BIOLOGICAL RESOURCES EVALUATION FOR THE SAND HILL WIND REPOWERING PROJECT

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Acronyms and Abbreviations

AMM	avoidance and minimization measures
APLIC	Avian Power Line Interaction Committee
APWRA	Altamont Pass Wind Resource Area
BGEPA	Bald and Golden Eagle Protection Act
BMP	best management practice
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CNDDB	California Natural Diversity Database
CRPR	California Rare Plant Rank
CWA	Clean Water Act
EPA	U.S. Environmental Protection Agency
ESA	federal Endangered Species Act
FR	Federal Register
HDD	horizontal directional drilling
I-	Interstate
kV	kilovolt
MBTA	Migratory Bird Treaty Act
MW	megawatt
NPDES	National Pollutant Discharge Elimination System
OHWM	ordinary high water mark
PCE	primary constituent element
PG&E	Pacific Gas and Electric Company
program EIR	*Altamont Pass Wind Resource Area Repowering Final Program Environmental Impact Report*
proposed project	Sand Hill Wind Repowering Project
RWQCB	Regional Water Quality Control Board
Sand Hill	Sand Hill Wind, LLC
State Water Board	State Water Resources Control Board
SWPPP	Storm Water Pollution Prevention Plan
USACE	U.S. Army Corps of Engineers
USC	16 United States Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

Chapter 1
Introduction

This report presents the methods and results of biological resource surveys and special-status species habitat assessment conducted for the proposed Sand Hill Wind Repowering Project (proposed project), located in the Altamont Pass Wind Resource Area (APWRA) of Alameda County, California (Figure 1). The project proponent, Sand Hill Wind, LLC. (Sand Hill), is proposing to install up to 40 new wind turbines in the approximately 2,700-acre project area. The project area comprises 15 privately owned parcels, many of which were previously used for wind production. Land use in the project area and the surrounding APWRA consists largely of cattle-grazed land supporting operating wind turbines and ancillary facilities.

This report assesses the potential effects associated with constructing and operating the proposed project and identifies those mitigation measures included in the *Altamont Pass Wind Resource Area Repowering Final Program Environmental Impact Report* (program EIR) (Alameda County Community Development Agency 2014) that will reduce potentially significant impacts, as defined under the California Environmental Quality Act (CEQA).

Potential project effects on nesting avian species that may result from construction activities are discussed in this report, but operational effects will be addressed separately through a micrositing study as required by the program EIR, and through the CEQA documentation (checklist and addendum) required for the project. .Accordingly, the potential operational effects on birds and bats are not discussed in this report.

Summary of Results

The 2,700-acre project area consists primarily of rolling hills supporting grasslands with scattered ponds and many ephemeral and perennial drainages. The project area is the site of an older wind project that has been recently decommissioned; however, the existing road infrastructure and substations still remain. Based on surveys and habitat assessments conducted to date, grasslands in the project area support aquatic and upland habitat for many special-status plant and wildlife species including several state- and federally listed species—large-flowered fiddleneck (*Amsinckia grandiflora*), California tiger salamander (*Ambystoma californiense*), California red-legged frog (*Rana draytonii*), tricolored blackbird (*Agelaius tricolor*), and San Joaquin kit fox (*Vulpes macrotis mutica*). Each of the potentially occurring special-status species in the project area was addressed in the program EIR, which set forth appropriate avoidance, minimization, and mitigation measures that would be applied to the proposed project.

An aquatic resources delineation was also conducted in the project area, consistent with U.S. Army Corps of Engineers (USACE) guidelines and requirements. A separate aquatic resources delineation report, describing the methods and results of the delineation, was prepared (ICF 2018). The delineation documented ponds, alkali wetland/drainages, perennial wetland drainages, ephemeral drainages, and one vernal pool within the study area. Aquatic resources within the project area qualify as potential waters of the United States and waters of the state that would be subject to USACE jurisdiction pursuant to Section 404 of the Clean Water Act (CWA), Central Valley Regional Water Quality Control Board (Central Valley Water Board) jurisdiction under Section 401 of the

CWA, and California Department of Fish and Wildlife (CDFW) jurisdiction under Section 1602 of the California Fish and Game Code (Streambed Alteration).

Biological Study Area

The study area reviewed for this analysis consists of the approximately 2,700-acre project area, the existing AML and Santa Clara substations, and the proposed offsite gen-tie and electrical collection line corridors that follow Altamont Pass Road, West Grant Line Road, and Mountain House Road (Figures 2a, 2b, and 2c). Lands within 1.24 miles of the project area were also reviewed through aerial photo interpretation to determine if potential aquatic breeding habitat for listed amphibians is present in the vicinity of the study area.

The study area is within the southeast quadrant of the Clifton Court Forebay and the northeast quadrant of the Midway, California U.S. Geological Survey (USGS) 7.5-minute quadrangles. Representative photographs of the study area are provided in Appendix A.

Project Overview

Sand Hill is planning to repower the Sand Hill Wind Project, consisting of 15 privately owned parcels, many of which were previously used for wind production. The parcels are located north of Interstate (I-) 580 with access from Altamont Pass Road and Mountain House Road. Onsite roads are graveled or graded dirt, varying in width from 12 to 20 feet. The project would use turbines with generating capacities between 2.3 and 4.0 megawatts (MW), all generally similar in size and appearance, to develop up to 144.5 MW. Three alternative layouts are proposed, each using up to 40 wind turbines (Figures 2a–2c). The layout would be selected on the basis of site constraints, data obtained from meteorological monitoring of the wind resources, and turbine availability. Existing roads would be used where possible, and temporary widening and some new roads would be necessary. The project would require the reconductoring/installation of generation-tie (gen-tie) lines connecting the project to two substations (Figures 2a–2c).

Construction Activities

Turbines would be delivered to the site from the Port of Stockton or other nearby port or rail transfer locations. Tower assembly requires the use of one large track-mounted crane and two small cranes. The turbine towers, nacelles, and rotor blades would be delivered to each foundation site and unloaded by crane. A large track-mounted crane would be used to hoist the base tower section vertically then lower it over the threaded foundation bolts. The large crane would then raise each additional tower section to be bolted through the attached flanges to the tower section below. The crane then would raise the nacelle, rotor hub, and blades to be installed atop the tower. Two smaller wheeled cranes would be used to offload turbine components from trucks and to assist in the precise alignment of the tower sections.

The final layout may differ from the three proposed layouts illustrated in Figures 2a-2c because the exact turbine locations are subject to micrositing (i.e., small moves to accommodate setback constraints, avian siting requirements, and other local considerations). All the layouts are expected to have a similar extent of impact. Temporarily disturbed areas would be restored within 1 year. The

repowering project would entail the construction activities listed below generally in the sequence shown.

- Demarcation of construction areas and any sensitive biological, cultural, or other resources needing protection.
- Construction of temporary staging areas.
- Road infrastructure upgrades.
- Erosion and sediment control.
- Wind turbine construction.
    - Final site preparation.
    - Crane pad construction.
    - Foundation excavation and construction.
    - Tower assembly.
    - Installation of nacelle and rotor.
- Power collection system and communication line installation.
- Gen-tie installation.
- Upgrades to the substation.
- Permanent meteorological tower installation.
- Construction of the O&M building (would not depend on the sequence of construction for the rest of the project).
- Final cleanup and restoration.

Site Preparation and Access Roads

Fourth-generation turbine towers and blades are significantly longer than older turbine components and require larger and longer trucks and cranes for transport and installation. These vehicles require wider roads with shallower turns and gradients than are currently present in the project area. Consequently, the existing road infrastructure must be upgraded to accommodate construction of the turbines. Road infrastructure upgrades would include grading, widening, and re-graveling of the existing roads. Existing road widths vary from 12 to 20 feet; future roads are expected to be approximately 20 feet wide. New roads may be needed in areas where existing roads do not provide access to proposed turbine locations.

Most roads in the portion of the study area where new turbines would be installed would be temporarily widened to approximately 40 feet to accommodate larger towers as well as the larger equipment necessary to install them. It is likely that the locations where roads curve as they climb hills to the ridgetops would require more roadwork and would be widened to more than 40 feet in some spots to safely accommodate the larger equipment. In addition, access road entrances from main roads onto the project site would need to be widened to provide sufficient space for the minimum turning radius of construction cranes and other flatbed delivery trucks. Lands subject to temporary road widening beyond a 20-foot permanent width would be reclaimed after construction.

Culverts are generally installed as part of the road drainage system on slopes, although some are installed at small stream crossings. Existing culverts may need to be replaced with larger culverts or reinforced to provide adequate size and strength for construction vehicles.

Staging Areas

Seven staging areas of various sizes, totaling up to 34 acres, would be established in the project area. These areas would be used for the storage of turbine components, construction equipment, water tanks, office trailers, and other supplies needed for project construction. The trailers would be used to support workforce needs and site security, and would also house a first aid station, emergency shelter, and hand tool storage area for the construction workforce. Parking areas would be located near the trailers. Vegetation would be cleared and the staging areas would be graded level. These areas would use native material, supplemented with gravel or soil stabilizer, if needed, and appropriate erosion control devices (e.g., earth berm, silt fences, straw bales) would be installed to manage water runoff. Diversion ditches would be installed, as necessary, to prevent stormwater from running onto the site from surrounding areas. Following completion of construction activities, the contractor would restore the temporary staging areas. The gravel surface would be removed, and the areas would be contour graded (if necessary and if environmentally beneficial) to conform with the natural topography. Stockpiled topsoil would be replaced, and the area would be stabilized and reseeded with an appropriate seed mixture.

Construction and Installation of Turbines

Repowered turbine construction entails placement of a foundation, new tower, rotor, nacelle, and transformer. Construction and installation of repowered turbines is regulated by County conditions of approval, building permit requirements, and grading permit requirements.

Grading for Tower Foundations

At each turbine site, a level turbine work area would be graded to support the construction of tower foundations (discussed below) and to support the use of large cranes to lift the turbine components into place. The extent and shape of grading at each turbine site would depend on local topography; however, each site would require up to approximately 2.9 acres of graded area to support the construction of foundations and installation of turbines. A crane pad would be leveled and graded within the turbine work area at each turbine site. The crane pad—a flat, level, and compacted area—would provide the base from which the crane would work to place the turbine. Most wind turbine construction activities would occur within the turbine work area. Following construction, the turbine work area would be reclaimed.

Construction of Tower Foundations

The type of turbine foundation used depends on terrain, wind speeds, and wind turbine type. Two foundation types may be used in repowering APWRA wind projects: an inverted “T” slab foundation or a concrete cylinder foundation. An inverted T slab foundation is a type of spread footing foundation. A single concrete pad is placed at ground level, although part of the pad may be placed below ground level depending on the slope. At the center of the pad is a cylindrical concrete pedestal to which the wind turbine tower is bolted—hence the name, inverted T.

A concrete cylinder foundation is a large concrete cylinder with a concrete pedestal that is slightly larger than the tower base diameter. The size of the concrete cylinder and pad is determined by wind turbine size and site-specific conditions (e.g., expected maximum wind speeds, soil characteristics). Its weight must be sufficient to hold the wind turbine in place.

Either type of foundation is typically formed by placing concrete in an excavated footing with reinforced steel. The foundation would be installed immediately within the turbine work area adjacent to the crane pad. While the foundation type is determined by terrain, wind speeds, and turbine type, in general, the foundation is formed by placing concrete in an excavated footing with reinforced steel. A small graveled area would encircle each foundation to facilitate maintenance access. The total diameter of the final project footprint for each turbine, including the graveled area, would be approximately 60 feet.

Installation of Turbines

Turbine construction entails placement of a foundation, new tower, rotor, nacelle, and transformer. Construction and installation of turbines in this area is regulated by the County's conditions of approval, building permit requirements, and grading permit requirements. The turbine towers, nacelles, and blades are delivered to each turbine location in the order of assembly, once the concrete of the foundation has been poured and has cured sufficiently. Large cranes are brought to each site to lift and assemble the turbine components. First, the base section of the tower is secured to the foundation using large bolts. The remaining tower sections are then lifted with the crane and connected to the base section. After the nacelle and rotor are delivered to the turbine site, the turbine blades are bolted to the rotor hub, and the nacelle and rotor are lifted by a crane and connected to the main shaft.

Excess rock generated by foundation construction would be spread on existing roads and maintenance areas surrounding the turbines. Old foundations from the previous wind project onsite may be removed if they are within proposed construction areas; doing so would involve workers demolishing the foundations using jackhammers or similar tools. The material from old turbine foundations may be reused for road base or hauled offsite to the Altamont Landfill.

Meteorological Towers

Three permanent meteorological towers would be installed in strategic locations onsite to monitor wind speeds and to calibrate turbines. The permanent meteorological towers would be a freestanding tower design without guy wires, approximately 80 meters tall. The permanent meteorological towers would each require a small concrete foundation and graveled area around the tower, as well as an access road to facilitate maintenance activities. The small foundation and graveled area would be approximately 30 feet in diameter.

Power Collection System

Each new wind turbine must be connected to the medium-voltage electrical collection system via a pad-mounted transformer. The collection system carries electricity generated by the turbines to a substation, where the voltage level of the collection system is stepped up to that of the power grid. From the substation, electricity is carried through an interconnection point to the transmission lines that distribute electricity to the power grid. Transmission lines in the project vicinity are maintained by the Pacific Gas and Electric Company (PG&E). Each of the collection system components is discussed below.

Collection Lines

Medium-voltage collection lines would collect power from each turbine for conveyance to the substation. Medium-voltage lines are normally up to 35 kilovolts (kV). The new medium-voltage collection lines would be installed underground as close to project roads as possible to minimize ground disturbance as well as to facilitate access for any necessary O&M activities on the lines.

Installation of underground medium-voltage lines is accomplished in most cases using a cut-and-cover construction method. A disturbance width of 20 feet is generally standard to allow for the trench excavation and equipment, but this width may vary depending on the topography and soil type. Typically, the topsoil is separated from the subsurface soil for later replacement. A 3-foot-wide trench is then plowed using a special bulldozer attachment that buries the line in the same pass in which it digs the trench. Once the collection lines are in place, the trench is partially backfilled with subsurface soil. Typically, communication lines are then placed in the trench. The trench is then backfilled with the remaining subsurface soil, compacted, and covered with the reserved topsoil.

To minimize surface disturbance within wetlands and streams, collection lines may be installed under wetlands and other waters using horizontal directional drilling (HDD) techniques, where feasible. HDD involves the use of a steered drilling head, which allows the bore machine to sit at ground level, bore down along on the collection line route, and to direct the bore back up to the surface at a distant point. The bore machine uses a drilling fluid in the process, typically a mixture of fine clay (such as bentonite) and fresh water. The clay and water mixture coats the wall of the borehole to help hold it open and to provide lubrication for the drill stem and conduit being installed. Excess drilling fluid is typically captured using a vacuum truck.

Collection lines would terminate near the edge of the property where power would be conveyed offsite to the substations through gen-tie lines. The gen-tie lines would be installed underground or overhead, making use of existing overhead power poles where possible. If gen-tie lines are carried on existing poles, these lines would need to be strung with new conducting wire (i.e., reconductored), requiring work areas (i.e., pull sites) to string the upgraded power line. Additionally, some power poles may need to be replaced. If new overhead collection or gen-tie line facilities are required, they would be completed in compliance with the latest recommendations of the Avian Power Line Interaction Committee (APLIC).

Three offsite gen-tie corridors would be reconductored or installed for the project as listed below and shown in Figures Figure 2a–2c.

- **Gen-tie 1**—Heading west from the study area approximately 3.4 miles adjacent to Altamont Pass Road, 0.14 mile south along a private road, into the Santa Clara substation.
- **Gen-tie 2**—Heading east from the study area approximately 1 mile adjacent to Altamont Pass Road, 0.5 mile north and west on private land, into the AML substation.
- **Gen-tie 3**—Heading south from the study area approximately 0.4 mile adjacent to Mountain House Road, 0.8 mile southwest adjacent to Grant Line Road, 0.6 mile west adjacent to Altamont Pass Road, 0.5 mile north and west on private land, into the AML substation.

