 –7; 21 – 36; 44 – 46; 51; 62 – 64 will avoid or reduce potential Project-related impacts to CTS to less than significant.

5.3.2 Western Spadefoot

Western spadefoot have been documented near the Study Area and wetlands, small mammal burrows in and surrounding the Study Area provide habitat for this species. The following Project-specific mitigation measures will avoid or reduce potential Project-related impacts to western spadefoot to less than significant.

- If project-related activities commences during the wet season and active dispersal period for these species (between approximately November 1 and March 31), pre-activity surveys for western spadefoot would be conducted in the Study Area no more than two weeks prior to the initiation of project-related activities to ensure that California tiger salamander and western spadefoot are not actively using the work area or adjacent areas. Pre-activity surveys would be conducted by a qualified biologist familiar with all life stages and would cover all terrestrial and aquatic habitats in the Study Area that are suitable for western spadefoot.

- If western spadefoot are observed within the Study Area during work, specifically within the construction zone, all work shall immediately halt in the vicinity of the animal, and the animal will be allowed to leave the area of its own will. If the animal is in immediate danger, an approved biologist will relocate the animal outside of the construction zone, at a safe distance from all construction-related activities, and within suitable habitat. No one other than an agency approved biologist shall handle, take, or otherwise harass the animal. No work shall resume until the animal has moved or been removed from areas of potential disturbance so long as the animal is out of harm's way.

5.4 MITIGATION FOR NORTHWESTERN POND TURTLE

Northwestern pond turtle may utilize aquatic features in Le Grand Canal and Fairfield Canal adjacent to the Study Area and northwestern pond turtle may utilize upland within the Study Area for refuge or egg-laying/nesting habitat. The following Project-specific mitigation measures will avoid or reduce potential Project-related impacts to northwestern pond turtle to less than significant.

- If possible, conduct all grading and land disturbing activities outside of the breeding season for western pond turtle (breeding season is generally April to May for western pond turtle; work conducted between June and September should avoid these species' breeding seasons) to avoid potential impacts to breeding/dispersing individuals.

- If project construction commences during breeding season (April 1 to May 31), then a qualified biologist should conduct a pre-construction survey for northwestern pond turtle within 24 hours before the start of grading or land-disturbing activities. If the survey shows that there is no evidence of these species, then a letter report should be prepared to document the survey and provided to the Project proponent, and no additional measures are recommended. If development does not commence within 24 hours of the survey, or halts for more than seven days, then an additional survey is required before starting or resuming work.

    - If this species are observed during the survey, no work shall occur until CDFW has been consulted to determine appropriate mitigation measures.

- If northwestern pond turtles are observed within the Study Area during work, specifically within the construction zone, all work shall immediately halt in the vicinity of the animal, and the animal will be allowed to leave the area of its own will. If the animal is in immediate danger, an approved biologist will relocate the animal outside of the construction zone, at a safe distance from all construction-related activities, and within suitable habitat. No one other than an agency approved biologist shall handle, take, or otherwise harass the animal. No work shall resume until the animal has moved or been removed from areas of potential disturbance so long as the animal is out of harm's way.

5.5 MITIGATION FOR SPECIAL-STATUS AND NON-SPECIAL STATUS MIGRATORY BIRDS

Special-status and non-special status migratory birds, including Swainson's hawk and burrowing owl have potential to occur in the Study Area. Burrowing owl was present at the time of the surveys and has a high potential to occur within the ruderal, and annual grassland vegetation community, and along the margins of the pasture during Project implementation due to the presence of suitable nesting (e.g., burrows) and foraging habitat and known occurrences within the vicinity of the Study Area. One burrowing owl was observed during the reconnaissance level biological survey, and the species is expected to continue to occupy the Study Area. To avoid potential impacts to this species, 2020 LRDP SEIR MM BIO-9 is recommended. However, measures in the 2020 LRDP SEIR BIO-9 specific to Swainson's hawk have been superseded by mitigation measures 12, 47, 48, 49 and 50, which are provided in the ITP No. 2081-2009-010-04 (Amendment No. 4) presented in Appendix E, in addition to general mitigation measures 4 –7; 21 – 36; 44 – 46; 51; 62 – 64. 2020 LRDP SEIR BIO-9 is listed below, with minor modifications for clarity.

Avoid and minimize impacts on special-status and non-special-status migratory birds and raptors.

(a) Limit construction to the non-breeding season or, if breeding season work is required, conduct pre-construction (tree, shrub, and ground) nest surveys to identify and avoid active nests or as an option, remove potential breeding habitat during the non-breeding season.

- If feasible, the applicant shall conduct all construction-related activities including (but not limited to) tree and shrub removal, other vegetation clearing, grading, or other ground disturbing activities during the non-breeding season (between August 16 and February 14) for special-status and non-special-status migratory birds and raptors. If construction activities are scheduled to occur during the breeding season, a qualified avian biologist, with knowledge of the species to be surveyed, shall be retained to conduct focused nesting surveys within 15 days of the start of ground-disturbing or construction activities and within the appropriate habitat.

- Specifically, tree, shrub, and ground nesting surveys for special-status birds (including but not limited to white-tailed kite, northern harrier, burrowing owl, loggerhead shrike, and tricolored blackbird), and other migratory birds and raptors shall be conducted before any construction disturbances occur in or near suitable nesting habitat within 500 feet of the construction work area between February 15 and August 15.

- If an active nest is located on or within 500 feet of the project area, CDFW shall be consulted to determine an appropriate no-disturbance buffer around the nest until the nest is no longer active and the young have fledged. No construction shall be allowed within this exclusion area without consulting with CDFW. A wildlife biologist shall monitor the nest site during construction at least once a week, or at a frequency determined by CDFG, to ensure that the nest site is not disturbed and the buffer is maintained.

- If the project proponent elects to remove a nest tree, nest trees may only be removed between August 16 and February 28, after the qualified avian biologist has determined that the nests are unoccupied.

(b) Minimize impacts to burrowing owl and compensate for habitat loss.

- The CDFW 1995 (updated by CDFW 2012) recommends that preconstruction surveys be conducted to locate active burrowing owl burrows in the construction work area and within a 500-foot-wide buffer zone around the construction area. The project proponent or its contractor shall retain a qualified biologist to conduct preconstruction surveys for active burrows according to the CDFW's Staff Report on Burrowing Owl Mitigation (updated by CDFW 2012). The preconstruction surveys shall include a breeding season survey and a wintering season survey. If no burrowing owls are detected, no further mitigation is required.

- If active burrowing owls are detected, the following additional measures are required:

- Occupied burrows shall not be disturbed during the breeding season (February 1 to August 31), which requires a 250 foot no disturbance buffer.

- If owls must be moved away from the project site during the nonbreeding season, passive relocation techniques (e.g., installing one-way doors at burrow entrances) shall be used instead of trapping, as described in CDFG guidelines. At least 1 week will be necessary to complete passive relocation and allow owls to acclimate to alternate burrows.

- When destruction of occupied burrows is unavoidable during the nonbreeding season (September 1 to January 31), unsuitable burrows shall be enhanced (enlarged or cleared of debris) or new burrows created (by installing artificial burrows) at a ratio of 2:1 on protected lands approved by the CDFW. Newly created burrows shall follow guidelines established by the CDFW (2012). These guidelines also require compensation for loss of foraging habitat.

5.6 MITIGATION FOR SAN JOAQUIN KIT FOX

Based on the presence of habitat for San Joaquin kit fox in the Study Area, San Joaquin kit fox may occur in the Study Area and could potentially be impacted by the proposed Project if it were to den or otherwise occupy the Study Area. If present in the Study Area at the time of implementation of the Project, impacts to San Joaquin kit fox could include harm as a result of coming into contact with equipment or personnel, loss of habitat, displacement from current habitat, or loss of a den. Impacts that could harm San Joaquin kit fox or result in loss of a den or a permanent loss of habitat would be considered potentially significant. To avoid potential impacts to this species, the following measures are provided as a result of federal and state permitting associated with the Project. Implementation of mitigation measures 13 – 15; which are provided in the ITP No. 2081-2009-010-04 (Amendment No. 4) presented in Appendix E, in addition to general mitigation measures 4 –7; 21 – 36; 44 – 46; 51; 62 – 64 will avoid or reduce potential Project-related impacts to San Joaquin kit fox to less than significant.

5.7 MITIGATION FOR AMERICAN BADGER

Based on the presence of habitat in the Study Area, American badger may occur in the Study Area and could potentially be impacted by the proposed Project. If present in the Study Area at the time of implementation of the Project, impacts to American badger could include harm as a result of coming into contact with equipment or personnel, loss of habitat, displacement from current habitat, or loss of a den. Impacts that could harm American badger or result in loss of a den or a permanent loss of habitat would be considered potentially significant. Implementation of San Joaquin kit fox mitigation measures 13 – 15; which are provided in the ITP No. 2081-2009-010-04 (Amendment No. 4) presented in Appendix E, in addition to general mitigation measures 4 –7; 21 – 36; 44 – 46; 51; 62 – 64 as required above under Section 5.6, Mitigation for San Joaquin Kit Fox, will avoid or reduce potential Project-related impacts to American badger to less than significant as the two species are known to occur in similar habitats.

5.8 AQUATIC RESOURCES

A total of 0.05 acre of aquatic features (seasonal wetlands) were mapped within the Study Area. On April 29, 2009, the USACE took jurisdiction over the permitted activity and authorized work that would

result in the discharge of fill into 77.79 acres of waters of the U.S. for the University of California Merced Campus and Community North Project (SPK-1999-00203; USACE 2022). The University of California Merced Campus and Community North Project was subsequently modified and the permit updated and extended on March 5, 2012, September 10, 2015, April 18, 2017, and April 21, 2022. The time limit for completing the work covered under SPK-1999-00203 has been extended through May 1, 2030, and the size of the University of California Merced Campus and Community North Project was expanded from 833 acres to 1,026 acres. The current Study Area falls within the area permitted under SPK-1999-00203 and was a covered activity, and aquatic resources within the Study Area are fully mitigated under SPK-1999-00203.

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Appendix A

CNDDB, CNPS, and USFWS Lists of Regionally Occurring Special-Status Species

United States Department of the Interior

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In Reply Refer To: 10/27/2025 21:31:56 UTC
Project Code: 2026-0009107
Project Name: Solar Expansion Project

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)

(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts, see https://www.fws.gov/program/migratory-bird-permit/what-we-do.

It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures, see https://www.fws.gov/library/collections/threats-birds.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/partner/council-conservation-migratory-birds.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
(916) 414-6600

PROJECT SUMMARY

Project Code: 2026-0009107
Project Name: Solar Expansion Project
Project Type: Power Gen - Solar
Project Description: Solar project with battery storage.
Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@37.36180755,-120.41389059389498,14z



Counties: Merced County, California

ENDANGERED SPECIES ACT SPECIES

There is a total of 13 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
San Joaquin Kit Fox *Vulpes macrotis mutica* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2873	Endangered

REPTILES

NAME	STATUS
Northwestern Pond Turtle *Actinemys marmorata* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1111	Proposed Threatened

AMPHIBIANS

NAME	STATUS
California Tiger Salamander *Ambystoma californiense* Population: U.S.A. (Central CA DPS) There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2076	Threatened
Western Spadefoot *Spea hammondii* Population: Northern DPS No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5425	Proposed Threatened

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9743	Proposed Threatened
Valley Elderberry Longhorn Beetle *Desmocerus californicus dimorphus* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7850	Threatened

CRUSTACEANS

NAME	STATUS
Conservancy Fairy Shrimp *Branchinecta conservatio* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8246	Endangered
Vernal Pool Fairy Shrimp *Branchinecta lynchi* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/498	Threatened

NAME	STATUS
Vernal Pool Tadpole Shrimp *Lepidurus packardi*	Endangered

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
Species profile: https://ecos.fws.gov/ecp/species/2246

FLOWERING PLANTS

NAME	STATUS
Colusa Grass *Neostapfia colusana*	Threatened

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
Species profile: https://ecos.fws.gov/ecp/species/5690

Fleshy Owl's-clover *Castilleja campestris ssp. succulenta*	Threatened

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
Species profile: https://ecos.fws.gov/ecp/species/8095

Hairy Orcutt Grass *Orcuttia pilosa*	Endangered

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
Species profile: https://ecos.fws.gov/ecp/species/2262

San Joaquin Valley Orcutt Grass *Orcuttia inaequalis*	Threatened

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
Species profile: https://ecos.fws.gov/ecp/species/5506

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

IPAC USER CONTACT INFORMATION

Agency:	HELIX Environmental Planning, Inc.
Name:	Patrick Martin
Address:	1180 Iron Point Road
Address Line 2:	Suite 130
City:	Folsom
State:	CA
Zip:	95630
Email	patrickm@helixepi.com
Phone:	9164351205

Selected Elements by Element Code

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Merced (3712034) OR Winton (3712045) OR Yosemite Lake (3712044) OR Haystack Mtn. (3712043) OR Planada (3712033) OR Atwater (3712035) OR Sandy Mush (3712025) OR El Nido (3712024))
 AND Elevation IS greater than OR equal to "0"
 AND Elevation IS less than OR equal to "1000"

Element Code	Species	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
AAAAA01181	***Ambystoma californiense pop. 1*** California tiger salamander - central California DPS	Threatened	Threatened	G3T3	S3	WL
AAABF02020	***Spea hammondii*** western spadefoot	Proposed Threatened	None	G2G3	S3S4	SSC
ABNKC10010	***Haliaeetus leucocephalus*** bald eagle	Delisted	Endangered	G5	S3	FP
ABNKC19070	***Buteo swainsoni*** Swainson's hawk	None	Threatened	G5	S4	
ABNKC19120	***Buteo regalis*** ferruginous hawk	None	None	G4	S3S4	WL
ABNKD06030	***Falco columbarius*** merlin	None	None	G5	S3S4	WL
ABNNB03100	***Anarhynchus montanus*** mountain plover	None	None	G3	S2	SSC
ABNSB10010	***Athene cunicularia*** burrowing owl	None	Candidate Endangered	G4	S2	SSC
ABPBXB0020	***Agelaius tricolor*** tricolored blackbird	None	Threatened	G1G2	S2	SSC
AFCJB25010	***Mylopharodon conocephalus*** hardhead	None	None	G3	S3	SSC
AMACC01020	***Myotis yumanensis*** Yuma myotis	None	None	G5	S4	
AMACC05032	***Lasiurus cinereus*** hoary bat	None	None	G3G4	S4	
AMACC05080	***Lasiurus frantzii*** western red bat	None	None	G4	S3	SSC
AMACC10010	***Antrozous pallidus*** pallid bat	None	None	G4	S3	SSC
AMACD02011	***Eumops perotis californicus*** western mastiff bat	None	None	G4G5T4	S3S4	SSC
AMAFD01060	***Perognathus inornatus*** San Joaquin pocket mouse	None	None	G3	S2S3	
AMAFD03062	***Dipodomys heermanni dixoni*** Merced kangaroo rat	None	None	G4T2	S2	
AMAJA03041	***Vulpes macrotis mutica*** San Joaquin kit fox	Endangered	Threatened	G4T2	S3	

