ATTACHMENT A1: PROJECT DESCRIPTION

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TABLE OF CONTENTS

FIGURES

TABLES

ACRONYMS AND ABBREVIATIONS

APWRA	Altamont Pass Wind Resource Area
BMP	Best Management Practices
Caltrans	California Department of Transportation
CDA	Community Development Agency
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
County	Alameda County
CUP	Conditional Use Permit
CUPA	Certified Unified Program Agency
EPC	Engineering, Procurement and Construction
FPEIR	Final Program Environmental Impact Report
FSEIR	Final Supplemental Environmental Impact Report
HMBP	Hazardous Materials Business Plan
kV	kilovolt
MW	megawatt
O&M	Operations and Maintenance
PCB	Polychlorinated Biphenyls
PG&E	Pacific Gas and Electric
PRD	Permit Registration Document
QA/QC	quality assurance/quality control
SMARTS	Stormwater Multiple Application and Report Tracking System
SPCC	Spill Prevention, Control, and Countermeasures
SWPPP	Stormwater Pollution Prevention Plan
TMP	Traffic Management Plan
USFWS	United States Fish and Wildlife Service

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A1 PROJECT DESCRIPTION

1.0 PROPOSED PROJECT

Altamont Winds, LLC (Applicant) proposes to develop the Summit Wind Repower Project (Project) in unincorporated eastern Alameda County, California. The Project is described in detail below. In general, development activities will be the same as those described in the October 2014 *Final Program Environmental Impact Report for the Altamont Pass Wind Resource Area* (State Clearinghouse No. 2010082063) that was certified on November 12, 2014 (FPEIR). Section 2.5, "Proposed Repowering"; provides a detailed description of these activities and is therefore not repeated here. However, discussion is provided, where necessary, to describe specific design, siting, or potential impact mechanisms that are not described in the FPEIR. Where project-level design has not been completed, project-related metrics (e.g., areas of disturbance associated with specific types of activities) will be based on the Golden Hills North Project, located in the southern, Alameda County, portion of the Altamont Pass Wind Resource Area (APWRA).

The Project will repower the decommissioned site of an existing wind energy facility. Within the Project footprint, 569 wind turbine generators and foundations will be removed. Up to 33 new wind turbine generators are proposed to be installed, with an alternate location for one wind turbine generator (20a) for a total of 34 proposed wind turbine generator sites. The proposed Project would result in a net reduction of 536 wind turbine generators and foundations. The Project will continue transmitting energy from the site to the regional power grid and will maximize renewable energy production by replacing the aging infrastructure with newer, more efficient wind turbine generators. The proposed project area, along with the existing and proposed turbine layouts, is shown in Figure A1.1-1. The proposed turbine layout shows 33 wind turbine generators with an alternate location for one wind turbine generator (20a) for a total of 34 proposed wind turbine generator sites.

1.1 Environmental Setting

Existing conditions for the Program Area are detailed in Section 3 of the FPEIR. The project area extends over approximately 3,469 acres of grassland north of I-580 in Alameda County, and it consists of cattle-grazed land on which operating wind turbines are currently, or previously have been, installed.

1.2 Project Location and Land Ownership

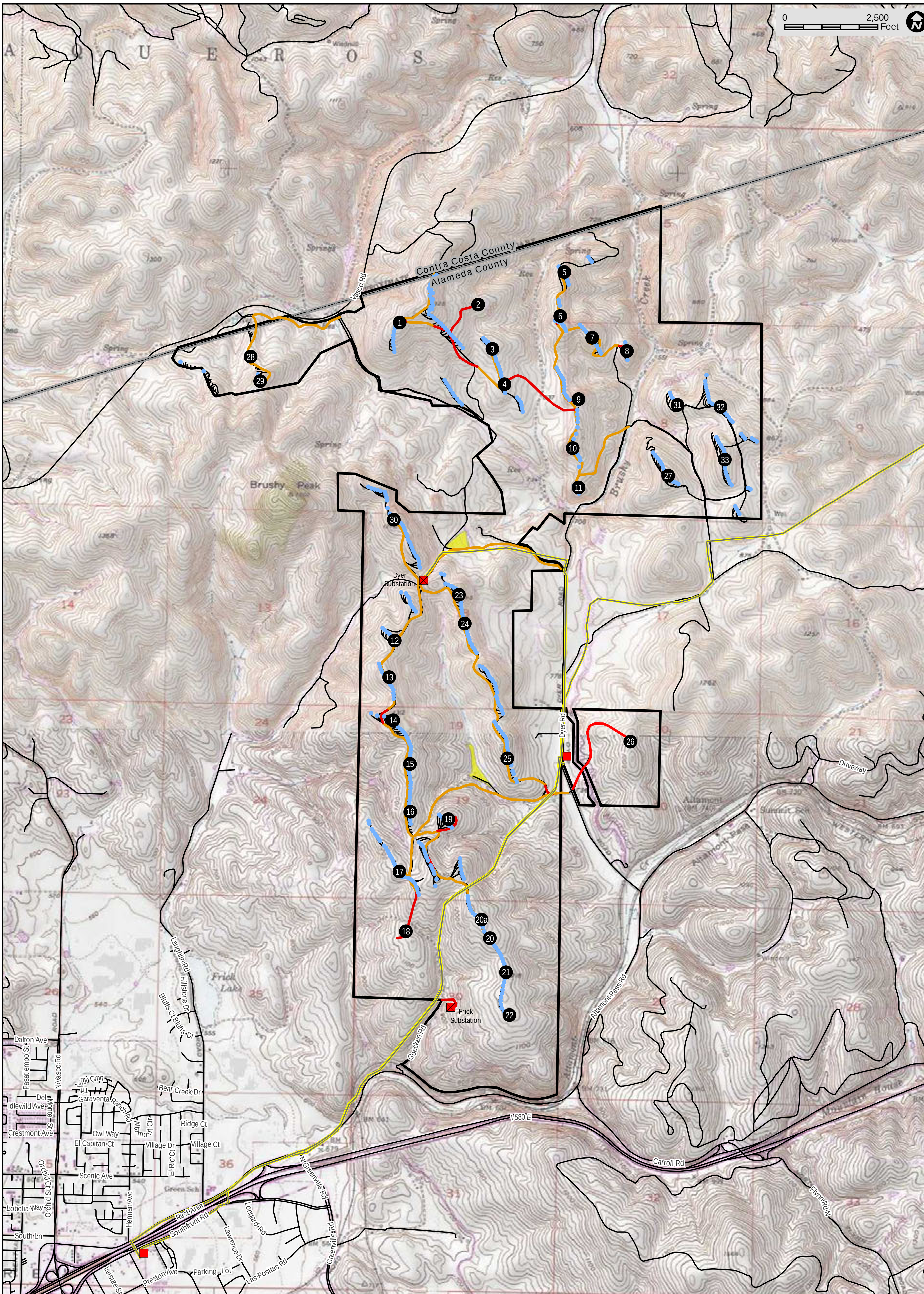
The project area is located in the northwestern portion of the 50,000-acre APWRA, generally east of the Brushy Peak Regional Preserve, south of the Alameda County-Contra Costa County border, and west of Dyer Road, and north of Interstate 590 (I-590). Access to the Project will be available through existing private gates and roads emanating off of Vasco Road, Dyer Road, and Altamont Pass Road, all north of I-580.

The Project will be constructed entirely on private land which is leased under long-term agreements with up to eight landowners possessing 17 parcels (refer to Table A1.1, Project Landowners Parcels and Area).

TABLE A1.1 PROJECT LANDOWNERS, PARCELS AND AREA (ACRES)

PROPERTY OWNERS	ASSESSOR PARCEL NUMBERS	ACRES
Costa	99B-5680-15	207.12
Dunton	99B-5680-1	330.46
DeVincenzi	99B-5610-1, 99B-6075-3, 99B-6051-2, 99B-6051-1 and 99B-6051-9	813.19
Egan	99B-6125-3	160.47
Elliot	99B-6125-4	157.54
Jackson	99B-6125-5	325.59
Rooney	99B-6125-2	160.21
Walker	99B-6100-2-10, 99B-6100-2-11, 99B-6100-2-12, 99B-6100-3-10, 99B-6100-3-11, 99B-and 99B-6100-3-15	1,314.55
	Total Project Area	3,469.13

If Alameda County (County) approves the proposed Project, by approving the Conditional Use Permit (CUP), the existing easement between the Applicant and each landowner will be revised and formalized to identify the final location of proposed project components. The creation and modification of these landowner agreements to accommodate the proposed Project is not subject to California Environmental Quality Act (CEQA) requirements.



Legend

- Summit Wind Repower Turbine Location
- Existing Altamont Wind Turbine Location
- Project Boundary
- O&M Area
- Existing Road
- Existing Road - Upgraded
- New Road
- PG&E Substation
- Wind Project Substation
- Existing PG&E Transmission Line
- County Boundary

FIGURE A1.1-1
SUMMIT WIND
PROJECT LAYOUT

ALTAMONT WINDS LLC
PROPOSED SUMMIT WIND
REPOWER PROJECT
ALAMEDA COUNTY, CA

Source: ArcGIS USA Topo Maps, accessed 2015.

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2.0 EXISTING FACILITIES

The County of Alameda Community Development Agency (County CDA) previously analyzed operation of the applicant's wind farm facilities with proposed modifications to the 16 existing CUPs in the Final Environmental Impact Report (FEIR) that was certified in July of 2013 (for the proposal to operate through the fall of 2015 without phased decommissioning). The County CDA subsequently evaluated additional modifications to the permits in a Supplemental Environmental Impact Report (SEIR, State Clearinghouse No. 2014092057) that was certified May 2015 (*86MW Altamont Wind Farms Final SEIR* [FSEIR]), for CUP Extension through October 2018. Major project components of existing operations were detailed in Section 2.4 of the FSEIR document.

The existing wind turbines, of various models, are characterized by hub heights of 18–24 meters (60–80 feet) and a rotor diameter of 18 meters (59 feet). The existing wind turbine foundations are concrete piers or pads with approximately 10 feet of drain rock placed around each foundation. The existing underground electricity collection system will remain in place and will not be excavated.

The Project will continue transmitting energy from the site to the regional power grid and will maximize renewable energy production by replacing the aging infrastructure with newer and more efficient wind turbine generators. The proposed project area, along with the existing and proposed turbine layouts, is shown on Figure A1.1-1.

Existing roads and other disturbed areas not needed for the proposed Project's new turbines will be decommissioned, contour graded, stabilized, and reseeded with an appropriate seed mixture to maintain slope stability. Temporary erosion control measures during turbine installation will be implemented to maintain topsoil and re-vegetation, as necessary.

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3.0 PROPOSED PROJECT CHARACTERISTICS

The Project will install up to 33 new wind turbine generators with an aggregate nominal nameplate capacity of 54 megawatts (MW). The specific equipment chosen for the proposed Project will depend on the final micrositing and the nominal nameplate capacity of the wind turbine generators selected.

3.1 Wind Turbines

The Project will select a turbine with characteristics similar to those of the Suzlon S97 model: a 2.1 MW turbine with a hub height of 90 meters (295 feet), a rotor diameter of 97 meters (318 feet), a total height of 138.5 meters (454 feet), and a minimum distance from ground to rotor tip at 6:00 position of 41.5 meters (136 feet).

3.2 Foundations

Once the roads have been constructed or upgraded, turbine foundations will be constructed. A site-specific geotechnical investigation and the associated report will be prepared to identify the appropriate turbine foundation design as discussed in Mitigation Measure GEO-1 of the FPEIR, the APWRA FPEIR Implementation Checklist, and the Checklist Supporting Document for the Summit Wind Repower Project located in Attachment A2. A geotechnical investigation report will be performed and report submitted to the County prior to start of project construction. Pending completion of the geotechnical analysis, each foundation is expected to require an excavation of up to 18 meters (60 feet) in diameter with foundations constructed of steel-reinforced concrete. Concrete for the foundations will be transported using concrete trucks. A rectangular gravel crane pad area of approximately 20 by 40 meters (65 by 130 feet) will be developed at the base of each tower.

3.3 Access Road Improvements

Turbine transport involves uniquely large equipment and crane specifications that dictate special road width and turning radii. To allow safe passage of the large transport equipment used in grading and construction, all-weather gravel roads will be built with adequate drainage and compaction to accommodate such vehicles. The proposed road construction described below is designed to minimize disturbance, avoid sensitive resources, and maximize transportation efficiency.

After sensitive areas have been identified and marked, initial grading of access roads and interior project roads will commence. The proposed permanent gravel roads will be constructed as described below. Cut materials will be used as fill onsite; no material will be disposed of offsite. General cut-and-fill slopes will be established at a 2:1 ratio. The final location of the road and the cut-and-fill volumes will be based on grading, construction, environmental permitting requirements, topography, and sound engineering principles. The construction-related assumptions for roads are described below.

3.3.1 Interior Project Roads

The Project will involve construction of about 104,000 linear feet of roadways. Interior project roads will have temporary construction widths up to 52 feet – a maximum 40-foot width plus two 6-foot shoulders. Following construction of the Project, the permanent access roads will be finalized (see below); temporarily disturbed shoulders and passing areas will be reclaimed. To the greatest extent possible, the new roadway system will be designed to limit disturbance and avoid sensitive resources. The proposed project’s interior road system will follow existing roadway alignments where possible, but grade adjustments, as required by the turbine manufacturers, will be made in many locations to accommodate maximum grades. The maximum road grade on access roads used during construction will be approximately 10%.

Temporary passing areas will be provided along one-way roadways at approximately every 2,500 feet to facilitate safe passing of traffic through the site interior. Up to 50% of the turnout areas developed during construction will be maintained to support safe passing for subsequent Operations and Maintenance (O&M) traffic on the interior road system. The remaining turnouts and turnaround areas will be reclaimed and temporary shoulder areas will be restored. Temporarily disturbed areas will be restored in accordance with the proposed project's reclamation plan and with all relevant permit conditions.

Drainage culverts (new or upgrade of existing) will be installed (or removed) in accordance with County standards. Primarily, these culverts will be installed to divert water away from areas where drainage swales intersect with roadways, thus preventing high stormwater flows from crossing road surfaces.

3.3.2 Post-construction Project Road Conditions

Final road shaping will be completed to ensure proper water flow away from cut-and-fill slopes and into ditches and culverts. Erosion control devices also will be installed or completed, disturbed areas adjoining the roads will be restored, and the appropriate erosion control devices will be installed.

Following construction and depending on whether roads will be needed to provide access for O&M, roads will be left in place or restored in conformance with County standards. Roads left in place will be inspected and graded where low spots and ruts have formed. Culverts will be left in place and road edges will be restored.

3.3.3 Improvements at Local Access Roads

Proposed project ingress/egress to the site will be via Vasco Road, Dyer Road, and Altamont Pass Road, all north of I-580. Vasco Road crosses Contra Costa County for a short distance, and Project access would occur along this section. Improvements to roads in Contra County have previously occurred during the development of the Golden Hills North Project will remain in place will provide access for the Project.

The existing roadway system primarily consists of gravel access roads up to 16 feet wide. To the extent possible, existing roads will be used for proposed Project construction and operations. All-weather gravel roads will be built with adequate drainage and compaction to accommodate equipment transport vehicles. Improvements will require the widening of roadways outlined above to provide additional shoulder and lane widths. Minor drainage improvements will be required to adjust existing drainage inlets to grade and provide roadside ditches.

All road improvements will be designed according to Alameda County design standards. Preliminary design for the project ingress and egress points will be provided to the Alameda County Public Works Department. Encroachment permits for minor roadway improvements, if required, will be needed from the Alameda County Public Works Department and will be designed to meet Alameda County Design Standards and California Department of Transportation (Caltrans) Highway Design Manual Standards, as applicable). An encroachment permit for improvements within the public right-of-way falling within Alameda County will be needed, and the Alameda County Public Works Department will conduct design review of the proposed improvements.

After construction, the permanent access roads will be reduced in width to 25 feet and the remaining disturbed area will be reclaimed. Temporarily disturbed areas will be reclaimed as determined through consultations with United States Fish and Wildlife Service (USFWS), California Department of Fish and Wildlife (CDFW), and the County. Erosion control devices will be installed or completed.

Drainage culverts will be installed or removed as appropriate in accordance with Alameda County standards to prevent high stormwater flows from crossing road surfaces.

The Applicant will repair, repave, or reconstruct those portions of existing County roads damaged during construction in accordance with applicable design standards agreed upon prior to beginning construction.

3.4 Power Collection System

3.4.1 Collection Lines

The power collection system will consist of medium-voltage, high-density, insulated underground cables that will connect the turbines to the onsite substation. The underground collection cables are usually buried in trenches adjacent to the roadbed of the interior access roads. Communication lines will be installed in the same trenches. No existing collection lines will be used.

Trenching equipment will be used to excavate trenches in or near the access roadbed to allow installation of the insulated underground cables and will connect each turbine to the substation. The trenches typically will be 12–24 inches wide and 48 inches deep; however, the depth and number of trenches will be determined, ultimately, by the size of the cable required and the thermal conductivity of the soil or rock surrounding the trench. The large conductor cables will be placed within the trenches, packed in sand or native materials (depending on the soil properties), and covered to protect the cables from damage or possible contact. Optical fiber communication links and communication lines for turbine performance remote-sensing equipment will be placed in the same trenches as the conductor cables.

In locations where two or more sets of underground lines converged, pad-mounted switch panels will be used to tie the lines together into one or more sets of larger feeder conductors. The accumulated cables from the individual arrays will be spaced 10 feet apart on either side of the road system to the onsite substation. The locations of the buried infrastructure will be recorded in as-built project diagrams and will be developed at the end of the construction period. A significant portion of the underground collection cables will be installed parallel to and within the footprint of areas temporarily disturbed by road construction. Therefore, installation of the collection system is only expected to result in minimal additional permanent surface disturbance. Installation will result in an estimated 14.3 acres of temporary disturbance.

3.4.2 Collector Substation

The main functions of a collector substation are to step up the voltage from the 34.5 kilovolt (kV) collection lines to the 60 kV 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 an overhead lightning-suppression conductors. The main outdoor electrical equipment and control house are installed on a concrete foundation.

The existing onsite substations (Dyer Substation and Frick Substation) serve as the collector substations for the existing windfarm. The 0.25 acre Dyer Substation and the 0.25 acre Frick Substation and existing lighting will be replaced by another or others in the same general location. The substation will consist of a graveled footprint area of approximately 2 acres, a 12-foot chain-link perimeter fence, and an outdoor lighting system. The new lights will be shielded or directed downward to reduce glare. These lights will remain on from dusk to dawn. Construction of the substation will entail a total disturbance area of up to 6 acres. Of these 6 acres, 3 acres will be disturbed temporarily during construction and will be restored after construction is complete. The remaining 3 acres will be permanently disturbed.

3.5 Meteorological Towers

The proposed project will entail construction of up to three permanent meteorological towers at hub height (90 meters or 295 feet) and distributed through the project area to monitor weather conditions and wind speed. Each freestanding (without supporting guy wires) tower will be mounted on a circular pier or slab foundation surrounded by a circular area of gravel to a radius of about 15 feet.

3.6 Operations and Maintenance Facilities and Other Project Elements

Up to four portable toilets will be maintained year-round onsite and serviced by a contractor. No other water, wastewater, or sewer/septic systems will be present at the existing windfarm, and no changes to the existing water, wastewater, or sewer/septic system will be proposed to support the proposed project.

4.0 PROJECT CONSTRUCTION

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

4.1 Schedule

Proposed project construction will proceed after all construction-related permits are issued. These activities are anticipated to proceed according to the phases outlined in the FPEIR, Section 2.5.3, Repowering Activities. Construction-related Best Management Practices (BMPs) will be implemented during the November–April wet season. The final approved work hours will be specified in the proposed project's CUP.

4.2 Workforce

Based on data provided for typical wind energy projects of similar size, approximately 33 workers will need to be employed to decommission the existing wind farm. On average, approximately 123 workers will be employed during construction, with a peak workforce of 184. Craft workers will include: millwrights, iron workers, electricians, equipment operators, carpenters, laborers, and truck drivers. Local construction contractors and suppliers will be used to the extent possible.

4.3 Construction Equipment and Ancillary Construction Facilities

The types of equipment listed in FPEIR, Section 2.5.3, Repowering Activities, will be used during the various stages of decommissioning and construction. On average, all equipment is assumed to operate for approximately 10 hours per day. The probable fuel type is diesel.

4.3.1 Portable Rock Crusher

To construct and improve proposed project roads, a rock crusher will be required to provide appropriately sized aggregate for fill and road base. In accordance with BMPs, the rock-crushing area will be sprayed by a water truck to suppress dust. The crusher proposed for this project incorporates several dust-suppression features, including screens and water spray. Dust-control measures, such as exposed surface watering and the covering of loose hauled materials, will be used at all emission points during operation, including startup and shutdown periods, as required.

4.3.2 Equipment Maintenance

During construction, refueling and maintenance of equipment and vehicles that are authorized for highway travel will be performed offsite at an appropriate facility. Equipment and vehicles that are not highway authorized will be serviced on site by a maintenance crew using a specially designed vehicle maintenance truck.

4.4 Staging and Laydown Areas

The proposed project includes construction staging areas (for storage of project components and equipment) and additional laydown areas at each turbine location (for offloading and storage of the tower components). These areas are indicated as *O&M Area* on Figure A1.1-1

4.4.1 Construction Staging Areas

Temporary staging areas (indicated as *O&M Area* on Figure A1.1-1) will be used during construction. It is anticipated that up to six staging areas, ranging from 1.7 to 7.0 acres (average 3.4 acres), will be used for the storage of turbine components, construction equipment, office trailers, and other supplies, including hazardous materials. Trailers will be placed at the staging areas to support workforce needs and site security. The trailers will also house a first aid station, emergency shelter, and hand tool storage area for the construction workforce. Vegetation will be cleared and each construction staging area will be graded to be level. Then, it will be covered with a 4-inch gravel surface and appropriate erosion control device (e.g., earth berm, silt fences, straw bales) will be installed to manage water runoff. Diversion ditches will be installed, as necessary, to prevent stormwater from running onto the site from surrounding areas. Following completion of construction activities, the contractor will restore the temporary construction staging areas. The gravel surface will be removed and the areas will be contour graded (if necessary and if environmentally beneficial) to conform to the natural topography, stockpiled topsoil will be replaced, and the area will be stabilized and reseeded with an appropriate seed mixture.

4.4.2 Laydown Areas

A laydown area will be constructed at each new turbine pad to accommodate offloading and storage of the tower sections, nacelle, rotor hub, and blades, as well as some construction equipment. Each laydown area will occupy approximately 0.5 acre. The laydown areas will include a compacted, gravel-surfaced crane pad within the 0.5-acre area. The crane pad will be approximately 65 feet wide (adjacent to the turbine access road) to allow a large track-mounted crane to access the turbine foundations. The laydown areas must be level or nearly level to allow the crane to lift the large and heavy turbine components safely, and vegetation clearing and/or grading will be necessary. The crane pad will be constructed using standard cut-and-fill road construction procedures. The laydown areas will generally be circular. The actual dimensions of the individual laydown areas will be based on site topography and the need to minimize cut and fill.

4.5 Hazardous Materials Storage

Hazardous materials, such as turbine gear lubricant, will be stored at one of the staging areas. To minimize the potential for harmful releases of hazardous materials through spills or contaminated runoff, these substances will be stored within secondary containment areas in accordance with federal, state, and local requirements and permit conditions. Storage facilities for petroleum products will be constructed, operated, and maintained in accordance with the Spill Prevention Control and Countermeasures (SPCC) Plan that will be prepared and implemented for the proposed project (Code of Federal Regulations [CFR], Title 40, Part 112). The SPCC Plan will specify engineering standards (for example, secondary containment), administrative standards (e.g., training with special emphasis on spill prevention, standard operating procedures, and inspections), and BMPs.

A Hazardous Materials Business Plan (HMBP) will be developed for the proposed project. The HMBP will contain specific information regarding the types and quantities of hazardous materials, as well as their production, use, storage, spill response, transport, and disposal.

4.6 Traffic and Parking

A Traffic Management Plan (TMP) has been prepared for the proposed project (See Attachment A9) to reduce hazards that will result from the increased truck traffic, and to ensure that traffic flow on local public roads and highways will not be adversely. The TMP will incorporates measures such as informational signs, traffic cones, and flashing lights to identify any necessary changes in temporary land configuration. Flaggers with two-way radios will be used to control construction traffic and reduce the potential for accidents along roads. Speed limits will be set commensurate with road type, traffic volume, vehicle type, and site-specific conditions as necessary to ensure safe and efficient traffic flow. Onsite construction traffic will be restricted to the roads developed for the proposed project. Use of existing unimproved roads will be restricted to emergency situations.

Preconstruction decommissioning activities and delivery of construction materials and equipment will require approximately 10,087 fully loaded inbound trips of large trucks to the site from offsite sources, for a total of up to 20,174 inbound and (empty) outbound truck trips associated with the proposed project. It is estimated that up to 550 of these trips will include oversized vehicles delivering wind turbine generator and substation materials, heavy equipment, and other construction-related materials. Construction of the proposed project components (roads, turbines, substation, and electrical/communication lines) will occur at about the same time, using individual vehicles for multiple tasks. Based on data provided for typical similarly sized wind energy projects, it is anticipated that during the construction period, there will be approximately 37 daily round trips by vehicles transporting construction personnel to the site. Assuming that construction material deliveries from external sources will occur over the 8-month construction period at 20 workdays per month, an average of about 49 one-way truck trips per day (that is, 24.5 trucks generating one trip to the proposed project site and one trip from the site) will be added to background traffic volumes on area roadways. In addition to these large truck loads, dump trucks, concrete trucks, water trucks, cranes, and other construction and trade vehicles operating within the Project area will entail more than 7,330 truck trips.

Construction-related parking will be located in construction staging areas. Carpooling from a location within 10 miles of the site, other than the O&M facility, will also be used.

After construction, O&M of the proposed project will require approximately five round trips per day using pickups or other light-duty trucks.

4.7 Water and Wastewater Requirements

Water for project construction activities will be provided through an agreement with municipal or private suppliers. Temporary onsite water tanks and water trucks will be made available for fire water support, dust suppression, and construction needs. One or more 3,500-gallon tanks or other means of fire water support will be subject to approval by the County.

During construction of the Project, up to 31 million gallons of water will be used for dust control on roads and during grading and site work, as well as for mixing with cement and aggregate to form concrete. Daily water use will vary, depending on the weather conditions and time of year, which affect the need for dust control. Hot, dry, windy conditions will necessitate greater amounts of water. Tanker trucks will apply water to construction areas where needed to aid in road compaction and reduce construction-generated dust.

A minimal amount of water will be required for construction worker needs (drinking water, sanitation facilities). This water will be trucked in or delivered as bottled drinking water. A local sanitation company will provide and maintain appropriate construction sanitation facilities. Portable toilets will be placed at each of the crane assembly areas, the substation, and the trailer pad area. When necessary, additional facilities will be placed at specific construction locations.

Appropriate BMP training will be provided to truck operators to prevent runoff from dust suppression and control activities. Water used for cement mixing and truck washing will be managed in accordance with applicable permit conditions (and BMPs) and will not be discharged offsite.

4.8 Demarcation of Sensitive Resources

Sensitive resources adjacent to and within construction areas will be marked to ensure adequate avoidance. Prior to construction, a biological resource monitor, the construction contractor, and any subcontractors will conduct a walk-through of the areas to be affected, or potentially affected, by construction activities. Sensitive areas will be staked and flagged as detailed in Mitigation Measure BIO-1b. The preconstruction walk-throughs will be conducted regularly to identify sensitive resources to be avoided, limits of clearing, location of drainage features, and the layout for sedimentation and erosion control measures. Following identification of these features, specific construction measures will be reviewed, and any modifications to construction methods or locations will be agreed upon before construction could begin. Resource agency representatives from the CDFW will be consulted or included on these walk-throughs as needed.

4.9 Materials and Services

Approximately 123,000 cubic yards of aggregate will be brought onto the proposed project site for roadway construction, turbine foundations, and the onsite substations.

4.10 Estimated Ground Disturbance

Temporary and permanent ground disturbance will result from project construction, operation, and maintenance activities. Table A1.2 details Project impact calculations based on activity and disturbance type assumptions described Section 3.0 and the installation of 34 Suzlon S97 2.1 MW wind turbine generators (including alternate wind turbine generator 20a). Refer to Figure A1.1-1 for location of project features.

TABLE A1.2 PROJECT GROUND DISTURBANCE

PROJECT FEATURE	TEMPORARY DISTURBANCE (ACRES)	PERMANENT DISTURBANCE (ACRES)
Crane Pad/Laydown Areas	23.4	0.122
Foundation	2.1	0
New Access Road	8.4	7.5
Upgraded Road	35.7	11.9
O & M Area #1	4.8	0
O & M Area #2	4.1	0
Substations	3.0	2.7
MET Towers (x3)	0	0.048
Staging Areas (x6)	20.4	0
Total	101.90	22.27

Note: These are preliminary calculations are based on pre-design turbine layout as shown on Figure A1.1-1 and data provided by AWI, and represent conservative estimates of disturbance. Actual disturbance is likely to be lower than these estimates due to the anticipated 22 to 28 turbine/54 MW installed capacity build-out.

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5.0 INSPECTION AND STARTUP TESTING

Prior to operation, each completed turbine will be inspected and checked for mechanical, electrical, and control functions in accordance with the manufacturer’s specifications before being released for startup testing. A series of startup procedures will then be performed by the manufacturer’s technicians. Electrical tests on the transformers, underground power lines, and collector substation will be performed by qualified engineers, electricians, and test personnel to ensure that electrical equipment is operating within tolerances and to ensure the equipment has been installed in accordance with design specifications. The aboveground power lines interconnecting to the Pacific Gas and Electric (PG&E) system will be tested and inspected as required.

5.1 Cleanup and Restoration

Clearing and disposing of trash, debris, and scrub on those portions of the site where construction will occur will be performed at the end of each workday at all stages of construction. Existing vegetation will be cleared only where necessary. All excavations made by clearing will be backfilled with compacted earth and aggregated as soon as cable infrastructure is tested. Disposal of cuttings and debris will be at an approved facility designed to handle the waste.

Before construction is complete, all remaining trash and debris will be removed from the site. All temporarily disturbed areas will be returned to their previous contours; any debris will be removed and properly disposed of offsite, consistent with Alameda County restoration requirements and as described in a Reclamation Plan. The Reclamation Plan will be developed prior to construction as part of the construction planning and permitting process. Any material placed in the areas of the foundations or roads will be compacted as required for soil stability.

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6.0 SAFETY AND SECURITY

6.1 Quality Assurance and Quality Control

A quality assurance/quality control (QA/QC) program will be implemented to ensure that construction and startup of the facility are completed as specified. The Applicant will be responsible for ensuring implementation of the QA/QC program prior to construction. The program will specify implementing and maintaining QA/QC procedures, environmental compliance programs and procedures, and health and safety compliance programs and procedures. It will also integrate the Applicant's activities with the contractors during project construction. The engineering, procurement and construction (EPC) contractor and turbine supplier will be responsible for enforcing compliance with the construction procedures program of all of its subcontractors.

6.2 Construction Environmental Compliance

Orientation of construction staff will include education on the potential environmental impacts of project construction. The construction manager will establish procedures for staff to formally report any issues associated with the environmental impacts, to keep management informed, and to facilitate rapid response.

6.3 Stormwater Control

Because the proposed project will disturb more than one acre, it will require coverage under the state's General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order 2010-0014-DWQ) (Construction General Permit). Permit coverage will be obtained by submitting permit registration documents (PRDs) to the State Water Resources Control Board through its Stormwater Multiple Application and Report Tracking System (SMARTS) website. The PRDs include a notice of intent, site maps, a stormwater pollution prevention plan (SWPPP), a risk level assessment, and other materials. The SWPPP will include the elements described in Section A of the Construction General Permit and maps that show the location and type of erosion control, sediment control, and non-stormwater BMPs, which are intended to prevent significant water quality impacts on receiving waters. Depending on the risk level, the SWPPP may also specify that sampling of pH and turbidity in the runoff leaving the site be conducted during construction. The SWPPP will also describe site inspection, monitoring, and BMP maintenance procedures and schedules.

6.4 Safety Compliance

The Applicant and its construction contractors and subcontractors will be responsible for construction health and safety issues. Each contractor and subcontractor will provide a health and safety coordinator who will ensure that applicable laws, regulations, ordinances, and standards of health and safety are followed. Any identified deficiencies will be corrected as quickly as possible. The health and safety coordinator will conduct onsite orientation and safety training for contract and subcontract employees and will report back to the onsite construction manager. Upon identification of a health and safety issue, the health and safety coordinator will work with the construction manager and responsible subcontractor or direct hire workers to correct the violation.

6.5 Emergency Preparedness and Response

If severe storms result in a downed interconnection power line, standard O&M procedures will be applied. The turbines will be equipped with internal protective control mechanisms to safely shut them down in the event of a high-voltage grid outage or a turbine failure related to fire or mechanical problems. A separate low-voltage distribution service feed might be connected to the low-voltage side of the collector substation as a backup system to provide auxiliary power to project facilities in case of outages. For safety, the collector substation will be fenced, locked, and properly signed to prevent access to high-voltage equipment. Safety signage will be posted around turbines, transformers, other high-voltage facilities, and along roads, as required.

6.6 Public Access and Security

The proposed project will be located on private property with restricted public access. Only authorized access to the Project site will be allowed. The site will be fenced and the collector substations will be fenced with an additional 12-foot-high, chain-link fence to prevent public and wildlife access to high-voltage equipment. Safety signs will be posted in conformance with applicable state and federal regulations around all turbines, transformers, and other high-voltage facilities and along access roads. Vegetation clearance will be maintained adjacent to project ingress and egress points and around the collector substations, transformers, and interconnection riser poles.

6.7 Hazardous Materials Storage and Handling

The County's Hazardous Materials Program Division is the Certified Unified Program Agency (CUPA) for all areas of Alameda County. Management of hazardous materials will be conducted in accordance with a County-approved HMBP developed for the proposed project pursuant to the requirements of the CUPA. Hazardous materials used during O&M activities will be stored within the existing O&M building in aboveground containers with appropriate spill containment features as prescribed by the local fire code or the SPCC Plan for the O&M building as stipulated by the appropriate regulatory authority. Such materials will be similar in type and amount to those currently stored and used for O&M for the existing facility.

Lubricants used in the turbine gearbox are potentially hazardous. The gearbox will be sealed to prevent lubricant leakage. The gearbox lubricant will be sampled periodically and tested to confirm that it retains adequate lubricating properties. When the lubricants have degraded to the point where they are no longer adequate, the gearbox will be drained, new lubricant will be added, and the used lubricants will be disposed of at an appropriate facility in accordance with all applicable laws and regulations.

Transformers contain oil for heat dissipation. The transformers will be sealed and contain no polychlorinated biphenyls (PCBs) or moving parts. The transformer oil will not be subject to periodic inspection and does not need replacement.

O&M vehicles will be properly maintained to minimize leaks of motor oil, hydraulic fluid, and fuel. During operation, O&M vehicles will be serviced and fueled at the existing O&M building (using mobile fuel tanks) or at an offsite location. No storage tanks are located at the existing windfarm and none are proposed.

7.0 OPERATION AND MAINTENANCE ACTIVITIES

O&M activities for the proposed project will be similar to the O&M activities presently conducted for the existing wind facility. Maintenance of turbines and associated infrastructure includes a wide variety of activities. Routine maintenance involves activities such as: checking torque on tower bolts and anchors; checking for cracks and other signs of stress on the turbine mainframe itself and other turbine components; inspecting for leakage of lubricants, hydraulic fluids, and other hazardous materials and replacing them as necessary; inspecting the grounding cables, wire ropes and clips, and surge arrestors; and, cleaning. Most routine maintenance activities occur within and/or around the tower and the nacelle. Cleanup from routine maintenance activities will be performed at the time maintenance is performed by the O&M personnel. While performing most routine maintenance activities, O&M staff will travel by pickup truck or other light-duty trucks. In addition, on routine maintenance such as repair or replacement of rotors or other major components may be necessary. Such maintenance will involve use of one or more cranes and equipment transport vehicles, though the cranes will not be as large as the track-mounted cranes used to erect the turbine towers.

Monitoring of the proposed project’s operations will be computer-based. Computers in the base of each turbine tower will be connected to the existing O&M facility through fiber-optic telecommunication links.

The O&M’s workforce is not anticipated to change from the existing turbine technicians, operations personnel, administrative personnel, and management staff. O&M staff will continue to monitor turbine and system operation, perform routine maintenance, shut down and restart turbines when necessary, and provide security. All O&M staff will be trained regularly to observe BMPs.

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8.0 DECOMMISSIONING AND RECLAMATION

The anticipated life of the windfarm will be coterminous with the terms of the CUP required for its operation.

The decommissioning and removal of the proposed project will be similar to the decommissioning and removal of existing windfarm components that will be undertaken prior to construction of repowered facilities, except that considerably fewer turbines will be removed. Decommissioning and removal of the project will be assured by a bond and will be based on a Decommissioning Plan. In addition, existing service roads will be used. No new access roads will be required, and no roads extant are anticipated to require widening.

Decommissioning will involve removing the turbines, transformers, substations, foundations and related infrastructure to a depth of 3 feet below grade. A single large crane will be used to disassemble the turbines, and smaller cranes will lift the parts onto trucks to be hauled away. Generally, turbines, electrical components, and towers will either be refurbished and resold or recycled for scrap. All unsalvageable materials will be disposed of at authorized sites in accordance with federal, state, and local laws, regulations, ordinances, and adopted County policies in effect at the time of final decommissioning. Following removal of the equipment and structures, a dozer will be used to spread dirt over the foundations. Road reclamation will be accomplished using scrapers and gravel trucks. Site reclamation after decommissioning will be subject to a County-approved reclamation plan (County Code Article 88-3.8). Based on site-specific requirements, the reclamation plan will include re-grading, spot replacement of topsoil, and re-vegetation of disturbed areas with an approved seed mix.

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ATTACHMENT A2: CHECKLIST OF SUPPORTING DOCUMENTS

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TABLE OF CONTENTS

FIGURES:

TABLES:

ACRONYMS AND ABBREVIATIONS

AADT	Annual Average Daily Traffic
APWRA	Altamont Pass Wind Resource Area
ARB	Air Resource Board
BAAQMD	Bay Area Air Quality Management District
BACTs	Best Available Control Technologies
BMP	Best Management Practices
CalEEMod	California Emissions Estimator Model
CAP	Bay Area 2010 Clean Air Plan
CDFW	California Department of Fish and Wildlife
CMP	Congestion Management Program
County	Alameda County
CUP	Conditional Use Permit
CUPA	Certified Unified Program Agency
dBA	decibel (A-weighted)
dB	decibel
ECAP	Environmental Compliance Assurance Procedure or East County Area Plan
EPC	Engineering, Procurement and Construction
FAA	Federal Aviation Administration
FPEIR	Final Program Environmental Impact Report
GHG	greenhouse gas
HCP	Habitat Conservation Plan
HMBP	Hazardous Materials Business Plan
I-580	Interstate 580
kV	kilovolt
Ldn	Day Evening Night Sound Level
LOS	Level of Service
LPA	Local Public Agency
MW	megawatt
MWh	megawatt hour
NCCP	National Community Conservation Planning
NPDES	National Pollutant Discharge Elimination System

O&M	Operations and Maintenance
PCB	Polychlorinated Biphenyls
PG&E	Pacific Gas and Electric
PRD	Permit Registration Document
PRMP	Paleontologic Resource Mitigation-monitoring Plan
QA/QC	quality assurance/quality control
SFBAAB	San Francisco Bay Area Air Basin
SMARTS	Stormwater Multiple Application and Report Tracking System
SJVAB	San Joaquin Valley Air Basin
SPCC	Spill Prevention, Control, and Countermeasures
SWPPP	Strormwater Pollution Prevention Plan
TMP	Traffic Management Plan
TTH	Total Tower Height
USFWS	United States Fish and Wildlife Service
WT	Wind Turbine Generator

1.0 AESTHETICS

1.1 Impact AES-1

Temporary visual impacts caused by construction activities (less than significant with mitigation)

APWRA Issues to Consider: Will construction or heavy equipment be visible from residences or recreation areas and trails?

Residences are located on Dyer Road, just off of Vasco road in the Project area, and are located within approximately 250 meters of the Project. Figures 2.1-1 and 2.1-2 show residences located in the Project area. These residences are mostly single-family, rural homes on large land parcels. The views of most residents in the Program Area consist of smooth, grass-covered, rolling hills and existing turbine strings. Motorists along state-designated scenic highways and county-designated scenic routes, nearby residences as depicted in Figures 2.1-1 and 2.1-2, recreationists using the recreation areas and trails in the Brushy Peak Regional Preserve area, and employees of nearby businesses will be the principal viewer groups. Brushy Peak Regional Preserve is just west of the Project site. The south portion is open to the public. The north half has restricted access.

Construction associated with the Project will create temporary changes in views of and from the Project area. Construction is expected to last 8–12 months. Construction activities will create views of heavy equipment and associated vehicles into the viewshed of residents, businesses, recreational areas, state-designated scenic highways (I-580), and Alameda County–designated scenic routes. Construction will also require crane pads and laydown areas for offloading turbine components.

In addition, high-powered lighting used for nighttime construction will negatively affect nighttime views of and from the work area and may be a nuisance to nearby residents. Construction equipment is anticipated to operate for approximately 10 hours per day. Alameda County Noise Ordinance, Section 6.60.070, limits noise sources associated with construction to occur between 7 a.m. and 7 p.m. Monday thru Friday and between 8 a.m. and 5 p.m. on Saturday and Sunday. This will ensure the majority of project construction will not occur beyond these hours. During summer, the ordinance will ensure that nighttime lighting is not needed because the sun will rise around 6 a.m. and set around 8:30 p.m. However, during winter the sun rises around 7 a.m. and set around 5 p.m. (Sunrise Sunset 2013). Consequently, if construction occurs after sunset, which varies by season, high-powered lighting will be required for construction operations. The presence of this lighting during construction will adversely affect nearby residents if high-powered lighting spills inside their homes or yards. High-powered lighting could also adversely affect views of sunsets and nighttime constellations for viewers in the Project area during the construction months.

Construction impacts will be temporary and short-term, and decommissioning and construction activities will occur in a manner consistent with Alameda County requirements for work days and hours. However, the highly sensitive viewers in the Project area (residents and recreationists) could perceive these impacts as significant. Therefore, construction impacts will be potentially significant on a temporary basis. Implementation of Mitigation Measure AES-1 will reduce this impact to a less-than-significant level.

1.2 Impact AES-2

Have a substantial adverse effect on a scenic vista (less than significant with mitigation)

APWRA Issues to Consider: Will new turbines be placed in areas where no turbines currently exist? (See Policies 105 and 106 for list of sensitive ridgelines, pg. 3.1-6)

As discussed in the Regulatory Setting, Policy 105 of the Environmental Compliance Assurance Procedure (ECAP) lists the ridgelines above Vasco Road and the ridgelines surrounding Brushy Peak north of Livermore as sensitive viewsheds. Policy 105 also states that the County shall preserve these visually sensitive ridgelines largely in open space use. Turbines will be installed in areas bordering the Brushy Peak Regional Preserve on the Preserve's north, the east sides, and Vasco Road on the northwestern edge of the Project (See Attachment A1, Figure A1.1-1). New turbines (2, 18, 26, and 27a) will be located in areas not previously developed. However, under Policy 105 the County will be obligated to disallow new turbine structures from being located in these areas (see Final Program Environmental Impact Report [FPEIR], Section 3.1.2, "Regulatory Setting"). The installation of new turbines in such areas will conflict with Policy 105 and will constitute a significant impact on scenic routes identified in the Scenic Route Element. The distance of new turbines in relation to existing turbines is shown in Table A2.1-1. Implementation of Mitigation Measure AES-2a will reduce this impact to less than significant because the county will review the location of new turbines along ridgelines that have not previously been developed and potentially modify the location of structures.

A number of scenic vistas are available from local roadways out and over the Project area. In addition, scenic vistas exist as seen from local recreational trails and residences and businesses on hillsides in and near the Project area in the vicinity of Brushy Peak, Vasco Road, Altamont Pass Road, and as shown in Attachment A3. These areas consist of wide open views of the rolling, grass-covered, rural landscape dotted with existing turbines. The tower height of first-generation and second-generation turbines range from 18 to 55 meters (approximately 59 to 180 feet), while the third-generation turbines range from 41 to 68 meters (approximately 134 to 223 feet). The proposed fourth-generation towers installed under the Project will be 80–96 meters (262–315 feet) tall; therefore, the proposed fourth-generation towers will be 28–62 meters (92–203 feet) taller than the existing turbines. Views of the proposed turbines may be dominant depending on a viewer's location within the landscape, if the viewer has more direct views of the turbines, or views that are partially or fully screened by topography.

A total of 13 visual simulations from 11 viewpoints have been produced and are shown in Attachment A3. Four simulations are located along designated scenic routes. Figure A2.1-1 shows the location of the simulations from the following "Camera Positions":

- Camera 1 Position (Figure A3-1) – Altamont Pass Road 2.6 miles north of N. Flynn Road overpass looking west (Designated Scenic Route).
- Camera 2 Position (Figure A3-2) – Carrol Road one mile west of North Flynn Road looking northwest.
- Camera 3 Position (Figure A3-3) – Northfront Road 0.15 miles west of Greenville Road underpass looking northeast (Designated Scenic Route).
- Camera 4 Position (Figure A3-4) – Vasco Road 1.3 miles north of Vasco Road overpass looking northeast (Designated Scenic Route).
- Camera 5 Position (Figure A3-5) – Laughlin Road at Brushy Peak Loop Trailhead looking northeast.

TABLE A2.1-1 DISTANCE OF NEW TURBINES FROM EXISTING TURBINES

TURBINE NUMBER	DISTANCE TO NEAREST EXISTING TURBINE (FEET)
1	87
2	911
3	31
4	27
5	41
6	166
7	24
8	30
9	37
10	16
11	85
12	51
13	92
14	73
15	46
16	36
17	47
18	1042
19	109
20	17
21	32
22	61
23	55
24	31
25	80
26	3238
27	32
28	517
29	20
30	50
31	64
32	40
33	43
20a	63

- Camera 6 Position (Figure A3-6) – North Vasco Road 0.75 mile southwest of Dyer Road looking east (Designated Scenic Route).
- Camera 7 Position (Figure A3-7) – Dyer Road 0.2 miles north of Altamont Pass Road looking west.
- Camera 8 Position –
    - (Figure A3-8) Brushy Peak Regional Preserve 2.4 miles along eastern half of Brushy Peak Loop Trail looking east
    - (Figure A3-9) Brushy Peak Regional Preserve 2.4 miles along eastern half of Brushy Peak Loop Trail looking southeast
- Camera 9 Position (Figure A3-10) - Brushy Peak Regional Preserve 2.4 miles along eastern half of Brushy Peak Loop Trail looking southeast
- Camera 10 Position (Figure A3-11) - Brushy Peak Regional Preserve 2.5 miles along eastern half of Brushy Peak Loop Trail looking north
- Camera 11 Position –
    - (Figure A3-12) Brushy Peak Regional Preserve 1.2 miles along eastern half of Brushy Peak Loop Trail looking northeast
    - (Figure A3-13) Brushy Peak Regional Preserve 1.2 miles along eastern half of Brushy Peak Loop Trail looking southeast

Although the new, more efficient turbines are larger than the existing turbines, the new spaced out configuration detracts less from the natural landscape than the existing string configuration. There are several scenic vistas in the Project area. The photo simulations located in Attachment B shows existing views of the Project area and proposed views with buildout of the Project. The newly consolidated configuration promotes views of the rolling, grassy terrain to become more prominent, as back-dropped by the sky, and less interrupted by developed features. While the larger turbines will draw viewers' attention toward them, the eye is also able to follow the natural undulation of the ridgeline in a more cohesive manner than under existing conditions without it being broken by multiple, jagged turbines. With existing conditions, the eye is drawn to and focuses on the numerous turbines cluttering the view by protruding from the hillsides and ridgelines.

Policies 170 and 215 of the East County Area Plan require the County to protect nearby existing uses from the visual impacts (among other effects) of windfarms' construction and operation, and to maintain and enhance scenic values in these areas through review of development and use of conservation policies (see FPEIR 3.1.2, "Existing Conditions", "Regulatory Setting"). For those areas with existing older turbines, the replacement of the many existing smaller and older turbines with proportionally far fewer and less intrusive fourth-generation turbines will serve Policies 170 and 215 of the East County Area Plan, and it serves to protect and enhance scenic values.

Due to the increased size and potential dominance of the new structures, impacts will potentially be significant. Implementation of Mitigation Measures AES-2a through AES-2c will reduce this impact to a less-than-significant level.

Refer to Attachment A1, Figure A1.1-1: Summit Wind Repower Project Layout, illustrating the location of proposed structures in relation to existing residences.

1.3 Impact AES-3

Substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings along a scenic highway (significant and unavoidable – findings of overriding considerations made at the program level)

APWRA Issues to Consider: Will turbines be located along a state- or county-designated scenic highway?

In addition to state-designated scenic highways, there are several County-designated scenic routes in the Project area. Refer to Attachment B for a list of County-designated scenic routes in the Project area and Figure A2.1-1 for scenic routes in relation to proposed turbines. There are portions of I-580, Vasco Road, Altamont Pass Road, and the proposed Route 239 Freeway where no turbines currently exist. However, motorists on these roads are accustomed to seeing wind turbines along the route and therefore, they will not be adversely affected. Although the new, more efficient turbines will be 28–62 meters (92–203 feet) taller than the existing turbines, the new spaced out configuration detracts less from the natural landscape than the existing string configuration (See Attachment A3; Figures A3-2 to a-14). The proposed configuration allows for views of the rolling, grassy terrain to become more prominent, back-dropped by the sky, and less interrupted by anthropogenic features. While the larger turbines will draw viewers' attention toward them, the eye is also able to follow the ridgeline of the hills in a more cohesive manner than existing conditions. With existing conditions, the eye is drawn to and focuses on the numerous turbines cluttering the view by protruding from the hillsides and ridgelines. However, it will be a significant impact to locate turbines around Vasco Road where no turbines currently exist even though motorists are considered moderately but not highly sensitive.

For those areas with existing older turbines, the replacement of the many existing smaller and older turbines with far fewer and less intrusive fourth-generation turbines will serve Policies 170 and 215 of the East County Area Plan, and serve to protect and enhance scenic values; therefore, this impact is potentially significant. Implementation of Mitigation Measures AES-2a, AES-2b, and AES-2c will reduce this impact to a less-than-significant level.

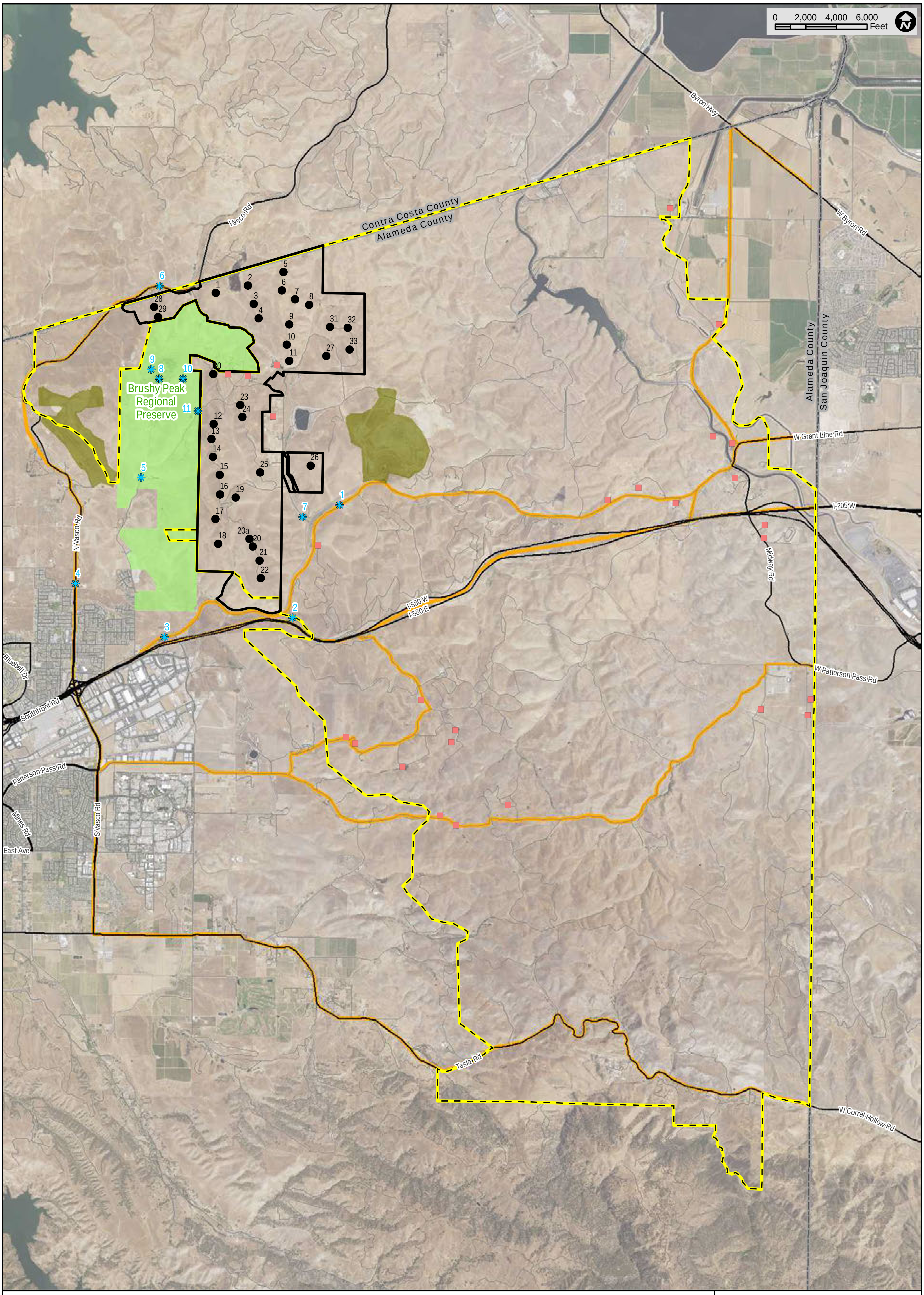
Figure A2.1-1 shows new turbines in relation to state and county designated scenic highways and residences.

Figure A2.1-2 shows new turbines in relation to residences from each proposed turbine.

Table A2.1-2 below shows distances to the nearest residences from each proposed turbine.

TABLE A2.1-2 DISTANCE TO NEAREST RESIDENCES FROM PROPOSED TURBINES

TURBINE NUMBER	DISTANCE TO NEAREST RESIDENCE	
	METERS	FEET
1	1630	5349
2	1673	5490
3	1291	4235
4	987	3238
5	1842	6044
6	1480	4854
7	1347	4421
8	1352	4434
9	831	2727
10	441	1447
11	256	839
12	1033	3390
13	1313	4308
14	1445	4740
15	1577	5173
16	1882	6176
17	2108	6916
18	1990	6528
19	1781	5842
20	1300	4264
21	1207	3959
22	1317	4319
23	601	1973
24	615	2017
25	1150	3773
26	1231	4039
27	994	3262
28	1982	6503
29	1792	5878
30	292	958
31	1294	4245
32	1588	5209
33	1475	4841
20a	1374	4508



Legend

- Summit Wind Repower Turbine Location
- Project Boundary
- Program Area
- Residential Area
- Photo Simulation Location
- Major Roads
- Roads
- Designated Scenic Route *
- County Boundary
- Open Space
- Landfill

* See Attachment B for list of designated scenic roads.

FIGURE A2.1-1
STATE AND COUNTY DESIGNATED SCENIC HIGHWAYS AND RESIDENCES

ALTAMONT WINDS LLC
PROPOSED SUMMIT WIND REPOWER PROJECT
ALAMEDA COUNTY, CA

Source: USDA, NAIP Imagery, 2014.

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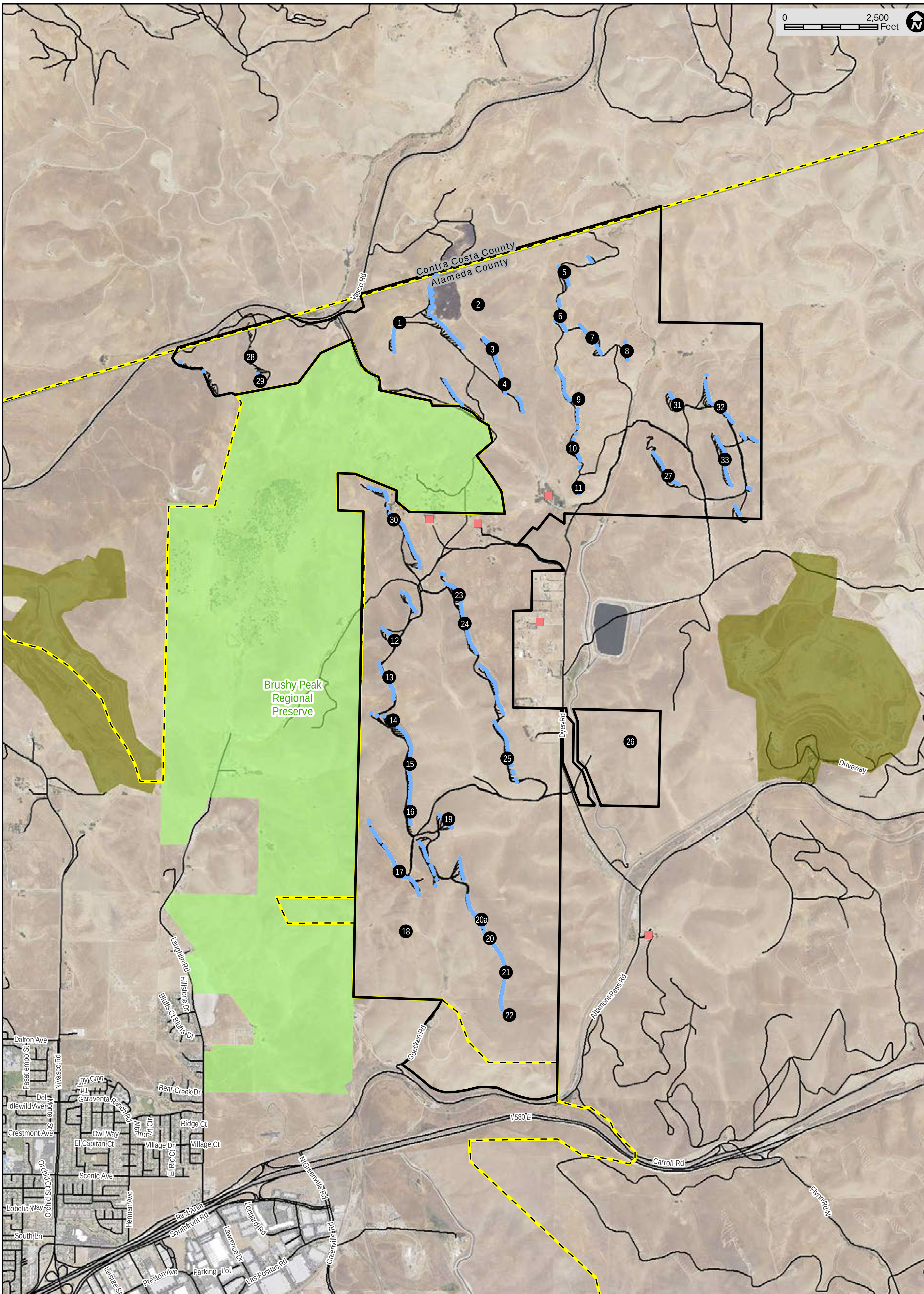

Legend

- Summit Wind Repower Turbine Location
- Existing Altamont Wind Turbine Location
- Project Boundary
- Program Area
- Residential Area
- Existing Road
- County Boundary
- Landfill
- Open Space

FIGURE A2.1-2
TURBINES IN RELATION
TO NEAREST RESIDENCE

ALTAMONT WINDS LLC
PROPOSED SUMMIT WIND
REPOWER PROJECT
ALAMEDA COUNTY, CA

Source: USDA, NAIP Imagery, 2014.

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1.4 Impact AES-4

Substantially degrading the existing visual character or quality of the site and its surroundings (significant and unavoidable – findings of overriding considerations made at the program level)

APWRA Issues to Consider: Will new turbines be placed in the southern portion of the program area, starting approximately 2.5 miles south of Patterson Pass Road, or in other areas where no turbines currently exist?

The Project will not be placed in the southern portion of the program area. The Project boundary is located approximately two miles north of Patterson Pass Road, and the turbine closest to Patterson Pass Road is approximately 2.4 miles north of Patterson Pass Road. The Project will primarily be visible to recreationists, area residents, motorists, and employees of the businesses. The area is mostly characterized by grass-covered, rounded hills and smooth contours. Strings of turbines, plus power lines, transformers, access roads, and substations are the most visually distinct artificial features throughout the Project area. In addition, although the new, more efficient turbines are larger than the existing turbines, the new spaced out configuration detracts less from the natural landscape than the existing string configuration. This configuration allows for views of the rolling, grassy terrain to become more prominent, back-dropped against the sky, and less interrupted by anthropogenic features. While the larger turbines will draw viewers' attention toward them, the eye is also able to follow the ridgeline of the hills in a more cohesive manner than existing conditions. With existing conditions, the eye is drawn to and focuses on the numerous turbines cluttering the view by protruding from the hillsides and ridgelines. Because of this, Project implementation in areas where turbines currently exist will not substantially degrade the existing visual character or quality of the Project area and will improve views where existing turbine threads are replace with much fewer of the new larger turbines.

According to Policy 170 of the ECAP, Alameda County is obligated to protect nearby existing uses from potential visual and other impacts generated by the construction and operation of windfarm facilities (see FPEIR, Section 3.1.2, "Existing Conditions", "Regulatory Setting"). Several residences in the vicinity will have views of this portion of the Project area (see Figure A2.1-2). Because residents are considered highly sensitive viewers, constructing turbines in this area will conflict with Policy 170. This impact will be significant, but implementation of Mitigation Measures AES-2a, AES-2b, and AES-2c will reduce this impact to a less-than-significant level.

1.5 Impact AES-5

Create a new source of substantial light or glare that will adversely affect daytime or nighttime views in the area (less than significant with mitigation)

APWRA Issues to Consider: Will turbine be located in a setback area? Are there residents nearby - i.e., within 500 meters [1,640 feet] in a generally east or west direction to account for all seasons? Could blades cause shadow flicker that will disturb sensitive viewers, especially residents?

Scattered single-family rural residences are located within the Project boundary, including homes on both very large parcels (more than 100 acres) and comparatively small lots (less than 5 acres). Single-family rural residences are mostly located along the west side of the Project area. Within the Project boundary, several residences along Altamont Pass Road are located as close as 600 feet from existing turbines. Several residences located along Dyer Road are within about 1,100 feet of existing turbines.

All repowered wind turbines will require Federal Aviation Administration (FAA) lighting. This could affect daytime and nighttime views in the Project area because of the visual contrasts created by flashing and continuous lighting against the sky resulting reduction of visual character and quality However, because the Project will reduce the number existing turbines by up to 487 (from 511 to 24), the amount of FAA-required lighting in the Program Area is expected to be reduced in comparison to existing turbine lighting in the Project area. Therefore, the proposed Project will not create a new source of substantial light in the Project area that will affect daytime or nighttime views.

There are three existing substations within the Project area: Frick Substation, Dyer Substation, and a P, G and E owned and operated substation. The Frick and the Dyer Substation will be reconstructed as part of the project. Safety and security requirements will necessitate substation lighting. The lighting will create a potential source of glare. Visual impacts created by lighting will be minimized by focusing the lighting downward to limit skyward illumination. Sodium vapor lamps and spotlights will not be used at any facility substations except when emergency maintenance is needed. Lighting at substations will be minimized using downcast lighting and motion-detection devices. Therefore, the impact created by substation lighting will be less than significant.

Generally, turbines are painted white. Because the existing turbines will be replaced with far fewer of the larger, more efficient turbines, the source of glare is expected to be reduced in areas where turbines currently exist. However, in areas where no turbines currently exist, their presence could be a new source of substantial glare. The color of towers and rotors on the new turbines will be neutral and non-reflective (i.e., dull white or light gray), and the Alameda County Windfarm Standard Conditions specify that the turbines be treated to blend with the surrounding environment. See Attachment A3 – Photo Simulations that shows existing and proposed turbines.

Residences are located within 500 meters generally east or west of the Project, and blades could cause shadow flicker that may disturb sensitive viewers (see Figure A2.1-3 Shadow Map). A total of 26 receptors were included in the shadow flicker analysis (Refer to Attachment G1 for the Shadow Flicker Study). Every receptor was assumed to have windows facing all directions (“greenhouse” mode) which yield the most conservative results. In the model, a switch was enabled limiting calculations to a total of 10 rotor diameters (970 meters) from a wind turbine. Therefore, impacts at receptors greater than 970 meters from a wind turbine were zero. In addition, shadow flicker impacts were calculated only when the angle of the sun was at least 3° above the horizon. Four (4) of the 26 receptors were predicted to have total annual impacts over 30 hours per year. Additionally, four (4) of the 33 wind turbines produce a noticeably high amount of shadow flickering hours on the receptors (see Table A2.1-3 and Figure A2.1-3).

Residences are located on Dyer Road and just off of Vasco road directly east and west in the Project area. Blade rotation could cause shadow flicker that could be a visual intrusion to viewers and could be especially disruptive to residents who will be exposed to these conditions for long periods of time. As indicated in the “Project Description”, Alameda County has setback requirements for siting turbines within certain types of land uses, including residential, commercial, recreational, and infrastructure (public roads). Turbines will not be allowed to be located within these setback distances. The Alameda County Wind Farm Standard Conditions (Alameda County 1998: Appendix F) indicate that a turbine may not be within 300 feet of a Building Site upon which a wind farm has not been approved and within 500 feet of a dwelling unit. The Alameda County Wind Farm Standard Conditions (Alameda County 1998: Appendix F) indicate that noise setbacks specify generators are not allowed within 1,000 feet upwind or a 300 feet circumference of any existing dwelling or building site. However, these setbacks may not be sufficient to prevent shadow flicker with the new, taller turbines.

TABLE A2.1-3 DURATION OF SHADOW FLICKER ON RECEPTORS BY WIND TURBINE NUMBER

TURBINE NUMBER	EXPECTED SHADOW FLICKER (HRS PER YEAR)
11	85:21
19	5:31
22	17:34
23	59:18
24	101:57
25	75:02
26	18:37
30	11:31

During detailed project design, the project applicant will prepare a graphic model and study evaluating the shadow flicker impacts on nearby residences. If shadow flicker at any receptors still exceed Alameda County’s FPEIR standards of additional mitigation measures will be employed when consulting affected residence owners. The Applicant is prepared to move or shut down any wind turbines that are installed and impose shadow flicker on receptors in excess of the FPEIR standards during morning and afternoon shadow flicker hours to reduce the shadow flicker impact on the nearby receptors to within County standards. Therefore, implementation of Mitigation Measure AES-5 will reduce this impact to a less-than-significant.

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FIGURE A2.1-3 SHADOW MAP

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Project:
Summit

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Pacific Winds LLC
15850P Jess Ranch Road
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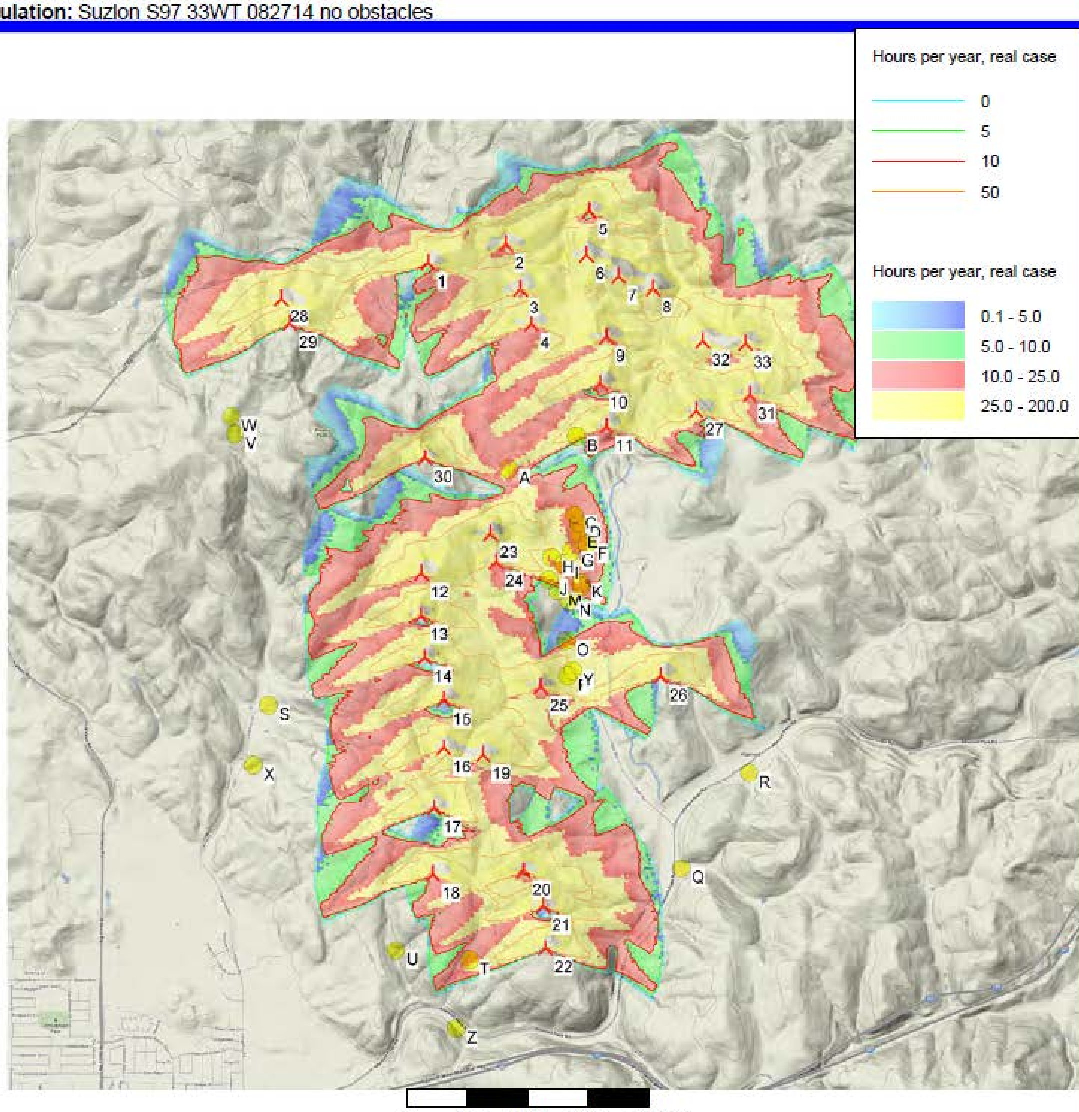
Ryan Darlow / rd@powerworks.com
Calculated:
8/27/2014 11:57 AM/2.9.269

SHADOW - Map

Calculation: Suzlon S97 33WT 082714 no obstacles



Map: topo north , Print scale 1:50,000, Map center UTM (north)-WGS84 Zone: 10 East: 615,860 North: 4,179,673

New WTG   Shadow receptor

Flicker map level: HCL 30kmsq 5mres

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1.6 Impact AES-6

Consistency with state and local policies (less than significant with mitigation)

APWRA Issues to Consider: Will the project comply with measures set forth to protect visual resources along scenic roadways and open space areas identified for protection (Alameda County 1966) and comply with measures set forth in the ECAP to protect visual resources such as sensitive viewsheds, streets and highways, scenic highways, and areas affected by windfarms (Alameda County 2000)?