Gen-tie 3 may not be needed if collection lines from the northern and eastern parcels are routed directly across the California Aqueduct where it bisects the study area as opposed to the alignments described above.

Transformers and Power Poles

Transformers boost the voltage of the electricity produced by the turbines to the voltage of the collection system. Each turbine would have its own transformer adjacent to or within the turbine, either mounted on a small pad adjacent to the turbine or within the tower.

The installation of overhead power lines and poles would be limited to locations where underground lines are infeasible and locations immediately outside the substation where underground medium-voltage lines come aboveground to connect to the substation.

To install power poles, a laydown area is required. To mount the medium-voltage lines on a power pole, a pull site and a tension site are required. Pole sites, pull sites, tension sites, access roads, and laydown areas are cleared (i.e., mowed) if necessary. Pole holes and any necessary anchor holes are excavated. Where possible, a machine auger is used to install poles. The width and depth of the setting hole depends on the size of the pole, soil type, span, and wind loading.

Power poles are framed, devices installed, and any anchors and guy wires are installed before the pole is set. Anchors and guy wires installed during construction are left in place. After setting the pole, conductors are strung.

Substations

The main functions of a collector substation are to step up the voltage from the turbine collection lines to the transmission level and to provide fault protection. The basic elements of the substation facilities are a control house, a bank of one or two main transformers, outdoor breakers, capacitor banks, relaying equipment, high-voltage bus work, steel support structures, an underground grounding grid, and overhead lightning-suppression conductors. The main outdoor electrical equipment and control house are installed on a concrete foundation. The project will connect to two existing substations as described below.

The AML substation served as the collector substation for a portion of the previous wind project. The AML substation consists of a graveled footprint area of approximately 0.6 acre, a 12-foot chain-link perimeter fence, and an outdoor lighting system. The AML substation would not be expanded, however equipment within the existing fence may be upgraded for the repowering project. Any new lights would be shielded or directed downward to reduce glare. The upgraded substation would remain fenced in keeping with the fencing around the existing substation (i.e., 12-foot chain link perimeter fencing).

The Santa Clara substation consists of a graveled footprint area of approximately 0.2 acre, a 12-foot chain-link perimeter fence, and an outdoor lighting system. The Santa Clara substation would not be expanded for Sand Hill, however equipment within the existing fence may be upgraded for the repowering project.[1] Any new lights would be shielded or directed downward to reduce glare. The upgraded substation would be fenced in keeping with the fencing around the existing substation (i.e., 12-foot chain link perimeter fencing).

[1] The Santa Clara substation is the connection point for the Rooney Ranch Wind Repowering Project, proposed by the same developer. If the Rooney Ranch Wind Repowering Project is constructed, it would include an expansion of the substation to a 0.3 acre footprint.

Operations and Maintenance Facility

An O&M building would be constructed onsite. Operations, storage, and repairs would take place at the facility. Upon completion of construction, the O&M facility would obtain power by tapping into the existing PG&E power lines. The line tap would be undergrounded along proposed access roads. Portable restrooms would be used during the construction phase, and the O&M building restroom facilities would be used during operation. An onsite wastewater treatment system would be required for the permanent restroom facilities and would be subject to permitting by the Alameda County Department of Environmental Health. If an onsite wastewater treatment system is determined to be infeasible, portable toilets, serviced by a contractor, would be used instead. The O&M building, parking, and equipment storage could occupy approximately 2 acres. Two locations are being considered for the O&M building (Figures 2-2a through 2-2c), referred to as O&M Option A and O&M Option B. The final location would be selected by Sand Hill based on site conditions and final lease agreements.

Operations and Maintenance Activities

O&M activities would consist of equipment replacement, collection system repair, and gravel application and repair to access roads as necessary. Maintenance-related ground disturbance would take place within the footprint of the initial construction-related disturbance areas. Road gravelling and road repair activities would occur within the footprint of the 20-foot-wide corridor of existing and new roads. Turbines may need to be repaired or replaced at a rate of approximately two every 5 years. No new permanent effects are anticipated during maintenance activities, but 1 acre of temporary impact is assumed every 5 years, and temporarily affected areas would be restored within 1 year of disturbance.

Post-Project Decommissioning

It is anticipated that Sand Hill would decommission the turbine-related infrastructure (wind turbines, meteorological towers, road expansions, O&M building, and substations) after approximately 35 years of operation. A reclamation plan would be developed and approved by the County in advance of decommissioning. Post-project decommissioning would include temporary widening of access roads to bring in cranes and other equipment to remove turbines and foundations to 3 feet below surface level. A contractor would disassemble the turbine generators, towers, and other aboveground facilities, then reclaim and reseed the roads and temporarily disturbed areas to restore the project area. Any aboveground collection lines would be removed, and any buried collection lines would be capped and abandoned in place.

Regulatory and Management Considerations

This section provides an overview of the major laws and regulations that influence the management of biological resources in the study area.

Federal Endangered Species Act

The U.S. Fish and Wildlife Service (USFWS) has jurisdiction over species listed as threatened or endangered under Section 9 of the federal Endangered Species Act (ESA). ESA protects listed species from harm, or *take*, which is broadly defined as to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." For any project involving a federal agency in which a listed species could be affected, the federal agency must consult with USFWS in accordance with Section 7 of ESA. USFWS issues a biological opinion and, if the project does not jeopardize the continued existence of the listed species, issues an incidental take permit. When no federal context is present, proponents of a project affecting a listed species must consult with USFWS and apply for an incidental take permit under ESA Section 10. Section 10 requires an applicant to submit a habitat conservation plan that specifies project impacts and mitigation measures.

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (BGEPA) (16 United States Code [USC] 668) prohibits take and disturbance of individuals and nests. Take permits for birds or body parts are limited to religious, scientific, or falconry pursuits. However, the BGEPA was amended in 1978 to allow mining developers to apply to USFWS for permits to remove inactive golden eagle (*Aquila chrysaetos*) nests in the course of "resource development or recovery" operations.

In 2009, USFWS issued the 2009 Final Rule on new permit regulations that allows take "for the protection of…other interests in any particular locality" and where the take is "associated with and not the purpose of an otherwise lawful activity…" (74 Federal Register [FR] 46836–46879). The 2009 Final Rule authorized programmatic take (take that is recurring and not in a specific, identifiable timeframe or location) of eagles only if avoidance measures have been implemented to the maximum extent achievable such that take was no longer avoidable.

In 2016, USFWS issued revisions to the Final Rule pertaining to incidental take and take of eagle nests. The Final Rule changed the programmatic take standard to a new standard authorizing "incidental take" if all "practicable" measures to reduce impacts on eagles are implemented. An eagle incidental take permit under the 2016 Revisions to the Final Rule (50 Code of Federal Regulations [CFR] 22) is available for activities that may disturb or otherwise take eagles on an ongoing basis, such as operational activities. The eagle incidental take permit under the 2009 Final Rule was valid for up to 5 years. In 2012, USFWS proposed extending the maximum term for eagle incidental take permits from 5 to 30 years (77 FR 22267–22278). In 2013, USFWS issued a Final Rule to extend the maximum term for eagle incidental take permits to 30 years, subject to a recurring 5-year review process throughout the life of the permit. Although this rule was challenged in 2015, the final regulations under the 2016 Revisions to the Final Rule also include a maximum permit term of 30 years, subject to a recurring 5-year review process throughout the life of the permit (81 FR 91494–91554).

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) (16 U.S.C. Section 703, et seq.), first enacted in 1918, provides for protection of international migratory birds and authorizes the Secretary of the Interior to regulate the taking of migratory birds. The MBTA of 1918 provides that it shall be unlawful, except as permitted by regulations, to pursue, take, or kill any migratory bird, or any part, nest, or

egg of any such bird. On December 22, 2017, the U.S. Department of the Interior's Office of the Solicitor issued a legal, revised interpretation (Opinion M-37050) of the MBTA's prohibition on the take of migratory bird species. Opinion M-37050 concludes that "consistent with the text, history, and purpose of the MBTA, the statute's prohibitions on pursuing, hunting, taking, capturing, killing, or attempting to do the same apply only to affirmative actions that have as their purpose the taking or killing of migratory birds, their nests, or their eggs." According to the Opinion M-37050, take of a migratory bird, its nest, or eggs that is incidental to another lawful activity does not violate the MBTA, and the MBTA's criminal provisions do not apply to those activities. Opinion M-37050 may affect how MBTA is interpreted but it does not legally change the regulation itself. The current list of species protected by the MBTA can be found in Title 50 CFR, Section 10.13. The list includes nearly all birds native to the United States.

California Endangered Species Act

The California Endangered Species Act (CESA) prohibits the take of endangered and threatened species; however, habitat destruction is not included in the state's definition of *take*. Section 2090 of CESA requires state agencies to comply with endangered species protection and recovery and to promote conservation of these species. CDFW administers CESA and authorizes take through Section 2081 agreements.

California Fish and Game Code

Fully Protected Species

The California Fish and Game Code provides protection from take for a variety of species, referred to as *fully protected species*. Section 5050 lists fully protected amphibians and reptiles, Section 3515 lists fully protected fish, Section 3511 lists fully protected birds, and Section 4700 lists fully protected mammals. The California Fish and Game Code defines *take* as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." Except for take related to scientific research or authorized pursuant to an approved natural community conservation plan (NCCP), all take of fully protected species is prohibited.

Sections 3503 and 3503.5

Section 3503 of the California Fish and Game Code prohibits the killing of birds and the destruction of bird nests. Section 3503.5 prohibits the killing of raptor species and the destruction of raptor nests.

Section 1600: Streambed Alteration Agreements

In addition to regulating listed and special-status species, CDFW regulates activities that would interfere with the natural flow—or substantially alter the channel, bed, or bank—of a lake, river, or stream. These activities are regulated under California Fish and Game Code Sections 1600–1616 and require a streambed alteration agreement. Requirements to protect the integrity of biological resources and water quality are often conditions of streambed alteration agreements. CDFW may require avoidance or minimization of vegetation removal, use of standard erosion control measures, limitations on the use of heavy equipment, limitations on work periods to avoid impacts on fish and

wildlife, and restoration of degraded sites or compensation for permanent habitat losses, among other conditions.

Clean Water Act

The CWA was passed by Congress in 1972 with a broad mandate "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." The chief purpose of the CWA is to establish the basic structure for regulating discharges of pollutants into waters of the United States. The CWA authorizes the U.S. Environmental Protection Agency (EPA) to set national water quality standards and effluent limitations, and includes programs addressing both point-source and nonpoint-source pollution. Point-source pollution is pollution that originates or enters surface waters at a single, discrete location, such as an outfall structure or an excavation or construction site. Nonpoint-source pollution originates over a broader area and includes urban contaminants in stormwater runoff and sediment loading from upstream areas. The CWA operates on the principle that all discharges into the nation's waters are unlawful unless specifically authorized by a permit; permit review is the CWA's primary regulatory tool. Aquatic resources (i.e., drainage features and wetlands) are present in the study area and may be regulated under CWA Section 404.

Section 402: Permits for Stormwater Discharge

CWA Section 402 regulates construction-related stormwater discharges to surface waters through the National Pollutant Discharge Elimination System (NPDES) program, administered by EPA. In California, the State Water Resources Control Board (State Water Board) is authorized by EPA to oversee the NPDES program through the Regional Water Quality Control Boards (RWQCBs).

NPDES permits are required for projects that disturb more than 1 acre of land. The NPDES permitting process requires the applicant to file a public notice of intent to discharge stormwater and to prepare and implement a stormwater pollution prevention plan (SWPPP). The SWPPP must include a site map, a description of proposed construction activities, and the best management practices (BMPs) that will be implemented to prevent soil erosion and discharge of other construction-related pollutants (e.g., petroleum products, solvents, paints, cement) that could contaminate nearby water resources. Permittees are required to conduct annual monitoring and reporting to ensure that BMPs are correctly implemented and effective in controlling the discharge of stormwater-related pollutants. Because the proposed project would disturb more than 1 acre of land, Sand Hill would prepare a SWPPP and apply for an NPDES permit.

Section 404: Permits for Placement of Fill in Waters of the United States (Including Wetlands)

Waters of the United States (including wetlands) are protected under Section 404 of the CWA. Any activity that involves a discharge of dredged or fill material into waters of the United States, including wetlands, is subject to regulation by USACE. *Waters of the United States* is defined to encompass navigable waters of the United States; interstate waters; all other waters where their use, degradation, or destruction could affect interstate or foreign commerce; tributaries of any of these waters; and wetlands that meet any of these criteria or are adjacent to any of these waters or their tributaries. *Wetlands* are defined under Section 404 as those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Jurisdictional wetlands must meet three wetland delineation criteria.

- They support hydrophytic vegetation (i.e., plants that grow in saturated soil).
- They have hydric soil types (i.e., soils that are wet or moist enough to develop anaerobic conditions).
- They have wetland hydrology.

Section 401: Water Quality Certification

Under CWA Section 401, applicants for a federal license or permit to conduct activities that may result in the discharge of a pollutant into waters of the United States must apply for water quality certification from the state. Therefore, all projects with a federal component that may affect the quality of waters of the state (including projects that require federal approval, such as a CWA Section 404 permit) must comply with CWA Section 401.

In California, CWA Section 401 is administered by the State Water Board through the RWQCBs. All areas qualifying as waters of the United States under CWA Section 404 also qualify as waters of the State of California (waters of the state) under the jurisdiction of CWA Section 401 and the State Water Board and RWQCBs; however, some areas considered as waters of the state do not qualify as waters of the United States. State Water Board jurisdiction at streams, lakes, and ponds considered as waters of the United States extends beyond the ordinary high water mark (OHWM) to the top of bank or to the greatest lateral extent of riparian vegetation, whichever is greater. Isolated wetlands, nonnavigable waters, and intrastate waters may also qualify as waters of the state subject to State Water Board jurisdiction under CWA Section 401.

As currently designed, the proposed project is expected to result in a discharge of pollutants into waters of the United States; accordingly, a CWA Section 401 water quality certification from the RWQCB will be required. All riparian areas associated with streams in the study area also qualify as jurisdictional wetlands and are mapped and described in the delineation of aquatic resources. No features in the study area are waters of the state but not waters of the United States.