Selected Elements by Element Code

California Department of Fish and Wildlife

California Natural Diversity Database

Element Code	Species	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
PDCHE040B0	***Atriplex cordulata var. cordulata*** heartscale	None	None	GNRT2	S2	1B.2
PDCHE042M0	***Atriplex minuscula*** lesser saltscale	None	None	G2	S2	1B.1
PDCHE042P0	***Atriplex persistens*** vernal pool smallscale	None	None	G2	S2	1B.2
PDHYD0C0S2	***Phacelia ciliata var. opaca*** Merced phacelia	None	None	G5TH	SH	3.2
PDMAL110D0	***Sidalcea keckii*** Keck's checkerbloom	Endangered	None	G2	S2	1B.1
PDONA050Y0	***Clarkia rostrata*** beaked clarkia	None	None	G2G3	S2S3	1B.3
PDPLM0C0J2	***Navarretia nigelliformis ssp. radians*** shining navarretia	None	None	G4T2T3	S2S3	1B.2
PDPLM0C0X1	***Navarretia myersii ssp. myersii*** pincushion navarretia	None	None	G2T2	S2	1B.1
PDRAN0B1J0	***Delphinium recurvatum*** recurved larkspur	None	None	G2?	S2	1B.2
PDSCR0D3Z1	***Castilleja campestris var. succulenta*** succulent owl's-clover	Threatened	Endangered	G4?T2T3	S2S3	1B.2
PDSCR0R060	***Gratiola heterosepala*** Boggs Lake hedge-hyssop	None	Endangered	G2	S2	1B.2
PMALI040Q0	***Sagittaria sanfordii*** Sanford's arrowhead	None	None	G3	S3	1B.2
PMPOA040K0	***Agrostis hendersonii*** Henderson's bent grass	None	None	G2Q	S2	3.2
PMPOA4C010	***Neostapfia colusana*** Colusa grass	Threatened	Endangered	G1	S1	1B.1
PMPOA4G040	***Orcuttia pilosa*** hairy Orcutt grass	Endangered	Endangered	G1	S1	1B.1
PMPOA4G060	***Orcuttia inaequalis*** San Joaquin Valley Orcutt grass	Threatened	Endangered	G1	S1	1B.1
PMPOA6N010	***Tuctoria greenei*** Greene's tuctoria	Endangered	Rare	G1	S1	1B.1

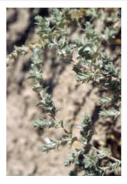
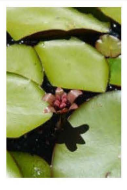
Record Count: 56

California Native Plant Society

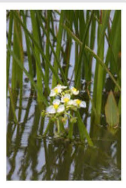
Search Results

27 matches found. Click on scientific name for details

Search Criteria: , CRPR is one of [1A:1B:2A:2B:3] , Quad is one of [3712034:3712045:3712044:3712043:3712033:3712035:3712025:3712024:3712023], 0 meters between Plant low elevation and high elevation, 300 meters between Plant low elevation and high elevation

▲ SCIENTIFIC NAME	COMMON NAME	FAMILY	LIFEFORM	BLOOMING PERIOD	FED LIST	STATE LIST	GLOBAL RANK	STATE RANK	CA RARE PLANT RANK	CA ENDEMIC	DATE ADDED	PHOTO
Agrostis hendersonii	Henderson's bent grass	Poaceae	annual herb	Apr-Jun	None	None	G2Q	S2	3.2		1974-01-01	 ©2005 Steve Matson
Atriplex cordulata var. *cordulata*	heartscale	Chenopodiaceae	annual herb	Apr-Oct	None	None	GNRT2	S2	1B.2	Yes	1988-01-01	 © 1994 Robert E. Preston, Ph.D.
Atriplex minuscula	lesser saltscale	Chenopodiaceae	annual herb	May-Oct	None	None	G2	S2	1B.1	Yes	1994-01-01	 © 2000 Robert E. Preston, Ph.D.
Atriplex persistens	vernal pool smallscale	Chenopodiaceae	annual herb	Jun-Oct	None	None	G2	S2	1B.2	Yes	2001-01-01	No Photo Available
Atriplex subtilis	subtle orache	Chenopodiaceae	annual herb	(Apr)Jun-Sep(Oct)	None	None	G1	S1	1B.2	Yes	1994-01-01	 © 2000 Robert E. Preston, Ph.D.
Brasenia schreberi	watershield	Cabombaceae	perennial rhizomatous herb (aquatic)	Jun-Sep	None	None	G5	S3	2B.3		2010-10-27	 ©2014 Kirsten Bovee
Calycadenia hooveri	Hoover's calycadenia	Asteraceae	annual herb	Jul-Sep	None	None	G2	S2	1B.3	Yes	1980-01-01	No Photo Available

Castilleja campestris var. *succulenta*	succulent owl's-clover	Orobanchaceae	annual herb (hemiparasitic)	(Mar)Apr-May	FT	CE	G4? T2T3	S2S3	1B.2	Yes	1984-01-01	No Photo Available
Clarkia rostrata	beaked clarkia	Onagraceae	annual herb	Apr-May	None	None	G2G3	S2S3	1B.3	Yes	1974-01-01	No Photo Available
Delphinium recurvatum	recurved larkspur	Ranunculaceae	perennial herb	Mar-Jun	None	None	G2?	S2	1B.2	Yes	1988-01-01	No Photo Available
Downingia pusilla	dwarf downingia	Campanulaceae	annual herb	Mar-May	None	None	GU	S2	2B.2		1980-01-01	 © 2013 Aaron Arthur
Eryngium racemosum	Delta button-celery	Apiaceae	annual/perennial herb	(May)Jun-Oct	None	CE	G1	S1	1B.1	Yes	1974-01-01	No Photo Available
Eryngium spinosepalum	spiny-sepaled button-celery	Apiaceae	annual/perennial herb	Apr-Jun	None	None	G2	S2	1B.2	Yes	1980-01-01	No Photo Available
Gratiola heterosepala	Boggs Lake hedge-hyssop	Plantaginaceae	annual herb	Apr-Aug	None	CE	G2	S2	1B.2		1974-01-01	 ©2004 Carol W. Witham
Lagophylla dichotoma	forked hare-leaf	Asteraceae	annual herb	Apr-May	None	None	G1	S1	1B.1	Yes	2012-03-13	 © 2010 Chris Winchell
Lasthenia chrysantha	alkali-sink goldfields	Asteraceae	annual herb	Feb-Apr	None	None	G2	S2	1B.1	Yes	2019-09-30	 © 2009 California State University, Stanislaus
Navarretia myersii ssp. *myersii*	pincushion navarretia	Polemoniaceae	annual herb	Apr-May	None	None	G2T2	S2	1B.1	Yes	1994-01-01	 © 2020 Leigh Johnson
Navarretia nigelliformis ssp. *radians*	shining navarretia	Polemoniaceae	annual herb	(Mar)Apr-Jul	None	None	G4T2T3	S2S3	1B.2	Yes	1994-01-01	No Photo Available
Neostapfia colusana	Colusa grass	Poaceae	annual herb	May-Aug	FT	CE	G1	S1	1B.1	Yes	1974-01-01	No Photo Available
Orcuttia inaequalis	San Joaquin Valley Orcutt grass	Poaceae	annual herb	Apr-Sep	FT	CE	G1	S1	1B.1	Yes	1974-01-01	No Photo Available

Orcuttia pilosa	hairy Orcutt grass	Poaceae	annual herb	May-Sep	FE	CE	G1	S1	1B.1	Yes	1980-01-01	 © 2003 George W. Hartwell
Phacelia ciliata var. *opaca*	Merced phacelia	Hydrophyllaceae	annual herb	Feb-May	None	None	G5TH	SH	3.2	Yes	1980-01-01	No Photo Available
Pseudobahia bahiifolia	Hartweg's golden sunburst	Asteraceae	annual herb	Mar-Apr	FE	CE	G1	S1	1B.1	Yes	1974-01-01	No Photo Available
Puccinellia simplex	California alkali grass	Poaceae	annual herb	Mar-May	None	None	G2	S2	1B.2		2015-10-15	 © 2017 Chris Winchell
Sagittaria sanfordii	Sanford's arrowhead	Alismataceae	perennial rhizomatous herb (emergent)	May-Oct(Nov)	None	None	G3	S3	1B.2	Yes	1984-01-01	 ©2013 Debra L. Cook
Sidalcea keckii	Keck's checkerbloom	Malvaceae	annual herb	Apr-May(Jun)	FE	None	G2	S2	1B.1	Yes	1974-01-01	No Photo Available
Tuctoria greenei	Greene's tuctoria	Poaceae	annual herb	May-Jul(Sep)	FE	CR	G1	S1	1B.1	Yes	1974-01-01	 ©2008 F. Gauna

Showing 1 to 27 of 27 entries

Go to top

Suggested Citation:
California Native Plant Society, Rare Plant Program. 2025. Rare Plant Inventory (online edition, v9.5.1). Website https://www.rareplants.cnps.org [accessed 27 October 2025].
}

Element Code	Species	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
AMAJF04010	***Taxidea taxus*** American badger	None	None	G5	S3	SSC
ARAAD02031	***Actinemys marmorata*** northwestern pond turtle	Proposed Threatened	None	G2	SNR	SSC
ARACF07010	***Gambelia sila*** blunt-nosed leopard lizard	Endangered	Endangered	G1	S2	FP
ARADB36150	***Thamnophis gigas*** giant gartersnake	Threatened	Threatened	G2	S2	
CTT44110CA	***Northern Hardpan Vernal Pool*** Northern Hardpan Vernal Pool	None	None	G3	S3.1	
CTT44120CA	***Northern Claypan Vernal Pool*** Northern Claypan Vernal Pool	None	None	G1	S1.1	
ICBRA03010	***Branchinecta conservatio*** Conservancy fairy shrimp	Endangered	None	G2	S2	
ICBRA03030	***Branchinecta lynchi*** vernal pool fairy shrimp	Threatened	None	G3	S3	
ICBRA03150	***Branchinecta mesovallensis*** midvalley fairy shrimp	None	None	G2	S2S3	
ICBRA06010	***Linderiella occidentalis*** California linderiella	None	None	G2G3	S2S3	
ICBRA10010	***Lepidurus packardi*** vernal pool tadpole shrimp	Endangered	None	G3	S3	
IICOL4C030	***Lytta molesta*** molestan blister beetle	None	None	G2	S2	
IIHYM24260	***Bombus pensylvanicus*** American bumble bee	None	None	G3G4	S2	
IIHYM24480	***Bombus crotchii*** Crotch's bumble bee	None	Candidate Endangered	G2	S2	
PDAPI0Z0S0	***Eryngium racemosum*** Delta button-celery	None	Endangered	G1	S1	1B.1
PDAPI0Z0Y0	***Eryngium spinosepalum*** spiny-sepaled button-celery	None	None	G2	S2	1B.2
PDAST1P040	***Calycadenia hooveri*** Hoover's calycadenia	None	None	G2	S2	1B.3
PDAST5L030	***Lasthenia chrysantha*** alkali-sink goldfields	None	None	G2	S2	1B.1
PDAST7P010	***Pseudobahia bahiifolia*** Hartweg's golden sunburst	Endangered	Endangered	G1	S1	1B.1
PDCAB01010	***Brasenia schreberi*** watershield	None	None	G5	S3	2B.3
PDCAM060C0	***Downingia pusilla*** dwarf downingia	None	None	GU	S2	2B.2

Appendix B

Potential for Special-Status Species in the Region to Occur in the Study Area

Scientific Name/ Common Name[1]	Status[2]	Habitat, Ecology and Life History	Potential to Occur[3]
Plants			
Agrostis hendersonii Henderson's bent grass	--/--/3.2	Henderson's bent grass is an annual herb found in mesic sites in valley and foothill grasslands and in vernal pools from 70 to 305 meters elevation. This species blooms from April to May (CNPS 2025).	**Moderate Potential:** Suitable vernal pool habitat is not present in the Study Area; however shallow seasonal wetlands could provide marginal habitat for this species. Historically, vernal pools in aerial photos in the Study Area appeared to support water through July in 2011 but no longer appear to be present in the Study Area. There are two CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025). Both CNDDB records are located 3.9 miles to the northeast of the Study Area. The record from 1999 documents this species in a vernal pool surrounded by annual grassland (CDFW 2025).
Atriplex cordulata var. *cordulata* heartscale	--/--/1B.2	Heartscale is an annual herb found on saline or alkaline soils in chenopod scrub, meadows, seeps, and sandy valley and foothill grasslands from 0 to 560 meters elevation. This species blooms from April through October (CNPS 2025).	**No Potential:** Suitable saline or alkaline habitat is not present. Soils consist primarily of acidic to strong acidic soils. There are no CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025).
Atriplex minúscula Lesser saltscale	--/--/1B.1	Lesser saltscale is an annual herb found on sandy alkaline soils in chenopod scrub, playas, and valley and foothill grasslands in the Central Valley from 15 to 200 meters elevation. This species blooms from May through October (CNPS 2025).	**No Potential.** Suitable sandy and alkaline habitat is not present. Soils consist primarily of acidic to strong acidic soils. There are no CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025).
Atriplex persistens Vernal pool smallscale	--/--/1B.2	Vernal pool saltscale is an annual herb found in alkaline vernal pools from 10 to 115 meters elevation. This species blooms from June through October (CNPS 2025).	**No Potential**. Suitable saline or alkaline habitat is not present. Soils consist primarily of acidic to strong acidic soils. There are no CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025).
Brasenia schreberi watershield	--/--/2B.3	Watershield is an aquatic perennial rhizomatous herb found in freshwater marshes and swamps from 0 to 7,220 meters elevation. Blooms June- September (CNPS 2025).	**No Potential**. Suitable marsh or swamp habitat is not present for this species There is one historic CNDDB reported occurrences of this species within a five-mile radius of the Study Area from 1915 that is not specific to its location (CDFW 2025).