Under the Patterson Pass Project (see Introduction-Section 1.3), the County will be obligated to comply with measures set forth to protect visual resources along scenic roadways and open space areas identified for protection, as detailed in the Scenic Route and Open Space Elements of the Alameda County General Plan (Alameda County 1966). In addition, the County is obligated to comply with measures set forth in the ECAP to protect visual resources such as sensitive viewsheds, streets and highways, scenic highways, and areas affected by windfarms (Alameda County 2000). The turbines will be neutral and non-reflective (i.e., dull white or light gray) so as to blend in with the surroundings. However, the proposed Project will still introduce large, visually obtrusive turbines within existing viewsheds of scenic viewsheds in proximity to sensitive viewers and residences. Implementation of Mitigation Measures AES-2a, AES-2b, AES-2c, and AES-5 will reduce this impact to a less-than-significant level.

Refer to Attachment A1, Figure A1.1-1- Summit Wind Repower Project Layout illustrating location of proposed structures in relation to existing structures.

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2.0 AGRICULTURAL RESOURCES

2.1 Impact AG-1

Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to nonagricultural use (less than significant with mitigation)

APWRA Issues to Consider: Will *project components be built on Prime Farmland?*

There is no Prime Farmland, Unique Farmland, or Farmland of Statewide Importance in the Project area. Because the proposed Project will not permanently convert any Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, there will be no impact. No mitigation is required.

2.2 Impact AG-2

Conflict with existing zoning for agricultural use or conflict with a Williamson Act contract (no impact)

APWRA Issues to Consider: Will the project conflict with existing zoning for agricultural use or conflict with a Williamson Act contract?

Wind turbines are a conditionally permitted use in the agricultural zone applied to the program area and are a compatible use allowed under the Williamson Act contracts for grazing land covering the program area. Therefore, repowering projects will result in no impact. All of the Williamson Act land within the Project area is Non-Prime Farmland. Wind turbines are a compatible use allowed under the Williamson Act contracts covering the Project area. The replacement of wind turbine towers on land currently under Williamson Act contract will not remove the land from Williamson Act contract status. There will be no impact. No mitigation is required.

2.3 Impact AG-3

Conflict with existing zoning for, or cause rezoning of forest land, timberland, or timberland zoned Timberland Production (no impact)

APWRA Issues to Consider: Will project features be built in forest or timber land?

There is no forest land in the program area. Therefore, repowering projects will result in no impact.

2.4 Impact AG-4

Result in the loss of forest land or conversion of forest land to non-forest use (no impact)

APWRA Issues to Consider: Will project features be built in forest or timber land?

There is no forest land in the program area. Therefore, repowering projects will result in no impact.

2.5 Impact AG-5

Involve other changes in the existing environment that, due to their location or nature, could result in conversion of Farmland to nonagricultural use or conversion of forest land to non-forest use(less than significant with mitigation)

APWRA Issues to Consider: Will project features be built on Prime Farmland, Farmland of Statewide Importance, or forest land?

There is no Prime Farmland, Unique Farmland, or Farmland of Statewide Importance in the Project area. Because the proposed Project will not permanently convert any Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, there will be no impact. No mitigation will be required.

3.0 AIR QUALITY

3.1 Impact AQ-1

Conflict with or obstruct implementation of the applicable air quality plan (less than significant)

APWRA Issues to Consider: Will the project include activities not covered in the PEIR?

The impacts resulting from additional emissions from workers for the Project are similar to that of the program (see FPEIR, Section 3.3.2, "Impact AQ-1a-1"). Implementation of the Project will result in no new permanent employees relative to existing conditions, nor will it increase population projections. On average, approximately 123 workers will be employed during construction with a peak workforce of 184. Therefore, the Project will not induce population or employment growth and will result in no net increase in vehicle miles traveled in the San Francisco Bay Area Air Basin (SFBAAB).

In addition, although short-term mitigated emissions resulting from the Project construction will exceed the Bay Area Air Quality Management District (BAAQMD) significance threshold for nitrous oxides (NOx) (see Impact AQ-2d), the Project will result in long-term benefits from new renewable wind-generated energy, including reduction of NOx emissions relative to the production of comparable energy from fossil fuel sources. Thus, the Project will be consistent with the Bay Area 2010 Clean Air Plan (CAP) regardless of this short-term impact.

It is assumed that trucks transporting some components and aggregate will travel from the Port of Stockton and the City of Tracy through portions of the San Joaquin Valley Air Basin (SJVAB) to the Project area. However, San Joaquin Valley Air Pollution Control District (SJVAPCD) rules and clean air plans will not be applicable to the proposed Project because the Project area is located in the SFBAAB. Therefore, no conflict with SJVAPCD clean air plans will occur.

This impact will be less than significant. No mitigation will be required.

3.2 Impact AQ-2

Violate any air quality standard or contribute substantially to an existing or projected air quality violation (significant and unavoidable)

APWRA Issues to Consider: Will project construction create air quality conditions that violate air quality standards? Will project operation create air quality conditions that violate air quality standards? Will the project include activities not covered in the PEIR?

Construction Activities: Construction of the Project will occur over a period of approximately 9 months. It is estimated that there will be approximately 184 workdays that will involve the use of heavy construction equipment. Construction activities in the Project area will include the same phases, construction equipment, and truck trips as detailed in the FPEIR (see FPEIR, Section 3.3.2, "Environmental Impacts", "Construction Activities").

It is anticipated that the majority of equipment and material-related truck trips will originate at the Port of Stockton (45 mile to the northeast) and in the City of Tracy (15 miles to the east), and that the construction worker-related commute trips will occur entirely within the SFBAAB. The portion of the equipment, material, and aggregate haul trips that will originate at the Port of Stockton and in the City of Tracy and will be generated in the SJVAB, which is under SJVAPCD's jurisdiction. Therefore, the heavy-duty truck trip exhaust emissions that will be generated in the SJVAB have been quantified and compared to SJVAPCD's annual significance thresholds (Table A2.3-1).

TABLE A2.3-1 SUMMIT PROJECT CONSTRUCTION EXHAUST AND FUGITIVE DUST EMISSIONS WITHIN THE SJVAB — MAXIMUM DAILY UNMITIGATED EMISSIONS

	ESTIMATED MAXIMUM ANNUAL UNMITIGATED EMISSIONS (TONS/YEAR)					
Construction Activity	ROG	NO_x	CO	SO_2	PM10 Total	PM2.5 Total
Offsite Truck Trips	0.15	5.24	0.81	0.01	0.17	0.13
Total Emissions	0.15	5.24	0.81	0.01	0.17	0.13
SJVAPCD Significance Threshold	10	10	N/A	N/A	15	15
Significant Impact?	No	No	No	No	No	No

Criteria pollutant emissions of reactive organic gases (ROGs), nitrous oxides (NOx), carbon monoxide (CO), sulfur dioxide (SO2), particulate matter less than or equal to 10 microns in diameter (PM10), and particular matter less than or equal to 2.5 microns in diameter (PM2.5) from construction equipment will incrementally add to the regional atmospheric loading of these pollutants during construction of the Project. The maximum daily unmitigated construction-related exhaust emissions that will occur in the SFBAAB have been estimated and are presented in Table A2.3-2. As discussed above, construction exhaust emissions were estimated using the California Emissions Estimator Model (CalEEMod) (South Coast Air Quality Management District 2011), the Environmental Protection Agency (EPA) Emissions Factors & AP 42 Compilation of Air Pollutant Emission Factors document (U.S. EPA 1995a, 1995b, 1995c), and the Air Resource Board (ARB) EMFAC 2011 model (California Air Resources Board 2013c). This time period involves the overlap of construction phases including decommissioning and foundation removal, road construction, construction of new turbine foundations, along with offsite truck trips and offsite worker trips. Other non-overlapping construction phases contribute to average daily and average annual emissions, but they are not counted as contributing to the maximum daily emissions that occur when the phases listed above overlap.

TABLE A2.3-2 SUMMIT PROJECT CONSTRUCTION EXHAUST AND FUGITIVE DUST EMISSIONS WITHIN THE SFBAAB – MAXIMUM DAILY UNMITIGATED EMISSIONS

Construction Activity	ESTIMATED MAXIMUM DAILY UNMITIGATED EMISSIONS (POUNDS/DAY)							
	ROG	No_x	CO	SO_2	PM10 Exhaust	PM10 Dust	PM2.5 Exhaust	PM2.5 Dust
Decommissioning and Foundation Removal	9.19	77.07	28.64	0.10	2.69	3.89	2.66	0.18
Laydown, Substation, and Switch Yards	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Road Construction	8.65	72.91	32.01	0.10	2.60	25.02	2.57	7.92
Turbine Foundations and Batch Plants	14.43	122.26	52.27	0.17	4.29	13.41	4.23	10.89
Turbine Delivery and Installation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Utility Collector Line Installation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Restoration and Clean-up	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Truck Trips	3.30	67.47	17.20	0.21	1.69	0.65	1.56	0.24
Offsite Worker Trips	0.18	0.81	5.85	0.07	0.01	0.13	0.01	0.05
Total Emissions	35.75	340.52	135.97	0.65	11.27	43.11	11.02	19.27
BAAQMD Significance Threshold	54	54	N/A	N/A	82	N/A	54	N/A
Significant Impact?	No	Yes	No	No	No	No	No	No

Note: Construction activity with aero emissions means that this activity Is not anticipated to occur during the time period producing the maximum daily emissions for construction.

[a] Includes construction activities along with fugitive dust emissions from the concrete batch plants.

As indicated in Table A2.3-2, maximum daily unmitigated exhaust emissions of NOx will exceed BAAQMD's significance threshold result in a significant impact. Implementation of Mitigation Measures AQ-2a and AQ-2b will reduce construction-related exhaust emissions. As indicated in Table A2.3-1, maximum annual unmitigated exhaust emissions of ROG or NOx that will be generated in the SJVAB will not exceed SJVAPCD's significance threshold and result in a less-than-significant impact. As noted above, the SJVAB is downwind of the Project site, and some emissions that are emitted at the Project site within the SFBAAB will likely drift into the SJVAB due to transport. However, these emissions were not quantified due to the high variability in wind patterns, local weather, and other conditions that contribute to emission transport, and it will be speculative to quantify the amount of project-related emissions that will transport into the SJVAB. Therefore, these emissions were not estimated nor compared to the SJVAPCD's thresholds. Implementation of Mitigation Measures AQ-2a and AQ-2b will, however, reduce construction-related exhaust emissions in the SJVAB.

In addition to exhaust emissions, emissions of fugitive dust will also be generated by project-related construction activities associated with grading and earth disturbance, travel on paved and unpaved roads, and operation of the concrete batch plant and rock crusher. As noted above, BAAQMD's new applicable recommended fugitive dust control measures, which are contained in Mitigation Measures AQ-2a and AQ-2b, will be implemented to reduce impacts associated with fugitive dust emissions to a less-than-significant level. Emissions were estimated for construction activities for informational purposes and are presented in Table A2.3-2.

The Project proponents will be required to obtain permits from BAAQMD for the proposed construction-related operations of the concrete batch plant and the rock crusher. Fugitive sources associated with these facilities will include: the transfer of sand and aggregate, truck loading, mixer loading, vehicle traffic, and wind erosion from sand and aggregate storage piles. Permit stipulations will require the use of Best Available Control Technologies (BACTs). Permit stipulations will likely focus on increasing moisture content of the materials and may require the use of water sprays, enclosures, and bag-house devices. Implementation of BAAQMD's BACTs for batch plants and crushing equipment will ensure that fugitive dust emission impacts that will be associated with these facilities will be less than significant. As noted above, stationary source emissions from fuel combustion at the batch plants were not estimated due to lack of data. Although these emissions will likely be minor after BACTs are implemented, these emissions will contribute to those estimated in Tables A2.3-3 through A2.3-5.

TABLE A2.3-3 SUMMIT PROJECT OPERATIONAL EXHAUST AND FUGITIVE DUST EMISSIONS FOR THE SFBAAB— MAXIMUM DAILY UNMITIGATED EMISSIONS

Operational Activity	ESTIMATED MAXIMUM DAILY UNMITIGATED EMISSIONS (POUNDS/DAY)							
	ROG	No_x	CO	SO_2	PM10 Exhaust	PM10 Dust	PM2.5 Exhaust	PM2.5 Dust
Offsite Worker Trips	0.01	0.07	0.52	0.01	0.00	0.01	0.00	0.01
Maintenace/Operation	1.83	15.14	6.76	0.02	0.62	0.40	0.62	0.02
Total Emissions	1.84	15.22	7.28	0.02	0.62	0.41	0.62	0.02
BAAQMD Significance Threshold	54	54	N/A	N/A	82	N/A	54	N/A
Significant Impact	No	No	No	No	No	No	No	No

TABLE A2.3-4 SUMMIT PROJECT OPERATIONAL EXHAUST AND FUGITIVE DUST EMISSIONS FOR THE SFBAAB— MAXIMUM ANNUAL UNMITIGATED EMISSIONS

Operational Activity	ESTIMATED MAXIMUM ANNUAL UNMITIGATED EMISSIONS (TONS/DAY)							
	ROG	NO_x	CO	SO_2	PM10 Exhaust	PM10 Dust	PM2.5 Exhaust	PM2.5 Dust
Offsite Worker Trips	0.00	0.01	0.07	0.00	0.00	0.00	0.00	0.00
Maintenance/Operation	0.04	0.32	0.23	0.00	0.02	0.00	0.02	0.00
Total Emissions	0.04	0.33	0.29	0.00	0.02	0.01	0.02	0.00
BAAQMD Significance Threshold	10	10	NA	NA	15	NA	10	NA
Significant Impact?	No	No	No	No	No	No	No	No

TABLE A2.3-5 SUMMIT PROJECT CONSTRUCTION EXHAUST AND FUGITIVE DUST EMISSIONS WITHIN THE SFBAAB— MAXIMUM DAILY MITIGATED EMISSIONS

Construction Activity	ESTIMATED MAXIMUM DAILY UNMITIGATED EMISSIONS (POUNDS/DAY)							
	ROG	No_x	CO	SO_2	PM10 Exhaust	PM10 Dust	PM2.5 Exhaust	PM2.5 Dust
Decommissioning and Foundation Removal	9.19	61.65	28.64	0.10	1.48	1.75	1.47	0.08
Laydown, Substation, and Switch Yards	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Road Construction	8.65	58.33	32.01	0.10	1.43	11.20	1.41	3.56
Turbine Foundations and Batch Plants	14.43	97.80	52.27	0.17	2.36	6.04	2.32	4.90
Turbine Delivery and Installation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Utility Collector Line Installation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Restoration and Clean-up	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite Truck Trips	3.30	67.47	17.20	0.21	1.69	0.65	1.44	0.24
Offsite Worker Trips	0.18	0.81	5.85	0.07	0.01	0.14	0.01	0.05
Total Emissions	35.75	286.07	135.97	0.65	6.96	19.83	6.76	8.83
BAAQMD Significance Threshold	54	54	N/A	N/A	82	N/A	54	N/A
Significant Impact?	No	Yes	No	No	No	No	No	No

Note: Construction activity with aero emissions means that this activity Is not anticipated to occur during the time period producing the maximum daily emissions for construction.

[a] Includes construction activities along with fugitive dust emissions from the concrete batch plants.

Operational Activities: In addition to construction-related emissions, the proposed Project will also result in operational-related emissions associated with turbine maintenance activities, substation operation, and worker trips to and from the Project area. However, daily and annual emissions of criteria pollutants associated with operational activities are anticipated to reduce under the proposed Project and will not be considered to result in a significant contribution to existing air quality violations. The maximum daily unmitigated operation-related emissions that will occur in the SFBAAB have been estimated and are presented in Table A2.3-3; maximum annual unmitigated operation-related emissions are presented in Table A2.3-4.

Implementation of Mitigation Measures AQ-2a and AQ-2b will ensure that impacts related to fugitive dust emissions in the SFBAAB will be less than significant. However, implementation of these mitigation measures will not reduce total NOx emissions to a less-than-significance level (Table A2.3-5). This impact of total NOx emissions will be significant and unavoidable.

Mitigation Measures AQ-2a and AQ-2b will not reduce the on-road emissions shown in Table A2.3-1, but these emissions will not exceed SJVAPCD's significance threshold and are, therefore, less than significant.

3.3 Impact AQ-3

Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a nonattainment area for an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)(significant and unavoidable for construction and less than significant for operation)

APWRA Issues to Consider: Will the project create new permanent stationary sources of criteria pollutants or increase criteria pollutant emissions from any existing stationary sources? Will the *project result in an increase in ROG, NOX, PM10, or PM2.5? Will the project include activities not covered in the PEIR?*

Operation of the Project will not result in new permanent stationary sources of criteria pollutants, nor will it increase criteria pollutant emissions from any existing stationary sources. No new permanent workers will be employed under the proposed Project. Drive-by inspections and scheduled wind turbine maintenance will continue to occur on a daily, weekly, or monthly basis, and will be conducted by existing technicians and operations personnel. These activities will continue to be performed per the requirements of the equipment specifications and standard industry practice. Daily emissions of criteria pollutants associated with these activities are anticipated to reduce under the proposed Project due to the reduction of the number of turbines (from 511 to 24) and the reduction of levels of maintenance required by new turbines. Therefore, those emissions will not be considered to result in a significant contribution to existing air quality violations.

Because the Project will also provide renewable energy, the Project will reduce emissions of both criteria pollutants and GHG, thus lessening the amount of pollution emitted overall. Also, because construction emissions of NOx for the Project will be greater than the BAAQMD thresholds after the implementation of Mitigation Measures AQ-2a and AQ-2b (Table A2.3-5), construction impacts will be significant and unavoidable.

3.4 Impact AQ-4

Expose sensitive receptors to substantial pollutant concentrations (less than significant with mitigation)

APWRA Issues to Consider: Will the project be located near sensitive receptors? The closest sensitive receptors to the program area are a community of single-family residences in the city of Livermore located approximately 4,500 feet to the west of the program area boundary and the Mountain House community located approximately 5,000 feet to the east of the program area boundary.

The Project is located near the northeast side of Livermore within approximately 6,400 feet of sensitive receptors. Sensitive receptors are defined as locations where human populations, especially children, seniors, and sick persons, are located and where there is reasonable expectation of continuous human exposure according to the averaging period for the air quality standards (e.g., 24-hour, 8-hour, and 1-hour). Typical sensitive receptors include residences, hospitals, and schools. While the Project is located in the rural setting of the Altamont Pass, sensitive receptors in area vicinity include scattered residences throughout and adjacent to the program area. See Figure A2.1-2 for the location of sensitive receptors in the Project area. The impact for the Project is the same as for overall program as discussed in the FPEIR, Section 3.3.2, “Environmental Impacts”, “Impacts and Mitigation Measures”. Construction activities are anticipated to last for 10 months, and associated emissions will be spatially dispersed over the approximately 3,469-acre Project area. With implementation of Mitigation Measures AQ-2a and AQ-2b, which will reduce both criteria pollutants and toxic air contaminant emissions from construction equipment and reduce the potential health risks to sensitive receptors, this impact will be less than significant.

3.5 Impact AQ-5

Create objectionable odors affecting a substantial number of people (less than significant)

APWRA Issues to Consider: Will the project include activities not covered in the PEIR?

Will the project cause objectionable odors that will affect a substantial number of people?

The Project's impacts are the same as for overall program as discussed in the FPEIR, Section 3.3.2, "Environmental Impacts" because typical, objectionable odor sources are associated with: wastewater treatment plants, sanitary landfills, transfer stations, composting facilities, petroleum refineries, asphalt batch plants, chemical manufacturing facilities, animal feedlots, fiberglass manufacturing facilities, auto body shops, and rendering plants as described in the FPEIR. Although Project construction will involve the use of diesel equipment that could result in the creation of odors, the construction activities will be temporary (approximately 10 months), spatially dispersed over the 3,469-acre Project area, and will take place in areas that are not in the vicinity of sensitive receptors.

This impact will be less than significant. No mitigation will be required.

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4.0 BIOLOGICAL RESOURCES

4.1 Impact BIO-1

Potential for ground-disturbing activities to result in adverse effects on special-status plants or habitat occupied by special-status plants (less than significant with mitigation)

APWRA Issues to Consider: Will project construction affect special-status plants or habitat occupied by special-status plants?

Special-status plant surveys have not been conducted within the Project area and therefore presence/absence cannot be conclusively pre-determined. Based on findings of the Habitat Assessment and the FPEIR, there is a potential for ground-disturbing activities to result in adverse effects on special-status plants or occupied by special-status plants. Ground-disturbing activities associated with the project could result in adverse effects on special-status plants or their habitat. Direct effects include those effects where plants may be removed, damaged, or crushed by ground-disturbing activities, general vehicle usage, and the placement of equipment and supplies. Ground disturbance can kill or damage mature individuals or eliminate their habitat. Excavation alters soil properties and may create conditions unsuitable for the growth of some species or favor their replacement by other species. The roots of shrubs and other perennial species are susceptible to damage from soil compaction by equipment or construction materials. Possible indirect effects on plants could result from erosion that degrades habitat or accidental ignition of a fire that damages or kills individuals. Because these ground-disturbing activities could have substantial adverse effects on special-status plant species, this impact is significant. These effects will be reduced to less than significant with implementation of Mitigation Measures BIO-1a: Conduct surveys to determine the presence or absence of special-status plant species, BIO-1b: Implement Best Management Practices (BMPs) 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, and BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas, as presented in the FPEIR.

4.2 Impact BIO-2

Adverse effects on special-status plants and natural communities resulting from the introduction and spread of invasive plant species(less than significant with mitigation)

APWRA Issues to Consider: Will construction vehicles have the potential to introduce invasive plant species into the project area?

Special-status plant surveys have not been conducted within the Project area and therefore presence/absence cannot be conclusively pre-determined, although natural communities have been generally mapped. Based on findings of the Habitat Assessment and the FPEIR, there is a potential for adverse effects on special-status plants and natural communities resulting from the introduction and spread of invasive plant species. Although much of the Project area is comprised of non-native annual grass species, there is the potential to introduce additional, more aggressive invasive plant species into the area. Construction activities have the potential to facilitate the introduction and spread of invasive non-native plant species by removing vegetation and disturbing soils. Construction vehicles and machinery are known to spread invasive species, which then compete with native species for resources and can alter natural communities by influencing fire regimes, hydrology (e.g., changes in sedimentation and erosion rates), light availability, nutrient cycling, and soil. Invasive species also have the potential to harm human health and the economy by adversely affecting natural ecosystems, recreation, agricultural lands, and developed areas. These effects will be reduced to less than significant with implementation of Mitigation Measure BIO-2: Prevent introduction, spread, and establishment of invasive plant species, BIO-1b, BIO-2, BIO-5c, and WQ-1, as presented in the FPEIR.

4.3 Impact BIO-3

Potential mortality of or loss of habitat for vernal pool branchiopods and curved-footed hygrotus diving beetle (less than significant with mitigation)

APWRA Issues to Consider: Will the project occur in or near vernal pool habitat or drainages?

Will the project involve road construction or widening?

Will the project alter the hydrology or sedimentation?

Will herbicides be used during operation or maintenance near or upstream of suitable habitat for curved-footed hygrotus diving beetle?

Will the project involve road or firebreak maintenance?

Based on findings of the Habitat Assessment and the FPEIR, there is potential for mortality of or loss of habitat for vernal pool branchiopods and curved-footed hygrotus diving beetle. A portion of the project area occurs within designated critical habitat for longhorn fairy shrimp. The Project, including access roads, will potentially occur in or near vernal pool habitat, which could directly impact habitat and water quality. Road construction and widening will occur as a part of the Project, potentially crossing or adjacent to water features such as drainages or vernal pools. There is a potential for the Project to alter local hydrology or sedimentation. Herbicides will potentially be utilized during operation and maintenance of the project near or upstream of suitable habitat for curved-footed hygrotus diving beetle, which could result in mortality or reduced fitness for these species. The Project will involve road maintenance and potentially firebreak maintenance. Estimated permanent and temporary impacts on wetland, ponds, and drainages that may provide habitat for vernal pool branchiopods and curved-footed hygrotus diving beetle cannot be estimated because these features have not yet been delineated. These potential disturbances will be reduced to less than significant effects with implementation of Mitigation Measures BIO-1b, BIO-1e, BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species, and BIO-3b: Implement measures to avoid, minimize, and mitigate impacts on vernal pool branchiopods and curved-footed hygrotus diving beetle, as presented in the FPEIR.

4.4 Impact BIO-4

Potential disturbance or mortality of and loss of suitable habitat for valley elderberry longhorn beetle(less than significant with mitigation)

APWRA Issues to Consider: Will the project cause the removal of elderberry shrubs during construction or operation?

Will the project cause the trimming of elderberry shrubs during construction or operation?

Will the project cause disturbance of elderberry roots within the shrub dripline?

Will the project cause changes in topography or compaction of soil from construction in the vicinity of elderberry shrubs?

Special-status plant surveys have not been conducted within the Project area and therefore the presence/absence of appropriate elderberry habitat for valley elderberry longhorn beetle cannot be conclusively pre-determined. Based on findings of the FPEIR, there is a potential for disturbance or mortality of and loss of suitable habitat for the valley elderberry longhorn beetle. Removal of habitat (elderberry shrubs) and potential injury or mortality of valley elderberry longhorn beetle associated with removal of elderberry shrubs will be considered direct effects on the species. Trimming of elderberry branches 1 inch or more in diameter could also result in injury or mortality of valley elderberry longhorn beetle. Valley elderberry longhorn beetle larvae may feed on the roots of elderberries, making disturbance of elderberry roots within the shrub dripline a direct affect that could result in injury or mortality of individuals. Reduction of water infiltration to elderberry shrubs caused by changes in topography or compaction of soil from construction could result in reduced shrub vigor/vitality and an associated decrease in shoot, leaf, and flower production and could ultimately reduce the suitability of the shrubs to provide habitat for valley elderberry longhorn beetle. These potential disturbances will be reduced to less than significant effects with implementation of Mitigation Measures BIO-1b, BIO-1e, BIO-3a, BIO-4a: Implement measures to avoid or protect habitat for valley elderberry longhorn beetle, and BIO-4b: Compensate for direct and indirect effects on valley elderberry longhorn beetle, as presented in the FPEIR, should they be deemed necessary.

4.5 Impact BIO-5

Potential disturbance or mortality of and loss of suitable habitat for California tiger salamander, western spadefoot, California red-legged frog, and foothill yellow-legged frog(less than significant with mitigation)

APWRA Issues to Consider Will the project include any of the following activities?

- ☐ *Excavation, grading, or stockpiling of soil*
- ☐ *Removal or disturbance of upland habitat*
- ☐ *Installation of power collection and communication systems*
- ☐ *Turbine construction*
- ☐ *Road infrastructure construction/maintenance and upgrades*
- ☐ *Meteorological tower installation and removal*
- ☐ *Temporary staging area set-up*
- ☐ *Reclamation*
- ☐ *Operation and maintenance*
- ☐ *Travel on maintenance roads:*

Based on findings of the Habitat Assessment and the FPEIR, there is a potential for disturbance or mortality of and loss of suitable habitat for California tiger salamander, western spadefoot toad, California red-legged frog, and foothill yellow-legged frog. The Project area is completely within designated critical habitat for California red-legged frog. Estimated permanent and temporary impacts on seasonal wetland, freshwater marsh, mixed willow riparian scrub, ponds, and drainages that may provide habitat for amphibians cannot be estimated because these features have not yet been delineated. The majority of construction activities will take place on suitable upland grassland dispersal and aestivation habitat for California tiger salamander, western spadefoot, and California red-legged frog. Aquatic habitats for specials-status amphibians will generally be avoided; however, direct impacts on habitat and impacts on water quality could result from road construction or widening activities. The Project will consist of various activities that may potentially disturb habitat for these species, including excavation, grading, and stockpiling of soil, removal or disturbance of upland habitat, installation of power collection and communications systems, turbine construction, road infrastructure construction/maintenance and upgrades, meteorological tower installation and removal, temporary staging area set-up, site reclamation, travel on maintenance access roads, and general operation and maintenance activities. Changes in hydrology or sedimentation of habitat from erosion associated with project construction could alter the suitability of their habitat or cause mortality. These potential disturbances will be reduced to less than significant effects with implementation of Mitigation Measures BIO-1b, BIO-1e, BIO-3a, BIO-5a: Implement BMPs to avoid and minimize effects on special-status amphibians, BIO-5b: Compensate for loss of habitat for special-status amphibians, and BIO-5c: Restore disturbed annual grasslands, as presented in the FPEIR.

4.6 Impact BIO-6

Potential disturbance or mortality of and loss of suitable habitat for western pond turtle (less than significant with mitigation)

APWRA Issues to Consider: Will the project involve construction activities in or near ponds, reservoirs, drainages, or surrounding riparian and grassland areas? Will the project involve road construction or widening activities?

Based on findings of the Habitat Assessment and the FPEIR, there is a potential for disturbance or mortality of and loss of suitable habitat for western pond turtle. Estimated permanent and temporary impacts on ponds, reservoirs, and drainages that may provide habitat for western pond turtle cannot be estimated because these features have not yet been delineated. The Project will include construction activities, such as road construction and widening, in or near ponds, reservoirs, drainages, or surrounding riparian and grasslands areas. Aquatic and upland (overwintering and nesting) habitat for western pond turtle may be removed or temporarily disturbed by construction activities. Potential direct impacts include mortality or injury by equipment, entrapment in open trenches or other project facilities, and removal or disturbance of aquatic or upland nesting habitat. Western pond turtles could also be injured or killed if gasoline, oil, or other contaminants enter habitat. Because the majority of construction activities will take place on grassland habitat along ridgelines, suitable aquatic habitat will generally be avoided; however, direct impacts on habitat and impacts on water quality could result from road construction or widening activities. These potential disturbances will be reduced to less than significant effects with implementation of Mitigation Measures BIO-1b, BIO-1e, BIO 3a, and BIO-6: Conduct preconstruction surveys for western pond turtle and monitor construction activities if turtles are observed, as presented in the FPEIR.

4.7 Impact BIO-7

Potential disturbance or mortality of and loss of suitable habitat for Blainville's horned lizard, Alameda whipsnake, and San Joaquin coachwhip (less than significant with mitigation)

APWRA Issues to Consider: Will the project involve construction activities in grassland, chaparral, oak woodland, or scrub? Will the project involve road and firebreak maintenance activities in grassland, chaparral, oak woodland, or scrub?

Based on findings of the Habitat Assessment and the FPEIR, there is a potential for mortality of and loss of suitable habitat for Blainville's horned lizard, Alameda whipsnake, and San Joaquin coachwhip. The Project will include construction activities, including road and firebreak maintenance activities, in grassland, chaparral, oak woodland, and scrub habitats, which may result in injury or mortality due to equipment usage, entrapment in open trenches or other project facilities, and removal or disturbance of habitat. These potential disturbances will be reduced to less than significant effects with implementation of Mitigation Measures BIO-1b, BIO-1e, BIO-3a, BIO-5c, BIO-7a: Implement BMP practices to avoid and minimize effects on special-status reptiles, and BIO-7b: Compensate for loss of habitat for special-status reptiles, as presented in the FPEIR.

4.8 Impact BIO-8

Potential construction-related disturbance or mortality of special-status and non–special-status migratory birds (less than significant with mitigation)

APWRA Issues to Consider: Will construction occur during nesting season (generally February 1–August 31)?

The project has a potential to incur construction related disturbance or mortality of special-status and non-special-status migratory birds. The exact dates of construction activities are not yet known; it is currently assumed that construction may occur during the bird nesting season (generally February 1–August 31). Construction activities during the nesting season of white-tailed kite, bald eagle, northern harrier, Swainson's hawk, golden eagle, western burrowing owl, loggerhead shrike, and tricolored blackbird could result in direct effects on these species, as well as on non–special-status migratory birds, if they are nesting in the program area. Suitable nesting habitat may be present in nearly all land cover types in the program area. Removal of grassland, burrows, wetland and marsh vegetation, and trees or shrubs with active nests and construction disturbance during the breeding season may result in nest abandonment and subsequent loss of eggs or young. Because the placement of wind turbines will generally be on the tops of hills and ridgelines in the program area where trees are not generally present, the number of trees to be removed is expected to be very low. Exclusion of burrowing owls from their burrows during the non-nesting season as part of efforts to avoid or minimize some forms of direct take could result in harm of burrowing owls. Nest disturbance and/or destruction could affect the local population of special-status and non–special-status birds. This will be a significant impact. These potential impacts will be reduced to less than significant effects with implementation of Mitigation Measures BIO-1b, BIO-1e, BIO-3, BIO-5c, BIO-8a (Implement measures to avoid and minimize potential impacts on special-status and non–special-status nesting birds), and BIO-8b (Implement measures to avoid and minimize potential impacts on western burrowing owl), as presented in the FPEIR.

4.9 Impact BIO-9

Permanent and temporary loss of occupied habitat for western burrowing owl and foraging habitat for tricolored blackbird and other special-status and non–special-status birds (less than significant with mitigation)

APWRA Issues to Consider: Will the project result in the temporary or permanent loss of grassland?

The Project will potentially result in the temporary and permanent loss of grassland that provides suitable foraging habitat for burrowing owl and a number of other special-status and non–special-status migratory birds. Because of the limited use of the program area by Swainson's hawks for foraging, no compensation was proposed in the PEIR for the loss of foraging habitat for Swainson's hawk.

Protocol-level surveys for burrowing owls, tricolored blackbirds, and other birds have not been recently conducted within the Project area. Recently or currently occupied burrowing owl habitat is not documented within the Project area but burrowing owls have a high potential to breed within the Project area. Suitable habitat associated with abundant ground squirrel burrows is present throughout the project area. A burrowing owl was observed within the Project area in March 2014 just outside of the southern proposed Operation and Maintenance area; CNDDB data documents numerous breeding occurrences of burrowing owls within the BSA during the past decade.

Grassland provides important foraging habitat for tricolored blackbirds, and non-breeding habitat for special status amphibians (tiger salamander, red-legged frog, western spadefoot). Special status amphibians have been documented by the CNDDB in burrow refugia in grassland habitat in the biological study area. A flock of approximately 50 tricolored blackbirds was observed foraging at the site during a site visit in March 2014, but suitable wetland breeding habitat is not present within the Project area.

The loss of grassland foraging habitat for special-status and non–special-status birds will be compensated through implementation of Mitigation Measure BIO-5b (for special-status amphibians) and/or through the standardized mitigation ratios for non-listed species developed for the EACCS. CDFW has determined that compensation is required for permanent loss of occupied burrowing owl habitat (i.e., where burrowing owls have been documented to occupy burrows in the preceding 3 years). Permanent loss of occupied burrowing owl habitat could affect the local population and will be a significant impact. These potential impacts will be reduced to less than significant effects with implementation of Mitigation Measures BIO-5b, BIO-5c, and BIO-9: Compensate for the permanent loss of occupied habitat for western burrowing owl, as presented in the FPEIR. Additionally, in the long-term, the amount of landscape returned to grassland habitat in the process of decommissioning the first- and second-generation turbines will offset the amount habitat lost to repowering activities.

4.10 Impact BIO-10

Potential injury or mortality of and loss of habitat for San Joaquin kit fox and American badger (less than significant with mitigation)

APWRA Issues to Consider: Will the project result in temporary or permanent impacts on grassland? Will the project use vehicles that could hit San Joaquin kit fox or American badger?

Will the project have exposed pipes, large excavated holes, or trenches that could entrap San Joaquin kit foxes or American badgers?

Will the project have operation or maintenance activities, such as road and firebreak maintenance?

Based on findings of the Habitat Assessment and the FPEIR, there is a potential for mortality of and loss of suitable habitat for San Joaquin kit fox and American badger. The Project will result in temporary and permanent impacts to grasslands. Mortality to these species could occur due to vehicle usage during construction activities, and operations and maintenance activities. The installation of culverts, and excavation of holes and trenches, will occur during the course of the project that could possibly entrap these species. These potential effects will be reduced to less than significant with implementation of Mitigation Measures BIO-1b, BIO-1e, BIO-3a, BIO-5c, BIO-10a: Implement measures to avoid and minimize potential impacts on San Joaquin kit fox and American badger, and BIO-10b: Compensate for loss of suitable habitat for San Joaquin kit fox and American badger, as presented in the FPEIR.

4.11 Impact BIO-11

Avian mortality resulting from interaction with wind energy facilities (significant and unavoidable)

APWRA Issues to Consider: Will the project include turbines or powerlines?

Estimated avian mortality for the pre-Project non-repowered turbines and the proposed repowered turbines are shown in Table A2.4-1. This table is similar to Table 3.4-10 of the PEIR, but the non-repowered fatality rates differ slightly because they are based on the average rates of bird years 2005 to 2012 (ICF 2014), rather than 2005-2011 as was used in the PEIR. The adjusted fatality rates from non-repowered turbines (APWRA-wide), and repowered turbines (based on Vasco Winds) were multiplied by the nameplate capacity of the pre-Project and Project (39.9 MW and 54 MW) to estimate total number of fatalities resulting from the pre-Project non-repowered turbines and repowered turbines.

TABLE A2.4-1 ESTIMATED ANNUAL FATALITY RATES FOR NON-REPOWERED AND REPOWERED TURBINES AT SUMMIT WIND

SPECIES/GROUP	ADJUSTED FATALITY RATES[1]		ESTIMATED SUMMIT WIND FATALITIES[4]		DECREASE
	NON REPOWERED[2]	REPOWERED[3]	NON REPOWERED 39.9 MW	REPOWERED 54 MW	
American Kestrel	0.58	0.30	23.02	16.20	30%
Burrowing Owl	0.70	0.05	27.93	2.70	90%
Golden Eagle	0.08	0.03	3.23	1.73	47%
Red-tailed Hawk	0.41	0.25	16.40	13.50	18%
All Raptors	2.09	0.64	83.35	34.56	59%
All Native Non-raptors	4.24	2.09	169.30	112.86	33%

[1] Annual Fatalities per MW of nameplate capacity
[2] Average of 2005-2012 bird years for entire APWRA. Obtained from (ICF 2014)
[3] Values from first year of monitoring (2013) at Vasco Winds. Obtained from PEIS, Table 3.4-10.
[4] Estimated total number of Project-wide fatalities. Calculated by multiplying adjusted fatality rate by MW

There are no federally listed threatened or endangered avian species likely to occur within the Project area and no fatalities of federally listed avian species have been observed within the APWRA (ICF 2014). As described above, and shown in Table A2.4-1, the repowered Project area is expected to reduce estimated fatality rates of all four focal species, all raptors combined, and native non-raptors. However, fatalities will still be expected to result from the operation of the repowered turbines, and uncertainty surrounding the accuracy of the estimated fatality rates and the types of species potentially affected remains. Considering this information, and despite the anticipated reductions in avian impacts compared to the baseline rates, the County has determined to use a conservative approach for the impact assessment, concluding that turbine related fatalities could constitute a substantial adverse effect on avian species because the rates for some or all of the species could be greater than the baseline rates. This impact will be significant. Implementation of Mitigation Measures BIO-11a through BIO-11i will reduce this impact, but not to a less-than-significant level; accordingly, this impact is considered significant and unavoidable. These measures, which individual project proponents will be required to carry out as appropriate in light of project-specific conditions, were derived from the EACCS, based on established practice, or developed in the context of the program’s conservation objectives. They include: 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 post-construction avian fatality monitoring for all repowering projects, BIO-11h: Compensate for the loss of raptors and other avian species by contributing to conservation efforts, and BIO-11i: Implement an avian adaptive management program, as presented in the FPEIR.

4.12 Impact BIO-12

Potential mortality or disturbance of bats from roost removal or disturbance (less than significant with mitigation)

APWRA Issues to Consider: Will the project construction or decommissioning involve any of the following activities?

- ☐ *Increased traffic, noise, lighting, or human access*
- ☐ *Removal or disturbance of trees, rock outcrops, debris piles, outbuildings, or other artificial structures*
- ☐ *Removal of special-status species' roost structures*

The project has the potential to incur mortality or disturbance of bats from roost removal or disturbance. Several species of both common (myotis spp.) and special-status (pallid bat, Townsend's big-eared bat) bats could occur in or around the project area, and could use the area for foraging, dispersal, and migration. Bats may use rock outcrops, trees, buildings, bridges, and other structures in the vicinity of the Project area as maternity or migratory stopover roosts. Permanent water bodies and stock tanks in and adjacent to the program area provide sources of fresh water for both resident and migratory bats. Construction and decommissioning of turbines could result in disturbance or loss of active bat roosts through increased traffic, noise, lighting, and human access. Removal or disturbance of trees, rock outcrops, debris piles, outbuildings, or other artificial structures is not anticipated to occur, but if it does it could result in removal of roost habitat and mortality of bats using the structure as a roost. Several species of bat are sensitive to disturbance and may abandon flightless young, or they may simply not return to the roost once disturbed, resulting in the loss of that roost as habitat for the local population. Because some bats roost colonially, removal of special-status species' roost structures in a roost-limited habitat could result in the loss of a significant portion of the local bat population. This will be a significant impact. These potential effects will be reduced to less than significant with implementation of Mitigation Measures BIO-1b, BIO-3, BIO-12a: Conduct bat roost surveys, and BIO-12b: Avoid removing or disturbing bat roosts, as presented in the FPEIR.

4.13 Impact BIO-13

Potential for construction activities to temporarily remove or alter bat foraging habitat (less than significant)

APWRA Issues to Consider: Will project construction degrade bat foraging habitat by replacing vegetation with nonvegetated land cover types?

Construction of repowering projects could degrade bat foraging habitat by replacing vegetation with non-vegetated land cover types. Project construction will create a temporary increase in traffic, noise, and artificial night lighting in the program area, reducing the extent of landscape available for foraging. However, the amount of landscape returned to foraging habitat in the process of decommissioning the first- and second-generation turbines will offset the amount of foraging habitat lost to repowering activities. This impact will be less than significant. No mitigation is required.

4.14 Impact BIO-14

Turbine-related fatalities of special-status and other bats (significant and unavoidable – *findings of overriding considerations made with the program EIR*)

APWRA Issues to Consider: Will the project involve turbines?

The project involves turbines and has the potential to incur turbine-related fatalities of special-status and other bats. Resident and migratory bats flying in and through the program area may be killed by collision with wind turbine blades or other interaction with the wind turbine generators. Insufficient data are currently available to develop accurate fatality estimates for individual bat species. Five bat species have been documented in fatality monitoring programs in the APWRA, of which two (western red bat and hoary bat) are special-status species. Extrapolating from existing fatality data and from trends observed at other wind energy facilities where fourth-generation turbines are in operation, it appears likely that fatalities will occur predominantly in the late summer to mid-fall migration period; that fatalities will consist mostly of migratory bats, particularly Mexican free-tailed bat and hoary bat; that fatalities will occur sporadically at other times of year; and that fatalities of one or more other species will occur in smaller numbers.

Diablo Winds, Buena Vista, and Vasco Winds are the only repowered projects in the APWRA for which estimates of bat fatality rates are available. Based on these estimates, bat collision risk increases substantially when old-generation turbines are replaced by newer, larger turbines. Based on these estimates as presented in the FPEIR, annual estimated bat fatalities in the program area from implementation of Alternative 1 are anticipated to increase from the current estimate of 0.26 annual fatalities per MW to 1.67–3.92 annual fatalities per MW. Adjusting these estimates to the current 39.9 MW Project and the repowered 54 MW Project we anticipate an increase from approximately 10 bat fatalities per year to 90-212 bat fatalities per year.

Implementation of Mitigation Measures will reduce this impact, but not to a less-than significant level; accordingly, this impact is considered significant and unavoidable. These mitigation measures include: BIO-14a: Site and select turbines to minimize potential mortality of Bats, BIO-14b: Implement post-construction 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, and BIO-14e: Compensate for expenses incurred by rehabilitating injured bats BIO-14e: Compensate for expenses incurred by rehabilitating injured bats, as presented in the FPEIR.

4.15 Impact BIO-15

Potential for road infrastructure upgrades to result in adverse effects on alkali meadow (less than significant with mitigation)

APWRA Issues to Consider: Will the project involve grading, widening, or regravelling of existing roads or construction of new roads in alkali meadow habitat?

Will existing culverts be upgraded or new culverts installed in alkali meadow habitat?

Although natural communities have been generally mapped, alkali meadow can occur in small patches, easily overlooked and unrecorded during a general habitat assessment. Based on findings of the FPEIR, there is a potential for road infrastructure upgrades to result in adverse effects on alkali meadow. The project will include grading, widening, regravelling existing roads, construction of new roads through habitat that may contain alkali meadow. Additionally, upgrading of and installation of new culverts will occur, also in habitat that may contain alkali meadow. Should this community occur within areas of potential disturbance and cannot be feasibly avoided, effects will be reduced to less than significant levels with implementation of Mitigation Measures BIO-15: Compensate for the loss of alkali meadow habitat, as presented in the FPEIR.

4.16 Impact BIO-16

Potential for road infrastructure upgrades to result in adverse effects on riparian habitat (less than significant with mitigation)

APWRA Issues to Consider: Will the project involve grading, widening, or regravelling of existing roads or construction of new roads in riparian habitat?

Will existing culverts be upgraded or new culverts installed in riparian habitat?

Although natural communities have been generally mapped, riparian habitat can occur in small patches, easily overlooked and unrecorded during a general habitat assessment. Based on findings of the FPEIR, there is a potential for road infrastructure upgrades to result in adverse effects on riparian habitat. The project will include grading, widening, regravelling existing roads, construction of new roads through habitat that may contain alkali meadow. Additionally, upgrading of and installation of new culverts will occur, also in habitat that may contain riparian habitat. Should this community occur within areas of potential disturbance and cannot be feasibly avoided, effects will be reduced to less than significant levels with implementation of Mitigation Measures BIO-16: Compensate for the loss of riparian habitat, as presented in the FPEIR.

4.17 Impact BIO-17

Potential for ground-disturbing activities to result in direct adverse effects on common habitats (less than significant)

APWRA Issues to Consider: Will the project cause ground disturbance in common habitats?

Will the project not include the following measures, which are part of the project, as described in Chapter 2, Program Description, of the EIR?

-*develop a reclamation plan in coordination with the County, USFWS, and CDFW*

-*ensure the reclamation plan is completed and approved by the County 6 months in advance of project decommissioning*

Ground disturbance for the project will occur generally in common habitats, consisting primarily of annual grassland. A reclamation plan will be developed in coordination with the County, USFWS, and CDFW, to address these common lands disturbed by project related construction activities. The plan will be completed and approved by the County six month in advance of project decommissioning. No other mitigation is required, as presented in the FPEIR.

4.18 Impact BIO-18

Potential for road infrastructure upgrades to result in adverse effects on wetlands (less than significant with mitigation)

APWRA Issues to Consider: Will the project involve grading, widening, or regravelling of existing roads or construction of new roads in wetlands?

Will existing culverts be upgraded or new culverts installed in wetlands?

Wetlands are present in the project area. The project may potentially require road infrastructure upgrades that could result in adverse effects on wetlands, based on findings of the Habitat Assessment and the FPEIR. The project will include grading, widening, regravelling existing roads, construction of new roads through habitat that may contain wetlands. Additionally, upgrading of and installation of new culverts will occur, also in habitat that may contain wetlands. Should wetlands occur within areas of potential disturbance and cannot be feasibly avoided, effects will be reduced to less than significant levels with implementation of Mitigation Measures BIO-18: Compensate for the loss of wetlands, as presented in the FPEIR.

4.19 Impact BIO-19

Potential impact on the movement of any native resident or migratory wildlife species or established native resident or migratory wildlife corridors, and the use of native wildlife nursery sites (significant and unavoidable - *findings of overriding considerations made with the program EIR*))

APWRA Issues to Consider: Will the project involve construction activities or fencing of work areas?

The project may potentially have an impact on the movement of native resident or migratory wildlife species or established native resident or migratory wildlife corridors, and the use of native wildlife nursery sites, based on findings of the Habitat Assessment and the FPEIR. Many common wildlife species, including ground squirrels, coyote, raccoon, and skunk, and potentially special-status wildlife species, such as California red-legged frog, Alameda whipsnake and American badger, are likely to occur in and move through the project area. Construction activities associated with the project and fencing of work areas may temporarily impede wildlife movement through the work area or cause animals to travel longer distances to avoid the work area. This could result in higher energy expenditure and increased susceptibility to predation for some species and is a potentially significant impact. The construction period for project may exceed 9 months for various reasons, and will potentially encompass the movement/migration period for some species (e.g., California tiger salamander movement to/from breeding ponds). In particular, smaller animals, whose energy expenditures to travel around or avoid the area are greater than for larger animals, could be more strongly affected. Upon completion of the project, the new wind turbines will be spaced apart and will not be a barrier to on-the-ground wildlife movement. Additionally, there will be fewer turbines on the ground, and a net increase in the amount of natural area will result from the restoration of decommissioned turbine pads and foundations. This removal of turbines and increase of natural area will partially compensate for this impact. As discussed above for special-status species, the project has the potential to affect native wildlife nursery sites (i.e., breeding areas). Because common species may also use these breeding areas, they may also be affected by the project. This will constitute a significant unavoidable effect. These potential effects will be avoided and minimized with implementation of Mitigation Measures BIO-1b, Implementation of Mitigation Measures BIO-1b, BIO-1e, BIO-3a, BIO-4a, BIO-5a, BIO-5c, BIO-7a, BIO-8a, BIO-8b, BIO-10a, BIO-11b, BIO-11c, BIO-11d, BIO-11e, BIO-11i, BIO-12a, BIO-12b, BIO-14a, as presented in the FPEIR.

4.20 Impact BIO-20

Conflict with local plans or policies (less than significant with mitigation)

APWRA Issues to Consider: Will project construction or operation cause the loss of special-status species or their habitat, loss of alkali meadow, loss of riparian habitat, or loss of existing wetlands?

The Project will potentially cause the loss of special-status species or their habitat, loss of alkali meadow, loss of riparian habitat, and loss of existing wetlands, based on findings of the Habitat Assessment and the FPEIR, which will conflict with local plans or policies. The East County Area Plan (ECAP) encourages the preservation of areas known to support special-status species, no net loss of riparian and seasonal wetlands, and protection of existing riparian woodland habitat. ECAP has several policies related to windfarms, including establishing a mitigation program to minimize the impacts of wind turbine operations on bird populations. Loss of special-status species and their habitat, loss of alkali meadow, loss of riparian habitat, and loss of existing wetlands as a result of implementing the project will be in conflict with these policies. This impact is significant, but will be reduced to less than significant with the implementation of Mitigation Measures BIO-1a, BIO-1b, BIO-1c, BIO-1d, BIO-1e, BIO- 3a, BIO-4a, BIO-4b, BIO-5a, BIO-5b, BIO-5c, BIO-7a, BIO-7b, BIO-8a, BIO-8b, BIO-9, BIO-10a, BIO-10b, and BIO-15, BIO-16, and BIO-18, as presented in the FPEIR.

4.21 Impact BIO-21

Conflict with provisions of an adopted HCP/NCCP or other approved local, regional, or state habitat conservation plan (no impact)

APWRA Issues to Consider: Will the project include activities that are not within the scope of the project described in the PEIR?

There are no adopted HCP-NCCPs for the project area. The East Alameda County Conservation Strategy (EACCS) provides formal guidance for project planning and permitting process to ensure that impacts are offset in a biologically effective manner, although it the EACCS is not a formal HCP. The mitigation measures set forth above are based on measures from the FPEIR, which in turn are based on measures from the EACCS, with some modifications and additions. The project will have no impact on adopted HCP/NCCPs.

5.0 CULTURAL RESOURCES

5.1 Impact CUL-1

Cause a substantial adverse change in the significance of a historical resource (less than significant with mitigation)

APWRA Issues to Consider: Are any historic architectural resources located in the project area?

If historic-era resources are present in the project area, they could be adversely affected during Project-related earth-disturbing activities, such as excavation of tower foundations, cutting and filling of soils at and near the tower pad, trenching for power collection systems, and grading for roads and staging areas.

An archaeological records search and survey of the Project footprint was undertaken by POWER Engineers, Inc. archaeological staff to determine if such resources exist in the project area (see Attachment A5). The results of the survey showed that there are no historic-era resources that will be directly impacted by project construction, and that one historic-era resource is known near the area of direct Project impact.

A qualified Project Archaeologist should design a Cultural Resource Mitigation-monitoring Plan (CRMP) that guides how avoidance measures, application of Cultural BMP's, and the process for evaluating or avoiding resources uncovered without an archaeologist present will take place during construction. The CRMP must be written and submitted to the County prior to the start of the construction phase. Active construction monitoring is not recommended for this Project because the potential for impacting historic-era resources during construction is considered "low" because the field Survey showed that no cultural resource sites are located in the footprint of the current Project construction zone.

The historic-era resources that exist near the area of direct Project impact (site ARI#1) can be avoided by constructing a temporary fence (a Cultural BMP) that separates the resource's features from any grading areas.

Implementation of these measures will reduce this impact to a less-than-significant level because the site will be avoided and no ground disturbing activities will not occur in the area of the site.

5.2 Impact CUL-2

Cause a substantial adverse change in the significance of an archaeological resource(less than significant with mitigation)

APWRA Issues to Consider: Will the project involve ground-disturbing activities?

If archaeological resources are located in the Project area, they could be adversely affected during Project-related earth-disturbing activities such as: excavation of tower foundations, cutting and filling of soils at and near the tower pad, trenching for power collection systems, and grading for roads and staging areas.

The results of the survey (see Attachment A5) show there are no archaeological resources that will be directly impacted by project construction, but one resource (ALA-54) could be located near the Project footprint. This resource can be avoided by constructing a temporary fence that separates the resource's features from any grading or trenching areas.

A qualified Project Archaeologist should design a Cultural Resource Mitigation-monitoring Plan (CRMP) that guides how avoidance measures, application of Cultural BMP's, and the process for evaluating or avoiding resources uncovered without an archaeologist present shall take place. This must be written and submitted to the County prior to the start of the construction phase. Active construction monitoring is not recommended for this project because the potential for impacting archaeological resources during construction is considered "low."

Implementation of these measures will reduce this impact to a less-than-significant level because appropriate avoidance measures, BMPs and procedures will be identified and implemented to avoid resource impacts.

5.3 Impact CUL-3

Disturb any human remains, including those interred outside of formal cemeteries (less than significant with mitigation)

APWRA Issues to Consider: Will the project involve ground-disturbing activities?

The results of the survey (see Attachment A5) show there are no known human remains that will be directly impacted by Project construction. It is possible that human remains could be uncovered during Project construction, and the CRMP must implement mitigation measure CUL-4 (see Attachment A5).

6.0 GEOLOGY, SOILS, MINERAL RESOURCES, AND PALEONTOLOGICAL RESOURCES

6.1 Impact GEO-1

Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of rupture of a known earthquake fault (less than significant with mitigation)

APWRA Issues to Consider: Will the project involve construction activities?

A Geotechnical Investigation will be completed for the Project and submitted to Alameda County Building Department prior to construction, and the results will be incorporated into the design of the turbines as detailed in GEO-1.

Placement of a turbine or power collection system on or near a fault could result in damage or destruction of the turbine. If a turbine were constructed on or near a fault, rupture of that fault could damage a turbine or cause harm to personnel on the site. The turbine could be damaged or collapse and possibly injure personnel or property in the immediate area. The daily operation and periodic maintenance of the facility does not require continuous occupation of the site by workers. Thus, the risk of injury to personnel is minimized.

Detailed, site-specific geotechnical investigations will reveal the location of fault traces in the area. Turbine foundation and power collection system design and construction details will be developed and implemented based on the investigation so that chance of damage to or collapse of the turbines or collection system resulting from a seismic event will be minimized.

The impact will be significant, but because design modification will occur as a result of geotechnical investigations, implementation of Mitigation Measure GEO-1 will reduce this impact to a less-than-significant level.

6.2 Impact GEO-2

Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of strong seismic ground shaking (less than significant with mitigation)

APWRA Issues to Consider: Will the project involve construction activities?

A Geotechnical Investigation will be completed for the Project and submitted to Alameda County Building Department prior to construction, and the results will be incorporated into the design of the turbines.

Construction of turbines or power collection systems in areas with potential to experience strong ground shaking could expose people or structures to potential substantial adverse effects. As noted above, detailed site-specific geotechnical investigations will reveal the location of fault traces in the area to inform design details which will minimize potential harm to personnel or property.

The range of potential shaking intensity resulting from a seismic event in the Project is identical to those intensities potentially experienced in the program area, from low to high. The potential damage and harm that could result from moderately strong ground shaking will be a significant impact.

Both the State of California and Alameda County have stringent building safety requirements, and all construction will have to comply with the CBSC. However, this may not address all seismic-related safety issues. If the turbine foundation and power collection system design and construction were not based on rigorous, detailed, site-specific geotechnical investigation, the foundation or collection system could fail during strong ground shaking and cause damage to or collapse of the turbine or collection system.

Implementation of Mitigation Measure GEO-1 will reduce this impact to a less-than-significant level because design modification will occur as a result of geotechnical investigations.

6.3 Impact GEO-3

Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of seismic-related ground failure, including landsliding and liquefaction (less than significant with mitigation)

APWRA Issues to Consider: Will the project involve construction activities?

A Geotechnical Investigation will be completed for the Project and submitted to Alameda County Building Department prior to construction, and the results will be incorporated into the design of the turbines.

Construction of turbines or power collection systems in areas with potential to experience seismic-related ground failure, such as landsliding, liquefaction, lateral spread, and differential settlement, could expose people or structures to potential substantial adverse effects. If turbine foundations or power collection systems are not properly designed and sited for the earthquake-induced ground failure conditions present at the project area, they could fail and cause damage to or collapse of the turbine towers or collection system. This damage or collapse could cause harm to personnel or property in the immediate area.

Both the State of California and Alameda County have stringent building safety requirements, and all construction will have to comply with the CBSC. However, this may not address all seismic-related ground failure issues.

This impact will be significant, but implementation of Mitigation Measure GEO-1 will reduce this impact to a less-than-significant level because design modification will occur as a result of geotechnical investigations.

6.4 Impact GEO-4

Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of landsliding (less than significant with mitigation)

APWRA Issues to Consider: Will the project involve construction activities?

A Geotechnical Investigation will be completed for the Project and submitted to Alameda County Building Department prior to construction, and the results will be incorporated into the design of the turbines.

In addition to the seismic-related ground failure described in impact GEO-3, construction of turbines or power collection systems in areas with potential to experience non-seismic-related landsliding caused by heavy precipitation could also expose people or structures to potential substantial adverse effects. If turbine foundations or power collection systems were not properly designed and sited for the landsliding conditions present at the project area, they could fail and cause damage to or collapse of the turbine towers or collection system. This damage or collapse could cause harm to personnel or property in the immediate area. The program area, including the Summit project area, is in steep, hilly terrain in an area known to be susceptible to landsliding. The potential damage and harm that could result from landsliding will be a significant impact.

Both the State of California and Alameda County have stringent building safety requirements, and all construction will have to comply with the CBSC. However, this may not address all seismic-related landsliding issues. If the turbine foundation and power collection system design and construction are not based on rigorous, detailed, site-specific geotechnical investigation, the foundation or collection system could fail as a result of landsliding and cause damage to or collapse of the turbine or collection system.

This impact will be significant, but implementation of Mitigation Measure GEO-1 will reduce this impact to a less-than-significant level because design modification will occur as a result of geotechnical investigations.

6.5 Impact GEO-5

Result in substantial soil erosion or the loss of topsoil (less than significant)

APWRA Issues to Consider: Will the project not include the following measures, which are part of the project, as described in Chapter 2, Program Description, of the EIR?

- *Preparation of a SWPPP*
- *Development of a reclamation plan in coordination with the County, USFWS, and CDFW*
- *Completion and County approval of the reclamation plan 6 months in advance of project decommissioning*

The Project will require the development and implementation of a site specific Stormwater Pollution Prevention Plan (SWPPP) as part of National Pollutant Discharge Elimination System (NPDES) permitting.

Ground-disturbing earthwork associated with construction of the proposed project may increase soil erosion rates. These activities, which include excavation, grading, trenching, compaction, and road widening, will cause surface disturbance and vegetation removal during turbine foundation construction and power collection system and communication lines installation and, to a lesser extent, during preparation and decommissioning of the staging areas. As a result, soil will be exposed to rain and wind and potentially cause accelerated erosion, thereby resulting in significant impacts.

An approved SWPPP, as required by the applicable Regional Water Board, is required when a project involves one acre or more of disturbance. A SWPPP specifies Best Management Practices (BMPs) that will prevent construction pollutants from contacting stormwater with the intent of keeping all products of erosion from moving offsite into receiving waters. Compliance with the federal and local erosion- related regulations applicable to the proposed program (i.e., the SWPPP that is developed for the site and the requirements of the county’s Stormwater Quality Management Plan) will ensure that the construction activities do not result in significant erosion and that impacts will be reduced to a less-than-significant level.

To address erosion of decommissioned sites, as described in Chapter 2, Program Description of the PEIR, decommissioned sites will be regraded and seeded to pre-project conditions (unless leaving certain roadways or footings is deemed to be more protective of natural resources than removal). The project applicants will develop a reclamation plan in coordination with the County, USFWS, and CDFW. The reclamation plan will be completed and approved by the County 6 months in advance of project decommissioning. Compliance with the reclamation plan will ensure that decommissioned sites do not result in significant erosion and that impacts will be reduced to a less-than-significant level.

6.6 Impact GEO-6

Be located on expansive soil, creating substantial risks to life or property (less than significant with mitigation)

APWRA Issues to Consider: Will the project involve construction activities?

There is potential for the Project to be located on expansive soils. Turbine foundations built on expansive soils will be subject to the expansion and contraction of these soils, which could cause damage to structures if the subsoil, drainage, and foundation are not properly engineered. A Geotechnical Investigation will be completed for the Project and submitted to Alameda County Building Department prior to construction, and the results will be incorporated into the design of the turbines as detailed in Mitigation Measure GEO-1. Soil sampling and treatment procedures are addressed by state and local building codes. Compliance with these codes and implementation of Mitigation Measure GEO-1 will ensure that this is a less-than-significant impact.

6.7 Impact GEO-7

Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature (less than significant with mitigation)

APWRA Issues to Consider: Will the project involve ground-disturbing earthwork associated with construction?

If fossils are present in the project area, they could be damaged by during earth-disturbing activities during construction activities, such as excavation for foundations, placement of fills, trenching for power collection systems, and grading for roads and staging areas. Paleontological resource damage is dependent on potential occurrence within geologic units and the extent to which earth disturbing activities occur.

The archaeological survey report (see Attachment A5) included an analysis of the fossil bearing rock formations in and near the Project area. In addition, fossils were observed during the survey. The results of the analysis showed that there are paleontologic resources that are likely to be directly impacted by Project construction, but only in relatively undisturbed areas. The implementation of a Paleontologic Resource Mitigation-monitoring Plan (PRMP) will reduce the potential impacts to a less-than-significant level.

A qualified Project Paleontologist should be retained to write a PRMP, and evaluate the potential need for the locations of active paleontological monitoring. Active paleontologic construction monitoring is recommended for this project for those portions of the project footprint that have a “high” level of paleontologic sensitivity, such as in previously undisturbed areas. Monitoring is not recommended in “low sensitivity” areas such as those areas previously disturbed by existing wind farm construction.

The PRMP must guide the duties of the paleontological monitor(s) during the construction phase and describe the process by which recovered fossils shall be collected, analyzed, and curated.

Implementation of Mitigation Measure PAL-5 (see Attachment A5) will reduce this impact to a less-than-significant level because areas of “high potential’ for paleontological resources will be identified and monitoring measure will be identified and implemented.

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7.0 GREENHOUSE GAS EMISSIONS

7.1 Impact GHG-1

Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment (less than significant)

APWRA Issues to Consider: Will the project include activities that are not within the scope of the project described in the PEIR?

The Project will not include activities not already cover in the PEIR.

Construction of the Project will occur over a period of approximately 9 months. It is estimated there will be approximately 184 workdays that will involve the use of heavy construction equipment. Construction activities at the Project site will be associated with: decommissioning, foundation removal of existing turbine sites, laydown yards, substations, switch yards, road construction, construction of new turbine foundations, batch plant operations, turbine delivery and installation, utility collector line installation, restoration, and clean up. Each of these activities will occur over periods that will range from approximately 2 to 4 months. It is estimated that as many as 90 pieces of off-road construction equipment, including cranes, excavators, graders, loaders, cement trucks, and bulldozers, will be required for an average of 8 hours per day to construct the Project. At any given time, approximately 6 to 54 pieces of construction equipment will be operating, depending on the construction phasing (see Attachment A1, Section 4.2).

In addition to the off-road equipment, on-road vehicle trips will be required to deliver materials and equipment to the construction sites and to transport workers to and from the construction sites. It is anticipated that an average of approximately 140 truck trips and 86 commuting worker trips will be required per day during the 9 month construction period for each year. It is anticipated that the majority of equipment and material-related truck trips will originate at the Port of Stockton (45 miles to the northeast) and in the City of Tracy (15 miles to the east), and that the construction worker related commute trips will occur entirely within the Bay Area. The portion of the equipment, material, and aggregate haul trips that will originate at the Port of Stockton and in the City of Tracy will be generated in the San Joaquin Valley, which is under the jurisdiction of the San Joaquin Valley Pollution Control District (SJVAPCD). However, the SJVAPCD does not have thresholds for greenhouse gas (GHG) emissions. Therefore, the heavy-duty truck trip exhaust emissions that will be generated in the San Joaquin Valley have been added to the Bay Area GHG emissions and compared to Bay Area Air Quality Management District (BAAQMD) annual significance thresholds.

Total GHG emissions associated with construction of the Project has been estimated and are presented in Table A2.7-1. As discussed above, construction GHG exhaust emissions were estimated using California Emissions Estimator Model (CalEEMod) (South Coast Air Quality Management District 2011) and the ARB EMFAC 2011 model (California Air Resources Board 2013c). In addition, indirect GHG emissions associated with water use for dust control were estimated for the Project by employing emission factors and assumptions from the CAPCOA GHG mitigation measure guidance document (California Air Pollution Control Officers Association 2010), and the Climate Registry (CR) (Climate Registry 2013a, 2013b).

Operational GHG emissions above baseline will consist of SF_6 leakage; these emissions were quantified using the same methods as discussed for the program (see FPEIR, Section 3.7.2, “Environmental Impacts”). Daily emissions associated with maintenance of the Project will be similar to baseline conditions, and thus the potential increase or decrease in maintenance-related emissions will be negligible. However, operational emissions from offsite worker trips, maintenance activities, and electricity use were estimated. Emission sinks from partial reabsorption of carbon dioxide (CO_2) during the life of the concrete structures were also included as an emissions sink for operational activities (Portland Cement Association 2013). These emissions are presented in Table A2.7-1.

TABLE A2.7-1 SUMMIT PROJECT CONSTRUCTION AND OPERATION GHG EMISSIONS FOR THE BAY AREA

Construction Activity	ESTIMATED TOTAL EMISSIONS (METRIC TONS)				
	CO_2	CH_2	N_2O	SF_6	CO_2e
Construction Activity (All Years)					
Decommissioning and Foundation Removal	234.77	0.01	0.00	0.00	236.99
Laydown Yards, Substations and Switch Yards	152.30	0.01	0.00	0.00	153.78
Road Construction	218.17	0.01	0.00	0.00	220.27
Turbine Foundations and Batch Plant A	969.73	0.04	0.01	0.00	974.94
Turbine Delivery and Installation	149.61	0.00	0.00	0.00	151.04
Utility Collector Line Installation	104.88	0.00	0.00	0.00	105.83
Restoration and Clean-up	76.37	0.00	0.00	0.00	77.08
Offsite Truck Trips	1,700.35	0.01	0.09	0.00	1,727.07
Offsite Worker Trips	114.70	0.00	0.01	0.00	115.72
Electricity Use	0.54	0.00	0.00	0.00	0.54
Water Use – Indirect Emissions	5.72	0.00	0.00	0.00	5.76
Total	3,727.15	0.12	0.13	0.00	3,769.00
Amortized (Per Year, for 30 Years)					125.64
Operational Activity (Per Year)	0.00	0.00	0.00	0.00	0.00
Offsite Worker Trips	15.25	0.00	0.00	0.00	15.37
Maintenance/Operation	36.50	0.00	0.00	0.00	43.04
Electricity Use	0.54	0.00	0.00	0.00	0.54
Circuit Breaker Leakage	0.00	0.00	0.00	0.00	15.37
Concrete Carbonation	-0.60	0.00	0.00	0.00	-0.60
Total	57.81	0.00	0.00	0.00	73.72
Total Construction and Operation Emissions (Per Year)					199.35
Annual GHG Reductions from Offsetting Grids Electricity					8,483.80
Annual Net GHG Emissions					8,284.45
BAAQMD Significance Threshold					1,100.00
Significant Impact?					No

Includes direct emissions from construction activities for the construction phase along with indirect stationary CO_2 emissions associated with the manufacture of the concrete (offsite) used at the batch plants (onsite). Indirect emissions include fuel combustion emissions and calcination emissions.

As shown in Table A2.7-1, total GHG construction emissions in the form of carbon dioxide equivalent (CO_2e) will be approximately 3,769 metric tons. These emissions amortized over a 30-year period equal approximately 126 metric tons per year. Adding to that the operation emissions of 74 metric tons CO_2e per year, total Project GHG emissions will be approximately 199 metric tons CO_2e per year, which will be less than the BAAQMD's significance threshold of 1,100 metric tons CO_2e per year for non-stationary sources.

It also should be noted that total Project GHG emissions will be relatively small compared to the GHG emissions that will be avoided by the increased production of wind energy under the Project. By replacing older model turbines with new more efficient ones, the Project will reduce energy production-related contributions to climate change overall, relative to the existing facility, because it will contribute approximately 150% more power to the grid by installing turbines that are 50% more efficient than the existing turbines. The Project will contribute approximately 43,371 megawatt hour (MWh) of additional wind-generated energy per year to the power grid compared to baseline conditions[4], and will therefore replace the same amount of conventional (carbon-based) energy production. Using an emission factor of 329.9 pounds of CO_2e per MWh developed by Pacific Gas and Electric (PG&E) for its current energy production portfolio (Climate Registry 2013b), it can be estimated that the Project will result in an annual GHG emissions reduction of 8,484 metric tons CO_2e. Therefore, operation of the Project will result in a net reduction of approximately 8,284 metric tons CO_2e per year, there will be no long-term impacts associated with project-generated GHG emissions, and this impact will be less than significant.