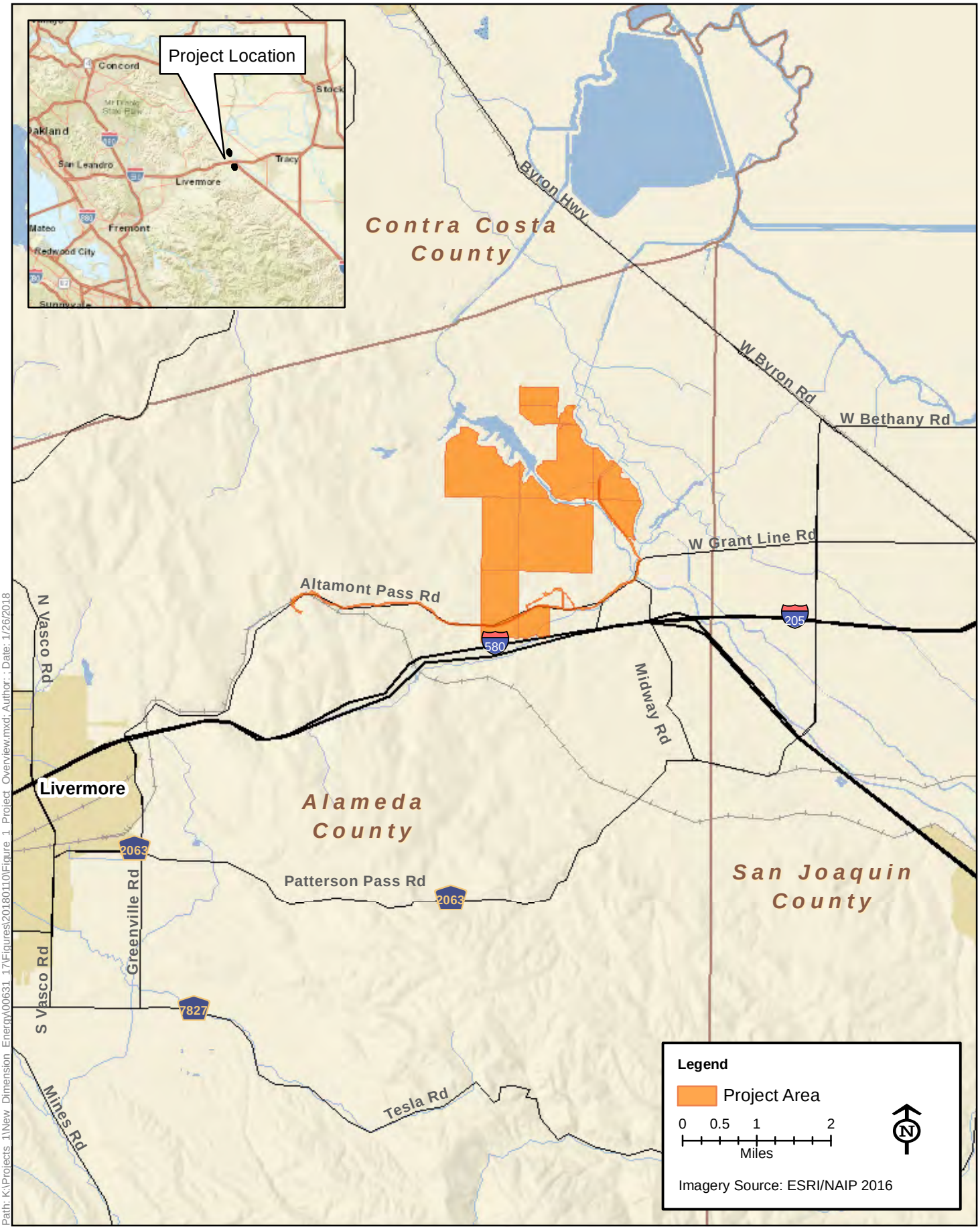

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Figure 1
Project Location

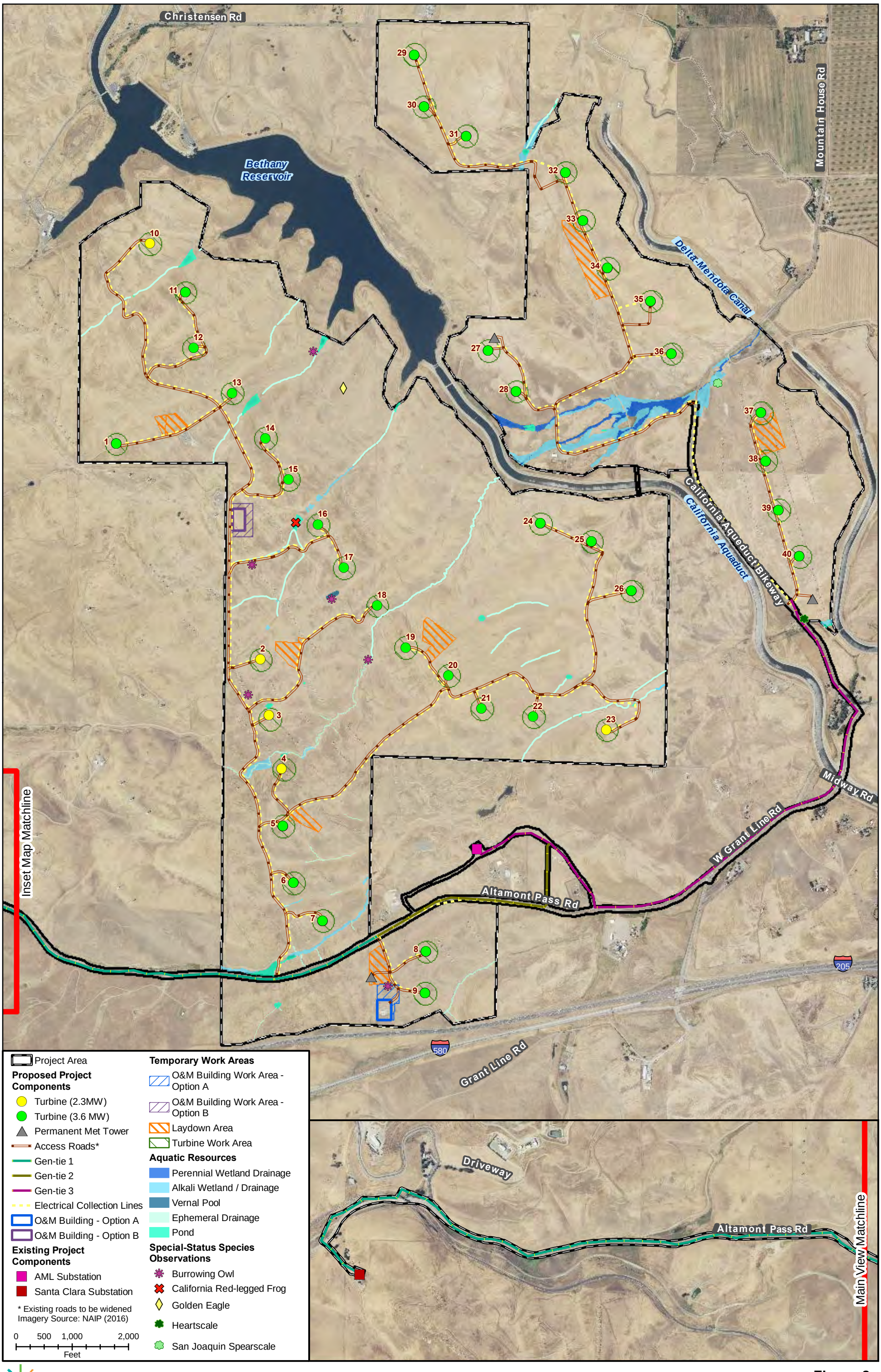

Figure 2a
Land Cover Types in the Sand Hill Wind Repowering Project Area—Layout 1

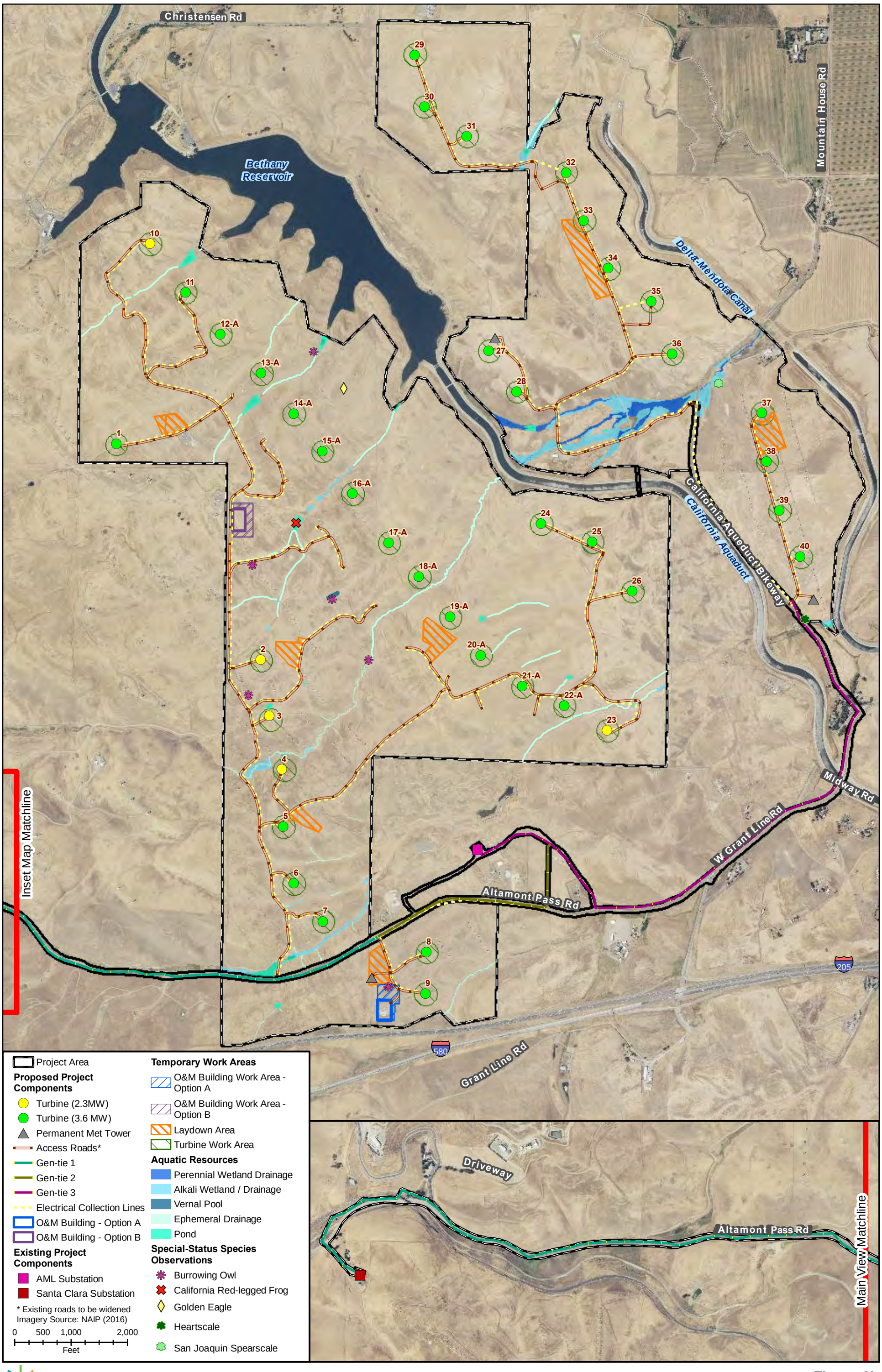

Figure 2b
Land Cover Types in the Sand Hill Wind Repowering Project Area—Layout 2

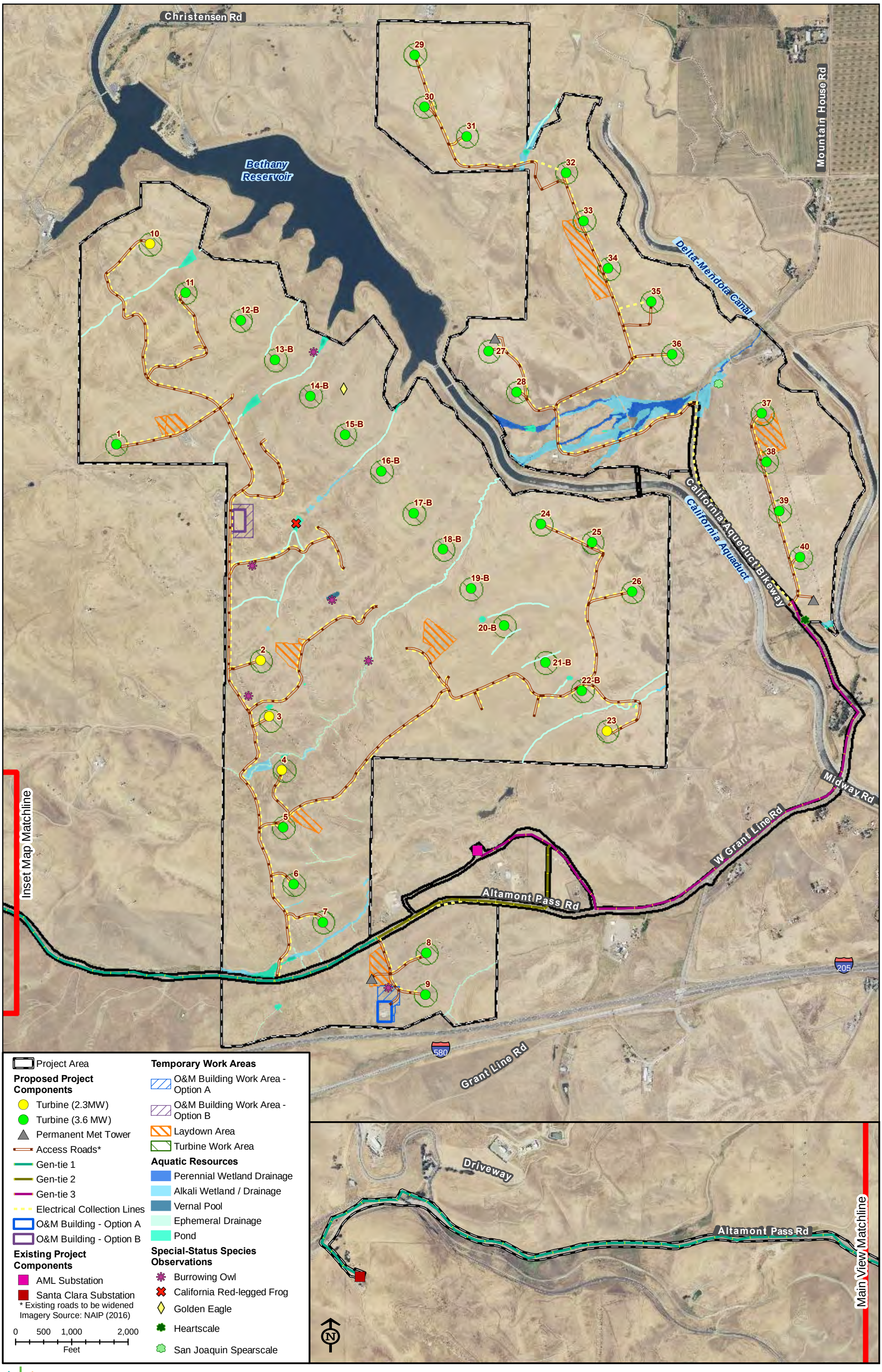

Figure 2c
Land Cover Types in the Sand Hill Wind Repowering Project Area—Layout 3

Chapter 2
Methods

This biological resources evaluation entailed a prefield investigation and reconnaissance and focused field surveys to identify and describe the biological resources in the proposed project area.

The methods used to identify special-status plant and wildlife species and their habitats in the study area comprised a background search of existing and available information and a reconnaissance-level field survey. *Special-status wildlife* refers to animal species that are legally protected under ESA, CESA, or other state, federal, and local regulations.

Background Search

The sources of information listed below were reviewed to identify special-status species potentially occurring in the study area.

- CDFW's California Natural Diversity Database (CNDDB) records search of the Clifton Court Forebay, Midway, and surrounding USGS 7.5-minute quadrangles (California Department of Fish and Wildlife 2018).
- USFWS IPaC Trust Resource report species list for the project area (U.S. Fish and Wildlife Service 2018).
- *Altamont Pass Wind Resource Area Repowering Final Program Environmental Impact Report* (Alameda County 2014).
- *East Alameda County Conservation Strategy* (EACCS) (ICF International 2010).

ICF also reviewed aerial photographs of the study area in Google Earth Pro to obtain information on historical habitat conditions.

Field Surveys

Field surveys conducted for biological resources in the study area consisted of a delineation of aquatic resources and a habitat assessment for special-status plants and wildlife species. Each of these surveys is described below.

Wetlands and Nonwetland Waters of the United States

ICF botanists/wetland ecologists Kate Carpenter, Devin Jokerst, and Renee Richardson conducted aquatic resources delineation surveys in the study area on October 25 and 26 and November 6, 2017, and January 5 and 19, 2018. The delineation surveys were conducted in accordance with the guidance provided in the 1987 *U.S. Army Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987:53–69), the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual for the Arid West Region* (U.S. Army Corps of Engineers 2008), and 33 CFR 328.3(e) and 329.11(a)(1). The OHWM was identified according to USACE's Regulatory Guidance

Letter No. 05-05 and *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual* (U.S. Army Corps of Engineers 2005; Lichvar and McColley 2008).