Scientific Name/ Common Name[1]	Status[2]	Habitat, Ecology and Life History	Potential to Occur[3]
Balsamorhiza macrolepis big-scale balsamroot	--/--/1B.2	This species is a perennial herb found on rocky slopes in chaparral, cismontane woodland, and valley and foothill grassland, with a strong affinity for ultramafic soil. This species is found at elevation ranges from 45 to 1,555 meters. This species blooms from March through June (CNPS 2025).	**No Potential:** Suitable habitat with ultramafic soil is not present within the Study Area. There are no CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025).
Calycadenia hooveri *Hoover's calycadenia*	--/--/1B.3	Hoover's calycadenia is an annual herb found in rocky microsites in cismontane woodland and valley and foothill grassland from 65 to 300 meters elevation. This species blooms from July through September (CNPS 2025).	**No Potential:** Suitable rocky microsite habitat for this species is not present within the Study Area. There are no CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025).
Castilleja campestris var. *succulenta* Succulent owl's-clover	FT/SE/1B.2	Succulent owl's-clover is an annual herb found in vernal pools from 50 to 750 meters elevation. This species blooms from (March) April through May (CNPS 2025).	**Moderate Potential**. Suitable vernal pool habitat is not present in the Study Area; however shallow seasonal wetlands within the Study Area could provide marginal habitat for this species. Historically, vernal pools on aerials appeared to support water through July in 2011 but no longer appear to be present in the Study Area. There are 20 CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025). The nearest CNDDB record is located 0.5 mile to the east of the Study Area in a wetland reserve. The record documents hundreds of plants in vernal pools in 1999, 2017 and 2019 (CDFW 2025).
Clarkia rostrata Beaked clarkia	--/--/1B.3	Beaked clarkia is an annual herb found in cismontane woodland from 60 to 500 meters elevation. This species blooms from April through May (CNPS 2025).	**No Potential**. Suitable woodland habitat is not present, and this species typically occurs at higher elevations in the foothills. There are no CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025).
Delphinium recurvatum Recurved larkspur	--/--/1B.2	Recurved delphinium is a perennial herb found in alkaline microsites in chenopod scrub, cismontane woodland, and valley and foothill grassland from 3 to 79 meters elevation. This species blooms from March through June (CNPS 2025).	**No Potential**. Suitable alkaline habitat is not present in the Study Area. There are no CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025).

Scientific Name/ Common Name[1]	Status[2]	Habitat, Ecology and Life History	Potential to Occur[3]
Downingia pusilla dwarf downingia	--/--/2B.2	Dwarf downingia is an annual herb found in vernal pools and mesic microsites in valley and foothill grassland from 1 to 445 meters elevation. This species blooms from March through May (CNPS 2025).	**Moderate Potential:** Suitable vernal pool habitat is not present in the Study Area; however shallow seasonal wetlands could provide marginal habitat for this species. Historically, vernal pools on historic aerials of the Study Area appeared to support water through July in 2011 but no longer appear to be present in the Study Area. There are two CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025). The nearest CNDDB record is located 0.4 mile to the north of the Study Area. The record documents 100 plants of this species in vernal pools during surveys in 1999 and they are presumed extant (CDFW 2025).
Eryngium racemosum Delta button-celery	--/SE/1B.1	Delta button-celery is an annual/ perennial herb found in vernally mesic clay depressions in riparian scrub from 3 to 30 meters elevation. This species blooms from June through September (CNPS 2025).	**No Potential:** Suitable vernal pool habitat is not present within the Study Area, and the Study Area occurs above this species elevational range. There are no CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025).
Eryngium spinosepalum Spiny-sepaled button-celery	--/--/1B.2	Spiny-sepaled button-celery is an annual/perennial herb found in valley and foothill grassland and vernal pools from 80 to 975 meters elevation. This species blooms from April through June (CNPS 2025).	**Moderate Potential**. Suitable vernal pool habitat is not present in the Study Area; however shallow seasonal wetlands could provide marginal habitat for this species. Historically, vernal pools shown in historic aerials of the Study Area appeared to support water through July in 2011 but no longer appear to be present in the Study Area. There are five CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025). The nearest CNDDB records are located 1.5 miles to the east and south of the Study Area. The records have limited information but show this species occurring in vernal pools associated with Rascal Creek and tributaries in 2001 (CDFW 2025).
Gratiola heterosepala Boggs Lake hedge-hyssop	--/SE/1B.2	Boggs Lake hedge-hyssop is an annual herb found on clay soils in marshes and swamps at lake margins, and in vernal pools from 10 to 2,375 meters elevation. This species blooms from April through August (CNPS 2025).	**No Potential:** Suitable marsh or lake margin habitats for this species are not present within the Study Area. There are no CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025).

Scientific Name/ Common Name[1]	Status[2]	Habitat, Ecology and Life History	Potential to Occur[3]
Lagophylla dichotoma Forked hare-leaf	--/--/1B.1	Forked hare-leaf is an annual herb found in cismontane woodland and valley and foothill grassland, sometimes on clay soils, from 190 to 335 meters elevation (CDFW 2025). This species is currently known from only seven extant locations. This species blooms from April through May (CNPS 2025).	**No Potential**. Suitable habitat is present in the Study Area; however the Study Area is located below this species' elevational range. There is one CNDDB reported occurrence of this species within a five-mile radius of the Study Area, however this is a historic and nonspecific record from 1915 (CDFW 2025).
Lasthenia chrysantha Alkali-sink goldfields	--/--/1B.1	Alkali-sink goldfields is an annual herb found in vernal pools and wet saline flats below 100 meters elevation. This species blooms from February through April (Jepson eFlora Project 2025).	**No Potential.** Suitable alkaline vernal pools or saline flats are not present in the Study Area. Soils consist primarily of acidic to strongly acidic soils. There are no CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025).
Navarretia myersii ssp. *myersii* Pincushion navarretia	--/--/1B.1	Pincushion navarretia is an annual herb found in vernal pools from 20 to 330 meters elevation. This species blooms from April through May (CNPS 2025).	**No Potential**. Suitable vernal pool habitat is not present in the Study Area; however shallow seasonal wetlands could provide marginal habitat for this species. Historically, vernal pools shown on historic aerials of the Study Area appeared to support water through July in 2011 but no longer appear to be present in the Study Area. There are no CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025).
Navarretia nigelliformis ssp. *radians* Shining navarretia	--/--/1B.2	Shining navarretia is an annual herb found in vernal pools and on clay soils in cismontane woodland and valley and foothill grassland from 65 to 1,000 meters elevation. May not be limited to vernal pools (CDFW 2025). This species blooms from (March) April through July (CNPS 2025).	**High Potential**. Suitable vernal pool habitat is not found within the Study Area. Seasonal wetlands and adjacent annual grasslands in the Study Area may provide habitat for this species. There are 23 CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025). The nearest CNDDB record is located 0.8 mile to the southwest of the Study Area as recently as 2001. The record documents this species in annual grassland (CDFW 2025).

Scientific Name/ Common Name[1]	Status[2]	Habitat, Ecology and Life History	Potential to Occur[3]
Neostapfia colusana Colusa grass	FT/SE/1B.1	Colusa grass is an annual herb found in the bottoms of large, deep vernal pools, typically on adobe substrate, from 5 to 200 meters elevation. This species blooms from May through August (CNPS 2025).	**No Potential.** The Study Area consists of loamy soil over a duripan and does not support large deep vernal pools. Adobe clay is not present. There are 20 CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025). The nearest CNDDB record is located 0.75 mile to the north of the Study Area. The record documents this species in a stock pond in 2013 (CDFW 2025).
Orcuttia inaequalis San Joaquin Valley Orcutt grass	--/--/1B.2	San Joaquin Valley Orcutt grass is an annual herb found in vernal pools from 10 to 755 meters elevation. This species blooms from April through September (CNPS 2025).	**No Potential**. Suitable vernal pool habitat is not present in the Study Area. Historically, vernal pools appeared to support water through July in 2011 but no longer appear to be present in the Study Area. There are eight CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025). The nearest CNDDB record is located two miles to the east of the Study Area. The record documents thousands of plants observed in a vernal pool in 2001 (CDFW 2025).
Orcuttia pilosa Hairy Orcutt grass	FE/ST/1B.1	Hairy Orcutt grass is an annual herb found in vernal pools from 46 to 200 meters elevation. This species blooms from May through September (CNPS 2025).	**No Potential**. Suitable vernal pool habitat is not present in the Study Area. Historically, vernal pools appeared to support water through July in 2011 but no longer appear to be present in the Study Area. There is one CNDDB reported occurrences of this species within a five-mile radius of the Study Area located 2.8 miles to the west of the Study Area. The record documents a population that is extirpated and was last detected in 1938 and is now developed (CDFW 2025).
Phacelia ciliata var. *opaca* Merced phacelia	--/--/3.2	Merced phacelia is an annual herb found on clay soils in valley and foothill grassland from 60 to 150 meters elevation; sometimes in alkaline microsites. This species blooms from February through May (CNPS 2025).	**Low Potential.** Suitable grassland habitat is present in the Study Area, however clay soil or alkaline microsites are not present in the Study Area. There is one CNDDB reported occurrence of this species within a five-mile radius of the Study Area. The record documents a CNDDB record from 1929 with a one-mile accuracy that includes the Study Area (CDFW 2025).

Scientific Name/ Common Name[1]	Status[2]	Habitat, Ecology and Life History	Potential to Occur[3]
Pseudohabia bahiifolia Hartweg's golden sunburst	FE/SE/1B.1	Hartweg's golden sunburst is an annual herb in acidic clay soils in cismontane woodlands and valley and foothill grassland from 15 to 150 meters elevation. This species blooms from March through April (CNPS 2025).	**No Potential**. Suitable habitat with acidic clay is not present in the Study Area. Soil in the Study Area consists of acidic sandy or rocky loam soil. There are no CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025).
Puccinellia simplex California alkali grass	--/--/1B.2	California alkali grass is an annual herb found in alkaline, vernally mesic sinks, flats, and lake margins in chenopod scrub, meadows, seeps, vernal pools, and valley and foothill grasslands from 2 to 930 meters elevation. This species blooms from March through May (CNPS 2025).	**No Potential**. Suitable alkaline habitat is not present in the Study Area. There are no CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025).
Sagittaria sanfordii Sanford's arrowhead	--/--/1B.2	Sanford's arrowhead is a perennial rhizomatous herb found in marshes, swamps, and assorted shallow freshwater habitats from 0 to 650 meters elevation. This species blooms from May through October (November) (CNPS 2025).	**No Potential:** Suitable freshwater habitat is not present for this species in the Study Area. There are two CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025). The nearest CNDDB record is located 4.7 miles to the north of the Study Area. The record documents 25 plants in a stock pond in 2012 (CDFW 2025).
Sidalcea keckii Keck's checkerbloom	FE/--/1B.1	Keck's checkerbloom is an annual herb found in cismontane woodland and valley and foothill grassland, often in serpentinite and clay soils, from 75 to 650 meters elevation. This species blooms from April through May (June) (CNPS 2025).	**No Potential**. Suitable habitat with serpentine derived clay soils is not present in the Study Area. There are two CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025). The nearest CNDDB record is located one mile to the west of the Study Area. The record documents one plant observed in annual grassland habitat in 2016 (CDFW 2025).
Tuctoria greenei Greene's tuctoria	FE/SR/1B.1	Greene's tuctoria is an annual herb found in vernal pools from 30 to 1,070 meters elevation. This species blooms from May through July (September) (CNPS 2025).	**No Potential**. Suitable vernal pool habitat is not present in the Study Area; however shallow seasonal wetlands could provide marginal habitat for this species. Historically, vernal pools in historical aerials of the Study Area appeared to support water through July in 2011 but no longer appear to be present in the Study Area. There are no CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025).

Scientific Name/ Common Name[1]	Status[2]	Habitat, Ecology and Life History	Potential to Occur[3]
Animals			
Invertebrates			
Bombus crotchii Crotch's bumble bee	--/SCE/--	Crotch's bumble bee occurs in grassland and scrub habitats (California Department of Fish and Wildlife [CDFW] 2019a). New colonies are initiated by solitary queens, generally in the early spring, which typically occupy abandoned rodent burrows (CDFW 2019b). This species is a generalist forager and has been reported visiting a wide variety of flowering plants. A short-tongued bumble bee; food plants include *Asclepias* spp., *Antirrhinum* spp., *Clarkia* spp., *Eschscholzia* spp., *Eriogonum* spp., *Chaenactis* spp., *Lupinus* spp., *Medicago* spp., *Phacelia* spp., and *Salvia* spp. (Koch et al. 2012). The flight period for queens in California is from February to October. New queens hibernate over the winter and initiate a new colony the following spring (CDFW 2019b). It is rare throughout its range and in decline in the Central Valley and southern California (CDFW 2019).	**High Potential**. Suitable annual grassland habitat with burrows and foraging plant species are present in the Study Area. There are two CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025). The nearest CNDDB record is located 1.6 miles to the east of the Study Area. The record documents one female observed in March 2024 (CDFW 2025).
Branchinecta conservatio Conservancy fairy shrimp	FE/--/--	Conservancy fairy shrimp occupies large clay bottomed vernal pools to vernal lakes with turbid water in grasslands. The historical distribution of this species is unknown, and it is currently distributed throughout the Central Valley and southern coastal regions of California (USFWS 2005).	**Moderate Potential**. Suitable vernal pool habitat is not present in the Study Area; however shallow seasonal wetlands could provide habitat for this species. Historically, vernal pools in historic aerials of the Study Area appeared to support water through July in 2011, but no longer appear to be present in the Study Area. There are five CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025). The nearest CNDDB record is located 2.4 miles to the east of the Study Area. The record documents one individual in a shallow vernal pool as recently as 2009 (CDFW 2025).

Scientific Name/ Common Name[1]	Status[2]	Habitat, Ecology and Life History	Potential to Occur[3]
Branchinecta lynchi vernal pool fairy shrimp	FT/--/--	Vernal pool fairy shrimp occupies vernal pools ranging from small, clear, sandstone rock pools to large, turbid, alkaline, grassland valley floor pools. This species is most frequently found in pools measuring less than 0.05 acre; although has been collected from vernal pools exceeding 25 acres. The known range of vernal pool fairy shrimp within California includes the Central Valley and southern California (USFWS 2005).	**Moderate Potential**. Suitable vernal pool habitat is not present in the Study Area but vernal pool habitat is present east of the Study Area. Historically, vernal pools in historic aerials of the Study Area appeared to support water through July in 2011, but no longer appear to be present in the Study Area. However, seasonal wetlands in the Study Area may provide habitat for this species. There are 46 CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025). The nearest CNDDB record is located east of the Study Area along the Fairfield Canal that abuts the Study Area. The record documents this species in vernal pools and swales from 2001 (CDFW 2025).
Danaus plexippus pop. 1 monarch - California overwintering population	FCE/--/--	The federal listing on December 17, 2020 was for overwintering populations of Monarch butterflies that roost in wind protected tree groves, especially with *Eucalyptus* sp., and species of pine or cypress with nectar and water sources nearby. Winter roost sites extend along the coast from Mendocino County to Baja California. As caterpillars, monarchs feed exclusively on the leaves of milkweed (*Asclepias* sp.) (Nial et al. 2019 and USFWS 2020a). Monarch butterfly migration routes pass east over the Sierra Nevada in the fall and back to the California coast in the spring (USFWS 2020). The overwintering population is located along the Coast while summer breeding areas occur in interior California and North America with spring breeding areas located further east (USFWS 2020a).	**No Potential:** Suitable roost or overwintering sites are not present in the Study Area for this species. There are no CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025).
Desmocerus californicus dimorphus valley elderberry longhorn beetle	FT/--/--	Valley elderberry longhorn beetled is endemic to elderberry shrubs (*Sambucus* spp.) occurring in riparian habitat in the Sacramento and San Joaquin Valleys, riparian habitats in the Sacramento and San Joaquin Valleys, and less common throughout riparian forests of the Central Valley from Redding to Fresno County (USFWS 2014) typically below 152 meters elevation (USFWS 2017a).	**No Potential:** No elderberry shrubs that may provide habitat for valley elderberry longhorn beetle are present. There are no CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025).