7.2 Impact GHG-2

Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases (less than significant with mitigation)

APWRA Issues to Consider: Will the project use vehicles that emit greenhouse gases?

The Project will use vehicles that emit greenhouse gasses, causing conflicts with certain GHG reduction goals set forth in AB 32, including the 39 Recommended Actions identified by the Air Resource Board (ARB) in its Climate Change Scoping Plan (California Air Resources Board 2008b). These potential conflicts are the same as the program presented in the FPEIR, Section 3.7.2, “Environmental Impacts”, “Scoping Plan Measures T-7, E-3, and H-6”. Consistency of the Project with these measures is reflected in the evaluation of the program by each source-type measure above. Implementation of Mitigation Measure GHG-2a will ensure that the Project will not conflict with implementation of Measure T-7. Implementation of Mitigation Measure GHG-2b will ensure that the Project will not conflict with implementation of Measure H-6.

The Project could also conflict with GHG reduction goals set forth in the Alameda County Final Draft Climate Action Plan, including the 39 Recommended Actions identified by ARB in its Climate Change Scoping Plan. These potential conflicts are the same as presented for the program (see FPEIR, Section 3.7.2, “Environmental Impacts”, “Impacts and Mitigation Measures”). Consistency of the Project with these measures is reflected in the evaluation of the program by each source-type measured in the FPEIR. Implementation of Mitigation Measure GHG-2c will ensure that the Project will not conflict with implementation of CCAP Measure E-10. Implementation of Mitigation Measure GHG-2d will ensure that the Project will not conflict with implementation of CCAP Measure WS-2.

This impact will be significant, but implementation of Mitigation Measures GHG-2a through GHG-2d will reduce this impact to a less-than-significant level because Project construction and operation material and equipment sources of GHG emissions will be documented, monitored, and modified where necessary.

8.0 HAZARDS AND HAZARDOUS MATERIALS

8.1 Impact HAZ-1

Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials (less than significant)

APWRA Issues to Consider: Will the project NOT implement the following BMPs and procedures?

- ☐ *Standard construction BMPs to reduce pollutant emissions during construction*
- ☐ *BMPs to reduce the potential for or exposure to accidental spills involving the use of hazardous materials*
- ☐ *Procedures to carefully disassemble and remove wind turbines in a manner consistent with recycling and/or reselling the units*

The Project will implement standard construction BMPs and spill control BMPs (those implemented to reduce the potential for or exposure to accidental spills involving the use of hazardous materials). Procedures will be implemented to carefully disassemble and remove wind turbines in a manner consistent with recycling and reselling of units and in accordance with methods identified in the NPDES SWPPP and Spill Prevention, Control, and Countermeasure (SPCC) Plan.

8.2 Impact HAZ-2a-1

Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment (less than significant)

APWRA Issues to Consider: Will the project involve activities or materials beyond those described in the PEIR?

The Project will not involve the use of materials that will potentially cause the release of hazard material beyond those identified in the PEIS. This impact will be less than significant, and no mitigation will be required.

8.3 Impact HAZ-3

Emit hazardous emissions or involve handling hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school (no impact)

APWRA Issues to Consider: Is a public or private K–12 school located within 0.25 mile of the project area?

There are no public or private K-12 schools within 0.25 mile of the Project area. The nearest school is approximately 1.46 miles west of proposed wind facilities on Garaventa Ranch Road (see Figure A1.1-1) and it is unlikely that hazardous materials will be emitted or released within 0.25 mile of any schools. Also, implementation of the Stormwater Pollution Prevention Plan (SWPPP) and Spill Prevention, Control, and Countermeasure (SPCC) Plan by contractors will reduce the potential of a hazardous spill incident. There will be no impact and no mitigation is required.

8.4 Impact HAZ-4

Location on a hazardous materials site, creating a significant hazard to the public or the environment (less than significant with mitigation)

APWRA Issues to Consider: Will the project involve soil disturbance?

Based upon review of database search of regulatory agency lists, a hazardous materials site is located within the Project area. The reported site is a closed Spill; Leak, Investigation, and Cleanup (SLIC) case of mineral oil used as a coolant for transformers described as a light napththenic hydrotreated distillate and is reportedly considered to have low toxicity (Alameda County Environmental Health 2014).

A review of the mapped locations in California for the occurrence of ultramafic rocks, which have the highest potential for serpentine, revealed that the Project site is not near these mapped locations, and therefore, the potential for encountering naturally occurring asbestos during construction is considered very low (Churchill & Hill 2000).

Land uses in the Project area include agriculture, grazing, riding and hiking trails, and windfarms. Some of these land uses involve the use of potentially hazardous materials (e.g., fertilizer). Because soil disturbance will be involved in construction activities for both decommissioning activities and construction of the proposed Project, any contaminated soil found could represent a significant risk to human health and the environment. This impact will be significant, but implementation of Mitigation Measure HAZ-4 will reduce this impact to a less-than-significant level.

All projects requiring a Conditional Use Permit (CUP) from the County will be bound by the program, see FPEIR. Therefore, future repowering projects will require County permit approval of new CUPs, and Mitigation Measure HAZ-4 will become a standard condition of approval for the CUP.

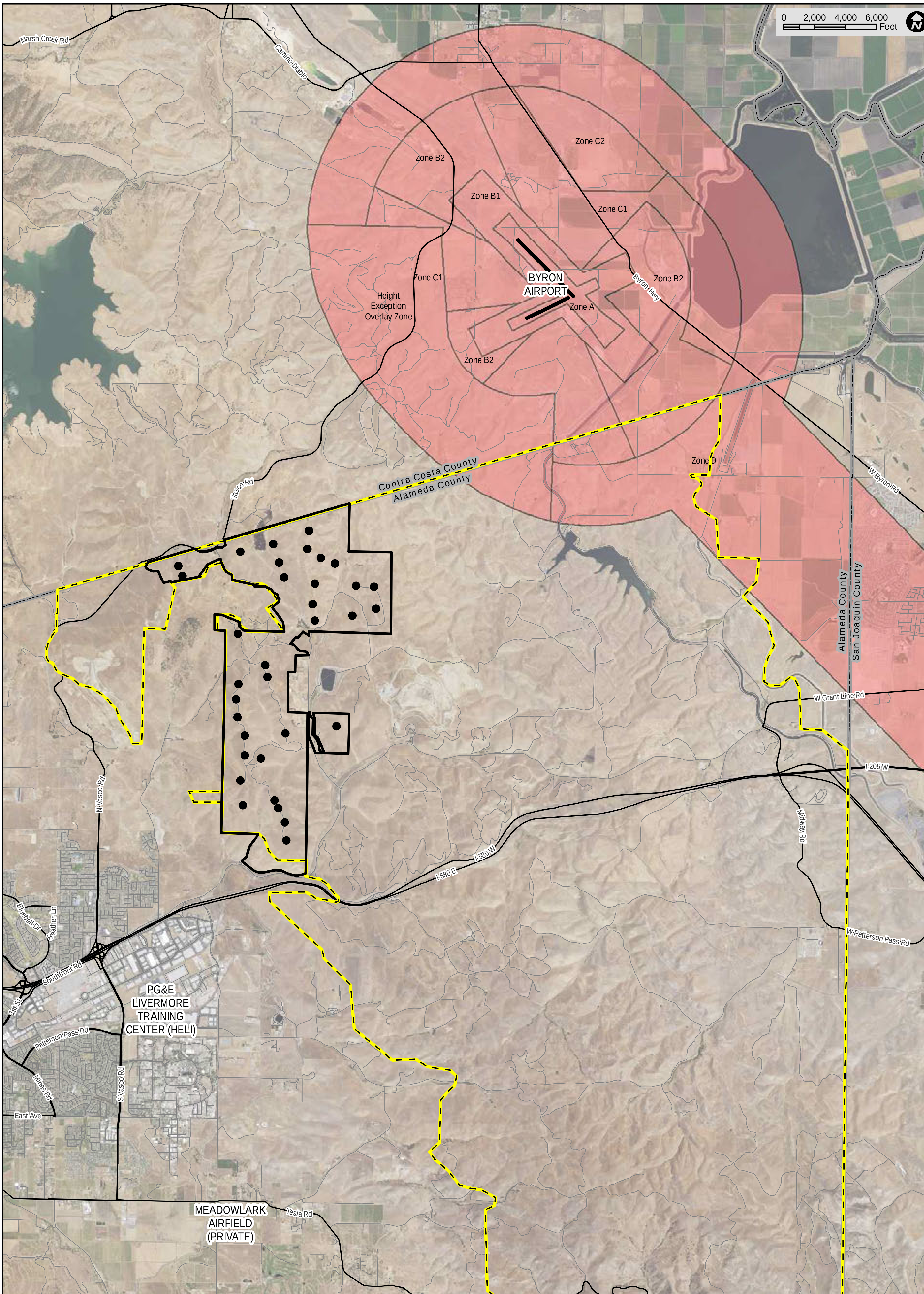
8.5 Impact HAZ-5

Location within an airport land use plan area or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, resulting in a safety hazard for people residing or working in the project area (less than significant with mitigation)

APWRA Issues to Consider: Will the project be located in the Byron Airport influence area?

Refer to Figure A2.8-1 for the locations of turbines in relation to the Byron Airport influence areas and private airstrips.

The closest public airport to the proposed Project is the Byron Airport which is located approximately 3.72 miles northeast of the Project area. Because the Project area is not within 2 miles of a public airport, implementing the proposed Project will not result in a safety hazard for people residing or working in the Project area because turbines will not impede into the anticipated glide path approach of an airport. Also, as discussed in FPEIR, Chapter 2, “Project Description”, Section 2.5.3, “Repowering Activities”, “Lighting”, all repower wind turbines will require FAA lighting as they are all more than 200 feet tall and must be individually lit with obstruction lighting. Through its Notice of Proposed Construction or Alteration (Form 7460.1), the FAA will review the proposed Project prior to construction (14 CFR Part 77). The FAA analysis will include a review of proposed marking (paint scheme) and nighttime lighting to ensure that aircraft could readily identify and avoid the wind turbines. Compliance with FAA requirements will reduce the Project’s potential aviation safety impacts to an acceptable level of risk and therefore to a less-than-significant level.



Legend
- Summit Wind Repower Turbine Location
- Project Boundary
- Program Area
- Major Road
- Roads
- County Boundary
- Byron Airport Influence Area

FIGURE A2.8-1
BYRON AIRPORT INFLUENCE AREA AND PRIVATE AIRFIELDS

ALTAMONT WINDS LLC
PROPOSED SUMMIT WIND REPOWER PROJECT
ALAMEDA COUNTY, CA

Source: USDA, NAIP Imagery, 2014.

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8.6 Impact HAZ-6

Location within the vicinity of a private airstrip, resulting in a safety hazard for people residing or working in the project area (less than significant)

APWRA Issues to Consider: Will the project be located within 2 miles of a private airstrip?

The Project site is approximately 4.73 miles north of the Meadowlark Airstrip. Because the Project area is not within 2 miles of a private airstrip, implementing the Project will not result in a safety hazard for people residing or working in the Project area. Refer to Figure A2.8-1 for the locations of turbine in relation to the Byron Airport influence areas and private airstrips.

Also, as discussed in FPEIR, Chapter 2, “Project Description”, Section 2.5.3, “Repowering Activities”, “Lighting”, all repower wind turbines will require FAA lighting as they are more than 200 feet tall and must be individually lit with obstruction lighting. Through its Notice of Proposed Construction or Alteration (Form 7460.1), the FAA will review the proposed Project prior to construction (14 CFR Part 77). The FAA analysis will include a review of proposed marking (paint scheme) and nighttime lighting to ensure that aircraft could readily identify and avoid the wind turbines. Compliance with FAA requirements will reduce the Project’s potential aviation safety impacts to an acceptable level of risk and therefore to a less-than-significant level.

8.7 Impact HAZ-7

Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan (less than significant with mitigation)

APWRA Issues to Consider: Will the project increase vehicular traffic?

Existing vehicular traffic is associated with operations and maintenance of project facilities and is not anticipated to change under the proposed Project. Accordingly, operation of the Project will have no impact. During construction, there will be an increase in vehicular traffic transporting work crews, equipment, and materials. A Traffic Management Plan (TMP) has been prepared for the proposed Project to reduce hazards that could result from the increased truck traffic and to ensure that traffic flow on local public roads and highways will not be adversely affected (See Attachment A9). This plan will incorporate measures such as informational signs, traffic cones, and flashing lights to identify any necessary changes in temporary land configuration. Flaggers with two-way radios will be used to control construction traffic and reduce the potential for accidents along roads. Speed limits will be set commensurate with road type, traffic volume, vehicle type, and site-specific conditions as necessary to ensure safe and efficient traffic flow. Any part of the Project proposed within the unincorporated area of the county are reviewed by the Alameda County Fire Department during the building permit process to ensure that they are consistent with adopted emergency response plans and emergency evacuation plans. Consequently, the proposed Project will not conflict with any adopted emergency response plan or emergency evacuation plan. Finally, conveyance of decommissioned turbines, towers and other components on public roads will occur at an irregular, infrequent rate, and will be subject to standard Caltrans regulations. Such conveyance will not hinder emergency access to the Project area. Implementation of Mitigation Measure TRA-1 will reduce potential impacts to a less-than-significant level by coordinating, directing and controlling Project generated traffic and ensuring emergency vehicle access.

8.8 Impact HAZ-8

Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands (less than significant)

APWRA Issues to Consider: Will the project alter the Altamont Pass Wind Farms Fire Requirements as described in Exhibit C of the 2005 CUPs?

Refer to Section 3.8.2 of the FPEIR for an impact discussion of the repowering program Alternative 1 for a general description of impacts associated with exposing people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands. Impacts for the Project will be similar to those described. Fire breaks around buildings and structures, turbines, riser poles, and substations will be maintained in accordance with the requirements, and will not be altered. Therefore, this impact will be less than significant, and no mitigation is required.

8.9 Impact HAZ-9

During normal operation, the effects of bending and stress on rotor blades over time could lead to blade failure and become a potential blade throw hazard (less than significant)

APWRA Issues to Consider: Is there potential for blade throw to occur outside windfarm boundaries?

Will overall site access NOT be limited to persons approved for entry by the windfarm operators or landowners?

Persons and facilities within a blade throw hazard zone could be at risk of damage, injury, or death if struck by a falling blade. People potentially within the hazard zone include the residences within the Project area, and motorists travelling along I-580 and county roads. The important infrastructure in and adjacent to the Project area potentially susceptible to damage from blade throw includes PG&E transmission lines and windfarm substations.

Altamont Winds LLC retained Epsilon Associates to conduct an independent blade throw study for the Project (the Study) (see Attachment A8-Blade Throw Study). The calculations in the California Energy Commission's Permitting Setback Requirements for Wind Turbines in California, November 2006, report number CEC-500-2005-184 (the CEC Report), were used as a guide in the Study. The analysis in the Study uses a simple ballistics model methodology, which is outlined in Section 3.4.1 of the CEC Report.

Based on the results of the Study, the Project will abide by all general and/or alternative minimum setbacks outlined in the FPEIR Table 2-2, with the exception of one wind turbine (30), affecting a dwelling off Dyer Road and wind turbines 28 and 29, affecting the Livermore Area Recreation and Park District recreation area boundary lines. In the first case (wind turbine 30), the dwelling is beyond the blade throw hazard zone of 1.4 times the TTH, and in the second case, no recreation trails or roads are within the blade throw hazard zone. Although, the applicant is seeking a waiver of the alternative minimum setback requirements for the affected wind turbines, it may not be possible to meet the setback requirements of Table 2-2 in the FPEIR for wind turbines 29 and 30.

Blade throw risks are also reduced as a result of new technologies and engineering design developed over the past decades. Most commercially available wind turbines, including those proposed for the Project, are equipped with safety and engineering features to reduce the risk of blade failure, and are designed to ensure safe operation under normal conditions. Fourth-generation rotors include blade pitch controls that regulate the angle of the rotor blade into the wind, and redundant brake mechanisms that can control speed and shutdown or slowdown in response to excessive wind speed.

There is no ordinance dictating setback conditions in Alameda County; rather, setbacks are determined on a project-by-project basis in accordance with the standard conditions of approval for a CUP. FPEIR Table 2-2 provides setback requirements for the program and this Project, with respect to adjacent parcels (with and without wind energy CUPs), dwelling units, public roads, trails, commercial or residential zoning, recreation areas, and transmission lines. These setback requirements account for blade throw risks. For each of the aforementioned affected land use or corridor, a general setback requirement is stated, which is subject to adjustment based on wind turbine elevation above or below the affected use. In addition, alternative minimum setback requirements are provided, which allow reduced setbacks under specified conditions when general setbacks cannot be met.

Altamont Winds LLC strictly controls access to the existing wind energy facilities, and overall site access is limited to persons approved for entry. This strict control of public access will further reduce the risk of potential blade strike in the Project area. Accordingly, considering all the foregoing, the potential for exposure of people or structures to a significant risk of loss, injury, or death involving blade throw is less than significant, and no mitigation is required.

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9.0 HYDROLOGY AND WATER QUALITY

9.1 Impact WQ-1a-1

Violate any water quality standards or waste discharge requirements—program Alternative 1: 417 MW (less than significant with mitigation)

APWRA Issues to Consider: Will the project involve earth-disturbing activities?

Construction-related, earth-disturbing activities associated with the Project will introduce the potential for increased erosion and sedimentation, with subsequent effects on drainage and water quality. During construction, trenching and other construction activities create areas of bare soil that can be exposed to erosive forces for extended periods of time. Bare soils are much more likely to erode than vegetated areas because of the lack of dispersion, infiltration, and retention properties created by covering vegetation. Construction activities involving soil disturbance, excavation, cutting/filling, stockpiling, and grading could result in increased erosion and sedimentation to surface waters, if proper best management practices (BMPs) are not used.

While existing activities at the Project area may already result in the release of sediment, the extent of earth disturbance resulting from construction of the Project is anticipated to result in a new and intensified potential for the release of sediments due to staging areas and turbine construction sites. If precautions are not taken to contain or capture sedimentation, earth-disturbing construction activities could result in substantial sedimentation in stormwater runoff and result in a significant impact on existing surface water quality. As stated in Chapter 2, “Project Description”, the Project will be required to obtain coverage under the state’s National Pollutant Discharge Elimination System (NPDES) Construction General Permit (see additional discussion in Mitigation Measure WQ-1).

Implementation of Mitigation Measure WQ-1 will minimize the potential erosion-related and sedimentation-related water quality impacts and will therefore reduce this impact to a less-than-significant level.

9.2 Impact WQ-2

Substantially deplete groundwater supplies or interfere substantially with groundwater recharge, resulting in a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells will drop to a level that will not support existing land uses or planned uses for which permits have been granted) (less than significant)

APWRA Issues to Consider: Will the project involve very large areas of disturbance or involve a substantial use of water beyond that described in the PEIR?

As disclosed in the program-level analysis in the FPEIR, construction of the Project involves a relatively small, impervious footprint created as a result of turbines tower and foundation. This footprint will not result in blocking groundwater infiltration to a point that will deplete groundwater supplies or interfere substantially with any nearby agricultural wells. In addition, Project construction will not involve a substantial use of water with the exception of normal BMPs such as road and site dust control (this water will be trucked to the site). Operational water consumption will also be minimal. Therefore, this impact will be less than significant and no mitigation will be required.

9.3 Impact WQ-3

Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that will result in substantial erosion or siltation onsite or offsite less than significant with mitigation)

APWRA Issues to Consider: Will the project involve construction activities?

The project is located within the Brush Creek, Califton Court Forebay, and Upper Arroyo Las Positas watersheds. Kellogg Creek, Brushy Creek are significant named streams in the Project area. The Project will not construct any turbines that will result in the substantial alteration of drainage patterns or the course of any stream. New turbines will constitute a maximum of approximately 6 acres of impervious surfaces; however the existing 511 turbine foundations that will be removed will be replaced by a maximum of 33 turbines, resulting in a net reduction of impervious surface. Consequently, this impact will be less than significant.

As disclosed in the program-level analysis in the FPEIR, the Project will not construct any turbines within existing drainage areas and the Project footprints will be designed to not cause any downstream erosion during the storm season. In addition, the proposed Project will be required to adhere to the NPDES Construction General Permit. Therefore, implementation of Mitigation Measure WQ-1 will ensure that project-related stormwater runoff will not result in substantial erosion or downstream siltation.

Although road improvements will result in a roughly 30% increase in the extent of graveled surfaces (which can result in increased runoff) from the extent of existing graveled roads, the soils underlying the Project area are predominantly high runoff soils (i.e., Hydrologic Soil Group D) (Soil Conservation Service 1966, 1977). Compacted gravel roads have runoff potential similar to that of Hydrologic Soil Group D soils. Consequently, the expanded graveled roads will not result in a net increase in runoff potential than presently exists in the native soils where the new gravel will be placed. Accordingly, because the runoff will not increase as a result of the widened gravel roads, there will not be an increase in flooding onsite or offsite. In addition, the Project will be required to adhere to the NPDES stormwater Construction General Permit, which requires that post construction runoff management measures be implemented in the event that the Project’s SWPPP determines that the Project could cause an increase in peak runoff flows from the Project area. Implementation of Mitigation Measure WQ-1 will ensure that project-related stormwater runoff will not result in flooding onsite or offsite.

9.4 Impact WQ-4

Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that will result in flooding onsite or offsite (less than significant with mitigation)

APWRA Issues to Consider: Will the project involve construction activities?

Project turbine construction will not result in the substantial alteration of drainage patterns or the course of any stream. New turbines will occupy a maximum of approximately 6 acres of impervious surfaces. 511 existing turbine foundations will be removed and replaced by a maximum of 33 turbines, resulting in a net reduction of impervious surface. Consequently, this impact will be less-than-significant.

Refer to the discussion Section 9.4 regarding existing soils, gravel road construction and implementation of the Project SWPPP that will prevent potential flooding.

9.5 Impact WQ-5

Create or contribute runoff water that will exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff (less than significant with mitigation)

APWRA Issues to Consider: Will the project be constructed in an area with stormwater drainage facilities? Will the project involve construction activities?

The Project area does not currently have existing or planned stormwater drainage facilities and construction of the proposed Project will not exceed capacities or increase the rate of polluted runoff. However, construction could generate polluted runoff as soil will be stripped, bare areas will be exposed, and stormwater could cause sedimentation. Implementation of Mitigation Measure WQ-1 will ensure that project-related stormwater runoff will not affect water quality.

9.6 Impact WQ-6a-1

Otherwise substantially degrade water quality—program Alternative 1: 417 MW (less than significant with mitigation)

APWRA Issues to Consider: Will the project involve construction activities?

Although Mountain House Creek, a tributary of Old River, is listed as impaired for chloride and salinity, and Old River is impaired for chlorpyrifos, electrical conductivity, total dissolved solids, and low dissolved oxygen (State Water Resources Control Board 2010), the Project area does not currently have any substantial water quality issues or drainages that could carry a substantial amount of polluted runoff to receiving waters (see page 3.9-5 of the FPEIR). In addition, the operation of the Project is not anticipated to result in a substantial amount of additional runoff that could affect water quality. However, construction could generate polluted runoff as soil will be stripped, bare areas will be exposed, and stormwater could cause sedimentation. Implementation of Mitigation Measure WQ-1 will ensure that project-related stormwater runoff will not affect water quality.

9.7 Impact WQ-7

Place housing within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map (no impact)

APWRA Issues to Consider: Will the project involve construction of housing or be constructed within the 100-year floodplain?

The Project area will not involve construction of housing or be constructed within the 100-year floodplain. There will be no impact.

9.8 Impact WQ-8

Place within a 100-year flood hazard area structures that will impede or redirect flood flows (no impact)

APWRA Issues to Consider: Will the project involve construction of housing or be constructed within the 100-year floodplain?

The Project area will not involve construction of housing or be constructed within the 100-year floodplain. There will be no impact.

9.9 Impact WQ-9

Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam (no impact)

APWRA Issues to Consider: Will the project involve construction of housing or be constructed within the 100-year floodplain?

Because the Project is located in upland areas characterized by elevated, sloping topography and because there are no 100-year floodplains with the Project boundary, the likelihood of a flood event in the area is considered minimal. In addition, because the proposed Project will not involve construction of housing, if Bethany Reservoir Dam were to fail, the likelihood of significant risk or loss is considered minimal. This impact will be less than significant and no mitigation is required.

9.10 Impact WQ-10

Contribute to inundation by seiche, tsunami, or mudflow (less than significant with mitigation)

APWRA Issues to Consider: Will the project involve construction activities?

Because the Project is located in upland areas characterized by elevated, sloping topography and is located far from the ocean, the likelihood of a seiche or tsunami occurring is considered minimal. In addition, a mudflow is also highly unlikely, but could be possible in rolling hills if proper BMPs are not used during the construction process. Mudflows may occur if substantial areas of bare soil are exposed and saturated, the implementation of soil stabilizing measures will reduce the risk these mudflows by reducing runoff velocities and preventing soil displacement. Implementation of Mitigation Measure WQ-1 will ensure that project-related stormwater runoff will be properly contained and drain appropriately as to not build up or cause rills and sedimentation resulting in the potential for a mudflow.

10.0 LAND USE AND PLANNING

10.1 Impact LU-1

Physically divide an established community (no impact)

APWRA Issues to Consider: Will the project divide an established community?

There are no established communities in the Project area that will be bisected by any development associated by the Project. The Project area is in a rural area of Alameda County with only two small rural community districts. The Project area and vicinity are primarily used for cattle grazing and wind energy production. The dominant land use category in the Project area is rural. Accordingly, the Project will not divide an established community. There will be no impact.

10.2 Impact LU-2

Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, a general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect (no impact)

APWRA Issues to Consider: Will the project involve activities or materials beyond those described in the PEIR?

The Summit Wind Repower Project consists of operational modifications, removal and replacement of wind turbines, and site reclamation in eastern Alameda County. Land uses within and adjacent to the Project area include grazing land, scattered rural residences, and other windfarms. Project area lands are under agricultural use and are designated Large Parcel Agriculture (LPA). Subject to the provisions, policies, and programs of the East County Area Plan (ECAP), the LPA designation permits one single-family residence per parcel, agricultural uses, agricultural processing facilities, public and quasi-public uses, quarries, landfills and related facilities, wind farms and related facilities, utility corridors, and similar uses. Wind energy production is a conditionally permitted use, and wind turbines exist throughout the Project area. The Summit Wind Repower Project will not conflict with any applicable land use plan, policy, or regulation, including the Alameda County General Plan, the Environmental Compliance Assurance Procedure (ECAP) or the Alameda County Zoning Ordinance. As permitted in the ECAP, windpower operations are compatible with the preservation of open space, habitat conservation, and the County's trail system, and will therefore not conflict with Policies 52, 53, or 70 of the ECAP. The Summit Wind Repower Project will also be compatible with ECAP agricultural land use Policies 71, 89, and 92 for the preservation of prime soils, rangelands, and large parcels. The Summit Wind Repower Project will directly serve to implement Policies 169 and 170 regarding the continued and redeveloped use of land for windfarms, and the Alameda County FPEIR supports development of measures to mitigate adverse traffic, noise, dust, visual, and other effects of windfarms on existing sensitive land uses. Accordingly, implementation of the Summit Wind Repower Project will not result in any changes to existing land uses or pose any land use conflicts. There will be no impact. No mitigation will be required.

10.3 Impact LU-3

Conflict with any applicable habitat conservation plan or natural community conservation plan (no impact)

APWRA Issues to Consider: Will the project include activities that are not within the scope of the project described in the PEIR?

The Summit Project area is not within a Habitat Conservation Plan (HCP) or National Community Conservation Planning (NCCP) area. Accordingly, it will not conflict with an HCP or NCCP. There will be no impact. No mitigation will be required.

11.0 NOISE

11.1 Impact NOI-1

Exposure of residences to noise from new wind turbines—program Alternative 1 (less than significant with mitigation)

APWRA Issues to Consider: Will the project be located with approximately 2,000 feet of residences?

Scattered, single-family rural residences are located within the Project boundary, including homes on both very large parcels (more than 100 acres) and comparatively small lots (less than 5 acres). Refer to Attachment A10 for the Project specific Noise Study. Single-family rural residences are mostly located along the west side of the Project area. Within the Project boundary, several residences along Altamont Pass Road are located as close as 600 feet from existing turbines. Several residences located along Dyer Road are within about 1,100 feet of existing turbines. No other residences are located within 1,500 feet of the existing turbines in the Project boundary. See Figure A2.1-1 and A2.1-2 for a map showing locations of proposed turbines in relation to residences.

As discussed in the FPEIR, Section 3.11.1, "Environmental Setting", "Existing Noise Conditions", there are no documented instances of wind turbines causing exceedance of noise standards in the existing CUPs. In addition, proposed modern turbines have several characteristics that reduce aerodynamic sound levels and make for quieter operations than the existing turbines. The modern turbines have relatively low rotational speeds and pitch control on the rotors, both of which reduce sound levels.

The noise prediction results in the FPEIR, Section 3.11-5, Table 3.11-5, however, indicate that residences located within about 1,750 feet of a group of turbines could be exposed to noise that exceeds 55 dBA (Ldn) or increases in noise greater than 5 dB. The noise prediction results in the FPEIR, Section 3.11.2, Table 3.11-6 also indicate that residences located within about 800 feet of a group of turbines could be exposed to noise that exceeds 70 decibels relative to the carrier (dBC) (Ldn). Because of the possibility that daily Ldn value caused by wind turbines could increase by more than 5 dB at locations where noise currently exceeds 55 dBA (Ldn), exposure of residences to noise in excess of 55 dBA (Ldn) where noise is currently less than 55 dBA (Ldn), or exposure of residences to noise in excess of 70 dBC (Ldn), this impact is considered to be significant.

The Project-specific noise study presented in Attachment A10, conducted using WindPRO software, assuming Suzlon S97 wind turbines and twenty-six (26) noise receptors. The results show that the noise level at each of the noise receptors is below the thresholds of the FPEIR standard. Construction traffic increase will increase traffic noise by less than 2 dB, which will not be a noticeable increase at nearby residential uses along the major county roads. Therefore, the impact of construction traffic noise is considered to be less than significant.

Implementation of Mitigation Measure NOI-1 will reduce this impact to a less-than-significant level by monitoring, measuring and evaluating noise levels and modifying Project operations should County noise standards be exceeded.

11.2 Impact NOI-2

Exposure of residences to noise during decommissioning and new turbine construction (less than significant with mitigation)

APWRA Issues to Consider: Will construction equipment be used within 800 feet of residences?

Construction noise levels associated with anticipated construction phases and equipment for the repowering Project, Summit, are discussed in the FPEIR, Section 3.11.2, under Impact NOI-2a and summarized in FPEIR, Section 3.11.2, Tables 3.11-7 and 3.11-9. FPEIR, Section 3.11.2, Table 3.11-10 summarizes the distances within which Alameda County noise standards could be exceeded as a result of the construction activities. In a number of instances, there are residences located within 800 feet of where turbine removal and restoration activities could occur. The results in the FPEIR, Section 3.11.2, Table 3.11-10, indicate that these activities could result in noise that exceeds Alameda County noise ordinance standards during nonexempt hours. This impact is therefore considered to be significant. Implementation of Mitigation Measure NOI-2 will reduce this impact to a less-than-significant level by employing noise reducing construction practices during project construction and decommissioning activities. Refer to Figure A2.1-1 and A2.1-2 illustrating location of proposed turbines in relation to existing residences.

12.0 POPULATION AND HOUSING

12.1 Impact POP-1

Induce substantial population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure) (no impact)

APWRA Issues to Consider: Will the project create any housing?

The Project will not create any housing and will, therefore, not result in a direct increase in population. Indirect population growth is discussed below.

Construction: Construction of the Project is expected to last from 8 up to 12 months with approximately 123 workers employed (peak workforce of 184). The majority of the activities, primarily wind turbine installation, will take place during a five-month period. Construction will result in a temporary increase in construction-related jobs in the local area. However, the new jobs provided by construction of the Project will be temporary, and therefore, will not likely result in household relocation by construction workers to the Project vicinity.

Construction workers can be expected to be drawn from the construction employment labor force already residing in the region. The construction jobs will not be permanent and are not expected to change the current ratio of 0.98 jobs per employed resident. Therefore, employment opportunities provided by construction of the Project will not generate population growth. There will be no impact. No mitigation is required.

Operation and Maintenance: Operation and maintenance of the Project will be similar to operation and maintenance of the existing Altamont Winds windfarm. Activities will be conducted year-round, with operation, monitoring, and control of wind turbines performed continuously. Operation and maintenance will require full-time, skilled workers. It is expected that these workers will be sourced from the existing pool of personnel that is employed for operation and maintenance of the existing Altamont Winds windfarm. Therefore, operation and maintenance of the Project will not create new jobs and will not induce population growth or an increased demand for housing.

Project implementation will result in the construction of upgraded existing and new service roads, and new electrical infrastructure. The service roads will provide access to Project facilities within the Project area, including wind turbines and substations. The purpose of the new electrical infrastructure will be to transfer power generated by the turbines to the regional electrical grid. The roads and electrical infrastructure will be privately owned and will neither extend offsite nor provide convenient connection points for potential offsite development. Therefore, any new infrastructure within the Project area will not encourage new development or induce population growth.

The Project will allow for generation of electricity for distribution to the electrical grid. The generation of wind energy is necessary to meet the legal requirement for investor-owned utilities, electric service providers, and community choice aggregators to procure 33% of energy from renewable resources by 2020. The Project will repower the existing first-generation turbines with new, current-generation wind turbines. Because repowering will not exceed the originally installed 54 megawatt (MW) nameplate capacity in the Project area, the Project is not considered growth-inducing. There will be no impact. No mitigation is required.

12.2 Impact POP-2

Displace a substantial number of existing housing units, necessitating the construction of replacement housing elsewhere (no impact)

APWRA Issues to Consider: Will the project result in the demolition or displacement of existing housing?

The Project area is currently developed as a windfarm with some scattered rural residences. The Project will not include the demolition or displacement of any existing housing. There will be no impact.

12.3 Impact POP-3

Displace a substantial number of people, necessitating the construction of replacement housing elsewhere (no impact)

APWRA Issues to Consider: Will the project result in the demolition or displacement of existing housing?

The Project area is currently developed as a windfarm with some scattered rural residences. Because there will be no demolition of any housing, the Project will not displace any people. There will be no impact.

13.0 PUBLIC SERVICES

13.1 Impact PS-1

Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or a need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services: fire protection; police protection; schools; parks; other public facilities (no impact)

APWRA Issues to Consider: Will the project involve activities beyond those described in the PEIR?

Fire Protection: CalFire provides fire protection services to the Project area. The fire protection facilities and infrastructure required to protect the proposed facilities and employees are already in place and will not change as a result of the proposed Project. The Project will result in a net reduction of turbines and related infrastructure in the Project area. As a result, fewer wind energy facility components could be threatened by fire or could cause a fire. CalFire indicated that the newer generation wind turbines were safer than the original models that exist in the area (Giambrone pers. comm.). All of the workers that will be employed during construction and operations are expected to reside locally or regionally and therefore are a part of the existing demand on fire protection services. The proposed Project will not result in the need for new or altered fire protection facilities, such as a new or expanded fire station. There will be no impact. No mitigation is required. See Section 3.8, “Hazards and Hazardous Materials”, for a discussion of wildland fire impacts.

Law Enforcement: The Alameda County Sheriff’s Office provides law enforcement services to the Project area. Theft of copper and parts/equipment is the largest law enforcement issue in the Project area. The police protection facilities and infrastructure required to protect the Project area are already in place and serve to protect the existing wind energy facilities. The Project area is secured with perimeter fencing and locked gates. Replacing the older turbines with newer turbines is not anticipated to increase theft, or other crime, in the Project area (Kelly personal communication). The construction and operations workers are anticipated to be from the local and regional workforce, and therefore already part of the existing demand on police services. Therefore, the proposed Project will not require additional police staffing or facilities. There will be no impact. No mitigation will be required.

Schools: No schools are present in the Project area. No residential uses are proposed as part of the Project, and the proposed Project will not result in new, permanent jobs that will bring new residents to the area. Therefore, no new students will be generated. Temporary and permanent employees are assumed to reside locally and regionally and their school-aged children are assumed to be part of the existing or anticipated student population. Therefore, implementation of the Project will not require the construction or expansion of school facilities and no impact will occur. No mitigation will be required.

Parks: There are several regional parks and other open space areas near the Project area. These facilities are intended to serve a large segment of the regional population. Residential uses are not proposed as part of the Project, and the proposed Project will not result in new, permanent jobs that will bring new residents to the area. Therefore, no direct increase in the number of park users is expected to result. It is anticipated that temporary and permanent employees will already reside locally and regionally, and so will be part of the existing demand on park facilities. There will be no impact. No mitigation will be required. Parks are discussed in more detail in Section 14, “Recreation”.

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14.0 RECREATION

14.1 Impact REC-1

Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility will occur or be accelerated (no impact)

APWRA Issues to Consider: Will the project involve activities beyond those described in the PEIR?

There are no existing neighborhood parks on site or in the vicinity of the Project. Existing regional parks and other recreational facilities in the vicinity of the Project area will not be affected because the Project will not involve new potential users of parks or other recreational facilities. Construction workers are presumed to reside locally or regionally and are therefore among the existing users of available facilities. The operations and maintenance workforce at the site will be sourced from the existing pool of personnel that is employed for operation and maintenance of the existing wind energy operations. No additional permanent employees will be required. The Project is not anticipated to increase the use of existing parks or other recreational facilities such that substantial physical deterioration will occur or be accelerated. There will be no impact.

14.2 Impact REC-2

Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment (no impact)

APWRA Issues to Consider: Will the project involve activities beyond those described in the PEIR?

The Project will not include recreational facilities. It will not require the construction of new or expansion of existing recreational facilities because implementing the proposed Project will not generate a significant number of new users of such facilities (described above under Impact REC-1). Construction workers are presumed to reside locally or regionally and are therefore among the existing users of existing recreational facilities. Operation and maintenance activities will be similar to existing activity. Because the Project will not result in an increase in demand for recreational facilities, no new recreational facilities will need to be developed or provided that could have a physical effect on the environment. There will be no impact.

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15.0 TRANSPORTATION/TRAFFIC

15.1 Impact TRA-1

Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation, including mass transit and non-motorized travel and relevant components of the circulation system, including, but not limited to, intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit or conflict with an applicable congestion management program, including, but not limited to, level-of-service standards and travel demand measures or other standards established by the county congestion management agency for designated roads or highways (less than significant with mitigation)

APWRA Issues to Consider: Will the project construction or operation increase traffic? Will the project involve activities beyond those described in the PEIR?

The Project will not involve activities outside of those described in the PEIR, will temporarily increase traffic during construction.

Operations: Construction traffic associated with the Project will be temporary. Once the new turbines are installed and in operation, maintenance needs will be limited and not substantially greater than currently required: post-construction traffic generated by the maintenance activities will be well within the capacity of the local roadway system and will not differ materially from the current maintenance traffic level. Operation of windfarms in the Altamont Pass Wind Resource Area (APWRA) is consistent with the Alameda County General Plan, transportation plans, and regulations incorporating assumptions of buildout of the General Plan; accordingly, the Project will not conflict with applicable transportation plans, ordinances, and policies. The traffic impact associated with operation and maintenance of the Project will be less than significant.

Construction: Construction of the Project will temporarily increase vehicle traffic on regional and local access routes in the Project vicinity and involve the transport of oversize and overweight wind turbine components. Construction activities will take place over a time period lasting approximately 8 to12 months. As discussed above and summarized in Table A2.15-1, the Project is anticipated to generate an average of 330 vehicle trips per day (229 truck trips and 101 worker trips) during the peak months of the construction period, with an average of 41 vehicle trips per hour (29 truck trips and 13 worker trips) generated during the peak commute hours.

Table A2.15-1 summarizes an estimate of the Project construction-related trips on regional access highways in the program vicinity. The traffic increase due to Project construction trips is a small fraction (less than 0.3 percent) of annual average daily traffic (AADT) on I-580 in the Program Area and on the regional access highways in the program vicinity; accordingly, the construction traffic is not expected to degrade traffic operation on these regional access roadways.

TABLE A2.15-1 ESTIMATED CONSTRUCTION TRIPS ON REGIONAL ACCESS ROADWAYS – SUMMIT PROJECT

ROADWAY NAME	DESCRIPTION	2012 AADT			2012 TRUCK AADT		AVERAGE DAILY CONSTRUCTION TRIPS	AVERAGE DAILY CONSTRUCTION TRUCK TRIPS
I-580, in Program Area	I-205 – Greenville Rd., Livermore	87,353		Quantity	12,828		162[a]	93[a]
				% of Total AADT	10.4%		0.1%	0.1%
		Low	High		Low	High		
I-580, west of Program Area	Greenville Rd., Livermore – I-680	86,742	130,724	Quantity	4,612	1,2297	130[a]	93[a]
				% of Total AADT	4.6%	12.2%	0.1%	0.1%
I-580, east of Program Area	I-5 – I-205	12,828	18,937	Quantity	2,370	3,256	65[b]	46[b]
				% of Total AADT	12.5%	17.9%	0.3%	0.1% to 0.2%
I-205, Tracy	I-580 – Junction I-5	50,090	69,638	Quantity	6,451	8,357	65[b]	46[b]
				% of Total AADT	11.3%	12.0%	0.3%	<1%
I-680, Dublin	Bernal Ave., Pleasanton – Alcosta Blvd., San Ramon	80,633	102,014	Quantity	5,345	7,752	32[c]	23[c]
				% of Total AADT	5.3%	9.2%	<1%	<1%

[a] Assumes 50% of the total daily vehicle trips (324) and total truck trips (186) will originate from west of the program are, from the Livermore area and areas to the west, and 50% of the construction traffic will originate from east of the program area, from the Tracy area and areas to the east.

[b] Assumes 50% of the construction traffic originated from east of the program area, which is 25% of the total construction traffic, will access the project area via I-580, and 50% of the construction traffic will access the project area via I-205.

[c] Construction traffic, will be from areas west of Livermore and use I-680o access the program area. 50% of the construction traffic will be from the south and 50% of the construction traffic will be from the north (12.5% of total construction traffic.)

Construction traffic could cause a substantial traffic increase on the local county roads that provide direct access to the Project —e.g., Altamont Pass Road, Vasco Road, and Dyer Road—as these roads generally have low traffic volumes. Table A2.15-2 summarizes an estimate of the construction-related trips on the primary county road that provides direct access to Project construction sites, Altamont Pass Road. The increase in traffic due to Project construction trips will range from 2 to 3 percent of AADT and from 5 to 8 percent of peak hour volumes on Altamont Pass Road. The substantial increase in traffic due to construction, especially during the AM and PM peak commute hours, could potentially cause degradation of traffic operation on these local Project access routes. The impact from increased traffic due to construction trips on the local roadway traffic operation is considered a significant impact.

However, because the construction activities will be temporary and will not cause the long- term closures or alternation of Project access roads that will otherwise substantially change the circulation of the surrounding roadway system and could degrade the traffic operation to an unacceptable level of service (LOS), implementation of Mitigation Measure TRA-1 will reduce the impact of increased traffic on local access roads and the impact of short-term temporary closures of travel lanes at Project site access points during delivery of oversized loads to a less-than-significant level.

TABLE A2.15-2 Estimated Construction Trips on Local Access Road, Altamont Pass Road—Summit Project

ROADWAY NAME	COUNTER LOCATION	EXISTING ADT (VPD)	AVERAGE DAILY CONSTRUCTION TRIPS[a]	PERCENT OF TOTAL ADT	CONSTRUCTION TRIPS[a]	PERCENT OF PEAK HOUR TRAFFIC[b]
Altamont Pass Rd.	West of Greenville Rd.	10.250	165	2%	41	5%
	West of Grant Line Rd.	5,850	165	3%	41	8%

[a] Assumes construction traffic will access the construction sites either via Patterson Pass or via Altamont Pass Road, depending on the project locations; and 50% of total construction traffic (424 daily trips and 98 peak hour trips) will access the project area via roadways from the west and 50% of the construction traffic will be from the east.

[b] Peak hour traffic on the roadway segments typically is assumed about 10% ADT.

15.2 Impact TRA-2

Conflict with an applicable congestion management program, including, but not limited to, level-of-service standards and travel demand measures or other standards established by the county congestion management agency for designated roads or highways (less than significant)

APWRA Issues to Consider: Will the project maintenance needs be substantially greater than currently required? Will post-construction traffic generated by the maintenance activities exceed the capacity of the CMP roadway system and differ materially from the current maintenance traffic level? Will the increase in construction traffic be substantial? Will the increase in construction traffic degrade the traffic operation of the CMP roadway segments that already exceed the LOS standard E or cause a CMP roadway segment to exceed the LOS standard?

As discussed under TRA-1, maintenance needs of the Project will be limited and not substantially greater than currently required; post-construction traffic generated by the maintenance activities will be well within the capacity of the Congestion Management Program (CMP) roadway system and will not differ materially from the current maintenance traffic level. Therefore, the traffic impact associated with operation and maintenance of the Project will be less than significant.

The increase in traffic due to Project construction, as shown in Table A2.15-2, is a small fraction (less than 0.3 percent) of AADT on I-580 in the Program Area and the regional CMP roadways (I-205 and I-680) in the program vicinity. Although some of the CMP roadway segments operated at LOS F (Alameda County Transportation Commission 2013b:12-16). However, the small increase in traffic due to Project construction is not expected to degrade the traffic operation of the CMP roadway segments that already exceed the LOS standard E or cause a CMP roadway segment to exceed the LOS standard. Therefore, the construction traffic impact on CMP roadways will be less than significant.

15.3 Impact TRA-3

Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks (less than significant)

APWRA Issues to Consider: Will the project affect air traffic patterns of the public or private airports in the vicinity of the program area? Will the project result in substantial safety risks associated with airport operations?

Implementing the proposed Project will not affect air traffic patterns of the public and private airports in the vicinity of the Project due to distance of these facilities from the Project. Additionally, the Project will not result in substantial safety risks associated with airport operations (see airport impact discussion and FAA lighting requirements discussion in Section 3.8, "Hazards and Hazardous Materials", under Impact HAZ-5 and Impact HAZ-6). See Figure A2.8-1. Thus, the impact will be less than significant.

15.4 Impact TRA-4

Substantially increase hazards because of a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment) due to construction-generated traffic (less than significant with mitigation)

APWRA Issues to Consider: Will the project involve large, slow-moving construction-related vehicles and equipment among the general-purpose traffic on roadways?

Proposed Project ingress/egress to the Project area will be via Altamont Pass Road, Dyer Road, and Vasco Road. Minor intersection improvements will be implemented along these roads, as necessary, to allow for safe passage of the oversized vehicles and facilitate ingress/egress from local roads. Following road construction, all roads will be inspected to determine if and where any additional grading or additional gravel will be necessary to meet Alameda County road standards.

Regardless, the presence of large, slow-moving construction-related vehicles and equipment among the general-purpose traffic on roadways that provide access to the Project area could cause other drivers to act impatiently and create traffic safety hazards. In addition, the slow-moving trucks entering or exiting the Project area from public roads could pose a traffic hazard to other vehicles and increase the potential for turning movement collisions at the Project area entrance intersections. The creation of potential traffic safety hazards as a result of construction trucks will be a significant impact. Implementation of Mitigation Measure TRA-1 will reduce this impact to a less-than-significant level.

15.5 Impact TRA-5

Result in inadequate emergency access due to construction-generated traffic (less than significant with mitigation)

APWRA Issues to Consider: Will the project involve large, slow-moving construction-related vehicles and equipment among the general-purpose traffic on roadways? Will the project involve lane/road closures occurring during delivery of oversized loads?

Slow-moving construction trucks could delay or obstruct the movement of emergency vehicles on Project area haul routes. In addition, lane/road closures occurring during delivery of oversized loads could impair roadway capacity and increase the response time for emergency vehicles traveling through the closure area. Therefore, construction will have the potential to significantly affect emergency vehicle access. The TCP required under the Mitigation Measure TRA-1 and included in Attachment A9 will reduce this impact to a less-than-significant level.

15.6 Impact TRA-6

Conflict with adopted policies, plans, or programs regarding public transit, bicycle or pedestrian facilities, or otherwise decrease the performance or safety of such facilities (less than significant with mitigation)

APWRA Issues to Consider: Will the project involve large, slow-moving construction-related vehicles and equipment among the general-purpose traffic on roadways? Will the project involve lane/road closures occurring during delivery of oversized loads?

No public transit services or pedestrian facilities are available on the Project access routes in the Project vicinity. Therefore, the maintenance and construction activities associated with the Project will not conflict with polices, plans, or programs regarding alternative transportation or degrade the performance of transit services and pedestrian facilities.

Most of the maintenance and construction activities associated with the Project will be contained within the Project work site and are not expected to result in the long-term closures of travel lanes or roadway segments, permanently alter the public access roadways, and create new public roadways that could substantially change the travel patterns of vehicles and bicycles on the surrounding roadway facilities and conflict with the policies and plans regarding bicycle facilities.

However, during the construction, slow-moving oversized trucks could potentially disrupt the movement of bicycles traveling on the shoulders along Altamont Pass Road, Dyer Road, and Vasco Road in the Project area and increase the safety concerns for any bicyclists who use the routes. These roadways are not the County classified bikeways, but are used as recreational and inter-regional access routes. In addition, lane/road closures occurring during delivery of oversized loads near the work site access points could temporarily disrupt the bicycle access on the roads. Therefore, construction will have the potential to significantly affect bicycle access. The traffic control plan located in Attachment A9 and required under the Mitigation Measure TRA-1 will reduce this impact to a less-than-significant level.

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16.0 UTILITIES AND SERVICE SYSTEMS

16.1 Impact UT-1

Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board (less than significant)

APWRA Issues to Consider: Will the project generate a significant amount of wastewater?

The Project will not generate a significant amount of wastewater that will be treated by public wastewater facilities because the project will not require new or expanded wastewater facilities or storm water systems, or require new or expanded entitlements to water resources. Portable toilets will be used during construction and will be serviced by a private contractor. Accordingly, the Project will not generate a significant amount of wastewater that will be treated by public wastewater treatment facilities and will exceed neither the San Francisco Bay Regional Water Quality Control Board's nor the Central Valley Regional Water Quality Control Board's wastewater treatment requirements. This impact will be less than significant. No mitigation will be required.

16.2 Impact UT-2

Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects (no impact)

APWRA Issues to Consider: Will the project generate a significant amount of wastewater?

Will new water or wastewater treatment facilities be required?

The Project will not generate a significant amount of wastewater, and water for use in the Project area will be trucked in. No new water or wastewater treatment facilities will be required. There will be no impact.

16.3 Impact UT-3

Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects (less than significant)

APWRA Issues to Consider: Will the project substantially modify the existing stormwater drainage patterns? Will the project increase impermeable surfaces onsite beyond the tower foundations?

Will the project disturb less than 1 acre and therefore NOT be required to have coverage under the state's Construction General Permit?

The Project is located entirely in a rural setting: stormwater runoff drains primarily through natural drainage swales, ditches, and watercourses. The Project will not substantially modify the existing stormwater drainage patterns at the Project site, and increases in impermeable surfaces onsite will be primarily limited to tower foundations. In addition, because the Project will disturb more than 1 acre, it will require coverage under the State's Construction General Permit. Coverage under this permit requires developing and complying with a SWPPP. Consequently, impacts related to construction of new stormwater drainage facilities or expansion of existing facilities will be very minor. This impact will be less than significant. No mitigation will be required.

16.4 Impact UT-4

Require new or expanded entitlements to water resources (less than significant)

APWRA Issues to Consider: Will the project require more than minimal water use? Will the project require new or expanded entitlements to supply the program during construction or operation?

Water quantities used for the Project are expected to be minimal. The majority of water use will take place during the construction of the Project. Water will be used for concrete mixing for the turbine tower and electrical substation foundations as well as for dust control on roads and during grading and site work. Daily water use will vary. A minimal amount of water will be required for construction worker needs (e.g., drinking water, sanitation facilities). In addition, as part of final cleanup and site restoration activities, water will be needed for re-vegetation measures. The Project proponent plans to draw needed water for water trucks and drinking water from an offsite source.

The use of water is expected to be minimal, and no new or expanded entitlements to supply the Project during construction or operation are anticipated. This impact is less than significant. No mitigation will be required.

16.5 Impact UT-5

Result in a determination by the wastewater treatment provider that serves or may serve the project that it does not have adequate capacity to serve the program's projected demand in addition to the provider's existing commitments (no impact)

APWRA Issues to Consider: Will the project involve the construction or expansion of wastewater systems? Will the project require an offsite wastewater treatment provider?

No construction or expansion of wastewater systems will be required under the Project because it will not be connected to a public sewer system. During construction, portable toilets will be utilized. No offsite wastewater treatment provider will be necessary. There will be no impact.

16.6 Impact UT-6

Generate solid waste that will exceed the permitted capacity of landfills to accommodate the program's solid waste disposal needs—program Alternative 1: 417 MW (less than significant)

APWRA Issues to Consider: Will the project involve activities beyond those described in the PEIR?

The majority of solid waste generation will take place during construction and during decommissioning of the Project. Minimal solid waste will be generated during the operation of the Project. The Project is not anticipated to generate a substantial amount of solid waste because turbines and components will be sold or recycled, which will reduce the amount of solid waste taken to landfills. It is not anticipated that construction or operation of the Project will generate enough solid waste to affect the capacity of any landfill. This impact will be less than significant. No mitigation will be required.

16.7 Impact UT-7

Not comply with federal, state, and local statutes and regulations related to solid waste (no impact)

APWRA Issues to Consider: Will the project involve activities beyond those described in the PEIR?

The Project will be required to comply with local, state, and federal solid waste regulations. Most of the solid waste will be limited to the construction phase, with minimal solid waste generated during the operation of the Project. Most of the wind turbine components will be resold or recycled in compliance with the County construction site waste regulations. There will be no impact.

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17.0 REFERENCES

Aesthetics

See FPEIR, Section 3.1.4, References Cited

Agricultural Resources

See FPEIR, Section 3.2.3, References Cited

Air Quality

See FPEIR, Section 3.3.3, References Cited

Biological Resources

ICF International. 2014. Altamont Pass Wind Resource Area Bird Fatality Study, Bird Years 2005 to 2012. Available at: http://www.altamontsrc.org/alt_doc/m101_apwra_2005_2012_bird_fatality_report.pdf.

See FPEIR, Section 3.4.3 References Cited and Attachments A4 and A6

Cultural Resources

See FPEIR, Section 3.5.3 References Cited and Attachment A5

Geology, Soils, and Emissions

See FPEIR, Section 3.6.3 References Cited

Greenhouse Gas Emissions

See FPEIR, Section 3.7.3 References Cited

Hazards and Hazardous Materials

See FPEIR, Section 3.8.3 References Cited

Hydrology and Water Quality

See FPEIR, Section 3.9.3 References Cited

Land Use and Planning

See FPEIR, Section 3.10.3 References Cited

Noise

See FPEIR, Section 3.11.3 References Cited

Population and Housing

See FPEIR, Section 3.12.3 References Cited

Public Services

See FPEIR, Section 3.13.3 References Cited

Recreation

See FPEIR, Section 3.14.3 References Cited

Transportation and Traffic

See FPEIR, Section 3.15.3 References Cited and Attachment A9

Utilities and Service Systems

See FPEIR, Section 3.16.3 References Ci*ted*

ATTACHMENT A3: PHOTO SIMULATIONS

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TABLE OF CONTENTS

FIGURES

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FIGURE A3-1 EXISTING AND SIMULATED VIEWS FROM CAMERA 1 POSITION

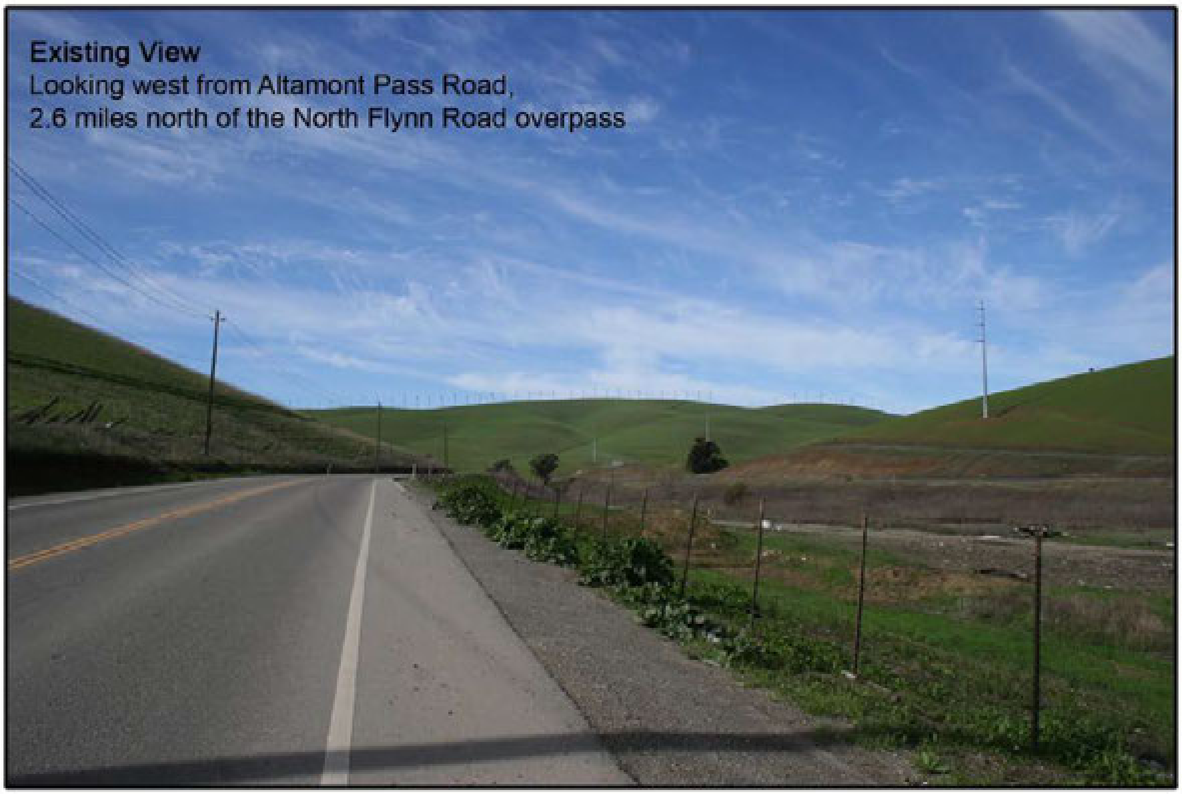

FIGURE A3-2 EXISTING AND SIMULATED VIEWS FROM CAMERA 2 POSITION

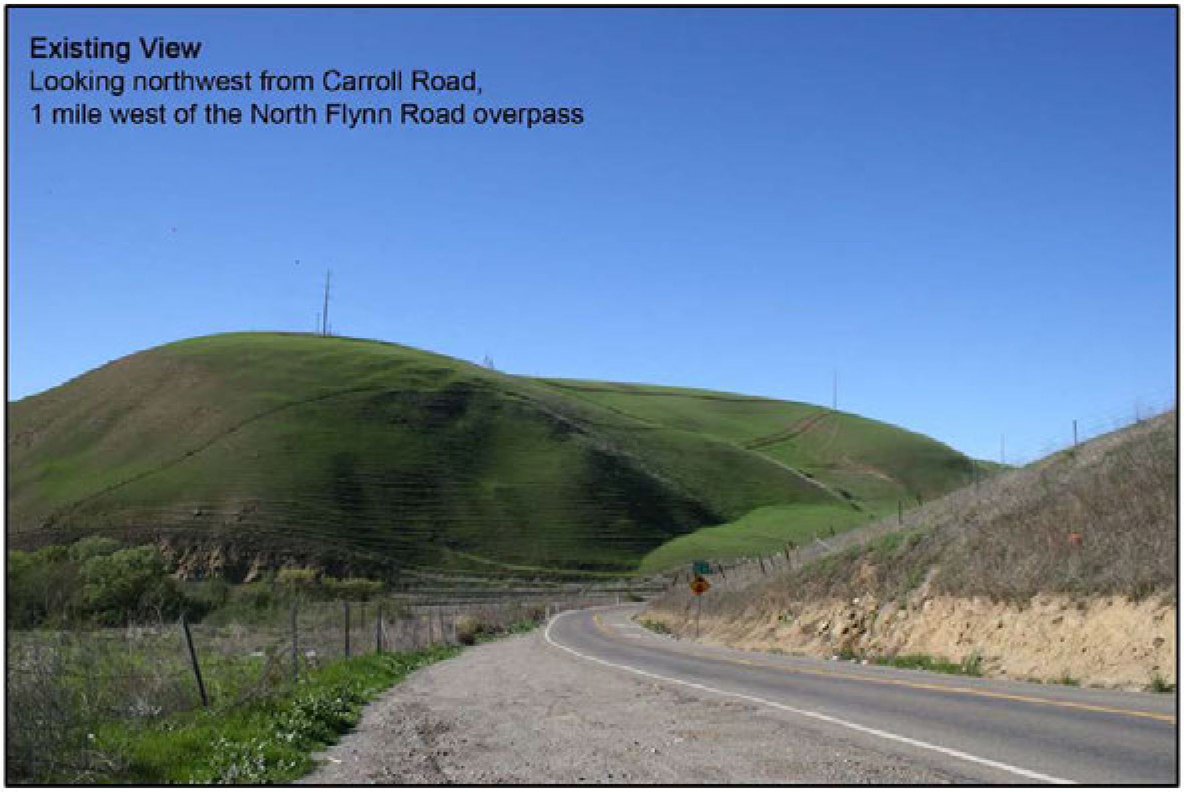

FIGURE A3-3 EXISTING AND SIMULATED VIEWS FROM CAMERA 3 POSITION

FIGURE A3-4 EXISTING AND SIMULATED VIEWS FROM CAMERA 4 POSITION

FIGURE A3-5 EXISTING AND SIMULATED VIEWS FROM CAMERA 5 POSITION

FIGURE A3-6 EXISTING AND SIMULATED VIEWS FROM CAMERA 6 POSITION

FIGURE A3-7 EXISTING AND SIMULATED VIEWS FROM CAMERA 7 POSITION

FIGURE A3-8 EXISTING AND SIMULATED VIEWS FROM CAMERA 8 POSITION

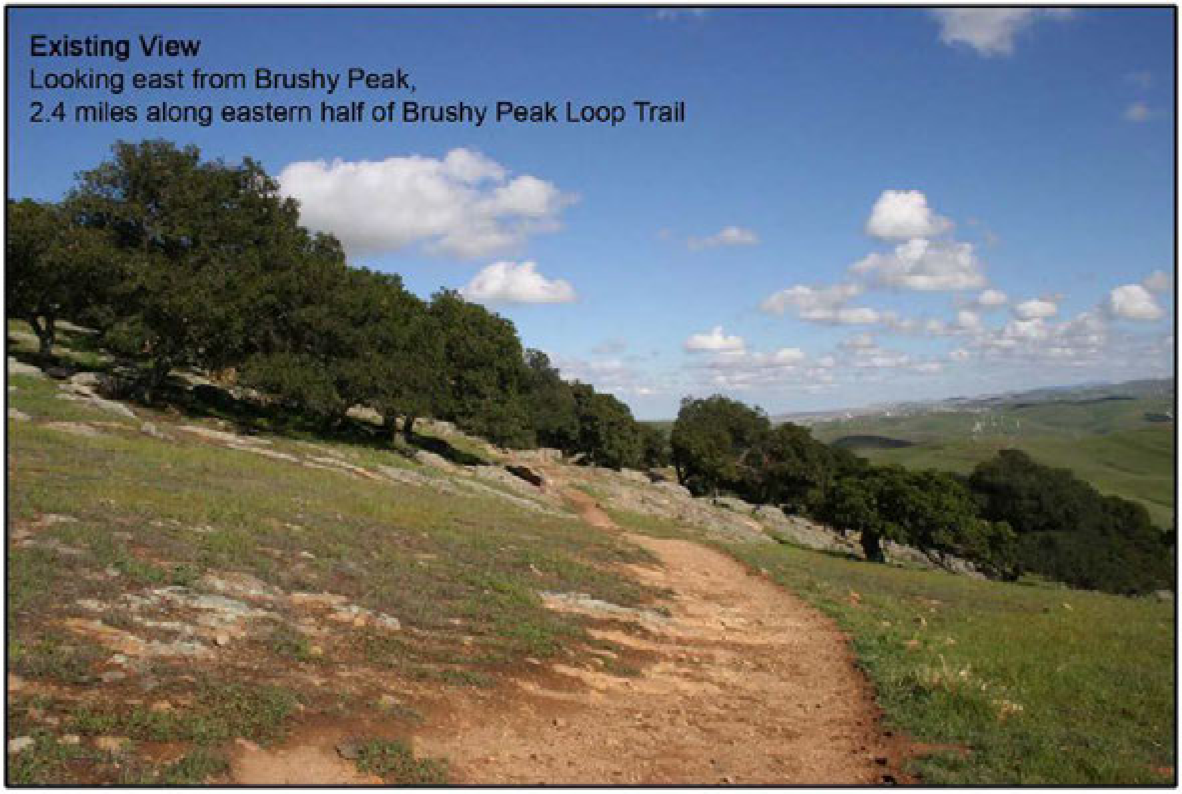

FIGURE A3-9 EXISTING AND SIMULATED VIEWS FROM CAMERA 8 POSITION

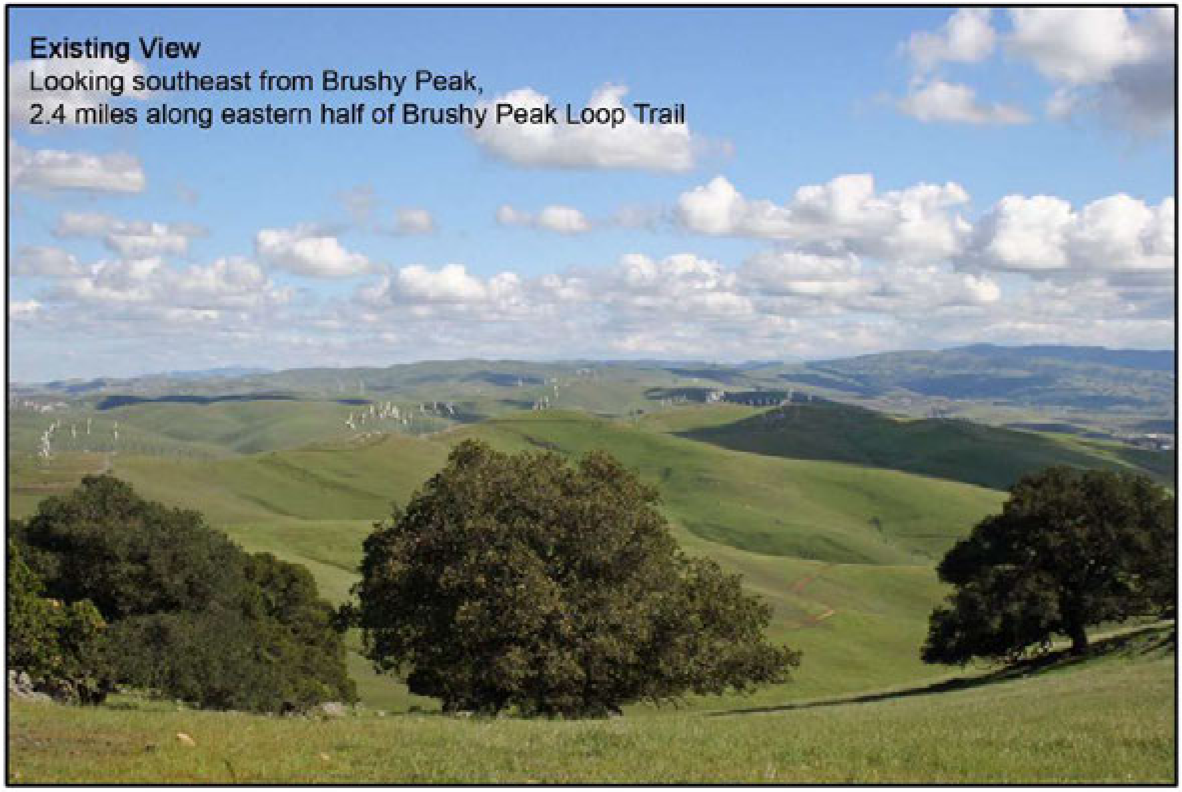

FIGURE A3-10 EXISTING AND SIMULATED VIEWS FROM CAMERA 9 POSITION

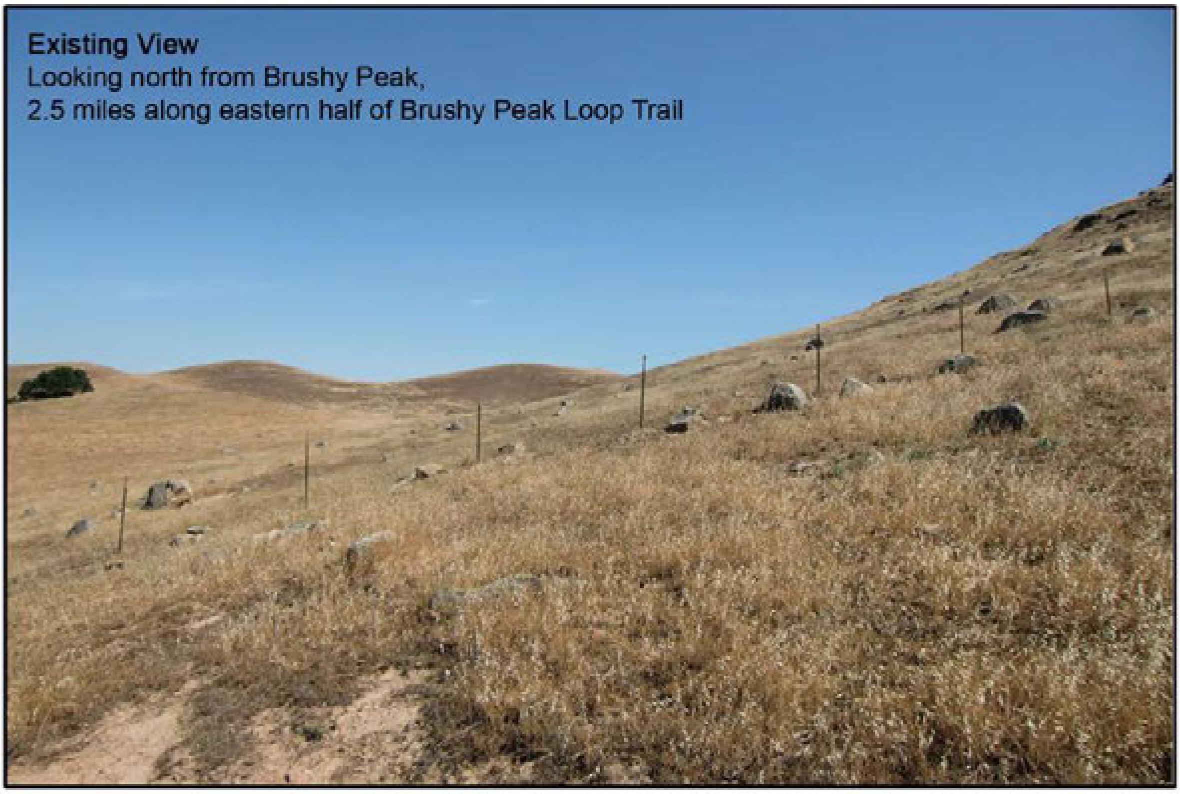

FIGURE A3-11 EXISTING AND SIMULATED VIEWS FROM CAMERA 10 POSITION

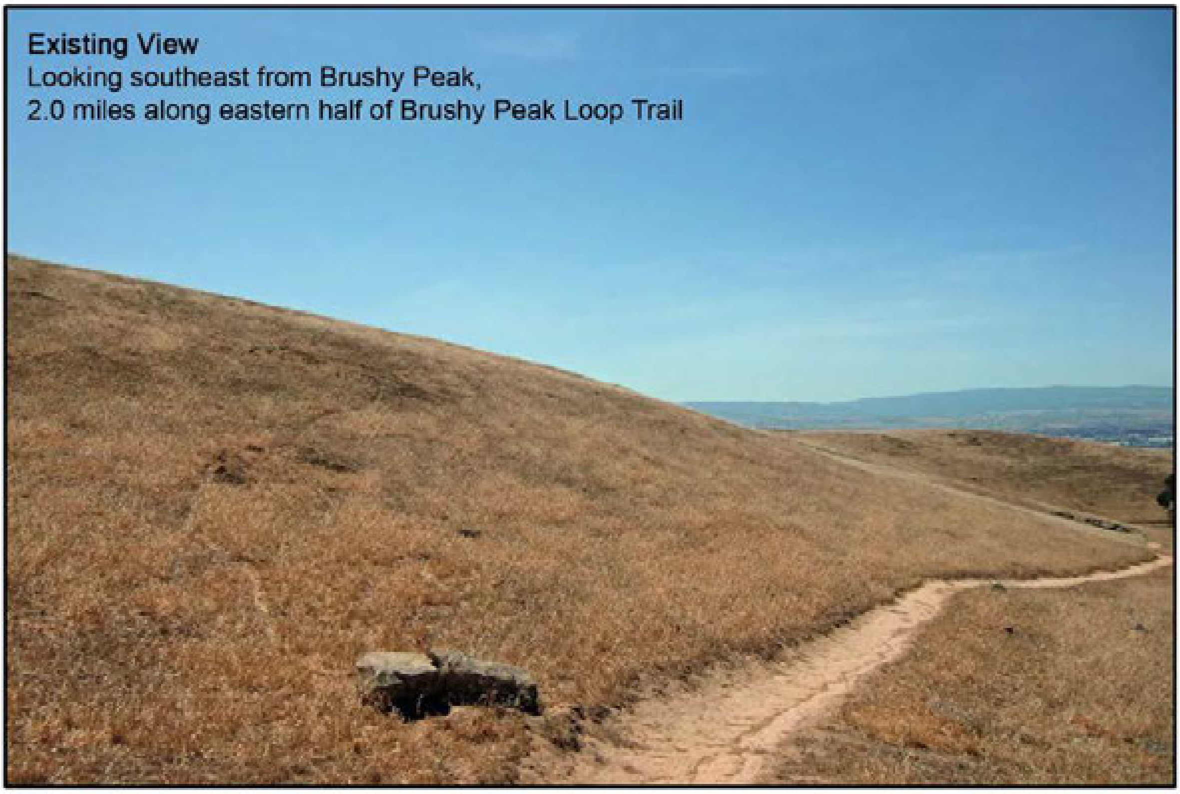

FIGURE A3-12 EXISTING AND SIMULATED VIEWS FROM CAMERA 11 POSITION

FIGURE A3-13 EXISTING AND SIMULATED VIEWS FROM CAMERA 11 POSITION

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ATTACHMENT A4: BIOLOGICAL RESOURCES HABITAT ASSESSMENT

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September 2015

ALTAMONT WINDS LLC

Summit Wind Repower Project

Biological Resources Habitat Assessment

PROJECT NUMBER:
133377

PROJECT CONTACT:
Ken McDonald
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POWER ENGINEERS

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Biological Resources Habitat Assessment

PREPARED FOR: ALTAMONT WINDS LLC

PREPARED BY: KEN MCDONALD
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TABLE OF CONTENTS

FIGURES:

TABLES:

APPENDICES:

1.0 INTRODUCTION

At the request of Altamont Winds, LLC (Applicant), POWER Engineers, Inc. (POWER) conducted a biological resources habitat assessment for the Summit Wind Repower Project (Project). AW and its affiliates currently own and operate a wind energy generation facility comprised of 828 wind turbines and additional operational buildings and equipment located on an approximately 12,000-acre site within the Altamont Pass Wind Resource Area (APWRA). The facility's current Conditional Use Permit (CUP) allows the facility to operate through October 31, 2015. Upon expiration of the CUP, AW and its affiliates will be required to decommission the facility.