Special-Status Plants

Botanical surveys have been conducted in a portion of the study area that was evaluated as part of earlier repowering efforts. ICF conducted surveys for late summer–blooming special-status plants on August 7 and 8, 2012 (ICF International 2013), and Alphabiota Environmental Consulting, LLC, conducted spring-blooming surveys on May 2, 3, and 4, 2013, in target areas where proposed facilities were previously sited (Alphabiota Environmental Consulting 2013). The botanical surveys generally followed *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (California Department of Fish and Game 2009), the currently generally accepted protocol outlining the requirements for conducting surveys for special-status plants. Additional surveys would be necessary to assess special-status species occupancy for the entire study area.

Special-Status Wildlife

ICF biologist Angela Alcala conducted habitat assessment surveys on October 25 and 26, 2017. The surveys focused on evaluating vegetation communities within and adjacent to the study area for their suitability to support special-status plant and wildlife species with potential to occur in the project region (Tables 1 and 2). During the assessment, Ms. Alcala drove existing dirt roads through the study area to get an overview of habitat types in and adjacent to the study area. Ms. Alcala visually inspected all potential aquatic resources (e.g., areas with standing or flowing water) and rock outcrops within the study area that could provide habitat for special-status species. All wildlife species observed in the study area were recorded during the field survey; these records are on file at ICF. Locations of special-status species observations and suitable habitat identified during the field surveys are shown in Figures 3a–3c.

ICF conducted a formal site assessment for California red-legged frog and California tiger salamander in a portion of the study area that was evaluated as part of earlier repowering efforts (ICF International 2012). The site assessment was conducted in accordance with USFWS's (2005) *Revised Guidance on Site Assessment and Field Surveys for the California Red-legged Frog* and the California Department of Fish and Game's (subsequently changed to California Department of Fish and Wildlife) (2003) *Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander*.

Table 1. Special-Status Plants Known to Occur or that May Occur in the Sand Hill Wind Repowering Study Area and Vicinity

Species	Status[a] Federal/State/CRPR	California Distribution	Habitats	Blooming Period	Likelihood to Occur in Study Area
Amsinckia grandiflora Large-flowered fiddleneck	E/E/1B.1	Foothills of Mount Diablo in Alameda, Contra Costa, and San Joaquin Counties; currently known from only three natural occurrences	Open grassy slopes in annual grasslands and cismontane woodlands	April–May	Low—suitable annual grassland habitat is present throughout the study area; however, the species is not known to occur in the study area and is only known from three localities in California. Designated critical habitat for the species occurs approximately 2 miles southeast from the study area
Amsinckia lunaris Bent-flowered fiddleneck	–/–/1B.2	Alameda, Contra Costa, Lake, Marin, Santa Cruz, Shasta, and Siskiyou Counties	Cismontane woodland, valley and foothill grassland	March–June	Moderate—suitable annual grassland habitat is present throughout the study area
Astragalus tener var. *tener* Alkali milk-vetch	–/–/1B.2	Historically found in western San Joaquin Valley, San Francisco Bay Area, and Monterey County; likely extirpated from all historical occurrences except those in Merced, Solano, and Yolo Counties	Playas and grasslands with adobe clay soils and alkaline vernal pools	March–June	High—suitable annual grassland and alkali habitats are present throughout the study area
Atriplex cordulata Heartscale	–/–/1B.2	Western Central Valley and valleys of adjacent foothills	Alkali grasslands, alkali meadows, alkali scrublands	May–October	High—suitable annual grassland and alkali habitats are present throughout the study area
Atriplex depressa Brittlescale	–/–/1B.2	Western Central Valley and valleys in foothills on west side of Central Valley	Alkali grasslands, alkali meadows, alkali scrublands, chenopod scrublands, playas, valley and foothill grasslands; on alkaline or clay soils	May–October	High—suitable annual grassland and alkali habitats are present throughout the study area
Atriplex joaquiniana San Joaquin spearscale (saltbush)	–/–/1B.2	West margin of Central Valley from Glenn to Tulare Counties	Alkali grasslands, alkali scrublands, alkali meadows, saltbush scrublands	April–September	High—suitable annual grassland and alkali habitats are present throughout the study area; species has been documented within the study area
Atriplex minuscula Lesser saltscale	–/–/1B.1	Sacramento and San Joaquin Valley, Butte County to Kern County	Alkali sink and sandy alkaline soils in grasslands, chenopod scrub, between 65 and 325 feet above msl	May–October	High—suitable annual grassland and alkali habitats are present throughout the study area

Species	Status[a] Federal/State/CRPR	California Distribution	Habitats	Blooming Period	Likelihood to Occur in Study Area
Balsamorhiza macrolepis var. *macrolepis* Big-scale balsamroot	–/–/1B.2	Scattered occurrences in Coast Ranges and Sierra Nevada foothills.	Chaparral, cismontane woodland, valley and foothill grassland, sometimes on serpentine soils, at 295–4,593 feet.	March–June	Moderate—suitable annual grassland habitat within study area
Blepharizonia plumosa ssp. *plumosa* Big tarplant	–/–/1B.1	Interior Coast Range foothills in Alameda, Contra Costa, San Joaquin, Stanislaus[b], and Solano[b] Counties	Dry hills and plains in annual grasslands	July–October	High—suitable annual grassland habitat in the study area
California macrophylla Round-leaved filaree	–/–/1B.1	Scattered occurrences in the Great Valley, southern North Coast Ranges, San Francisco Bay Area, South Coast Ranges, Channel Islands, Transverse Ranges, and Peninsular Ranges	Cismontane woodland, valley and foothill grassland on clay soils	March–May	High—suitable annual grassland habitat in the study area; species is known to occur along Grant Line Road adjacent to the study area
Caulanthus lemmonii Lemmon's jewel-flower	–/–/1B.2	Southeast San Francisco Bay Area, south through the South Coast Ranges and adjacent San Joaquin Valley to Ventura County	Dry, exposed slopes in grasslands and pinyon-juniper woodland	March—May	Low—limited habitat is present in the study area
Centromadia parryi ssp. *congdonii* Congdon's tarplant	–/–/1B.2	Eastern San Francisco Bay Area, Salinas Valley, and Los Osos Valley	Lower slopes, flats, and swales in annual grasslands; locally on alkaline or saline soils	June–November	High—suitable annual grassland habitat and alkaline soils are present in the study area; species is known to occur along Altamont Pass Road near the study area
Chloropyron mollis ssp. *hispidus* Hispid bird's-beak	–/–/1B.1	Central Valley (Kern, Fresno, Merced, Placer, and Solano Counties) and Alameda County	Meadows, grasslands, and playas; on alkaline soils	June–September	Moderate—suitable annual grassland habitat and alkaline soils are present in the study area
Chloropyron palmatus Palmate-bracted bird's-beak	E/E/1B.1	Known from seven populations in Livermore Valley and Central Valley from Colusa County to Fresno County	Alkali grasslands, alkali meadows, and chenopod scrublands	May–October	Low—suitable alkali grassland habitat within study area, but species has a very limited distribution
Deinandra bacigalupii Livermore tarplant	–/–/1B.2	Endemic to Alameda County (Livermore Valley)	Alkaline meadows and seeps, not in Jepson Manual	June–October	Moderate—moist alkali soils are present in the study area
Delphinium recurvatum Recurved larkspur	–/–/1B.2	San Joaquin Valley and interior valleys of the south Coast Ranges, Contra Costa County to Kern County	Subalkaline soils in annual grassland, saltbush scrub, cismontane woodland, vernal pools	March–May	High—suitable annual grassland habitat and alkaline soils are present in the study area

Species	Status[a] Federal/State/CRPR	California Distribution	Habitats	Blooming Period	Likelihood to Occur in Study Area
Eschscholzia rhombipetala Diamond-petaled poppy	–/–/1B.1	Interior foothills of south Coast Ranges from Contra Costa County to Stanislaus County, Carrizo Plain in San Luis Obispo County	Grassland, chenopod scrub, on clay soils, where grass cover is sparse enough to allow growth of low annuals	March–April	Moderate—suitable annual grassland habitat within study area
Lasthenia conjugens Contra Costa goldfields	E/–/1B.1	Scattered occurrences in Coast Range valleys and southwest edge of Sacramento Valley, Alameda, Contra Costa, Mendocino, Monterey, Napa, Santa Barbara, Santa Clara, and Solano Counties	Alkaline or saline vernal pools and swales, below 1,542 feet	March–June	Low—suitable alkali soils and swales may be present but no nearby occurrences
Madia radiata Showy golden madia	–/–/1B.1	Scattered populations in the interior foothills of the South Coast Ranges: Contra Costa[b], Fresno, Kings[b], Kern, Monterey[b], Santa Barbara[b], San Benito, Santa Clara, San Joaquin[b], San Luis Obispo, and Stanislaus Counties	Oak woodland, valley and foothill grassland, slopes	March–May	Moderate—suitable annual grassland habitat within study area
Plagiobothrys glaber Hairless popcorn-flower	–/–/1A	Coastal valleys from Marin County to San Benito County	Alkaline meadows, coastal salt marsh	April–May	Low—suitable alkali soils are present in the study area but no nearby occurrences
Trifolium depauperatum var. *hydrophilum* Saline clover	–/–/1B.2	Alameda, Colusa, Monterey, Napa, San Benito, Santa Clara, San Luis Obispo, San Mateo, Solano, and Sonoma Counties	Marshes and swamps, valley and foothill grassland (mesic, alkaline), and vernal pools	April–June	Low—suitable annual grassland habitat within study area but no nearby occurrences
Tropidocarpum capparideum Caper-fruited tropidocarpum	–/–/1B.1	Historically known from the northwest San Joaquin Valley and adjacent Coast Range foothills	Grasslands in alkaline hills	March–April	High—suitable grassland and alkaline soils in the study area; species is known to occur along Grant Line Road adjacent to the study area

Species	Status[a] Federal/State/CRPR	California Distribution	Habitats	Blooming Period	Likelihood to Occur in Study Area

[a] Status explanations:

Federal

E = listed as endangered under the ESA.

– = no listing.

State

E = listed as endangered under the CESA.

– = no listing.

California Rare Plant Rank (CRPR)

1A = List 1A species: presumed extinct in California.

1B = List 1B species: rare, threatened, or endangered in California and elsewhere.

2 = List 2 species: rare, threatened, or endangered in California but more common elsewhere.

CRPR Code Extensions:

0.1 = seriously endangered in California (over 80% of occurrences threatened / high degree and immediacy of threat.

0.2 = fairly endangered in California (20–80% of occurrences threatened).

[b] Populations uncertain or extirpated in the county.

Table 2. Special-Status Wildlife Species Known to Occur or that May Occur in the Sand Hill Wind Repowering Study Area and Vicinity

Scientific Name Common Name	Status Federal/State	Geographic Distribution	Habitat Requirements	Likelihood to Occur in the Study Area
Invertebrates				
Branchinecta longiantenna Longhorn fairy shrimp	E/–	Eastern margin of central Coast Ranges from Contra Costa County to San Luis Obispo County; disjunct population in Madera County	Small, clear pools in sandstone rock outcrops of clear to moderately turbid clay- or grass-bottomed pools	None—Rock outcrop pools are not present in the study area
Branchinecta lynchi Vernal pool fairy shrimp	T/–	Central Valley, central and south Coast Ranges from Tehama County to Santa Barbara County; isolated populations also in Riverside County	Common in vernal pools; also found in sandstone rock outcrop pools	Moderate—Several alkali wetlands, small ephemeral ponds, and a vernal pool in the study area provide suitable habitat
Lepidurus packardi Vernal pool tadpole shrimp	T/–	Shasta County south to Merced County	Vernal pools and ephemeral stock ponds	Moderate—Several alkali wetlands, small ephemeral ponds, and a vernal pool in the study area provide suitable habitat

Scientific Name Common Name	Status Federal/State	Geographic Distribution	Habitat Requirements	Likelihood to Occur in the Study Area
Desmocerus californicus Valley elderberry longhorn beetle	T/–	Streamside habitats below 3,000 feet above sea level throughout the Central Valley	Riparian and oak savanna habitats with elderberry shrubs and streamside habitats below 3,000 feet above sea level. Elderberry shrub is the host plant.	None—Elderberry host plants not observed in the study area
Fish				
Acipenser medirostris Green sturgeon	T/SSC	In marine waters of the Pacific Ocean from the Bering Sea to Ensenada, Mexico. In rivers from British Columbia south to the Sacramento River, primarily in the Klamath/Trinity and Sacramento Rivers	Primarily marine, using large anadromous freshwater rivers and associated estuaries for spawning and rearing	None—outside of species known range and no suitable habitat present
Hypomesus transpacificus Delta smelt	T/T	Primarily in the Sacramento–San Joaquin Estuary, but has been found as far upstream as the mouth of the American River on the Sacramento River and Mossdale on the San Joaquin River; range extends downstream to San Pablo Bay	Occurs in estuary habitat in the Delta where fresh and brackish water mix in the salinity range of 2–7 parts per thousand (Moyle 2002)	None—No suitable habitat (estuary) in the study area
Oncorrhynchus mykiss Central California Coastal steelhead Distinct Population Segement (DPS)	T/-	Coastal drainages along the central California coast	An anadromous fish that spawns and spends a portion of its life in inland streams, typically maturing in the open ocean	None—no perennial streams suitable for anadromous fish are present in the study area
Oncorrhynchus mykiss Central Valley steelhead DPS	T/–	Sacramento and San Joaquin River and their tributaries	An anadromous fish that spawns and spends a portion of its life in inland streams, typically maturing in the open ocean	None—no perennial streams suitable for anadromous fish are present in the study area

Scientific Name Common Name	Status Federal/State	Geographic Distribution	Habitat Requirements	Likelihood to Occur in the Study Area
Amphibians				
Ambystoma californiense California tiger salamander	T/T	Central Valley, including Sierra Nevada foothills, up to approximately 1,000 feet, and coastal region from Sonoma County south to Santa Barbara County	Small ponds, lakes, or vernal pools in grasslands and oak woodlands for larvae; rodent burrows, rock crevices, or fallen logs for cover for adults and for summer dormancy	High—Species has not been previously detected in the study area but several records exist within 1 mile of the study area (CNDDB 2018). Many ponds, alkali wetlands, and a vernal pool in the study area represent suitable breeding habitat and grasslands provide upland dispersal habitat
Rana boylii Foothill yellow-legged frog	–/SSC	Occurs in the Klamath, Cascade, north Coast, south Coast, Transverse, and Sierra Nevada Ranges up to approximately1,800 meters (6,000 feet)	Creeks or rivers in woodland, forest, mixed chaparral, and wet meadow habitats with rock and gravel substrate and low overhanging vegetation along the edge. Usually found near riffles with rocks and sunny banks nearby	None—no suitable streams with rocky, gravel substrate and overhanging vegetation are present within the study area
Rana draytonii California red-legged frog	T/SSC	Found along the coast and coastal mountain ranges of California from Mendocino County to San Diego County and in the Sierra Nevada from Butte County to Stanislaus County	Permanent and semipermanent aquatic habitats, such as creeks and cold-water ponds, with emergent and submergent vegetation; may estivate in rodent burrows or cracks during dry periods	High—Study area is entirely within critical habitat for California red-legged frog (Unit ALA-2). The species was detected in the study area during 2012 field surveys. Many ponds and perennial wetland drainages throughout the study area represent suitable aquatic habitat and grasslands provide upland dispersal habitat