Scientific Name/ Common Name[1]	Status[2]	Habitat, Ecology and Life History	Potential to Occur[3]
Lepidurus packardi Vernal pool tadpole shrimp	FE/--/--	Vernal pool tadpole shrimp occurs in a variety of seasonally inundated habitats, particularly low-alkalinity seasonal pools in grasslands. This species is known to occur in vernal pools, wetlands, and other freshwater habitats. This species occurs in larger, deeper features where dissolved oxygen levels are higher and features remain inundated for longer periods (CDFW 2025).	**Moderate Potential**. Suitable vernal pool habitat is not present in the Study Area but vernal pool habitat is present east of the Study Area. However shallow seasonal wetlands could provide habitat for this species. Historically, vernal pools shown in historic aerials of the Study Area appeared to support water through July 2011 but no longer appear to be present in the Study Area. There are 14 CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025). The nearest CNDDB record is located one mile to the southeast of the Study Area. The record documents 179 vernal pools occupied by this species during surveys in 2001 (CDFW 2025).
Fishes			
Mylopharodon conocephalus hardhead	--/--/SSC	Hardhead are found in low to mid-elevation streams in undisturbed habitats. This species prefers large streams with slow water, deep pools, well-oxygenated, clear water with sandy and boulder substrate. This species prefers warmer waters and typically co-occurs with other native fish such as Sacramento pikeminnow or suckers and is typically absent when alien fish species are present. Hardhead is seemingly incapable of passing manmade barriers even when fish ladders for anadromous fish are present. Hardhead are found in most large tributaries of the Sacramento River drainage (Moyle *et al.* 2015).	**No Potential:** No suitable aquatic habitat is present for this species in the Study Area. There are no CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025).

Scientific Name/ Common Name[1]	Status[2]	Habitat, Ecology and Life History	Potential to Occur[3]
Amphibians			
Ambystoma californiense California tiger salamander	FT/ST/--	California tiger salamanders are generally restricted to vernal pools and seasonal ponds, including many constructed stock ponds, in grassland and oak savannah plant communities from sea level to about 1,500 feet in central California. This species spends the majority of its life in upland areas in the vicinity of suitable breeding ponds, where it inhabits rodent burrows. In order to provide suitable habitat for this species, suitable breeding habitat must be present in combination with suitable upland habitat. In the Coastal region, populations are scattered from Sonoma County in the northern San Francisco Bay Area to Santa Barbara County, and in the Central Valley and Sierra Nevada foothills from Yolo to Kern counties (USFWS 2017b).	**Moderate Potential:** Suitable vernal pool habitat is not present in the Study Area; however shallow seasonal wetlands could provide marginal habitat for this species. Historically, vernal pools shown in historic aerials of the Study Area appeared to support water through July 2011 but no longer appear to be present in the Study Area. If present, this species is most likely to occur in burrows or dispersing through upland habitats in the Study Area. Suitable upland habitat is located throughout the Study Area in small mammal burrows or other refuge sites. Seasonal wetlands in the Study Area were dry during the site visit in November and are unlikely to provide breeding habitat for this species. There are 14 CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025). The nearest CNDDB record is located 0.7 mile to the west of the Study Area. The record documents a subadult and adult in aquatic habitat surrounded by annual grassland with burrows in 2000 (CDFW 2025).

Scientific Name/ Common Name[1]	Status[2]	Habitat, Ecology and Life History	Potential to Occur[3]
Spea hammondii western spadefoot	FPT/--/SSC	Western spadefoot occurs in a variety of habitats including mixed woodlands, grasslands, coastal sage scrub, chaparral, sandy washes, and playas. This species breeds in vernal pools, depressional wetlands, puddles, and other ephemeral water features including altered or constructed features, often after heavy rains. Breeding sites must remain inundated for at least 3 to11 weeks for larvae to mature with water temperatures between 48 to 86 degrees Fahrenheit (USFWS 2023a). Spadefoots are primarily terrestrial and require upland habitats for feeding and for constructing burrows for long dry-season dormancy (USFWS 2023a). Spadefoot typically burrow up to 3 feet below the surface and require sandy or friable soils which facilitate digging and water absorption (USFWS 2023a). Dispersal through uplands may vary between wet and dry years but is up to 262 meters in a dry year and up to 605 meters in a wet year but is typically less (USFWS 2023a).	**Moderate Potential:** Suitable vernal pool habitat is not present in the Study Area; however shallow seasonal wetlands could provide marginal habitat for this species. Vernal pools in historical aerials of the Study Area appeared to support water through July 2011 but no longer appear to be present in the Study Area. If present, this species is most likely to occur dispersing through upland habitats in the Study Area. Sandy loam soil along levees could support burrow excavation by this species. There is one CNDDB reported occurrences of this species within a five-mile radius of the Study Area located 2.5 miles to the southeast of the Study Area. The record documents this species in "pools" along Le Grand Canal during surveys in 2001 (CDFW 2025).
Reptiles			
Actinemys marmorata northwestern pond turtle	FPT/--/SSC	Northwestern pond turtles occur in a variety of aquatic habitats; typically, semi-permanent ponds, lakes, streams, irrigation ditches, canals, marshes, or pools in intermittent drainages. This species prefers areas lined with abundant vegetation and either rocky or muddy substrates. This species requires basking sites such as logs, rocks, cattail mats or exposed banks. This species is active from February through November, and breeding occurs from April through May. Females typically nest in compact and dry soils from 3 to 400 meters from water, with a preference for south facing slopes between 0 and 60 degrees with little vegetation cover, however pond turtles occurring in forested areas will select nest sites under forest canopy that is more open. Overwintering occurs in upland terrestrial habitats close to water sources in open areas (up to 500 meters from water), in which they will bury themselves under loose soil where leaf litter is present (USFWS 2023b).	**Moderate Potential:** Suitable aquatic habitat is not present in the Study Area; however, Le Grand Canal and Fairfield Canal provide potential aquatic habitat adjacent to the Study Area. Suitable egg laying or nesting habitat is present in the Study Area. There are no CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025).

Scientific Name/ Common Name[1]	Status[2]	Habitat, Ecology and Life History	Potential to Occur[3]
Gambelia sila Blunt-nosed leopard lizard	FE/SE/--	Blunt-nosed leopard lizard is endemic to the southern Coast Ranges and Central Valley, from Santa Clara and Merced Counties south to Ventura and Los Angeles Counties. Occurs in alkali sink, playa, and saltbush scrub habitats in the Central Valley, and grassland habitats in the foothills (USFWS 2010a). During breeding season, females show red coloration and males show a salmon coloration instead of the usual patterned tan, brown and white colors. Use rodent burrows for shelter from predators and extreme hot and cold temperatures (USFWS 2010a). This species eats primarily grasshoppers, crickets, moths and other lizards (USFWS 2010a).	**No Potential**. The Study Area is outside of this species' known range. There are no CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025).
Thamnophis gigas giant garter snake	FT/ST/--	Giant garter snake is endemic to the San Joaquin and Sacramento Valley floors. This species inhabits agricultural wetlands and other waterways such as irrigation and drainage canals, sloughs, ponds, small lakes, low gradient streams, and adjacent uplands. Giant garter snake requires adequate water during its active season (early spring through mid-fall) to provide food and cover, emergent, herbaceous wetland vegetation for foraging and cover, grassy banks and openings in waterside vegetation for basking, and higher elevation uplands for cover and refuge from flood waters during its dormant season (winter). This species inhabits small mammal burrows and other soil crevices with sunny exposure along south and west facing slopes, above prevailing flood elevations when dormant. This species is primarily found in marshes and sloughs as well as slow-moving creeks but absent from large rivers (USFWS 2017c).	**Low Potential:** There is marginal habitat for this species within the canals adjacent to the Study Area and the Study Area is within the 300-foot elevation contour, however it is outside of any recovery units for this species (USFWS 2017c). The nearest recovery unit is the San Joaquin Recovery Basin along the San Joaquin River west of the Study Area. There is one CNDDB reported occurrence of this species within a five-mile radius of the Study Area (CDFW 2025). The record documents a historical and nonspecific account of this species from 1908; however the general location is developed, and this population is presumed to be extirpated (CDFW 2025).

Scientific Name/ Common Name[1]	Status[2]	Habitat, Ecology and Life History	Potential to Occur[3]
Birds			
Agelaius tricolor tricolored blackbird	--/ST/SSC	Tricolored blackbirds are common locally throughout central California. This species nests and seeks cover in emergent wetland vegetation and thorny vegetation such as Himalayan blackberry (*Rubus armeniacus*) as well as cattails and tules. Nesting areas must be large enough to support a minimum colony of 50 pairs as this is a highly colonial species. This species forages on the ground in croplands, grassy fields, flooded land, and edges of ponds for insects (Shuford and Gardali 2008).	**Low Potential:** There is no suitable nesting habitat for this species in the Study Area, however this species could forage within the Study Area. Impacts to potential foraging habitat for tricolored blackbird that could occur as a result of the proposed Project are considered less than significant because foraging habitat for tricolored blackbird in the Study Area is disturbed and managed and is abundant in the region at preserves that will continue to function as potential foraging habitat for tricolored blackbird after the completion of the Project. There are five CNDDB reported occurrences of this species within a five-mile radius of the Study Area with the nearest extant record located approximately five miles to the west of the Study Area. The record documents a breeding colony in an agricultural field in 2014 (CDFW 2025).
Anarhynchus montanus mountain plover	--/--/SSC	Mountain plover is a winter resident of the Central Valley, southern deserts, and southern coast, as well as Texas, Arizona, and northern Mexico; does not breed in California. This species is found in places with sparse, low-growing vegetation such as fallow or burned agricultural fields, heavily grazed pastures, and playas (Shuford and Gardali 2008).	**Low Potential:** This species is only known to winter in California and is not known to breed in California. Impacts to potential foraging or wintering habitat for mountain plover that could occur as a result of the proposed Project are considered less than significant because foraging habitat for mountain plover in the Study Area is disturbed and managed and is abundant in the region at preserves that will continue to function as potential foraging habitat for mountain plover after the completion of the Project. There is one CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025) located 0.5 mile east of the Study Area. The record documents five individuals observed with breeding plumage in March 1999 (CDFW 2025).

Scientific Name/ Common Name[1]	Status[2]	Habitat, Ecology and Life History	Potential to Occur[3]
Athene cunicularia burrowing owl	--/SCE/SSC	Burrowing owl forages in grasslands, agricultural fields, and disturbed places where burrowing mammals are abundant where low and sparse vegetation is present. This species nests in burrows, especially those of California ground squirrel (*Otospermophilus beecheyi*) but will use other refuge sites. In the Central Valley of California, 80% of foraging occurs within 600 meters of the nest (Shuford and Gardali 2008).	**High Potential:** Suitable burrows that could be utilized for nesting are abundant along the levee on the eastern boundary of the Study Area. One burrowing owl was observed foraging in annual grassland on November 11, 2025. There are two CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025). The nearest CNDDB record is located 0.6 mile to the west of the Study Area. The record documents several active burrows observed during the winter in 2000. However, only burrowing owl sign was documented and no burrowing owls were observed per this record (CDFW 2025).
Buteo regalis Ferruginous hawk	--/--/WL	Ferruginous hawk is found in arid and semi-arid open grasslands, sagebrush flats, desert scrub, low foothills and areas of pinyon and juniper habitat. Ferruginous hawks' nest in trees, large shrubs, utility poles and occasionally on the ground near river cut banks. In California, ferruginous hawk is a winter migrant and does not nest in California. This species preys upon ground squirrels, rabbits, mice, and gophers (Dechant *et al.* 1999).	**Low Potential:** This species is only known to winter in California and is not known for breeding in California. There is no potential for this species to nest in the Study Area, although this species was observed flying through the Study Area during the site visit in November 2025. Impacts to potential foraging or wintering habitat for ferruginous hawk that could occur as a result of the proposed Project are considered less than significant because foraging habitat for ferruginous hawk in the Study Area is disturbed and managed, and is abundant in the region at preserves that will continue to function as potential foraging habitat for ferruginous hawk after the completion of the Project. There are no CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025).

Scientific Name/ Common Name[1]	Status[2]	Habitat, Ecology and Life History	Potential to Occur[3]
Buteo swainsoni Swainson's hawk	--/ST/--	Swainson's hawks usually arrive in the Central Valley between March 1 and April 1 and migrate south between September and October. Found in a variety of habitats including grasslands, agricultural areas, and open woodlands. Often nests peripherally to riparian systems or other aquatic habitats. Nests in mature lone trees or groves of mature trees in agricultural fields, residential trees, or roadside trees. Prefers nest sites adjacent to large, open areas suitable for foraging. Fremont cottonwood, walnut, and willow, at least 30 feet in height, are the most commonly used nest trees in the Central Valley, but are not required (CDFW 1994).	**High Potential:** Suitable nesting habitat for this species may be found in the Study Area in scattered trees. The Study Area also supports foraging habitat. Nesting habitat and foraging habitat are abundant in the surrounding area. There are two CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025). The nearest CNDDB record is located along the northern boundary of the Study Area. The record documents a nest tree that was removed in 2016 (CDFW 2025).
Falco columbarius Merlin	--/--/WL	Merlin is an uncommon winter migrant in California which breeds in Alaska and Canada. This species uses a variety of habitats but requires trees close to water for cover and is usually found near coastlines, lakeshores, and wetlands (Zeiner *et al.* 1990).	**Low Potential:** This species is only known to winter in California and is not known for breeding in California. Impacts to potential foraging or wintering habitat for merlin that could occur as a result of the proposed Project are considered less than significant because foraging habitat for merlin in the Study Area is disturbed and managed and is abundant in the region at preserves that will continue to function as potential foraging habitat for merlin after the completion of the Project. There are no CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025).
Haliaeetus leucocephalus Bald eagle	FD/SE/FP	Bald eagles occur in a variety of habitats near large aquatic resources such as river systems, lakes, ocean shorelines and coastal wetlands. Nests in mature trees or snags, often in remote mixed stands adjacent to water. Suitable foraging habitat consists of large bodies of water with abundant fish and adjacent perching sites such as snags or large trees. Nests are usually located within a 1-mile radius of water. Nests are most often situated in large trees with a commanding view of the area (Zeiner *et al.* 1990).	**No Potential:** Suitable nesting or foraging habitat in proximity to large bodies of open water is present near the Study Area, however there are no potential nesting trees in or near the Study Area. Yosemite Lake provides nesting habitat for this species. There is one CNDDB reported occurrence of this species within a five-mile radius of the Study Area located 0.3 mile north of the Study Area (CDFW 2025). The record documents winter day roost activity at Yosemite Lake (CDFW 2025).