The Applicant proposes to repower the decommissioned site of an existing wind energy facility. Within the Project footprint, 569 wind turbine generators (WTs) and foundations will be removed. Up to 33 new WTs are proposed to be installed, with an alternate location for one WT (20a) for a total of 34 proposed WT sites. However, the current interconnection capacity is limited to 54 megawatts (MW), limiting the potential number of WTs installed until additional capacity is added. Depending on the WT model or combination of models installed, 22 to 28 could be installed before interconnection capacity is added. The Project would continue transmitting energy from the site to the regional power grid and would maximize renewable energy production by replacing the aging infrastructure with newer, more efficient WTs. This would allow the existing CUP to be extended for up to three years while AW pursues development of a repowered wind generation facility on the remainder of its current facility. The Project includes installation of larger-capacity wind turbines, as well as associated access roads and operation and maintenance (O&M) facilities.

On March 25 and 26, 2014, POWER biologists Ken McDonald and Mark Pollock conducted field investigations of the Study Area to assess the habitat occurring on the site and to determine the potential for presence of protected plant and animal species. This report documents the approach to the assessment and results.

1.1 Project Location

The Project is located in northeastern Alameda County, California approximately six miles northeast of the City of Livermore (Figure 1). The Biological Study Area (BSA) encompasses approximately 3,500 acres of the APWRA at latitude 37°45'08.42" North, longitude 121°41'11.94" West (Figure 2). The Project area is characterized by rolling hills, with elevations ranging from approximately 500 to 1,300 feet above mean sea level. Wind farm operations and livestock grazing are the primary land uses in the Project area.

1.2 Regulatory Setting

1.2.1 Federal

<u>Federal Endangered Species Act</u>

Pursuant to the federal Endangered Species Act (ESA), U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) have authority over projects that may result in take of a species listed as threatened or endangered under the act. *Take* is defined under ESA as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Under federal regulations, take is further defined to include habitat modification or degradation that results, or is reasonably expected to result, in death or injury to wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. If a likelihood exists that a project would result in take of a federally listed species, either an incidental take permit, under Section 10(a)(1)(B), or a federal interagency consultation, under Section 7, is required.

Several federally listed species, including vernal pool fairy shrimp (*Branchinecta lynchi*), longhorn fairy shrimp (*Branchinecta longiantenna*), California tiger salamander (*Ambystoma californiense*), California red-legged frog (*Rana draytonii*), Alameda whipsnake (*Masticophis lateralis euryxanthus*), and San Joaquin kit fox (*Vulpes macrotis mutica*), have the potential to be affected by activities associated with the Project. Accordingly, such effects would require consultations with USFWS.

For San Joaquin kit fox, USFWS has developed standardized protection measures for avoiding and minimizing construction and operational impacts on the species. This guidance is published in the *U.S. Fish and Wildlife Service Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox* (USFWS 2011).

Additionally, USFWS has published several recovery plans and draft recovery plans that identify reasonable actions that are believed to be required to recover and/or protect listed species. These plans include information on the status of the species within its current range, long-term conservation strategies, and priority locations for recovery efforts. Recovery plans that pertain to listed species within the Project area include the following.

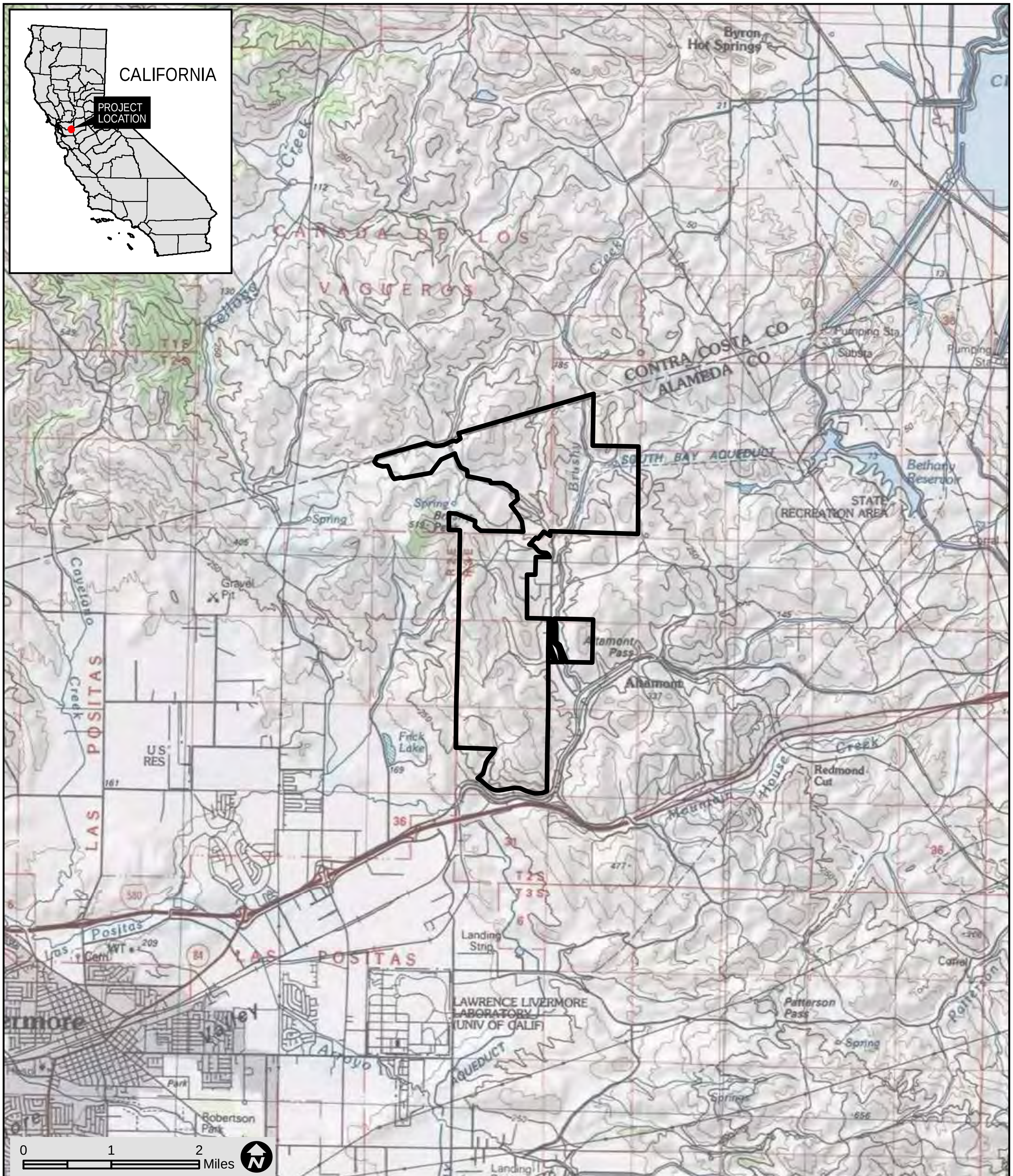
- Recovery Plan for the California Red-legged Frog (*Rana aurora draytonii*) (USFWS 2002a)
- Draft Recovery Plan for Chaparral and Scrub Community Species East of San Francisco Bay, California (USFWS 2002b)
- Recovery Plan for Upland Species of the San Joaquin Valley, California (USFWS 1998)
- Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon. Portland (USFWS 2005)

Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act, as amended in 1964, was enacted to protect fish and wildlife when federal actions result in the control or modification of a natural stream or body of water. The statute requires federal agencies to take into consideration the effect that water-related projects would have on fish and wildlife resources. Consultation and coordination with USFWS and California Department of Fish and Wildlife (CDFW) are required to address ways to prevent loss of and damage to fish and wildlife resources, and to further develop and improve these resources.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) domestically implements a series of international treaties that provide for migratory bird protection. The MBTA authorizes the Secretary of the Interior to regulate the taking of migratory birds. The Act further provides that it is unlawful, except as permitted by regulations, “to pursue, take, or kill any migratory bird, or any part, nest or egg of any such bird…” (16 United States Code [USC] 703). This prohibition includes both direct and indirect acts, although harassment and habitat modification are not included unless they result in direct loss of birds, nests, or eggs. The current list of species protected by the MBTA can be found in the March 1, 2010 *Federal Register* (75 Federal Register [FR] 9281). This list comprises several hundred species, including essentially all native birds. Permits for take of nongame migratory birds can be issued only for specific activities, such as scientific collecting, rehabilitation, propagation, education, taxidermy, and protection of human health and safety and of personal property. USFWS publishes a list of birds of conservation concern (BCC) to identify migratory nongame birds that are likely to become candidates for listing under ESA without additional conservation actions. The BCC list is intended to stimulate coordinated and collaborative conservation efforts among federal, state, tribal, and private parties. The Project has the potential to affect migratory birds regulated by the MBTA.



Legend

Project Boundary

FIGURE 1
PROJECT LOCATION

ALTAMONT WINDS LLC
PROPOSED SUMMIT WIND
REPOWER PROJECT
ALAMEDA COUNTY, CA

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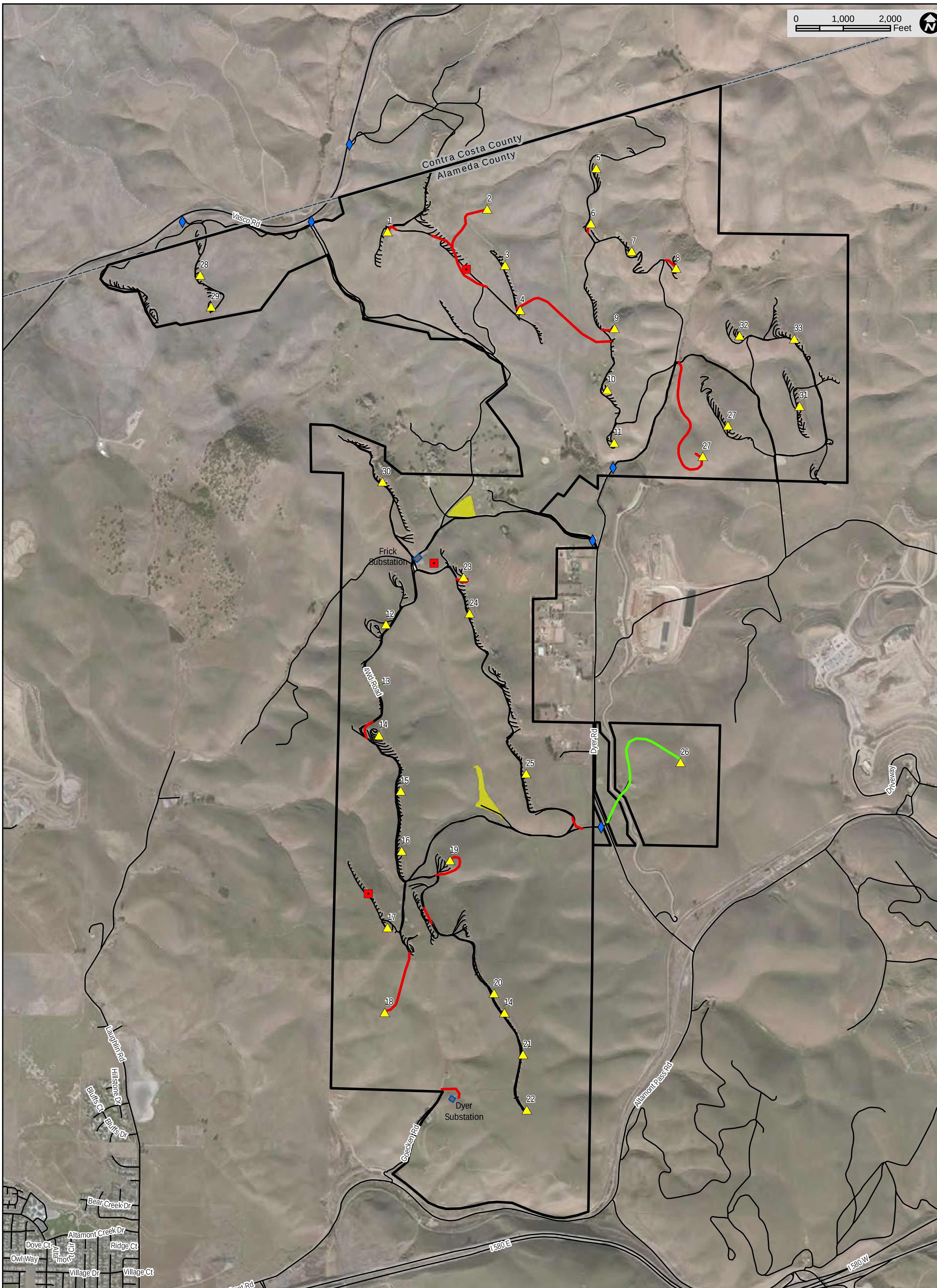

Legend

- Wind Turbine
- Gate
- Met Tower
- Project Boundary
- Substation
- O&M Area
- Existing Road
- Road - New
- Devincenzi Rd East
- County Boundary

FIGURE 2
BIOLOGICAL STUDY AREA

ALTAMONT WINDS LLC
PROPOSED SUMMIT WIND
REPOWER PROJECT
ALAMEDA COUNTY, CA

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Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (BGEPA) (16 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, 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. With the 2007 removal of bald eagle from the ESA list of threatened and endangered species, USFWS issued new regulations to authorize the limited take of bald eagles and golden eagles under the BGEPA, where the take to be authorized is associated with otherwise lawful activities. A final Eagle Permit Rule was published on September 11, 2009 (74 FR 46836–46879; 50 Code of Federal Regulations [CFR] 22.26).

A permit authorizes limited, non-purposeful take of bald eagles and golden eagles. Individuals, companies, government agencies (including tribal governments), and other organizations can apply for permits to allow disturbance or otherwise take eagles in the course of conducting lawful activities, such as operating utilities and airports. Under BGEPA, *take* is defined as “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest or disturb.” *Disturb* is defined in the regulations as “to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available: (1) injury to an eagle; (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.” Most permits issued under the regulations authorize disturbance. In limited cases, a permit may authorize the physical take of eagles, but only if every precaution is first taken to avoid physical take.

USFWS issued the *Eagle Conservation Plan Guidance* (Eagle Guidance) to assist parties to avoid, minimize, and mitigate adverse effects on bald and golden eagles (USFWS 2013). The Eagle Guidance calls for scientifically rigorous surveys, monitoring, assessment, and research designs proportionate to the risk to eagles. The Eagle Guidance describes a process by which wind energy developers can collect and analyze information that, if necessary, could lead to a programmatic permit to authorize unintentional take of eagles at wind energy facilities. USFWS recommends that eagle conservation plans be developed in five stages. Each stage builds on the prior stage, such that together the process is a progressive, increasingly intensive look at likely effects on eagles of the development and operation of a particular site and configuration. Additional refinements to the Eagle Guidance are expected at some point in the future. To date, USFWS has not issued any programmatic eagle take permits.

Clean Water Act

The Clean Water Act (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 the waters of the United States. CWA authorizes the 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. 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. During permit review, the permitting agency is required (under ESA) to evaluate the impact of the discharge on species federally listed as threatened or endangered. Aquatic resources (i.e., streams, wetlands, ponds) are present in the Project area and could be regulated under CWA Section 404 (see below).

Water Quality Certification (Section 401)

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 certification from the state. Therefore, all projects that have a federal component and may affect state water quality (including projects that require federal agency approval such as a Section 404 permit) must comply with CWA Section 401. Aquatic resources that would qualify as waters of the United States are present in the Project area. Construction and foundation removal activities have the potential to result in a discharge of pollutants into waters of the United States; therefore, a Section 401 Water Quality Certification may be required.

Permits for Fill Placement in Waters and Wetlands (Section 404)

Wetlands and other waters of the United States are protected under Section 404 of the CWA. Any activity that involves any discharge of dredged or fill material into waters of the United States, including wetlands, is subject to regulation by the U.S. Army Corps of Engineers (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.

Project activities have the potential to result in a discharge of fill material into waters of the United States; therefore, a Section 404 CWA permit may be required for the Initial and Full Repower phases.

Executive Order 11990: Protection of Wetlands

Executive Order 11990 (May 24, 1977) established the protection of wetlands and riparian systems as the official policy of the federal government. The executive order requires all federal agencies to consider wetland protection as an important part of their policies; take action to minimize the destruction, loss, or degradation of wetlands; and preserve and enhance the natural and beneficial values of wetlands. The proposed Project may affect wetlands and therefore federal agencies would be required to consider this Executive Order prior to issuing permits.

Executive Order 11312: Invasive Species

Executive Order 11312 (February 3, 1999) directs all federal agencies to prevent and control the introduction and spread of invasive non-native species in a cost-effective and environmentally sound manner to minimize their effects on economic, ecological, and human health. The executive order was intended to build upon existing laws, such as the National Environmental Policy Act (NEPA), the Nonindigenous Aquatic Nuisance Prevention and Control Act, the Lacey Act, the Plant Pest Act, the Federal Noxious Weed Act, and ESA. The executive order established a national Invasive Species Council composed of federal agencies and departments, as well as a supporting Invasive Species Advisory Committee composed of state, local, and private entities. The council and advisory committee oversee and facilitate implementation of the executive order, including preparation of the National Invasive Species Management Plan. Federal activities addressing invasive aquatic species are now coordinated through this council and through the National Aquatic Nuisance Species Task Force. The proposed Project may introduce invasive species and therefore federal agencies would be required to consider this Executive Order prior to issuing permits.

1.2.2 State

California Environmental Quality Act

The California Environmental Quality Act (CEQA) requires California public agencies to identify and mitigate the significant environmental impacts of projects that they are considering for approval.

A project normally has a significant environmental impact on biological resources if it substantially affects a rare or endangered species or the habitat of that species, substantially interferes with the movement of resident or migratory fish or wildlife, or substantially diminishes habitat for fish, wildlife, or plants. The State CEQA Guidelines define rare, threatened, and endangered species as those listed under ESA or the California Endangered Species Act (CESA) or any other species that meet the criteria of the resource agencies or local agencies (e.g., species of special concern, as designated by CDFW). The State CEQA Guidelines state that the lead agency preparing an EIR (Alameda County) must confer with CDFW concerning project impacts on species listed as endangered or threatened. The effects of a proposed project on these resources are important in determining whether the project has significant environmental impacts under CEQA. CEQA ultimately authorizes the lead agency to require mitigation measures that avoid, minimize, or mitigate potentially significant impacts.

California Endangered Species Act

CESA (California Fish and Game Code Sections 2050–2116) was implemented in 1984 to prohibit the take of species that are listed as endangered or threatened. Section 86 of the California Department of Fish and Game Code defines *take* as to "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." CDFW administers CESA and authorizes incidental take through either California Fish and Game Code Section 2080.1 (consistency determination) or Section 2081 (Incidental Take Permit). Several state-listed species (e.g., California tiger salamander, California red-legged frog, Alameda whipsnake, and San Joaquin kit fox) have the potential to be affected by the Project and would require consultation with CDFW under CESA.

For Swainson's hawks (*Buteo swainsoni*), CDFW has developed survey guidance, conservation strategies, and best practices for avoiding, minimizing, and mitigating project impacts on the species. This guidance is published in CDFW's *Staff Report Regarding Mitigation for Impacts to Swainson's Hawks in the Central Valley of California* (CDFW as California Department of Fish and Game [CDFG] 1994).

Fully Protected Species

Sections 3511, 3513, 4700, and 5050 of the California Fish and Game Code pertain to fully protected wildlife species (birds in Sections 3511 and 3513, mammals in Section 4700, and reptiles and amphibians in Section 5050) and strictly prohibit the take of these species. CDFW cannot issue a take permit for fully protected species, except under narrow conditions for scientific research, the protection of livestock, or if a Natural Community Conservation Planning (NCCP) has been adopted. Specifically, Section 3513 prohibits any take or possession of birds designated by the MBTA as migratory non-game birds except as allowed by federal rules and regulations pursuant to the MBTA. Based on observations during the habitat assessment, the Project has the potential to affect golden eagle, a fully protected species.

Protection of Birds and Raptors

Section 3503 of the Fish and Game Code prohibits the killing of birds and/or the destruction of bird nests. Section 3503.5 prohibits the killing of raptor species and/or the destruction of raptor nests. Typical violations include destruction of active bird and raptor nests as a result of tree removal, and failure of nesting attempts (loss of eggs and/or young) as a result of disturbance of nesting pairs caused by nearby human activity. The Project has the potential to adversely affect birds and raptors protected under Sections 3503 and 3503.5 of the Fish and Game Code. For burrowing owls (*Athene cunicularia*), CDFW has developed survey guidance, conservation strategies, and best practices for avoiding, minimizing, and mitigating project impacts on the species. This guidance has been recently revised in their *Staff Report on Burrowing Owl Mitigation* (CDFW 2012).

Lake and Streambed Alteration

CDFW regulates activities that would interfere with the natural flow of or substantially alter the channel, bed, or bank of, a lake, river, or stream, including disturbance of riparian vegetation under Fish and Game Code Sections 1600–1616. CDFW requires a Lake and Streambed Alteration Agreement (LSAA) permit for these activities. Requirements to protect the integrity of biological resources and water quality are often conditions of streambed alteration agreements. CDFW may establish conditions that include avoiding or minimizing vegetation removal, use of standard erosion control measures, limitations on the use of heavy equipment, limitations on work periods to avoid impacts on fisheries and wildlife resources, and requirements to restore degraded sites or compensate for permanent habitat losses. Aquatic resources (e.g., streams and ponds) that would be regulated by CDFW are present in the Project area. The Project would not likely involve modifications or improvements to stream crossings or modifications to the bed, bank, or channel of a stream, and would therefore not likely require an LSAA. If modifications are necessary, then an LSAA would be pursued.

California Native Plant Protection Act

The California Native Plant Protection Act (CNPPA) of 1977 prohibits importation of rare and endangered plants into California, take of rare and endangered plants, or sale of rare and endangered plants. CESA defers to the CNPPA, which ensures that state-listed plant species are protected when state agencies are involved in projects subject to CEQA. For the Initial and Full Repower, plants listed as rare under the CNPPA are not protected under CESA but rather under CEQA. Several rare and endangered plants have potential to occur in the Project area and could be adversely affected by Project activities.

Porter-Cologne Water Quality Control Act

The California Water Code addresses the full range of water issues in the state, and includes Division 7, known as the Porter-Cologne Water Quality Control Act (Porter-Cologne Act) (Sections 13000–16104 of the California Water Code). Section 13260 requires "any person discharging waste, or proposing to discharge waste, in any region that could affect the waters of the State to file a report of discharge (an application for waste discharge requirements [WDRs])" with the appropriate Regional Water Quality Control Board (Regional Water Board). Under this act, each of the nine Regional Water Boards must prepare and periodically update water quality control basin plans (basin plans). Each basin plan sets forth water quality standards for surface water and groundwater, as well as actions to control nonpoint and point sources of pollution. Projects that affect wetlands or waters must meet the waste discharge requirements of the Regional Water Board. Pursuant to CWA Section 401, an applicant for a Section 404 permit to conduct any activity that may result in discharge into navigable waters must provide a certification from the Regional Water Board that such discharge will comply with state water quality standards. As part of the wetlands permitting process under Section 404, a project applicant may be required to apply for a water quality certification from the applicable Regional Water Board if necessary.

Section 13050 of the Porter-Cologne Act authorizes the State Water Resources Control Board (State Water Board) and the relevant Regional Water Board to regulate biological pollutants. The California Water Code generally regulates more substances contained in discharges, and defines *discharges to receiving waters* more broadly than the CWA does. Waters of the State could be directly or indirectly affected during activities associated with the Project.

California Wetlands Conservation Policy

The goals of the California Wetlands Conservation Policy, adopted in 1993 (Executive Order W-59-93), are "to ensure no overall net loss, and achieve a long-term net gain in the quantity, quality, and permanence of wetlands acreage and values in California, in a manner that fosters creativity, stewardship, and respect for private property;" to reduce procedural complexity in the administration of state and federal wetlands conservation programs; and to make restoration, landowner incentive programs, and cooperative planning efforts the primary focus of wetlands conservation.

1.2.3 Local

East County Area Plan

Land use planning in the eastern portion of Alameda County is governed by the East County Area Plan (ECAP). In November 2000, the Alameda County electorate approved Measure D, the Save Agriculture and Open Space Lands Initiative, which amended portions of the County's General Plan, including the ECAP, to limit urban development on agricultural lands (Alameda County 2000). The Open Space Element of the ECAP addresses sensitive lands and regionally significant open space, including biological resources.

East Alameda County Conservation Strategy

The East Alameda County Conservation Strategy (EACCS) is a collaborative effort among several local, state, and federal agencies intended to provide an effective voluntary framework to protect, enhance, and restore natural resources in eastern Alameda County, while improving and streamlining the environmental permitting process for impacts resulting from infrastructure and development projects (ICF 2010). The EACCS is intended to identify and provide a means to avoid, minimize and compensate for impacts on biological resources such as endangered and other special-status species, and sensitive habitat types (e.g., wetlands, riparian corridors, rare upland communities). The EACCS provides a framework of comprehensive conservation goals and objectives, and facilitates implementation using consistent and standardized mitigation requirements. By implementing the EACCS, local agencies will be able to more easily address the legal requirements relevant to these species.

The EACCS study area encompasses 271,485 acres, or approximately 52 percent of Alameda County, including the cities of Dublin, Livermore, and Pleasanton. The western boundary of the EACCS study area runs along the Alameda Creek watershed, and the northern, southern, and eastern boundaries follow the Alameda County line with its adjacent counties.

EACCS development included input and review by CDFW to address impacts on state-listed species. Consistency with the EACCS also aids in streamlining CESA permit compliance for project impacts on state-listed species. A final draft of the EACCS was completed in October 2010 and released to the public in March 2011.

2007 Settlement Agreement

In 2007, Audubon, Californians for Renewable Energy (CARE), and three wind-energy companies (AES, NextEra, and EnXco) entered into a Settlement Agreement to resolve litigation regarding the County's issuance of CUP approvals. The 2007 Settlement Agreement, including Exhibit G-1 (modified from the 2005 CUPs,) requires participants to develop an NCCP or a similar agreement to "address the long-term operation of wind turbines at the APWRA and the conservation of impacted species of concern and their natural communities." In particular, the 2007 Settlement Agreement committed the wind companies to achieve a 50 percent reduction in avian fatalities from estimated annual fatalities of four focal raptor species (golden eagle, burrowing owl, American kestrel [*Falco sparverius*], and red-tailed hawk [*Buteo jamaicensis*]). Companies that could not demonstrate that these requirements were being met were required by the 2007 Settlement Agreement to institute an adaptive management plan. The adaptive management plan and other components of the Settlement

Agreement require strategies to provide protection and enhancement of habitat for raptors and other wildlife.

2.0 METHODS

2.1 Approach to Data Collection

The first step in the approach to data collection for this analysis included the identification and characterization of biological resources, including vegetation community types, riparian habitats, and special-status plant and animal species that are known to occur or have potential to occur in the Project area and larger BSA. The Project area (footprint of disturbance) is defined as the area directly affected by the proposed construction and consists of construction workspace areas, generally along the ridgelines within the BSA, two temporary staging areas, and new and existing access routes. The BSA that was assessed includes the overall site, as presented in Figure 2. The BSA was defined to compile adequate biological resources information that would encompass sufficient area to assess the potential for indirect effects from site preparation activities and construction. Should the Project area change prior to construction, it is expected that the actual footprint would still be within the limits of the BSA.

“Special-status,” as used in this report, refers to species that are:

- Listed, proposed for listing, or candidates for listing as threatened or endangered under the Federal Endangered Species Act (FESA) (50 Code of Federal Regulations [CFR] Part 17.12 [listed plants], 50 CFR Part 17.11 [listed animals], 67 Federal Register [FR] 40657 [candidate species], wait listed (WL) species, Birds of Conservation Concern (BCC), and various notices in the FR [proposed species]);
- Listed or proposed for listing by the State of California as threatened or endangered under the California Endangered Species Act (CESA) (CDFW [as CDFG] 2011);
- Identified by the California Department of Fish and Wildlife (CDFW) as fully protected species, including fish and wildlife that do not have State or federal threatened or endangered status but may still be threatened with extinction (CDFW [as CDFG] 2011);
- California Species of Special Concern: vertebrate species that have been designated as “species of special concern” by the CDFW because declining population levels, limited range, and/or continuing threats have made them vulnerable to extinction (CDFW [as CDFG] 2011);
- Included in the California Native Plant Society (CNPS) Rare Plant Inventory (CNPS 2014);
- Otherwise defined as rare, threatened, or endangered under the California Environmental Quality Act (CEQA); or
- Identified by the County of Alameda ECAP or EACCS as a sensitive species.

Prior to conducting fieldwork, the biologists reviewed records of known occurrences to identify special-status species that may occur within the BSA, including the defined Project area. Those records were then compared with lists of federal- or State-listed threatened, endangered, or other special-status species. Details of all survey work and approaches to collecting data are described below.

2.2 Literature Review

Preliminary investigation included review of information obtained from literature searches, examinations of habitat as discernible from aerial photographs, and database searches including CNPS and the California Natural Diversity Database (CNDDB) records (CDFW 2014). To identify the existing and potential biological resources present in the vicinity of the proposed Project, a geographic information system (GIS) search was performed. This consisted of mapping baseline biological resource data (vegetation mapping, CNDDB records, and water resources).

2.3 Field Survey

A reconnaissance-level biological resource survey was conducted by POWER biologists Ken McDonald and Mark Pollock, with Erik Nyquist and Cindy Lysne concurrently providing support for jurisdictional water resources, on March 25 and 26, 2014. Weather ranged from clear and sunny, to overcast and raining. Temperature ranged from the low 50s to mid-70 degrees Fahrenheit (°F). The reconnaissance survey included vegetation mapping of the entire BSA, as well as botanical and wildlife inventories within and adjacent to the Project area. Both the botanical and wildlife surveys were conducted by walking throughout the Project area, which was the primary focus of the surveys, and recording detected species. Vegetation communities were classified according to Holland (1986). The botanical inventories of the sites were floristic in nature, meaning that all plants observed were identified to the taxonomic level needed to determine whether they were special-status plant species. Wildlife species were detected either by observation, by vocalization, or by sign (e.g., tracks, burrows, scat).

3.0 RESULTS

3.1 Vegetation Community Descriptions

The following vegetation communities were mapped within the BSA, classified according to Holland (1986), and are presented in Figure 3. Table 1 presents the acreages of the observed vegetation communities within the Project disturbance area and within the BSA as a whole.

TABLE 1 VEGETATION COMMUNITY TYPES (ACRES)

VEGETATION COMMUNITY TYPE	BSA	PROJECT AREA
California Annual Grassland	3,391.6	101.4
Northern Coastal Scrub	8.2	0
Coast Live Oak Woodland	3.4	0
Rock Outcrop	7.0	0.3
Pond	4.6	0.4
Disturbed/Developed	20.1	19.0
Total	3434.9	120.5

3.1.1 California Annual Grassland

California annual grassland generally occurs on fine-textured loam or clay soils, which are moist or even waterlogged during the winter rainy season and very dry during the summer and fall. It is characterized by a dense to sparse cover of annual grasses, often with native and non-native annual forbs (Holland 1986). This habitat type also matches the Sawyer and Keeler-Wolf (1995) California annual grassland series. The habitat quality of the grasslands observed within the BSA is low, given the history of grazing as the main disturbance factor. Approximately 3,390 acres of California annual grassland occurs within the BSA, with approximately 101.4 acres currently occurring within the Project area.

3.1.2 Northern Coastal Scrub

Northern coastal scrub consists of low shrubs, usually up to two meters in height, growing on exposed sites with shallow, rocky soils (Holland 1986). Stands of northern coastal scrub can be dense, but with open areas dominated by grasses. This habitat type matches the Sawyer and Keeler-Wolf (1995) California sagebrush series in part. The northern coastal scrub observed within the BSA appeared to be remnant communities, following a lengthy regime of cattle browsing which has reduced the habitat to a low quality. Approximately eight acres of northern coastal scrub occur within the BSA, with approximately none currently occurring within the Project area.

3.1.3 Coast Live Oak Woodland

Coast live oak woodland varies from pure, closed-canopy of coast live oak (*Quercus agrifolia*) to mixtures with other broadleaf trees to open savannas (Holland 1986). This evergreen community reaches from 10 to 25 meters in height, generally having a poorly developed shrub layer. The herb layer may vary from sparse to abundant, usually annual grasses. The coast live oak woodland observed within the BSA was comprised of coast live oak, with some California bay (*Umbellularia californica*) and buckeye (*Aeculus californica*). This community was also often found adjacent to or to contain small to large rock outcroppings. Approximately 3.5 acres of coast live oak woodland occur within the BSA, with none currently occurring within the Project area.

3.1.4 Rock Outcrop

Rock outcrop is an exposure of bedrock, and is not necessarily associated with any specific vegetation community, but is known to possess vernal depressions suitable for some special-status wildlife species. Rock outcrops within the BSA range from fairly large and solitary to small and spread out. Rock outcrops were generally small in area, and were more easily observed within the grassland portions of the site. Rock outcrops occurring within oak woodland were not mapped separately. Approximately seven acres of rock outcropping occur within the BSA, with approximately 0.3 acres currently occurring within the Project area.

3.1.5 Pond

Ponds are perennial or seasonal water bodies with generally little to no vegetation. Within the BSA, they are utilized as a water source for cattle. Vegetation, such as trees, is occasionally found adjacent to these bodies of water, although more commonly only weedy non-native, generally riparian, vegetation and grasses were observed. The habitat quality of the ponds observed within the BSA is low, given the history of grazing as the main disturbance factor. Approximately 4.5 acres of ponds occur within the BSA, with approximately 0.4 acres currently occurring within the Project area.

3.1.6 Disturbed/Developed

Disturbed/developed areas are generally devoid of native vegetation (cleared or graded or containing buildings and offices) including dirt and paved roads, or areas dominated by a sparse cover of ruderal vegetation or ornamental vegetation. Approximately 20 acres of disturbed or developed occur within the BSA, with approximately 19.0 acres currently occurring within the Project area.

3.2 Special-Status Plant Species

A total of 41 special-status plant species were determined by the literature review to potentially occur within the BSA. Their habitat description, status, and potential for occurrence within the BSA are provided in Table 2. Potential for occurrence was based on habitat, elevation, soil, and proximity to known recorded occurrences of a species.

Special-status botanical species were not detected during the field surveys; however, species-specific plant surveys were not conducted as part of the habitat assessment, as the reconnaissance surveys were conducted outside of the suitable blooming periods for some species. The BSA provides habitat that could support special-status species; however, the Project area provides only marginal suitable habitat that could support special-status species.

Of the 41 plant species considered to have a potential to occur within the vicinity, seven were determined to have a high potential for occurrence within the BSA, 17 had moderate potential, and 10 had low potential, while the rest were determined to be absent. For the Project area, 31 species had a low potential for occurrence, while the rest were determined to be absent. A list of plant species observed during the survey is provided in Appendix A.

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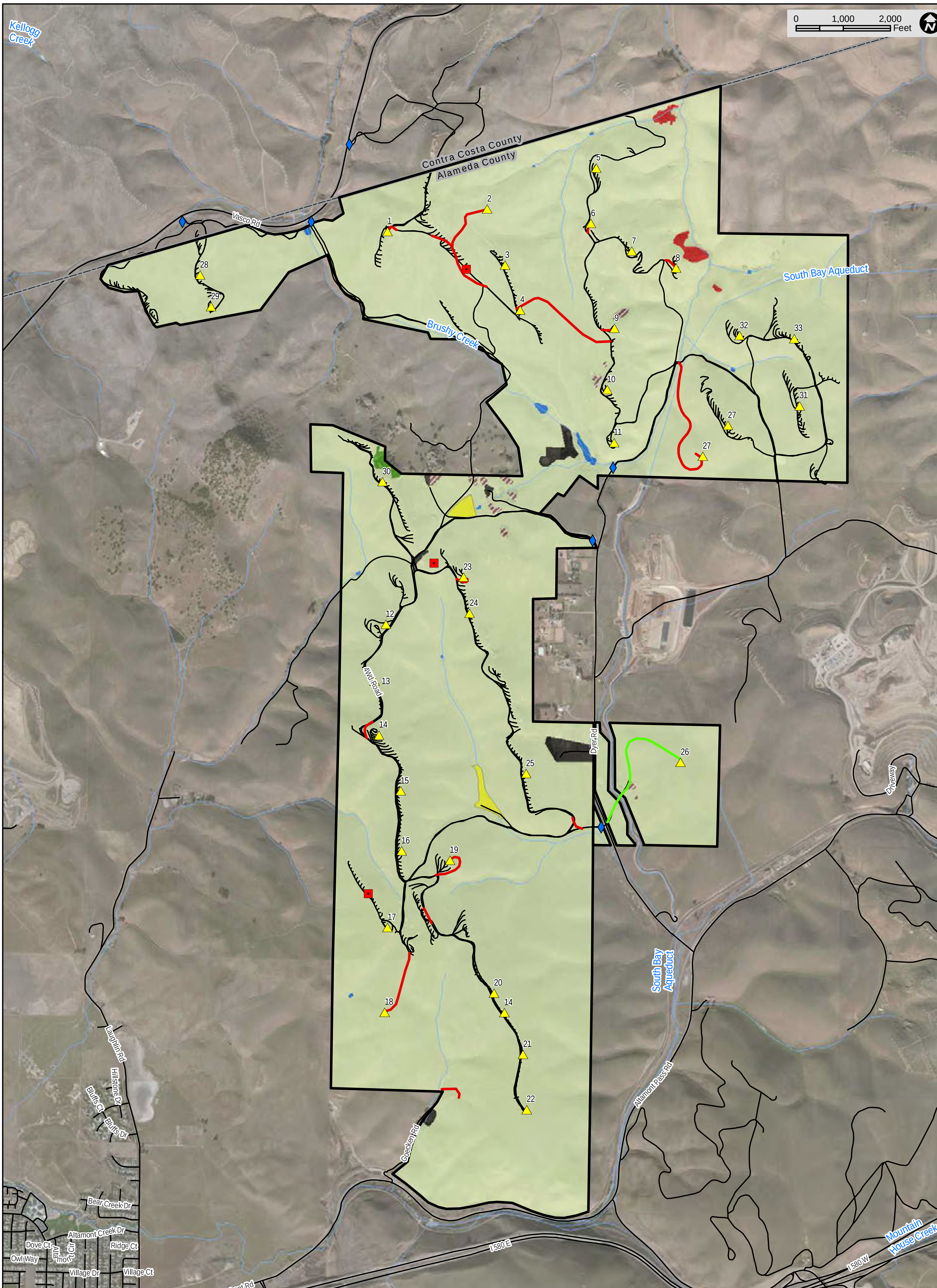

Legend

Wind Turbine	Existing Road	Stream	Vegetation
Gate	Road - New	County Boundary	California Annual Grassland
Met Tower	Devincenzi Rd East		Coast Live Oak Woodland
Project Boundary			Northern Coastal Scrub
O&M Area			Pond
			Rock Outcrop
			Developed

FIGURE 3
VEGETATION COMMUNITIES

ALTAMONT WINDS LLC
PROPOSED SUMMIT WIND
REPOWER PROJECT
ALAMEDA COUNTY, CA

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TABLE 2 SPECIAL-STATUS PLANT SPECIES AND THEIR POTENTIAL TO OCCUR WITHIN THE BIOLOGICAL SURVEY AREA

SPECIES	STATUS	HABITAT	BLOOMING PERIOD	POTENTIAL FOR OCCURRENCE – BSA	POTENTIAL FOR OCCURRENCE – PROJECT AREA
Amsinckia grandiflora large-flowered fiddleneck	Fed: Endangered State: Endangered CNPS: List 1B.1	Annual herb occurring in cismontane woodland and valley and foothill grassland. From 275 – 550 meters in elevation.	April – May	Low. Suitable habitat occurs within the BSA; however the nearest reported observation of this species is greater than 5 miles away.	Low. The heavily grazed grassland provides only marginal suitable habitat within the Project area.
Amsinckia lunaris bent flowered fiddleneck	Fed: None State: None CNPS: List 1B.2	Annual herb occurring in coastal bluff scrub, cismontane woodland, and valley and foothill grassland. From 3 – 550 meters in elevation.	March – June	Low. Suitable habitat occurs within the BSA; however the nearest reported observation of this species is greater than 17 miles away.	Low. The heavily grazed grassland provides only marginal suitable habitat within the Project area. This species was not observed during the survey.
Anomobryum julaceum slender silver moss	Fed: None State: None CNPS: List 2B.2	Moss occurring in broadleafed upland forest, lower montane coniferous forest, and North Coast coniferous forest. On damp rock and soil on outcrops, usually on roadcuts. From 10 – 1000 meters in elevation.	N/A	Absent. No suitable habitat for this species occurs within the BSA.	Absent. No suitable habitat for this species occurs within the Project area.
Arctostaphylos auriculata Mt. Diablo manzanita	Fed: None State: None CNPS: List 1B.3	Perennial evergreen shrub occurring in sandstone areas in chaparral and in cismontane woodland. From 135 – 650 meters in elevation.	January – March	Low. Suitable habitat occurs within the BSA; however the nearest reported observation of this species is greater than 4 miles away.	Absent. This obvious shrub was not detected during the survey of the Project area.

SPECIES	STATUS	HABITAT	BLOOMING PERIOD	POTENTIAL FOR OCCURRENCE – BSA	POTENTIAL FOR OCCURRENCE – PROJECT AREA
Arctostaphylos manzanita ssp. *laevigata* Contra Costa manzanita	Fed: None State: None CNPS: List 1B.2	Perennial evergreen shrub occurring in rocky chaparral. From 500 – 1100 meters in elevation.	January – March	Absent. No suitable habitat for this species occurs within the BSA, and the Project occurs below the known elevation range for the species.	Absent. This obvious shrub was not detected during the survey of the Project area.
Astragalus tener var. *tener* alkali milk-vetch	Fed: None State: None CNPS: List 1B.2	Annual herb occurring in playas, in adobe clay in valley and foothill grasslands, and in vernal pools. In alkaline areas. From 1 – 60 meters in elevation.	March – June	Absent. The Project occurs above the known elevation range for the species.	Absent. The Project occurs above the known elevation range for the species.
Atriplex cordulata var. *cordulata* heartscale	Fed: None State: None CNPS: List 1B.2	Annual herb occurring in chenopod scrub, meadows and seeps, and sandy valley and foothill grassland. In saline or alkaline areas. From 0 – 560 meters in elevation.	April – October	High. Suitable habitat occurs within the BSA, and the nearest reported observation of this species is less than one mile away.	Low. The heavily grazed grassland provides only marginal suitable habitat within the Project area.
Atriplex coronata var. *vallicola* Lost Hills crownscale	Fed: None State: None CNPS: List 1B.2	Annual herb occurring in chenopod scrub, valley and foothill grassland, and vernal pools. In alkaline areas. From 50 – 635 meters in elevation.	April – August	Moderate. Suitable habitat occurs within the BSA	Low. The heavily grazed grassland provides only marginal suitable habitat within the Project area.
Atriplex depressa brittlescale	Fed: None State: None CNPS: List 1B.2	Annual herb occurring in chenopod scrub, meadows and seeps, playas, valley and foothill grassland, and vernal pools. In alkaline or clay areas. From 1 – 320 meters in elevation.	April – October	High. Suitable habitat occurs within the BSA, and the nearest reported observation of this species is less than one mile away.	Low. The heavily grazed grassland provides only marginal suitable habitat within the Project area.

SPECIES	STATUS	HABITAT	BLOOMING PERIOD	POTENTIAL FOR OCCURRENCE – BSA	POTENTIAL FOR OCCURRENCE – PROJECT AREA
Atriplex joaquinana San Joaquin spearscale	Fed: None State: None CNPS: List 1B.2	Annual herb occurring in chenopod scrub, meadows and seeps, playas, and valley and foothill grassland. In alkaline areas. From 1 – 835 meters in elevation.	April – October	High. Suitable habitat occurs within the BSA, and the nearest reported observation of this species is less than one mile away.	Low. The heavily grazed grassland provides only marginal suitable habitat within the Project area.
Atriplex minuscula lesser saltscale	Fed: None State: None CNPS: List 1B.1	Annual herb occurring in chenopod scrub, playas, and valley and foothill grassland. In alkaline or sandy areas. From 15 – 200 meters in elevation.	May – October	High. Suitable habitat occurs within the BSA, and the nearest reported observation of this species is less than 0.5 miles away.	Low. The heavily grazed grassland provides only marginal suitable habitat within the Project area.
Balsamorhiza macrolepis big-scale balsamroot	Fed: None State: None CNPS: List 1B.2	Perennial herb occurring in chaparral, cismontane woodland, and valley and foothill grassland. Sometimes in serpentinite areas.	March – June	Low. Suitable habitat occurs within the BSA; however the nearest reported observation of this species is greater than 5 miles away.	Low. The heavily grazed grassland provides only marginal suitable habitat within the Project area. This species was not observed during the survey.
Blepharizonia plumosa big tarplant	Fed: None State: None CNPS: List 1B.1	Annual herb occurring in valley and foothill grassland. Usually in clay areas. From 30 – 505 meters in elevation.	July – October	High. Suitable habitat occurs within the BSA, and the nearest reported observation of this species is less than 1 mile away.	Low. The heavily grazed grassland provides only marginal suitable habitat within the Project area. This species was not observed during the survey.

SPECIES	STATUS	HABITAT	BLOOMING PERIOD	POTENTIAL FOR OCCURRENCE – BSA	POTENTIAL FOR OCCURRENCE – PROJECT AREA
California macrophylla round-leaved filaree	Fed: None State: None CNPS: List 1B.1	Annual herb occurring in cismontane woodland and valley and foothill grassland. In clay areas. From 15 – 1200 meters in elevation.	March – May	Moderate. Suitable habitat occurs within the BSA, and the nearest reported observation of this species is less than 0.5 miles away.	Low. The heavily grazed grassland provides only marginal suitable habitat within the Project area. This species was not observed during the survey.
Calochortus pulchellus Mt. Diablo fairy-lantern	Fed: None State: None CNPS: List 1B.2	Perennial bulbiferous herb occurring in chaparral, cismontane woodland, riparian woodland, and valley and foothill grassland. From 30 – 840 meters in elevation.	April – June	Moderate. Suitable habitat occurs within the BSA, and the nearest reported observation of this species is less than 3 miles away.	Low. The heavily grazed grassland provides only marginal suitable habitat within the Project area. This species was not observed during the survey.
Caulanthus lemmonii Lemmon's jewelflower	Fed: None State: None CNPS: List 1B.2	Annual herb occurring in pinyon and juniper woodland and valley and foothill grassland. From 80 – 1220 meters in elevation.	March – May	Moderate. Suitable habitat occurs within the BSA, and the nearest reported observation of this species is less than 8 miles away.	Low. The heavily grazed grassland provides only marginal suitable habitat within the Project area. This species was not observed during the survey.
Centromadia parryi ssp. *congdonii* Congdon's tarplant	Fed: None State: None CNPS: List 1B.1	Annual herb occurring in alkaline valley and foothill grasslands. Up to 230 meters in elevation.	May – October	High. Suitable habitat occurs within the BSA, with observations of this species immediately adjacent to the BSA along Dyer Road.	Low. The heavily grazed grassland provides only marginal suitable habitat within the Project area. This species was not observed during the survey.

SPECIES	STATUS	HABITAT	BLOOMING PERIOD	POTENTIAL FOR OCCURRENCE – BSA	POTENTIAL FOR OCCURRENCE – PROJECT AREA
Chloropyron molle ssp. *hispidum* hispid salty bird's-beak	Fed: None State: None CNPS: List 1B.1	Annual hemiparasitic herb occurring in meadows and seeps, playas, and valley and foothill grasslands. In alkaline areas. Up to 155 meters in elevation.	June – September	Moderate. Suitable habitat occurs within the BSA, and the nearest reported observation of this species is less than 3 mile away.	Low. The heavily grazed grassland provides only marginal suitable habitat within the Project area. This species was not observed during the survey.
Chloropyron palmatum Palmate-bracted salty bird's-beak	Fed: Endangered State: Endangered CNPS: List 1B.1	Annual hemiparasitic herb occurring in chenopod scrub and valley and foothill grasslands. In alkaline areas. Up to 155 meters in elevation.	May – October	Moderate. Suitable habitat occurs within the BSA, and the nearest reported observation of this species is less than 3 miles away.	Low. The heavily grazed grassland provides only marginal suitable habitat within the Project area.
Deinandra bacigalupii Livermore tarplant	Fed: None State: None CNPS: List 1B.2	Annual herb occurring in alkaline meadows and seeps. From 150 – 185 meters in elevation.	June – October	Moderate. Suitable habitat occurs within the BSA, and the nearest reported observation of this species is less than 3 miles away.	Low. The heavily grazed grassland provides only marginal suitable habitat within the Project area.
Delphinium californicum ssp. *interius* Hospital Canyon larkspur	Fed: None State: None CNPS: List 1B.2	Perennial herb occurring in openings in chaparral, in mesic cismontane woodland, and in coastal scrub. From 195 – 1095 meters in elevation.	April – June	Low. Some suitable habitat occurs within the BSA, and the nearest reported observation of this species is more than 7 miles away.	Absent. No suitable habitat occurs within the Project area.
Delphinium recurvatum recurved larkspur	Fed: None State: None CNPS: List 1B.2	Perennial herb occurring in chenopod scrub, cismontane woodland, and valley and foothill grassland. In alkaline areas. Up to 790 meters in elevation.	March – June	Moderate. Suitable habitat occurs within the BSA, and the nearest reported observation of this species is less than 4 miles away.	Low. The heavily grazed grassland provides only marginal suitable habitat within the Project area.

SPECIES	STATUS	HABITAT	BLOOMING PERIOD	POTENTIAL FOR OCCURRENCE – BSA	POTENTIAL FOR OCCURRENCE – PROJECT AREA
Eryngium spinosepalum spiny sepaled button celery	Fed: None State: None CNPS: List 1B.2	Annual/perennial herb occurring in valley and foothill grassland and vernal pools. From 80 – 255 meters in elevation.	April – May	Moderate. Suitable habitat occurs within the BSA, and the nearest reported observation of this species is less than 9 miles away.	Low. The heavily grazed grassland provides only marginal suitable habitat within the Project area.
Eschscholzia rhombipetala diamond-petaled California poppy	Fed: None State: None CNPS: List 1B.1	Annual herb occurring in alkaline and clay valley and foothill grassland. Up to 975 meters in elevation.	March – April	Moderate. Suitable habitat occurs within the BSA, and the nearest reported observation of this species is less than 1 mile away.	Low. The heavily grazed grassland provides only marginal suitable habitat within the Project area.
Fritillaria agrestis stinkbells	Fed: None State: None CNPS: List 4.2	Perennial bulbiferous herb occurring in chaparral, cismontane woodland, pinyon and juniper woodland, and valley and foothill grassland. In clay and sometimes serpentinite areas. From 10 – 1555 meters in elevation.	March – June	High. Suitable habitat occurs within the BSA, and the nearest reported observation of this species is less than 1 mile away.	Low. The heavily grazed grassland provides only marginal suitable habitat within the Project area.
Helianthella castanea Diablo helianthella	Fed: None State: None CNPS: List 1B.2	Perennial herb occurring in broadleafed upland forest, chaparral, cismontane woodland, coastal scrub, riparian woodland, and valley and foothill grassland. From 60 – 1300 meters in elevation.	March – June	Moderate. Suitable habitat occurs within the BSA, and the nearest reported observation of this species is less than 4 miles away.	Low. The heavily grazed grassland provides only marginal suitable habitat within the Project area.
Hesperolinon breweri Brewer's western flax	Fed: None State: None CNPS: List 1B.2	Annual herb occurring in chaparral, cismontane woodland, and valley and foothill grassland. Usually in serpentinite areas. From 30 – 945 meters in elevation.	May – July	Moderate. Suitable habitat occurs within the BSA, and the nearest reported observation of this species is less than 3 miles away.	Low. The heavily grazed grassland provides only marginal suitable habitat within the Project area.

SPECIES	STATUS	HABITAT	BLOOMING PERIOD	POTENTIAL FOR OCCURRENCE – BSA	POTENTIAL FOR OCCURRENCE – PROJECT AREA
Hibiscus lasiocarpos var. *occidentalis* woolly rose-mallow	Fed: None State: None CNPS: List 1B.2	Perennial rhizomatous herb emergent occurring in freshwater marshes and swamps. Often found in the riprap on the sides of levees. Up to 120 meters in elevation.	June – September	Absent. The BSA occurs above the known elevation range for the species.	Absent. The Project occurs above the known elevation range for the species.
Lasthenia conjugens Contra Costa goldfields	Fed: Endangered State: None CNPS: List 1B.1	Annual herb occurring in cismontane woodland, alkaline playas, valley and foothill grassland, and vernal pools. In mesic areas. Up to 470 meters in elevation.	March – June	Low. Suitable habitat occurs within the BSA; however the nearest reported observation of this species is greater than 16 miles away.	Low. The heavily grazed grassland provides only marginal suitable habitat within the Project area.
Lilaeopsis masonii Mason's lilaeopsis	Fed: None State: Rare CNPS: List 1B.1	Perennial rhizomatous herb occurring in brackish or freshwater marshes and swamps and riparian scrub. Up to10 meters in elevation.	April – November	Absent. The BSA occurs above the known elevation range for the species.	Absent. The Project occurs above the known elevation range for the species.
Limosella australis Delta mudwort	Fed: None State: None CNPS: List 2B.1	Perennial stoloniferous herb occurring in freshwater or brackish marshes and swamps and riparian scrub. Usually on mud banks. Up to 3 meters in elevation.	May – August	Absent. The BSA occurs above the known elevation range for the species.	Absent. The Project occurs above the known elevation range for the species.
Madia radiata showy golden madia	Fed: None State: None CNPS: List 1B.1	Annual herb occurring in cismontane woodland and valley and foothill grassland. From 25 – 1215 meters in elevation.	March – May	Low. Suitable habitat occurs within the BSA; however the nearest reported observation of this species is greater than 12 miles away.	Low. The heavily grazed grassland provides only marginal suitable habitat within the Project area.

SPECIES	STATUS	HABITAT	BLOOMING PERIOD	POTENTIAL FOR OCCURRENCE – BSA	POTENTIAL FOR OCCURRENCE – PROJECT AREA
Monardella antonina ssp. *antonina* San Antonio Hills monardella	Fed: None State: None CNPS: List 3	Perennial rhizomatous herb occurring in chaparral and cismontane woodland. From 320 – 1000 meters in elevation.	June – August	Low. Suitable habitat occurs within the BSA, but there are no recorded observations within 20 miles.	Absent. No suitable habitat occurs within the Project area.
Myosurus minimus ssp. *apus* little mouse tail	Fed: None State: None CNPS: List 3.1	Annual herb occurring in valley and foothill grassland and vernal pools. In alkaline areas. From 20 – 640 meters in elevation.	March – June	Low. Suitable habitat occurs within the BSA, but there are no recorded observations within 20 miles.	Low. The heavily grazed grassland provides only marginal suitable habitat within the Project area.
Navarretia nigelliformis ssp. *radians* shining navarretia	Fed: None State: None CNPS: List 1B.2	Annual herb occurring in cismontane woodland, valley and foothill grassland, and vernal pools. Sometimes in clay areas. From 76 – 1000 meters in elevation.	April – July	Moderate. Suitable habitat occurs within the BSA, and the nearest reported observation of this species is less than 8 miles away.	Low. The heavily grazed grassland provides only marginal suitable habitat within the Project area.
Navarretia prostrata prostrate vernal pool navarretia	Fed: None State: None CNPS: List 1B.1	Annual herb occurring in coastal scrub, meadows and seeps, alkaline valley and foothill grasslands, and vernal pools. In mesic areas. From 15 – 1210 meters in elevation.	April – July	Moderate. Suitable habitat occurs within the BSA, and the nearest reported observation of this species is less than 9 miles away.	Low. The heavily grazed grassland provides only marginal suitable habitat within the Project area.

SPECIES	STATUS	HABITAT	BLOOMING PERIOD	POTENTIAL FOR OCCURRENCE – BSA	POTENTIAL FOR OCCURRENCE – PROJECT AREA
Plagiobothrys glaber hairless popcornflower	Fed: None State: None CNPS: List 1A	Annual herb occurring in alkaline meadows and seeps and coastal salt marshes and swamps. From 15 – 180 meters in elevation.	March – May	Moderate. Suitable habitat occurs within the BSA, and the nearest reported observation of this species is less than 4 miles away.	Low. The heavily grazed grassland provides only marginal suitable habitat within the Project area.
Senecio aphanactis chaparral ragwort	Fed: None State: None CNPS: List 2B.2	Annual herb occurring in chaparral, cismontane woodland, and coastal scrub. Sometimes in alkaline areas. From 15 – 800 meters in elevation.	January – April	Low. Marginal suitable habitat occurs within the BSA, and the nearest reported observation of this species is less than 5 miles away.	Low. The heavily grazed grassland provides only marginal suitable habitat within the Project area.
Trifolium hydrophilum saline clover	Fed: None State: None CNPS: List 1B.2	Annual herb occurring in marshes and swamps, in mesic and alkaline valley and foothill grasslands, and in vernal pools. Up to 300 meters in elevation.	April – June	Moderate. Suitable habitat occurs within the BSA, and the nearest reported observation of this species is less than 3 miles away.	Low. The heavily grazed grassland provides only marginal suitable habitat within the Project area.
Tropidocarpum capparideum caper-fruited tropidocarpum	Fed: None State: None CNPS: List 1B.1	Annual herb occurring in alkaline hills of valley and foothill grassland. Up to 455 meters in elevation.	March – April	Moderate. Suitable habitat occurs within the BSA, and the nearest reported observation of this species is less than 5 miles away.	Low. The heavily grazed grassland provides only marginal suitable habitat within the Project area.
Viburnum ellipticum oval-leaved viburnum	Fed: None State: None CNPS: List 2B.3	Perennial deciduous shrub occurring in chaparral, cismontane woodland, and lower montane coniferous forest. From 215 – 1400 meters in elevation.	May - June	Absent. No suitable habitat for this species occurs within the BSA.	Absent. No suitable habitat for this species occurs within the Project area.

Absent: Species or sign not observed on the site, outside of the known range, and conditions unsuitable for occurrence.
Low: Species or sign not observed on the site, but conditions marginal for occurrence.
Moderate: Species or sign not observed on the site, but conditions suitable for occurrence and/or an historical record exists in the vicinity.
High: Species or sign not observed on the site, but reasonably certain to occur on the site based on conditions, species ranges, and recent records.
Present: Species or sign of their presence recently observed on the site.

Federal status
Endangered = listed as Endangered under the federal Endangered Species Act
Delisted = previously listed under the federal Endangered Species Act but now removed
State status
Endangered = listed as Endangered under the California Endangered Species Act
Rare = designated as Rare
CNPS State Rank
List 1B Plants rare, threatened, or endangered in California and elsewhere
List 4 Plants of limited distribution; a watch list
CNPS threat extension codes
.1 Seriously endangered in California
.2 Fairly endangered in California

3.3 Non-native Plant Species

A comprehensive plant inventory, including non-native species, was taken during the reconnaissance surveys and is included in Appendix B. Non-native plants are rated by the California Invasive Plant Council (Cal-IPC) as falling into one of three categories (Cal-IPC 2013):

- **High** – These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.
- **Moderate** – These species have substantial and apparent, but generally not severe, ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.
- **Limited** – These species are invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.

Some species are not currently rated due to lack of adequate information or lack of significant impacts on native communities.

The non-native plant species that were detected during reconnaissance surveys that have a rating by Cal-IPC are as follows:

- Poison hemlock (*Conium maculatum*) – rated as moderate
- Fennel (*Foeniculum vulgare*) – rated as high
- Italian thistle (*Carduus pycnocephalus*) – rated as moderate
- Slender-flower thistle (*Carduus tenuiflorus*) – rated as limited
- Tocalote (*Centaurea melitensis*) – rated as moderate
- Yellow star-thistle (*Centaurea solstitialis*) – rated as high
- Bull thistle (*Cirsium vulgare*) – rated as moderate
- Artichoke thistle (*Cynara cardunculus*) – rated as moderate
- Black mustard (*Brassica nigra*) – rated as moderate
- Field mustard (*Brassica rapa*) – rated as limited
- Bur clover (*Medicago polymorpha*) – rated as limited
- Red-stemmed filaree (*Erodium cicutarium*) – rated as limited
- Curly dock (*Rumex crispus*) – rated as limited
- Slender wild oat (*Avena barbata*) – rated as moderate
- Wild oat (*Avena fatua*) – rated as moderate
- Ripgut grass (*Bromus diandrus*) – rated as moderate
- Soft chess (*Bromus hordeaceus*) – rated as limited
- Foxtail chess (*Bromus madritensis*) – rated as high
- Rye grass (*Festuca perennis*) – rated as moderate
- Glaucous foxtail barley (*Hordeum murinum*) – rated as moderate
- Annual beard grass (*Polypogon nomspeliensis*) – rated as limited

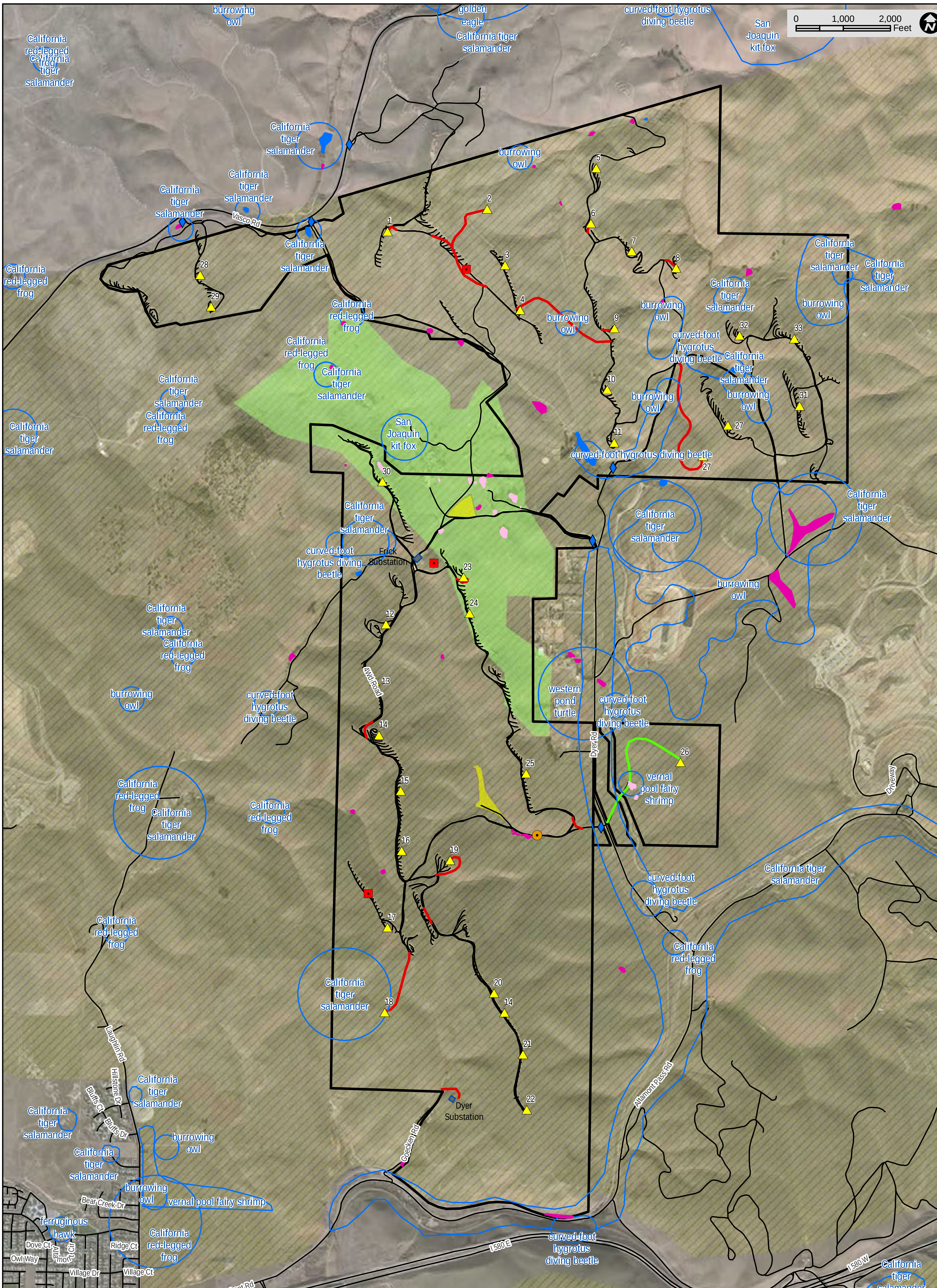
3.4 Special-Status Wildlife Species

There are eight special status wildlife species that have been documented to occur within the Project area and an additional 21 that have potential to occur (Table 3). Among federally threatened and endangered species, two have been documented within the Project area (California tiger salamander and vernal pool fairy shrimp), and four others have potential to occur (longhorn fairy shrimp, San Joaquin kit fox, Alameda whipsnake, and California red-legged frog). Critical habitat has been designated within the BSA for longhorn fairy shrimp and California red-legged frog. In this section, each federally listed species is discussed separately and all other special status wildlife species with potential to occur in the BSA are grouped by the landcover type that provides the most important (or limiting) habitat for each species. A list of wildlife species observed during the survey is provided in Appendix C.