Scientific Name Common Name	Status Federal/State	Geographic Distribution	Habitat Requirements	Likelihood to Occur in the Study Area
Reptiles				
Actinemys marmorata Western pond turtle	–/SSC	Uncommon to common in suitable aquatic habitat throughout California, west of the Sierra-Cascade crest and absent from desert regions, except in the Mojave Desert along the Mojave River and its tributaries	Occupies ponds, marshes, rivers, streams, and irrigation canals with muddy or rocky bottoms and with watercress, cattails, water lilies, or other aquatic vegetation in woodlands, grasslands, and open forests. Nests are typically constructed in upland habitat within 0.25 mile of aquatic habitat.	Moderate—where water is present, ponds, ephemeral drainages, and perennial wetland drainages in the study area provide potential aquatic habitat. Annual grasslands adjacent to aquatic habitats provide potential nesting areas for pond turtles.
Masticophis flagellum ruddocki San Joaquin coachwhip	–/SSC	From Colusa county in the Sacramento Valley southward to the grapevine in the San Joaquin Valley and westward into the inner coast ranges. An isolated population occurs at Sutter Buttes. Known elevational range from 20–900 meters (66–2,953 feet).	Occurs in open, dry, vegetative associations with little or no tree cover; in valley grassland and saltbush scrub associations; and often occurs in association with mammal burrows	Moderate—suitable grassland habitat is present within the study area; known occurrences just southwest of the study area (CNDDB 2018)
Masticophis lateralis euryxanthus Alameda whipsnake	T/T	Restricted to Alameda and Contra Costa Counties; fragmented into five disjunct populations throughout its range	Valleys, foothills, and low mountains associated with northern coastal scrub or chaparral habitat; requires rock outcrops for cover and foraging	None—grassland habitat is present throughout the study area but preferred vegetation associations (scrub and chaparral) and rock outcrops used for cover are not present in or near the study area. The closest suitable scrub habitats are approximately 3 miles northwest of the project area; accordingly, the species is not expected to occur in the study area
Phyrnosoma blainvillii Blainville's (Coast) horned lizard	–/SSC	Sacramento Valley, including foothills, south to southern California; Coast Ranges south of Sonoma County; below 1,200 meters (4,000 feet) in northern California	Grasslands, brushlands, woodlands, and open coniferous forest with sandy or loose soil; requires abundant ant colonies for foraging	Moderate—Annual grasslands provide potential habitat for the species but microhabitat conditions such as loose soils and open areas are limited within the study area

Scientific Name Common Name	Status Federal/State	Geographic Distribution	Habitat Requirements	Likelihood to Occur in the Study Area
Thamnophis gigas Giant garter snake	T/T	Central Valley from the vicinity of Burrel in Fresno County to near Chico in Butte County; extirpated from areas south of Fresno	Sloughs, canals, low-gradient streams, and freshwater marshes where there is a prey base of small fish and amphibians. Also irrigation ditches and rice fields. Requires grassy banks and emergent vegetation for basking and areas of high ground protected from flooding during winter.	None—no suitable habitat is present in the study area and no nearby occurrences (CNDDB 2018)
Mammals				
Antrozous pallidus Pallid bat	–/SSC	Low elevations throughout California	Occurs in a variety of habitats from desert to coniferous forest; most closely associated with oak, yellow pine, redwood, and giant sequoia habitats in northern California. Prefers rocky outcrops, cliffs, and crevices with access to open habitats for foraging. Uses caves, crevices, mines, and hollow trees for roosting.	Low—may forage in the study area but no suitable roosting habitat is present
Corynorhinus townsendii Townsend's big-eared bat	–/SSC	Widespread throughout California	Roosts in caves, tunnels, mines, crevices, hollow trees, and buildings; usually near water	Low—may forage in the study area but no suitable roosting habitat is present
Taxidea taxus American badger	–/SSC	In California, badgers occur throughout the state except in humid coastal forests of northwestern California in Del Norte and Humboldt Counties	Badgers occur in a wide variety of open, arid habitats but are most commonly associated with grasslands, savannas, mountain meadows, and open areas of desert scrub; the principal habitat requirements for the species appear to be sufficient food (burrowing rodents), friable soils, and relatively open, uncultivated ground.	High—Suitable habitat is present throughout the study area. Species documented along Altamont Pass Road adjacent to the study area (CNDDB 2018)

Scientific Name Common Name	Status Federal/State	Geographic Distribution	Habitat Requirements	Likelihood to Occur in the Study Area
Vulpes macrotis mutica San Joaquin kit fox	E/T	Principally occurs in the San Joaquin Valley and adjacent open foothills to the west; recent records from 17 counties extending from Kern County north to Contra Costa County	Saltbush scrub, grassland, oak, savanna, and freshwater scrub	Low—Suitable habitat is present throughout the study area. While there have been no recent sighting of kit fox within the project vicinity for more than 20 years, there is a potential for incidental use of the study area by foxes dispersing from the central San Joaquin Valley
Birds				
Laterallus jamaicensis coturniculus California black rail	–/T	Found along San Francisco Bay, the Delta, coastal southern California, the Salton Sea, lower Colorado River, and some in land areas in the northern Sacramento Valley and adjacent foothills	Found in brackish and freshwater emergent marshes, typically in high wetland zone near the upper limit of flooding	Low—could migrate through the study area but no suitable nesting habitat is present
Haliaeetus leucocephalus Bald eagle	D/E	Nests in Siskiyou, Modoc, Trinity, Shasta, Lassen, Plumas, Butte, Tehama, Lake, and Mendocino Counties and in the Lake Tahoe Basin; reintroduced into central coast; winter range includes the rest of California, except the southeastern deserts, very high altitudes in the Sierra Nevada, and east of the Sierra Nevada south of Mono County	In western North America, nests and roosts in coniferous forests within 1 mile of a lake, reservoir, or stream, or the ocean	High—species winters in the APWRA and may forage adjacent to the study area at Bethany Reservoir; however, no suitable nesting or foraging habitat (large lakes, reservoirs, or rivers) is present in the study area
Aquila chrysaetos Golden eagle	–/FP	Foothills and mountains throughout California; uncommon nonbreeding visitor to lowlands such as the Central Valley	Nests in cliffs and escarpments or tall trees; forages in annual grasslands, chaparral, or oak woodlands that provide abundant medium and large-sized mammals for prey	High—species is known to occur in the APWRA and suitable foraging habitat is present within the study area; however, no suitable nesting habitat is present in the study area
Buteo swainsoni Swainson's hawk	–/T	Lower Sacramento and San Joaquin Valleys, Klamath Basin, and Butte Valley; highest nesting densities occur near Davis and Woodland, Yolo County	Nests in oaks or cottonwoods in or near riparian habitats; forages in grasslands, irrigated pastures, and grain fields	High—species is known to occur in the APWRA; limited nesting habitat (large trees) is present in the study area but the species could forage in annual grassland throughout the study area; documented nest sites within 1 mile north of the study area (CNDDB 2018)

Scientific Name Common Name	Status Federal/State	Geographic Distribution	Habitat Requirements	Likelihood to Occur in the Study Area
Elanus leucurus White-tailed kite	–/FP	Lowland areas west of Sierra Nevada from the head of the Sacramento Valley south, including coastal valleys and foothills to western San Diego County at the Mexico border	Low foothills or valley areas with valley or live oaks, riparian areas, and marshes near open grasslands for foraging	High—species is known to occur in the APWRA and is likely to forage in the study area; limited nesting habitat (large trees) is present in the study area
Falco peregrinus anatum American peregrine falcon	D/D	Permanent resident of the north and south Coast Ranges; may summer on the Cascade and Klamath Ranges south through the Sierra Nevada to Madera County; winters in the Central Valley south through the Transverse and Peninsular Ranges and the plains east of the Cascade Range	Nests and roosts on protected ledges of high cliffs, usually adjacent to lakes, rivers, or marshes that support large populations of other bird species	Low—potential winter migrant; foraging areas limited and no suitable nesting habitat is present
Athene cunicularia Burrowing owl	–/SSC	Lowlands throughout California, including the Central Valley, northeastern plateau, southeastern deserts, and coastal areas; rare along south coast	Level, open, dry, heavily grazed or low stature grassland or desert vegetation with available burrows	High—species observed during winter and summer surveys within grassland habitat throughout the study area. Several CNDDB occurrences are present within and adjacent to the study area
Lanius ludovicianus Loggerhead shrike	–/SSC	Resident and winter visitor in lowlands and foothills throughout California; rare on coastal slope north of Mendocino County, occurring only in winter	Prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches; nests in densely foliaged trees or shrubs	High—species was observed in the study area during 2012 surveys and suitable foraging habitat is present throughout the study area; nesting habitat is limited to scattered shrubs or small trees near farm areas
Agelaius tricolor Tricolored blackbird	–/T	Permanent resident in the Central Valley from Butte County to Kern County; breeds at scattered coastal locations from Marin County south to San Diego County and at scattered locations in Lake, Sonoma, and Solano Counties; rare nester in Siskiyou, Modoc, and Lassen Counties	Nests in dense colonies in emergent marsh vegetation, such as tules and cattails, or upland sites with blackberries, nettles, thistles, and grain fields; habitat must be large enough to support 50 pairs; probably requires water at or near the nesting colony	High—perennial wetland drainage habitat in the study area provides suitable nesting substrate; foraging habitat present throughout the study area. Two confirmed nesting colonies have been documented along Altamont Pass Road and the California Aqueduct adjacent to the study area (CNDDB 2018)

Scientific Name Common Name	Status Federal/State	Geographic Distribution	Habitat Requirements	Likelihood to Occur in the Study Area

Status explanations:

Federal

- E = listed as endangered under the ESA.
- T = listed as threatened under the ESA.
- PT = proposed for federal listing as threatened under the ESA.
- C = species for which USFWS has on file sufficient information on biological vulnerability and threat(s) to support issuance of a proposed rule to list, but issuance of the proposed rule is precluded.
- D = delisted.
- – = no listing.

State

- E = listed as endangered under CESA.
- T = listed as threatened under CESA.
- FP = fully protected under the California Fish and Game Code.
- SSC = species of special concern in California.
- D = delisted.
- – = no listing.

Potential Occurrence in the Study Area

- High: Known occurrences of the species within the study area, or CNDDB, or other documents, records the occurrence of the species within a 10-mile radius of the study area; suitable habitat is present within the study area.
- Moderate: CNDDB, or other documents, records the known occurrence of the species within a 10-mile radius of the study area; poor quality suitable habitat is present within the study area.
- Low: CNDDB, or other documents, does not record the occurrence of the species within a 10-mile radius of the study area; suitable habitat is present within the study area.

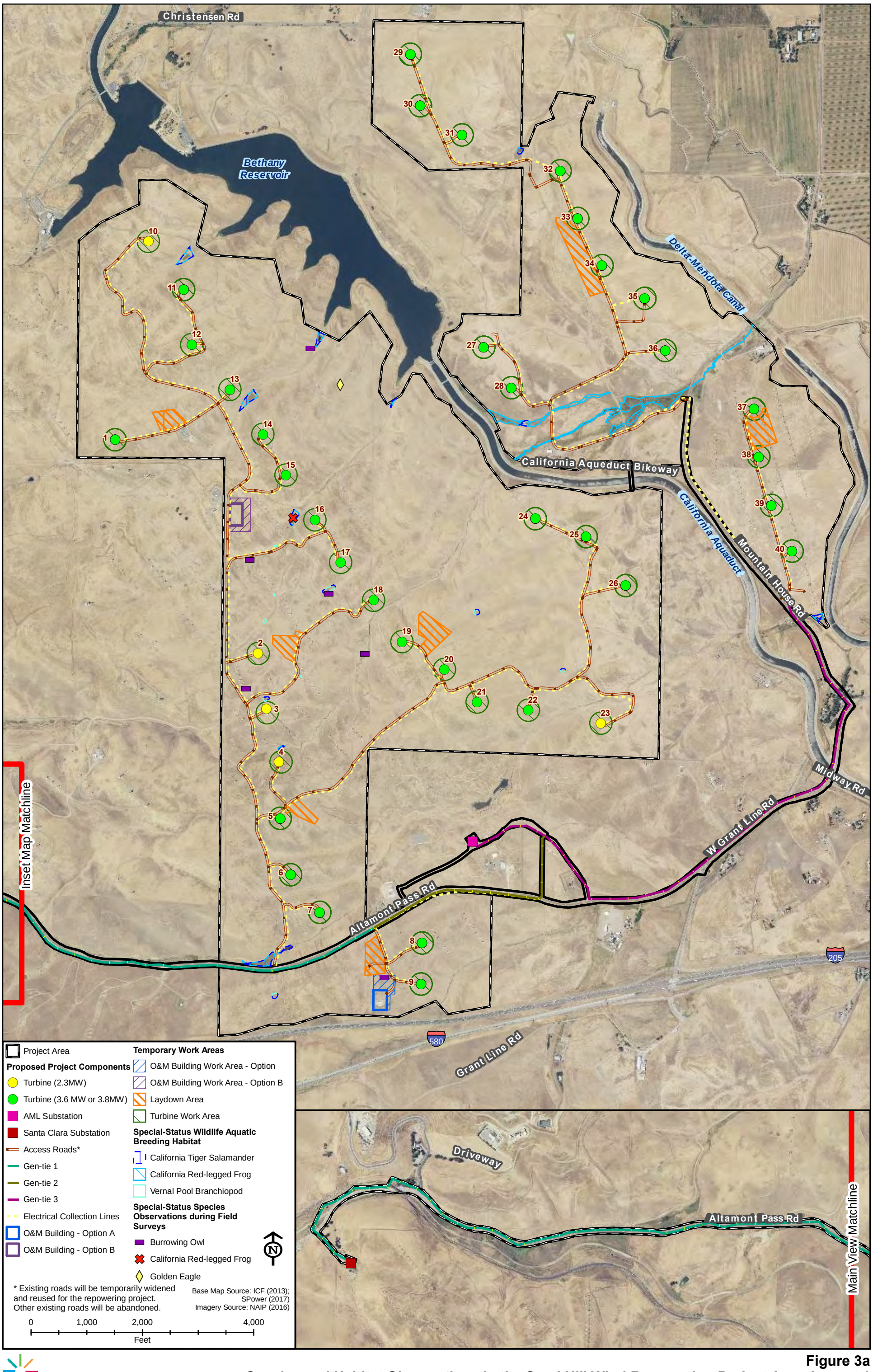

Figure 3a
Species and Habitat Observations in the Sand Hill Wind Repowering Project Area–Layout 1