Scientific Name/ Common Name[1]	Status[2]	Habitat, Ecology and Life History	Potential to Occur[3]
Mammals			
Antrozous pallidus pallid bat	--/--/SSC	Pallid bat occurs throughout California except for the high Sierra Nevada and the northern Coast Ranges. This species occurs in habitats that include grasslands, shrublands, woodlands, and forests from sea level to 6,000 feet elevation. This species is most common in open, dry habitats with rocky areas for roosting; roosts also include cliffs, abandoned buildings, bird boxes, and under bridges (Bolster, ed. 1998).	**No Potential:** Suitable roosting habitat is not present in the Study Area. There are no CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025).
Eumops perotis californicus western mastiff bat	--/--/SSC	Western mastiff bat is found throughout California and the southwestern U.S. to west Texas. This species roosts in natural crevices in large outcrops of granite, sandstone, or basalt, on cliff faces, among boulders, and in appropriately proportioned cracks in buildings. This species roosts are at least 10 feet above ground to facilitate flying (Bolster, ed. 1998).	**No Potential:** Suitable roosting habitat is not present in the Study Area. There is one CNDDB reported occurrence of this species within a five-mile radius of the Study Area (CDFW 2025). The record documents the collection of a specimen in 1991 preserved in the Museum of Vertebrate Zoology at Berkely (CDFW 2025).
Lasiurus frantzii western red bat	--/--/SSC	Western red bat roosts primarily in woodlands and forests amongst branches and avoids roosting in caves or buildings (Bolster 1998). This species forages in open habitat such as croplands, grasslands and shrublands. This species is typically associated with water and has a poor urine concentration ability. Western red bat primarily roosts solitarily in trees from 2 to 40 feet high, with females and young roosting higher in the trees than males. This species forages along edge habitats (Zeiner et al. 1990). This species is rarely found in the winter at locations that freeze (Pierson *et al.* 2006).	**No Potential**: Suitable roosting habitat is not present in the Study Area. There are no CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025).
Taxidea taxus American badger	--/--/SSC	American badger inhabits drier open stages of most shrub, forest, and herbaceous habitats with loose, friable soils. Badger preys on a wide variety of mammals, reptiles, birds, and carrion, and hunts mostly by digging out fossorial prey. This species occasionally takes prey on the surface. Badger is not tolerant of cultivation and this species no longer occurs in the Central Valley except on the extreme western edge (Williams 1986).	**Moderate Potential**: Suitable habitat grassland habitat is present in the Study Area for this species, however friable soils for digging are limited to the levees and friable soil is absent from most of the Study Area. Habitat is abundant east of the Study Area. There are no CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025).

Scientific Name/ Common Name[1]	Status[2]	Habitat, Ecology and Life History	Potential to Occur[3]
Vulpes macrotis mutica San Joaquin kit fox	FE/ST/--	San Joaquin kit fox inhabits grasslands, agricultural areas, playas, and scrublands. This species was formerly widespread in the Central Valley; but is now primarily found in the foothills at the margins of the Central Valley and in the interior Coast Ranges. This species uses natural and artificial burrows with entrances between 8 and 10 inches in diameter and occupies many different burrows in a single season (USFWS 2010b).	**Moderate Potential**: Suitable grassland habitat is present in the Study Area for this species, and this species is known to utilize canals as dispersal corridors; however, the Study Area is not within known satellite or core populations (USFWS 2020). The Study Area is within a linkage area for this species (USFWS 2010b) and suitable habitat is abundant east of the Study Area. There are two CNDDB reported occurrences of this species within a five-mile radius of the Study Area (CDFW 2025). The nearest CNDDB record is located 1.8 miles to east of the Study Area. The record documents one individual observed foraging in annual grassland in 1999 (CDFW 2025).

[1] Sensitive species reported in CNDDB or CNPS on the "*Merced, Winton, Yosemite Lake, Haystack Mtn., Planada, Atwater, Sandy Mush, El Nido,* and *Plainsburg*" USGS quads, or in USFWS lists for the project site.

[2] Status is as follows: Federal (ESA) listing/State (CESA) listing/other CDFW status or CRPR. F = Federal; S = State of California; E = Endangered; T = Threatened; C = Candidate; FP=Fully Protected; SSC=Species of Special Concern; WL=Watch List.

[3] Status in the Project site is assessed as follows. **No Potential:** The Study Area is outside the known distribution of the species; or there is no suitable habitat present for the species; or, the species is not known to occur within five miles of the Study Area boundary, and its dispersal capability is less than five miles. **Low Potential:** There are no documented occurrences within five miles of the Study Area boundary, and the existing habitat is of low or marginal quality, or all documented occurrences within five miles of the Study Area line are believed to be extirpated, and existing habitat is of low or marginal quality, or extant occurrences are documented within five miles of the Study Area, and the most recent occurrence is greater than or equal to 25 years old. **Moderate Potential:** Documented occurrences are reported within five miles of the Study Area, the most recent occurrence is less than 25 but greater than 10 years old, and suitable habitat is present; or critical habitat is mapped within the Study Area, all PCEs are present within the Study Area, and suitable habitat is present. **High Potential:** There are extant occurrences within one mile of the Study Area, the most recent occurrence is less than 10 years old, and there is suitable habitat within the Study Area; or critical habitat is mapped within the Study Area, documented occurrences are present within one mile of the Study Area, suitable habitat is present, and all PCEs are present within the Study Area.

CRPR = California Rare Plant Rank: 1B – rare, threatened, or endangered in California and elsewhere; 2B – rare, threatened, or endangered in California but more common elsewhere; 3 – lack the necessary information to assign them to one of the other ranks or to reject them. Extension codes: .1 – seriously endangered; .2 – moderately endangered; .3 –Not very threatened in California.

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Appendix C

Plant and Animal Species Observed in the Study Area

Family	Scientific Name	Common Name	Status*
Native			
Apiaceae	*Eryngium castrense*	Great valley button-celery	--
Asteraceae	*Centromadia fitchii*	Spikeweed	--
	Erigeron canadensis	Canada horseweed	--
	Grindelia camporum	Common gumplant	--
	Holocarpha virgata	Narrow tarweed	--
	Psilocarphus brevissimus	Woolly marbles	--
	Xanthium strumarium	Rough cocklebur	--
Boraginaceae	*Plagiobothrys stipitatus*	Vernal pool allocarya	--
Juncaceae	*Juncus bufonius*	Toad rush	--
Lamiaceae	*Trichostema lanceolatum*	Vinegarweed	--
Onagraceae	*Epilobium brachycarpum*	Annual fireweed	--
Non-Native			
Asteraceae	*Centaurea solstitialis*	Yellow star thistle	High
	Carduus pycnocephalus	Italian thistle	Moderate
	Hypochaeris glabra	Smooth cat's ear	Limited
	Leontodon saxatilis	Hawkbit	--
Brassicaceae	*Hirschfeldia incana*	Wild mustard	Moderate
Caryophyllaceae	*Spergularia rubra*	Red sandspurry	--
Fabaceae	*Medicago polymorpha*	Burclover	Limited
	Pisum sativum	Garden pea	--
	Trifolium hirtum	Rose clover	Limited
	Trifolium subterraneum	Subterranean clover	--
	Vicia sativa	Spring vetch	--
Fagaceae	*Quercus suber*	Cork oak	--
Geraniaceae	*Erodiuim botrys*	Big heron bill	--
	Erodium cicutarium	Red stemmed filaree	Limited
	Geranium dissectum	Cutleaf geranium	Limited
Juncaceae	*Juncus usitatus*	Australian rush	--
Lythraceae	*Lythrum hyssopifolia*	Hyssop loosestrife	Moderate
Myrtaceae	*Eucalyptus cinerea*	Argyle apple	--
	Eucalyptus sideroxylon	Red ironbark	--
Plantaginaceae	*Plantago lanceolata*	English plantain	Limited
Poaceae	*Avena barbata*	Slender oats	Moderate
	Bromus diandrus	Ripgut brome	Moderate
	Bromus hordeaceus	Soft brome	Limited
	Cynodon dactylon	Bermuda grass	Limited
	Festuca myuros	Rattail sixweeks grass	Moderate
	Festuca perennis	Italian rye grass	Moderate
	Hordeum marinum	Seaside barley	Moderate
	Hordeum murinum	Foxtail barley	Moderate
	Paspalum dilatatum	Dallis grass	--
	Phalaris aquatica	Harding grass	Moderate
	Polypogon monspeliensis	Annual beard grass	Limited
Pinaceae	*Pinus pinea*	Stone pine	--
Polygonaceae	*Rumex crispus*	Curly dock	Limited

Family	Scientific Name	Common Name	Status*
Solanaceae	*Datura stramonium*	Jimson weed	--
	Physalis lanceifolia	Narrow leaf tomatillo	--
	Solanum elaeagnifolium	Silverleaf nightshade	--

Cal-IPC Rating = Limited –; Moderate –; High; -- (no listing)
CDFA Rating = C –

Family	Scientific Name	Common Name	Indicator Status*
Birds			
Accipitridae	*Astur cooperii*	Cooper's hawk	WL
	Buteo jamaicensis	Red-tailed hawk	--
	Buteo regalis	Ferruginous hawk	WL
Alaudidae	*Eremophila alpestris*	Horned lark	--
Ardeidae	*Ardea alba*	Great egret	--
	Ardea herodias	Great blue heron	--
Charadriidae	*Charadrius vociferus*	Killdeer	--
Columbidae	*Zenaida macroura*	Mourning dove	--
Corvidae	*Corvus brachyrhynchus*	American crow	--
	Corvus corax	Common raven	--
Fringillidae	*Haemorhous mexicanus*	House finch	--
	Spinus psaltria	Lesser goldfinch	--
Icteridae	*Euphagus cyanocephalus*	Brewer's blackbird	--
	Sturnella neglecta	Western meadowlark	--
Phalacrocoracidae	*Nannopterum auritum*	Double-crested cormorant	WL
Picidae	*Colaptes auratus*	Northern flicker	--
Strigidae	*Athene cunicularia*	Burrowing owl	SCE, SSC
Sturnidae	*Sturnus vulgaris*	European starling	--
Trochilidae	*Calypte anna*	Anna's hummingbird	--
Tyrannidae	*Sayornis nigricans*	Black phoebe	--
	Sayornis saya	Say's phoebe	--
Mammals			
Canidae	*Canis latrans*	Coyote	--
Geomyidae	*Thomonys bottae*	Botta's pocket gopher	--
Sciuridae	*Otospermophilus beecheyi*	California ground squirrel	--

Appendix D

Representative Site Photographs



Photograph 1. Representative view of existing solar panels and annual grassland with small mammal burrows in the Study Area. This location is also where a vernal pool existed prior to 2011 based upon aerial imagery. Photo taken 11/11/2025.



Photograph 2. Representative view of a seasonal wetland adjacent to a solar array on the southwest side of the Study Area. Prior to 2009, a large wetland complex was located in this location. Photo taken 11/11/2025.



Photograph 3. Representative view of pasture in the Study Area. Photo taken 11/11/2025.



Photograph 4. Representative view of Le Grand Canal and a large vernal pool east of the Study Area in the Merced Vernal Pools and Grassland Reserve. Photo taken 11/11/2025.

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Photograph 5. Representative view of annual grassland in the Study Area. Photo taken 11/11/2025.



Photograph 6. Representative view of exclusion fence along the western perimeter of the Study Area with escape doors on the Study Area side of the fence. Photo taken 11/11/2025.

Appendix E

CESA Incidental Take
Permit No. 2081-2009-010-04
Amendment No. 4
Mitigation Measures

Docusign Envelope ID: F581D9F4-09F6-4FAC-9B82-C90EE921ED3C

Attachment 1

CALIFORNIA DEPARTMENT OF FISH AND GAME
MITIGATION MONITORING AND REPORTING PROGRAM (MMRP)
CALIFORNIA ENDANGERED SPECIES ACT

AMENDED INCIDENTAL TAKE PERMIT NO. 2081-2009-010-04
(Amendment No. 4)

PERMITTEE 1: Regents of the University of California

PERMITTEE 2: Virginia Smith Trust

PERMITTEE 3: County of Merced

PROJECT: University of California, Merced
Campus and Community North Project

PURPOSE OF THE MMRP

The purpose of the MMRP is to ensure that the impact minimization and mitigation measures required by the Department of Fish and Wildlife (CDFW) for the above-referenced Project are properly implemented, and thereby to ensure compliance with section 2081(b) of the Fish and Game Code and section 21081.6 of the Public Resources Code. A table summarizing the mitigation measures required by CDFW is attached (Conditions of Approval). This table is a tool for use in monitoring and reporting on implementation of mitigation measures, but the descriptions in the table do not supersede the mitigation measures set forth in the California Incidental Take Permit (ITP) and in attachments to the ITP, and the omission of a permit requirement from the attached table does not relieve the Permittee of the obligation to ensure the requirement is performed.

OBLIGATIONS OF PERMITTEE

Mitigation measures must be implemented within the time periods indicated in the table that appears below. Permittee has the primary responsibility for monitoring compliance with all mitigation measures and for reporting to CDFW on the progress in implementing those measures. These monitoring and reporting requirements are set forth in the ITP itself and are summarized at the front of the attached table.

VERIFICATION OF COMPLIANCE, EFFECTIVENESS

CDFW may, at its sole discretion, verify compliance with any mitigation measure or independently assess the effectiveness of any mitigation measure.

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TABLE OF MITIGATION MEASURES

The following items are identified for each mitigation measure: Mitigation Measure, Source, Implementation Schedule, Responsible Party, and Status/Date/Initials. The Mitigation Measure column summarizes the mitigation requirements of the ITP. The Source column identifies the ITP condition that sets forth the mitigation measure. The Implementation Schedule column shows the date or phase when each mitigation measure will be implemented. The Responsible Party column identifies the person or agency that is primarily responsible for implementing the mitigation measure. The Status/Date/Initials column shall be completed by the Permittee during preparation of each Status Report and the Final Mitigation Report and must identify the implementation status of each mitigation measure, the date that status was determined, and the initials of the person determining the status.