Grassland Habitat

The majority of the BSA and most of the Project area occurs within grassland habitat. Much of the grassland habitat contains burrow systems of California ground squirrel (*Otospermophilus beecheyi*); the species is abundant and widespread and occurs throughout the BSA in varying densities. California ground squirrels and their burrows may provide important habitat components for many special status wildlife species including refugia for California tiger salamander, California red-legged frog, Alameda whipsnake, and San Joaquin whipsnake; breeding burrows for burrowing owls; and prey for golden eagle, ferruginous hawk (*Buteo regalis*), Swainson's hawk, white-tailed kite (*Elanus leucurus*), prairie falcon (*Falco mexicanus*), American badger (*Taxidea taxus*), and San Joaquin kit fox. During the site visit, numerous observations were noted of foraging golden eagles. A burrowing owl was observed on March 25 and again on March 26, just south of the southern proposed O&M area; CNDDB data documents numerous breeding occurrences of burrowing owls within the BSA during the past decade (Figure 4). California tiger salamander has been documented at numerous ponds and vernal pools within the BSA and California red-legged frog and San Joaquin kit fox have been documented just outside of the BSA (within 500 feet), each of these three species is discussed in detail below. Numerous burrow systems are present within areas that would experience ground disturbance as a result of the proposed Project, and avoidance of the ubiquitous burrows would be virtually impossible. Because the ground squirrels are so abundant and widespread within the BSA and direct ground disturbance would impact a relatively very small proportion of the area, it is unlikely that the necessary disturbance of ground squirrel burrows would have a detectable or biologically significant effect on populations of special status wildlife species in the area.

Several other species use grassland habitat. California horned lark (*Eremophila alpestris actia*) and northern harrier (*Circus cyaneus*) both nest on the ground in grassland and were observed at multiple locations in the BSA during the March 25-26 site visit. Coast horned lizards (*Phrynosoma coronatum*) utilize a variety of open areas including grassland. Grassland provides important foraging habitat for two species that breed in wetlands, western spadefoot toads (*Spea hammondii*) and tricolored blackbirds (*Agelaius tricolor*), and two species that roost in oaks or cliffs, pallid bats (*Antrozous pallidus*) and Townsend's big-eared bats (*Corynorhinus townsendii*). A flock of approximately 50 tricolored blackbirds was observed foraging at the site during the site visit, but suitable breeding habitat is not present within the Project area. Additionally, loggerhead shrikes (*Lanius ludovisianus*) use grassland that is adjacent to oak woodlands or shrubby areas.



Legend

Wind Turbine	Existing Road	Burrowing Owl	Perennial Pond
Gate	Road - New	CNDDB Wildlife Species	Vernal Pool in Swale
Met Tower	Devincenzi Rd East	Longhorn Fairy Shrimp DCH (USFWS)	Sandstone Outcrop with Vernal Pools
Project Boundary		California Red-legged Frog DCH (USFWS)	
Substation			
O&M Area			

FIGURE 4
WILDLIFE CNDDB AND FIELD SURVEY OBSERVATION OCCURENCES

ALTAMONT WINDS LLC
PROPOSED SUMMIT WIND REPOWER PROJECT
ALAMEDA COUNTY, CA

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Oak Woodland

Several pockets of oak woodland occur in the BSA, though none occur within the Project area. Oak woodlands are year-round habitat for San Francisco dusky-footed woodrat (*Neotoma fuscipes*) and silvery legless lizards (*Anniella pulchra pulchra*). Cooper's hawks (*Accipiter cooperii*) occur in oak woodlands; the woodlands at the BSA are too small to support any breeding territories, but they might be used occasionally during migration or dispersal. Some avian species that primarily forage in grassland or shrub communities could utilize the woodland trees for nesting, including: Swainson's hawk, white-tailed kite, ferruginous hawk, golden eagle, and loggerhead shrike. Pallid bats and Townsend's big-eared bats forage in oak woodlands and pallid bats often roost in tree cavities. Alameda whipsnake occurs primarily in coastal scrub and chaparral communities, but they also utilize grasslands and open oak woodlands.

Perennial ponds and riparian vegetation

Four perennial ponds occur within the BSA: one near Vasco Road and the access road to proposed Turbines 28 and 29, one along Brushy Creek just south of proposed Turbine 11, and two smaller ponds just east of Brushy Creek on tributaries. A small patch of dense riparian vegetation occurs surrounding the Brushy Creek pond, and scattered riparian trees occur near the Vasco Road pond and along Brushy Creek. The dense riparian patch could provide suitable habitat for Modesto song sparrow (*Melospiza melodia*), though they have not been documented within three miles of the BSA. The perennial ponds may provide suitable habitat for California tiger salamanders and western pond turtle (*Actinemys marmorata*), and marginal habitat for California red-legged frogs, western spadefoot toads, and curved-foot hygrotus diving beetle (*Hygrotus curvipes*). California tiger salamanders and curved-foot hygrotus diving beetle have each been documented in several locations in the BSA, while western pond turtle and California red-legged frog have been documented just outside of the Project area (Figure 4). California tiger salamanders and California red-legged frogs are federally threatened and each is discussed below. No ponds or riparian vegetation occur within the Project area.

Vernal Pools and Intermittent Streams

Numerous vernal pools occur within the BSA, but none occur within the Project area. Vernal pools in the BSA primarily occur at small drainage impoundments, typically used as cattle tanks, and within depressions in sandstone rock outcrops. The locations of these two vernal pool types are shown in Figure 4. Vernal pools within sandstone outcrops are typically small and shallow (less than 5 feet across and less than 1 foot deep), and provide prime habitat for longhorn fairy shrimp and vernal pool fairy shrimp. Designated critical habitat for longhorn fairy shrimp occurs within the BSA, and vernal pool fairy shrimp were documented within a sandstone outcrop pool in the BSA in 2006. Both of these species are federally listed and each is discussed below. Impounded vernal pools within drainages in the BSA are typically used as cattle tanks and experience high levels of disturbance from cattle. Nevertheless, they could provide suitable habitat for California tiger salamanders, curved-foot hygrotus diving beetles, western spadefoot toads, midvalley fairy shrimp (*Branchinecta mesovallensis*), longhorn fairy shrimp, and vernal pool fairy shrimp. California tiger salamanders and curved-foot hygrotus diving beetles have each been documented at several locations within the BSA in this type of pool. Curved-foot hygrotus diving beetles were also documented within intermittent pools that occur along Brushy Creek, where the creek flows north through the BSA. Widely scattered small pools could also occur along other drainages in the BSA.

Cliffs and Rock Outcrops

A few cliffs and several areas of rock outcrops occur within the BSA. No cliffs or large rock outcrops occur within the Project area. Exposed rock within the BSA consists primarily of sandstone and conglomerate. The sandstone commonly has pockets, bowls, and huecos eroded into its surface, providing vernal pool habitat (discussed above), and protected ledges suitable for raptor nesting. Special status bird species with potential to nest on cliffs within the BSA are golden eagle and prairie falcon. Foraging golden eagles were observed at multiple locations in the BSA during the March 25-26 site visit. During the course of the habitat assessment two raven nests were incidentally observed on cliffs, but no raptor nests were observed, nor have raptor cliff nests been previously documented within the BSA. Two species of bats have potential to roost within cliff/rock habitat: pallid bats roost within crevices, while Townsend's big-eared bats roost in caves. Caves were not observed at the site, but rock crevices are common. Alameda whipsnakes use rock outcrops for protection from predators, egg-laying sites, and winter hibernaculum.

California Tiger Salamander

California tiger salamander is federally listed as Threatened, and requires two habitat components: vernal ponds (or permanent ponds with no predatory fish) for breeding, and valley and foothill upland grasslands for estivation and refuge sites. Adults congregate at aquatic breeding sites for brief periods during warm rains, primarily between November and February (Loredo et al. 1996), and spend the rest of the year in upland areas. Larva spend the winter and spring within the aquatic site and metamorphose in late spring or early summer, after which they disperse to upland sites (Holland et al. 1990). The species uses small mammal burrows for cover during the non-breeding season and during migration to and from breeding sites. Aquatic sites need to retain water for a minimum of 10 weeks and be free from predatory fish. The most suitable type of breeding habitat typically consists of large vernal pools near an abundance of ground squirrel or pocket gopher burrows (Jennings and Hayes 1994; Loredo et al. 1996). Tiger salamanders do not avoid burrows occupied by ground squirrels (Loredo et al. 1996). While tiger salamanders may inhabit upland areas up to one mile from breeding sites (Jennings and Hayes 1994), they probably remain much closer to breeding sites in areas where ground squirrel burrow density is high. In Contra Costa County, Loredo et al. (1996) found average migration distances between breeding and refugia sites of only 118 feet for adults and 85 feet for juveniles.

The species has been documented in burrow refugia at three locations within the BSA, in two breeding ponds within the Project area, and several additional breeding ponds within one mile of the BSA (Figure 4). Suitability of breeding ponds depends largely on how long the pool retains water during a typical year which is difficult to predict from a single site visit, but some of the other vernal or permanent ponds within the BSA likely provide suitable breeding habitat as well. No potential breeding sites occur within the Project area, but numerous ground squirrel burrows are present within areas that would experience ground disturbance, and avoidance of the ubiquitous burrows may be impossible.

California Red-Legged Frog

California red-legged frog is federally listed as Threatened, and breeds in aquatic habitats, including ponds, quiet stream pools, backwaters, and cattle ponds, usually in water at least two feet deep, with dense, shrubby riparian or emergent vegetation. Cattle ponds are frequently inhabited; sometimes even cattle ponds that lack emergent vegetation cover still support breeding populations of red-legged frogs. During dry weather, red-legged frogs are seldom found far from water, but during wet periods they may travel through uplands up to two miles from breeding habitat. Some populations find refuge during the dry season in small mammal burrows, logs, rocks, debris, or in cracks at the bottom of dry vernal pools, but this behavior has not been observed in all populations (USFWS 2002a).

The entire BSA is within land designated as critical habitat for California red-legged frog (USFWS 2004). Red-legged frogs have not been documented within the Project area, but have been documented just outside (Figure 4). Potential breeding habitat occurs within the BSA, although not within the Project area, primarily within permanent ponds (Figure 4), though these appear to be heavily used by cattle and do not have the thick riparian or emergent vegetation usually associated with red-legged frog habitat use.

Vernal Pool Fairy Shrimp

Vernal pool fairy shrimp are federally listed as Threatened, and require vernal pools or vernal pool-like habitat, including natural depressions in swales and drainages (most commonly), pools in rock outcrops, cattle ponds, roadside ditches, or even ruts left by heavy construction vehicles; they have never been found in permanent bodies of water. Fairy shrimp eggs, or cysts, remain dormant when the pool is dry and when the pool fills can complete their entire life cycle in 18 days at 68 degrees Fahrenheit and 41 days at 15 degrees Fahrenheit. They can inhabit small pools that hold water for as little as three weeks in springtime or six to seven weeks during winter (USFWS 2006).

Vernal pool fairy shrimp have been documented at several locations in the vicinity of the BSA and at one location within the BSA, in a very small pool on top of a 15-foot-tall sandstone rock outcrop (Figure 4), although not within the Project area. Though the edge of this outcrop is within about 20 feet of the two-track road proposed to be upgraded for access to proposed turbine #26, it is not anticipated that the pool would be directly disturbed, as there appears to be ample room for the road adjacent to the rock without requiring blasting of the rock outcrop. Within the BSA, three other rock outcrops containing vernal pools occur within 40 feet of roads proposed for upgrade all are in the general vicinity of the northern proposed O&M area. Again, it does not appear that disturbance of the rock outcrops would be necessary, and the pools would all be above the grade of the road, minimizing the chance of construction material or runoff disturbing the pools. The manmade vernal cattle pond approximately 40 feet east of the proposed northern O&M area may be more vulnerable to disturbance. This pond, which appears to be heavily used by cattle, has a small complex of perennial and vernal pools occur in the roadside ditch of a road proposed to be upgraded for access. This complex occurs about 300 feet south of the proposed southern O&M area and within a few feet of the current roadside. These pools also appear to be heavily disturbed.

Longhorn Fairy Shrimp

The longhorn fairy shrimp is a federally listed as Endangered species with designated critical habitat within the BSA (Figure 4). Longhorn fairy shrimp inhabit vernal pools and vernal pool-like habitat, including natural depressions in swales and drainages (most commonly), pools in rock outcrops, cattle ponds, roadside ditches, or even ruts left by heavy construction vehicles. They do not occur in permanent bodies of water (USFWS 2006). Within the vicinity of the BSA (i.e., Contra Costa and Alameda Counties), most reports of longhorn fairy shrimp are associated with pools in sandstone outcrops (Jones and Stokes 2006). Fairy shrimp eggs, or cysts, remain dormant when the pool is dry and when the pool fills can complete their entire life cycle in as little as 23 days. They can inhabit small pools that hold water for as little as three to four weeks in springtime or six to seven weeks during winter (USFWS 2006).

The CNDDB does not document any specific occurrence records within the BSA, but provides a large occurrence polygon encompassing the entire Project area, indicating that the species is likely to occur within the BSA. Within the BSA, four rock outcrops containing vernal pools occur within 40 feet of roads proposed for upgrade, although it does not appear that disturbance of the rock outcrops would be necessary and the pools would all be above the grade of the road, minimizing the chance of construction material or runoff disturbing the pools. The manmade vernal cattle pond approximately 40 feet east of the proposed northern O&M area may prove to be more vulnerable to disturbance. This pond, which appears to be heavily used by cattle, has a small complex of perennial and vernal pools that occur in the roadside ditch of a road proposed to be upgraded for access. This complex occurs about 300 feet south of the proposed southern O&M area and within a few feet of the current roadside, and not within the Project area. These pools also appear to be heavily disturbed.

Alameda Whipsnake

The Alameda whipsnake is listed as a federally Threatened subspecies of the California whipsnake, restricted in distribution to Contra Costa and Alameda Counties. They occur primarily in chaparral and coastal scrub communities, but also utilize grasslands and open oak woodlands when they are adjacent to chaparral or scrub. They use rock outcrops and ground squirrel burrows as retreat sites. It is not known how far Alameda whipsnakes will range from shrubland into grassland. California whipsnake has been documented greater than 1,000 feet from shrubland when rock outcrops were available (USFWS 2002b). The CNDDB provides a large occurrence polygon encompassing the entire BSA, but does not document any specific occurrence records in or within three miles of the BSA. A small amount of remnant coastal scrub occurs within the BSA and adjacent to the Project area, but it is sparse and of marginal quality. In the immediate vicinity of the Project area, areas with low shrubs are few and far between and very small. Though patterns of grassland and oak woodland habitat use by Alameda whipsnake are not well understood (USFWS 2002b), based on available information it appears unlikely that they would occur within the Project area. If they do occur, they would most likely be found near rock outcrops, or possibly ground squirrel burrows.

San Joaquin Kit Fox

San Joaquin kit fox is listed as federally Endangered, and is a distinct subspecies of kit fox inhabiting grasslands of California’s San Joaquin Valley and in foothills of surrounding coast ranges, Sierra Nevada, and Tehachapi Mountains (USFWS 1998). The majority of the population occurs in the southern San Joaquin Valley; the BSA is near the northern extent of the species range, where the population is relatively sparse and kit foxes possibly occur only intermittently (Smith et al. 2006).

Kit foxes typically inhabit open grassland and oak savannah. They are more common in sandy soils where burrows are easier to dig but also inhabit areas with clay soils where they can enlarge ground squirrel burrows. In the northern part of their range their primary prey is California ground squirrels (*Otospermophilus beecheyi*), requiring at least some daytime activity from the normally crepuscular kit fox (Clark et al. 2007). The general lack of kangaroo rats, kangaroo mice, and pocket mice (*Heteromyidae*), may limit their abundance in the northern part of their range; these species form the bulk of their diet in the core portions of the kit fox’s range.

In recent decades there have been numerous attempts to document kit fox distribution in the northern part of their range with varied success (Smith et al. 2006; Clark et al. 2007). While many surveys have failed to detect kit foxes, they are periodically detected in low numbers in Alameda and Contra Costa Counties, including a detection in 2002 just outside of the BSA east of Brushy Peak (Clark et al. 2007).

TABLE 3 SPECIAL-STATUS WILDLIFE SPECIES AND THEIR POTENTIAL TO OCCUR WITHIN THE BIOLOGICAL SURVEY AREA

Species	Status	Habitat	Potential for Occurrence – BSA	Potential for Occurrence – Project Area
Accipiter cooperii Cooper's hawk	Fed: None State: WL	Nests in riparian and oak woodlands, including those in canyon bottoms and river floodplains.	Low. Oak woodlands on site are too small for residency. Possibly briefly used during migration or dispersal.	Low. May pass through the area
Agelaius tricolor tricolored blackbird	Fed: BCC State: SSC	A highly colonial species that requires open water, protected nesting areas, and a foraging area within a few kilometers of the colony.	Present. No suitable nesting habitat, but foraging habitat throughout.	High. No suitable nesting habitat, but appropriate foraging habitat throughout.
Ambystoma californiense California tiger salamander	Fed: Threatened State: Threatened, SSC	Requires underground refuges, particularly ground squirrel burrows, as well as vernal pools or other seasonal water sources for breeding.	Present. Numerous breeding pools, upland habitat, and burrow refugia throughout.	High. No breeding pools with the project area, but appropriate upland habitat and burrows for dry season refugia
Anniella pulchra pulchra silvery legless lizard	Fed: None State: SSC	Occurs in sandy or loose loamy soils under sparse vegetation including oak woodland. Requires soil moisture, preferably soils with high moisture content.	Low. No records within 3 miles of the site, but marginal habitat exists.	Low. No records within 3 miles of the site, but marginal habitat exists.
Antrozous pallidus pallid bat	Fed: None State: SSC	Occurs in deserts, grasslands, shrublands, woodlands, and forests. It is most commonly found in open, dry areas with rocky outcrops that can be used for roosts. These roosts must be able to protect the bats from high exterior and ambient temperatures.	High. Roosting habitat in oak woodlands and foraging habitat throughout the BSA.	High. No roosting habitat, but foraging habitat throughout.
Aquila chrysaetos golden eagle	Fed: BCC State: FP	Nests in cliff-walled canyons or in large trees surrounded by open countryside. Forages primarily in open areas including rolling foothills, mountains, sage-juniper flats, and deserts.	Present. Commonly observed foraging on site.	Present. Commonly observed foraging on site.
Athene cunicularia burrowing owl	Fed: BCC State: SSC	Occurs in open, dry annual or perennial grasslands, deserts, and scrublands with low-growing vegetation. Nests underground, making use of existing mammal burrows, particularly those of the California ground squirrel.	Present. Suitable habitat throughout associated with abundant ground squirrel burrows. Observed during site visit and several documented breeding occurrences.	High. Nests within BSA and has potential to nest within burrows in disturbance area.

Species	Status	Habitat	Potential for Occurrence – BSA	Potential for Occurrence – Project Area
Branchinecta longiatenna longhorn fairy shrimp	Fed: Endangered State: None	Occurs in small, clear-water depressions in sandstone and in clear-to-turbid clay or grass-bottomed pools in shallow swales. Vernal pools must pond for 6-7 weeks in winter and 3 weeks in spring. Endemic to the eastern margin of the Central Coast Mountains.	High. Designated critical habitat and numerous suitable vernal pools occur in swales, cattle-tanks, and pools in sandstone outcrops.	Low. Disturbance area overlaps designated critical habitat, but no suitable vernal pools were identified within disturbance area. Suitable sandstone outcrops occur just outside of disturbance area.
Branchinecta lynchi vernal pool fairy shrimp	Fed: Threatened State: None	Occurs in small, clear-water sandstone depression pools and grassed swale, earth slump, or basalt-flow depression pools. Vernal pools must pond for 6-7 weeks in winter and 3 weeks in spring. Endemic to grasslands within the Central Valley, Central Coast Mountains, and South Coast Mountains.	Present. Numerous suitable vernal pools occur in swales, cattle-tanks, and pools in sandstone outcrops. Documented at 1 sandstone outcrop on site in 2006.	Low. No suitable vernal pools were identified within disturbance area. Suitable sandstone outcrops occur just outside of disturbance area. The documented occurrence was on top of a 15 foot tall rock outcrop adjacent to a 2-track road that will be upgraded.
Branchinecta mesovallensis midvalley fairy shrimp	Fed: None State: None Other: CNDDB	Occurs in vernal pools in the Central Valley. Most commonly in grassy or clay-bottomed vernal pools, and roadside ditches, including "flashy" pools that pond for as little as 4 days or as long as 3 months.	High. Can occur in extremely short duration vernal pools that are difficult to identify, as well as in more prominent vernal pools.	Moderate. Can occur in extremely short duration vernal pools that are difficult to identify, including those that occur in roadside ditches and other disturbed areas.
Buteo regalis *ferruginous hawk*	Fed: BCC State: None	Occurs in open grasslands, sagebrush flats, desert scrub, low foothills, and the fringes of pinyon-juniper habitats.	High. Suitable nesting and foraging habitat and prey base throughout. Documented occurrence within 3 miles of the BSA.	High. Suitable nesting and foraging habitat and prey base throughout. Documented occurrence within 3 miles of the Project area.
Buteo swainsoni Swainson's hawk	Fed: BCC State: Threatened	Breeds in grasslands with scattered trees, juniper-sage flats, riparian areas, savannahs, and agricultural or ranch lands, and forages in adjacent open flatlands including grasslands and agricultural fields.	Moderate. Breed in Central Valley. Likely transient on site during migration.	Moderate. Breed in Central Valley. Likely transient on site during migration
Circus cyaneus northern harrier	Fed: None State: SSC	Nests on the ground in shrubby vegetation, usually along marsh edges. Forages over coastal salt and freshwater marshes, grasslands, deserts, and mountains.	Present. Commonly observed on site. Foraging and nesting habitat throughout (nest on ground in grassland).	Present. Commonly observed on site. Foraging and nesting habitat throughout (nest on ground in grassland).

Species	Status	Habitat	Potential for Occurrence – BSA	Potential for Occurrence – Project Area
Corynorhinus townsendii Townsend's big-eared bat	Fed: None State: SSC	Occurs in a large number of different habitats but is most commonly found in mesic areas. Roosts in the open on surfaces such as walls or ceilings.	High. Foraging habitat throughout. Roosting habitat possible in large rock outcrops and cliffs.	High. No roosting habitat, but foraging habitat throughout.
Desmocerus californicus dimorphus valley elderberry longhorn beetle	Fed: Threatened State: None	Associated with blue elderberry. Endemic to the Central Valley.	Absent. Endemic to blue elderberry patches in the Central Valley.	Absent. Endemic to blue elderberry patches in the Central Valley.
Elanus leucurus white-tailed kite	Fed: None State: FP	Nests in isolated trees with dense tops, and forages nearby in open grasslands, meadows, or marshes.	High. Foraging habitat throughout and nesting habitat in oak woodlands. Nearest documented occurrence about 3 miles from the BSA.	High. Foraging habitat throughout.
Emys marmorata western pond turtle	Fed: None State: SSC	Occurs primarily in ponds, marshes, or slow-flowing rivers, streams, and irrigation ditches. Requires basking sites inside the water or on the bank and requires sandy banks or grassy fields within 0.5 km for egg-laying.	Moderate. Potentially suitable ponds occur. Documented just outside of the BSA on Brushy Creek in 1982.	Low. No suitable habitat. Potential presence would be limited to dispersal, but very unlikely.
Eremophila alpestris actia California horned lark	Fed: None State: WL	Occurs in short-grass prairie, "bald" hills, mountain meadows, open coastal plains, fallow grain fields, and alkali flats along coastal regions primarily between Sonoma County and San Diego County. Also found in most of the San Joaquin Valley and east to the foothills.	Present. Commonly observed throughout grasslands in the BSA. Likely resident breeders on site. Nest on the ground in grassland.	Present. Commonly observed throughout grasslands in the Project area. Likely resident breeders on site. Nest on the ground in grassland.
Falco mexicanus prairie falcon	Fed: BCC State: WL	Nests on cliffs and forages in agricultural fields, marshlands, shorelines, and other open areas.	High. Foraging habitat and prey base present throughout. Potential nesting substrates on small cliffs in the BSA. CNDDB nesting occurrence polygons overlap the BSA, but exact locations not known.	High. Foraging habitat and prey base present throughout. No nesting substrates in disturbance area. CNDDB occurrence polygons overlap the Project area, but exact locations not known.
Hygrotus curvipes curved-foot hygrotus diving beetle	Fed: None State: None Other: CNDDB	Occurs in water. Only known to occur in Alameda and Contra Costa Counties.	Present. Suitable habitat and documented occurrences on Brushy Creek and several ponds within and near the BSA.	Low. No suitable habitat (ponds and stream pools) within the disturbance area, but present nearby.

Species	Status	Habitat	Potential for Occurrence – BSA	Potential for Occurrence – Project Area
Lanius ludovicianus loggerhead shrike	Fed: BCC State: SSC	Nests in dense shrubs and brush and forages over open country. Perches in the open while scanning for prey. Preferred habitat types include broken woodlands, savannah, pinyon-juniper, Joshua tree, and riparian woodlands, and desert oases, scrub, and washes.	High. Suitable habitat present in oak woodlands and adjacent grassland.	High. Suitable habitat present in oak woodlands and adjacent grassland. But nesting substrates not present in disturbance area (trees or tall shrubs).
Masticophis flagellum ruddocki San Joaquin whipsnake	Fed: None State: SSC	Occurs in open, dry habitats with little or no tree cover, and usually found in valley grassland and saltbush scrub in the San Joaquin Valley. Uses mammal burrows for refuge and nesting.	Moderate. Suitable habitat occurs, though more common in the Central Valley. Occurrence not documented within 3 miles of the BSA.	Moderate. Suitable habitat occurs.
Masticophis lateralis euryxanthus Alameda whipsnake	Fed: Threatened State: Threatened	Occurs in chaparral and scrub habitats most often, but also uses adjacent grassland, oak savannah, and woodland habitats. Typically found on south-facing slopes and ravines, particularly in areas with rocky outcrops, deep crevices, or high numbers of rodent burrows.	Low. Primary habitat (chaparral and scrub) does not occur, but oak woodlands and grassland often utilized when adjacent to primary habitat. Specific occurrence not documented within 3 miles of the Project area, but CNDDB large occurrence polygon overlaps the BSA.	Low. Low shrub cover is restricted to very small, isolated patches, probably insufficient to support Alameda whipsnakes.
Melospiza melodia song sparrow ("Modesto" population)	Fed: None State: SSC	Occurs in brushy areas, particularly dense streamside thickets and woodland edges with a dense shrub layer. In winter song sparrows may also inhabit tall weedy fields, marshes, moist ravines, or brush piles.	Moderate. Suitable habitat occurs only in one or two patches along Brushy Creek. Species not documented within 3 miles of the BSA.	Low. Suitable habitat does not occur in the disturbance area.
Neotoma fuscipes annectens San Francisco dusky-footed woodrat	Fed: None State: SSC	Occurs in moderately-canopied forests and chaparral with moderate to dense understories.	Moderate. Marginally suitable habitat occurs in oak woodland on the site.	Low. Suitable habitat does not occur in the disturbance area.
Phrynosoma blainvillii coast horned lizard	Fed: None State: SSC	Occurs in a large number of habitats, but is most common in chaparral or in lowlands along sandy washes. Requires open areas for basking, nearby bushes for cover from predators, loose soil for burying itself, and a large supply of ants or other suitable insects.	Moderate. Primary habitat does not occur, but oak woodlands and grassland often utilized.	Moderate. Primary habitat does not occur, but grassland often utilized.

Species	Status	Habitat	Potential for Occurrence – BSA	Potential for Occurrence – Project Area
Rana boylii foothill yellow-legged frog	Fed: None State: SSC	Occurs in a large number of habitats with partly-shaded, shallow streams and riffles with rocky substrate.	Absent. Suitable habitat does not occur within the BSA.	Absent. Suitable habitat does not occur within the Project area.
Rana draytonii California red-legged frog	Fed: Threatened State: SSC	Occurs in lowlands and foothills in or near permanent, deep water with dense, shrubby or emergent riparian vegetation. Some populations utilize rock outcrops and mammal burrows as refugia during the dry season.	Moderate. The entire Project area is within designated critical habitat. Marginal breeding habitat occurs in perennial ponds within the Project area. Potential refugia habitat occurs at rock outcrops and burrows. Documented just outside of the BSA (northeast of Brushy Peak) in 2002.	Moderate. The entire Project area is within designated critical habitat. No breeding habitat occurs in disturbance area. Potential refugia habitat occurs at rock outcrops and burrows.
Spea hammondii western spadefoot	Fed: None State: SSC	Occurs primarily in grasslands but may also be found in valley-foothill hardwood woodlands. Requires vernal pools or temporary water sources (e.g., rain pools) for breeding and egg-laying.	High. Suitable breeding habitat occurs in vernal pools, and suitable non-breeding habitat is present throughout the uplands.	High. Suitable breeding habitat does not occur, but suitable non-breeding habitat is present throughout the uplands.
Spirinchus thaleichthys longfin smelt	Fed: Candidate State: Threatened, SSC	Occurs in open waters of estuaries, mostly in the middle or bottom of the water column. Because this species is euryhaline, nektonic, and anadromous, it can occur in pure freshwater to almost pure seawater.	Absent. Suitable habitat not present.	Absent. Suitable habitat not present.
Taxidea taxus American badger	Fed: None State: SSC	Occurs in a wide variety of habitats but is most often found in dry, open shrub, forest, or herbaceous habitats, including uncultivated fields. Requires friable soil for digging burrows.	High. Suitable habitat and prey base occurs throughout the BSA.	High. Suitable habitat and prey base occurs throughout the Project area.
Thaleichthys pacificus eulachon	Fed: Threatened State: SSC	Occurs in the lower reaches of coastal rivers with moderate water velocities and bottom substrates consisting of pea-sized gravel, sand, and woody debris. Known to occur in the Klamath River, Mad River, Redwood Creek, and the Smith River and Humboldt Bay tributaries.	Absent. Suitable habitat not present.	Absent. Suitable habitat not present.

Species	Status	Habitat	Potential for Occurrence – BSA	Potential for Occurrence – Project Area
Vulpes macrotis mutica San Joaquin kit fox	Fed: Endangered State: Threatened	Occurs in annual grasslands or grassy open stages with scattered shrubby vegetation. Requires friable soils for digging burrows.	High. Suitable habitat and prey base occurs throughout the Project area. Occurrence documented just outside of the BSA (northeast of Brushy Peak) in 2002.	High. Suitable habitat and prey base occurs throughout the Project area.

Absent: Species or sign not observed on the site, outside of the known range, and conditions unsuitable for occurrence.
Low: Species or sign not observed on the site, but conditions marginal for occurrence.
Moderate: Species or sign not observed on the site, but conditions suitable for occurrence and/or an historical record exists in the vicinity.
High: Species or sign not observed on the site, but reasonably certain to occur on the site based on conditions, species ranges, and recent records.
Present: Species or sign of their presence recently observed on the site.
Occurrence documentation based on California Natural Diversity Database (CNDDB) and on biologist site visit March 25-26, 2014.

Federal status
Endangered = listed as Endangered under the federal Endangered Species Act
Threatened = listed as Threatened under the federal Endangered Species Act
Candidate = a Candidate for listing under the federal Endangered Species Act
BCC = designated as a Bird of Conservation Concern
State status
Endangered = listed as Endangered under the California Endangered Species Act
Threatened = listed as Threatened under the California Endangered Species Act
SSC = designated as a Species of Special Concern
FP = designated as a Fully Protected species
WL = designated as a Watch List species
Other
CNDDB = this species is only listed by the CNDDB and may be locally sensitive or its occurrences may be monitored to see if further protection is needed

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APPENDIX A PLANTS OBSERVED DURING THE SURVEY

SCIENTIFIC NAME	COMMON NAME
FERNS AND FERN ALLIES	
POLYPODIACEAE	POLYPODY FAMILY
Polypodium calrhiza	polypody fern
ANGIOSPERMS (DICOTYLEDONS)	
APIACEAE	CARROT FAMILY
*Conium maculatum**	poison hemlock
*Foeniculum vulgare**	fennel
Sanicula bipinnata	poison sanicle
ASTERACEAE	SUNFLOWER FAMILY
Achillea millefolium	California yarrow
Achyrachaena mollis	blow-wives
Artemisia californica	California sagebrush
Baccharis pilularis	coyote brush
Baccharis salicifolia	mule fat
*Carduus pycnocephalus**	Italian thistle
*Carduus tenuiflorus**	slender flower thistle
*Centaurea melitensis**	tocalote
*Centaurea solstitialis**	yellow star-thistle
*Cirsium vulgare**	bull thistle
*Cynara cardunculus**	cardoon
Grindelia camporum	gum-plant
Gutierrezia californica	California matchweed
Lasthenia gracilis	common goldfields
*Senecio vulgaris**	common groundsel
*Silybum marianum**	milk thistle
*Sonchus asper**	prickly sow thistle
*Sonchus oleraceus**	common sow thistle
BORAGINACEAE	BORAGE FAMILY
Amsinckia intermedia	common fiddleneck
BRASSICACEAE	MUSTARD FAMILY
*Brassica nigra**	black mustard
*Brassica rapa**	field mustard
Lepidium sp.	peppergrass
*Sisymbrium altissimum**	tumble mustard
CARYOPHYLLACEAE	PINK FAMILY
*Stellaria media**	common chickweed
CHENOPODIACEAE	GOOSEFOOT FAMILY
*Chenopodium album**	lamb's quarters
Chenopodium californicum	California goosefoot

SCIENTIFIC NAME	COMMON NAME
CONVOLVULACEAE	MORNING-GLORY FAMILY
Calystegia sp.	bindweed
*Convolvulus arvensis**	bindweed
CRASSULACEAE	STONECROP FAMILY
CUCURBITACEAE	GOURD FAMILY
Marah fabaceae	California man-root
FABACEAE	LEGUME FAMILY
Acmispon strigosus [Lotus strigosus]	strigose deervetch
Astragalus asymmetricus	San Joaquin milkvetch
Lathyrus jepsonii var. *jepsonii*	delta tule pea
Lupinus bicolor	miniature lupine
Lupinus nanus	sky lupine
Lupinus succulentus	arroyo lupine
*Medicago polymorpha**	bur clover
*Melilotus officinalis**	yellow sweetclover
Vicia sp.	vetch
FAGACEAE	OAK FAMILY
Quercus agrifolia	coast live oak
GERANIACEAE	GERANIUM FAMILY
*Erodium brachycarpum**	long-beaked filaree
*Erodium cicutarium**	red-stemmed filaree
*Erodium moschatum**	white-stemmed filaree
HYDROPHYLLACEAE	WATERLEAF FAMILY
Pholistoma membranaceum	white fiesta flower
HIPPOCASTANACEAE	BUCKEYE FAMILY
Aesculus californica	buckeye
LAURACEAE	LAUREL FAMILY
Umbellularia californica	California laurel
MALVACEAE	MALLOW FAMILY
*Malva parviflora**	cheeseweed
Malvella leprosa	alkali-mallow
MARTYNIACEAE	UNICORN-PLANT FAMILY
*Proboscidea louisianica ssp. louisianica**	devil's-claw
MYRTACEAE	MYRTLE FAMILY
*Eucalyptus globulus**	blue gum
ONAGRACEAE	EVENING PRIMROSE FAMILY
Epilobium canum	California fuchsia
PAPAVERACEAE	POPPY FAMILY
Eschscholzia californica	California poppy
PLANTAGINACEAE	PLANTAIN FAMILY
Plantago erecta	western plantain

SCIENTIFIC NAME	COMMON NAME
POLYGONACEAE	BUCKWHEAT FAMILY
Eriogonum sp.	buckwheat
*Rumex crispus**	curly dock
Rumex salicifolius	willow dock
PORTULACACEAE	PURSLANE FAMILY
Calandrinia ciliata	red maids
Claytonia parviflora ssp. parviflora	streambank spring beauty
PRIMULACEAE	PRIMROSE FAMILY
Dodecatheon clevelandii ssp. patulum	Padres' shooting star
RANUNCULACEAE	BUTTERCUP FAMILY
Ranunculus canus var. ludovicianus	Sacramento Valley buttercup
RUBIACEAE	MADDER FAMILY
Galium tricornutum	rough corn bedstraw
SALICACEAE	WILLOW FAMILY
SCROPHULARIACEAE	FIGWORT FAMILY
Mimulus aurantiacus	orange bush monkey-flower
Scrophularia californica var. floribunda	bee plant
SOLANACEAE	NIGHTSHADE FAMILY
Datura sp.	jimson weed
URTICACEAE	NETTLE FAMILY
Urtica dioica	giant creek nettle
*Urtica urens**	dwarf nettle
VIOLACEAE	VIOLET FAMILY
Viola pedunculata	johnny-jump-up
ANGIOSPERMS (MONOCOTYLEDONS)	
JUNCACEAE	RUSH FAMILY
Juncus sp.	rush
LILIACEAE	LILY FAMILY
Brodiaea elegans	brodiaea
Chlorogalum pomeridianum	soap plant
Triteleia laxa	Ithuriel's spear
POACEAE	GRASS FAMILY
*Avena barbata**	slender wild oat
*Avena fatua**	wild oat
*Avena sativa**	cultivated oats
*Avena sp.**	wild oat
*Bromus diandrus**	ripgut grass
*Bromus hordeaceus**	soft chess
*Bromus madritensis**	foxtail chess
Bromus sp.	brome
Danthonia californica	California oatgrass
Distichlis spicata	saltgrass

SCIENTIFIC NAME	COMMON NAME
Elymus sp.	wildrye
Festuca bromoides	brome fescue
Festuca myuros [Vulpia myuros]	rat-tail sixweeks grass
Festuca perennis [Lolium multiflorum]*	rye grass
Hordeum jubatum	foxtail barley
*Hordeum murinum**	glaucous foxtail barley
Melica californica	California melic grass
Nassella cernua	nodding needlegrass
Nassella pulchra	purple needlegrass
Poa secunda	Malpais bluegrass
*Polypogon monspeliensis**	annual beard grass
Vulpia microstachys	fescue
TYPHACEAE	CATTAIL FAMILY
Typha latifolia	broad-leaved cattail

APPENDIX B WILDLIFE OBSERVED DURING THE SURVEY

SCIENTIFIC NAME	COMMON NAME
CLASS AVES	BIRDS
ARDEIDAE	HERONS, BITTERNS
Ardea alba	great egret
ANATIDAE	DUCKS, GEESE, SWANS
Anas platyrhynchos	mallard
Bucephala albeola	bufflehead
CATHARTIDAE	NEW WORLD VULTURES
Cathartes aura	turkey vulture
ACCIPITRIDAE	HAWKS, KITES, EAGLES
Aquila chrysaetos	golden eagle
Buteo jamaicensis	red-tailed hawk
Circus cyaneus	northern harrier
FALCONIDAE	FALCONS
Falco sparverius	American kestrel
CHARADRIIDAE	PLOVERS
Charadrius vociferus	killdeer
COLUMBIDAE	PIGEONS & DOVES
Zenaida macroura	mourning dove
STRIGIDAE	TRUE OWLS
Athene cunicularia	burrowing owl
TROCHILIDAE	HUMMINGBIRDS
Calypte anna	Anna's hummingbird
PICIDAE	WOODPECKERS
Colaptes auratus	northern flicker
Picoides nuttallii	Nuttall's woodpecker
TYRANNIDAE	TYRANT FLYCATCHERS
Sayornis nigricans	black phoebe
ALAUDIDAE	LARKS
Eremophila alpestris	horned lark
HIRUNDINIDAE	SWALLOWS
Petrochelidon pyrrhonota	cliff swallow
Hirundo rustica	barn swallow
CORVIDAE	JAYS & CROWS
Aphelocoma californica	western scrub-jay
Corvus brachyrhynchos	American crow
Corvus corax	common raven
PARIDAE	CHICKADEES, TITMICE
Baeolophus inornatus	oak titmouse

SCIENTIFIC NAME	COMMON NAME
TROGLODYTIDAE	WRENS
Salpinctes obsoletus	rock wren
Thryomanes bewickii	Bewick's wren
REGULIDAE	KINGLETS
Regulus calendula	ruby-crowned kinglet
TURDIDAE	THRUSHES
Catharus guttatus	hermit thrush
Sialia mexicana	western bluebird
STURNIDAE	STARLINGS
Sturnus vulgaris	European starling
PARULIDAE	WOOD WARBLERS
Dendroica coronata	yellow-rumped warbler
ICTERIDAE	BLACKBIRDS
Agelaius phoeniceus	red-winged blackbird
Agelaius tricolor	tricolored blackbird
Euphagus cyanocephalus	Brewer's blackbird
Sturnella neglecta	western meadowlark
Molothrus ater	brown-headed cowbird
EMBERIZIDAE	EMBERIZIDS
Junco hyemalis	dark-eyed junco
Passerculus sandwichensis	savannah sparrow
Zonotrichia atricapilla	golden-crowned sparrow
FRINGILLIDAE	FINCHES
Carpodacus mexicanus	house finch
Carpodacus purpureus	purple finch
CLASS MAMMALIA	MAMMALS
LEPORIDAE	HARES & RABBITS
Sylvilagus audubonii	desert cottontail
SCIURIDAE	SQUIRRELS
Spermophilus beecheyi	California ground squirrel

ATTACHMENT A5: PHASE 1 CULTURAL RESOURCE SURVEY (CONFIDENTIAL)

The Summit Wind Repower Project Phase 1 Cultural Resource Survey is a confidential document only to be viewed by a registered archaeologist.

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ATTACHMENT A6: AVIAN AND BAT PROTECTION PLAN

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AVIAN & BAT PROTECTION PLAN
Summit Wind Repower Project
Alameda County, California

31 October 2015

Table of Contents

ABBREVIATIONS

ABPP	Avian and Bat Protection Plan
ACP	Advanced Conservation Practice
ADMM	adaptive management measure
APLIC	Avian Power Line Interaction Committee
APWRA	Altamont Pass Wind Resource Area
BACI	before-after-control-impact
blob	base layer of operating group boundaries
BMPs	best management practices
CDFW	California Department of Fish and Wildlife
CEC	California Energy Commission
CI	confidence interval
COD	commercial operation date
County	Alameda County
EBRPD	East Bay Regional Park District
ECP	Eagle Conservation Plan
FAA	Federal Aviation Administration
FPEIR	APWRA Final Program Environmental Impact Report
kV	kilo-volt
LARPD	Livermore Area Regional Park District
Mteam	Alameda County Avian Fatality Monitoring Program
MW	megawatt
O&M	operations and maintenance
PEIR	CEC's Public Integrated Energy Research Program
PPR	power pole retrofit
Project	54 MW Summit wind repower project
REA	Resource Equivalency Analysis
TAC	Technical Advisory Committee
USFWS	United States Fish and Wildlife Service
WT	wind turbine

1. INTRODUCTION

1.1 Project Overview

The applicant proposes to develop a wind project to repower the decommissioned site of an existing wind energy facility comprising 569 existing wind turbine (**"WT"**) / foundation sites. Up to 33 new WTs are proposed to be installed, with an alternate location for one WT (20a) for a total of 34 proposed WT sites. The proposed Project would result in a net reduction of 536 WTs and foundations. The new wind farm, called the Summit Wind Farm (**"Project"**), would continue transmitting energy from the site to the regional power grid and would maximize renewable energy production by replacing the aging infrastructure with newer, more efficient WTs. The Project location and WT layout are shown in Figures 1.1a and 1.1b, respectively.

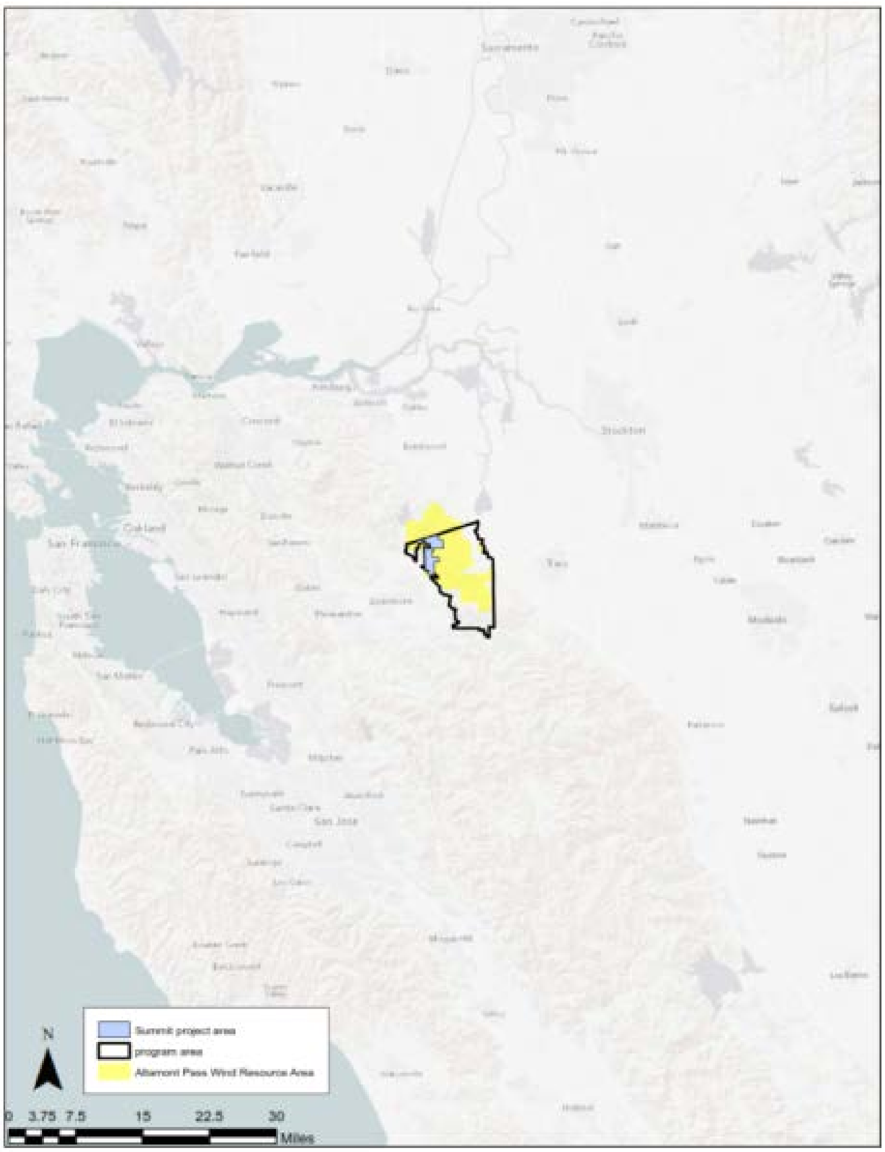

Figure 1.1a. Summit Wind Farm Location Map

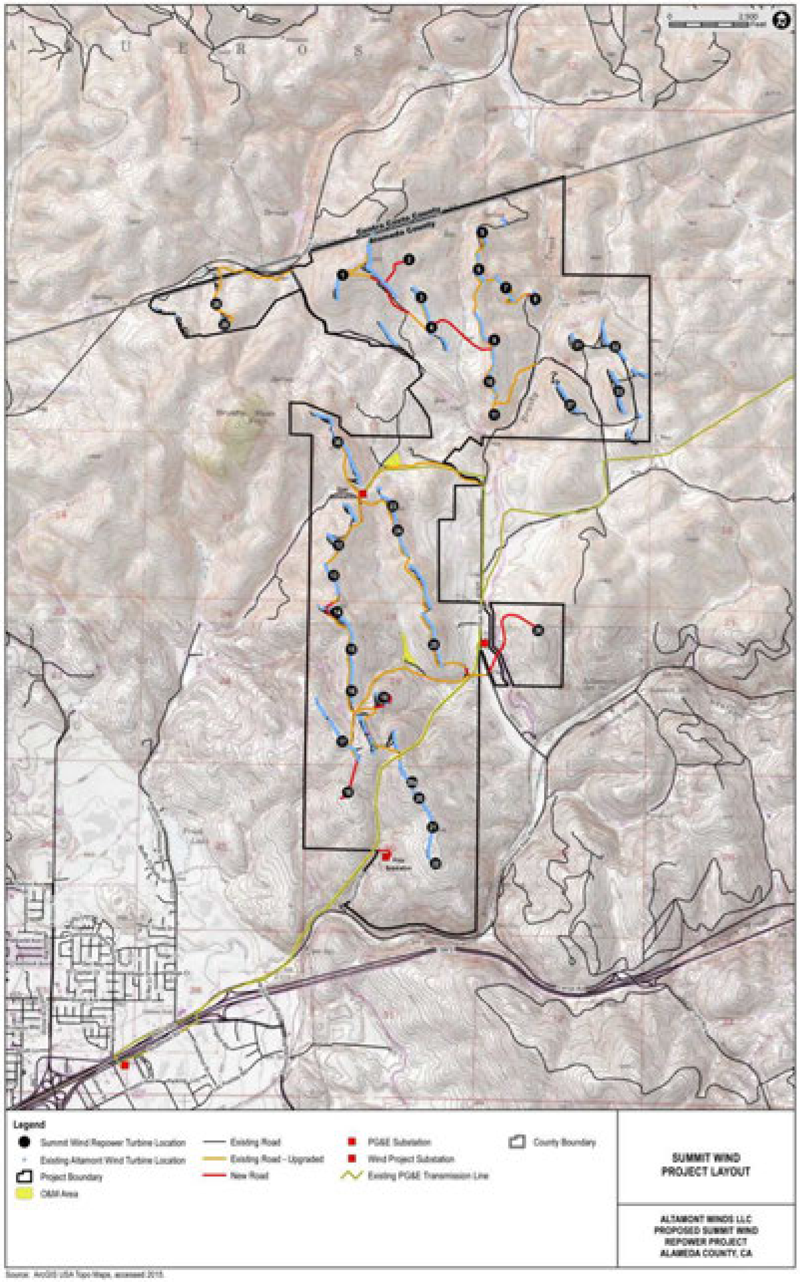

Figure 1.1b. Project Layout "footprint"

1.1.1 Project Location and Land Ownership. The Project area extends over approximately 3,600 acres of grassland north of I-580 in Alameda County and consists of cattle-grazed land on which operating WTs are currently, or previously have been, installed. The applicant will construct the Project entirely on private land, leased under long-term agreements with landowners. The Project will have a direct impact on approximately 238 acres, consisting of road expansion and modification, WT pads and laydown/operation and maintenance (**"O&M"**) yards. Access to the Project will be available through existing private gates and roads emanating off of Vasco Road, Dyer Road, and/or Altamont Pass Road, all north of I-580.

1.1.2 Project Need, Goals, and Objectives. The Project is needed to meet the ever-increasing demand of society and consumers for electricity from clean, renewable, and economically viable power sources. Specifically, the Project will assist California in meeting its legislated Renewable Portfolio Standard criteria for the generation of renewable energy in the state. This standard requires electric utilities and providers to procure 33% of their supply of electricity from renewable energy sources, such as wind, by 2020. In addition, this Project will assist California in meeting its legislated global warming solutions criteria requiring reductions in carbon dioxide and other greenhouse gas emissions to 1990 levels by 2020.

The applicant proposes to construct and operate the Project, a high performance, high reliability, and long service life wind energy facility, in order to produce clean, renewable wind-generated electrical energy in a proven wind resource area.

The Project's additional objective are listed below:

> Develop the Project in an available wind resource area that has been, and currently is, utilized by wind farms and make use of existing transmission lines and other infrastructure necessary to operate the Project, thereby eliminating the need to develop the Project on new land.

> Contribute to domestic energy security by reducing California’s reliance on fossil fuels; and, unlike fossil fuel reserves, the wind resource will not diminish over time.

> Provide significant benefits to the environment, wildlife and human health by reducing climate change/global warming-causing pollutants and reducing water usage. Over 20 years, the Project is estimated to offset more than 4 billion pounds of nitrous oxides (NOx), sulfur dioxide (SO_2), fine particulate matter, and carbon dioxide (CO_2) that would otherwise be produced by natural gas power plants (McCubbin and Sovacool, 2011).

> Avoid the premature death of nearly 8,000 birds by offsetting harmful air pollution emitted by fossil-fuel power plants, while minimizing the impact of the wind farm on avian life (McCubbin and Sovacool, 2011).

> Reduce human illnesses and prevent more than 748 cases of premature mortality, heart attacks, cardio-respiratory illness, and lost work days resulting from asthma and other illnesses caused by exposure to toxic air pollutants, and thus, save society an estimated $87 million in health care costs (McCubbin and Sovacool, 2011).

> Reduce water consumption by nearly 51,000,000 gallons per year, compared to a natural gas plant of comparable electricity output, as well as, reduce water pollution (including heating of water bodies used for cooling), and contamination caused by other methods of electricity generation.

> Stimulate Alameda County’s (**“County”**)’s economy through local construction jobs and expenditures on materials, tools, supplies, and equipment purchases, as well as, through the creation of long-term skilled employment opportunities to operate and maintain the Project.

1.1.3 Existing Facilities. The applicant would remove up to 569 WT sites including the associated foundations, transformers, electrical equipment, and meteorological towers. Up to 33 new WTs are proposed to be installed, with an alternate location for one WT (20a) for a total of 34 proposed WT sites. The proposed Project would result in a net reduction of 536 WTs and foundations. Decommissioning and removal of the existing WTs and ancillary facilities would allow the existing wind energy facility to be repowered.

The existing WTs are characterized by hub heights of 18 to 43 meters (60 to 140 feet) and a rotor diameter of 18 meters (59 feet). The existing WT foundations include concrete piers or pads. The vast majority of the existing underground electricity collection system would remain in place and would not be excavated/removed.

Existing roads and other disturbed areas not needed for the proposed Project's new WTs would be decommissioned, contour graded (if necessary and if environmentally beneficial), stabilized, and reseeded with an appropriate seed mixture to maintain slope stability. Temporary erosion control measures would be implemented to maintain topsoil and re-vegetation.

1.1.4 Proposed Project. The Project would install up to 33 new WTs, with an alternate location for one WT (20a) for a total of 34 proposed WT sites and related infrastructure with an aggregate nominal nameplate capacity of approximately 54 megawatts (**"MW"**). The specific equipment chosen for the proposed Project would depend on final micrositing and the nominal nameplate rating of the WTs. Related infrastructure would include, but not be limited to, on-site access roads, up to three non-guyed meteorological towers, an underground 34.5 kV collection system with communication lines, two 60 kV substations (on existing substation sites, and an O&M facility.

Siting would be determined prior to construction and on the basis of various siting criteria, such as terrain, geotechnical considerations, and the opportunity to avoid or minimize potential impacts.

Construction of the WTs would incorporate best management practices (**"BMPs"**) that are standard practice and normally required by building permits for large projects (e.g., dust suppression, erosion control measures, traffic management, noise controls, covering or enclosure of dry materials, controlled handling of hazardous materials).

1.1.5 Wind Turbines. The Project would likely select a WT with characteristics similar to those of the Suzlon S97 model, a 2.1 MW WT with a hub height of 90 meters (295 feet), a rotor diameter of 97 meters (318 feet), a total height of 138.5 meters (454 feet), and a minimum distance from ground to rotor tip at the 6:00 o'clock position of 41.5 meters (136 feet).

Another example includes the Goldwind turbine, a 2.5 MW WT with a hub height of 90 meters (295 feet), a rotor diameter of 121 meters (397 feet), a total height of 150.5 meters (493 feet), and a minimum distance from ground to rotor tip at the 6:00 o'clock position of 31 meters (102 feet)

1.2 Purpose and Goal of the Avian and Bat Protection Plan

Concern over air pollution, global warming, and reliance on foreign energy sources has stimulated development of clean, renewable energy sources, such as wind. Wind provides a clean, renewable alternative to fossil fuels, but no energy development is entirely without environmental impact. Concern over bird and bat fatalities, particularly at facilities with older generation WTs, has stimulated efforts to minimize wind energy impacts on birds and bats.

Efforts include development and refinement of research protocols to assess effects on birds and bats and an effort on the part of wind developers to utilize strategies to minimize impacts.

This Avian and Bat Protection Plan (**"ABPP"**) presents the applicant's methodology to minimize bird and bat mortality at the Project. An ABPP establishes a commitment to identify and address potential causes of mortality that occur from performing business-related activities, and is intended to facilitate compliance with federal and state laws and guidelines. Specifically, this ABPP provides:

> Documentation of the steps the applicant will take to avoid/reduce avian and bat impacts.

> Establishment of accepted processes to monitor bird and bat impacts.

1.3 Corporate Policy and Commitment to Environmental Protection

The Project provides clean, renewable power to either a utility and/or the merchant power market.

It's important to note that when clean wind power generation substitutes for fossil fuel energy sources, the result is a net decrease/displacement/avoidance in toxic air emissions. In turn, the decrease of toxic air emissions lessens many harmful effects to climate, ecosystems, humans, and wildlife. The quantities below were extrapolated from the bird and human savings from the study "Health, Wildlife and Climate Benefits of the 580 MW Altamont Wind Farm, Altamont Pass, California", (McCubbin and Sovacool, 2011), with the following results:

Operating this clean, renewable Project over its planned 20 year life, and thus, displacing/avoiding fossil-fired toxic air emissions in equivalent energy production in California, provides positive human and wildlife benefits, as follows:

> 10 fewer human fatalities
> 638 fewer lost work/sick days
> 3,910 fewer restricted activity days
> $87.5 million reduction in health and medical costs
> 7,753 fewer bird fatalities

In addition to addressing the large-scale environmental impacts of air pollution and global warming through the development of renewable wind energy, the applicant is committed to developing and operating wind energy in a way that minimizes direct impacts on wildlife. This ABPP defines the applicant's commitment to minimize impacts on local bird and bat populations at the Project.

2. EXISTING CONDITIONS

2.1 Environmental Setting

A description of the greater Altamont Pass Wind Resource Area (**"APWRA"**) environmental setting, including land cover types and special status plant and wildlife species occurring within the Project area, is provided in the Final Program Environmental Impact Report[1] (**"FPEIR"**). An overview of the laws and regulations that influence the management of biological resources, including avian and bat species in the study area, which includes the Project area, is provided in the FPEIR, Section 3.1.1 Existing Conditions.

2.2 Monitoring Methods and Results

Alameda County (**"County"**) established the Alameda County Fatality Monitoring Program (**"Mteam"**) in 2005. The Mteam monitored bird and bat use and fatalities in the APWRA through a scientific approach from 2005 to the end of 2014. It randomly selected approximately 30% of the WTs to monitor for bird and bat fatalities each year as shown in Figure 2.1, and also conducted bird use studies. A detailed description of the Mteam's methods and results is contained in the Altamont Pass Wind Resource Area Bird Fatality Study, Bird Years 2005 to 2012. (ICF 2014).

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[1] Alameda County Community Development Agency, 2014, Altamont Pass Wind Resource Area Repowering Final Program Environmental Impact Report, with technical assistance from ICF International

Figure 2.1. Distribution of WTs Monitored in the APWRA, 2005-2012 Bird Years (ICF 2014)

The monitoring methods included the division of the APWRA into areas of similar terrain and habitat called, base layer of operating group boundaries (**"blob"**). The Project occupies portions of blobs 5, 6, 7, 12, 13, as seen in Figure 2.2. The results of fatality monitoring and bird use observations for these blobs apply to the Project, and are presented in Section 3, below.

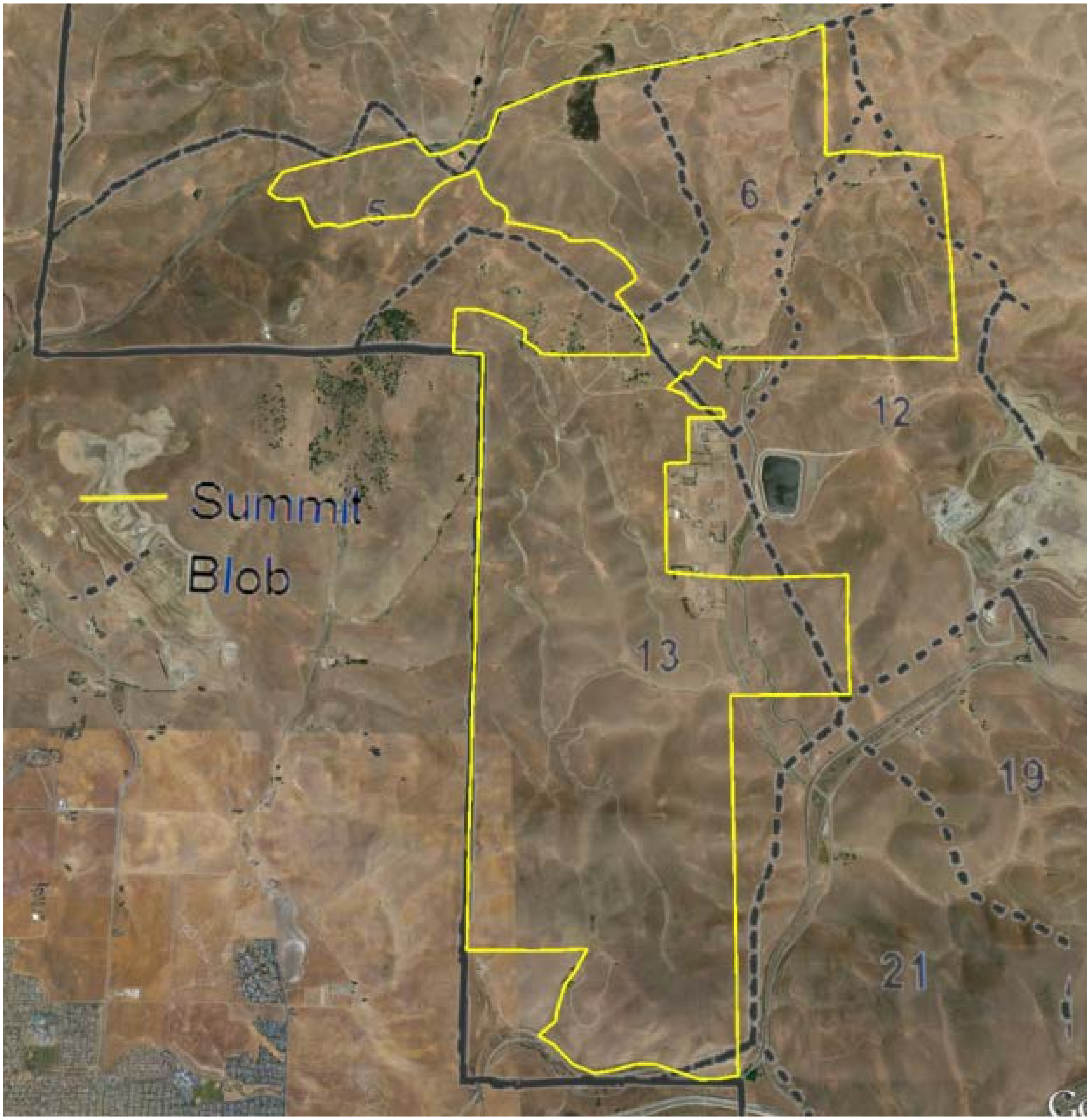

Figure 2.2. Blob areas associated with Summit Project

2.3 Avian Use Surveys

The Mteam conducted avian use surveys which began covering the entire APWRA starting in 2005. A description of the methods is contained in ICF 2014. The Mteam surveyed from five observation points in the Project area from 2005 to 2012 and from one observation point from 2005 to 2011, as shown in Figure 2.3. Project area avian use survey results for blobs 5, 6, 7, 12, and 13 are shown in Table 2.1 (extracted from Table E, ICF 2014).

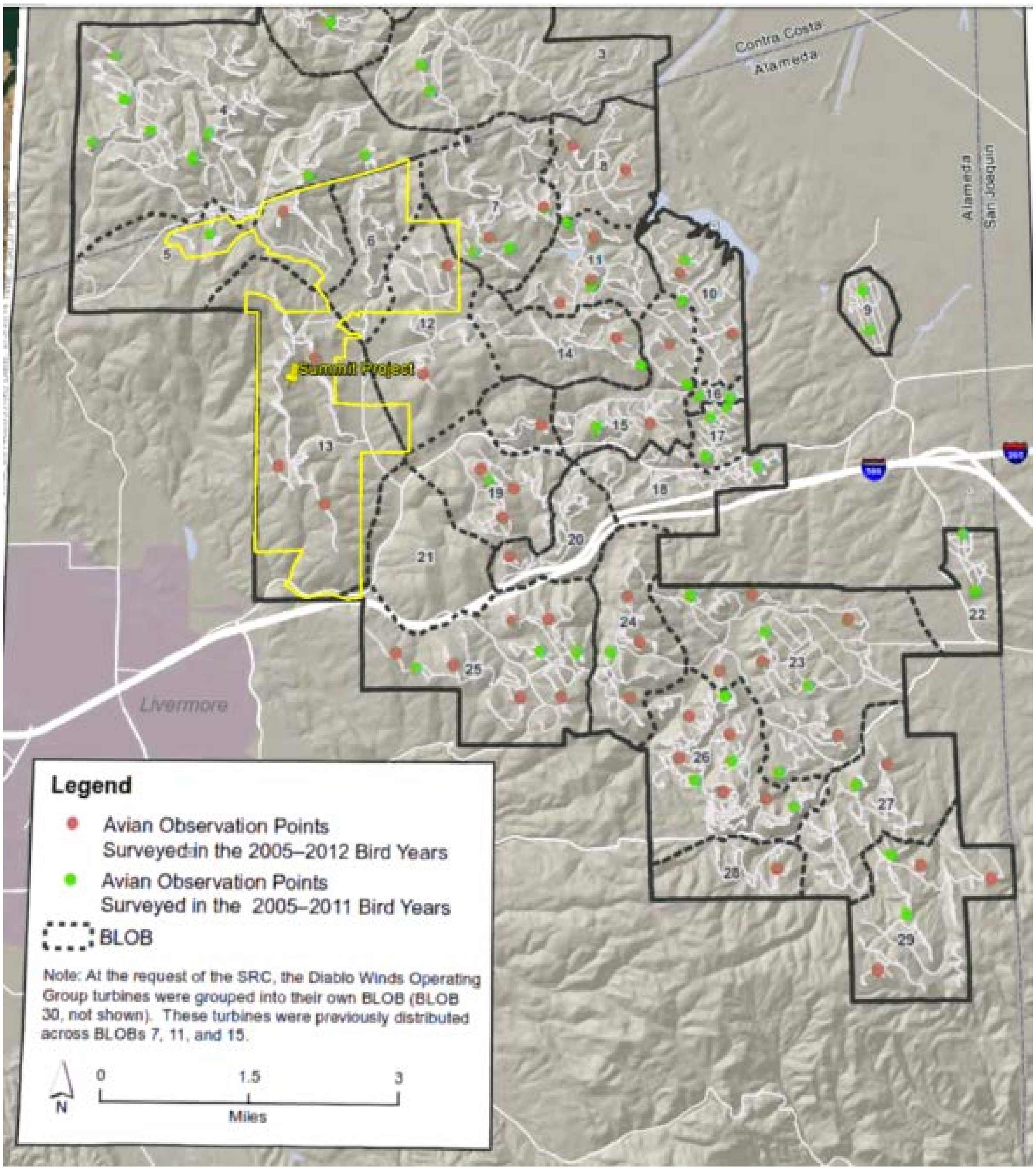

Figure 2.3. Mteam Bird Use Survey Observation Points in Project Area

Table 2.1. Megawatt Capacities, Unadjusted and Adjusted Fatality Rates, Estimated Total Fatalities and Bird Use by BLOB, Bird Years 2005-2012

	Bird Year							
BLOB	2005	2006	2007	2008	2009	2010	2011	2012
BLOB 5								
Installed capacity (MW)	18	18	15	14	13	13	8	6
Monitored capacity (MW)	1	1	10	9	9	6	3	2
American kestrel								
Adjusted fatalities per MW	5.90	0.00	0.35	0.00	0.41	0.00	0.00	0.00
Estimated total fatalities	108	0	5	0	5	0	0	0
Mean observations per minute per km^3	–	0.12	0.03	0.37	0.28	0.47	0.40	0.54
Burrowing owl								
Adjusted fatalities per MW	0.00	0.00	0.00	0.38	0.00	0.00	0.00	0.00
Estimated total fatalities	0	0	0	5	0	0	0	0
Mean observations per minute per km^3	–	0.07	0.00	0.00	0.00	0.00	0.00	0.00
Golden eagle								
Adjusted fatalities per MW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Estimated total fatalities	0	0	0	0	0	0	0	0
Mean observations per minute per km^3	–	0.03	0.58	0.45	0.30	0.38	0.20	0.49
Red-tailed hawk								
Adjusted fatalities per MW	0.00	0.00	0.43	0.15	0.00	0.46	0.63	0.00
Estimated total fatalities	0	0	7	2	0	6	5	0
Mean observations per minute per km^3	–	1.31	0.93	1.19	1.12	0.93	0.70	1.28
BLOB 6								
Installed capacity (MW)	8	8	7	6	6	6	5	5
Monitored capacity (MW)	2	1	1	1	1	2	1	3
American kestrel								
Adjusted fatalities per MW	0.00	2.40	0.00	0.00	6.35	1.96	4.15	0.00
Estimated total fatalities	0	18	0	0	38	12	22	0
Mean observations per minute per km^3	–	–	–	–	–	–	–	–
Burrowing owl								
Adjusted fatalities per MW	0.00	2.55	0.00	3.12	0.00	2.08	0.00	0.00
Estimated total fatalities	0	20	0	19	0	12	0	0
Mean observations per minute per km^3	–	–	–	–	–	–	–	–
Golden eagle								
Adjusted fatalities per MW	0.82	0.00	0.00	0.00	0.99	0.00	2.37	0.00
Estimated total fatalities	6	0	0	0	6	0	12	0
Mean observations per minute per km^3	–	–	–	–	–	–	–	–
Red-tailed hawk								
Adjusted fatalities per MW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.58
Estimated total fatalities	0	0	0	0	0	0	0	8
Mean observations per minute per km^3	–	–	–	–	–	–	–	–

BLOB	Bird Year 2005	2006	2007	2008	2009	2010	2011	2012
BLOB 7								
Installed capacity (MW)	18	18	18	17	17	17	17	16
Monitored capacity (MW)	9	9	9	9	9	9	5	7
American kestrel								
Adjusted fatalities per MW	0.00	0.00	0.00	0.00	0.40	0.00	0.81	0.00
Estimated total fatalities	0	0	0	0	7	0	13	0
Mean observations per minute per km^3	0.11	0.21	0.00	0.22	0.02	0.04	0.08	0.04
Burrowing owl								
Adjusted fatalities per MW	0.62	3.33	1.68	1.18	0.42	0.89	0.86	1.24
Estimated total fatalities	11	61	30	20	7	15	14	20
Mean observations per minute per km^3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Golden eagle								
Adjusted fatalities per MW	0.14	0.12	0.12	0.00	0.00	0.13	0.00	0.34
Estimated total fatalities	3	2	2	0	0	2	0	6
Mean observations per minute per km^3	0.15	0.06	0.17	0.09	0.32	0.27	0.15	0.71
Red-tailed hawk								
Adjusted fatalities per MW	0.42	0.79	0.64	0.00	0.65	0.17	0.00	0.46
Estimated total fatalities	8	14	12	0	11	3	0	8
Mean observations per minute per km^3	1.00	0.52	0.94	1.16	0.70	1.13	0.81	0.93
BLOB 12								
Installed capacity (MW)	16	16	16	16	13	11	10	7
Monitored capacity (MW)	6	6	6	6	5	5	5	3
American kestrel								
Adjusted fatalities per MW	0.00	0.00	1.13	1.04	0.00	0.00	1.99	0.00
Estimated total fatalities	0	0	18	17	0	0	21	0
Mean observations per minute per km^3	0.54	0.10	0.05	0.28	0.16	0.22	0.00	0.00
Burrowing owl								
Adjusted fatalities per MW	0.00	1.16	1.80	1.10	0.00	0.00	0.00	0.00
Estimated total fatalities	0	19	29	18	0	0	0	0
Mean observations per minute per km^3	0.00	0.00	0.00	0.37	0.02	0.00	0.00	0.00
Golden eagle								
Adjusted fatalities per MW	0.19	0.51	0.35	0.17	0.41	1.08	0.28	0.42
Estimated total fatalities	3	8	6	3	6	12	3	3
Mean observations per minute per km^3	0.20	0.03	0.46	0.24	0.47	0.24	0.26	0.53
Red-tailed hawk								
Adjusted fatalities per MW	0.83	0.67	0.46	0.00	0.27	0.57	0.00	0.00
Estimated total fatalities	14	11	7	0	4	6	0	0
Mean observations per minute per km^3	0.83	0.82	2.46	1.47	0.37	0.90	0.79	0.63

BLOB	Bird Year 2005	2006	2007	2008	2009	2010	2011	2012
BLOB 13								
Installed capacity (MW)	27	27	26	24	23	23	23	23
Monitored capacity (MW)	11	11	10	10	10	7	5	9
American kestrel								
Adjusted fatalities per MW	0.00	1.65	1.04	0.67	0.36	1.04	0.93	0.00
Estimated total fatalities	0	45	27	16	8	24	22	0
Mean observations per minute per km^3	1.18	1.04	0.74	0.95	0.33	0.37	0.21	0.53
Burrowing owl								
Adjusted fatalities per MW	0.00	0.35	0.00	0.00	0.00	0.00	0.00	0.00
Estimated total fatalities	0	9	0	0	0	0	0	0
Mean observations per minute per km^3	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00
Golden eagle								
Adjusted fatalities per MW	0.24	0.00	0.00	0.22	0.34	0.00	0.00	0.13
Estimated total fatalities	7	0	0	5	8	0	0	3
Mean observations per minute per km^3	0.19	0.08	0.28	0.60	0.57	0.83	0.39	1.72
Red-tailed hawk								
Adjusted fatalities per MW	0.52	0.40	0.42	0.14	0.00	0.84	0.36	0.54
Estimated total fatalities	14	11	11	3	0	19	8	13
Mean observations per minute per km^3	1.92	1.18	0.64	2.25	0.45	0.89	0.67	1.01
BLOB 14								
Installed capacity (MW)	16	16	13	11	10	9	9	8
Monitored capacity (MW)	3	3	2	2	2	5	2	2
American kestrel								
Adjusted fatalities per MW	0.00	0.00	0.00	1.54	0.00	0.00	0.00	0.00
Estimated total fatalities	0	0	0	17	0	0	0	0
Mean observations per minute per km^3	0.19	0.27	0.34	0.03	0.19	0.18	0.06	0.06
Burrowing owl								
Adjusted fatalities per MW	0.00	0.00	0.00	0.00	0.00	0.78	7.43	0.00
Estimated total fatalities	0	0	0	0	0	7	66	0
Mean observations per minute per km^3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Golden eagle								
Adjusted fatalities per MW	0.00	0.00	0.47	0.00	0.00	0.00	1.00	0.64
Estimated total fatalities	0	0	6	0	0	0	9	5
Mean observations per minute per km^3	0.19	0.13	0.86	0.63	0.88	0.27	0.23	1.03
Red-tailed hawk								
Adjusted fatalities per MW	0.72	1.70	0.61	1.31	0.82	0.61	2.73	0.00
Estimated total fatalities	11	27	8	15	8	6	24	0
Mean observations per minute per km^3	1.95	2.29	2.92	1.86	1.19	0.88	2.39	3.71

2.4 Avian Fatality Analysis

The method for estimating the quantities of avian fatalities that may occur at the Project are set forth in the FPEIR, Section 3.4.2.