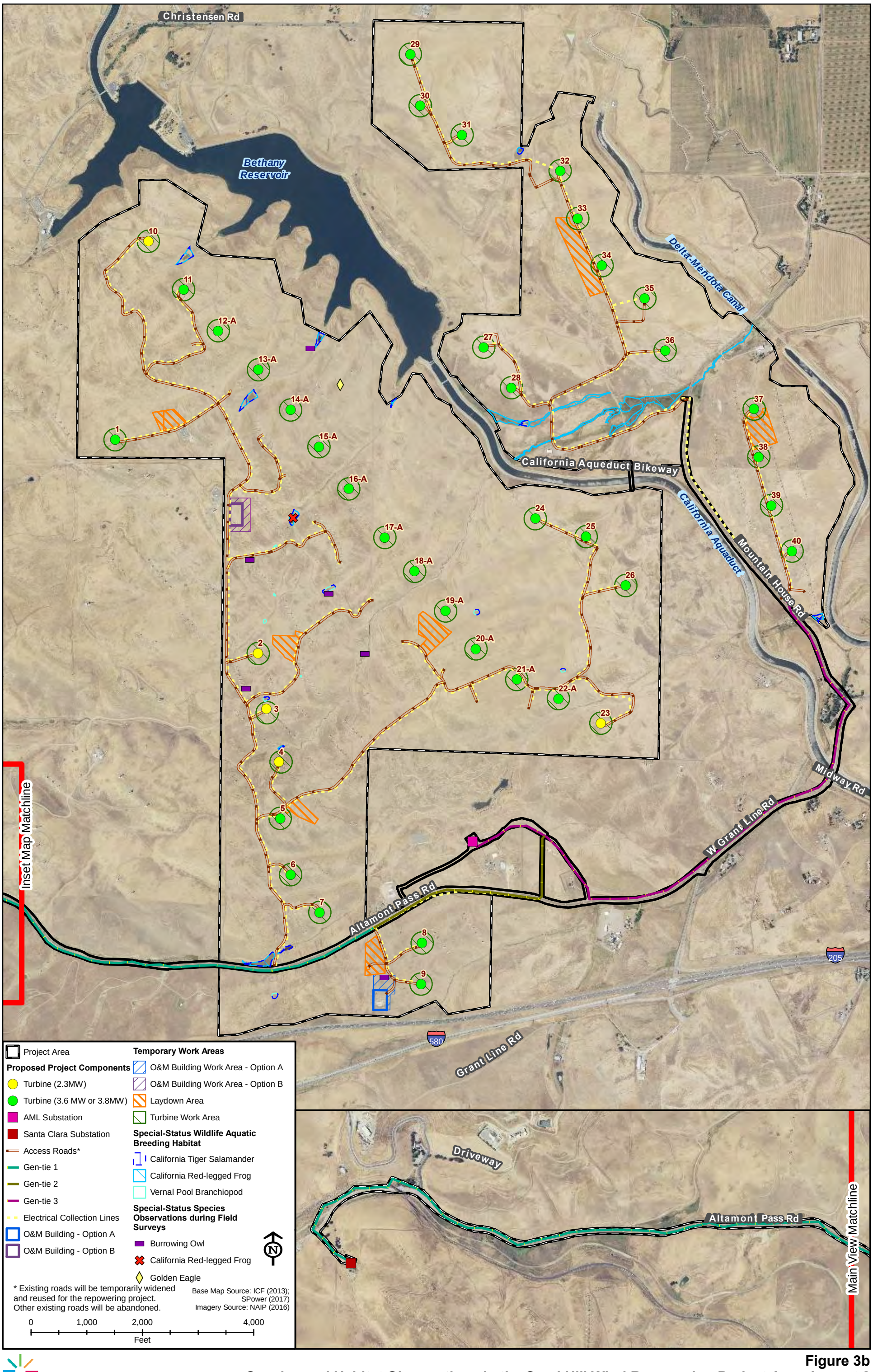

Figure 3b
Species and Habitat Observations in the Sand Hill Wind Repowering Project Area–Layout 2

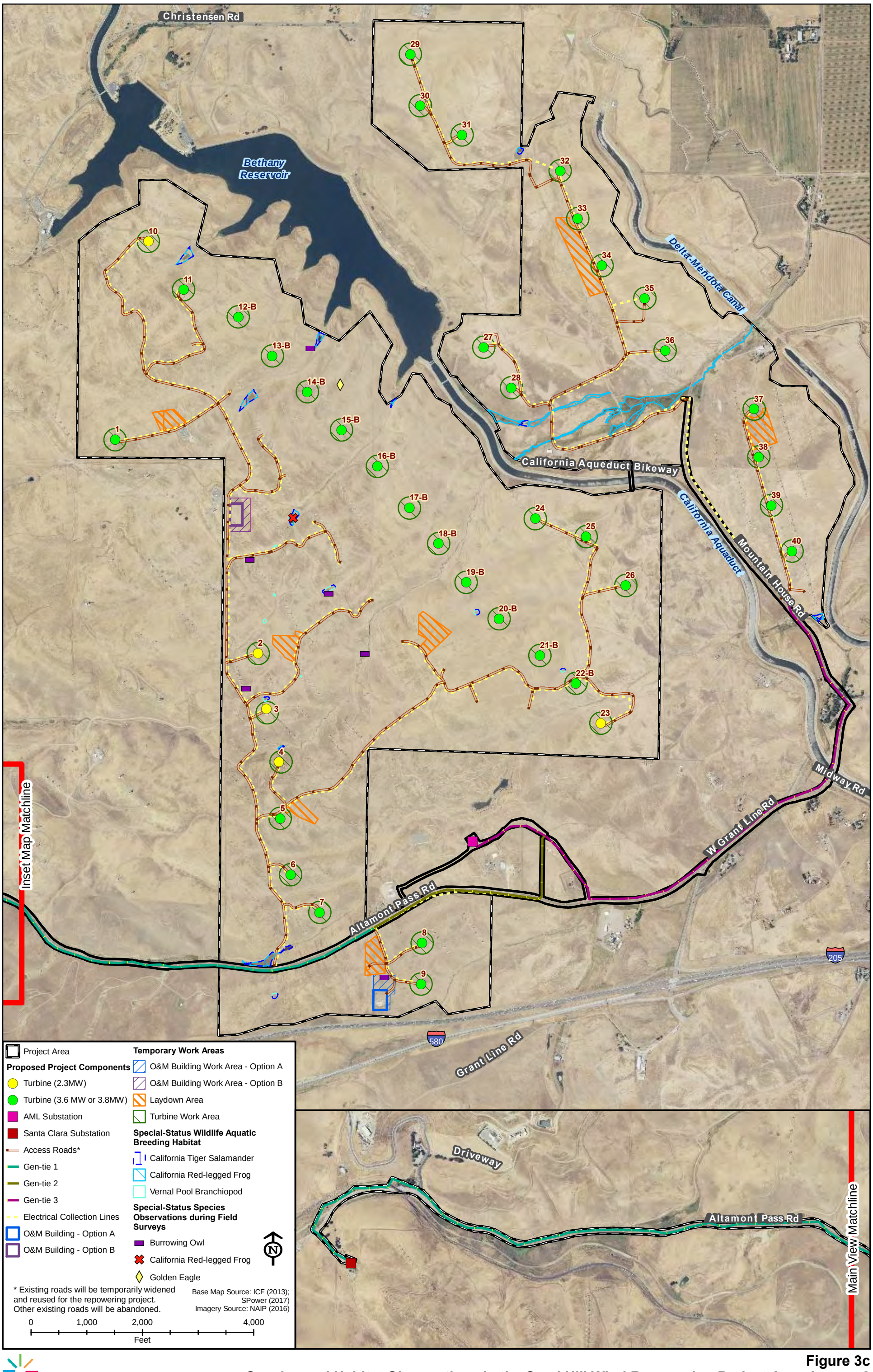

Figure 3c
Species and Habitat Observations in the Sand Hill Wind Repowering Project Area–Layout 3

Chapter 3
Results

The APWRA is an approximately 50,000-acre area that extends across the northeastern hills of Alameda County and a smaller portion of Contra Costa County to the north. The region is generally characterized by mostly treeless rolling foothills of annual grassland. The dominant land uses are wind energy generation, agriculture, and cattle grazing. Major anthropogenic features of the region are the wind turbines and ancillary facilities, an extensive grid of high-voltage power transmission lines, substations, microwave towers, a landfill site, I-580, railroad lines, ranch houses, clusters of rural residential homes on Dyer and Midway Roads, Bethany Reservoir, and the South Bay Pumping Plant.

Much of the study area is occupied by a previously operating wind farm within a rural, unincorporated portion of northeastern Alameda County. Most of the study area is also grazed by cattle. The region is mostly shrubless and treeless and is generally characterized by rolling foothills of annual grassland, steeper on the west and gradually flatter toward the east where the terrain slopes toward the floor of the Central Valley. Elevations range from approximately 600 to 1,200 feet above sea level. The study area is within Conservation Zone 6 in the EACCS study area.

Land Cover Types

A *land cover type* is defined as the dominant character of the land surface discernible from aerial photographs, as determined by vegetation, water, or human uses. Land cover types are the most widely used units in analyzing ecosystem function, habitat diversity, natural communities, wetlands and streams, and covered species habitat.

Land cover types within the study area are summarized in Table 3. ICF biologists collected and mapped geospatial land cover data during preparation of the EACCS (ICF International 2010) and used those data for the analyses in the program EIR (Alameda County Community Development Agency 2014). Additional site-specific surveys were completed to confirm the locations of aquatic resources within the study area (Figures 2a–2c). Each land cover type is described below. Representative photographs of land cover types in the study area are provided in Appendix A.

Table 3. Approximate Acreage of Land Cover Types

Land Cover/Habitat Type	Acres
Nonnative annual grassland	2,604.7
Developed/existing infrastructure	54.7
Alkali wetland/drainage	20.1
Vernal pool	0.3
Perennial wetland drainage	9.7
Pond	6.3
Ephemeral drainage	3.7
Canal (aqueducts)	1.0
Total	2,700.5

Wetlands (vernal pool, alkali wetland/drainage, perennial wetland drainage) and nonwetland waters (pond, ephemeral drainage, canal) mapped within the study area are considered potential waters of the United States and waters of the state that would be subject to federal regulations under Clean Water Act Sections 401 and 404 and to state regulation under the Porter-Cologne Water Quality Control Act. In addition, the wetland and nonwetland waters exhibiting a bed and bank would be regulated under California Fish and Game Code Section 1602.

Nonnative Annual Grassland

Nonnative annual grassland, the most common biological community in the delineation area, is an herbaceous community dominated by naturalized annual grasses intermixed with perennial and annual forbs. Annual grassland in the study area commonly exhibits low levels of diversity and is dominated by ripgut brome (*Bromus diandrus*), soft chess brome (*Bromus hordeaceous*), yellow star-thistle (*Centaurea solstitialis*), Italian ryegrass (*Festuca perennis* [*Lolium*] *multiflorum*), and wild oat (*Avena fatua*).

Alkali Wetland/Drainage

Alkali wetlands support ponded or saturated soil conditions and occur as perennial or seasonally wet features on alkali soils. Alkali wetlands occur primarily along stream channels where alkali soils are present. This land cover type occurs along Altamont Creek and in several drainages south of the Alameda/Contra Costa County line and west of Bethany Reservoir.

The vegetation of alkali wetlands is composed of halophytic plant species adapted to both wetland conditions and high salinity levels. The community is dominated almost entirely by saltgrass (*Distichlis spicata*), associated with Baltic rush (*Juncus balticus*) and alkali heath (*Frankenia salina*). Nonnative annual grasses such as sea barley (*Hordeum marinum* subsp. gussoneanum) and soft chess brome are also common associates.

Vernal Pool

The single vernal pool in the study area is in a shallow depression at the top of a hill in the eastern portion of the study area. Remnant vegetation observed during the fall was dominated by popcornflower (*Plagiobothrys* sp.) and woolly marbles (*Psilocarphus brevissimus*).

Perennial Wetland Drainage

Perennial wetland drainages in the study area support emergent wetland vegetation dominated by rabbitsfoot grass (*Polypogon monspeliensis*), watercress (*Nasturtium officinale* [*Rorippa nasturtium-aquaticum*]), saltgrass in shallow water habitats, and narrow leaf cattail (*Typha angustifolia*) in deeper water habitats.

Ephemeral Drainage

Ephemeral drainages occur in low-lying areas and valley bottoms in the study area. Some ephemeral drainages are unvegetated, while others are dominated by nonnative annual grassland species as described above.

Pond

Ponds in the study area are small permanent or seasonal bodies of water that have been constructed for the purposes of retaining runoff water for livestock use. The surface area of these features fluctuates widely throughout the year. In the study area, these features are located in low-lying drainages and valley bottoms, and the vegetation surrounding them is typically dominated by saltgrass and nonnative annual grassland species.

Special-Status Species

Numerous occurrences of special-status plants and wildlife are known from the region surrounding the study area (Figure 4). A summary of special-status plant and wildlife species known or with a potential to occur in the study area are provided below.

Chapter 3.4 of the program EIR describes the life history traits and habitat requirements of the plant and wildlife species discussed below; accordingly, that information is omitted from this report.

Special-Status Plants

Based on a review of the CNDDB and CNPS Inventory, 22 special-status plant species were identified as having the potential to occur in the study area vicinity (Table 1). Grassland and aquatic habitats present in the study area have the potential to support the following 10 special-status plants. The remaining species in Table 1 are not expected to occur in the study area based on the specific microhabitat conditions and geographic range.

- Large-flowered fiddleneck (*Amsinckia grandiflora*)—state- and federally listed as endangered
- San Joaquin spearscale (*Atriplex joaquiniana*)—California Rare Plant Rank (CRPR)[2] 1B.2
- Big tarplant (*Blepharizonia plumosa*)—CRPR 1B.1
- Round-leaved filaree (*California macrophylla*)—CRPR 1B.1
- Lemmon's jewelflower (*Caulanthus lemmonii*)—CRPR 1B.2
- Recurved larkspur (*Delphinium recurvatum*)—CRPR 1B.2
- Diamond-petaled California poppy (*Eschscholzia rhombipetala*)—CRPR 1B.1
- Shining navarretia (*Navarretia nigelliformis* ssp. *radians*)—CRPR 1B.2
- Rayless ragwort (*Senecio aphanactis*)—CRPR 2.2
- Caper-fruited tropidocarpum (*Tropidocarpum capparideum*)—CRPR 1B.1

Four of these species have been previously documented within or adjacent to the study area: San Joaquin spearscale, caper-fruited tropidocarpum, round-leaved filaree, and diamond-petaled California poppy (Figure 4).

[2] CRPR = California Rare Plant Rank.
1B.1 = rare, threatened or endangered in California and elsewhere, seriously endangered in California.
1B.2 = rare, threatened or endangered in California and elsewhere, fairly endangered in California.
2.2 = rare, threatened or endangered in California, but more common elsewhere, fairly endangered in California.

Special-Status Wildlife

Based on a review of the CNDDB (2018), the USFWS species list (U.S. Fish and Wildlife Service 2018), and the EACCS (ICF International 2010), as well as other environmental documents prepared for recent repowering projects near the project area, 29 special-status wildlife species were identified as having the potential to occur in the study area vicinity (Table 2). Numerous other special-status birds may occur in the study area during migration and while foraging, but these species are not addressed in this report because they are not known to nest in the area and thus would only be potentially subject to operational effects.

Grassland and aquatic habitats in the study area have the potential to support the following special-status wildlife species. A description of suitable habitat and likelihood of occurrence in the study area for these species is provided in Table 2 and discussed below.

- Vernal pool fairy shrimp (*Branchinecta lynchi*)—federally listed as threatened
- Vernal pool tadpole shrimp (*Lepidurus packardi*)—federally listed as endangered
- California tiger salamander (*Ambystoma californiense*)—state- and federally listed as threatened
- California red-legged frog (*Rana draytonii*)—federally listed as threatened
- Western pond turtle (*Actinemys marmorata*)—CDFW species of special concern
- San Joaquin coachwhip (*Masticophis flagellum ruddocki*)—CDFW species of special concern
- Blainville's horned lizard (*Phyrnosoma blainvillii*)—CDFW species of special concern
- White-tailed kite (*Elanus leucurus*)—California fully protected
- Northern harrier (*Circus cyaneus*)—CDFW species of special concern
- Swainson's hawk (*Buteo swainsoni*)—state-listed as threatened
- Western burrowing owl—CDFW species of special concern
- Loggerhead shrike (*Lanius ludovicianus*)—CDFW species of special concern
- Tricolored blackbird (*Agelaius tricolor*)—state-listed as threatened
- American badger (*Taxidea taxus*)—CDFW species of special concern
- San Joaquin kit fox (*Vulpes macrotis mutica*)—state-listed as threatened; federally listed as endangered

California red-legged frogs were observed during surveys conducted in 2012 for another wind project in a portion of the study area (ICF International 2013); burrowing owls and foraging golden eagles were observed in the study area during both 2012 and October 2017 surveys.

Several special-status wildlife listed in Table 2—golden eagle (*Aquila chrysaetos*), peregrine falcon (*Falco peregrinus anatum*), California black rail (*Laterallus jamaicensis coturniculus*), pallid bat (*Antrozous pallidus*), and Townsend's big-eared bat (*Corynorhinus townsendii*)—may forage over the study area but are not expected to breed onsite based on the lack of nesting and roosting habitat. The remaining species in Table 3 are not expected to occur in the study area based on the specific microhabitat conditions and geographic range.

Aquatic habitat and special-status wildlife species observations made during the October 25 and 26, 2017, field surveys are depicted in Figures 3a–3c.

Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp

The CNDDB lists no observations of vernal pool fairy shrimp or vernal pool tadpole shrimp within the study area (California Department of Fish and Wildlife 2018), and the study area is not within designated critical habitat for these species. Suitable habitat for vernal pool fairy shrimp and vernal pool tadpole shrimp in the study area consists of alkali wetlands, small seasonal ponds, and a vernal pool (Figures 2a–2c). The closest CNDDB occurrence of vernal pool fairy shrimp is approximately 0.5 mile north of the study area (Figure 4). Based on the presence of suitable habitat in the study area, the potential for vernal pool fairy shrimp or vernal pool tadpole shrimp to occur in the study area is considered to be moderate.

California Red-legged Frog

California red-legged frog was documented in the study area during 2012 surveys conducted for repowering (ICF International 2013). Suitable aquatic breeding habitat in the study area consists of perennial and semi-perennial ponds and perennial wetland drainages. California red-legged frogs may also use alkali wetlands and drainages and ephemeral drainages throughout the study area for dispersal and foraging (Figures 3a–3c). Annual grassland throughout the study area represents suitable upland dispersal habitat for this species. The CNDDB lists multiple occurrences within 2 miles of the study area (Figure 3).

The entire study area is within critical habitat unit ALA-2 for California red-legged frog (75 FR 12816, 12907). Primary constituent elements (PCEs) of designated critical habitat for this species include (1) aquatic breeding habitat (ponds, streams, wetlands); (2) aquatic nonbreeding (e.g., freshwater features not suitable for breeding) and riparian habitat; (3) upland habitats associated with riparian and aquatic habitat that provide food and shelter; and (4) dispersal habitat (i.e., accessible upland or riparian habitat within and between occupied or previously occupied sites that are located within 1 mile of each other, and that do not contain barriers—e.g., heavily traveled roads without bridges or culverts—to dispersal). All four PCEs are present within the study area.

California Tiger Salamander

California tiger salamander has not been previously documented in the study area; however, several ponds and a vernal pool in the study area provide suitable aquatic breeding habitat (Figures 3a–3c). Suitable upland habitat for the species is present in annual grasslands throughout the study area. The CNDDB lists numerous occurrences within 2 miles of the study area (Figure 4). Based on the presence of suitable habitat in the study area and known occupancy in the project vicinity, the potential for California tiger salamander to occur in the study area is considered to be high.

Western Pond Turtle

Where water is present, ponds, ephemeral drainages, and perennial wetland drainages in the study area provide potential aquatic habitat for western pond turtles. If pond turtles are present they could deposit eggs in the nearby grassland habitat. The closest CNDDB occurrence of western pond turtle is approximately 0.5 mile east of the study area (Figure 4). Based on the presence of suitable habitat in the study area and known occupancy in the project vicinity, the potential for pond turtles to occur in the study area is considered to be moderate.

Blainville's Horned Lizard and San Joaquin Coachwhip

Annual grassland in the study area provides suitable habitat for Blainville's horned lizard and San Joaquin coachwhip where substrate conditions exist: friable soils and rocky areas for Blainville's horned lizard and small mammal burrows for San Joaquin coachwhip. Based on the presence of suitable habitat in the study area, the potential for horned lizards and San Joaquin coachwhip to occur is considered to be moderate.

White-tailed Kite and Swainson's Hawk

Suitable nesting habitat for white-tailed kite and Swainson's hawk in the study area is limited to scattered trees along paved roads in the study area and transmission towers. Annual grassland in the study area is densely populated with small rodents (e.g., voles and mice) that provide abundant prey for raptors including Swainson's hawk and white-tailed kite. The closest CNDDB nesting records for Swainson's hawk and white-tailed are approximately 0.25 mile north and east of the study area (Figure 4). Based on the limited availability of nest sites, the potential for white-tailed kite and Swainson's hawk to nest in the study area is considered low; however, there is a high potential for foraging based on the presence of known nests in the project vicinity.

Burrowing Owl

Grasslands throughout the study area provide suitable nesting and wintering habitat for burrowing owls. Burrowing owls were observed in the study area during the October 25 and 26, 2017, field surveys (Figures 3a–3c) and are presumed to be using the study area as wintering grounds. During the surveys, one confirmed nest site was identified adjacent to the vernal pool mapped in the eastern portion of the project area (Figures 3a–3c), based on the presence of numerous owl pellets, white wash, and abundant downy feathers from young.

Loggerhead shrike

Loggerhead shrikes were observed during surveys conducted in 2012 for earlier repowering efforts (ICF International 2013). Nesting habitat is limited to scattered trees and shrubs in the study area. Locally nesting loggerhead shrikes could forage in grassland habitat throughout the study area. Based on the presence of suitable habitat in the study area and known occupancy in the project vicinity, the potential for loggerhead shrikes to occur in the study area is considered to be high.

Tricolored Blackbird

Perennial wetland drainage habitat in the project area provides suitable nesting substrate for tricolored blackbirds where wetland vegetation is dense and extensive. Grasslands and aquatic habitats throughout the study area provide suitable foraging areas. The closest CNDDB nesting records for tricolored blackbird are along Altamont Pass Road and the California Aqueduct, adjacent to the study area (Figure 4). Based on the presence of suitable habitat in the study area and known occupancy in the project vicinity, the potential for tricolored blackbirds to occur in the study area is considered to be high.

American Badger

Grasslands throughout the study area provide suitable habitat for American badger. The CNDDB lists several occurrences within 1 mile north and south of the study area (Figure 4). Based on the

presence of suitable habitat in the study area and known occupancy in the project vicinity, the potential for badgers to occur in the study area is considered to be high.

San Joaquin Kit Fox

The study area is within the northern range of San Joaquin kit fox. Suitable denning, foraging, and dispersal habitat is present in annual grassland throughout the study area, and many burrows sufficiently sized for kit foxes are present. The CNDDB lists several historic records for San Joaquin kit fox within 2 miles of the study area (Figure 4). These observations date from between 1972 and 1998. Since 1998, the population structure of San Joaquin kit fox has become more fragmented, with some resident satellite populations (particularly in the northern range) having been locally extirpated (U.S. Fish and Wildlife 2010:15).

The northern range of San Joaquin kit fox includes a narrow band of habitat along the western edge of the San Joaquin Valley from San Luis Reservoir in western Merced County north to central Alameda and Contra Costa Counties (linkage corridor) that is generally characterized by highly fragmented habitat of low suitability. Based on current habitat conditions, the northern range is unlikely to support a population of San Joaquin kit foxes (Cypher et al. 2013). Evidence indicates that kit foxes north of Santa Nella either occur at extremely low densities or, more likely, are only intermittently present (Constable et al. 2009). Given the low frequency of sightings in the region and the extent of habitat fragmentation between known populations in the southern portion of the species' range and the study area, San Joaquin kit fox has a low likelihood of occupying the study area.

Non-Special-Status Migratory Birds and Raptors

Ground-nesting migratory birds and raptors have the potential to nest and forage in the study area. Tree- and shrub-nesting habitat in the study area is limited; however, electrical towers may provide atypical nesting habitat for migratory birds and raptors. The breeding season for migratory birds and raptors generally extends from February through August, although nesting periods vary by species.

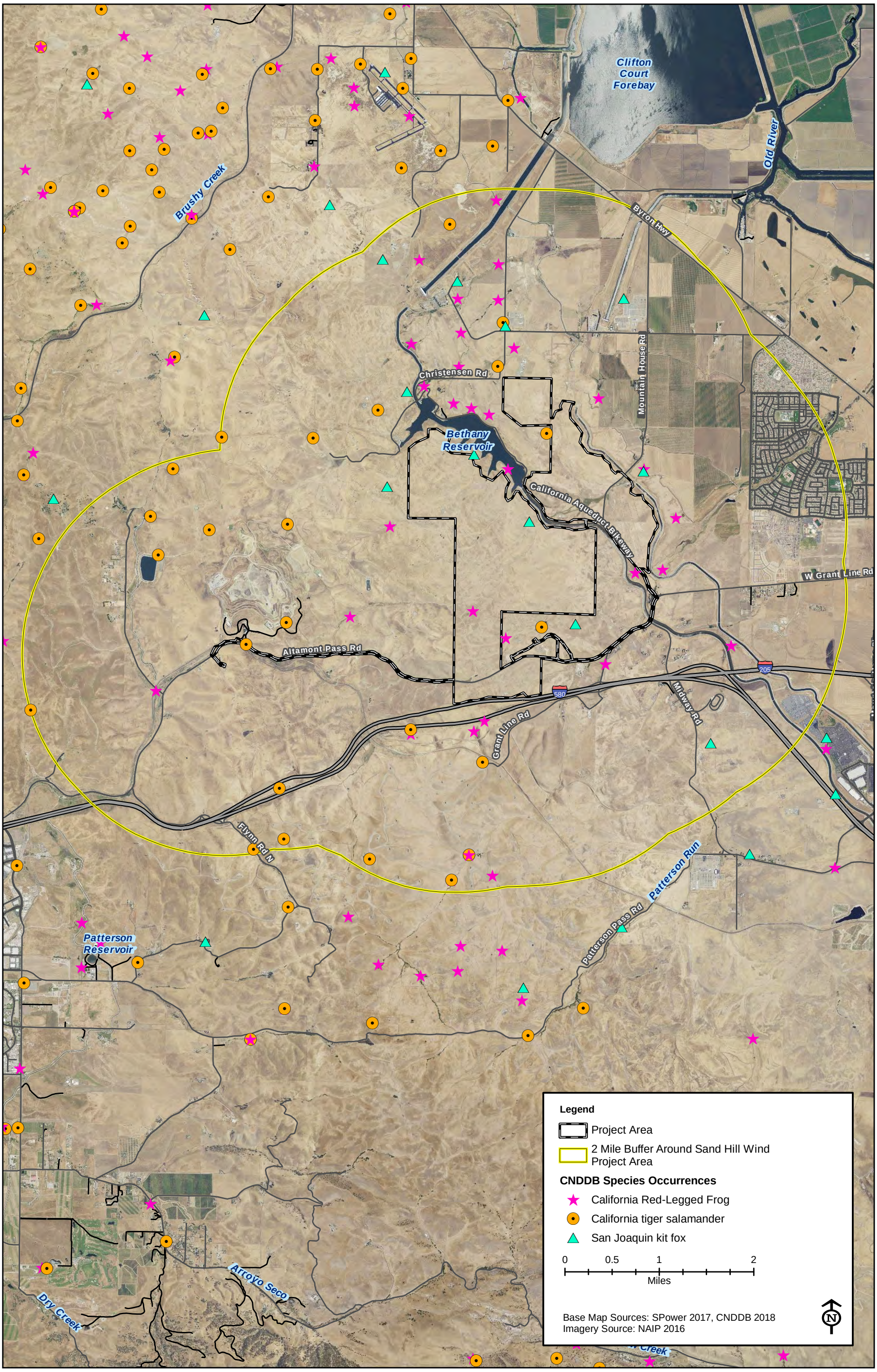

Figure 4
CNDDB Occurrences near the Sand Hill Wind Repowering Project Area

Chapter 4
Effects Analysis

This section assesses the effects on biological resources that could result from construction, maintenance, and decommissioning of the proposed project. A final determination on the potential effects of the proposed project will be made by Alameda County, the lead agency under CEQA.

Impacts of the Proposed Project

The proposed project would primarily affect upland annual grassland habitat in the study area. Proposed project activities would result in a small amount of permanent and temporary impacts on state- and federally regulated aquatic resources. Special-status plant and wildlife species that occupy aquatic and upland habitats in the study area could be directly or indirectly affected by construction and maintenance activities.

Table 4 shows the permanent and temporary impacts of project construction by land cover type. Each of the project layouts would have similar impacts; the layout with the most extensive impacts was used to calculate effects. Table 5 shows the impacts on upland grassland habitat by project component. Overall, a small portion of the site—approximately 8% of the total area—would be disturbed during the construction phase of the proposed project. Less than 1% of the property would be disturbed during O&M activities over the life of the project, and in 35 years, decommissioning activities would entail disturbance of less than 7% of the total area.

Table 4. Land Cover Impacts during Construction (acres)

Land Cover/Habitat Type	Permanent	Temporary	Total
Nonnative annual grassland	23.30	223.50	246.80
Developed/existing infrastructure[a]	N/A	N/A	N/A
Alkali wetland/drainage	0.04	0.42	0.46
Vernal pool	0.00	0.00	0.00
Perennial wetland drainage	0.01	0.09	0.10
Pond	0.00	0.00	0.00
Ephemeral drainage	0.01	0.17	0.18
Canal (aqueducts)[b]	N/A	N/A	N/A
Total	23.36	224.24	247.60

[a] The acreage of impacts on the developed/existing infrastructure land cover type was not calculated because it is not a biological resource.

[b] Surface impacts on canals are not anticipated; gen-tie lines would pass over or under the canal but would not directly contact it.

Table 5. Upland Grassland Habitat Impact Summary for Construction and Maintenance (acres)

Activity	Permanent Impact	Temporary Impact
Construction		
Power collection system installation	0.0	31.5
Gen-tie installation	0.0	15.0
Staging area installation	0.0	34.5
O&M facility installation	2.0	3.0
New access road[a]	10.6	7.6
Access road expansion[a]	7.9	24.3
Turbine foundation installation	2.6	107.0
Meteorological tower installation	0.2	0.6
Subtotal	23.3	223.5
Maintenance		
O&M work (1 acre every 5 years for 30 years) [b]	0.0	6.0
Total	23.3	229.5

[a] Existing access roads would be reused to the extent possible; however, some sections of new access road would be required.

[b] Although the operational period of the project is expected to be up to 35 years, ground-disturbing O&M activities would only occur in operational years 5–30.

As shown in Table 5, repowering would disturb 23.3 acres of upland habitat for 35 years (considered a permanent impact). Repowering and project maintenance would temporarily disturb an additional 229.5 acres of upland habitat. Following the 35-year life of the project, the project components would be decommissioned and removed. Table 6 lists the activities and impacts associated with decommissioning the proposed project.

Table 6. Decommissioning Impacts on Upland Grassland Habitat (acres)

Decommissioning Activity	Permanent Restoration	Temporary Impact
Staging area	0.0	34.5
Power collection system removal[a]	0.0	0.1
Temporary access road expansion[b]	7.9	24.3
New access road removal	10.6	7.6
Turbine foundation removal	2.6	107.0
O&M facility removal	2.0	3.0
Substation removal	0.6	0.2
Total	23.7	176.7

Note: Project decommissioning would entail removal of various project components and restoration of upland habitat following the operational life of the project.

[a] The power collection system, including the gen-tie line, would be mostly buried and would be capped and abandoned in place. Only minor aboveground components would be removed during decommissioning.

[b] Temporary widening of access roads would be necessary to decommission and remove turbines.

Decommissioning would restore 23.7 acres permanently disturbed by repowering and, as shown in Table 5, would temporarily disturb 176.7 acres to accomplish the restoration. All habitat

temporarily disturbed during construction, maintenance, and decommissioning would be reclaimed within 1 year of disturbance, subject to performance criteria and monitoring standards specified in Mitigation Measure BIO-1f (below).

Aquatic Resources

Construction and maintenance activities would not directly affect any ponds or the vernal pool habitat in the study area. Access road expansion and installation of the power collection system and gen-tie line have the potential to affect (permanent and temporary) up to 0.28 acre of ephemeral drainage and perennial wetland drainage habitats and up to 0.46 acre of alkali wetland/drainage. As noted in the project description, HDD may be used to avoid the surface disturbance of some aquatic habitats; however, the exact locations where HDD may be used are not currently known. Consequently, impacts on aquatic habitats are assumed to occur, but may ultimately be less than those described.

Additionally, some activities would have indirect effects (not quantified) on some aquatic habitats through potential changes in hydrology and water quality if the activities are conducted near aquatic habitats. Additional analysis of indirect effects on aquatic habitats for special-status species is presented in the following sections.

Special-Status Species

The following special-status wildlife species are known to occur or have a potential to occur in the project area. Potential impacts on these species are discussed below. Avoidance and minimization measures described below would be implemented prior to, during, and after construction, maintenance, and decommissioning activities to avoid and minimize potential direct and indirect impacts on special-status species.