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BEFORE COMMENCING GROUND- OR VEGETATION-DISTURBING ACTIVITIES					
	Mitigation Measure	**Source**	**Implementation Schedule**	**Responsible Party**	**Status / Date / Initials**
1	Before initiating Covered Activities, Permittee shall designate a representative (Designated Representative) responsible for communications with CDFW and overseeing compliance with the ITP. Permittee shall notify CDFW in writing before starting Covered Activities of the Designated Representative's name, business address, and contact information, and shall notify CDFW in writing if a substitute Designated Representative is selected or identified at any time during the term of the ITP.	ITP Condition of Approval Designated Representative	Before commencing ground- or vegetation-disturbing activities Entire Project Notify CDFW if a substitute Designated Representative is selected or identified at any time.	Permittee	
2	Permittee shall submit to CDFW in writing the name, qualifications, business address, and contact information of Designated Biologist(s) and/or Designated Monitor(s) at least 30 days before starting Covered Activities using the Biologist Resume Form (Attachment 5) or another format containing the same information. CDFW may approve Designated Biologist(s) for one or more Covered Species in the ITP. For example, CDFW may approve a Designated Biologist to implement all Conditions of Approval for CTS or approve a Designated Biologist to implement all Conditions of Approval in the ITP. The Designated Biologist(s) maybe assisted by approved individuals identified as a Designated Monitor that may not meet the qualifications to be a Designated Biologist to assist in compliance monitoring and/or implementation of specific Conditions of Approval. Designated Monitor(s) and their specific activities shall be approved in advance and in writing by CDFW. Permittee shall ensure that the Designated Biologist(s) and Designated Monitor(s) are knowledgeable and experienced in the biology and natural history of the Covered Species. The Designated Biologist(s) and Designated Monitor(s) shall be responsible for monitoring Covered Activities to help minimize and fully mitigate or avoid the incidental take of individual Covered Species and to minimize disturbance of Covered Species' habitat. Permittee shall obtain CDFW approval of the Designated Biologist(s) and Designated Monitor(s) in writing before starting Covered Activities, and shall also obtain approval in advance in writing if the Designated Biologist(s) or Designated Monitor(s) must be changed.	ITP Condition of Approval Designated Biologist(s) and/or Designated Monitor(s)	At least 30 days before commencing ground- or vegetation-disturbing activities Entire Project Notify CDFW if the Designated Biologist(s) or Designate Monitor(s) must be changed	Permittee	

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	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
3	Permittee shall conduct an education program for all persons employed or otherwise working in the Project Area before they perform any work. The program shall consist of a presentation from the Designated Biologist that includes a discussion of the biology and general behavior of the Covered Species; information about the distribution and habitat needs of the Covered Species; sensitivity of the Covered Species to human activities; the status of the Covered Species pursuant to CESA including legal protection; recovery efforts; penalties for violations; and the Project-specific protective measures described in the ITP. Permittee shall provide interpretation for non-English speaking workers, and the same instruction shall be provided for any new workers before they perform work in the Project Area. Permittee shall prepare and distribute wallet-sized cards or a fact sheet handout containing this information for workers to carry in the Project Area. Upon completion of the program, employees shall sign a form stating they attended the program and understand all protection measures. Permittee shall also maintain a continuous public education program to inform the students, residents, and staff of sensitive resource protection needs.	ITP Condition of Approval Education Program	Before commencing ground- or vegetation-disturbing activities Entire Project Provided to any new workers before they perform work in the Project Area Maintain a continuous public education program to inform the students, residents, and staff of sensitive resource protection needs	Permittee/ Designated Biologist	
4	Permittee shall initiate a trash abatement program before starting Covered Activities and shall continue the program for the duration of the Project. Permittee shall ensure that trash and food items are contained in closed (animal-proof) containers and removed regularly (at least once a week) to avoid attracting opportunistic predators such as ravens, coyotes, and feral dogs.	ITP Condition of Approval Trash Abatement	Before commencing ground- or vegetation-disturbing activities Entire Project Regularly/at least once a week	Permittee	
5	A Work Area is defined as a discrete construction zone and associated access routes, access points, staging/stockpiling areas within the Project Area where Covered Activities will occur. Permittee shall clearly delineate the boundaries of the Work Area with fencing, stakes, or flags where Covered Activities are planned to occur in the immediate future and before starting Covered Activities. Permittee shall restrict all Covered Activities to within the fenced, staked, or flagged areas. Permittee shall maintain all fencing, stakes, and flags in effective condition until the completion of Covered Activities.	ITP Condition of Approval Delineation of Work Areas	Before commencing ground- or vegetation-disturbing activities	Permittee	
6	Before starting Covered Activities, Permittee shall clearly delineate habitat of the Covered Species within the Project Area with posted signs, posting stakes, flags, and/or rope or cord and place fencing as necessary to minimize the disturbance of Covered Species' habitat. Permittee shall maintain all fencing, stakes, and flags in effective condition until the completion of Covered Activities.	ITP Condition of Approval Delineation of Habitat	Before commencing ground- or vegetation-disturbing activities	Permittee	

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	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
7	The Designated Representative shall notify CDFW 14 calendar days before starting Covered Activities and shall document compliance with all pre-Project Conditions of Approval before starting Covered Activities.	ITP Condition of Approval Notification Before Commencement	14 days before commencing ground- or vegetation-disturbing activities	Permittee/ Designated Representative	
8	The Designated Biologist shall survey the work site no more than 14 days before the Permittee begins Covered Activities within 1.3 miles of known CTS breeding habitat. These surveys shall provide 100 percent visual coverage of potential habitat (including burrow and crevice openings) within the Work Area and a 50-foot buffer zone around the Work Area. If the Designated Biologist finds any life stages of CTS (adults, eggs, or larvae) the Designated Biologist or Designated Representative shall immediately contact CDFW. The Designated Biologist shall relocate any adult CTS that is found in accordance with the CDFW-approved California Tiger Salamander Relocation Plan and coordinate with CDFW if CTS eggs or larvae are found. The Designated Biologist shall hold the appropriate State and federal Scientific Collecting Permits (SCP) for amphibians to be authorized to capture and handle CTS. The Designated Biologist may be assisted by approved biologists that do not have an SCP; these biologists shall be identified as Designated Monitors. Permittee shall provide the survey results to CDFW in a written report before starting Covered Activities.	ITP Condition of Approval California Tiger Salamander Surveys	No more than 14 days before commencing ground- or vegetation-disturbing activities Provide the survey results to CDFW in a written report before starting Covered Activities	Permittee/ Designated Biologist	
9	The Designated Biologist shall prepare a CTS relocation plan and submit it to CDFW for approval at least 30 days prior to the beginning of Covered Activities occurring within 1.3 miles of known CTS breeding habitat and before conducting surveys per Condition of Approval California Tiger Salamander Surveys. Covered Activities within these areas may not proceed until the California Tiger Salamander Relocation Plan is approved by CDFW. Permittee shall submit any proposed changes to the California Tiger Salamander Relocation Plan to CDFW in writing and CDFW shall approve proposed changes prior to implementation of any activities pursuant to a modified California Tiger Salamander Relocation Plan.	ITP Condition of Approval California Tiger Salamander Relocation Plan	At least 30 days before commencing ground- or vegetation-disturbing activities and before California Tiger Salamander Surveys and Small Mammal Burrow Surveys and Excavation	Permittee/ Designated Biologist	
10	During surveys per Condition of Approval California Tiger Salamander Surveys, the Designated Biologist(s) shall flag any small mammal burrows and crevices suitable for CTS occupancy within the Work Area and a 50-foot buffer zone around the Work Area if the burrow/crevice is within 0.25 mile of known or potential CTS breeding habitat. Any small mammal burrows or crevices that cannot be fully avoided by 50 feet regardless of whether the burrow/crevice is in the Work Area or solely within the Work Area's 50-foot buffer zone shall be fully excavated by the Designated Biologist(s) before starting Covered Activities. The Designated Biologist(s) shall relocate any live CTS discovered during burrow excavation in accordance with the CDFW-approved California Tiger Salamander Relocation Plan. Designated Monitor(s) are prohibited from capturing and handling CTS unless specifically approved in writing by CDFW and under the direct supervision of the Designated Biologist(s).	ITP Condition of Approval Small Mammal Burrow Surveys and Excavation	Before commencing ground- or vegetation-disturbing activities	Permittee/ Designated Biologist	

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	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
11	No later than 48 hours after surveying, flagging, and excavating small mammal burrows/crevices in accordance with Conditions of Approval California Tiger Salamander Surveys and Small Mammal Burrow Surveys and Excavation, Permittee shall install CTS exclusion fencing around the Work Area in upland habitat areas within 1.3 miles of potential or known CTS breeding habitat. Permittee shall maintain the California tiger salamander exclusion fencing throughout all construction activities. CTS exclusion fencing shall be installed under the direct supervision of a Designated Biologist. Permittee shall use wildlife exclusion fencing consisting of a fine (less than 0.4 inch) mesh equipped with one-way exits to avoid entrapment of amphibians inside the fence. Hardware cloth is not permitted. Permittee shall bury fencing to a depth of six inches and fencing shall be a minimum of 3.3 feet tall following installation. The fencing shall include the optional barrier lip designed to prevent species such as California tiger salamander from climbing over. The Permittee shall avoid small mammal burrows to the maximum extent possible during installation of the exclusion fencing. Where burrows cannot be avoided, the Designated Biologist shall excavate them by hand before the fence is installed. The Designated Biologist shall relocate any live CTS discovered during these inspections in accordance with the CDFW-approved California Tiger Salamander Relocation Plan. The Permittee may propose an alternative exclusion fence material and/or installation method for specific locations within the Project Area. Any alternative exclusion fence material and/or installation method shall be submitted to CDFW for written approval and shall be approved prior to its use. Permittee and/or Designated Biologist(s) shall inspect the entire length of the CTS exclusion fence and refuge areas (e.g., cover boards) a minimum of once a week during Covered Activities and during periods of inactivity. If Covered Species are found within the interior fence, the Designated Biologist(s) shall relocate them in accordance with the CDFW-approved California Tiger Salamander Relocation Plan.	ITP Condition of Approval California Tiger Salamander Exclusion Fencing	Before commencing ground- or vegetation-disturbing activities. No later than 48 hours after surveying, flagging, and excavating small mammal burrows/crevices in accordance with Conditions of Approval California Tiger Salamander Surveys and Small Mammal Burrow Surveys and Excavation	Permittee/ Designated Biologist	
12	The Designated Biologist shall conduct preconstruction surveys during the raptor nesting season (February 15 through September 15), within 0.5 mile of Covered Activities. Raptor surveys will be conducted no more than 10 days prior to the start of Covered Activities. The Designated Biologist or Designated Representative shall provide the survey results, including negative findings, to CDFW in a written report within 30 days after the start of Covered Activities.	ITP Condition of Approval Raptor Surveys	No more than 10 days before commencing ground- or vegetation-disturbing activities. Submit a written report within 30 days after the start of Covered Activities.	Permittee/ Designated Biologist	

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	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
13	No more than 30 days prior to Permittee beginning Covered Activities, the Designated Biologist shall perform a pre-construction survey for SJKF and dens (potential, known, and natal dens) in the Project Area and a buffer zone of 200 feet beyond the Project Area and construction zone.	ITP Condition of Approval San Joaquin Kit Fox Survey	No more than 30 days before commencing ground- or vegetation-disturbing activities.	Permittee/ Designated Biologist	
14	The Designated Biologist shall monitor all potential, known, and natal SJKF dens (USFWS 2011) identified in the Project Area during San Joaquin Kit Fox Survey or previous surveys for a minimum of four (4) consecutive nights using standard methods, including "dusting" the den entrance and apron and other means (wildlife camera) if necessary. Only when the den is determined to be unoccupied after four (4) consecutive nights of monitoring can the den be excavated by the Designated Biologist or individuals under the direct supervision of the Designated Biologist. Potential SJKF dens without any signs of SJKF use or characteristics suggesting it is a SJKF den may be excavated without advance tracking and camera monitoring. Known and natal dens shall not be destroyed until Permittee has installed replacement den(s) per Condition of Approval Replacement San Joaquin Kit Fox Dens. If an individual SJKF does not vacate a den within a reasonable timeframe, Permittee shall consult with CDFW to obtain written guidance prior to proceeding with den destruction. If a SJKF is still present after four (4) or more consecutive days of monitoring, the den may have to be excavated when, in the judgment of the Designated Biologist and in consultation with CDFW, the den is temporarily vacant. The Designated Biologist may excavate the den during the animal's normal foraging activities and after consultation with CDFW. The Designated Biologist shall excavate the den by hand unless soil conditions necessitate the use of excavating equipment; however, Permittee shall consult with CDFW to obtain written approval to use excavating equipment prior to doing so and shall exercise extreme caution. The Designated Biologist shall accomplish the destruction of the den by careful excavation until it is certain that no SJKF are inside. The Designated Biologist shall fully excavate the den, fill it with dirt, and compact it to ensure that SJKF cannot reenter or use the den during the Covered Activities. If at any point during excavation a SJKF is discovered inside the den, the Designated Biologist shall immediately cease the excavation activity and continue monitoring of the den as described above. Destruction of the den may be completed when, in the judgment of the Designated Biologist, the SJKF has escaped from the partially destroyed den. Permittee shall not exclude SJKF from occupied natal dens (den in which SJKF young are reared, typically with two or more openings) during the pupping/rearing season. If a natal den is discovered, Permittee shall not excavate natal dens (occupied or unoccupied) until the pups and adults have vacated the den and then only after written consultation and concurrence from CDFW to do so.	ITP Condition of Approval San Joaquin Kit Fox Den Monitoring and Excavation	After installation of artificial den(s) per to Condition of Approval Replacement San Joaquin Kit Fox Dens and before commencing ground- or vegetation-disturbing activities	Permittee/ Designated Biologist	