Fatality rates for existing WTs within the Project footprint are taken directly from FPEIR, Table 3.5-10 (column titled "Non-repowered") and repeated here as Figure 2.4. Such fatality rates are based on the average of the annual estimates from the 2005–2011 bird years (n=7 years), provided by the Mteam. Such WT-attributable fatality rates are based on old-generation WTs only; results from the Diablo Winds and Buena Vista WTs were excluded because they are not considered old-generation WTs. Such WT-attributable fatality rates were multiplied by 39.9 MW, the pre-Project output of old-generation WTs on the Project footprint, to get the total fatalities for the "Pre-Project" column shown in Table 3.3.

The avian WT-attributable fatality analysis compares the baseline quantity of fatalities for each species and species group to the quantities of fatalities expected to occur at the Project. The quantity of expected Project fatalities is the product of the size the Project measured in MW multiplied by the WT-attributable fatality rates for each species. The rates are derived from the rates at Vasco Winds project which is very similar to the Project in terms of the quantity and size of WTs and location in the APWRA. Further descriptions of the methods of analysis are described in the FPEIR. The annual WT-attributable fatality rates (expressed as fatalities per MW per year) for three repowering projects in the APWRA including Vasco are presented in FPEIR Table 3.4-10 included as Figure 2.4.

Table 3.4-10. Annual Adjusted Fatality Rates for Nonrepowered and Repowered APWRA Turbines

		Repowered		
Species/Group	Nonrepowered[a]	Diablo Winds[b]	Buena Vista[c]	Vasco Winds[d]
American kestrel	0.59	0.09	0.15	0.30
Barn owl	0.24	0.02	0.00	0.03
Burrowing owl	0.78	0.84	–	0.05
Golden eagle	0.08	0.01	0.04	0.03[e]
Loggerhead shrike	0.19	0.00	–	–
Prairie falcon	0.02	–	0.00	–
Red-tailed hawk	0.44	0.20	0.10	0.25
Swainson's hawk	0.00	–	–	–
All raptors	2.43	1.21	0.31	0.64
All native non-raptors	4.50	2.51	1.01	2.09

Notes: fatality rates reflect annual fatalities per MW. "–" denotes that no fatalities were detected. "0.00" signifies that, although fatalities were detected, the rate is lower than two significant digits.

[a] Average of 2005–2011 bird years.

[b] Average of 2005–2009 bird years.

[c] Average of 3 years (2007–2009).

[d] Values from first year of monitoring (2013).

[e] Value updated based on information provided by NextEra Energy Resources on July 21, 2014. Value provided is an average of the adjusted rates from monitoring years 1 (0.016) and 2 (0.048).

Figure 2.4. sourced from Table 3.4-10, FPEIR, showing adjusted WT-attributable fatality rates for non-repowered and repowered WTs

Potential biases in the avian WT-attributable fatality analysis methods are described in the FPEIR at page 3.4-56.

2.5 Bat WT-attributable fatality Analysis

The methods used to assess the Project's impacts on bat species are described in the FPEIR at 3.4-57. Bat fatalities for the FPEIR Program area, which includes existing Project area WTs, are taken directly from FPEIR, Table 3.4-15, shown here as Figure 2.5.

Table 3.4-15. Estimated Range of Annual Bat Fatalities

Study Area	Capacity (MW)	Baseline Fatalities[a]	Predicted Fatalities[b]
Existing program area	329	87	–
Program Alternative 1	417	110	700–1,635
Program Alternative 2	450	118	756–1,764
Golden Hills	88.4	23	148–347
Patterson Pass	19.8	5	33–78

[a] Estimate of total baseline fatalities are based on the Smallwood and Karas fatality rate of 0.263 fatalities/MW/year derived from 2005–2007 monitoring at the APWRA.

[b] Estimate of total predicted fatalities are based on fatality rates from the Vasco Winds repowering project (1.679 fatalities/MW/year), and from the multiyear average rates from the Shiloh I project in the Montezuma Hills WRA (3.92 fatalities/MW/year).

Figure 2.5. Bat Fatalities, source Table 3.4-15 from FPEIR, page 3.4-133

3. RISK ASSESSMENT

3.1 Background Mortality

The calculations in this ABPP do not factor in background mortality. However, historic avian data from the APWRA have shown that a significant portion of recorded fatalities are likely not caused by bird-WT interaction. Accounting for background mortality would make the estimates of total Project-caused fatalities lower, which means that we're over-mitigating. Therefore, the estimates in this ABPP are very conservative.

The following excerpt from Hunt 2002 corroborates the concept that not all golden eagle fatalities are cause by WTs:

> "Wind turbine blades accounted for 42 of 100 fatalities of radio-tagged eagles recorded during the study, and the actual number of blade strike deaths within the sample of tagged eagles may have been higher, because the blades destroyed the transmitters in an unknown proportion of cases."

Table 3.1, sourced from Russell 2014, shows that for golden eagles, trauma was the cause of death in only 27% of the cases. The remainder is from other causes including drowning, electrocution, poison, etc. and represent 73% of the total causes of death. Russel 2014 shows that there are many causes of death for golden eagles in the U.S. Thus, it's reasonable to expect that some of the fatalities found near WTs in the APWRA would be due, either directly or indirectly, to causes other than WTs.

Table 3.1. Causes of death for golden eagle carcasses submitted to the National Wildlife Health Center (Russell 2014).

Cause of Death		Carcasses	Portion of total
Not trauma			
	Drowned	3	0.2%
	Electrocution	381	26.7%
	Emaciation	90	6.3%
	Disease	39	2.7%
	Undetermined	131	9.2%
	Other	47	3.3%
	Poisoned	117	8.2%
	Shot	196	13.7%
	Trapped	39	2.7%
	Subtotal	**1,043**	**73.1%**
Trauma		384	26.9%
Total		**1,427**	**100.0%**

3.1.1 Estimate of Background Mortality

Three methods are used to calculate background mortality, as described below:

Method 1 — Fatalities categorized by operating season and non-operating season. The first method assumes all fatalities which occur during the non-operating season are background. For this method, it was assumed that background rates are constant throughout the year. Therefore, the background mortality rates (in fatalities/MW-yr.) established during the non-operating season are carried through the remainder of the year. However, background portions were limited to 100% in the cases of the American kestrel and burrowing owl, because the actual Method 1 results were higher than 100% for the American kestrel and burrowing owl, respectively. The fatalities of these two species are skewed to the non-operating season, thus, carrying the non-operating season rate through the operating–season months results in calculated background fatality quantities being greater that total fatality quantities.

Method 2 — by "Cause of Death" categorization. This second method relies on the Mteam's "Cause of Death" classification of fatalities by "Turbine strike", "Unknown" and "Other, turbine-related". For the focal species during the years 2007 to 2013 for WTs located on the Project footprint, the Mteam classified no fatalities as "Other, turbine related". Therefore, the two categories available for analysis were "Turbine strike" and "Unknown". For the purposes of this method, all "Unknown" fatalities count as background and all "Turbine strike" fatalities count as non-background. The background mortality portion is the quotient of "Unknown" and "Total" fatalities. This method is the most conservative approach to avian background mortality.

Method 3 — Method 2 with non-operating season "Turbine strikes" converted to "Unknown". The third method is the same as the second method, except that fatalities classified as "Turbine strike" and which occurred during the non-operating season, were reclassified as "Unknown" before calculating the background mortality portion. The background mortality portion is then calculated as in the second method, by dividing "Unknown" by "Total" fatalities. This method was done because there were several fatalities for which the estimated date of death was during the non-operating season, yet for which the cause of death was listed as "Turbine strike." It doesn't make sense that a "Turbine strike" could be a cause of death if the

WTs were not running. While the differences between Method 2 and Method 3 are not great for the Project footprint, they have been significant for larger sample sets.
As expected, the background mortality rates for each focal species vary by the calculation method. The results for each method are shown in Table 3.2.

Table 3.2. Summit Project Footprint Avian Background Mortality Proportions with Three Methods of Calculation

	Method 1	Method 2	Method 3
American kestrel	100%	**88%**	94%
burrowing owl	100%	**100%**	100%
golden eagle	0%	**40%**	40%
red-tailed hawk	75%	**16%**	25%

For discussions in this ABPP, the background proportions used are those of Method 2.

3.2 Estimated Avian Fatalities

The operation of repowered WTs in the Project area is expected to result in significantly fewer avian fatalities than would occur from non-repowered WTs. However, as discussed in the FPEIR (at Appendix F1, page 4), repowering would not likely fully eliminate avian WT-related fatalities. The estimated reductions in annual fatalities differ by species, presented in Table 3.3. The WT-attributable fatality rates in the Non-repowered column are based on the average rates of bird years 2005 to 2011 for the entire APWRA, prior to the Project and are taken from Table 3.4-10 of the PEIR.

Table 3.3. Project Footprint Fatalities, Pre- and Post-Project Commercial Operation Date

Species/Group	Adjusted Fatality Rates				Project Footprint Fatalities			
	Non-repowered[a]	Repowered: Diablo Winds[b]	Repowered: Buena Vista[c]	Repowered: Vasco Winds[d]	Pre-Project 39.9 MW per yr	Project 54 MW per yr	Project 54 MW 20 yrs	Decrease %
American kestrel	0.59	0.09	0.15	0.30	23.5	**16.2**	324	31.2%
Barn owl	0.24	0.02	0.00	0.03	9.6	**1.6**	32.4	83.1%
Burrowing owl	0.78	0.84	–	0.05	31.1	**2.7**	54	91.3%
Golden eagle	0.08	0.01	0.04	0.032	3.2	**1.7**	34.6	45.9%
Loggerhead shrike	0.19	0.00	–	–	7.6	**–**	–	–
Prairie falcon	0.02	–	0.00	–	0.8	**–**	–	–
Red-tailed hawk	0.44	0.2	0.10	0.25	17.6	**13.5**	270	23.1%
Swainson's hawk	0.00	–	–	–	–	**–**	–	–
All raptors	2.43	1.21	0.31	0.64	97.0	**34.6**	691	64.4%
All native non-raptors	4.50	2.51	1.01	2.09	179.6	**112.9**	2,257	37.1%

Notes: fatality rates reflect annual fatalities per MW. "–" denotes that no fatalities were detected. "0.00" signifies that, although fatalities were detected, the rate is lower than two significant digits.

[a] Average of 2005–2011 bird years.

[b] Average of 2005–2009 bird years.

[c] Average of 3 years (2007–2009).

[d] Values from first year of monitoring (2013).

e Value updated based on information provided by NextEra Energy Resources on July 21, 2014. Value provided is an average of the adjusted rates from monitoring years 1 (0.016) and 2 (0.048). provided is an average of the adjusted rates from monitoring years 1 (0.016) and 2 (0.048).

3.2.1 Focal Species. Focal species were defined by the County and the Mteam to be those species of primary concern, involving the targeted 50% reduction in turbine-related raptor fatalities in the APWRA[2]. They include American kestrel, golden eagle, red-tailed hawk and burrowing owl. The impact of the Project on focal species fatalities is discussed below:

3.2.1.1 American Kestrel and Burrowing Owl

American kestrel. As shown in Table 3.3, the Project estimates 16.2 American kestrel fatalities per year — a 31.2% decrease, as compared to existing WTs.

Burrowing owl. As shown in Table 3.3, the Project estimates 2.7 burrowing owl fatalities per year, a decrease of 91.3%, compared to existing WTs.

For both American kestrel and burrowing owl, predation is the likely cause of death, rather than turbine strikes. Therefore, the estimated quantities of American kestrel and burrowing owl fatalities attributable to the Project are likely high, as illustrated by the following excerpts from ICF 2014:

> The substantial increase in the proportion of fatality incidents occurring during the seasonal shutdown that are comprised of feather spots relative to the rest of the year for American kestrel and burrowing owl but not for golden eagle or red-tailed hawk—and that this increase coincides with a substantial increase in use by predatory species such as red-tailed hawk—strongly supports the hypothesis that a substantial portion of these fatalities are predation events rather than turbine related fatalities.[3]
>
> and;
>
> …it appears that predation is likely a significant driver of fatality rates for small birds in general and in particular for burrowing owl and (to a lesser extent) American kestrel. Despite a reduction in collision risk to zero or near zero for the period November through mid-February, 44% of all fatality incidents detected during the bird years 2009–2012 are estimated to have occurred during this period. The vast majority of these carcasses are feather spots, for which a cause and date of death cannot be estimated. While it is possible that some of these fatality incidents were turbine-related incidents occurring outside the shutdown period that were subsequently scavenged, missed on one or more searches, and then found as feather spots, the more parsimonious hypothesis is that these fatality incidents are the result of predation and are not directly turbine-related fatalities. If this hypothesis were true, estimates of total fatalities of American kestrel and burrowing owl would be biased high by 40% or more, and conclusions about the effectiveness of management actions and the 50% reduction goal would be very different.[4]
>
> and;
>
> However, as noted above, it is likely that a substantial portion—perhaps as high as 44%—of the American kestrel and burrowing owl fatality incidents documented from the 2009 through the 2012 bird years is due to predation rather than turbine collision.[5]

[2] ICF International, 2014, Altamont Pass Wind Resource Area Bird Fatality Study, Bird Years 2005-2012, page 5-2
[3] Ibid; page 3-10
[4] Ibid, page 4-2
[5] Ibid, page 4-3

3.2.1.2 Golden Eagle and Red-tailed Hawk

Golden eagle. As shown in Table 3.3, the Project estimates 1.7 golden eagle fatalities per year — a 45.9% decrease, compared to existing WTs. Although not included in this ABPP, background mortality would account for a significant portion of the 1.7 golden eagle fatalities per year. Historically, according to Mteam evaluation of the cause of death, as described in Method 2 in Section 3.1 above, background fatalities accounted for approximately 40% of golden eagle fatalities on the Project footprint (see Table 3.2)

Red-tailed hawk. As shown in Table 3.3, the Project estimates 13.5 red-tailed hawk fatalities per year — a 23.1% decrease, compared to existing WTs. Although not included in this ABPP, background mortality would account for a portion of the 13.5 red-tailed hawk fatalities per year. Historically, background fatalities have accounted for approximately 16% of red-tailed hawk fatalities on the Project footprint (see Table 3.2).

3.3 Birds

3.3.1 Collision. Overall, estimated cumulative bird fatalities due to collision with WTs is several orders of magnitude lower than estimated fatalities from other anthropogenic sources, such as, collision with vehicles and buildings, and predation by domestic and feral cats (Erickson et al. 2001). In a study of cumulative bird population impacts associated with wind energy in eastern Washington and Oregon, Johnson and Erickson (2008) concluded that effects on bird populations from 6,665 MW of existing wind energy facilities in that region were negligible.

Species differ in their vulnerability to collision with WTs. Songbirds, particularly migrants, account for a majority of WT-related fatalities (Erickson et al. 2001, NRC 2007, Strickland et al. 2011), but current wind facility WT-attributable fatality rates are unlikely to affect population trends of most songbirds (NRC 2007, Kingsley and Whittam 2007, Kuvlesky et al. 2007). In most cases, WT-attributable fatality estimates for raptors are very low relative to background natural mortality rates (Erickson 2008). Most non-coastal wind resource areas experience low rates of waterfowl and waterbird fatalities (Kingsley and Whittam 2007).

Bird behavior undoubtedly plays a role in exposure of various species to WT blades. Much of the time, birds either are not flying at rotor-swept height or are able to see and avoid the WT blades. Songbirds and upland game birds typically carry out daily activities well below the rotor-swept area of WTs; songbirds typically migrate at heights above the rotor-swept zone, but may be most vulnerable during migration, when ascending/descending to/from stopover sites, and during inclement weather that forces them to lower heights during migration flight (Johnson et al. 2002, NWCC 2010, Kunz et al. 2007a). This leads to spring and fall peaks in songbird mortality at most facilities (Johnson et al. 2002, NWCC 2010).

If raptors such as red-tailed hawks and golden eagles soar and hover at rotor-swept height while hunting, they may become distracted while focusing on prey. This hunting behavior, peculiar to raptors, may explain why species such as crows, ravens, and turkey vultures, which are also among the most commonly observed birds flying at rotor-swept height, account for very few fatalities (Strickland et al. 2011).

Land cover type does not appear to be a strong predictor of fatalities. Bird WT-attributable fatality rates appear similar in agricultural landscapes (2.8/MW/study period; 37 facilities), grasslands (2.4/MW/study period; 20 facilities), and forested landscapes (3.3/MW/study period; 9 facilities (Strickland et al. 2011). However, WT-attributable fatality rates vary somewhat among wind resource areas, and regions – for example, raptor WT-attributable fatality rates at some California wind farms (where the majority of WTs are smaller old-generation design), are much higher than those experienced elsewhere (Kingsley and Whittam 2007, Kuvlesky et al. 2007), and wind farms in the Midwest and Eastern U.S. may experience higher rates of songbird WT-attributable fatality than Western U.S. wind farms (Strickland et al. 2011).

Comparisons among wind farms should be interpreted with caution, as survey methodology and methods of WT-attributable fatality estimation have varied among wind facilities. Furthermore, the overall relationship between pre-construction abundance and post-construction fatalities needs further study (Ferrer et al. 2012).

3.3.2 Avian Displacement. Concern for wind energy development impacts on birds has largely focused on fatalities, thus, most post-construction monitoring data has focused on estimating fatalities. Relatively little is known about potential displacement of wildlife at wind farms. Displacement of wildlife may occur due to habitat loss, habitat fragmentation, or avoidance of WTs. Wind energy facilities create a relatively small footprint of vegetation loss — approximately 1 acre per WT. Consequently, there is generally low potential for displacement effects due to direct vegetation loss. Habitat fragmentation would clearly be an important consideration for wind developments proposed to occur within large, intact, contiguous natural vegetation communities.

It's important to remember that habitat is a species-specific concept (Johnson 2007); for most species, vegetation is the most important factor influencing habitat suitability, but suitability of habitat often depends on other factors as well, including avoidance of anthropogenic disturbance. For some species, the amount of habitat lost may amount to a greater area than the apparent footprint of the WTs, if the species avoids the surrounding area due to the proximity of human disturbance or infrastructure. If displacement due to avoidance is great enough, habitat fragmentation may occur.

More research is needed to better understand wildlife displacement at wind energy facilities. Several studies indicate that the zone of influence of WTs on grassland songbirds is 100 m or less, with most of the impact being a direct result of habitat loss at WT pads and roads, as well as, temporary construction disturbance (reviewed by Strickland et al. 2011). Displacement of waterfowl and shorebirds has been reported to extend 100 m to 600 m from WTs in Europe (Strickland et al. 2011).

Overall, avian wildlife displacement from habitat loss, habitat fragmentation, or avoidance of WTs, due to the Project is not expected to increase from the pre-construction state of the Project area, and it may even decrease. The Project area has been disturbed for wind farm operations since the 1980's, and the amount of disturbance will actually be less after repowering, with fewer new WTs being installed as compared to removed, and since existing roads and substation yards will be reused, for example.

3.4 Golden Eagles

3.4.1 Collision. Overall bird WT-attributable fatality rates at most wind farms are several orders of magnitude lower than estimated fatalities from other anthropogenic sources and do not appear to be high enough to cause population declines (Erickson et al. 2001).

Healthy golden eagle populations contain breeders, juveniles, and "floaters" — sub adults or adults that have not settled on a territory (Brown 1969, Hunt 1998, USFWS 2013). Floaters have been shown to be more vulnerable to collision with WTs than locally breeding adults and juveniles (Hunt et al. 1999, Hunt 2002). Population stability depends on the non-breeding population of floaters to replace breeding individuals that die (Hunt 1998, USFWS 2013).

Risk to eagles is influenced by four primary factors:

1. The amount of eagle use of the area.

2. Residency status (that is, dispersers, migrants, and floaters are at higher risk than resident adults and juveniles).

3. The interaction of topography, wind, and seasons (i.e., possibly, wind waves along upwind side of ridges and escarpments used for soaring, gliding, and kiting).

4. Behavior that distracts eagles (i.e., hunting or territorial interaction; USFWS 2011).

3.4.1.1 Siting Analysis and Risk-Model Results

The applicant hired an avian consultant with experience in the Altamont Pass (Smallwood 2014) to do a WT siting analysis in 2014. As a result of that report, the locations of several WTs were changed to areas where impacts would be reduced.

3.4.2 Determination of Risk Category

According to guidelines within the U.S. Fish and Wildlife Service's (**"USFWS"**), Eagle Conservation Plan Guidance (USFWS 2013), if the Project meets the following guideline, it poses a category 2 risk to golden eagles — high to moderate risk with an opportunity to mitigate impacts. The Project qualifies as a category 2 risk because it meets the second of the three Category 2 qualification criteria, namely that it:

> has an annual eagle WT-attributable fatality estimate between 0.03 eagles per year and no more than 5% of the estimated local-area population size

The two factors needed to determine whether the Project meets the criteria above are the estimated annual take of the Project and the local area population. Based upon the proration by project scale from the Vasco project, as shown in Table 3.3, it's estimated that the quantity of eagle fatalities before mitigation is 1.7 per year over the Project's 20 year design life.

3.4.3 Displacement. Displacement of eagles may occur due to habitat loss, habitat fragmentation, or avoidance of WTs. For the most part, studies have found little or no evidence of golden eagle displacement at wind facilities (Madders and Whitfield 2006). One study in Scotland (Walker et al. 2005) reported a shift in golden eagle home range use away from a newly constructed wind facility, but the possible displacement effect may have been confounded with habitat change. Forest outside the facility had been cleared immediately prior to construction in order to mitigate possible displacement effects; eagle use shifted from the wind facility into the newly created habitat.

The Project is not expected to increase eagle displacement because the Project area has been disturbed for wind farm operations since the 1980's, and the amount of disturbance will actually be less after repowering, with fewer new WTs being installed as compared to removed, and since existing roads and substation yards will be reused, for example.

3.5 Bats

3.5.1 Collision. Because bat fatalities were originally encountered incidentally in studies designed primarily to detect bird fatalities at wind energy facilities, they were likely underestimated (Kunz et al. 2007b). It eventually became apparent that bat fatalities were common at wind energy facilities (Strickland et al. 2011). Although bat population dynamics are not well understood, bat populations may be vulnerable because bats have low reproductive rates and are slow to recover from population declines (Arnett et al. 2011, Cryan 2011, Strickland et al. 2011).

Generally, bat fatalities have been highest on forested ridges in the eastern U.S. (14.9 – 53.3/MW/study period) and lowest in the Rocky Mountain and Pacific Northwest regions (0.8 – 8.9 MW/study period), but fatalities can be highly variable even among facilities in close proximity to one another (Arnett et al. 2008, Strickland et al. 2011).

Migratory tree roosting species are the most common bat fatalities found at wind energy facilities, even in non-forested landscapes. In the Western U.S., hoary bats (Lasiurus cinereus) and silver-haired bats (Lasionicteris noctivagans) account for the majority of documented fatalities (Kunz et al. 2007b, Arnett et al. 2008). WT-attributable fatality patterns suggest that bats may be attracted to large industrial-scale WTs — some hypotheses have been suggested to explain the apparent attraction, including: (1) tree roosting species may perceive WTs as tall trees and approach them to roost, (2) flying insects are attracted to the heat produced at the WT hub and bats may be attracted to the high insect densities, and (3) bats may be attracted to audible or ultrasonic sounds produced by WTs (Kunz et al. 2007b, Strickland et al. 2011).

Bat fatalities are often temporally clustered, peaking during certain seasons and weather patterns. Bat fatalities at wind facilities are consistently highly seasonal. Most bat fatalities occur during the fall migration, which depending on the area, occurs from July through October, but a few studies have documented WT-attributable fatality peaks in the spring (Kunz et al. 2007b, Arnett et al. 2008). Fatalities are often correlated with weather patterns. Most bats have been killed on nights with low wind speeds (<6 m/second), and fatalities often occur immediately before or after passage of a storm front (Arnett et al. 2008, Arnett et al. 2011).

Fatalities tend to be more or less randomly distributed among WTs at a site, though highest numbers of fatalities are often found near the ends of WT strings (Arnett et al. 2008). No differences in fatalities have been found between WTs equipped with standard FAA lighting and unlighted WTs (Arnett et al. 2008). Barclay et al (2007) found that bat fatalities/MW increased with increasing WT height, with the highest WT-attributable fatality rates occurring at WTs ≥ 65 meters tall.

Concern over bat fatalities at wind energy facilities is relatively recent, and in general, bat populations and bat interactions with WTs are poorly understood. The possibility that current WT designs may actually serve as an attractant to bats and the presence of spatial and temporal patterns in bat fatalities at wind energy facilities suggest that there is much potential for minimizing wind energy development impacts on bats. More research is needed to understand how technology, operational procedures, and potential mitigation measures can be used to minimize bat fatalities at wind farms.

Resident and migratory bats flying in and through the Project area may be impacted by collision with WT blades or other interaction with the WTs. Extrapolating from existing WT-attributable fatality data and from trends observed at other wind energy facilities where large, fourth-generation WTs are in operation, it appears likely that fatalities would occur predominantly in the late summer to mid-fall migration period; that fatalities would consist mostly of migratory bats, particularly Mexican free-tailed bat and hoary bat; that fatalities would occur sporadically at other times of year; and that fatalities of one or more other species will occur in smaller numbers. As shown in Table 3.4, prorating by relative project size from the adjacent Vasco project data, the bat fatalities estimates for the Project footprint will increase from the current 10.6 to 91-212 fatalities.

Table 3.4. Estimated Range of Annual Bat Fatalities

Study Area	Capacity (MW)[a]	Baseline Fatalities[b]	Predicted Fatalities[c]
Project area, old tech. WTs	39.9	10.6	–
Project	54		91–212

a. source: Rated power of existing project at time of the Notice of Preparation of the Summit EIR.
b Estimate of total baseline fatalities are based on the Smallwood and Karas fatality rate of 0.263 fatalities/MW/year derived from 2005–2007 monitoring at the APWRA.
c Estimate of total predicted fatalities are based on fatality rates from the Vasco Winds repowering project (1.679 fatalities/MW/year), and from the multiyear average rates from the Shiloh I project in the Montezuma Hills WRA (3.92 fatalities/MW/year).

3.5.2 Displacement. Displacement has not been identified as a risk to bats in recent reviews of wind energy facility impacts on bats (Kuvlesky et al. 2007, Arnett et al. 2008, Strickland et al. 2011). For this reason, it's not expected that displacement of bats will be substantial at the Project.

4. AVOIDANCE AND MINIMIZATION MEASURES

4.1 Conservation Measures.

This section identifies conservation and impact minimization measures that the applicant has already taken and/or is committed to carry out on the Project. These measures were primarily derived from the Final Land Based Wind Energy Guidelines (USFWS 2012b), from the National Wind Coordinating Collaborative Mitigation Toolbox (NWCC 2007), and from California Energy Commission ("CEC") guidelines.

The conservation measures to reduce impacts to wildlife and their habitats during the operation of the Project include:

(1) The Project site is disturbed land used for cattle grazing, which limits direct loss of bird and bat habitat.

(2) New power and communication lines are planned to be installed below ground. No new high voltage overhead power lines are planned to be installed for the Project. However, when power lines cannot be placed underground (such as, at a creek or steep ravine), appropriate avian protection designs will be employed. As a minimum requirement, the collection system will utilize the most current edition of the Avian Power Line Interaction Committee (**"APLIC"**) guidelines to prevent electrocutions.

The power collection system will consist of medium-voltage, high-density, insulated underground cables that will connect the turbines to the substation. Underground collection cables will be buried in parallel trenches located adjacent to the roadbed of the interior access roads. Trenching equipment will be used to excavate trenches in or near the access roadbed to allow installation of the insulated underground cables that will connect each turbine to the substation.

To the extent possible, existing roads will be used for proposed project construction and operations. The existing roadway system primarily consists of gravel access roads. Turbine transportation requires equipment transport and crane specifications that dictate road width and turning radii. To allow safe passage of the large transport equipment used in construction, all-weather gravel roads will be built with adequate drainage and compaction to accommodate equipment transport vehicles.

(3) To the extent possible, existing roads will be used for access roads.

(4) The met tower(s) will be a self-supporting, non-guyed lattice tower(s). If lighting is required by the Federal Avian Administration (**"FAA")**, it will be operated at the minimum allowable intensity, flashing frequency, and quantity allowed by the FAA.

(5) FAA lighting on the WTs will consist of the standard red synchronized flashing lights.

(6) The lights will be turned off at the Project's substations, which will reduce the confusion/attraction to birds, especially in foggy conditions. Lights at the substation will be switched on manually and will only be used during rare occasions when someone is at the substation at night. Lighting will be kept to a minimum, and they will be downward-directed lights that are only activated by motion sensors rather than being on continuously.

(7) WTs are located away from any creeks and will not affect hydrology.

(8) WT towers will be of the new generation, tubular design. The Project will use WTs with certain characteristics that are believed to reduce the collision risk for avian species. The Project will implement the design-related measures listed below:

> The distance of the lowest point of the turbine rotor (i.e., the tip of any blade at the 6:00 position), will be no less than 29 meters (95 feet) from the ground surface. This design characteristic addresses the finding that roughly 74% of all bird observations (54% of raptor observations) occurred at heights less than 30 meters (Curry and Kerlinger 2009).

> Turbine design will limit or eliminate nesting or roosting opportunities. Openings on turbines will be covered to prevent cavity-nesting species from nesting in the turbines. Designs will include a tubular tower with internal ladders; external catwalks, railings, or ladders will be prohibited.

> Lighting will be installed on the fewest number of turbines allowed by FAA regulations, and all pilot warning lights will fire synchronously. WT lighting will employ only red or dual red-and-white strobe, strobe-like, or flashing lights (U.S. Fish and Wildlife Service 2012b). All lighting on WTs will be operated at the minimum allowable intensity, flashing frequency, and quantity allowed by FAA (Gehring et al. 2009; U.S. Fish and Wildlife Service 2012b). The duration between flashes will be the longest allowable by the FAA.

(9) The Project's staff will minimize vehicle collision risk to wildlife by driving at appropriate speeds within the Project. The Project will implement a 25 mph speed limit at the Project for site personnel.

(10) Garbage at the site will be properly managed to avoid creating an attractive nuisance for wildlife.

(11) Following the useful life of the Project (about 25 years), the applicant will either repower the Project with state-of-the-art WTs or decommission the Project. Decommissioning will involve removal of all above-ground structures, as well as, all concrete foundations down to a depth of 3 feet, and restoration of the soil surface to as close as reasonably possible to its original condition. The reclaimed land would then likely be returned to agricultural use by the landowner.

(12) The Project will provide a clean, renewable electric power source that will, when substituted for fossil fuel-burning power plants, result in a net decrease of toxic air emissions and greenhouse gas emissions. The resulting reduction in pollutant emissions provides a long-term benefit to wildlife by slowing climate change and minimizing environmental toxins (as discussed in Sections 1.3 and 6.1).

(13) In accordance with FPEIR Mitigation Measure BIO-8a the Project will implement measures to avoid and minimize potential impacts on special-status and non-special-status nesting birds. Where suitable habitat is present, the following measures will be implemented for raptors (within 1 mile of suitable habitat), golden eagles (within 2 miles of suitable habitat), and tree/shrub- and ground-nesting birds within 50 feet of suitable habitat):

> Construction activities near suitable or occupied nesting habitat will be avoided to the extent feasible during the nesting season.

> Preconstruction nest surveys by a qualified biologist will take place if construction activities are scheduled during the nesting season.

> If an active nest is identified near a proposed work area when construction is scheduled to occur, coordination with USFWS and/or CDFW will occur to establish an appropriate no-activity buffer around the nest.

(14) In accordance with FPEIR Mitigation Measure BIO-8b the Project will implement measures to avoid and minimize potential impacts on western burrowing owl. Where suitable habitat for

western burrowing owl is in or within 500 feet of proposed work areas, the following measures will be implemented:

> During the nesting season, construction activities near active burrows will be avoided to the extent feasible.

> Preconstruction surveys for burrowing owl will occur no less than 14 days prior to, and within 24 hours of initiating ground-disturbing activities.

> If an active burrow is identified during the breeding season near a proposed work area, an appropriate no-activity buffer will be established with coordination from CDFW. An appropriate no- activity buffer will also be established for burrows occupied outside of the breeding season. If a no- activity buffer cannot be established, additional measures will be put in place as specified by a qualified biologist and CDFW.

> An approved burrowing owl exclusion plan may be used to exclude owl from burrows in the active project area during the non-breeding season.

> Ongoing surveillance of the project site will occur during project activities.

(15) In accordance with FPEIR Mitigation Measure BIO-9, the applicant will compensate for the permanent loss of occupied habitat for western burrowing owl

If construction activities result in the removal of occupied burrowing owl habitat, the habitat loss will be mitigated through a plan developed in coordination with CDFW and approved by the County.

4.1.2 Retrofit Existing Infrastructure to Minimize Risk to Raptors

As discussed in the FPEIR BIO-11e, the Project will retrofit any existing power lines in a specific project area that are owned by the wind project operator and that are associated with electrocution of an eagle or other raptor within 30 days to make them raptor-safe according to Avian Power Line Interaction Committee guidelines. All other existing structures to remain in a project area during repowering will be retrofitted, as feasible, according to specifications of FPEIR Mitigation Measure BIO-11c prior to repowered turbine operation.

4.1.2 Discourage Prey for Raptors. The Project will apply the following measures when designing and siting turbine-related infrastructure; these measures are intended to minimize opportunities for fossorial mammals to become established and thereby create a prey base that could become an attractant for raptors:

> Rodenticide will not be utilized on the Project site to avoid the risk of raptors scavenging the remains of poisoned animals.

> Boulders (rocks more than 12 inches in diameter) excavated during Project construction may be placed in above-ground piles in the Project area so long as they are more than 200 yards (656 feet) from any WT. Existing rock piles created during construction of first- and second-generation turbines will also be moved at least 200 yards from turbines.

> Gravel will be placed around each tower foundation to discourage small mammals from burrowing near turbines.

While these measures may reduce the populations of prey species near the WTs themselves, it's unlikely they will reduce overall prey-species populations significantly.

4.1.3 Compensate for the Loss of Raptors by Contributing to Conservation Efforts. To promote the conservation of raptors, the Project will compensate for the estimated quantity of raptor fatalities within the Project footprint. Mitigation will be provided in 10-year increments, with the first increment based on the estimates (raptors/MW/year) provided in this ABPP for NEER's Vasco Winds Project or the project-specific EIR for future Projects. The Vasco Winds WT-attributable fatality rates were selected because the Vasco WTs are similar to those to be used in the Project, and consequently, represent the best available WT-attributable fatality estimates. The Project will conduct post-construction WT-attributable fatality monitoring for three years, as required under Mitigation Measure BIO-11g, to estimate the average number of raptors taken each year, if any. The Project will compensate for this number of raptors in subsequent 10-year increments for the life of the Project, as outlined below. The FPEIR Mitigation Measure BIO-11g also requires additional WT-attributable fatality monitoring at year 10 of the Project. The results of the first three years of monitoring and/or the monitoring at year 10 may lead to revisions of the estimated average number of raptors taken, and mitigation provided can be adjusted accordingly in future 10-year increments.

Pursuant to the FPEIR, BIO-11h, page 3.4-115, the Project will donate $580 for each native raptor attributable to WT-related causes, to the Lindsay Wildlife Hospital in Walnut Creek. The first 10-year donation will be $200,448, as shown in Equation 4.6:

Equation 4.6:

$$D_{10} = F_{e10} * D_{rf} = 346 \times \$580 = \$200{,}448$$

where:

D_{10} = first 10-year donation, $
F_{e10} = 10-year estimated annual raptor fatalities
D_{rf} = donation per raptor WT-attributable fatality ($580 as designated in FPEIR, BIO-11h, page 3.4-115, pdf 399)

The second 10-year donation will be made in the 11th year of Project operations, based upon the quantity of raptors found during monitoring in the Project's 10th year of operation.

4.2 Other Conservation Measures Identified in the Future

As noted above, additional conservation measures for raptors may become available in the future. Conservation measures for raptors are currently being developed by USFWS and non-governmental organizations (e.g., American Wind Wildlife Institute)—for example, activities serving to reduce such fatalities elsewhere, and enhancing foraging and nesting habitat. Under this option, the Project may make alternative proposals to the County for conservation measures—based on a Resource Equivalency Analysis[6] (**"REA"**) or similar compensation assessment—that the County may accept as mitigation, if they are deemed by the County to be comparable to or more protective of raptor species than the other options described herein.

The Project will adjust operation and mitigation based upon the results of monitoring, new technology, and new research to ensure that the best available science is used to assess impacts and that impacts are minimized to the greatest extent possible. Baseline WT-attributable fatality estimates (i.e., estimates at the non-repowered turbines as described in Table 3.4-10 of the PEIR and in Table 3.3 of this ABPP) will be used as the thresholds to trigger implementation of **adaptive management measures** (**"ADMMs"**) (see Table 4.1). The Project thresholds are calculated by multiplying the fatality rates for non-repowered WTs, as shown in Table 3.3, by the Project footprint non-repowered WT capacity of 39.9 MW.

[6] REA is a method of determining compensation using non-monetary metrics. REA, habitat equivalency analysis, habitat evaluation procedures, and other quantitative tools have been used for years to evaluate ways to mitigate environmental impacts and select among various preferred mitigation alternatives. REAs were first used in the late 1990s for an oil-spill Natural Resource Damage Assessment (NRDA) case on the North Cape of Rhode Island (Sperduto et al. 1999, 2003). They have subsequently been used for a variety of other resources, including resources as varied as marbled murrelets and coral reefs. The use of REAs is consistent with the Comprehensive Environmental Response, Compensation, and Liability Act; the Oil Pollution Act; and California's Lempert-Keene-Seastrand Oil Spill Prevention and Response Act (Government Code Section 8670 et seq.). These regulations authorize trustee agencies to seek monetary compensation for injured natural resources (National Oceanic and Atmospheric Administration 1995). REA has also been internationally adopted by the European Union for addressing a full range of environmental liabilities (Cole & Kriström 2008).

A recent opinion paper by Cole (2011) advocates the use of REA as a method to specify appropriate types and amounts of compensation at windfarms. Additionally, USFWS recently provided REA examples in its ECP Guidance (U.S. Fish and Wildlife Service 2013, Appendix G) to illustrate the calculation of compensatory mitigation for the annual loss of bald and golden eagles caused by windfarm operations. USFWS's REA model is provided in a spreadsheet format. Inputs to the model include maximum lifespan, age of first reproduction, number of years females reproduce, productivity, age distribution of birds killed, productivity of mitigation, and a discount rate (i.e., the rate used in calculating the present value of expected yearly benefits and costs – 3%). This information is used to calculate direct losses, indirect losses, generational impacts, debits, productivity of mitigation, and credits owed. Based on these inputs, the model calculates the total debit in bird-years 1 associated with a specific timeframe. Additionally, USFWS's REA example notes that the REA metric of bird-years lends itself to consideration of other compensatory mitigation options, and implies that with enough reliable information, any compensatory mitigation that directly leads to an increased number of birds could be considered for compensation within the context of the REA (U.S. Fish and Wildlife Service 2013, Appendix G). The result of the REA is a comparison of the debit in bird years from the impact with the suggested benefit in bird years from the mitigation (i.e., the model demonstrates that the debits and the credits are equal).

Table 4.1. Thresholds for the implementation of ADMMs

Species/Group	Project 54 MW est. fatalities/yr	Project Thresholds fatalities/yr
American kestrel	16.2	23.5
Barn owl	1.6	9.6
Burrowing owl	2.7	31.1
Golden eagle	1.7	3.2
Loggerhead shrike	–	7.6
Prairie falcon	–	0.8
Red-tailed hawk	13.5	17.6
Swainson's hawk	–	–
bats	91–212	175.0
Focal species	**34.1**	**75.4**
All raptors	**34.6**	**97.0**
All native non-raptors	**112.9**	**179.6**

4.3 Tiers and Adaptive Management Measures (ADMMs)[7]

If fatality monitoring described in Section 5 results in an estimate that exceeds the preconstruction baseline WT-attributable fatality estimates (Table 4.1) for any focal species or species group (i.e., all focal species, all raptors, all non-raptors) as shown in Table 4.1, the Project will implement the adaptive management program described below, which includes:

> Preparing a project-specific adaptive management plan within two months following the availability of the fatality monitoring results that show a threshold has been exceeded.

> Implementing the project-specific adaptive management plan within two months of approval by the County.

> Tier One is defined as preconstruction WT-attributable fatality estimates of focal species, all raptors, or all other birds combined exceeding the thresholds established in Table 4.1

> Tier Two is defined as WT-attributable fatality of focal species, all raptors, or all other birds combined exceeding thresholds for 2 consecutive years.

> Tier Three is defined as WT-attributable fatality of focal species, all raptors, or all other birds combined exceeding thresholds for 3 consecutive years. The Project will use the best measures available when the plan is prepared in consideration of the specific adaptive management needs. For example, if only one threshold is exceeded, such as golden eagle fatalities, the plan and measures used will target that species. As set forth in other agreements in the APWRA, the Project may also focus adaptive management measures on individual or multiple WTs if those WTs are shown to cause a significantly disproportionate number of fatalities.[8]

[7] ACCDA 2014, page 1188, Appendix F1, page 56
[8] ACCDA 2014, BIO 11i, p 3.4-116-117

4.3.1 Tier 1 Adaptive Management Measures

4.3.1.1 Avian.

ADMM 1 Visual Modifications. If a Tier One threshold is exceeded then the Project will paint 25 percent of the turbine blades in a pattern to be determined by the County in consultation with the TAC. USFWS recommends testing measures to reduce motion smear—the blurring of turbine blades due to rapid rotation that renders them less visible and hence more perilous to birds in flight. Suggested techniques include painting blades with staggered stripes or painting one blade black. The Project shall conduct fatality studies on a controlled number of painted and non-painted turbines. The Project will coordinate with the TAC to determine the location of the painted turbines, but the intent is to install in areas that might have a higher potential for avian impacts.

ADMM 2 Power Pole Retrofits ("PPR"). (FPEIR page E-16, pdf 914; FPEIR 3.4-114, pdf 398; and FPEIR Appendix F1, page 57, pdf 1190) In consultation with the TAC, the Project will pay to retrofit 11 utility poles (the focal species that would benefit from power pole retrofits are only golden eagles and red-tailed hawks) every year for each golden eagle and red-tailed hawk exceeding the baseline WT-attributable fatality thresholds determined by preconstruction estimates and shown in Table 4.1.

4.3.1.2 Bat. If post-construction fatality monitoring results in a point estimate for the bat fatality rate that exceeds the 1.679 fatalities/MW/year threshold by a statistically significant amount, then, in consultation with the TAC, Bat ADMM-7 and Bat ADMM-8 (described below) will be implemented.

ADMMs for bats will be implemented using a stepped approach until necessary fatality reductions are reached. The Project will develop additional ADMMs for bats as new technologies or science supports doing so.

Bat ADMM Threshold

The upper threshold for bat fatalities for the project would be the quantity represented by the upper end of the 95% confidence interval for the fatality distribution from the first year monitoring results from the Vasco wind project (Brown 2013). Measures of the distributions from these fatality quantities from this report are shown in Figure 4.1. The mean of bat fatalities at Vasco Winds was 1.679 fatalities/MW/year and the standard deviation was 0.801 fatalities/MW/year. Assuming the original distribution is normal (the normality of the distribution is indicated by the equal distances from the mean of the lower and upper 80% confidence interval (**"CI"**) limits as shown in Figure 4.1), the threshold is 175 fatalities/MW-year as shown in Equation 4.7:

Equation 4.7:

$T_b = (M_V + 1.96 \times SE_V) \times C_P = (1.679 + 1.96 \times .801) \times 54 = 3.24 \times 54 = 175$ fatalities/MW-year

where:

Tb = bat ADMM threshold
MV = mean of bat fatalities at Vasco
SEV = standard error of bat fatalities at Vasco

This threshold of 175 fatalities/MW-year is shown in Table 4.1.

Table 14. Best estimates of Vasco Winds Area fatality rates based on overall detection rates (D) predicted by body mass and search radius adjustment (d) applied to monitoring results at wind turbines searched with 7 and 28 day intervals.

Species/Group	Adjusted fatalities/MW		Annual project-wide fatalities & 80% CI		
	Mean	SE	Mean	LCL	UCL
Mexican free-tail bat [a]	0.662	0.306	51.8	21.0	82.5
Western red bat	0.131	0.135	10.2	-3.3	23.8
Hoary bat	0.886	0.360	69.3	33.2	105.4
American kestrel	0.297	0.144	23.2	8.8	37.6
American kestrel [b]	0.297	0.144	23.2	8.8	37.6
Burrowing owl	0.050	0.052	3.9	-1.3	9.2
Barn owl	0.033	0.025	2.6	0.1	5.0
Red-tailed hawk [c]	0.246	0.149	19.2	4.3	34.2
Red-tailed hawk [b]	0.213	0.132	16.7	3.4	29.9
Golden eagle [d]	0.016	0.018	1.3	-0.5	3.1
Ruby-crowned kinglet	0.175	0.184	13.7	-4.7	32.1
Rough-winged swallow	0.162	0.170	12.7	-4.3	29.7
Tree swallow	0.151	0.157	11.8	-4.0	27.6
Swallow sp. [a]	0.148	0.155	11.6	-3.9	27.1
Small bird	0.529	0.346	41.4	6.8	76.1
Brewer's blackbird	0.093	0.097	7.3	-2.5	17.0
Virginia rail	0.182	0.399	14.2	-25.8	54.3
Western meadowlark	0.411	0.209	32.1	11.1	53.1
Mourning dove	0.111	0.082	8.7	0.4	16.9
Duck	0.033	0.035	2.6	-1.0	6.1
Gull	0.066	0.052	5.2	-0.1	10.4
Large bird	0.017	0.018	1.3	-0.5	3.1
Double-crested cormorant	0.016	0.018	1.3	-0.5	3.1
All bats	1.679	0.801	131.3	50.9	211.7
All raptors	0.642	0.388	50.2	11.4	89.1
All raptors [b]	0.609	0.371	47.7	10.5	84.8
All birds	2.554	1.911	214.1	-17.6	445.7
All birds [b]	2.521	1.894	211.6	-18.5	441.4

[a] One carcass found incidentally to routine fatality searches.
[b] Omitted 1 American kestrel and 2 red-tailed hawk fatalities that were found in search area that overlapped with the area searched by the Alameda County Monitoring Team at the nearby 120 KW Bonus turbines.
[c] One fatality found 137 m from wind turbine
[d] Found in February 2012, prior to fatality monitoring.

Figure 4.1 Table 14 from the Vasco first-year monitoring report (Brown 2013 p. 39) showing the bat expected fatality rate and standard error of that rate (highlighted in yellow)

Bat-ADMM-7 Seasonal Turbine Cut-in Speed Increase. Cut-in speed increases will be implemented as outlined below, with effectiveness assessed annually.

> The Project will increase cut-in speed to 5.0 m/s from sunset to sunrise during peak migration season (generally August–October). If this is ineffective, the Project will increase turbine cut-in speed by annual increments of 0.5 m/s until target fatality reductions are achieved.

The Project may refine site-specific migration start dates on the basis of pre- and post-construction acoustic surveys and ongoing review of dates of fatality occurrences for migratory bats in the APWRA.

The Project may request a shorter season of required cut-in speed increases with substantial evidence that similar levels of mortality reduction could be achieved. Should resource agencies and the TAC find there is sufficient support for a shorter period (as low as 8 weeks), evidence in support of this shorter period will be documented for the public record and the shorter period may be implemented.

> The Project may request shorter nightly periods of cut-in speed increases with substantial evidence from defensible onsite, long-term post-construction acoustic surveys indicating predictable nightly timeframes when target species appear not to be active. Target species are here defined as migratory bats or any other species appearing repeatedly in the fatality records.

> The Project may request exceptions to cut-in speed increases for particular weather events or wind patterns if substantial evidence is available from onsite acoustic or other monitoring to support such exceptions (i.e., all available literature and onsite surveys indicate that bat activity ceases during specific weather events or other predictable conditions).

> In the absence of defensible site-specific data, mandatory cut-in speed increases will commence on August 1 and continue through October 31, and will be in effect from sunset to sunrise.

Bat ADMM-8 Emerging Technology as Mitigation. The Project may request, with consultation and approval from the agencies, replacement or augmentation of cut-in speed increases with developing technology or another mitigation approach that has been proven to achieve similar bat fatality reductions.

The project proponent may also request the second tier of adaptive management to be the adoption of a promising but not fully proven technology or mitigation method. These requests are subject to review and approval by the TAC and must include a controlled research component designed by a qualified principal investigator so that the effectiveness of the method may be accurately assessed. Some examples of such emerging technologies and research areas that could be incorporated in adaptive management plans are listed below:

> The use of acoustic deterrents (Arnett et al. 2013:1).

> The use of altitude-specific radar, night vision and/or other technology allowing bat use monitoring and assessment of at-risk bat behavior (Johnston et al. 2013: 90-91) if research in these areas advances sufficiently to allow effective application of these technologies.

> Application of emerging peer-reviewed studies on bat biology (such as studies documenting

migratory corridors or bat behavior in relation to turbines) that support specific mitigation methods.[9]

4.3.2 Tier 2 Adaptive Management Measures

In addition to implementing Tier 1 ADMMs, the Project will implement the following:

ADMM 3 Anti-perching Measures. In consultation with the TAC, anti-perching devices may be considered on select artificial structures (excluding utility poles) within 1 mile of the Project footprint.

ADMM 4 Contribution to Research. To compensate for ongoing WT-attributable bird fatalities, the Project will contribute annually $2,000 for each WT-attributable bird fatality exceeding thresholds listed in Table 4.1 (FPEIR Appendix F1 page 57, pdf page 1190) up to an annual limit of $28,350 (calculation shown in Equation 4.7) in support of research of new technologies to help reduce WT-related fatalities. Similarly, the Project could deploy experimental technologies at a comparable cost (if appropriate innovations become available) at its facilities to test their efficacy in reducing WT-related fatalities through before after-control impact (**"BACI"**) methods.

Following the example of the Golden Hills ABPP (CH_2MHill 2015), the upper limit on donations is calculated as shown in Equation 4.8.

Equation 4.8:

$$RC_{AUL} = {(GH_{c/MW} \times P_c)}/{P_t} = {(\$10{,}500 \times 54)}/{20} = \$28{,}350$$

where:

RC_{AUL} =	upper limit of annual contribution to research
$GH_{c/MW}$ =	Golden Hills Project contribution per MW for total term of project
P_c =	Project rated capacity, MW
P_t =	Project life in years

The Project will pay 50% of the total fees to the California Energy Commission's Public Integrated Energy Research Program (**"PIER"**) for scientific research on the effects of WTs on birds at the APWRA; and 50% of the total fees shall be paid to a fund to be administered by the East Bay Regional Park District (**"EBRPD"**) and the Livermore Area Regional Park District (**"LARPD"**) for conservation efforts for the benefit of those bird species and their habitat in the greater area encompassed by and surrounding the APWRA.

4.3.3 Tier 3 Adaptive Management Measures

In addition to implementing Tier 1 and Tier 2 ADMMs, the Project will implement the following:

ADMM 5 WT Curtailment. (FPEIR Appendix F1, page 57, pdf page 1190) If the post-construction monitoring indicates patterns of turbine-caused fatalities, such as time of day, avian usage, topographic circumstances of the turbine location, or other data which would clearly

[9] ACCDA 2014, BIO-14d, PEIR pp. 3.4-135-137

substantiate that a specific curtailment of a turbine's operation would result in reducing future avian fatalities, the Project operator would curtail the offending WT or WTs. Curtailment restrictions would be developed in coordination with the TAC and based on current avian use data at the Project site.

ADMM 6 Cut-in Speed Study. (FPEIR Appendix F1, page 57, pdf page 1190) A statistically valid (e.g., BACI) six month cut-in-speed study will be conducted to see if changing cut-in speeds from 3 meters per second to 5 meters per second will significantly reduce avian fatalities. The Project will coordinate with the TAC in designing the study. Should the study show that increasing the cut-in speed has significant positive results, and bird fatalities continue to exceed thresholds, cut-in speed restrictions will be implemented.

ADMM 7 Real-Time Turbine Curtailment. (FPEIR Appendix F1, page 57, pdf page 1190) This monitoring approach involves a multiple step process based on radar, video, and visual observations to employ real-time WT curtailment. In effect, an onsite biologist or trained personnel will monitor raptors at the Project site. The trained personnel will make observations during daylight hours, initially locating and tracking raptors by way of radar technology, then identifying and observing flight direction of the raptors using video cameras and binoculars. Once visually located, the biologist will use video tracking software to maintain a lock on the raptor until it has moved away from the site and is no longer in view. If the target is projected to intersect a turbine, a curtailment command will be sent to the operations center for the appropriate WT(s).

4.4 Potential Mortality or Disturbance of Bats from Roost Removal or Disturbance

Construction and decommissioning of WTs could result in disturbance or loss of active bat roosts through increased traffic, noise, lighting or human access. Removal or disturbance of trees, rock outcrops, debris piles, outbuildings, or other artificial structures could result in removal of roost habitat and mortality of bats using the structure as a roost. Several species of bat are sensitive to disturbance and may abandon flightless young, or they may simply not return to the roost once disturbed, resulting in the loss of that roost as habitat for the local population. Because some bats roost colonially, removal of special-status species' roost structures in a roost-limited habitat could result in the loss of a significant portion of the local bat population. This would be a significant impact. Implementation of FPEIR Mitigation Measures BIO-1b, BIO-3, BIO-12a and BIO-12b would reduce this impact to a less-than-significant level.

4.4.1 FPEIR Mitigation Measure BIO-1b. Implement best management practices to avoid and minimize impacts on special-status species

4.4.2 FPEIR Mitigation Measure BIO-3. Conduct pre-construction surveys for habitat for special-status wildlife species. (Completed, see the FPEIR, Appendix C2 East Alameda County Conservation Strategy Mitigation Ratios and Locations)

4.4.3 FPEIR Mitigation Measure BIO-12a. Conduct bat roost surveys

Prior to development of the Project, a qualified bat biologist will conduct a roost habitat assessment to identify potential colonial roost sites of special-status and common bat species within 750 feet of the construction area. If suitable roost sites are to be removed or otherwise affected by the Project, the bat biologist will conduct targeted roost surveys of all identified sites that would be affected. Because bat activity is highly variable (both spatially and temporally) across the landscape and may move unpredictably among several roosts, several separate survey visits may be required. Surveys will be repeated at different times of year if deemed necessary by the bat biologist to determine the presence of seasonally active roosts (hibernacula, migratory stopovers, maternity roosts). Appropriate field methods will be employed to determine the species, type, and vulnerability of the roost to construction disturbance. Methods will follow best practices for roost surveys such that species are not disturbed and adequate temporal and spatial coverage is provided to increase likelihood of detection.

Roost surveys will consist of both daylight surveys for signs of bat use and evening/night visit(s) to conduct emergence surveys or evaluate the status of night roosts. Survey timing will be adequate to account for individual bats or species that might not emerge until well after dark.

Methods and approaches for determining roost occupancy status will include a combination of the following components, as the biologist deems necessary, for the particular roost site:

> Passive and/or active acoustic monitoring to assist with species identification.

> Guano traps to determine activity status.

> Night-vision equipment.

> Passive infrared camera traps.

At the completion of the roost surveys, a report will be prepared documenting areas surveyed, methods, results, and mapping of high-quality habitat or confirmed roost locations.

4.4.4 FPEIR Mitigation Measure BIO-12b. Avoid removing or disturbing bat roosts.

> Active bat roosts will not be disturbed, and will be provided a minimum buffer of 500 feet where preexisting disturbance is moderate or 750 feet where preexisting disturbance is minimal. Confirmation of buffer distances and determination of the need for a biological monitor for active maternity roosts or hibernacula will be obtained in consultation with CDFW. At a minimum, when an active maternity roost or hibernaculum is present within 750 feet of a construction site, a qualified biologist will conduct an initial assessment of the roost response to construction activities and will recommend buffer expansion if there are signs of disturbance to the roost.

> Structures (natural or artificial) showing evidence of significant bat use within the past year will be left in place as habitat wherever feasible. Should such a structure need to be removed or disturbed, CDFW will be consulted to determine appropriate buffers, timing and methods, and compensatory mitigation for the loss of the roost.

> The Project will provide environmental awareness training to construction personnel, establish buffers, and initiate consultation with CDFW if needed.

> Artificial night lighting within 500 feet of any roost will be shielded and angled such that bats may enter and exit the roost without artificial illumination and the roost does not receive artificial exposure to visual predators.

> Tree and vegetation removal will be conducted outside the maternity season (April 1–September 15) to avoid disturbance of maternity groups of foliage-roosting bats.

> If a maternity roost or hibernaculum is present within 500 feet of the construction site where preexisting disturbance is moderate or within 750 feet where preexisting disturbance is minimal, a qualified biological monitor will be onsite during groundbreaking activities.

4.4.5 Potential of construction activities to temporarily affect bat foraging habitat

Construction of the Project could degrade bat foraging habitat by replacing vegetation with non-vegetated land cover types. Project construction would create a temporary increase in traffic, noise, and artificial night lighting in the Project area, reducing the extent of landscape available for foraging. However, the amount of landscape returned to foraging habitat in the process of decommissioning the first-and second-generation turbines would offset the amount of foraging habitat lost to repowering activities. This impact would be less than significant. Therefore, no mitigation is required.

5. POST-CONSTRUCTION MONITORING

A post-construction monitoring program will be conducted at the Project for 3 years, beginning on the Project Commercial Operation Date (**"COD"**). Moreover, if the results of the first 3 years indicate that baseline WT-attributable fatality rates (i.e., non-repowered WT-attributable fatality rates) are exceeded, monitoring will be extended until the average annual WT-attributable fatality rate has dropped below baseline WT-attributable fatality rates for 2 years, and to assess the effectiveness of adaptive management measures specified in FPEIR Mitigation Measure BIO-11i and discussed below. An additional 2 years of monitoring will be implemented at year 10 (i.e., the 10th anniversary of the COD). The Project will provide access to qualified third parties authorized by the County to conduct any additional monitoring after the initial 3-year monitoring period has expired and before and after the additional 2-year monitoring period, provided that such additional monitoring utilizes scientifically valid monitoring protocols.

A technical advisory committee (**"TAC"**) will be formed to oversee the monitoring program and to advise the County on adaptive management measures that may be necessary if WT-attributable fatality rates substantially exceed the thresholds for the Project as shown in Table 4.l.

As discussed in FPEIR BIO-11i, the TAC will have a standing meeting, which will be open to the public every 6 months, to review monitoring reports produced by operators in the program area. In these meetings, the TAC will discuss any issues raised by the monitoring reports and recommend to the County next steps to address issues.

The TAC will comprise representatives from the County (including one or more technical consultants, such as a biostatistician, an avian and/or bat biologist), and wildlife agencies (CDFW, USFWS). Additional TAC members may also be considered (e.g., a representative from Audubon, a landowner in the program area, a representative of the operators) at the discretion of the County. The TAC will be a voluntary and advisory group that will provide guidance to the County Planning Department. To maintain transparency with the public, all TAC meetings will be open to the public, and notice of meetings will be given to interested parties.

The TAC will have three primary advisory roles: (1) to review and advise on project planning documents (i.e., project-specific ABPPs) to ensure that project-specific mitigation measures and compensatory mitigation measures described in this PEIR are appropriately and consistently applied, (2) to review and advise on monitoring documents (protocols and reporting) for consistency with the mitigation measures, and (3) to review and advise on implementation of the adaptive management plans.

Should fatality monitoring reveal that impacts exceed the baseline thresholds established in this PEIR, the TAC will advise the County on requiring implementation of adaptive management measures as described in Mitigation Measure BIO-11i. The County will have the decision-making authority, since it's the organization issuing the CUPs. However, the TAC will collaboratively review and inform its decisions with the County.

Operators are required to provide for avian use surveys to be conducted within the project area boundaries for a minimum of 30 minutes duration. Surveyors will be qualified and trained and subject to approval by the County.

Carcass surveys will be conducted at every turbine for projects with 20 or fewer turbines. For projects with more than 20 turbines, such surveys will be required at a minimum of 20 turbines, and a sample of the remaining turbines may be selected for carcass searches. The operator will be required to demonstrate that the sampling scheme and sample size are statistically rigorous and defensible. Where substantial variation in terrain, land cover type, management, or other factors may contribute to significant variation in WT-attributable fatality rates, the sampling scheme will be stratified to account for such variation. The survey protocol for sets and subsets of turbines, as well as, proposed sampling schemes that do not entail a search of all turbines, must be approved by the County in consultation with the TAC prior to the start of surveys.

The search interval will not exceed 15 days for the minimum of 20 turbines to be surveyed; however, the search interval for the additional turbines (i.e., those exceeding the 20-turbine minimum) that are to be included in the sampling scheme may be extended up to 30 days or longer if recommended by the TAC.

The estimation of detection probability is a rapidly advancing field. Carcass placement trials, broadly defined, will be conducted to estimate detection probability during each year of monitoring. Sample sizes will be large enough to potentially detect significant variation by season, carcass size, and habitat type.

5.1 General Monitoring Approach

The primary objective of post-construction avian and bat monitoring is to estimate the annual number of avian and bat fatalities attributable to the Project. As sample size permits, we will also assess whether WT-attributable fatality rates vary temporally or spatially within the Project.

The Project’s approach to avian and bat post-construction monitoring plan is based on the March 4, 2010 Wind Turbine Guidelines Advisory Committee recommendations (USFWS 2010) and the March 2012 USFWS Final Land-Based Wind Energy Guidelines (USFWS 2012b), which recommend the following:

> Depending on the level of bird and bat WT-attributable fatality risk identified during preconstruction surveys, post-construction surveys should initially be performed for 1 to 2 or

more years. Additional years of survey may be performed, based upon the results of the initial post-construction surveys.

> For wind projects containing more than 10 WTs, a sufficient number of WTs should be surveyed.

> WTs should be surveyed during all seasons.

> Survey area should have a radius of half the WT height for bat species, and a width of twice the WT height for avian species, with a minimum search area 120 meters in width around WTs.

> Survey transects should occur at an interval of 3 to 10 meters apart.

> During searches conducted at WTs, actual fatalities are incompletely observed, so carcass counts must be adjusted by some factor that accounts for searcher detection rates (efficiency) and removal of carcasses by scavengers.

The Project's monitoring approach consists of three primary components: (1) standardized carcass searches, (2) searcher efficiency trials, and (3) carcass removal trials. During searches conducted at WTs, actual fatalities are incompletely observed, so the USFWS Guidelines recommend adjusting carcass counts by a correction factor that accounts for searcher detection rates (efficiency) and removal of carcasses by scavengers. If searcher efficiency (i.e., imperfect detection), and carcass removal (i.e., decomposition and removal by scavengers), are not accounted for, carcass searches underestimate mortality at WTs (USFWS 2011). To minimize potential bias, we will use methodology developed by Huso (2010) for use at wind power facilities. The total quantities of avian and bat WT-related fatalities will be estimated by adjusting for carcass removal bias, searcher efficiency bias, and sampling effort. The Project will classify carcasses into WT-related and non-WT-related fatality categories.

The monitoring will be conducted for a three-year period. The results of years one and two will be used to determine the level of subsequent survey effort needed.   Annual reports will communicate all bird and bat fatalities observed, overall bird and bat fatality estimates, a comparison of WT-attributable fatality rates with rates at other existing wind projects, and an assessment of whether fatalities vary in relation to site characteristics within the Project area. Areas identified as high mortality locations will be documented and further evaluations will be determined as necessary. Following the final year of monitoring, the Project will provide a final report compiling the results of all years of monitoring. The larger sample size available for the combined-years data will likely enable a greater depth of insight into questions, such as, whether fatalities vary in relation to site characteristics within the Project, and whether there are seasonal or inter-annual differences in WT-attributable fatality rates.

Additional sources of avian and bat fatality, such as, transmission lines and background fatalities, are not part of this post-construction monitoring effort. In order to defray survey costs, one survey technician will be provided by the Project staff. The Project's technician will conduct carcass search surveys concurrently with a biological technician. Conversations among the Project, the California Department of Fish and Wildlife (**"CDFW"**), and USFWS will be used to further refine monitoring goals and adapt the monitoring plan, if needed.

5.1.1 Post-construction bat fatality monitoring program. The Project will implement a scientifically defensible, post-construction bat fatality monitoring program to estimate actual bat fatalities and determine if additional mitigation is required. The Project will develop bat-specific modifications to the 3-year post-construction monitoring program described in this section, in accordance with CEC 2007, and with appropriate recommendations from California Bat Working Group guidelines (2006), which will be implemented.

In addition to the avian monitoring outlined in this section, the following two bat-specific requirements will done:

> Include on the TAC at least one biologist with significant expertise in bat research and wind energy impacts on bats.

> Conduct bat acoustic surveys concurrently with fatality monitoring in the Project area to estimate nightly, seasonal, or annual variations in relative activity and species use patterns, and to contribute to the body of knowledge on seasonal bat movements and relationships between bat activity, environmental variables, and WT-related fatalities. Should emerging research support the approach, these data may be used to generate site-specific predictive models to increase the precision and effectiveness of mitigation measures (e.g., the season-specific, multivariate models described by Weller and Baldwin 2011:11). Acoustic bat surveys will be designed and data analysis conducted by qualified biologists with experience in acoustic bat survey techniques. Methods will be informed by the latest available guidelines (California Energy Commission guidelines, 2007); California Bat Working Group guidelines, 2006), except where best available science supports technological or methodological updates. High-quality, sensitive acoustic equipment will be used to produce data of sufficient quality to generate species identifications. Survey design and methods will be scientifically defensible and will include, at a minimum, the following elements:

> Acoustic detectors will be installed at multiple stations to adequately sample range of habitats in the project area for both resident and migratory bats. The number of detector arrays installed will incorporate emerging research on the density of detectors required to adequately meet sampling goals and inform mitigation approaches (Weller and Baldwin 2011:10).

> Acoustic detector arrays will sample multiple airspace heights, including as close to the rotor swept area as possible. Vertical structures used for mounting may be pre-existing or may be installed for the Project (e.g., temporary or permanent meteorological towers).

> Surveys will be conducted such that data are collected continuously from early July to early November to cover the activity transition from maternity to migration season and determine if there is elevated activity during migration. The survey season may be adjusted to more accurately reflect the full extent of the local migration season and/or season(s) of greatest local bat fatality risk, if scientifically sound data support doing so.