Impacts on Special-Status Plants

The proposed project has the potential to affect special-status plants that could occur in grassland and aquatic habitats in the study area. Chapter 3 lists 10 special-status plants with a moderate potential to occur in the study area. Four of these species—San Joaquin spearscale, caper-fruited tropidocarpum, round-leaved filaree, and diamond-petaled California poppy—have been previously documented in or adjacent to the study area (Figure 4). Comprehensive botanical surveys have not been conducted for project impact areas and would be necessary to fully determine the presence or absence of special-status plants in such areas.

Impacts on Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp

Based on the known presence of vernal pool fairy shrimp in the vicinity (within 1 mile of the study area), it was determined that vernal pool fairy shrimp and vernal pool tadpole shrimp (collectively referred to as vernal pool branchiopods) may occur in all suitable habitat (alkali wetlands, ephemeral ponds, and vernal pool) within the study area (Figures 2a–2c). Therefore, vernal pool branchiopods could be affected by project activities: construction of new turbines and support structures, maintenance activities, and post-project decommissioning activities.

Project features have been designed to avoid direct impacts on suitable habitat for vernal pool branchiopods (i.e., one vernal pool, five small seasonal ponds, and three small alkali wetlands).

However, because some ground-disturbing activities associated with widening of access roads and installation of new turbine foundations and ancillary structures would be necessary near some of these aquatic features, such activities could indirectly affect vernal pool branchiopods by altering suitable habitat. Construction activities such as excavation, grading, and stockpiling of soil could result in the runoff of sediment, gasoline, oil, or other contaminants into nearby aquatic features, potentially resulting in degradation of water quality in suitable habitat, adversely affecting the survival potential of both the branchiopods and their food resources. The construction of new facilities or improvements to existing roads that impede or alter the flow of stormwater across the study area could also reduce the suitability of vernal pool branchiopod habitat by altering the hydroperiod of those aquatic features.

Indirect effects associated with potential sediment and chemical runoff during construction would be avoided and minimized through implementation of construction BMPs requiring installation of sediment control devices and implementation of a spill response plan.

Impacts on California Tiger Salamander and California Red-Legged Frog

Based on the presence of suitable aquatic and upland habitat for California red-legged frog within the study area and known populations within and adjacent to the study area, there is a potential for California red-legged frogs and California tiger salamanders to be affected by project activities: construction of new turbines and support structures, maintenance activities, and post-project decommissioning activities.

Construction, maintenance, and decommissioning activities such as excavation, grading, and stockpiling of soil and materials could remove or otherwise alter suitable habitat for or result in injury or mortality of California red-legged frogs and California tiger salamanders. Potential direct effects include mortality or injury by equipment, entrapment in open trenches or other project facilities, and entombment of animals in occupied burrows that are covered or filled in.

Proposed project activities would affect upland habitat for California red-legged frog and California tiger salamander. Specifically, all turbine construction activities are within the species' upland dispersal range and would result in impacts on upland habitat. Project activities would have a minor impact on aquatic features in the study area that provide suitable aquatic habitat for California red-legged frog. While construction activities would affect alkali wetlands/drainages and ephemeral drainages where California red-legged frogs may forage and disperse, their potential breeding habitat is primarily found in permanent and semi-permanent ponds and perennial wetland drainages. No permanent or temporary direct impacts on aquatic habitat for California tiger salamander (ponds and a vernal pool) are anticipated. Project impacts on upland habitats associated with construction and maintenance activities and decommissioning activities are summarized in Tables 5 and Table 6, respectively.

Indirect effects on California red-legged frog and California tiger salamander could result from construction-related ground-disturbing activities that degrade nearby aquatic breeding habitat. Exposed soil surfaces left unvegetated have the potential to lead to sedimentation of adjacent aquatic resources that may provide suitable breeding, foraging, and dispersal habitat for these species. Construction activities also have the potential to result in degradation of water quality in these habitats from runoff of petroleum-based products associated with equipment and vehicles used during construction. Because of the limited areal extent of impacts in relation to the size of the

watershed, the project is not expected to significantly increase the amount of impervious surface or to alter local hydrology.

Impacts on Western Pond Turtle

According to current project design, all turbine components and work areas would be located outside suitable aquatic habitat for western pond turtle identified in the study area (perennial wetland drainage and large perennial ponds). However, culvert replacement activities and installation of collection lines may affect a small amount of suitable aquatic habitat (approximately 0.1 acre of perennial wetland drainage). It is expected that if pond turtles are present in these habitats they would voluntarily retreat from areas of human disturbance. While impacts on pond turtles within aquatic habitats would likely be avoided, pond turtles or pond turtle nests in grasslands in proposed work areas near aquatic habitats could be affected by project activities. Nests containing pond turtle eggs could be crushed or individuals could be injured or killed during movement of equipment or excavation and grading activities.

Impacts on San Joaquin Coachwhip and Blainville's Horned Lizard

Construction activities that involve excavation and grading in grassland habitat could crush San Joaquin coachwhips or Blainville's horned lizards if they are present. Individuals could also become entrapped in pits or trenches if these features are left open overnight, or they could be inadvertently injured or killed during the movement of equipment or materials that the reptiles use for shade and refuge.

Impacts on Western Burrowing Owl

Burrowing owls are likely to nest or winter in grasslands throughout the study area and could be directly or indirectly (construction-generated noise and human activities) affected by construction activities: excavation, grading, and culvert replacement. Because burrowing owls are active during the day and fly low to the ground, they could also be struck by vehicles and equipment driving through the work area.

Impacts on Ground-, Shrub- and Tree-Nesting Birds, including Swainson's hawk, White-Tailed Kite, Loggerhead Shrike, and Tricolored Blackbird

Vegetation removal, including initial site grubbing, has the potential to remove active migratory bird nests. Few if any trees or shrubs would be removed by the proposed project; however, grasslands and wetland vegetation have the potential to support ground-nesting bird species, including tri-colored blackbird. Destruction or disturbance of active bird nests could result in the incidental loss of fertile eggs or nestlings. Human presence and noise generated during construction could also disturb birds and raptors nesting near construction activities, potentially leading to nest abandonment, disruption of feeding patterns, or forced fledging of young. Loss of migratory bird eggs, young, or adults that results from construction activities would violate the MBTA and provisions of the California Fish and Game Code.

Impacts on American Badger

American badgers denning in or near active work areas could be killed or injured during excavation or grading activities and could become entrapped in pits or trenches if they are left open overnight.

Impacts on San Joaquin Kit Fox

Annual grassland habitat in the study area provides potential dispersal and denning habitat for San Joaquin kit fox. Although the likelihood of occurrence is very low because the species has not been detected in the vicinity in many years, dispersing San Joaquin kit foxes could travel through or den in the study area at the time of construction, and individuals could be injured or killed if they are encountered in active work areas. Kit foxes could be killed by vehicle collision, could become entrapped in pits or trenches if they are left open overnight, and could be injured during the movement of equipment or materials that kit foxes may use as cover.

Project impacts on upland grassland habitat associated with construction and maintenance activities and decommissioning activities are summarized in Tables 5 and Table 6, respectively.

Avoidance and Minimization Measures

Most of the mitigation measures identified in the program EIR would be applicable to the biological resources present in the Sand Hill project area and would be implemented to avoid, minimize, or compensate for impacts on sensitive biological resources (waters of the United States and state and special-status plants and wildlife) associated with the proposed project. The full text of the measures is available in the program EIR. The applicability of each measure is indicated in Table 7. Although operational impacts are not addressed in this document, it is assumed that all operations-related mitigation would be applicable; accordingly, those measures are included in Table 7.

Table 7. Applicability of Mitigation Measures Presented in the Program EIR

Mitigation Measure	Applicable	Not Applicable
BIO-1a: Conduct surveys to determine the presence or absence of special-status plant species	✓	
BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species	✓	
BIO-1c: Avoid and minimize impacts on special-status plant species by establishing activity exclusion zones	✓	
BIO-1d: Compensate for impacts on special-status plant species	✓	
BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	✓	
BIO-2: Prevent introduction, spread, and establishment of invasive plant species	✓	
BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species	✓	
BIO-3b: Implement measures to avoid, minimize, and mitigate impacts on vernal pool branchiopods and curved-footed hygrotus diving beetle	✓	
BIO-4a: Implement measures to avoid or protect habitat for valley elderberry longhorn beetle		✓
BIO-4b: Compensate for direct and indirect effects on valley elderberry longhorn beetle		✓
BIO-5a: Implement best management practices to avoid and minimize effects on special-status amphibians	✓	
BIO-5b: Compensate for loss of habitat for special-status amphibians	✓	

Mitigation Measure	Applicable	Not Applicable
BIO-5c: Restore disturbed annual grasslands	✓	
BIO-6: Conduct preconstruction surveys for western pond turtle and monitor construction activities if turtles are observed	✓	
BIO-7a: Implement best management practices to avoid and minimize effects on special-status reptiles	✓	
BIO-7b: Compensate for loss of habitat for special-status reptiles	✓	
BIO-8a: Implement measures to avoid and minimize potential impacts on special-status and non–special-status nesting birds	✓	
BIO-8b: Implement measures to avoid and minimize potential impacts on western burrowing owl	✓	
BIO-9: Compensate for the permanent loss of occupied habitat for western burrowing owl	✓	
BIO-10a: Implement measures to avoid and minimize potential impacts on San Joaquin kit fox and American badger	✓	
BIO-10b: Compensate for loss of suitable habitat for San Joaquin kit fox and American badger	✓	
BIO-11a: Prepare a project-specific avian protection plan	✓	
BIO-11b: Site turbines to minimize potential mortality of birds	✓	
BIO-11c: Use turbine designs that reduce avian impacts	✓	
BIO-11d: Incorporate avian-safe practices into design of turbine-related infrastructure	✓	
BIO-11e: Retrofit existing infrastructure to minimize risk to raptors	✓	
BIO-11f: Discourage prey for raptors	✓	
BIO-11g: Implement postconstruction avian fatality monitoring for all repowering projects and implement adaptive management measures as necessary	✓	
BIO-11h: Compensate for the loss of raptors and other avian species, including golden eagles, by contributing to conservation efforts	✓	
BIO-11i: Implement an avian adaptive management program	✓	
BIO-12a: Conduct bat roost surveys		✓
BIO-12b: Avoid removing or disturbing bat roosts		✓
BIO-14a: Site and select turbines to minimize potential mortality of bats	✓	
BIO-14b: Implement postconstruction bat fatality monitoring program for all repowering projects	✓	
BIO-14c: Prepare and publish annual monitoring reports on the findings of bat use of the project area and fatality monitoring results	✓	
BIO-14d: Develop and implement a bat adaptive management plan	✓	
BIO-14e: Compensate for expenses incurred by rehabilitating injured bats	✓	
BIO-15: Compensate for the loss of alkali meadow habitat	✓	
BIO-16: Compensate for the loss of riparian habitat		✓
BIO-18: Compensate for the loss of wetlands	✓	

Chapter 5
References Cited

Alameda County Community Development Agency. 2014. *Altamont Pass Wind Resource Area Repowering Final Program Environmental Impact Report*. State Clearinghouse #2010082063. October. (ICF 00323.08.) Hayward, CA. With technical assistance from ICF International, Sacramento, CA.

Alphabiota Environmental Consulting, LLC. 2013. Focused Spring Botanical Survey for the Sand Hill Project – A New Dimensions Energy Project. Squaw Valley, CA. May.

California Department of Fish and Game. 1994. *Staff Report Regarding Mitigation for Impacts to Swainson's Hawk (*Buteo swainsoni*) in the Central Valley of California*. Sacramento, CA. November 1.

———. 2003. *Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander*. Sacramento, CA. October.

———. 2009. P*rotocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities*.

———. 2012. *Staff Report on Burrowing Owl Mitigation*. State of California Natural Resources Agency. March 7.

California Department of Fish and Wildlife. 2018. *California Natural Diversity Database*, RareFind 5, July 2018. Search of the Midway and Clifton Court Forebay USGS 7.5-minute Quadrangles and 10 surrounding quadrangles. Sacramento, CA.

Constable, J. L., B. L. Cypher, S. E. Phillips, and P. A. Kelly. 2009. *Conservation of San Joaquin Kit Foxes in Western Merced County, California*. May 13. California State University, Stanislaus. Fresno, CA.

Cypher. B. L., S. E. Phillips, and P. A. Kelly. 2013. Quantity and Distribution of Suitable Habitat for Endangered San Joaquin Kit Foxes: Conservation Implications. *Canid Biology & Conservation* 16(7):25–31. California State University, Stanislaus. Turlock, CA.

Environmental Laboratory. 1987. *U.S. Army Corps of Engineers Wetlands Delineation Manual.* (Technical Report Y-87-1.) Vicksburg, MS: U.S. Army Waterways Experiment Station.

ICF. 2018. *Sand Hill Wind Repowering Project Aquatic Resources Delineation Report*. Draft. June. (ICF 00631.17.) Sacramento, CA. Prepared for Sand Hill Wind, San Francisco, CA.

ICF International. 2013. *Biological Resources Technical Report for the Sand Hill Project*. February. (ICF 00456.12.) Sacramento, CA. Prepared for FloDesign Wind Turbine Corporation, Waltham, MA.

———. 2012. *California Tiger Salamander and California Red-legged Frog Habitat Site Assessment for the Sand Hill Wind Project, Alameda County*. December. (ICF 00456.12.) Sacramento, CA. Prepared for FloDesign Wind Turbine Corporation, Waltham, MA.

———. 2010. *East Alameda County Conservation Strategy*. Final. October. (ICF 00906.08.) San Jose, CA. Prepared for East Alameda County Conservation Strategy Steering Committee, Livermore, CA.

Lichvar, R. W., and S. M. McColley. 2008. *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual.* Available: http://www.spk.usace.army.mil/Portals/12/documents/regulatory/pdf/Ordinary_High_Watermark_Manual_Aug_2008.pdf.

U.S. Army Corps of Engineers. 2005. *Ordinary High Water Mark Identification (Regulatory Guidance Letter No. 05-05).* December 7, 2005.

———. 2008. *Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Arid West Region (Version 2.0)*. Eds. J. S. Wakeley, R. W. Lichvar, and C.V. Noble. ERDC/EL TR-08-28. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

U.S. Fish and Wildlife Service. 2002. *Draft Recovery Plan for Chaparral and Scrub Community Species of San Francisco Bay, California*. November. Portland, OR.

———. 2005. *Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog*. Sacramento, CA.

———. 2010. *San Joaquin Kit Fox (*Vulpes macrotis mutica*) 5-Year Review: Summary and Evaluation*. Sacramento, CA: Sacramento Fish and Wildlife Office.

———. 2011. *U.S. Fish and Wildlife Service Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox Prior to or During Ground Disturbance*. Sacramento, CA: Sacramento Fish and Wildlife Office. January.

———. 2018. *IPaC Trust Resource Report. List of Federal Endangered and Threatened Species That Occur in or May Be Affected by the Project*. Available: <http://www.fws.gov/sacramento/es_species/Lists/es_species_lists.cfm>. Assessed January 2018.

Appendix A
Representative Photographs

Photo 1. Rolling hill grassland habitat

Photo 2. Existing gravel access road along western boundary of study area *(location of proposed operations and maintenance building adjacent to road on right side of photo)*

Graphics ... 00631.17 (5-15-2018) TG

Photo 3. Small pond adjacent to existing access road

Photo 4. Unvegetated stock pond

Graphics ... 00631.17 (5-15-2018)TG

Photo 5. Pond known to support California red-legged frog

Photo 6. Vernal pool

Graphics ... 00631.17 (5-15-2018)TG

Photo 7. Alkali wetland drainage

Photo 8. Ephemeral drainage

Photo 9. Perennial wetland drainage *(center)* and alkali wetland *(foreground)*

Photo 10. Burrowing owl nest location

Graphics ... 00631.17 (5-15-2018)TG