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	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
15	Permittee shall replace each known and natal SJKF den that must be destroyed per Condition of Approval San Joaquin Kit Fox Den Monitoring and Excavation with an artificial den to compensate for the loss of important shelter used for protection, reproduction, and escape from predators. The Designated Biologist shall determine the appropriate design and placement of replacement dens through consultation with CDFW on a site-specific basis. Permittee shall install artificial den(s) before starting Covered Activities and before destroying/excavating known and natal SJKF dens per Condition of Approval San Joaquin Kit Fox Den Monitoring and Excavation.	ITP Condition of Approval Replacement San Joaquin Kit Fox Dens	Before SJKF den excavation per Condition of Approval Den Monitoring and Excavation and before commencing ground- or vegetation-disturbing activities	Permittee/ Designated Biologist	
16	Permittee shall develop a salvage plan for succulent owls' clover, San Joaquin Valley Orcutt grass, and Colusa grass and submit it to CDFW for approval at least 30 days prior to beginning Covered Activities within 1,000 feet of known vernal pools, swales, or other wetland habitat. Covered Activities within these areas may not proceed until the Salvage Plan is approved by CDFW.	ITP Condition of Approval Salvage Plan	At least 30 days before commencing ground- or vegetation-disturbing activities	Permittee	
17	In areas with intact vernal pool, swale, or wetland habitat the Designated Biologist shall conduct botanical surveys prior to the Permittee beginning Covered Activities. The botanical surveys shall be floristic in nature, cover the entire area of direct and indirect effects, and should be timed appropriately to detect all species which may occur within the Project Area. The Designated Biologist or Designated Representative shall provide the survey results to CDFW in a written report within 30 days after the start of Covered Activities within areas with intact vernal pool, swale, or wetland habitat.	ITP Condition of Approval Botanical Surveys	Before commencing ground- or vegetation-disturbing activities Provide survey results to CDFW within 30 days of the beginning of Covered Activities	Permittee/ Designated Biologist	
18	Temporary fencing that delineates the Project Area as required by Conditions of Approval Delineation of Work Area Boundaries and Delineation of Habitat shall be placed by the Permittee such that it excludes the greatest number of Covered Species possible. Exact fencing locations shall be determined by the Designated Biologist.	ITP Condition of Approval Placement of Exclusion Fencing	Before commencing ground- or vegetation-disturbing activities	Permittee/ Designated Biologist	
19	If any of the plant Covered Species are found in the Project Area, the Designated Biologist shall salvage and transplant them in accordance with the CDFW-approved Salvage Plan.	ITP Condition of Approval Plant Salvage and Relocation	Before commencing ground- or vegetation-disturbing activities	Permittee/ Designated Biologist	
20	Permittee shall notify CDFW in writing before wetland restoration work begins at YLCA and notify CDFW when wetland restoration work is completed at YLCA. Wetland restoration for the Permittee shall be limited to the areas designated in Figure 11. An alternative wetland restoration area for the Permittee may be designated with written approval from CDFW. Wetland restoration work for the Project shall not occur when wetland restoration activities occur for any other project or activity at YLCA.	ITP Condition of Approval Wetland Restoration at YLCA	Before wetland restoration work begins at YLCA and when restoration work is completed at YLCA.	Permittee	

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DURING CONSTRUCTION					
	Mitigation Measure	**Source**	**Implementation Schedule**	**Responsible Party**	**Status / Date / Initials**
21	To ensure compliance with the Conditions of Approval of the ITP, the Designated Biologist(s) and/or Designated Monitor(s) shall have authority to immediately stop any activity that is not in compliance with the ITP, and/or order any reasonable measure to avoid the unauthorized take of an individual of the Covered Species, or a species not covered by the ITP. Permittee shall provide unfettered access to the Project Area and otherwise facilitate the Designated Biologist(s) and/or Designated Monitor(s) in the performance of their duties. If the Designated Biologist(s) and/or Designated Monitor(s) are unable to comply with the ITP, then the Designated Biologist(s) and/or Designated Monitor(s) shall notify the CDFW Regional Representative (detailed in the Notices section below) immediately. Permittee shall not enter into any agreement or contract of any kind, including but not limited to non-disclosure agreements and confidentiality agreements, with its contractors and/or the Designated Biologist(s)/Designated Monitor(s) that prohibit or impede open communication with CDFW, including but not limited to providing CDFW staff with the results of any surveys, reports, or studies or notifying CDFW of any non-compliance or take. Failure to notify CDFW of any non-compliance or take or injury of a Covered Species as a result of such agreement or contract may result in CDFW taking actions to prevent or remedy a violation of the ITP.	ITP Condition of Approval Designated Biologist and/or Designated Monitor Authority	Entire Project	Permittee/ Designated Biologist	
22	Permittee shall provide CDFW staff with reasonable access to the Project Area and mitigation lands under Permittee control, and shall otherwise fully cooperate with CDFW efforts to verify compliance with or effectiveness of mitigation measures set forth in the ITP.	ITP Condition of Approval CDFW Access	Entire Project	Permittee	
23	The Designated Biologist(s) and Designated Monitor(s) shall maintain a construction-monitoring notebook on-site throughout the construction period which shall include a copy of the ITP with attachments and a list of signatures of all personnel who have successfully completed the education program. Permittee shall ensure a copy of the construction-monitoring notebook is available for review in the Project Area upon request by CDFW.	ITP Condition of Approval Construction Monitoring Notebook	Entire Project	Permittee/ Designated Biologist	
24	Permittee shall prohibit firearms and domestic dogs from the Project Area and access routes during construction activities, except those in the possession of authorized security personnel or local, State, or federal law enforcement officials.	ITP Condition of Approval Firearms and Dogs	Entire Project	Permittee	
25	Permittee shall develop and establish leash rules and an animal control program.	ITP Condition of Approval Animal Control Program	Entire Project	Permittee	
26	Permittee shall prohibit use of erosion control materials potentially harmful to Covered Species and other species, such as mono-filament netting (erosion control matting) or similar material, in potential Covered Species' habitat. This includes photodegradable or biodegradable synthetic netting.	ITP Condition of Approval Erosion Control Materials	Entire Project	Permittee	
27	Permittee shall implement dust control measures during Covered Activities to facilitate visibility for monitoring of the Covered Species by the Designated Biologist. Permittee shall keep the amount of water used to the minimum amount needed, and shall not allow water to form puddles that last more than four (4) hours and watering shall not occur if puddles cannot percolate prior to one (1) hour before dusk.	ITP Condition of Approval Dust Control	Entire Project	Permittee	

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	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
28	Project-related personnel shall access the Project Area using existing routes and shall not cross Covered Species' habitat outside of or en route to the Project Area. Permittee shall restrict Project-related vehicle traffic to established roads, staging, and parking areas. Permittee shall ensure that vehicle speeds do not exceed 20 miles per hour to avoid Covered Species on or traversing the roads. Permittee shall strictly prohibit off-road traffic outside the designated Project Area. If Permittee determines construction of routes for travel are necessary outside of the Project Area, the Designated Representative shall contact CDFW for written approval before carrying out such an activity. CDFW may require an amendment to the ITP, if among other reasons, if additional take of Covered Species or Covered Species habitat impacts will occur as a result of the Project modification.	ITP Condition of Approval Project Access	Entire Project	Permittee/ Designated Representative	
29	Permittee shall confine all Project-related parking, storage areas, laydown sites, equipment storage, and any other surface-disturbing activities to the Project Area using, to the extent possible, previously disturbed areas. Additionally, Permittee shall not use or cross Covered Species' habitat outside of the marked Project Area.	ITP Condition of Approval Staging Areas	Entire Project	Permittee	
30	Permittee shall immediately stop and following pertinent State and federal statutes and regulations arrange for repair and clean up by qualified individuals of any fuel or hazardous waste leaks or spills at the time of occurrence, or as soon as it is safe to do so. Permittee shall exclude the storage and handling of hazardous materials from the Project Area, except in areas that have completed development and have been determined not to be Covered Species habitat by the Designated Biologist, and shall properly contain and dispose of any unused or leftover hazardous products off-site.	ITP Condition of Approval Hazardous Materials	Entire Project	Permittee	
31	The Designated Representative shall immediately notify CDFW in writing if it determines that the Permittee is not in compliance with any Condition of Approval of the ITP, including but not limited to any actual or anticipated failure to implement measures within the time periods indicated in the ITP and/or the MMRP. The Designated Representative shall report any non-compliance with the ITP to CDFW within 24 hours.	ITP Condition of Approval Notification of Non-Compliance	Entire Project	Permittee/ Designated Representative	
32	Initially, the Designated Biologist shall be on-site daily when Covered Activities occur. If Covered Activities occur in more than one Work Area, a Designated Biologist(s) shall be present on site in all Work Areas to conduct compliance inspections. The Designated Biologist shall conduct compliance inspections to (1) minimize incidental take of the Covered Species and to check for compliance with all mitigation and avoidance measures; (2) prevent unlawful take of species; (3) check for compliance with all measures of the ITP; (4) check all exclusion zones; and (5) ensure that signs, stakes, and fencing are intact, and that Covered Activities are only occurring in the Project Area. The Designated Representative or Designated Biologist shall prepare daily written observation and inspection records summarizing oversight activities and compliance inspections, observations of Covered Species and their sign, survey results, and monitoring activities required by the ITP. Eventually, CDFW may approve, in writing, periodic inspections once Covered Activities are on-going and more routine in nature. To reduce compliance inspections, Permittee shall submit a written request to CDFW, including any additional information that CDFW requests to demonstrate that Covered Activities are on-going and more routine in nature.	ITP Condition of Approval Compliance Monitoring	Daily when Covered Activities occur Entire Project	Permittee/ Designated Representative/ Designated Biologist	

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	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
33	The Designated Biologist shall submit all confirmed Covered Species sightings to the California Natural Diversity Database (CNDDB) within 60 calendar days of the observation. The Designated Biologist(s) shall include the following documented information: the date, time, and location of each occurrence using Global Positioning System (GPS) technology, the name of the party that actually identified the plant or animal, circumstances of the incident, the general condition and health of each individual, any diagnostic markings, sex, age (juvenile or adult), actions undertaken, and habitat description.	ITP Condition of Approval CNDDB Observations	Entire Project Within 60 calendar days	Permittee/ Designated Biologist	
34	The Designated Representative or Designated Biologist shall compile the observation and inspection records identified in Condition of Approval Compliance Monitoring into a Monthly Compliance Report (MCR) and submit it to CDFW along with a copy of the MMRP table with notes showing the current implementation status of each mitigation measure. Permittee shall submit MCRs to CDFW no more than 15 days after the end of the month. MCRs shall be submitted to CDFW's Central Region Office, Regional Representative, and Headquarters CESA Program. At the time of the ITP's approval, the Central Region Office email is R4CESA@wildlife.ca.gov, with a copy to the Regional Representative Ruby Kwan (Ruby.Kwan@wildlife.ca.gov) and Headquarters CESA Program (CESA@wildlife.ca.gov). CDFW may at any time increase the timing and number of compliance inspections and reports required under this provision depending upon the results of previous compliance inspections. If CDFW determines the reporting schedule must be changed, CDFW will notify Permittee in writing of the new reporting schedule.	ITP Condition of Approval Monthly Compliance Report	Entire Project Monthly Due no more than 15 days after the end of the month	Permittee/ Designated Representative/ Designated Biologist	
35	Permittee shall provide CDFW with an Annual Status Report (ASR) no later than January 31 of every year beginning with issuance of the ITP and continuing until CDFW accepts the Final Mitigation Report identified below. Each ASR shall include, at a minimum: (1) a summary of all MCRs, (2) a general description of the status of the Project Area and Covered Activities, including actual or projected completion dates, if known; (3) a copy of the table in the MMRP with notes showing the current implementation status of each mitigation measure; (4) an assessment of the effectiveness of each completed or partially completed mitigation measure in minimizing and mitigating Project impacts; (5) all available information about Project-related take of the Covered Species; (6) survivorship rates of Swainson's hawk replacement trees pursuant to Condition of Approval Tree Replacement; and (7) information about other Project impacts on the Covered Species. Permittee shall submit ASRs to CDFW's Central Region Office, Regional Representative, and Headquarters CESA Program.	ITP Condition of Approval Annual Status Report	Entire Project Due no later than January 31 of every year	Permittee	
36	Permittee shall immediately notify the Designated Biologist if a Covered Species is killed or taken by a Project-related activity, or if a Covered Species is otherwise found dead or injured within the vicinity of the Project. The Designated Biologist or Designated Representative shall provide initial notification to CDFW by calling the Regional Office at (559) 243-4005 and by email to CDFW's Central Region Office (R4CESA@wildlife.ca.gov) and Regional Representative (Ruby.Kwan@wildlife.ca.gov). The initial notification to CDFW shall include information regarding the location, species, number of animals taken or injured, name of the CDFW-approved facility where the animal was taken, and the ITP Number. Following initial notification, Permittee shall send CDFW a written report within two calendar days. The report shall include the date and time of the finding or incident, location of the animal or carcass, and if possible, provide a photograph, explanation as to cause of take or injury, and any other pertinent information.	ITP Condition of Approval Notification of Take	Entire Project Immediate initial notification Written report within two calendar days	Permittee/ Designated Representative/ Designated Biologist	

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	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
37	If CTS is found by any person in the Project Area before or during Covered Activities, the Permittee shall immediately stop all work that could potentially harm the CTS until the Designated Biologist can relocate the CTS to an active rodent burrow system in accordance with the CDFW-approved California Tiger Salamander Relocation Plan. Designated Monitor(s) are prohibited from capturing and handling CTS unless specifically approved in writing by CDFW and under the direct supervision of the Designated Biologist(s).	ITP Condition of Approval California Tiger Salamander in the Project Area	Entire Project	Permittee/ Designated Biologist	
39	The Permittee and Designated Biologist(s) shall monitor the National Weather Service 72-hour forecast for the Project Area. If a 70 percent or greater chance of rainfall is predicted within 72 hours, Permittee shall cease all Covered Activities in areas within 1.3 miles of potential or known CTS breeding habitat until no further rain is forecast unless the Work Area has been encircled with CTS exclusion fencing that is in effective condition pursuant to Condition of Approval California Tiger Salamander Exclusion Fencing. In addition, if a 70 percent or greater chance of rainfall is predicted within 72 hours, construction-related traffic moving through areas within 1.3 miles of potential or known CTS breeding habitat but outside of the CTS exclusion fencing (e.g., on roads) shall not occur at night or within two hours of sunrise and sunset unless a Designated Biologist leads the traffic by foot; further traffic shall not exceed 10 mph during daylight hours until no further rain is forecast. If Covered Activities must continue when rain is forecast in Work Areas within 1.3 miles from potential or known CTS breeding habitat, a Designated Biologist shall survey the Project construction footprint before construction begins each day that rain is forecast. If a Designated Monitor is used to conduct surveys, a Designated Biologist must remain on site to capture and relocate any CTS that are discovered during the surveys. If rain exceeds ¼ inch during a 24-hour period, Permittee shall cease work until no further rain is forecast.	ITP Condition of Approval Rain Forecast	Entire Project	Permittee/ Designated Biologist	
40	Permittee shall strictly prohibit all night work in areas within 1.3 miles of potential or known CTS breeding habitat when a 70 percent or greater chance of rainfall is predicted within 72 hours of Covered Activities until no further rain is forecast. This restriction is not applicable for areas within 1.3 miles of potential or known CTS breeding habitat once they have been encircled with CTS exclusion fencing pursuant to ITP Condition of Approval California Tiger Salamander Exclusion Fencing and is also not applicable to construction-related traffic led by a Designated Biologist by foot in accordance with Condition of Approval Rain Forecast.	ITP Condition of Approval Night Work	Entire Project	Permittee/ Designated Biologist	
41	Permittee shall ensure that soil stockpiles are placed where soil will not pass into potential CTS breeding habitat or into any other “Waters of the State”. Permittee shall appropriately protect stockpiles to prevent soil erosion.	ITP Condition of Approval Soil Stockpiles	Entire Project	Permittee	
42	Permittee shall construct roadways within 1.3 miles of known or potential CTS breeding habitat without steep curbs, berms, or dikes, which could prevent CTS from exiting the roadway. If curbs are necessary for safety and/or surface runoff, Permittee shall design and construct them to allow CTS to walk over them. If steep dikes are required, Permittee shall design and construct them to include over-side drains or curb/dike breaks spaced at intervals of 25 feet to allow CTS passage.	ITP Condition of Approval Barriers to California Tiger Salamander Movement	Entire Project	Permittee	
43	To ensure that disease is not conveyed between work sites all Designated Biologist(s) and Designated Monitor(s) shall follow the fieldwork code of practice developed by the Declining Amphibian Populations Task Force Fieldwork Code of Practice (Attachment 2). The Designated Biologist(s) and Designated Monitor(s) may substitute a bleach solution (0.5 to 1.0 cup of bleach to 1.0 gallon of water) for the ethanol solution. Care shall be taken so that all traces of the disinfectant are removed before entering the next aquatic habitat.	ITP Condition of Approval Field Work Code of Practice	Entire Project	Permittee/ Designated Biologist	