> Anticipated adaptive management goals, such as determining justifiable timeframes to reduce required periods of cut-in speed adjustments, will be reviewed with the TAC and incorporated in designing the acoustic monitoring and data analysis program.

> Modifications to the fatality search protocol will be implemented to obtain better information on the number and timing of bat fatalities (e.g., Johnston et al. 2013:85). Modifications will include decreases in the transect width and search interval for a period of time coinciding with high levels of bat mortality, i.e., the fall migration season (roughly August to early November, or as appropriate in the view of the TAC). In consultation with the TAC, the Project will determine

the nature of bat-specific transect distance and search intervals. This determination will be guided by scientifically sound and pertinent data on rates of bat carcass detection at wind energy facilities (e.g., Johnston et al. 2013:54–55) and site-specific data from APWRA repowering project fatality monitoring programs as these data become available.

The Project may consider other methods to achieve the goals of the bat fatality monitoring program while avoiding prohibitive costs subject to approval by the TAC, if these methods have been peer reviewed and evidence indicates the methods are effective. For example, if the Project wishes to have the option of altering search methodology to a newly-developed method, such as searching only roads and pads (Good et al. 2011:73), it will concurrently conduct a statistically robust field study to index the results of the methodology against standard search methods to ensure site-specific, long-term validity of the new methods.

Detection probability trials will utilize bat carcasses to develop bat-specific detection probabilities. Care will be taken to avoid introducing novel disease reservoirs; such avoidance will entail using onsite fatalities or using carcasses obtained from within a reasonably-anticipated flight distance for that species.

Finally, the Project will revise bat monitoring methods as needed to ensure accurate measurement of the effectiveness of the bat ADMMs.

5.2 Definitions and Field Methods

5.2.1 Selection and Delineation of Carcass Search Plots. The Project proposes to perform three years of surveys, with a random sample of a minimum of 20 WTs surveyed the first year and another random sample of nine WTs, with replacement, surveyed during year two, and another third random sample of nine WTs, with replacement, during year three. Sampling with replacement each year will allow the possibility of re-sampling one or more WTs, which would provide valuable information on inter-annual variability. A 200 m x 200 m plot (9.8 acres) will be centered on each WT, and will be orientated to the prevailing winds. Avian and bat searches will be conducted concurrently, along transects walked at 10-meter intervals within the plots. If the vegetation is too dense to achieve an adequate detection rate, transect intervals may need to be adjusted accordingly during one or more seasons each year.

Depending on location, various WTs may experience different WT-attributable fatality rates. For several potential risk factors which may influence avian and bat fatalities, see Table 5.1. In addition to providing an estimate of total Project fatalities, the field data will allow fatalities to be compared among WTs and assess various risk factors specific to each WT.

5.2.2 Scheduling/Timing. The post-construction monitoring surveys will commence following completion of construction and achievement of commercial operation of the Project. As described above, the Project will conduct the monitoring for a three-year period with a random sample of WTs surveyed each year. Surveys will be timed to capture spring and fall migration, breeding season, and the winter. Specific timing of surveys within each season will depend on weather, breeding, and migration phenology of bird and bat populations, and logistics (i.e., winter rains). For each of the three years, 26 rounds of surveys will be conducted at each of the nine sampled WTs at approximately one-month intervals.

5.3 Standardized Carcass Searches

The Project's objective is to systematically search for avian and bat fatalities that are attributable to collision with WTs.

Qualified biological field personnel will conduct each round of surveys; one will be a biological technician, and one technician will be provided by the Project staff. Within each 200 m x 200 m WT-centered plot, an observer will search for carcasses along 20 pre-established, parallel transects, spaced 10 m apart. If the vegetation is too dense to achieve an adequate detection rate, the Project may adjust transect intervals accordingly during one or more seasons each year. The detection rate will be evaluated based on searcher efficiency trials conducted each season.

The observer will walk at a rate of approximately 60 meters per minute (2.25 mph) along each transect, searching both sides out to five meters for carcasses. A consistent pace will be maintained to minimize variability in search effort. For each plot surveyed, observers will record date, WT, start and end times of survey, observer name, and quantity of carcasses found. The Project will record additional data for each carcass it finds during surveys including; species, sex, age, location of the carcass in UTM-NAD83, distance and azimuth from WT, habitat surrounding carcass, and condition of carcass. The condition of each carcass found will be recorded using the following condition categories:

Table 5.1 Wind Energy Biological Risk Factors

Risk Analysis Factor	Significance
Existing habitat/land use	Habitat and land use pose a risk because birds and bats are attached to and use various habitats and they are not expecting to have to adjust their flights to avoid the new impediment(s).
Wetland habitat	Wetlands are important ecological resources to birds and bats, and if WTs are located in a wetland, it increases the risk to birds taking off or landing, especially at night when there is less visibility.
Adjacent wetland or marsh	Wetlands are important ecological resources to birds and bats, and if WTs are located near a wetland, it increases the risk to birds and bats taking off, landing, foraging, and migrating at angles incompatible with WT distance and height.
Adjacent water body	Water is an important ecological resource to birds and bats, and if WTs are too close, it increases the risk to birds and bats taking off, landing, foraging, and migrating at angles incompatible with wind WT distance and height.
Valley or canyon crossing	Valleys and canyons are often used by migrating birds and bats, and if WTs strings are perpendicular to the direction of parallel movement along canyons, it poses a collision risk to any birds and bats which are passing through, especially at night when there is less visibility.
Wind direction	Strong winds may push birds and bats out of their flight paths, and if WTs are perpendicular to prevailing winds, it increases the risk that a bird and/or bat will be pushed into the WTs.
Wind speed	Pope et al. (2006) found that at wind speeds of 15.5 mph, lower numbers of daily avian migrants were observed.
Habitat separation	Water bodies and agricultural lands are both habitats necessary for life stages of avian and bat species. If WTs are constructed between different habitats such as these, it poses a risk to birds and bats which may be flying between the two, especially if there is only a short distance because of the lower flight heights during these activities.
Adjacent to ridgeline	Raptors use thermal updrafts near ridgelines in order to achieve an appropriate soaring height. WTs running near or on ridgelines may pose risks to birds using winds for their migratory paths.
Adjacent to river corridor or valley	Valleys and canyons are often used by migrating birds and bats, and if WTs are near or on a valley or canyon floor, it may pose a risk to birds and bats flying through.
Adjacent to cliffs	Certain birds, such as golden eagles, use cliff faces for nesting. If WTs are located near cliffs, it may pose a risk to adults or young coming from or going to the nest.

> Injured - animal is alive, but injured.

> Intact – a carcass that is completely intact, is not badly decomposed, and shows no sign of being fed upon by a predator or scavenger.

> Partial - a portion of a carcass (e.g. wings, skeletal remains, legs, pieces of skin, etc.)

> Scavenged – a carcass that shows signs of being fed upon by a (vertebrate) scavenger

> Decomposed - a carcass that is badly decomposed or scavenged by invertebrates

> Feather Spot - 10 or more feathers or two or more primaries.

The Project will collect photographic documentation of each carcass (if found), place the carcass in a labeled plastic bag, and provide both to agencies, as necessary/directed.

Collection of carcasses will be coordinated with the USFWS and CDFW, and appropriate collection permits will be obtained from the CDFW and the USFWS. Carcasses found in non-search areas will be treated as incidental discoveries. Incidental fatalities will be reported on an annual basis and the cause of death will be documented to the extent possible.

If the Project finds an injured golden eagle, it will notify the USFWS and a trained technician will carefully capture and transport the injured animal to Lindsay Wildlife Hospital in Walnut Creek, California.

5.4 Searcher Efficiency and Carcass Removal Trials

Unless unavailable or not transferrable to the Project, we will apply the results of searcher efficiency and carcass removal trials conducted at NextEra's Vasco Winds project (assuming, as appears to be the case [Brown 2013], that the Vasco project used searchers with similar experience and skill and that that the habitats and scavenger populations were similar to those of the Project), to this Project's post-construction monitoring.

5.5 Statistical Analysis and Reporting

The Project recognizes that it's not possible to detect 100% of fatalities. Factors that have the potential to bias WT-attributable fatality estimates include (1) decomposition and removal by scavengers and (2) imperfect ability of observers to detect carcasses. To control for these factors, the Project will use statistical methodology developed for use at wind power facilities (Huso 2010). The resulting unbiased estimate of fatalities will be derived from three components: (1) number of carcasses found during searches, (2) searcher efficiency expressed as the proportion of planted carcasses found by searchers, and (3) removal rates expressed as the average length of time a carcass is expected to remain in the study area and be available for detection by the searchers. As recommended in the September 18, 2011 USFWS Draft Land-Based Wind Energy Guidelines, the overall WT-attributable fatality rates will be expressed as fatalities per MW of nameplate capacity per year.

Each year, the Project will produce an annual report addressing tier four questions outlined in the March 4, 2010 Wind Turbine Guidelines Advisory Committee Recommendations (USFWS 2010) and the September 13, 2011 USFWS Draft Land-Based Wind Energy Guidelines. The reports will communicate all bird and bat fatalities observed, overall bird and bat WT-attributable fatality estimates, a comparison of WT-attributable fatality rates with rates at other existing wind projects, and an assessment of whether fatalities vary in relation to site characteristics within the Project area. Following the final year of monitoring, the Project will provide a final report synthesizing the results of all three years of monitoring. The larger sample size available for the combined-years data will likely enable a greater depth of insight into questions such as whether fatalities vary in relation to site characteristics within the Project, and whether there are seasonal or interannual differences in WT-attributable fatality rates.

5.6 Wildlife Reporting System

The Project staff will observe the surrounding area of each WT for birds and bats before entering the WTs to perform routine work. Personnel will perform visual scans around the perimeter of the WT when dispatched to WTs to perform operational duties.

When a dead or injured bird or bat is found during routine site activities, the wind-plant manager will be informed and photos will be taken of the specimen. The photos will be filed according to date and nearest WT to the specimen.

If the Project staff finds an injured golden eagle, it will notify the USFWS and a trained technician will carefully capture and transport the injured animal to Lindsay Wildlife Hospital in Walnut Creek, California.

6. ENVIRONMENTAL BENEFITS OF WIND POWER

6.1 Self-Mitigation

All means of generating electricity have environmental effects, and wind energy satisfies the societal need for electrical power at the lowest overall impact levels to human and animal health, as well as, to the overall environment. (Sovacool 2012). Specifically, wind power produces no air or water pollution and facilitates a net *reduction* in such externalities by offsetting toxic pollutants that would otherwise be generated by extracting, transporting, and burning fossil fuels.

In a real and quantifiable way, the Summit wind power project mitigates the negative environmental impacts of electricity generation generally, and in so doing, its operation helps prevent disease and premature death in humans and animals, including birds.

6.1.1 Avoided Emissions and Climate Considerations. The fundamental benefit of the Project is the significant reduction of toxic air pollution and climate change-causing greenhouse gases, achieved by offsetting/avoiding the use of fossil fuels to generate electrical power. In the absence of the Project, enormous amounts of fossil fuels, mostly natural gas, would be extracted, transported, and burned to generate electricity. Each stage in this process produces significant toxic emissions into area air and water. Comparatively, wind energy has the lowest lifecycle greenhouse gas emissions of any electricity source. (Jacobson 2009).

Prorating the calculations in McCubbin and Sovacool (2011) shows that over 20 years, the Project's wind power generation will offset and avoid a total estimated:

> 4.19 billion lbs. of greenhouse gas emissions, such as CO_2

> 20,000 lbs. of SO_2
> 4.3 million lbs. of NO_X
> 163,000 lbs. of fine particulate matter ($PM_{2.5}$)

These toxic and greenhouse emissions and the resulting health and climate change effects pose population-level threats to numerous species of birds, bats, and other wildlife, as discussed further in the following section. These emissions also have a staggering effect on human health and well-being. Numerous studies have found a strong link between the inhalation of air pollutants, particularly fine particulate matter ($PM_{2.5}$), and a number of human illnesses, including cardiovascular disease and stroke (Kettunen, et al. 2007; Brook, et al. 2002; Samet, et al. 2000). In 2010, the American Heart Association published a Scientific Statement providing a consensus opinion that, among other conclusions, short and long-term $PM_{2.5}$ exposure reduces life expectancy. In the McCubbin and Sovacool (2011) analysis of the Project, it was found that, by preventing the emissions of the harmful pollutants discussed above, the Project will prevent disease, premature death, and unproductivity due to ill health, as shown in Table 6.1 below.

Table 6.1 Average Health Impact Savings, 20 yr period

Health Effect	Forecast Quantity	Average Cost
mortality due to $PM_{2.5}$	10	$86,121,000
heart attacks	6	$898,000
asthma exacerbation	94	$6,000
lost work days	638	$63,000
minor restricted activity days	3,910	$284,000
TOTAL		**$87,451,000**

6.1.2 Benefits to Avian and Other Wildlife. While certain poorly-sited WTs can pose an unacceptable risk to individual birds, McCubbin and Sovacool (2011) have shown that overall, the benefits to bird and bat populations provided by the Project will likely save more avian lives than it adversely impacts. As discussed above, the Project will offset and avoid more than 4 billion pounds of toxic air pollutants/emissions throughout its 20-year life cycle. McCubbin and Sovacool (2011) estimate that the reduction/displacement in natural gas usage from this Project will prevent/avoid approximately 8,000 premature bird deaths over the next 20 years from reduced exposure to air pollutants and through reduction of climate change effects. Assuming these benefits are equally distributed across each year, the Project will prevent 388 premature avian deaths each year it operates.

Avian fatalities related to WTs have received far more attention and scrutiny than avian and other wildlife fatalities resulting from other forms of electricity generation, most likely because the fossil-fuel plant impacts on avian life are often remote and difficult to quantify. In other words, birds don't usually die at the base of the fossil-fired power plant; rather, they die from toxic air emissions or climate changes and then fall wherever they may be flying or nesting at the time of death. Avian deaths at traditional power plants result from a number of factors, including acid rain, smokestack collisions, mercury poisoning and contamination, and habitat destruction. For example, mountain top removal, for the purpose of coal extraction in just four states in the eastern U.S., destroyed more than 387,000 acres of mature, forested avian habitat, causing the loss of nearly 200,000 Cerulean Warblers (Winegrad 2004).

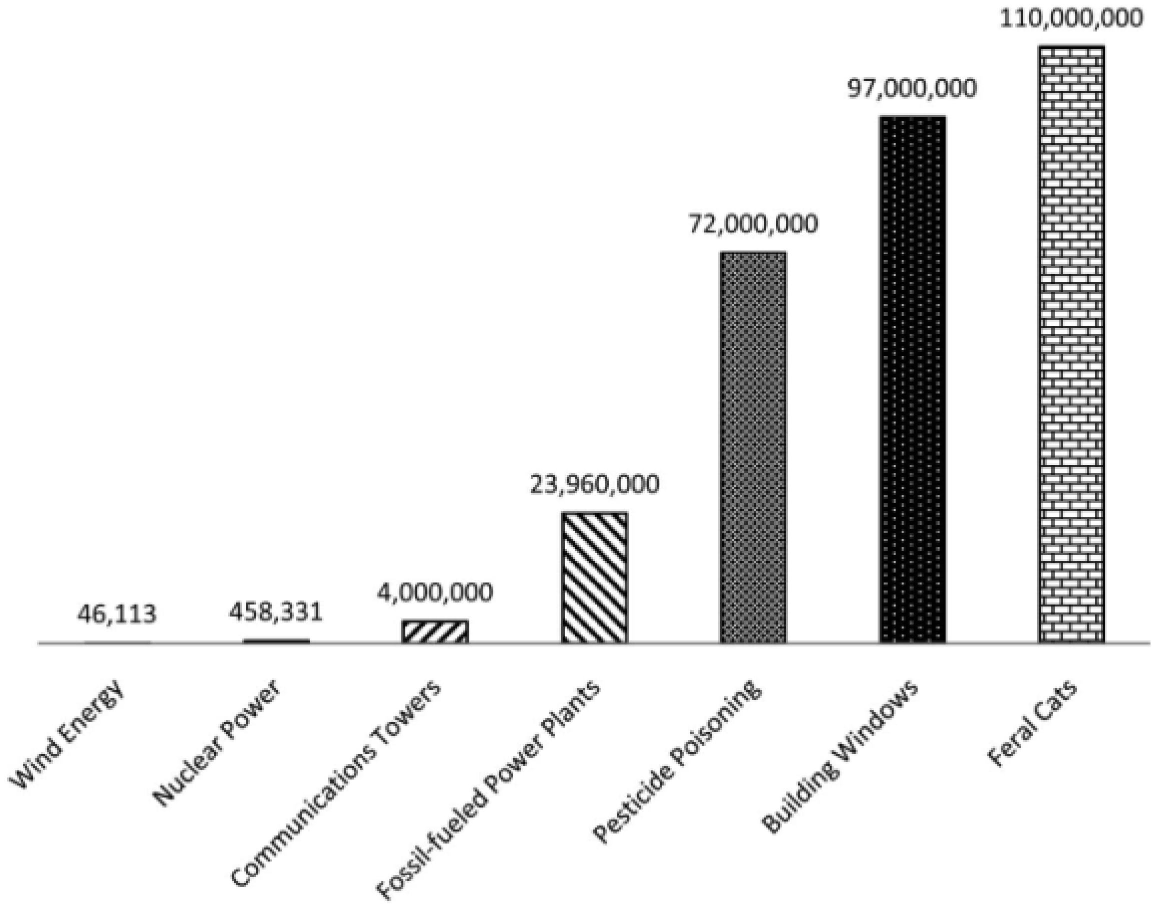

Figure 6.1. Avian deaths per year in the United States from various energy and non-energy sources, 2009. (Sovacool 2012, Figure 2)

Most significantly, climate change effects caused by toxic byproducts/greenhouse gas emissions of most non-wind forms of electricity generation pose population-level threats to numerous wildlife species, including birds and bats, both locally and worldwide. One study estimates that based on midrange predictions of climate warming, 15% to 37% of all species will be “committed to extinction” by 2050 due to rising sea levels and habitat destruction. (Thomas 2004). For avian species, climate change and resulting habitat loss could devastate between 950 and 1800 bird species by the end of the century (Jetz 2007).

In short, evidence suggesting a negative environmental effect of wind power facilities is in need of proper contextualization. Of major commercially available electricity generating technologies, wind energy is the least impactful. Here's one quote on this subject:

> “Whether looking at absolute avian fatalities or fatalities per unit of energy delivered, this article has demonstrated that nuclear power and fossil fuels are hazardous to birds and that, contrariwise, wind energy is far less harmful to wildlife. To recap, about 46,000 avian mortalities were associated with wind farms across the United States in 2009 but nuclear plants killed about 458,000 and fossil-fueled power plants almost 24 million, estimates illustrated by Figure 6.1. Figure 6.1 also reveals how the number of absolute birds killed by wind energy pales in comparison to other causes such

> as windows and cats. Regardless of where the wind turbines are located, by minimizing reliance on fossil fuels and nuclear power, they prevent the death and injury of wildlife that would otherwise occur across the world's coal mines, uranium tail ponds, oil refineries, natural gas facilities, uranium acidified forests, polluted lakes, and habitats soon to be threatened by climate change." (Sovacool 2012)

It should also be noted that a newer study (Loss et a. 2013) estimates feral cat bird kills at 1.3 to 4.1 billion, far more than the 110 million shown in Figure 6.1

6.2 Adaptive Management and Mitigation

Adaptive management is an iterative process in which impact minimization and mitigation measures are continuously reevaluated in order to improve them. As action is taken, the results are monitored and future actions are modified accordingly.

We are committed to incorporating adaptive management principles into Project operations. To facilitate the adaptive management process further, the Project will submit timely reports to USFWS and CDFW summarizing results of post-construction monitoring.

The Project provides significant health, wildlife, and climate benefits through the generation of clean, renewable wind power via the displacement/avoidance of toxic air pollution from fossil-fired plants. Any decisions about the potential need for additional mitigation measures must take into account the intrinsic mitigation provided by the air and water quality benefits inherent in the production of wind energy.

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ATTACHMENT A7: FINAL JURISDICTIONAL DELINEATION REPORT

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August 29, 2014

ALTAMONT WINDS LLC

Summit Wind Repower Project

Final Jurisdictional Delineation Report

PROJECT NUMBER:
133377

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POWER ENGINEERS

Final Jurisdictional Delineation Report

PREPARED FOR: *ALTAMONT WINDS LLC*
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TABLE OF CONTENTS

FIGURES:

TABLE:

APPENDICES:

ACRONYMS AND ABBREVIATIONS

Applicant	Altamont Winds LLC
APWRA	Altamont Pass Wind Resource Area
Co-Op	National Weather Service Cooperative Station
CUPs	Conditional Use Permits
HU	Hydrologic Unit
MW	megawatts
NHD	National Hydrography Dataset
NRCS	National Resources Conservation Service
NWI	National Wetland Inventory
O&M	operation and maintenance
OHWM	Ordinary High Water Mark
PEMCh	Palustrine emergent, seasonally flooded; diked/impounded
PEMFh	Palustrine emergent, semipermanently flooded; diked/impounded
PEMHh	Palustrine emergent, permanently flooded; diked/impounded
PFOCH	Palustrine forested, seasonally flooded; diked/impounded
Plan	Alameda County, East County Area General Plan
POWER	POWER Engineers, Inc.
Project	Summit Wind Repowering Project
PSSB	Palustrine scrub-shrub, saturated
PSSCH	Palustrine scrub-shrub, seasonally flooded; diked/impounded
PUBFh	Palustrine unconsolidated bottom, semipermanently flooded; diked/impounded
PUBHh	Palustrine unconsolidated bottom, permanently flooded; diked/impounded
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey
WRCC	Western Regional Climate Center

1.0 INTRODUCTION

At the request of Altamont Winds LLC. (Applicant), POWER Engineers, Inc. (POWER) conducted a delineation of wetlands and other waters for the Summit Wind Repower Project (Project). The project site (Study Area) is located in northeastern Alameda County, California approximately six miles northeast of the City of Livermore (see Figure 1). The Study Area encompasses approximately 3,500 acres of the Altamont Pass Wind Resource Area (APWRA) at latitude 37°45’08.42” North, longitude 121°41’11.94” West (see Figure 2).

Affiliates of Applicant currently own and operate a wind energy generation facility comprised of 828 wind turbines and additional operational buildings and equipment located on an approximately 12,000-acre site within the APWRA. The facility’s current Conditional Use Permit (CUP) allows the facility to operate through October 31, 2015. Upon expiration of the CUP, the Applicant and its affiliates will be required to decommission the facility.

The Applicant and its affiliates propose to exchange approximately 300 wind turbines and associated land for an equal number of wind turbines and associated land operated by another company within the AWPRA. This asset exchange would physically separate certain historically shared or common project assets within the AWPRA to allow consolidated operations and facilitate repowering of the facility upon expiration of the existing CUP. The Project would allow continued operation of the existing turbines, with a combined capacity of 85.8 megawatts (MW), on the new wind energy facility sites. This would allow the existing CUP to be extended for up to three years while the Applicant pursues development of a repowered wind generation facility on the remainder of its current facility. The Project includes installation of larger-capacity wind turbines, as well as associated access roads and operation and maintenance (O&M) facilities.

On March 25 and 26, 2014, POWER biologists Cindy Lysne and Erik Nyquist conducted field investigations of the Study Area to determine the presence of potentially jurisdictional Waters of the United States (including wetlands) that would likely be subject to regulation by the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act. This report documents the wetland delineation process and results.

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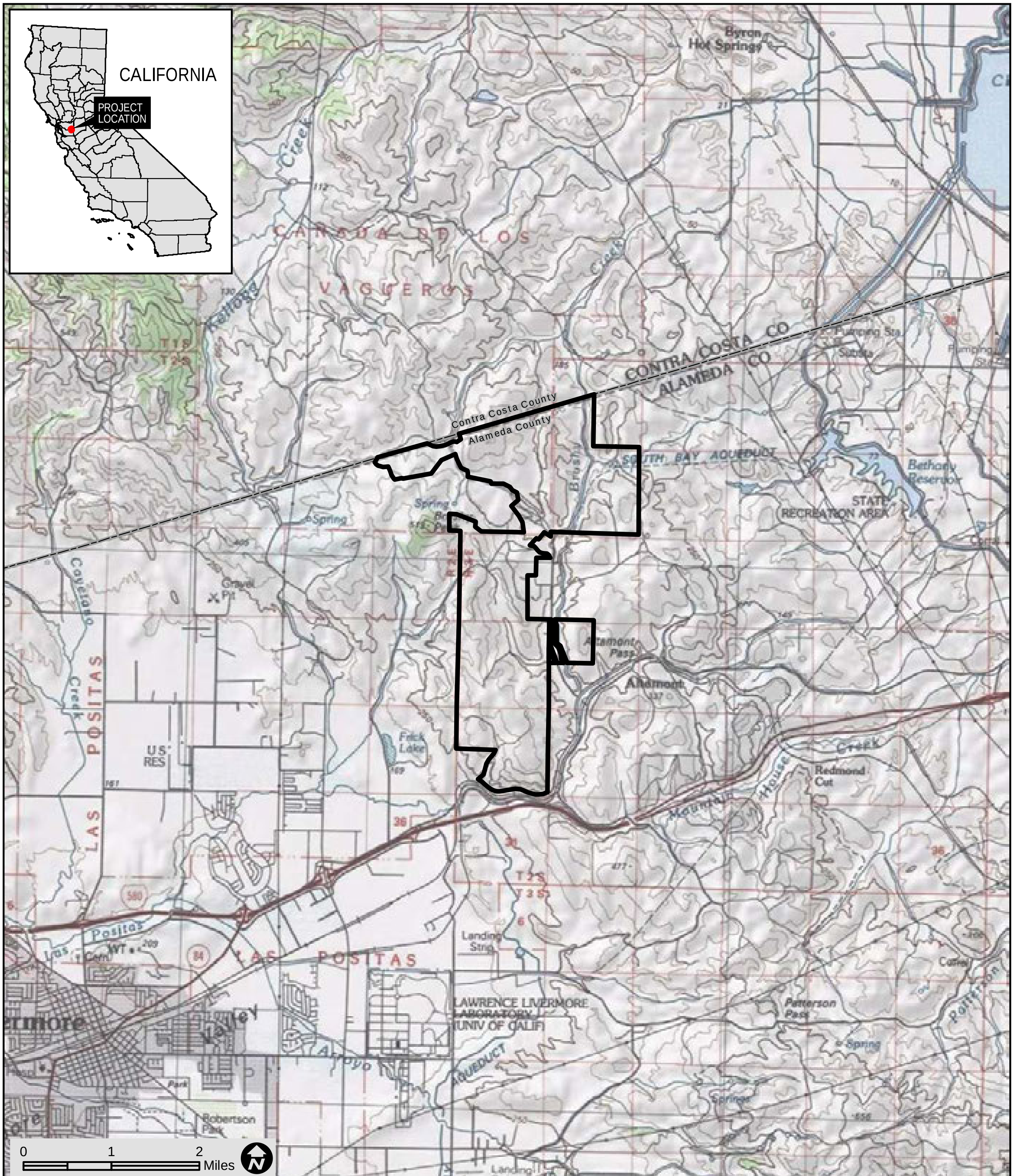

Legend

Project Boundary

County Boundary

FIGURE 1
PROJECT LOCATION

ALTAMONT WINDS LLC
PROPOSED SUMMIT WIND
REPOWER PROJECT
ALAMEDA COUNTY, CA

Source: ArcGIS US Topo Maps (National Geographic TOPO! 1:100,000).

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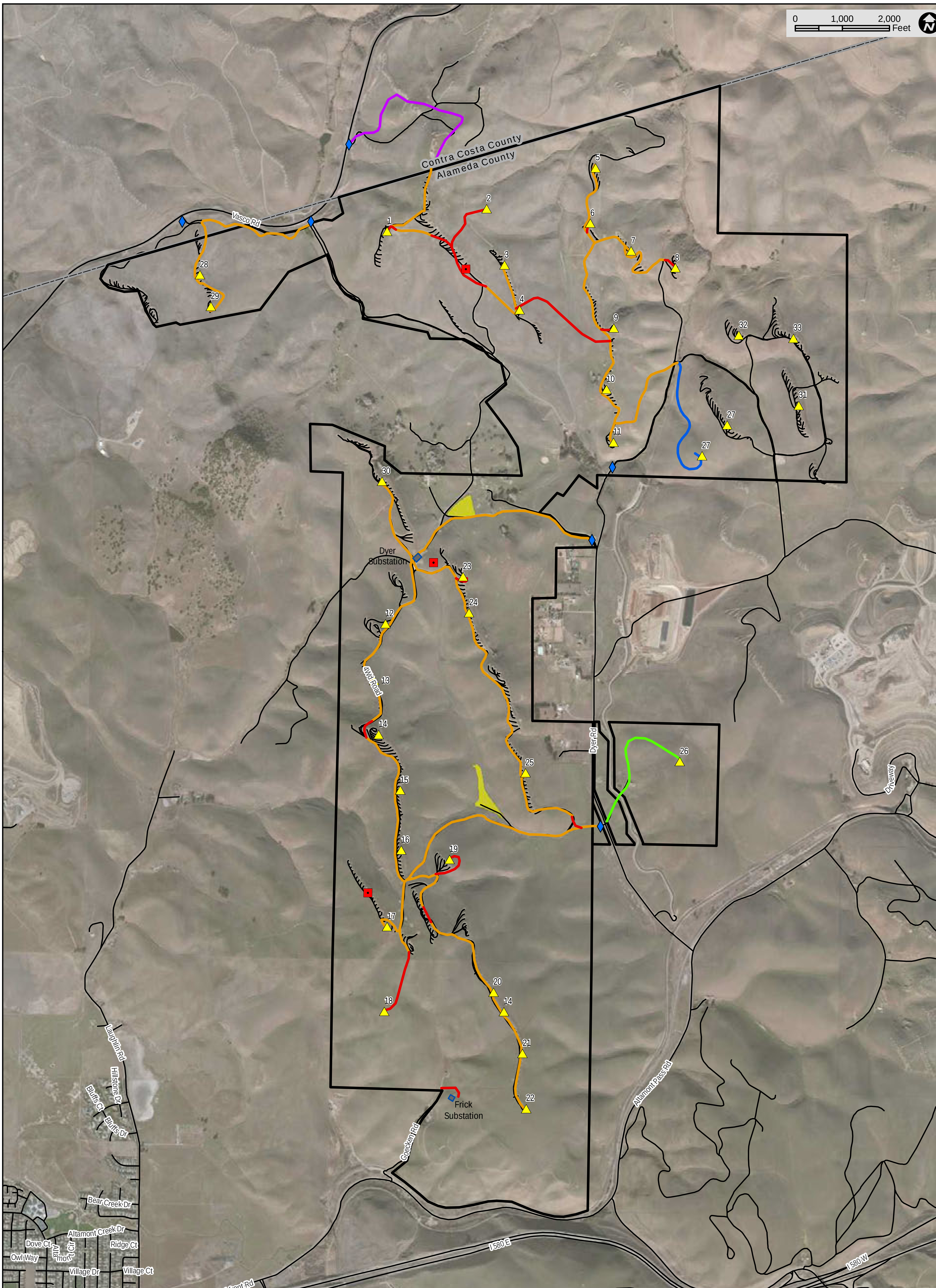

Legend

Wind Turbine	Existing Road	County Boundary
Gate	Road - New	
Met Tower	Road - Upgraded	
Project Boundary	Devincenzi Rd East	
Substation	Previously Upgraded Road	
O&M Area	Proposed Access Road (Elliot)	

FIGURE 2
SITE PLAN

ALTAMONT WINDS LLC
PROPOSED SUMMIT WIND
REPOWER PROJECT
ALAMEDA COUNTY, CA

Source: ArcGIS World Imagery, May 2010.

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2.0 METHODOLOGY

Prior to conducting the field investigation, an inventory of readily available data was conducted and results were reviewed., U.S. Geological Survey (USGS) topographical maps for the Byron Hot Springs and the Altamont 7.5-minute quadrangles, aerial photography, National Wetland Inventory (NWI) maps, data from the National Hydrography Dataset (NHD), and National Resources Conservation Service (NRCS) soil surveys of the Study Area were examined to determine locations of potential areas of USACE jurisdiction and the locations of wetlands/waterways. Areas of potential jurisdiction were evaluated in accordance with methodology set forth in the USACE *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (2008a), the USACE's 1987 Wetland Delineation Manual (Manual), and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Supplement (Version 2.0) (Supplement; USACE 2008b).

The Manual (USACE 1987) defines hydrophytic vegetation as the community of macrophytes that occurs in areas where inundation or soil saturation is either permanent or of sufficient frequency and duration to exert a controlling influence on the plant species present. Hydrophytic vegetation is considered present when the plant community is dominated by species that can tolerate prolonged inundation or soil saturation during the growing season (USACE 2008a, 2008b). Due to the extreme variability of climate, weather patterns, topography, soils, and wetland types in the Arid West, hydrophytic vegetation determinations are based primarily on their wetland indicator status as designated in the Arid West National Wetland Plant List (USACE 2013).

On March 25 and 26, 2014, POWER biologists Cindy Lysne and Erik Nyquist investigated locations of ground disturbance identified by the Applicant as new turbine sites, O&M areas, new access roads, and existing access roads scheduled to be improved. These areas constitute the approximately 35.9-acre "Wetland Investigation Area" within the 3,500-acre Study Area and wetlands and other waters that were located outside the planned areas of Project-related ground disturbance (Wetland Investigation Area) would not be affected and were therefore not delineated.

3.0 INVENTORY RESULTS

3.1 National Wetland Inventory Wetlands

The NWI provides approximate locations of previously identified wetlands one acre or larger that may or may not be jurisdictional based on the 1987 USACE Wetlands Delineation Manual and Supplement.

Data provided by the NWI revealed eight types of wetlands occurring within the Study Area:

- Palustrine emergent, seasonally flooded; diked/impounded (PEMCh)
- Palustrine emergent, semipermanently flooded; diked/impounded (PEMFh)
- Palustrine emergent, permanently flooded; diked/impounded (PEMHh)
- Palustrine forested, seasonally flooded; diked/impounded (PFOCH)
- Palustrine scrub-shrub, saturated (PSSB)
- Palustrine scrub-shrub, seasonally flooded; diked/impounded (PSSCH)
- Palustrine unconsolidated bottom, semipermanently flooded; diked/impounded (PUBFh)
- Palustrine unconsolidated bottom, permanently flooded; diked/impounded (PUBHh)

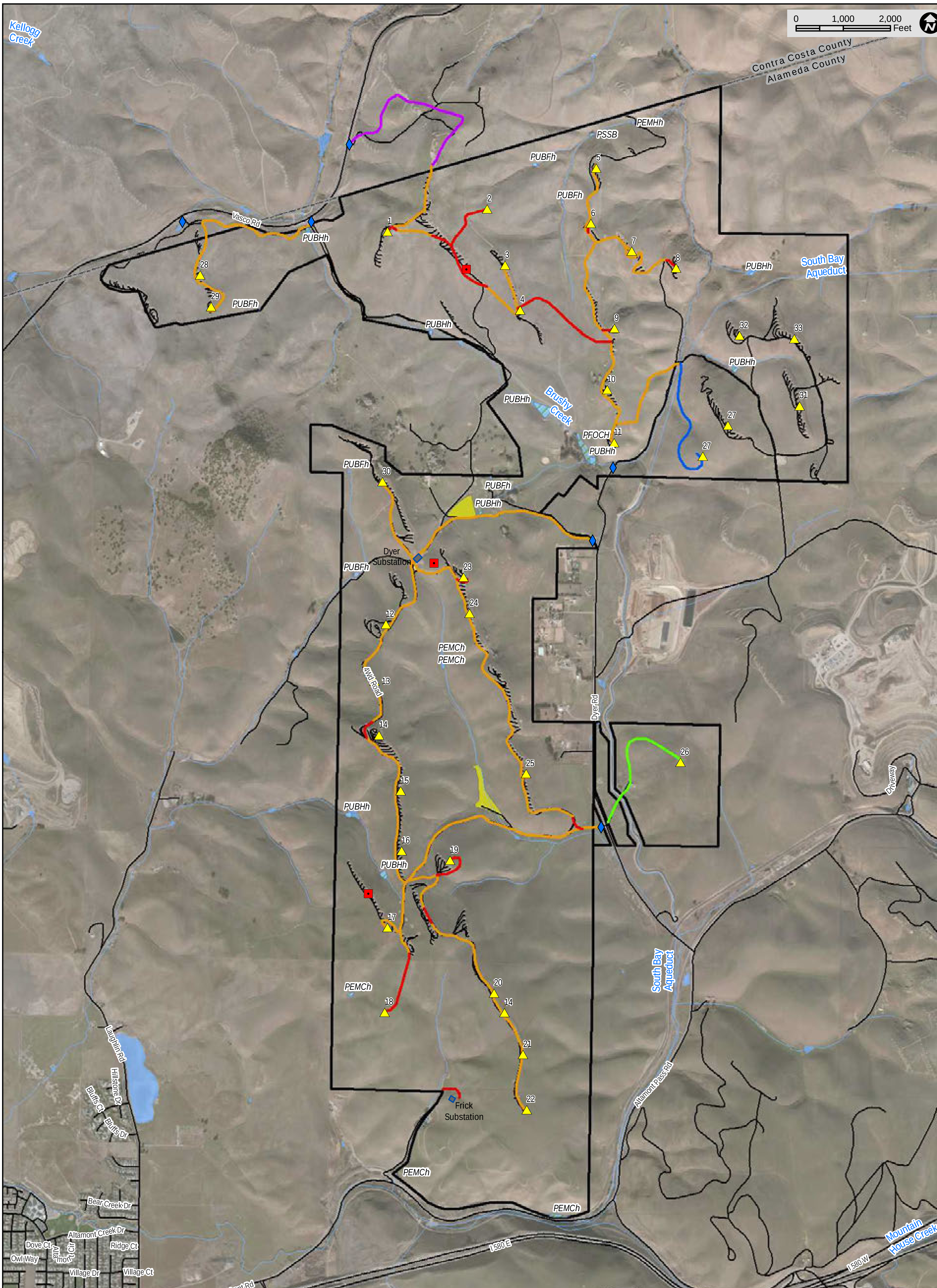
Palustrine emergent wetlands are characterized by erect, rooted, herbaceous vegetation, which is present for most of the growing season. Diked/impounded wetlands are those that have been artificially created by dams or other barriers that impedes the natural flow of water.

Palustrine forested wetlands are characterized by woody vegetation that is 20 feet in height or greater. Surface water in these wetlands is present for extended periods early in the growing season but absent at the end of the growing season in all but the wettest years.

Palustrine scrub-shrub wetlands are characterized by woody vegetation that is less than 20 feet in height, including true shrubs, saplings, and environmentally stunted trees or shrubs. These wetlands are typically saturated to the surface for extended periods during the growing season in all but the driest years.

Palustrine unconsolidated bottom wetlands are open water wetlands with a substrate that is more muddy or sandy than rocky, and that have a vegetation cover of less than 30 percent. Vegetation is usually found in shallow waters around the edges of the basin.

These NWI wetlands are scattered throughout the Study Area, generally along intermittent streams and valley floors (USFWS 1976, 1983, 1985-1987, 2002). Locations of these NWI wetlands are shown on Figure 3.



Legend

Wind Turbine	Existing Road	County Boundary	Stream (NHD)
Gate	Road - New		Waterbody (NHD)
Met Tower	Road - Upgraded		Wetland (NWI)
Project Boundary	Devincenzi Rd East		
Substation	Previously Upgraded Road		
O&M Area	Proposed Access Road (Elliot)		

FIGURE 3
NATIONAL WETLAND INVENTORY

ALTAMONT WINDS LLC
PROPOSED SUMMIT WIND
REPOWER PROJECT
ALAMEDA COUNTY, CA

Source: USFWS, National Wetland Inventory, 2013. ArcGIS World Imagery, May 2010.

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3.2 Soils

The NRCS has mapped the following soil types within the Study Area, as shown on Figure 4. Hydric soils are defined as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part of the soil profile (Federal Register 1994). Soils mapped in the Study Area are listed in Table 1, and hydric soils located within the Study Area are described in detail below.

TABLE 1 SOIL TYPES OCCURRING WITHIN THE STUDY AREA

SOIL NAME	SYMBOL	LANDFORMS	HYDRIC (Y/N)	HYDRIC CRITERIA
Altamont clay, 3 to 15 percent slopes	AaC	Basin floors	Y	2B3
Altamont clay, 15 to 30 percent slopes	AaD	Basin floors	Y	2B3
Altamont clay, 15 to 30 percent slopes[1]	AbEcc	Hill slopes	N	
Altamont clay, moderately deep, 30 to 45 percent slopes	AmE2	Basin floors	Y	2B3
Altamont clay, moderately deep, 45 to 75 percent slopes, eroded	AmF2	Basin floors	Y	2B3
Altamont-Fontana complex, 30 to 50 percent slopes	AcFcc	Depressions	Y	2B3
Cotati fine sandy loam, eroded	CoC2	Hill slopes	N	
Gaviota rocky sandy loam, 5 to 40 percent slopes, eroded	GaE2	Drainageways	Y	2B3
Gaviota rocky sandy loam, 40 to 75 percent slopes, eroded	GaF2	Hill slopes	N	
Los Osos and Millsholm soils, 7 to 30 percent slopes	LuD	Hill slopes	N	
Pescadero clay	Pd	Rims	Y	2B3, 3
Rincon clay loam, 3 to 7 percent slopes	RdB	Valley floors, fans	N	
Rock land	RoF	Hill slopes	N	

[1]Altamont clay, 15 to 30 percent slopes (AbEcc) is not listed as a hydric soil in either the Alameda Area or the Contra Costa County Soil Surveys. Although all listed Altamont clays are derived from residuum weathered from sandstone and shale, the minor components of AbEcc differ substantially from those of the other Altamont clays. In addition, the geomorphic setting of AbEcc soils differs from that of the hydric Altamont clays listed above.
Source: USDA 2014.

Altamont clay (AaC, AaD, AmE2, AnF2)

Altamont clays consist of residuum weathered from sandstone and shale and comprises the majority of soils within the Study Area, especially on hill slopes and basin floors. Altamont clays are listed as hydric soils in the Alameda Area Soil Survey based on the following hydric soil criteria: *Criteria 2B3 - Soils that are poorly drained or very poorly drained and have a water table at a depth of 1.0 foot or less during the growing season if permeability is less than 6.0 inches per hour in any layer within a depth of 20 inches.*

Altamont-Fontana Complex (AcFcc)

Altamont-Fontana Complex is derived from residuum weathered from sandstone and shale and is found in depressions along the northern boundary of the Study Area. Altamont-Fontana Complex, 30 to 50 percent slopes, is listed as a hydric soil in the Alameda Area Soil Survey based on hydric soil Criteria 2B3.

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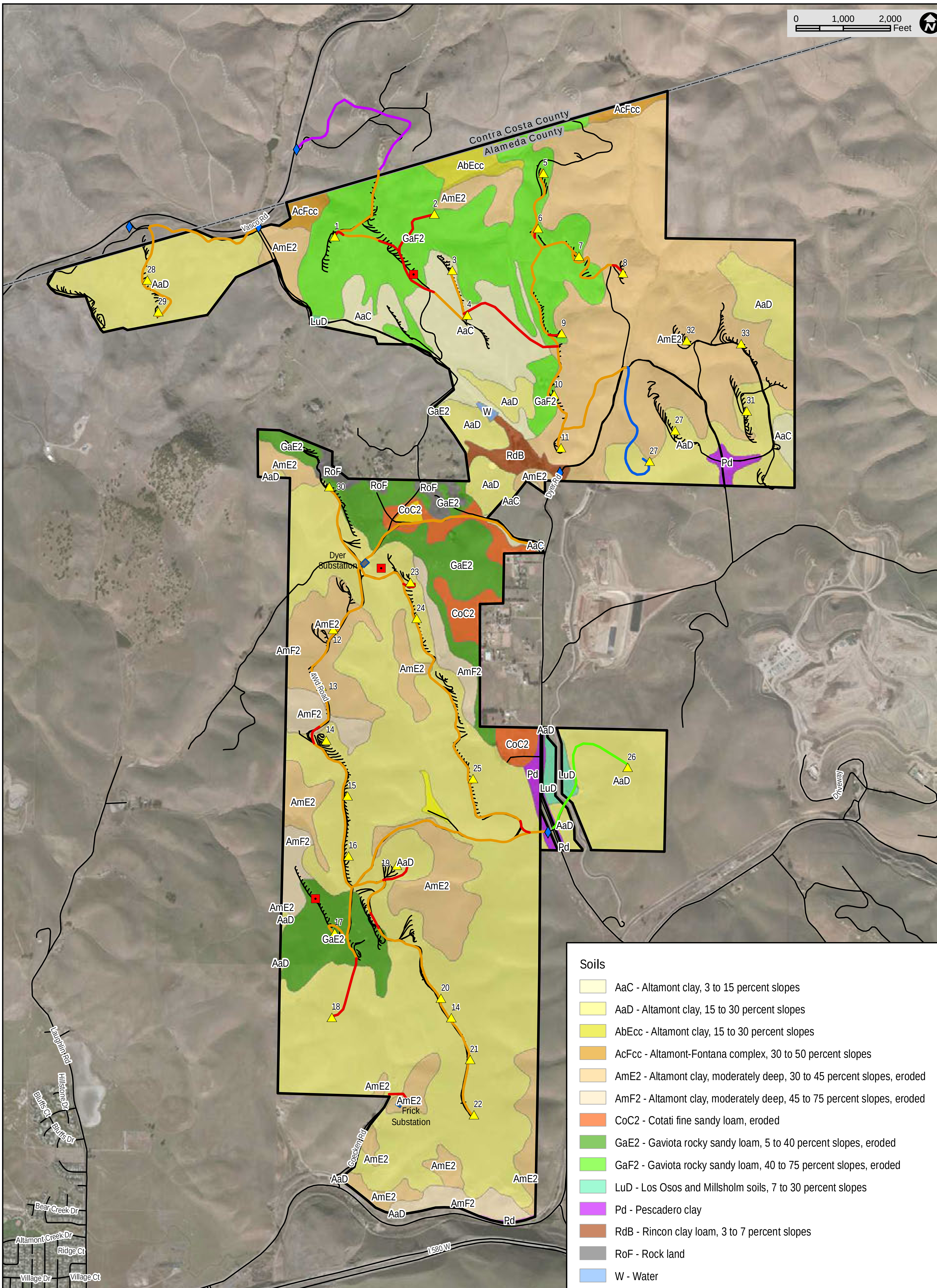

Legend

- Wind Turbine
- Gate
- Met Tower
- Project Boundary
- Substation
- O&M Area
- Existing Road
- Road - New
- Road - Upgraded
- Devincenzi Rd East
- Previously Upgraded Road
- Proposed Access Road (Elliot)
- County Boundary

FIGURE 4
SOILS

ALTAMONT WINDS LLC
PROPOSED SUMMIT WIND
REPOWER PROJECT
ALAMEDA COUNTY, CA

Source: U.S. Department of Agriculture, Natural Resources Conservation Service, Survey ca609, 2013. ArcGIS World Imagery, May 2010.

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Gaviota rocky sandy loam (GaE2)

Gaviota rocky sandy loam is derived from residuum weathered from sandstone and is found in the central and southern portions of the Study Area in drainageways and on hill slopes. Gaviota rocky sandy loam, 5 to 40 percent slopes, eroded is listed as a hydric soil in the Alameda Area Soil Survey based on hydric soil Criteria 2B3.

Pescadero clay (Pd)

Pescadero clay is comprised of alluvium derived from sandstone and shale and in the Study Area is found on rims near Dyer Road just north of Altamont Pass Road. Pescadero clay is listed as a hydric soil in the Alameda Area Soil Survey based on hydric soil Criteria 2B3 and: *Criteria 3 - Soils that are frequently ponded for periods of long or very long duration during the growing season.*

3.3 Hydrologic Data

Data from the Western Regional Climate Center (WRCC) were available for the National Weather Service Cooperative Station (Co-Op) in Livermore. The Livermore, California (044997) Co-Op Station located approximately six miles from the Study Area records an annual precipitation of 14.5 inches, most of which falls between November and April (WRCC 2014).

The USGS maintains stream gages in Old River (USGS 11312968, Old R Nr Delta Mendota Canal CA) approximately eight miles east of the Study Area, and Arroyo Valle (USGS 11176500 Arroyo Valle Nr Livermore CA) approximately nine miles southwest, but no USGS stream gages were located within the Study Area (USGS 2014). Due to the lack of applicable peak streamflow records for streams in or associated with the Study Area, a Bulletin 17B flow frequency analysis was not performed prior to this field investigation.

The southern two-thirds of the Study Area lies within the Upper Arroyo Las Positas Hydrologic Unit (HU) (HU 180500040202), and the upper third lies within the Brushy Creek Hydrologic Unit (HU 180400030603). In the Upper Arroyo Las Positas HU, most surface water from the Study Area drains into Arroyo Las Positas and reaches the Pacific Ocean via Alameda Creek. In the Brushy Creek HU, surface water drains into Brushy Creek and reaches the Pacific Ocean via Old River, Piper Slough, San Joaquin River, and Suisun Bay.

3.4 Land Use

The Study Area is located on approximately 3,500 acres of the Alameda County portion of the APWRA. The APWRA is designated by the State of California and recognized by Alameda County as a Wind Resource Area capable of supporting utility-scale wind power generation facilities.

The Land Use Element of the East County Area General Plan (Plan) (Alameda County 2000) designates the Study Area as an Open Space Area for the production of natural resources (e.g., windfarm facilities) among other uses (Policy 52). The Plan also calls for no net loss of riparian and seasonal wetlands (Policy 126).

4.0 FIELD INVESTIGATION RESULTS

The field investigation was concentrated on areas where new roads, roads scheduled to be improved, or O&M facilities crossed by or that had the potential to otherwise affect waters of the U.S., as shown on Figure 5A (Wetland Investigation Area). The field investigation resulted in the delineation of one slope wetland within the Wetland Investigation Area, as shown on figure 5B. Slope wetlands form by infiltration of high groundwater levels outside of a closed topographic depression, although slope wetlands may also form on flat areas. Precipitation is generally a secondary contributing source of water. Slope wetlands may lose water downgradient through channels and are often adjacent to or associated with other types of water features including streams, lakes, or other types of wetlands.

The following description of Wetland W-1-14 and surrounding upland reflects conditions observed at the time of the field investigation. Wetland and upland data were recorded for the delineated wetland, and the corresponding data forms are provided in Appendix A; corresponding photographs are provided in Appendix B.

In addition to the delineated wetland W-1-14, three waterway crossings were identified (Figures 5C, 5D, and 5E) as features that could be potentially impacted by the Project (i.e., improved roads). These areas are existing crossings of Brushy Creek and the South Bay Aqueduct. The crossing of the South Bay Aqueduct (Figure 5C) is an existing bridge and no Project-related improvements/impacts will be made to the bridge. The crossing of Brushy Creek located in the northeastern portion of the Study Area (Figure 5D) is an existing bridge/berm with a culvert and no Project-related improvements/impacts will be made to the bridge. The crossing of Brushy Creek located in the northwestern portion of the Study Area (Figure 5E) is an existing berm/roadway with a culvert and no Project-related improvements/impacts will be made to the crossing. As the wetlands/waterways associated with these three existing crossings will not be impacted as a result of Project activities, the features were not delineated as part of the wetland/waterway investigation.

4.1 Wetland W-1-14

Wetland W-1-14 is a slope wetland associated with an O&M area located along a drainage in the south-central portion of the Study Area. The delineated wetland area of W-1-14 totals approximately 960 square feet (0.02 acre) within the Wetland Investigation Area and the associated drainage extends outside of the potential area of impact identified within the Study Area. POWER biologists investigated up-slope of the delineated wetland W-1-14 and did not identify a defined bed and bank or wetland characteristics that corresponded to the drainage/O&M area. Therefore, no wetland or waterway features were identified and delineated in the associated drainage up-slope of the delineated wetland. The wetland and associated waterway extend down-slope from the delineated area into an intermittent drainage with a defined bed and bank that eventually terminates approximately 250 feet west of Dyer Road. The following section (5.0) describes the preliminary jurisdictional determination of wetland W-1-14 and the associated drainage and their potential connection to a water of the U.S.

The wetland hydrology indicators for W-1-14 included surface soil cracks, oxidized rhizospheres along living roots, the presence of reduced iron, and drainage patterns. The hydric soil indicator is a depleted matrix based on observations of a low chroma soil layer (10YR 4/1, 0 to 3 inches with 10 percent redox concentrations) underlain by a depleted soil layer (10YR 4/2, 4 to 18 inches) with 15 percent distinct redox concentrations (10YR 5/6).

Hydrophytic vegetation wetland indicators included a positive dominance test within the range indicating the presence of hydrophytic vegetation. The observed wetland vegetation was dominated by soft brome (*Bromus hordeaceus*, FACU), Baltic rush (*Juncus balticus*, FACW), and coastal salt grass (*Distichlis spicata*, FAC). Other vegetation observed in the wetland included redstem stork's bill (*Erodium cicutarium*, NS/UPL), wall barley (*Hordeum murinum*, FACU), and western dock (*Rumex occidentalis*, FACW). The wetland/upland boundary primarily follows a change in topography and vegetation from wetland- to upland-dominated species. The observed upland vegetation was dominated by soft brome. Other vegetation observed in the upland included wally barley, redstem stork's bill, and coastal saltgrass.

5.0 OBSERVED JURISDICTIONAL STATUS

During the on-site field investigation, a hydrologic connection to Waters of the United States was not observed for the slope wetland (Wetland W-1-14). The 7.5-minute topographic map for the Altamont quadrangle depicts the location of this wetland to be within an intermittent stream that terminates approximately 250 feet west of Dyer Road. However, the field investigation and aerial photographs indicate that water flows south from this point, at least seasonally.

Historical topographic maps were reviewed to identify drainage patterns and potential hydrologic connection of Wetland W-1-14 to Waters of the United States. The USACE 15-minute Altamont quadrangle map (USACE 1942) revealed that the intermittent stream flowing through Wetland W-1-14 once connected with a second intermittent stream (tributary to Altamont Creek) that originates approximately 1.5 miles northeast of the delineated wetland, and then continued south to connect with Altamont Creek. The natural flow of this second intermittent stream has been interrupted in recent years by construction of a reservoir approximately one mile northeast of Wetland W-1-14, and this disrupted flow has affected the hydrology downstream. However, based on a historic hydrologic connection to known Waters of the United States (Altamont Creek) approximately one mile downstream, Wetland W-1-14 is determined to be jurisdictional.

Final jurisdictional status for the delineated wetland will be provided by the USACE. Figure 5 depicts the boundaries of the wetland that was delineated within the Study Area and the approximate locations of the wetland and upland sampling points. In Appendix C, Figure 6A shows the wetland on the most current USGS 7.5-minute topographic map (USGS 1981) and Figure 6B illustrates the connectivity as shown on the historic 15-minute quadrangle maps. For supporting information, refer to the data sheets provided in Appendix A, the photographs of the data sampling points in Appendix B, and Figures 6A (USGS Topographic Quadrangle) and 6B (Historic USACE Topographic Quadrangle) in Appendix C.

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Legend

- USACE Jurisdictional Determination Boundary (238.5 Acres)
- County Boundary
- Intermittent Stream (1,754 feet, 0.158 acres)
- Open Water (0.053 acres)
- Delineated Wetlands (0.630 Acres)
- Upland Soil Sample Location
- Wetland Soil Sample Location

0 100 200 300 400
Feet
1" = 200 Feet
1:2,400

5A 5B 5C 5D 5E 5F 5G 5H

FIGURE 5A
WETLAND DELINEATION
MAPBOOK

ALTAMONT WINDS LLC
PROPOSED SUMMIT WIND
REPOWER PROJECT
ALAMEDA COUNTY, CA

Source: ArcGIS World Imagery, November 2010.

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Legend

- USACE Jurisdictional Determination Boundary (238.5 Acres)
- County Boundary
- Intermittent Stream (1,754 feet, 0.158 acres)
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1:2,400

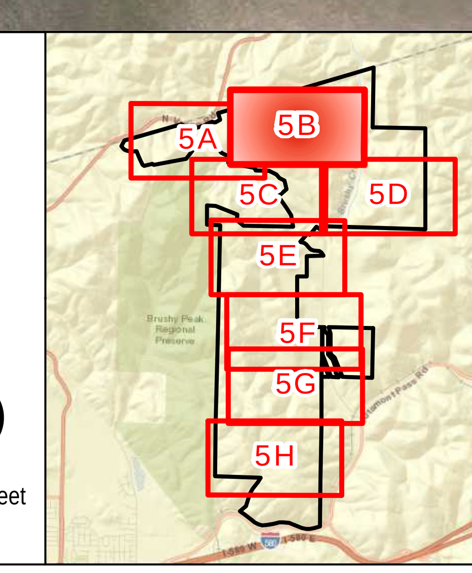

FIGURE 5B
WETLAND DELINEATION
MAPBOOK

ALTAMONT WINDS LLC
PROPOSED SUMMIT WIND
REPOWER PROJECT
ALAMEDA COUNTY, CA

Source: ArcGIS World Imagery, November 2010.

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Legend

- USACE Jurisdictional Determination Boundary (238.5 Acres)
- County Boundary
- Intermittent Stream (1,754 feet, 0.158 acres)
- Open Water (0.053 acres)
- Delineated Wetlands (0.630 Acres)
- Upland Soil Sample Location
- Wetland Soil Sample Location

0 100 200 300 400
Feet

1" = 200 Feet
1:2,400

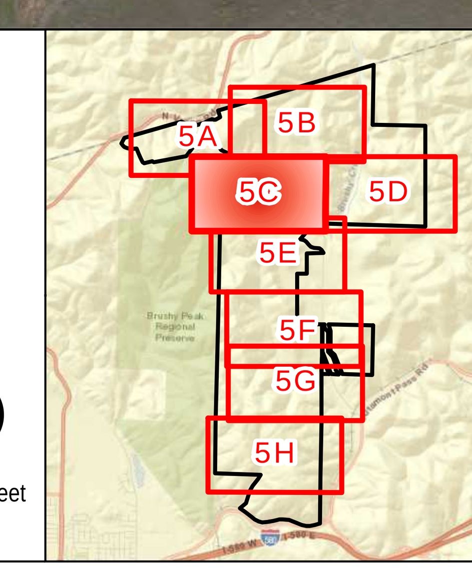

FIGURE 5C
WETLAND DELINEATION
MAPBOOK

ALTAMONT WINDS LLC
PROPOSED SUMMIT WIND
REPOWER PROJECT
ALAMEDA COUNTY, CA

Source: ArcGIS World Imagery, November 2010.

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Legend

- USACE Jurisdictional Determination Boundary (238.5 Acres)
- County Boundary
- Intermittent Stream (1,754 feet, 0.158 acres)
- Open Water (0.053 acres)
- Delineated Wetlands (0.630 Acres)
- Upland Soil Sample Location
- Wetland Soil Sample Location

0 100 200 300 400
Feet

1" = 200 Feet
1:2,400

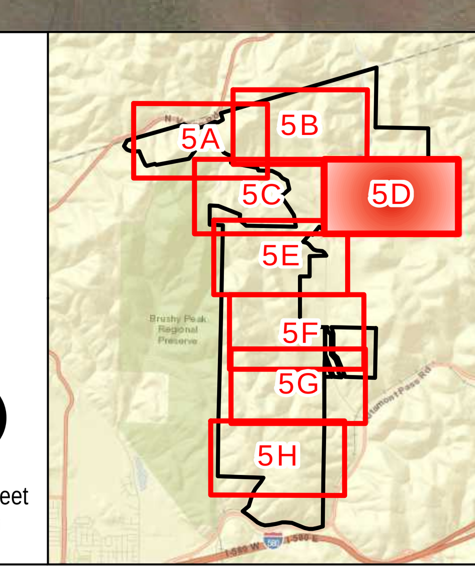

FIGURE 5D
WETLAND DELINEATION
MAPBOOK

ALTAMONT WINDS LLC
PROPOSED SUMMIT WIND
REPOWER PROJECT
ALAMEDA COUNTY, CA

Source: ArcGIS World Imagery, November 2010.

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Legend

- USACE Jurisdictional Determination Boundary (238.5 Acres)
- County Boundary
- Intermittent Stream (1,754 feet, 0.158 acres)
- Open Water (0.053 acres)
- Delineated Wetlands (0.630 Acres)
- Upland Soil Sample Location
- Wetland Soil Sample Location

0 100 200 300 400
Feet

1" = 200 Feet
1:2,400

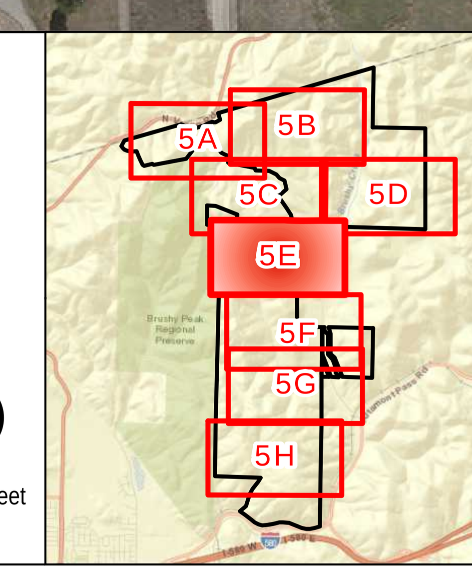

FIGURE 5E
WETLAND DELINEATION MAPBOOK

ALTAMONT WINDS LLC
PROPOSED SUMMIT WIND REPOWER PROJECT
ALAMEDA COUNTY, CA

Source: ArcGIS World Imagery, November 2010.

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Legend

- USACE Jurisdictional Determination Boundary (238.5 Acres)
- County Boundary
- Intermittent Stream (1,754 feet, 0.158 acres)
- Open Water (0.053 acres)
- Delineated Wetlands (0.630 Acres)
- Upland Soil Sample Location
- Wetland Soil Sample Location

0 100 200 300 400
Feet

1" = 200 Feet
1:2,400

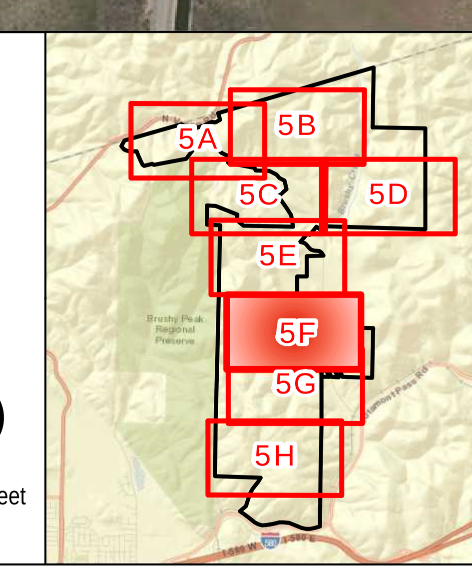

FIGURE 5F
WETLAND DELINEATION
MAPBOOK

ALTAMONT WINDS LLC
PROPOSED SUMMIT WIND
REPOWER PROJECT
ALAMEDA COUNTY, CA

Source: ArcGIS World Imagery, November 2010.

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Legend

- USACE Jurisdictional Determination Boundary (238.5 Acres)
- County Boundary
- Intermittent Stream (1,754 feet, 0.158 acres)
- Open Water (0.053 acres)
- Delineated Wetlands (0.630 Acres)
- Upland Soil Sample Location
- Wetland Soil Sample Location

0 100 200 300 400
Feet

1" = 200 Feet
1:2,400

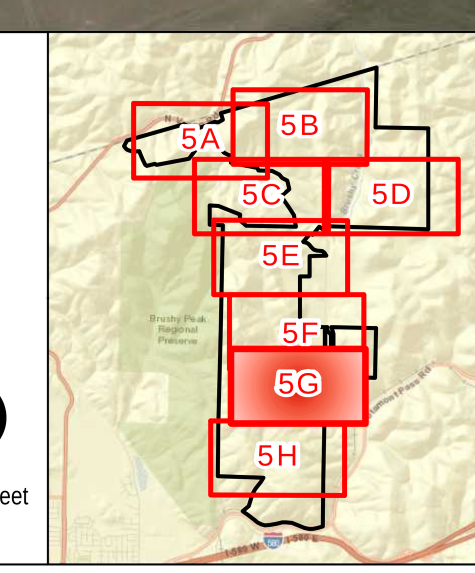

FIGURE 5G
WETLAND DELINEATION MAPBOOK

ALTAMONT WINDS LLC
PROPOSED SUMMIT WIND REPOWER PROJECT
ALAMEDA COUNTY, CA

Source: ArcGIS World Imagery, November 2010.

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Legend

USACE Jurisdictional Determination Boundary (238.5 Acres)	Intermittent Stream (1,754 feet, 0.158 acres)	Delineated Wetlands (0.630 Acres)
County Boundary	Open Water (0.053 acres)	Upland Soil Sample Location
		Wetland Soil Sample Location

0 100 200 300 400
Feet

1" = 200 Feet
1:2,400

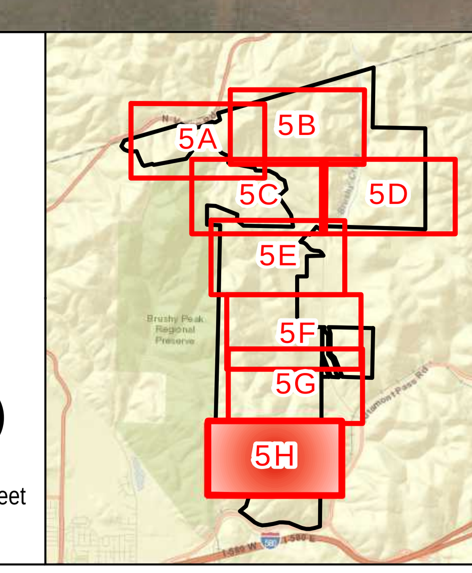

FIGURE 5H
WETLAND DELINEATION
MAPBOOK

ALTAMONT WINDS LLC
PROPOSED SUMMIT WIND
REPOWER PROJECT
ALAMEDA COUNTY, CA

Source: ArcGIS World Imagery, November 2010.

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APPENDIX A WETLAND DELINEATION DATA FORMS

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WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Summit Wind Repowering City/County: Alameda Co. Sampling Date: 3/26/2014

Applicant/Owner: Altamont Wind LLC State: CA Sampling Point: S-1-14①

Investigator(s): E. NYQUIST, C. LYSNE Section, Township, Range: Sec 19, T2S, R3E

Landform (hillslope, terrace, etc.): drainage Local relief (concave, convex, none): Concave Slope (%): 2-3

Subregion (LRR): LRR C Lat: 37°44'45.08"N Long: 121°41'2.74"W Datum: NAD83

Soil Map Unit Name: AaD- Altamont Clay, 15-30% slopes NWI classification: ____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	Is the Sampled Area within a Wetland? Yes X No ____
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present?	Yes X No ____	

Remarks: Area has experienced extreme drought

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 10')			
1. Bromus hordeaceus	40	Y	FACU
2. Juncus balticus	35	Y	FACW
3. Distichlis spicata	25	Y	FAC
4. Erodium cicutarium	5	N	NS/UPL
5. Hordeum murinum	3	N	FACU
6. Rumex occidentalis	2	N	FACW
7.			
8.			
= Total Cover	110		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.7% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species	37	x 2 =	74
FAC species	25	x 3 =	75
FACU species	43	x 4 =	172
UPL species	5	x 5 =	25
Column Totals:	110 (A)		346 (B)

Prevalence Index = B/A = 3.15

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: Slope wetland located in drainage

.5x110= 55

.2x110= 22

SOIL

Sampling Point: 5-1-14 (1)

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 4/1	90	10YR 5/6	10	C	M	SCL	
4-18	10YR 4/2	85	10YR 5/6	15	C	M	SCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes ✓ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- X Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres along Living Roots (C3)
- X Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- X Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ____

Water Table Present? Yes ___ No X Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ____

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: 3 primary and 1 secondary indicators observed

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Summit Wind Repowering City/County: Alameda Co. Sampling Date: 3/26/2014

Applicant/Owner: Altamont Wind LLC State: CA Sampling Point: S-1-14(2)

Investigator(s): E. Nyquist, C. Lysne Section, Township, Range: Sec 19, T , R

Landform (hillslope, terrace, etc.): slope/modified terrace Local relief (concave, convex, none): none Slope (%): 1.5

Subregion (LRR): LRRC Lat: 37°44'44.95"N Long: 121°41'3.29"W Datum: NAD83

Soil Map Unit Name: AaD - Altamont Clay, 15 to 30% slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No X (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes X No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ______ No X	Is the Sampled Area within a Wetland? Yes ______ No X
Hydric Soil Present?	Yes ______ No X	
Wetland Hydrology Present?	Yes ______ No X	

Remarks: Area has experienced extreme drought

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 10')			
1. Bromus hordeaceus	60	Y	FACU
2. Hordeum murinum	10	N	FACU
3. Erodium cicutarium	10	N	NS/UPL
4. Distichlis spicata	5	N	FAC
5.			
6.			
7.			
8.			
= Total Cover	85		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 15 % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species	5	x 3 = 15
FACU species	70	x 4 = 280
UPL species	10	x 5 = 50
Column Totals:	85 (A)	345 (B)

Prevalence Index = B/A = 4.05

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ______ No X

Remarks: .5x65= 42.5 Upland sample point
.2x85= 17

SOIL

Sampling Point: S4-14 (2)

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-16"	10YR4/2	100					SCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ **Vernal Pools (F9)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______________

Depth (inches): ______________

Hydric Soil Present? Yes ______ No X

Remarks: no hydric soil indicator

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No X Depth (inches): ______________

Water Table Present? Yes ______ No X Depth (inches): ______________

Saturation Present? (includes capillary fringe) Yes ______ No X Depth (inches): ______________

Wetland Hydrology Present? Yes ______ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: no hydrology indicators observed

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: SUMMIT WIND REPOWERING City/County: ALAMEDA Co. Sampling Date: 3/26/2014

Applicant/Owner: ALTAMONT WIND LLC State: CA Sampling Point: S-1-14 (3)

Investigator(s): E. NYQUIST, C. LYSNE Section, Township, Range: Sec 19, T2S, R3E

Landform (hillslope, terrace, etc.): historic drainage Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): LRR C Lat: 37°44'45.273"N Long: 121°40'32.505"W Datum: NAD83

Soil Map Unit Name: AaD, Altamont Clay, 15 to 30% Slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____ No X	Is the Sampled Area within a Wetland? Yes ____ No X
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present?	Yes ____ No X	

Remarks: Area has experienced extreme drought; sampling point located in historic drainage w/ no bed + bank identified or 2 wetland criteria

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 10')			
1. BROMUS hordeaceus	70	Y	FACU
2. HORDEUM MURINUM	15	N	FACU
3. ERODIUM CICUTARIUM	5	N	NS/UPL
4. DISTICHLIS SPICATA	5	N	FAC
5.			
6.			
7.			
8.			
= Total Cover	95		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 5 % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species	5	x 3 = 15
FACU species	85	x 4 = 340
UPL species	5	x 5 = 25
Column Totals:	95 (A)	380 (B)

Prevalence Index = B/A = 4.0

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:
.5x 95 = 47.5
.2x 95 = 19
Upland sample point

SOIL

Sampling Point: S-1-14 (3)

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-24"	10YR4/2	95	10YR5/6	5	C	M	S	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes X No ___

Remarks: hydric soil identified by presence of redox features; no hydophytic vegetation or hydrology observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: no hydrology indicators identified

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: SUMMIT WIND REPOWERING City/County: ALAMEDA CO. Sampling Date: 3/26/2014

Applicant/Owner: ALTAMONT WIND LLC State: CA Sampling Point: S-1-14 (4)

Investigator(s): E. NYQUIST, C. LYSNE Section, Township, Range: Sec 19, T2S, R3E

Landform (hillslope, terrace, etc.): toe of slope Local relief (concave, convex, none): concave Slope (%): 1.5

Subregion (LRR): LRR C Lat: 37°44'49.364" N Long: 121°41'9.718" W Datum: NAD83

Soil Map Unit Name: AaD, Altamont Clay, 15 to 30% slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X
Hydric Soil Present?	Yes ___	No X
Wetland Hydrology Present?	Yes ___	No X

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks: Area has experienced extreme drought; sample point located down-slope of erosional channel. No bed/bank or wetland criteria observed.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 10')			
1. BROMUS hordeaceus	60	Y	FACU
2. BROMUS tectorum	15	N	NS/UPL
3. HORDEUM MURINUM	10	N	FACU
4.			
5.			
6.			
7.			
8.			
= Total Cover	85		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 15 % Cover of Biotic Crust ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species	70	x 4 =	280
UPL species	15	x 5 =	75
Column Totals:	85 (A)		355 (B)

Prevalence Index = B/A = 4.17

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks: .5 x 85 = 42.5
.2 x 85 = 17
hydrophytic vegetation not identified.