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	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
44	The Designated Biologist shall inspect all open holes, sumps, and trenches within the Project Area at the beginning, middle, and end of each day for trapped animals. To prevent inadvertent entrapment of Covered Species or any other animals, the Designated Biologist shall oversee the covering of all excavated, steep-walled holes or trenches more than two feet deep, or of any depth if they contain water or other material, with plywood or other barrier materials at the close of each working day such that animals are unable to enter and become entrapped. Alternatively, Permittee shall provide earthen escape ramps of no more than 3:1 slope every 200 feet. Before holes or trenches are filled, the Designated Biologist shall thoroughly inspect them for trapped animals. If any worker discovers that Covered Species have become trapped, Permittee shall cease all Covered Activities in the vicinity and notify the Designated Biologist immediately. Project workers and the Designated Biologist shall allow the Covered Species to escape unimpeded if possible. If CTS is discovered in a hole or trench, the Designated Biologist shall relocate CTS as described in the CDFW-approved California Tiger Salamander Relocation Plan, before Covered Activities are allowed to continue. If an injured Covered Species is discovered at any time, the Designated Representative shall contact CDFW's Regional Representative within one working day of the incident pursuant to Condition of Approval Notification of Take.	ITP Condition of Approval Open Trenches	Entire Project Beginning, middle, and end of each day Before open holes, sumps, and trenches are filled	Permittee/ Designated Biologist/ Project Workers	
45	Workers shall inspect for Covered Species under vehicles and equipment before the vehicles and equipment are moved. If a Covered Species is present, the worker shall notify the Designated Biologist and wait for the Covered Species to move unimpeded to a safe location. Alternatively, especially if the animal is inside the fenced Project Area, the Designated Biologist shall move the Covered Species out of harm's way outside of the Project Area and in compliance with the CDFW-approved California Tiger Salamander Relocation Plan if applicable.	ITP Condition of Approval Equipment Inspection	Entire Project Before vehicles and equipment are moved	Permittee/ Designated Biologist/ Project Workers	
46	Workers shall thoroughly inspect all construction pipe, culverts, or similar structures with a diameter of three inches or greater that are stored for one or more overnight periods for Covered Species before the pipe is subsequently moved, buried, or capped. If during inspection a Covered Species is discovered inside a pipe, workers shall notify the Designated Biologist and allow the Covered Species to safely escape that section of pipe before moving and utilizing the pipe.	ITP Condition of Approval Materials Inspection	Entire Project Before moving, burying, or capping pipe, culverts, or similar structures	Permittee/ Designated Biologist/ Project Workers	
47	If a nesting Swainson's hawk is found within 0.5 mile of the Project Area during Raptor Surveys, or if a historic/potential nest becomes occupied, or a nesting Swainson's hawk is found at any time during Covered Activities, the Designated Biologist shall be present daily for the entire duration of Covered Activities during the nesting season (February 15 through September 15) to monitor the behavior of any Swainson's hawk nesting within 500 feet to 0.5 mile of Covered Activities. The Designated Biologist shall have the authority to order the cessation of all activities within 0.5 mile of any Swainson's hawk nest if the birds exhibit distress and/or abnormal nesting behavior (swooping/stooping, excessive vocalization (distress calls), agitation, failure to remain on nest, failure to deliver prey items for an extended time period, etc.) which may cause reproductive failure (nest abandonment and loss of eggs and/or young). Permittee shall not resume Covered Activities until CDFW has been consulted by the Designated Biologist, and both the Designated Biologist and CDFW confirm that the bird's behavior has normalized.	ITP Condition of Approval Nesting Swainson's Hawk	Entire Project Present daily for the entire duration of any Covered Activities	Permittee/ Designated Biologist	

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	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
48	The Permittee and Designated Biologist shall ensure that no Covered Activities occur within 500 feet of an active Swainson's hawk nest during the nesting season (February 15 through September 15).	ITP Condition of Approval Swainson's Hawk Nest Buffer	Entire Project	Permittee/ Designated Biologist	
49	Permittee shall not remove any historic or active Swainson's hawk nest trees during the nesting season (February 15 through September 15). Permittee shall remove a historic or active Swainson's hawk nest tree only between September 16 and February 14 of any year to avoid impacts to nesting Swainson's hawk.	ITP Condition of Approval Tree Removal	Entire Project	Permittee	
50	If Covered Activities affecting Swainson's hawk result in the removal of a Swainson's hawk nest tree in the Project Area, Permittee shall plant native species replacement trees at a 4:1 ratio (four trees for each historic and active nest tree removed) on HM lands in close proximity to suitable foraging habitat. Permittee shall prepare a Swainson's Hawk Nest Tree Replacement Plan and submit it to CDFW for review and written approval. The Swainson's Hawk Nest Tree Replacement Plan shall identify replacement tree locations, planting methods, and any site-specific management activities necessary to ensure the performance criteria of this Condition of Approval are achieved. The HM Lands manager shall monitor the tree survival rates and shall report them in the ASR pursuant to the reporting requirements of Condition of Approval Annual Summary Report. Permittee shall ensure that the number of trees required as compensation under the ITP matches the number of healthy and thriving trees at the end of the initial five-years monitoring period.	ITP Condition of Approval Tree Replacement	Entire Project Prepare a Swainson's Hawk Nest Tree Replacement Plan and submit it to CDFW for review and approval prior to implementation/tree replacement planting	Permittee	
51	If a Covered Species is injured as a result of Covered Activities, the Designated Biologist shall immediately take it to a CDFW-approved wildlife rehabilitation or veterinary facility. Permittee shall identify the facility before starting Covered Activities. Permittee shall bear any costs associated with the care or treatment of such injured Covered Species. Permittee shall notify CDFW of the injury to the Covered Species immediately by telephone and e-mail followed by a written incident report. Notification shall include the date, time, location (GPS coordinates) and circumstances of the incident, and the name of the facility where the animal was taken.	ITP Condition of Approval Covered Species Injury	Entire Project	Permittee/ Designated Biologist	
52	If a plant Covered Species is destroyed or damaged as a result of Project-related activities outside of the identified Project Area, or because avoidance and minimization measures included in the ITP were not followed, the Permittee shall notify CDFW of the incident immediately, including the extent to which damage to the Covered Species occurred via telephone and email, followed by a written incident report submitted to CDFW. Notification shall include the date, time, location (GPS coordinates), and circumstances of the incident.	ITP Condition of Approval Notification of Plant Damage	Entire Project	Permittee	
53	Permittee shall not collect inoculum from greater than 10 percent of the area of each donor pool. Permittee shall not collect inoculum from vernal pools within the designated inoculum collection area where CESA-listed (threatened, endangered, or rare) or invasive plants occur. Permittee shall provide a written report to CDFW, including maps, documenting the vernal pools used for inoculum collection.	ITP Condition of Approval Inoculum Collection	Prior to/during inoculum collection at collection sites Written report to CDFW after inoculum collection	Permittee	

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	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
54	Permittee shall permanently preserve 6,286 acres of Tier 1 HM lands which are currently owned in fee title by the UC and located in eastern Merced County. The Tier 1 lands to be used as HM Lands for the Project include: i. The 5,130-acre Virginia Smith Trust Preserve (VST); ii. The 1,339-acre Campus Natural Reserve (CNR); iii. The 92-acre Myers Easterly; and iv. The 75 acres of the Yosemite Lake Vernal Pool, LLC's YLCA, 50 acres of which is suitable upland habitat for Covered Species.	ITP Condition of Approval Habitat Management Land Acquisition	No later than 18 months from the effective date of the ITP if Security is provided	Permittee	
55	Convey a conservation easement to CDFW over the VST, CNR, YLCA, and Meyers Easterly HM lands under terms approved by CDFW within 18 months of execution of the ITP. Alternatively, the transfer may be to a CDFW-approved non-profit organization qualified pursuant to California Government Code section 65965, with CDFW named as a third-party easement beneficiary.	ITP Condition of Approval Habitat Management Land Acquisition	No later than 18 months from the effective date of the ITP	Permittee	
56	Permittee shall provide a recent preliminary title report, initial hazardous materials survey report, and other documents that may be necessary for the conservation easement (see Attachment 3). All documents are subject to the approval of CDFW, and if applicable, the Wildlife Conservation Board and the Department of General Services.	ITP Condition of Approval Habitat Management Land Acquisition	No later than 18 months from the effective date of the ITP	Permittee	
57	Manage the VST, CNR, and Meyers Easterly in accordance with the *Management Plan for Conservation Lands and the Adjacent Campus Buildout Lands for the University of California, Merced* (September 2008) and incorporate the plan by reference into the conservation easements. Similarly, manage the YLCA acreage in accordance with a long-term management plan to be prepared by as part of the Conditions of Approval for ITP No. 2081-2016-025-04 and approved by CDFW and incorporate the plan by reference into the conservation easement. In addition, Permittee shall implement the Take Avoidance and Minimization Measures required by the ITP when conducting biological monitoring, infrastructure maintenance or improvement, and management activities.	ITP Condition of Approval Habitat Management Land Acquisition		Permittee	
58	Permittee may select the conservation easement grantee, land owner, or other party as the land manager. Documents related to land management shall identify the land manager. Permittee shall notify CDFW of any subsequent changes in the land manager within 30 days of the change.	ITP Condition of Approval Habitat Management Land Acquisition	No later than 18 months from the effective date of the ITP	Permittee	
59	Permittee shall reimburse CDFW for reasonable expenses incurred during title and documentation review, expenses incurred from other State agency reviews, and overhead related to transfer of HM lands to CDFW. CDFW estimates that this Project will create an additional cost to CDFW of no more than $3,000 for every fee title deed or easement processed.	ITP Condition of Approval Habitat Management Land Acquisition		Permittee	

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	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
60	Sung Mo "Steve" Kang, UC Merced Chancellor, has submitted a letter dated January 26, 2011 (Attachment 4) confirming that the William and Flora Hewlett Foundation (Hewlett Foundation) has already provided $2 million for the long-term management of the HM lands. This $2 million will continue to be managed through the UC General Endowment Pool and it is estimated that it will provide $80,000 per year of interest income in perpetuity. This interest income shall be available for the operation, management and protection of HM lands, including reasonable administrative overhead, biological monitoring, improvements to carrying capacity, law enforcement measures, and any other action designed to protect or improve the habitat values of the HM lands, in accordance with the *Management Plan for Conservation Lands and the Adjacent Campus Buildout Lands for the University of California, Merced* (September 2008). Take Avoidance and Minimization Measures required by the ITP shall also be implemented when conducting biological monitoring, infrastructure maintenance or improvement, and management activities.	ITP Condition of Approval Performance Security		Permittee	
61	Permittee shall provide CDFW with the following: a) Within three (3) months of executing the Amended ITP, Permittee shall provide CDFW a draft Memorandum of Understanding (MOU) between the UC and CDFW outlining the conditions under which the UC could hold endowment monies provided for the long-term management of the HM lands (Attachment 4). Endowment monies would be held in accordance with a MOU approved by CDFW. b) The MOU must be finalized within six (6) months of executing the Amended ITP, except that this period may be extended if CDFW has approved a final draft MOU, and requires additional time for its internal processing. Absent finalization of this MOU within six (6) months of executing the Amended ITP, $2 million shall be submitted to CDFW, where it shall be deposited in a special deposit account established pursuant to Fish and Game Code section 13014. Alternatively, the $2 million shall be provided to the National Fish and Wildlife Foundation (NFWF). CDFW may pool the endowment with other endowments for the operation, management and protection of HM lands for local populations of the Covered Species. The land manager may be reimbursed for actual costs associated with HM land management (in accordance with the *Management Plan for Conservation Lands and the Adjacent Campus Buildout Lands for the University of California, Merced* (September 2008)), for up to the amount generated annually.	ITP Condition of Approval Performance Security	Within three (3) months of executing the Amended ITP MOU must be finalized within six (6) months of executing the Amended ITP	Permittee	

POST-CONSTRUCTION

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
62	Upon completion of construction Permittee shall remove from the Project Area and properly dispose of all construction refuse, including, but not limited to, broken equipment parts, wrapping material, cords, cables, wire, rope, strapping, twine, buckets, metal or plastic containers, and boxes.	ITP Condition of Approval Refuse Removal	Post-construction	Permittee	

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	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
63	o later than 45 days after completion of all mitigation measures, Permittee shall provide CDFW with a Final Mitigation Report. The Designated Biologist shall prepare the Final Mitigation Report which shall include, at a minimum: (1) a summary of all MCRs and all ASRs; (2) a copy of the table in the MMRP with notes showing when each of the mitigation measures was implemented; (3) all available information about Project-related take of the Covered Species; (4) information about other Project impacts on the Covered Species; (5) beginning and ending dates of Covered Activities; (6) an assessment of the effectiveness of the ITP's Conditions of Approval in minimizing and fully mitigating Project impacts of the taking on Covered Species; (7) recommendations on how mitigation measures might be changed to more effectively minimize take and mitigate the impacts of future projects on the Covered Species; and (8) any other pertinent information.	ITP Condition of Approval Final Mitigation Report	No later than 45 days after Project completion	Permittee	
64	CDFW accepts as complete the Permittee's Final Mitigation Report required by the ITP.			CDFW	