SOIL

Sampling Point: 5-1-14 (4)

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-24"	10YR 4/2	100					SCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No X

Remarks: no hydric soil indicators observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No X Depth (inches): ______

Water Table Present? Yes ______ No X Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ______ No X Depth (inches): ______

Wetland Hydrology Present? Yes ______ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: no hydrology indicators observed.

APPENDIX B PHOTOGRAPHS

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Photo 1. View southeast of S-1-14 1, wetland data point; wetland W-1-14.

Photo 2. View northwest of S-1-14 2, upland data point.

Photo 3. **View downstream of wetland W-1-14 on the downstream side of the access road that crosses the wetland/drainage.**

Photo 4. **View northwest of wetland area that the drainage associated with wetland W-1-14 terminates into. This area is located southeast and outside of the project area.**

APPENDIX C TOPOGRAPHIC QUADRANGLES (FIGURES 6A AND 6B)

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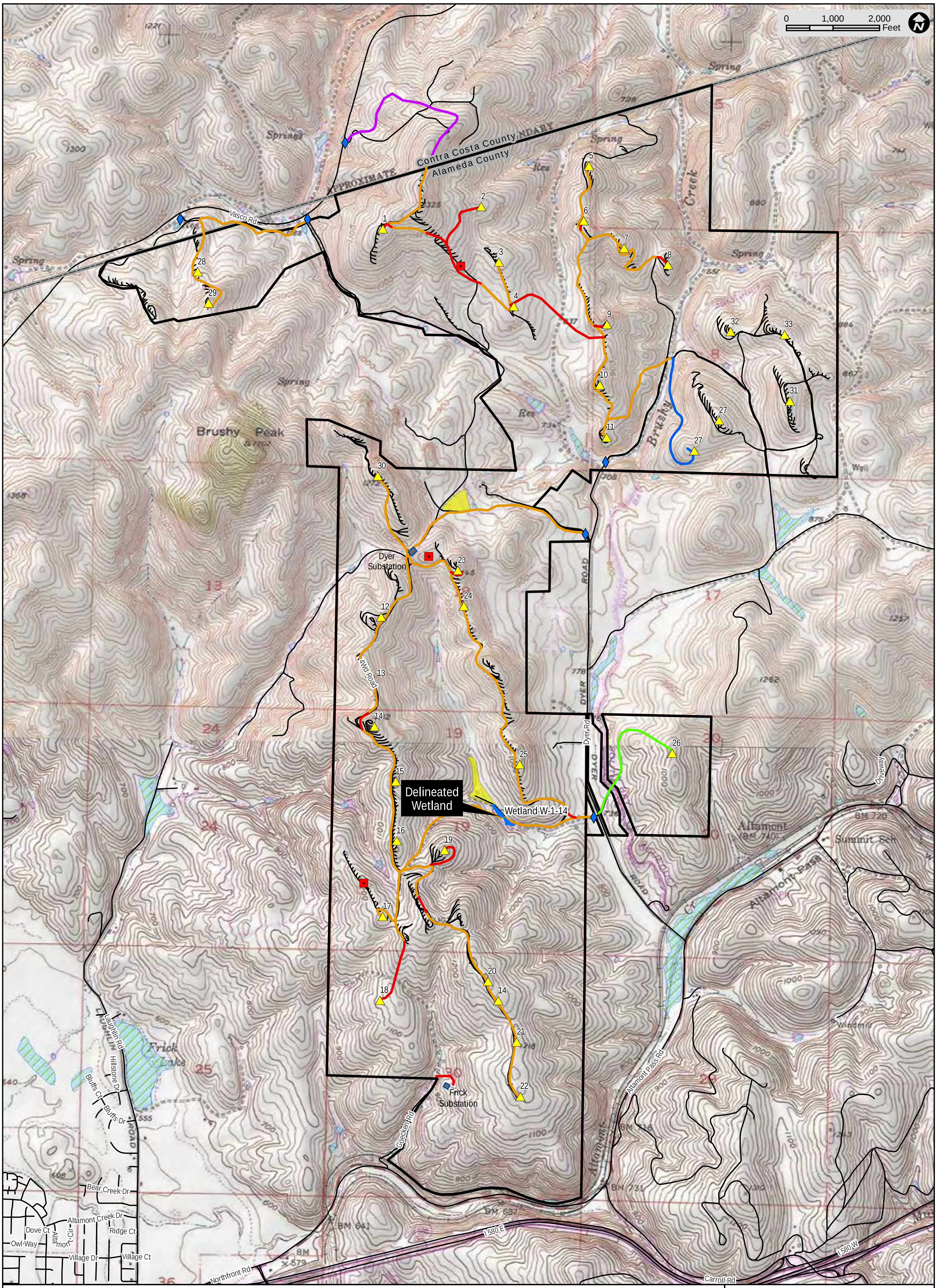

Legend

- Wind Turbine
- Gate
- Met Tower
- Project Boundary
- Substation
- O&M Area
- Existing Road
- Road - New
- Road - Upgraded
- Devincenzi Rd East
- Previously Upgraded Road
- Proposed Access Road (Elliot)
- Delineated Wetlands
- Wetland
- County Boundary

FIGURE 6A
WETLAND W-1-14
USGS TOPOGRAPHIC
QUADRANGLE

ALTAMONT WINDS LLC
PROPOSED SUMMIT WIND
REPOWER PROJECT
ALAMEDA COUNTY, CA

Source: ArcGIS US Topo Maps, USGS, 7.5' Topographic Quadrangles, Altamont (rev. 1981) and Byron Hot Springs (rev. 1978).

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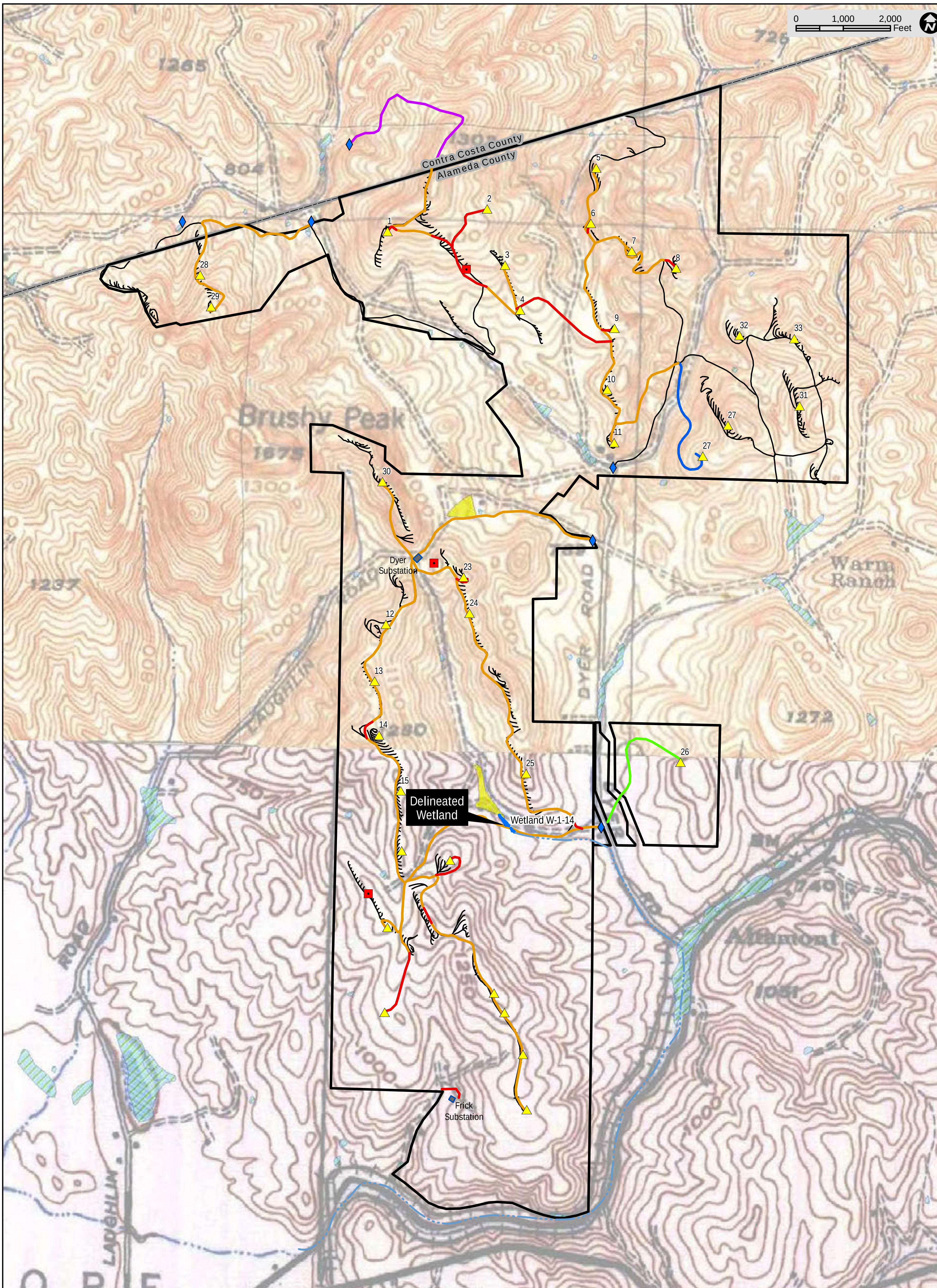

Legend

- Wind Turbine
- Gate
- Met Tower
- Project Boundary
- Substation
- O&M Area
- Road - New
- Road - Upgraded
- Devincenzi Rd East
- Previously Upgraded Road
- Proposed Access Road (Elliot)
- Delineated Wetlands
- Wetland
- County Boundary

FIGURE 6B
WETLAND W-1-14
HISTORIC USACE TOPOGRAPHIC
QUADRANGLE (1942, 1943)

ALTAMONT WINDS LLC
PROPOSED SUMMIT WIND
REPOWER PROJECT
ALAMEDA COUNTY, CA

Source: U.S Army Corps of Engineers, War Department, Altamont (1942) and Byron Hot Springs (1943).

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ATTACHMENT A8: BLADE THROW STUDY

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Epsilon ASSOCIATES INC.

Summit Repower Wind Project - Blade Throw Report PG&E 7-23-2014.docx

PRINCIPALS

Theodore A Barten, PE
Margaret B Briggs
Michael E Guski, CCM
Dale T Raczynski, PE
Cindy Schlessinger
Lester B Smith, Jr
Robert D O'Neal, CCM, INCE
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Michael D Howard, PWS
Laura E Rome
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978 897 7100
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July 23, 2014 Epsilon Ref. 3985

Mr. William Damon
Vice President
Altamont Winds LLC
15850 Jess Ranch Road
Tracy, CA 95377

Subject: Summit Repower Wind Project – Blade Throw Analysis

Dear Bill:

Epsilon Associates, Inc. has been retained by Altamont Winds LLC to evaluate potential impacts on the existing PG&E 60kV transmission lines adjacent to the proposed wind farm in Alameda County, California with respect to blade throw. In addition to the current study, Epsilon has conducted blade throw analyses for six different wind farms, including five in Pacific Gas & Electric Company (PG&E) service territory. A list of these studies is provided in Table 1.

Calculations in the California Energy Commission's Permitting Setback Requirements for Wind Turbines in California, prepared by the California Wind Energy Collaborative, November 2006, report number CEC-500-2005-184, (the "CEC report") were used as a guide in this blade throw analysis. The key assumptions in the calculations, which follow the simple ballistics model prediction methodology in Section 3.4.1 of that report, are the same as those used in blade throw analyses for other recently approved wind projects in California.

For this analysis it was assumed that each Suzlon S97-2.1 MW wind turbine evaluated will have the following characteristics:

- Hub height = 90 m above ground level (AGL)
- Rotor diameter = 97 m
- Rotor blade length = 47.5 m
- Rotor speeds = 11.8 rpm to 17.7 rpm

Blade throw calculations were completed for a full blade release at the maximum nominal rotor speed of 17.7 rpm. Due to the geometry of the S97 rotor, the maximum radial position of the blade's center of gravity for the full blade is 15.803 m (nominally 15.540 m +0.263/-0.500) from the hub center. Aerodynamic forces, considered to be much smaller than the rotor's weight, were not included in the model and the blade was assumed to travel and land in its original plane of rotation. Additionally, blade throw was presumed to occur anywhere within 360 degrees of each wind turbine (independent of wind direction).

The CEC report notes that "the maximum range in a vacuum is achieved when the release angle is 45°" (page 21)[1]. However, this is only true for an object that lands at the same elevation from which it was released, a virtual impossibility for a utility-scale wind turbine on flat or elevated terrain, unless it is located at the bottom of a valley. The base elevation of each WTG, derived from USGS Digital Elevation Model (DEM) data, was used to evaluate elevation changes within 650 ft surrounding each WTG. Based on this information, the maximum elevation drop from any turbine base modeled to a potential impact site can be as much as 98 m (321 ft). Due to these elevation changes, maximum range of throw for a full blade in a vacuum was calculated to occur not at 45°, but rather when the blade's "overhand" release angle is 20° from horizontal.

The results of the analysis found that, for the "full blade" scenario considered, the maximum blade throw ranges between 167 and 196 m (548-643 ft), or between 1.2 and 1.4 times the total turbine height (TTH) of 138.5 m, depending on local terrain. The attached Figure 1 presents the modeled wind farm layout along with the maximum calculated blade throw radii for each turbine shown as shaded circles. Given that the closest distance from any turbine (Turbine #20) to the existing PG&E overhead transmission line is 290 m (2.1 TTH), all wind turbines are well beyond the maximum blade throw distances predicted by this analysis.

[1] For the wind turbines proposed at this site, a release angle of 45° would result in maximum full blade throw of either 182 m (underhand release) or 167 m (overhand release)

If you have any questions on this memo, please contact me at (978) 461-6244, or by e-mail at cemil@epsilonassociates.com.

Sincerely,

EPSILON ASSOCIATES, INC.

Cory Emil, P.E., INCE
Project Engineer

Table 1 Epsilon Blade Throw Project Experience

Developer	Wind Farm	Location	Utility Service Territory (if known)
NextEra Energy	Altamont Wind	Contra Costa County, CA	PG&E
NextEra Energy	Blue Sky Wind	Los Angeles County, CA	PG&E
NextEra Energy	Montezuma I	Solano County, CA	PG&E
NextEra Energy	Montezuma II	Solano County, CA	PG&E
Pattern Energy	Tres Vasqueros	Contra Costa County, CA	PG&E
Confidential	Confidential	Maryland	unknown

G:\Projects2\CA\3985\blade_drop-full_REV1.mxd

Summit Repower Wind Project Alameda County, California

Epsilon

Figure 1

Potential Wind Turbine Blade Throw Areas - Full Blade

ATTACHMENT A9: TRAFFIC CONTROL & TRANSPORTATION PLAN

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Altamont Winds LLC

TRAFFIC CONTROL & TRANSPORTATION PLAN

54 MW Summit Wind Repower Project

Alameda County, California

27 August 2015

15850P Jess Ranch Road • Tracy, California 95377
phone 925.724.0179 • e-mail mw@powerworks.com • www.powerworks.com

Table of Contents

1. INTRODUCTION

This construction Traffic Control and Transportation Plan (**"Plan"**) has been prepared by Altamont Winds LLC to describe how the balance of plant construction contractor (**"BOP Contractor"**) intends to safely and effectively control traffic on, as well as maintain and minimize impacts to, county roads in Alameda, and possibly Contra Costa, Counties (**"County"** or **"Counties"**) that access the 54 MW Summit Wind Repower Project (**"Project"**). This Plan has been prepared in accordance with both the Caltrans Manual on Uniform Traffic Control Devices and the Work Area Traffic Control Handbook ("WATCH") Manual and includes, but is not limited to, the following issues:

> Coordination of Project deliveries including heavy equipment and building materials.

> Directing construction traffic with a flag person as needed.

> Temporary signage, lighting, and traffic control device placement, as required.

> Coordination of construction work hours to minimize arrival/departure times during peak traffic periods (7 a.m. to 9 a.m. and 4 p.m. to 6 p.m.).

> Coordination with County(ies) of any county projects that may impact county roads to be utilized for Project deliveries.

> Ensure access for emergency vehicles to the Project site.

> Temporary rolling closures of travel lanes or disruptions to street segments and intersections during Project deliveries, transmission line stringing activities (if any), or any other utility connections.

> Coordinate access to adjacent properties.

> Specification of both construction related vehicle travel and oversize load haul routes for the minimization of construction traffic during the A.M. and P.M. peak hours.

> Identification of vehicle safety procedures for entering and exiting Project site access roads.

2. Project Description

The Project consists of installing up to 33 new wind turbines, with an alternate location for one wind turbine, for a total of 34 proposed wind turbine sites. The Project is located east of Livermore, California, in Alameda County (see the Project Site Plan attached as Exhibit 6). Project turbine components are anticipated to arrive at the site from multiple worldwide manufacturing locations. The delivery route for turbine delivery is anticipated to be westbound Interstate 580 and then onto Dyer Road, and possibly onto North Vasco Road (Exhibits 1 and 2). The substation transformers are anticipated to be delivered via Interstate 205 in San Joaquin County, then crossing into Alameda County on Interstate 580, then onto Grant Line Road, then onto Altamont Pass Road, and then onto Dyer or Goecken Roads to the Project entrances (Exhibits 1 and 3). Due to the oversized loads needed to deliver materials to the site, suitable and safe accesses need to be in place, requiring widespread use of county roads for Project construction material, turbine and substation component deliveries. These county roads connect with smaller private paved and dirt access roads leading to the turbine sites and the Dyer and Frick substations.

3. TRAFFIC CONTROL PLAN

3.1 Traffic Notification Plan

Prior to the commencement of construction, the BOP Contractor will send postcards to residents in the Project area that may be affected by construction delivery activities notifying them of the Project. Postcards will include contact information for residents to report claims or issues directly to the BOP Contractor's project manager. Site-specific signage will also be posted at each of the Project entrances with information for residents and commuters to report claims or issues.

3.2 Traffic Handling Plan

During the course of the Project, the BOP Contractor will provide signage and/or traffic control to the extent deemed necessary by the conditions and amount of traffic using or accessing the county roads. The BOP Contractor will provide necessary traffic control signage when haul traffic or oversized loads are entering or using the county roads. These signs will inform, control, warn, shift, or stop traffic on all county roads affected by Project traffic. Traffic control will be provided to include the following means of controlling and directing traffic flow:

> Warning and construction signs as needed/required.

> Informational signs as needed/required.

> Flag persons as needed/required.

> Temporary delays in local traffic as needed/required.

Turbine component deliveries will be scheduled during weekdays and coordinated directly with the California Highway Patrol (**"CHP"**), as required. Construction equipment will be delivered directly to the construction locations. Carpooling will be promoted among the employees. Emergency vehicles will have access at all times. Temporary access will be provided to businesses, residences, and/or pedestrians during construction. Local existing utility service providers will be contacted to avoid and manage potential conflicts.

3.3 Main Access Points

The Project will use Interstate 205, Interstate 580, Dyer Road, North Vasco Road, Goecken Road, Grant Line Road and Altamont Pass Road as main access points to the site. All regular and transport traffic will be capable of using their own lane. Prior to the oversize loads arriving at the access point on county roads, traffic will be stopped in both directions for a short time period, allowing the transport to turn into the Project access route safely. Oversized loads that require road closures will utilize escort vehicles, CHP support and/or proper signage prior to closing or disrupting any lanes of traffic. Lanes will be opened as soon as possible to restore normal traffic patterns.

3.4 Special Event Road Closures

The BOP Contractor will coordinate with the County’s(ies’) public works agencies regarding any special events, such as parades or cycling races, that require road closures that may affect construction traffic on Dyer Road, North Vasco Road, Goecken Road, Grant Line Road and Altamont Pass Road. Construction deliveries will not be scheduled on the same day as a special event.

4. TRANSPORTATION PLAN

To ensure safety of the general public, all heavy equipment and building materials will follow the guidelines stated below.

> All construction work hours, heavy equipment deliveries, and timing of building materials will be coordinated with the County(ies) to minimize delays to public traffic.

> During construction, access to adjacent property will be coordinated onsite with the Landowners.

> Temporary closure of travel lanes or disruptions to street segments and intersections during Project deliveries, transmission line stringing activities (if any), or any other utility connections are not to exceed 15 minutes of disruption to traffic.

> The BOP Contractor will work with the County(ies), suppliers, and subcontractors to route trucks for the minimization of construction traffic during the A.M. and P.M. peak hours.

> Turbine deliveries and oversize load equipment deliveries will be coordinated with CHP and the County’s(ies’) public works agencies.

> Turbine deliveries and oversize load equipment deliveries will be limited to Monday through Friday.

> Project deliveries that require CHP escorts, will utilize the CHP for lane closures until the entry point of the Project is reached. All other loads will be monitored and lane closure requests will be utilized if deemed a public safety concern. If any equipment loads permitted through the County(ies) require lane closures, they will be noted on the permit requests.

> Any extra-large loads will have the appropriate permitting.

> Appropriate signage will be posted when necessary or required.

> Roads will be maintained throughout the Project construction duration.

> Appropriate permits will be obtained for as required.

5. EMERGENCY PERSONNEL ACCESS

Upon notification, the BOP Contractor’s site manager, safety coordinator or trade superintendent will respond to the emergency scene and manage emergency operations. In the event of a major medical emergency, the County’s emergency center will be notified and an ambulance and emergency medical team dispatched to the scene. BOP Contractor personnel will be stationed at the site access point nearest the emergency scene to direct and lead arriving outside responders to the emergency scene. In the event of a minor medical case, the affected individual will be transported via company vehicle to the closest medical facility.

6. EQUIPMENT DELIVERY AND WORKER TRIPS

6.1 Building Material and Equipment Delivery

> Wind Turbine Component Trucks (approximately three months) – trucks will travel on interstate 580 and turn north to Dyer Road via Grant Line Road and Altamont Pass Road, or possibly onto North Vasco Road. See attached Exhibits 1 and 2. Trips for turbine component trucks will be limited to weekdays.

> Substation Transformer Truck (one day each for a total of two transformers) – trucks will travel west on Interstate 205 and continue west on Interstate 580 and turn north onto Grant Line Road and then turn west onto Altamont Pass Road. From Altamont Pass Road, the transformer trucks will turn north onto Dyer Road to the site of the Dyer substation, or north onto Goecken Road to the site of the Frick substation. See attached Exhibits 1 and 3. The transformer trucks will travel the same routes i reverse when leaving the Project site.

> Water Trucks from Livermore Water Source (approximately 8-12 months) - trucks will travel on Interstate 580 and turn north to Altamont Pass Road and then to Dyer Road to the site. See attached Exhibit 4. The water trucks will travel the same route in reverse back to the Livermore water source. There will be water trucks running daily on site to provide dust control for the Project.

> Concrete trucks from Livermore (approximately six months) - trucks will travel east from Livermore on Interstate 580 and turn onto Altamont Pass Road and then north onto Dyer Road. See attached Exhibit 4. For the substations, concrete delivery trucks will travel east on Interstate 580 and onto Altamont Pass Road to either Dyer Road or Goecken Road. The trucks will travel the same route in reverse back to Livermore. There will be daily concrete truck trip during the wind turbine foundation construction period.

> Miscellaneous Building Material Trucks (approximately 8-12 months) - miscellaneous building material trucks will travel on Interstate 580 and turn onto Altamont Pass Road and then north onto Dyer Road, or possibly from Interstate 580 onto North Vasco Road. See attached Exhibit 4. For the substations, miscellaneous building material trucks will travel on Interstate 580 and onto Altamont Pass Road and then to either Dyer Road or Goecken Road. Trucks will travel the same route in reverse when leaving the Project site.

> Miscellaneous Equipment Delivery Trucks (approximately 8-12 months) - miscellaneous equipment delivery trucks will travel east from Livermore on Interstate 580 and turn onto Altamont Pass Road then north onto Dyer Road, or possibly from Interstate 580 onto North Vasco Road. See attached Exhibit 4. For the substations, miscellaneous equipment delivery trucks will travel east on Interstate 580 and onto Altamont Pass Road to either Dyer Road or Goecken Road. The trucks will travel the same route in reverse back to Livermore.

6.2 Worker Trips

Worker traffic will be entering on Dyer Road from Interstate 580 via Altamont Pass Road to the site. See attached Exhibit 5. Workers are expected to be on site eight to twelve months, with daily commute trips occurring Monday through Friday. Workers will park in designated areas located within the Project construction area and not along any public roads.

7. ROAD REPAIR

County roads utilized for the Project will be repaired, as necessary, per the Project's encroachment permit's conditions of approval. The roads will be surveyed and the pre-construction state recorded for comparison during and after construction traffic.

EXHIBITS

1 Delivery on County Road – Dyer Road
2 Delivery on County Road – North Vasco Road
3 Delivery on County Road – Goecken Road
4 Water, Concrete & Misc. Truck Delivery Route
5 Worker Trip Route
6 Project Site Plan

EXHIBIT 1
Delivery on County Road – Dyer Road

EXHIBIT 2
Delivery on County Road – North Vasco Road

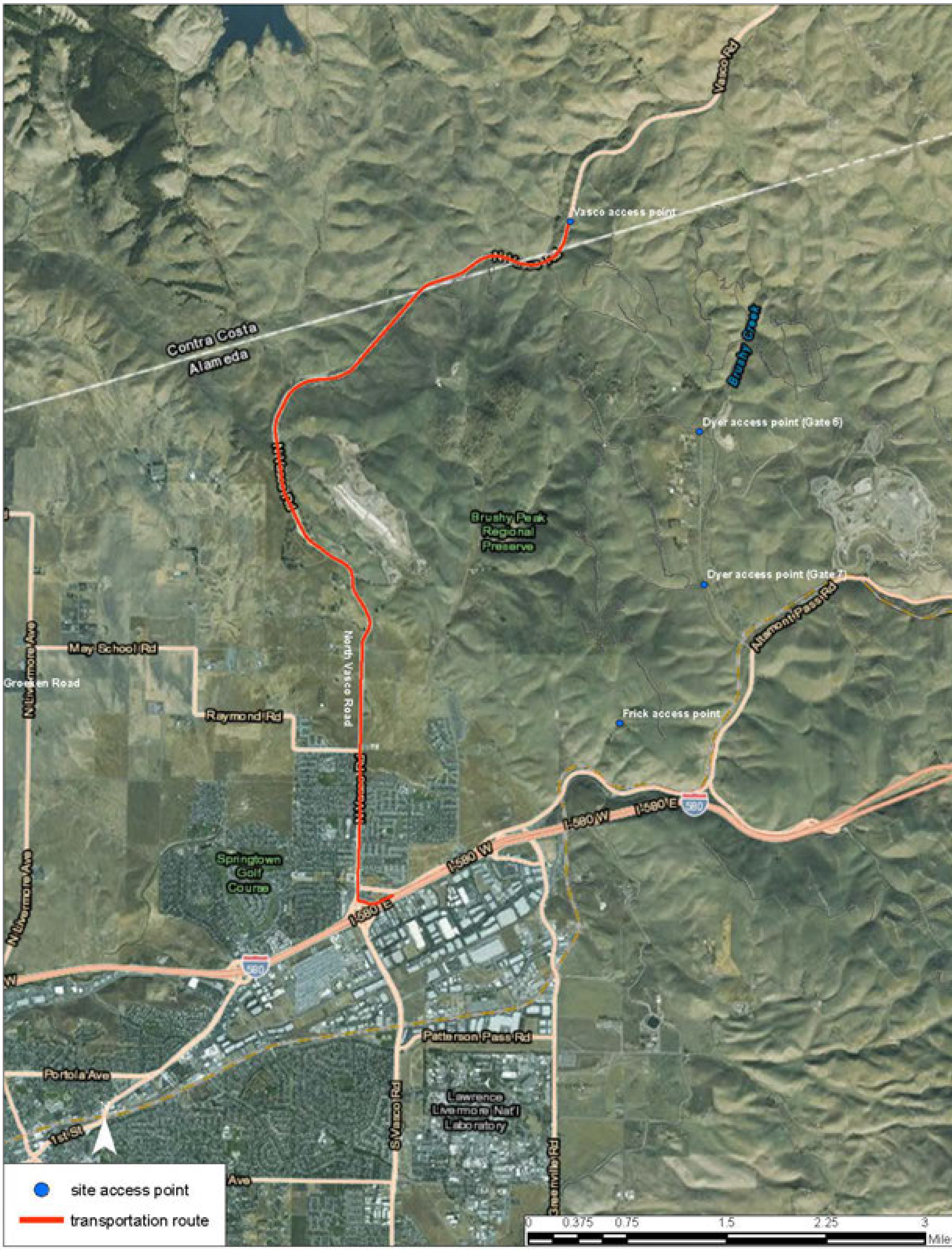


EXHIBIT 3
Delivery on County Road – Goecken Road

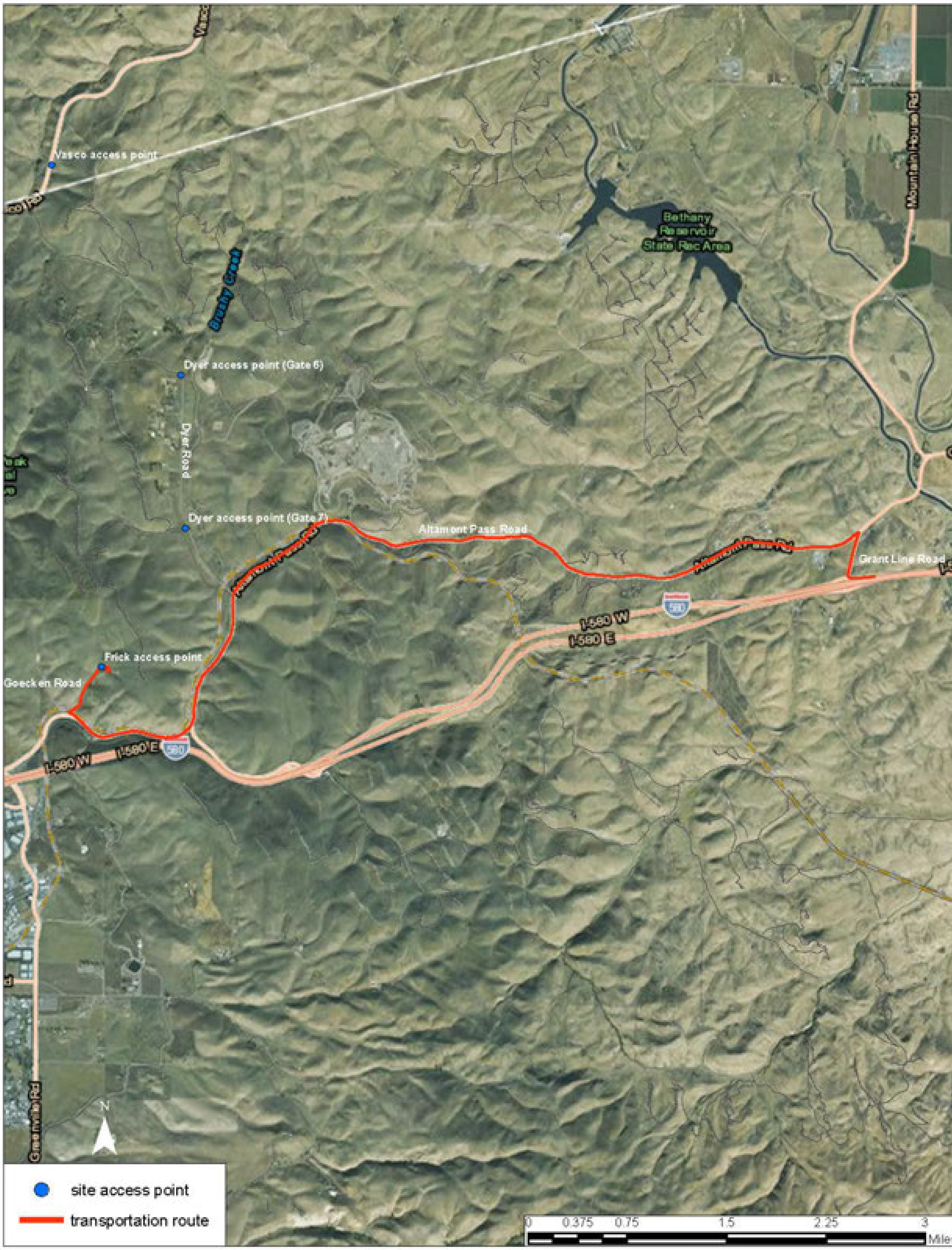


EXHIBIT 4
Water, Concrete & Misc. Truck Delivery Route

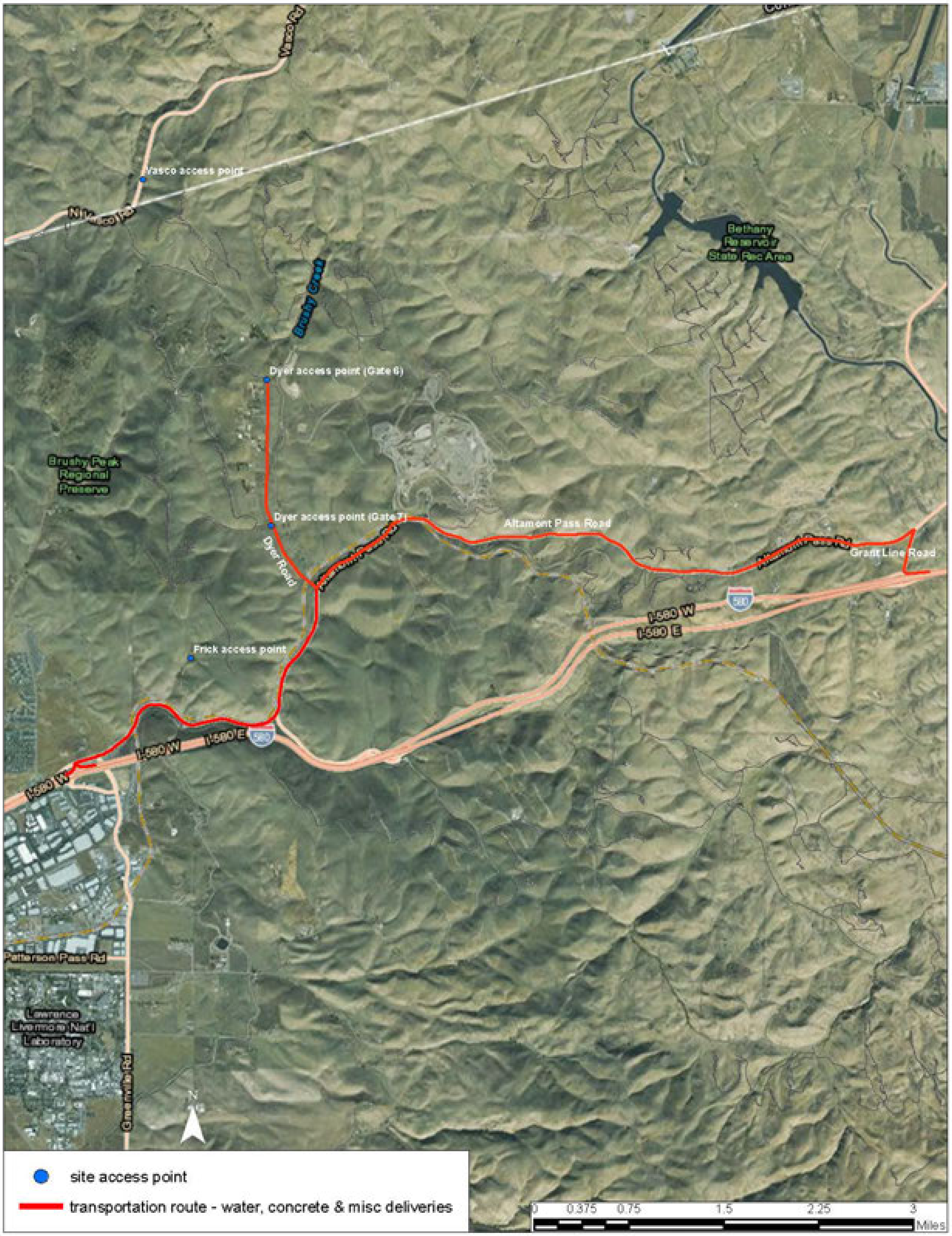


EXHIBIT 5
Worker Trip Route

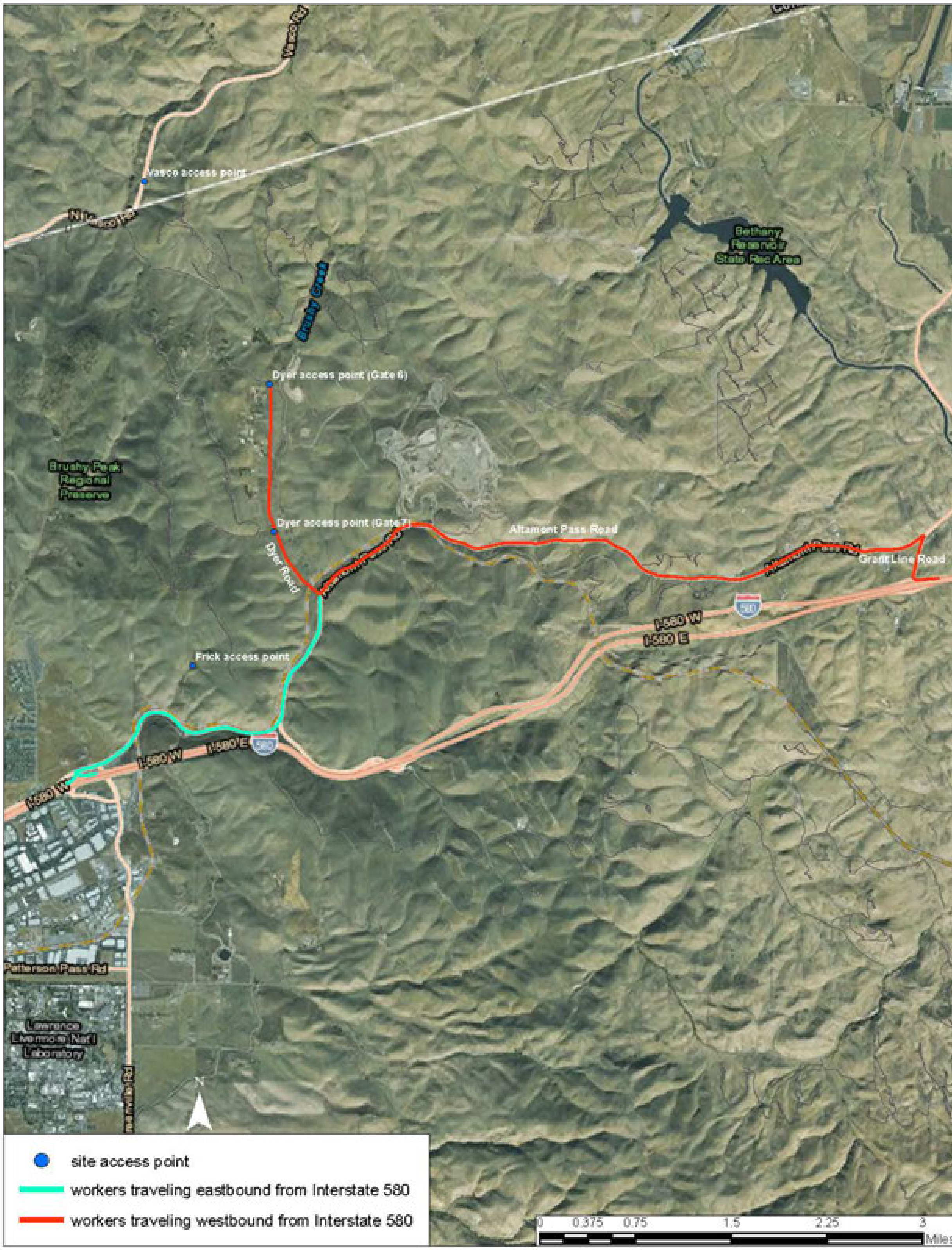
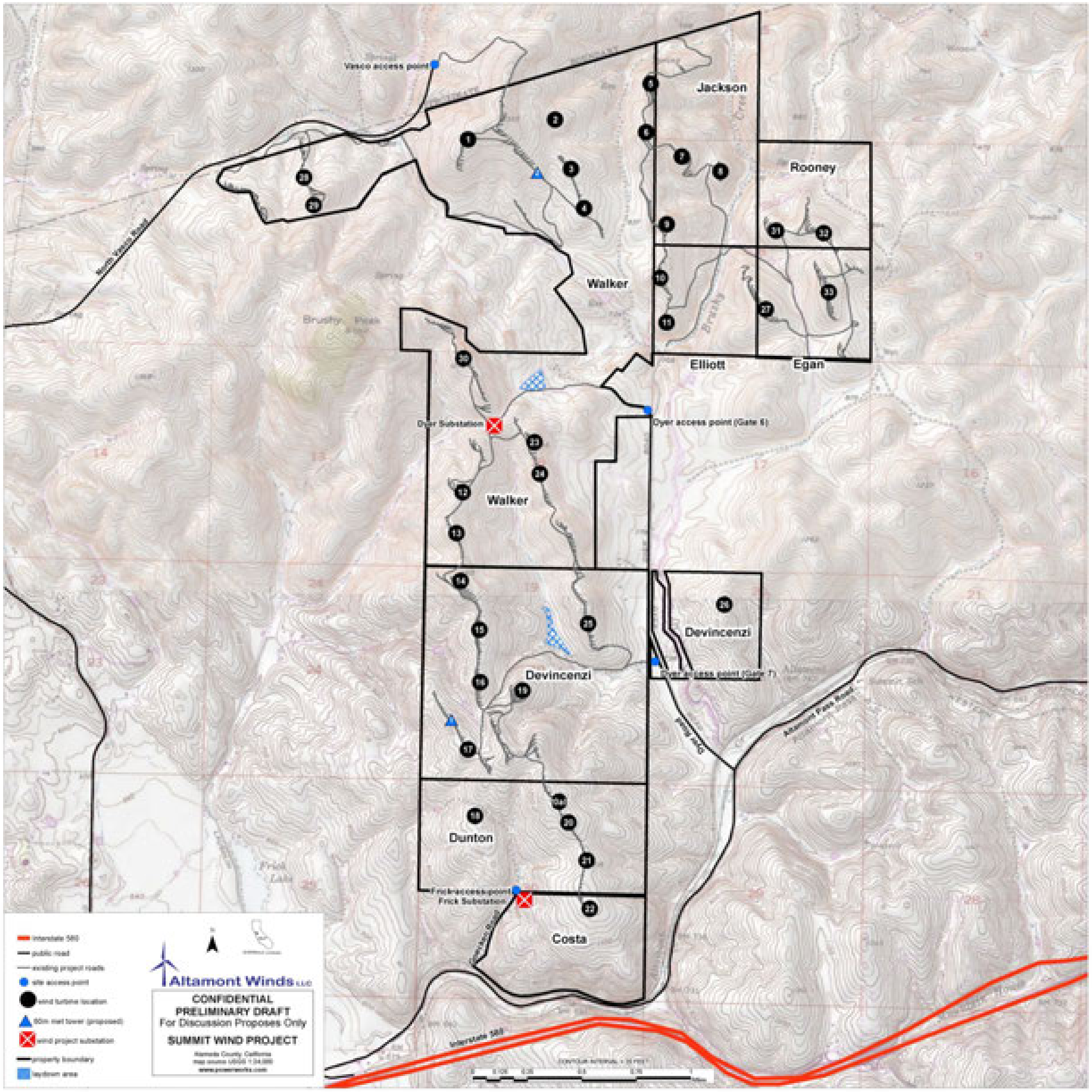


EXHIBIT 6
Project Site Plan



ATTACHMENT A10: NOISE STUDY

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NOISE STUDY

54 MW Summit Wind Repower Project

Alameda County, California

24 September 2015

15850P Jess Ranch Road • Tracy, California 95377
phone 925.724.0179 • e-mail mw@powerworks.com • www.powerworks.com

Table of Contents

1. INTRODUCTION

This noise study describes the environmental setting and regulatory setting for noise related to wind projects. It also describes the noise impacts, if any, that would result from implementation of the Summit Wind Repower Project **"Project"**). Where applicable, mitigation measures are described that would reduce possible impacts.

2. EXISTING CONDITIONS

See Final Program Environmental Impact Report (**"FPEIR"**), Section 3.11.1, "Existing Conditions", for a discussion on federal, state, and county regulations of noise, as well as a discussion on the background of noise in the Program Area, which contains the Project area.

3. ENVIRONMENTAL SETTING

3.1 Existing Land Uses. The Project area is located within the Program Area in the Alameda County (**"County"**) portion of the APWRA. The area is designated as Large Parcel Agriculture under the County Zoning Ordinance and the Environmental Compliance Assurance Procedure ("**ECAP"**). General agriculture, single-family residences, grazing, and riding or hiking trails are allowed uses. Conditional uses that may be allowed through a Conditional Use Permit (**"CUP"**) granted by the County include outdoor recreation facilities, transmission facilities, solid waste landfills, and windfarms. CUPs are developed to be consistent with general plan policies and other land uses permitted by the County's general plan.

3.2 Project Area. Scattered single-family rural residences are located within the Project boundary, including homes on both very large parcels (more than 100 acres) and comparatively small lots (less than 5 acres). Single-family rural residences are mostly located along the west side of the Project area and, within the Project area, to the east along Dyer Road.

3.3 Existing Noise Conditions. See FPEIR, Section 3.11.1, "Existing Conditions," "Existing Noise Conditions," for a discussion on the existing conditions of noise in the Program Area, which contains the Project area.

4. ENVIRONMENTAL IMPACTS

This section describes the impact analysis relating to noise for the Project. It describes the methods used to determine the impacts of the Project and lists the thresholds used to conclude whether an impact would be considered significant. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany the impact discussion.

4.1 Methods for Analysis. See FPEIR, Section 3.11.2, "Environmental Impacts," "Methods for Analysis," for a discussion on the method of analysis and tables that provide background in the analysis of noise in the Program Area, which contains the Project area. WindPRO, a commercially available windfarm siting software, was also used to analyze the noise impacts of the Project.

4.2 Determination of Significance. In accordance with Appendix G of the State CEQA Guidelines and the County conditions of approval for the existing turbine operations, the Summit Project would be considered to have a significant effect if it would result in any of the conditions listed below:

> Exposure of residences to noise from new wind turbines in excess of 55 decibel A filter (**"dBA"**) Day-night Average Sound Level (**"Ldn"**) where existing wind turbine noise is currently less than 55 dBA (Ldn). In the situation where the dwelling unit is on the same parcel being leased for a windfarm, 65 dBA (Ldn) is used as the threshold.

> Exposure of residences to a daily noise increase in Ldn value of more than 5 decibel (**"dB"**) from the addition of new wind turbines where the existing noise level is in excess of 55 dBA (Ldn). In the situation where the dwelling unit is on the same parcel being leased for a windfarm, 65 dBA (Ldn) is used as the threshold.

> Exposure of residences to equipment noise associated with construction activities that exceed County noise ordinance standards (See FPEIR, Section 3.11.1, Table 3.11-3) during nonexempt hours (7 p.m. to 7 a.m. on weekdays and 5 p.m. to 8 a.m. on Saturday and Sunday).

4.3 Impacts and Mitigation Measures

4.3.1 Impact NOI-1d: Exposure of residences to noise from new wind turbines—Summit Project (less than significant with mitigation)

The Project would remove the majority of the existing turbines (about 569 turbines) in the Project area and install up to 33 larger (with one alternative turbine location), current-generation turbines. Exhibit 1 shows the layout of proposed turbines in the Project area footprint.

As discussed in the FPEIR, Section 3.11.1, "Environmental Setting," "Existing Noise Conditions," there are no documented instances of wind turbines causing exceedance of noise standards in the existing CUPs. In addition, proposed modern turbines have several characteristics that reduce aerodynamic sound levels and make for quieter operations than the existing turbines. The modern turbines have relatively low rotational speeds and sophisticated pitch control on the rotors, both of which reduce sound levels.

The noise prediction results in the FPEIR, Section 3.11-2, Table 3.11-5, attached as Exhibit 2, however, indicate that residences located within about 1,750 feet of a group of wind turbines could possibly be exposed to noise that exceeds 55 dBA (L_{dn}) or increases in noise greater than 5 dB. Because of the possibility that daily L_{dn} value caused by wind turbines could increase by more than 5 dB at locations where noise currently exceeds 55 dBA (L_{dn}), or that residences could be exposed to noise in excess of 55 dBA (L_{dn}) where noise is currently less than 55 dBA (L_{dn}), Mitigation Measure NOI-1, which would reduce this impact to a less-than-significant level, should be implemented.

Mitigation Measure NOI-1: Perform project-specific noise studies and implement measures to comply with County noise standards

Note that a Project-specific noise study is presented in Exhibit 3, conducted using WindPRO software, assuming Suzlon S97 wind turbines and twenty-six (26) noise receptors (A through Z). WindPRO outputs results in units of dBA, rather than dBA (Ldn). The WindPRO units have been converted to dBA (Ldn) and are compared to the FPEIR standards in Table 3.1 and Figure 3.1 of Exhibit 3. The results show that the noise level at each of the noise receptors is below the thresholds of the FPEIR standard, and therefore, considered to be less than significant.

4.3.2 Impact NOI-2d: Exposure of residences to noise during decommissioning and new turbine construction—Summit Project (less than significant with mitigation)

Construction noise levels associated with anticipated construction phases and equipment for the repowering are discussed in the FPEIR, Section 3.11.2, under Impact NOI-2a and summarized in FPEIR, Section 3.11.2, Tables 3.11-7 through 3.11-9. FPEIR, Section 3.11.2, Table 3.11-9 summarizes the distances within which County noise standards could be exceeded as a result of the construction activities. The Project would include turbine removal and restoration activities located within distances to residences where the results in Table 3.11-9, indicate that these activities could result in noise that exceeds County noise ordinance standards. This impact is therefore considered to be significant. Implementation of Mitigation Measure NOI-2 would reduce this impact to a less-than-significant level.

Mitigation Measure NOI-2: Employ noise-reducing practices during decommissioning and new turbine construction

As discussed under FPEIR Impacts NOI-2a-1 and NOI-2a-2, the construction traffic increase would increase traffic noise by less than 2 dB, which would not be a noticeable increase at nearby residential uses along the major county roads; therefore, the impact of construction traffic noise is considered to be less than significant.

5. CONCLUSION

The results of the WindPRO noise study the for Project indicates that the noise level at each of the twenty-six (26) noise receptors (A through Z), assuming Suzlon S97 wind turbines are installed, is less than the allowable thresholds of the FPEIR standards, and therefore, considered to be less than significant.

Similarly, the construction traffic increase would increase traffic noise by less than 2 dB, which would not be a noticeable increase at nearby residential uses along the major county roads; therefore, the impact of construction traffic noise is considered to be less than significant.

EXHIBITS

1 Project Layout
2 FPEIR Table 3.11-5, Turbine Noise Level as a Function of Distance
3 Summit WindPRO Noise Calculations

EXHIBIT 1
Project Layout

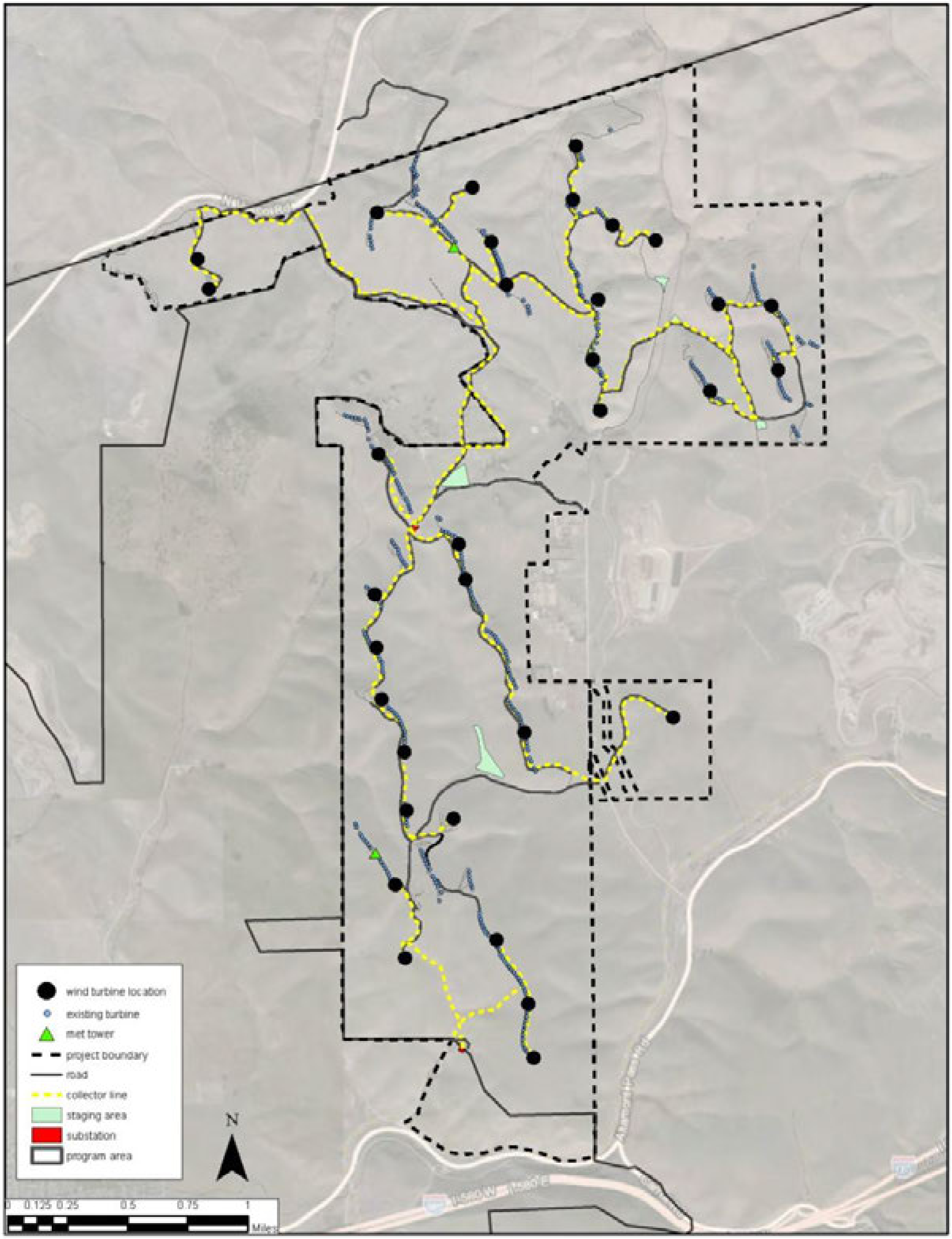

EXHIBIT 2
FPEIR Table 3.11-5, Turbine Noise Level as a Function of Distance

Table 3.11-5. Turbine Noise Level, dBA (L_{dn}), as a Function of Distance and Number of Turbines

	Number of Turbines Influencing the Received Noise Level						
Distance (feet)	1	2	3	4	5	7	10
500	56	59	61	62	63	64	66
550	55	58	60	61	62	63	65
750	52	55	57	58	59	60	62
1,000	50	53	55	56	57	58	60
1,150	49	52	54	55	56	57	59
1,250	48	51	53	54	55	56	58
1,400	47	50	52	53	54	55	57
1,500	46	49	51	52	53	54	56
1,750	45	48	50	51	52	53	55
2,000	44	47	49	50	51	52	54
2,500	42	45	47	48	49	50	52
3,000	40	43	45	46	47	48	50

Note: Based on simple geometric attenuation of 6 dB per doubling of distance.

EXHIBIT 3
Summit WindPRO Noise Calculations

WindPRO version 2.9.269 Nov 2013

Project:
Summit

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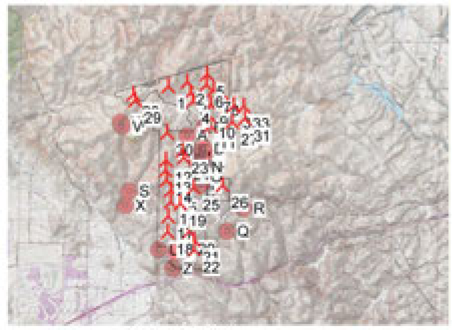
Licensed user:
Pacific Winds LLC
15850P Jess Ranch Road
US-TRACY, CA 95377
+1 925 724 0175
Ryan Darlow / rd@powerworks.com

Calculated:
8/27/2014 10:41 AM/2.9.269

DECIBEL - Main Result

Calculation: Summit 082714 proposed sound

Noise calculation model:
ISO 9613-2 General
Wind speed:
8.0 m/s
Ground attenuation:
None
Meteorological coefficient, C0:
0.0 dB
Type of demand in calculation:
1: WTG noise is compared to demand (DK, DE, SE, NL etc.)
Noise values in calculation:
All noise values are mean values (Lwa) (Normal)
Pure tones:
Pure tone penalty are added to demand: 5.0 dB(A)
Height above ground level, when no value in NSA object:
1.5 m Don't allow override of model height with height from NSA object
Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:
0.0 dB(A)



Scale 1:200,000
New WTG
Noise sensitive area

WTGs

	UTM (north)-WGS84 Zone: 10				WTG type						Noise data				
	East	North	Z [m]	Row data/Description	Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Creator	Name	Wind speed [m/s]	LwA,ref [dB(A)]	Pure tones
1	615,072	4,182,240	379.3	WT01-S972.1MW	Yes	Suzlon	S97-contract-2,100	2,100	97.0	90.0	USER	Level 0 -SBT47 1/3 octave	8.0	105.7	No
2	615,715	4,182,400	316.4	WT02-S972.1MW	Yes	Suzlon	S97-contract-2,100	2,100	97.0	90.0	USER	Level 0 -SBT47 1/3 octave	8.0	105.7	No
3	615,840	4,182,036	307.9	WT03-S972.1MW	Yes	Suzlon	S97-contract-2,100	2,100	97.0	90.0	USER	Level 0 -SBT47 1/3 octave	8.0	105.7	No
4	615,934	4,181,749	285.6	WT04-S972.1MW	Yes	Suzlon	S97-contract-2,100	2,100	97.0	90.0	USER	Level 0 -SBT47 1/3 octave	8.0	105.7	No
5	616,401	4,182,689	242.4	WT05-S972.1MW	Yes	Suzlon	S97-contract-2,100	2,100	97.0	90.0	USER	Level 0 -SBT47 1/3 octave	8.0	105.7	No
6	616,383	4,182,326	275.0	WT06-S972.1MW	Yes	Suzlon	S97-contract-2,100	2,100	97.0	90.0	USER	Level 0 -SBT47 1/3 octave	8.0	105.7	No
7	616,649	4,182,154	265.0	WT07-S972.1MW	Yes	Suzlon	S97-contract-2,100	2,100	97.0	90.0	USER	Level 0 -SBT47 1/3 octave	8.0	105.7	No
8	616,936	4,182,056	225.0	WT08-S972.1MW	Yes	Suzlon	S97-contract-2,100	2,100	97.0	90.0	USER	Level 0 -SBT47 1/3 octave	8.0	105.7	No
9	616,557	4,181,651	270.2	WT09-S972.1MW	Yes	Suzlon	S97-contract-2,100	2,100	97.0	90.0	USER	Level 0 -SBT47 1/3 octave	8.0	105.7	No
10	616,512	4,181,260	280.0	WT10-S972.1MW	Yes	Suzlon	S97-contract-2,100	2,100	97.0	90.0	USER	Level 0 -SBT47 1/3 octave	8.0	105.7	No
11	616,568	4,180,912	247.7	WT11-S972.1MW	Yes	Suzlon	S97-contract-2,100	2,100	97.0	90.0	USER	Level 0 -SBT47 1/3 octave	8.0	105.7	No
12	615,053	4,179,682	356.6	WT12-S972.1MW	Yes	Suzlon	S97-contract-2,100	2,100	97.0	90.0	USER	Level 0 -SBT47 1/3 octave	8.0	105.7	No
13	615,053	4,179,329	369.7	WT13-S972.1MW	Yes	Suzlon	S97-contract-2,100	2,100	97.0	90.0	USER	Level 0 -SBT47 1/3 octave	8.0	105.7	No
14	615,090	4,178,981	385.0	WT14-S972.1MW	Yes	Suzlon	S97-contract-2,100	2,100	97.0	90.0	USER	Level 0 -SBT47 1/3 octave	8.0	105.7	No
15	615,251	4,178,638	360.0	WT15-S972.1MW	Yes	Suzlon	S97-contract-2,100	2,100	97.0	90.0	USER	Level 0 -SBT47 1/3 octave	8.0	105.7	No
16	615,257	4,178,239	354.3	WT16-S972.1MW	Yes	Suzlon	S97-contract-2,100	2,100	97.0	90.0	USER	Level 0 -SBT47 1/3 octave	8.0	105.7	No
17	615,183	4,177,741	368.8	WT17-S972.1MW	Yes	Suzlon	S97-contract-2,100	2,100	97.0	90.0	USER	Level 0 -SBT47 1/3 octave	8.0	105.7	No
18	615,179	4,177,194	336.2	WT18-S972.1MW	Yes	Suzlon	S97-contract-2,100	2,100	97.0	90.0	USER	Level 0 -SBT47 1/3 octave	8.0	105.7	No
19	615,584	4,178,188	345.0	WT19-S972.1MW	Yes	Suzlon	S97-contract-2,100	2,100	97.0	90.0	USER	Level 0 -SBT47 1/3 octave	8.0	105.7	No
20	615,929	4,177,229	380.0	WT20-S972.1MW	Yes	Suzlon	S97-contract-2,100	2,100	97.0	90.0	USER	Level 0 -SBT47 1/3 octave	8.0	105.7	No
21	616,095	4,176,948	365.0	WT21-S972.1MW	Yes	Suzlon	S97-contract-2,100	2,100	97.0	90.0	USER	Level 0 -SBT47 1/3 octave	8.0	105.7	No
22	616,118	4,176,599	364.6	WT22-S972.1MW	Yes	Suzlon	S97-contract-2,100	2,100	97.0	90.0	USER	Level 0 -SBT47 1/3 octave	8.0	105.7	No
23	615,623	4,180,012	334.6	WT23-S972.1MW	Yes	Suzlon	S97-contract-2,100	2,100	97.0	90.0	USER	Level 0 -SBT47 1/3 octave	8.0	105.7	No
24	615,670	4,179,784	323.7	WT24-S972.1MW	Yes	Suzlon	S97-contract-2,100	2,100	97.0	90.0	USER	Level 0 -SBT47 1/3 octave	8.0	105.7	No
25	616,051	4,178,756	300.0	WT25-S972.1MW	Yes	Suzlon	S97-contract-2,100	2,100	97.0	90.0	USER	Level 0 -SBT47 1/3 octave	8.0	105.7	No
26	617,040	4,178,856	304.1	WT26-S972.1MW	Yes	Suzlon	S97-contract-2,100	2,100	97.0	90.0	USER	Level 0 -SBT47 1/3 octave	8.0	105.7	No
27	617,308	4,181,053	307.6	WT27-S972.1MW	Yes	Suzlon	S97-contract-2,100	2,100	97.0	90.0	USER	Level 0 -SBT47 1/3 octave	8.0	105.7	No
28	613,863	4,181,933	328.1	WT28-S972.1MW	Yes	Suzlon	S97-contract-2,100	2,100	97.0	90.0	USER	Level 0 -SBT47 1/3 octave	8.0	105.7	No
29	613,938	4,181,723	371.1	WT29-S972.1MW	Yes	Suzlon	S97-contract-2,100	2,100	97.0	90.0	USER	Level 0 -SBT47 1/3 octave	8.0	105.7	No
30	615,069	4,180,629	375.0	WT30-S972.1MW	Yes	Suzlon	S97-contract-2,100	2,100	97.0	90.0	USER	Level 0 -SBT47 1/3 octave	8.0	105.7	No
31	617,750	4,181,187	315.0	WT31-S972.1MW	Yes	Suzlon	S97-contract-2,100	2,100	97.0	90.0	USER	Level 0 -SBT47 1/3 octave	8.0	105.7	No
32	617,352	4,181,631	261.8	WT32-S972.1MW	Yes	Suzlon	S97-contract-2,100	2,100	97.0	90.0	USER	Level 0 -SBT47 1/3 octave	8.0	105.7	No
33	617,706	4,181,617	290.0	WT33-S972.1MW	Yes	Suzlon	S97-contract-2,100	2,100	97.0	90.0	USER	Level 0 -SBT47 1/3 octave	8.0	105.7	No

Calculation Results

Project
Summit

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8/29/2014 10:43 AM / 2

Licensed user
Pacific Winds LLC
15850P Jess Ranch Road
US-TRACY, CA 95377
+1 925 724 0175
Ryan Darlow / rd@powerworks.com

Calculated
8/27/2014 10:41 AM/2.9.269

DECIBEL - Main Result

Calculation: Summit 082714 proposed sound

Sound Level

Noise sensitive area		UTM (north)-WGS84 Zone: 10				Demands	Sound Level		Demands fulfilled ?
No.	Name	East	North	Z [m]	Imission height [m]	Noise [dB(A)]	From WTGs [dB(A)]	Distance to noise demand [m]	Noise
A	Sound Receptor 1	615,761	4,180,554	265.0	1.5	58.6	46.6	762	Yes
B	Sound Receptor 2	616,318	4,180,833	226.9	1.5	58.6	50.1	469	Yes
C	Sound Receptor 3	616,312	4,180,181	257.8	1.5	48.6	45.5	346	Yes
D	Sound Receptor 4	616,347	4,180,106	257.5	1.5	48.6	45.3	360	Yes
E	Sound Receptor 5	616,330	4,180,029	260.8	1.5	48.6	45.3	328	Yes
F	Sound Receptor 6	616,418	4,179,938	255.0	1.5	48.6	44.8	407	Yes
G	Sound Receptor 7	616,287	4,179,877	260.3	1.5	48.6	45.5	273	Yes
H	Sound Receptor 8	616,126	4,179,826	265.0	1.5	48.6	47.0	114	Yes
I	Sound Receptor 9	616,226	4,179,776	260.0	1.5	48.6	46.0	216	Yes
J	Sound Receptor 10	616,104	4,179,648	266.1	1.5	48.6	47.0	123	Yes
K	Sound Receptor 11	616,372	4,179,626	255.0	1.5	48.6	44.9	386	Yes
L	Sound Receptor 12	616,375	4,179,594	254.1	1.5	48.6	44.9	397	Yes
M	Sound Receptor 13	616,181	4,179,548	258.2	1.5	48.6	46.1	229	Yes
N	Sound Receptor 14	616,272	4,179,466	250.6	1.5	48.6	45.4	345	Yes
O	Sound Receptor 15	616,256	4,179,144	252.0	1.5	48.6	46.6	150	Yes
P	Sound Receptor 16	616,271	4,178,850	244.1	1.5	58.6	49.3	1,124	Yes
Q	Sound Receptor 17	617,233	4,177,275	230.0	1.5	48.6	39.7	872	Yes
R	Sound Receptor 18	617,786	4,178,075	234.4	1.5	48.6	38.6	833	Yes
S	Sound Receptor 19	613,804	4,178,577	196.6	1.5	48.6	39.9	986	Yes
T	Sound Receptor 20	615,489	4,176,498	252.9	1.5	48.6	44.4	326	Yes
U	Sound Receptor 21	614,885	4,176,567	225.0	1.5	48.6	42.1	428	Yes
V	Sound Receptor 22	613,490	4,180,809	362.5	1.5	48.6	40.0	721	Yes
W	Sound Receptor 23	613,455	4,180,953	403.5	1.5	48.6	40.5	612	Yes
X	Sound Receptor 24	613,682	4,178,076	195.9	1.5	48.6	38.7	1,200	Yes
Y	Sound Receptor 25	616,312	4,178,891	237.1	1.5	58.6	48.2	1,113	Yes
Z	Sound Receptor 26	615,390	4,175,927	202.8	1.5	48.6	39.7	718	Yes

Distances (m)

WTG	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
1	1822	1880	2404	2486	2544	2667	2657	2634	2721	2790	2920	2950	2912	3023	3315	3596	5415	4972	3877	5758	5676	2133
2	1847	1679	2298	2379	2449	2560	2587	2607	2673	2779	2851	2883	2890	2986	3301	3593	5345	4795	4274	5906	5892	2735
3	1485	1295	1914	1996	2066	2176	2205	2228	2293	2403	2468	2500	2511	2606	2922	3215	4961	4413	4014	5549	5552	2651
4	1208	993	1613	1694	1765	1875	1905	1933	1995	2108	2168	2200	2215	2308	2625	2919	4650	4114	3821	5270	5287	2619
5	2229	1858	2510	2584	2661	2751	2815	2876	2918	3056	3063	3095	3149	3226	3548	3841	5478	4818	4863	6258	6307	3465
6	1878	1494	2146	2220	2298	2388	2451	2513	2555	2692	2700	2732	2785	2862	3185	3478	5122	4477	4550	5896	5951	3266
7	1830	1362	2002	2070	2149	2228	2306	2386	2415	2565	2543	2575	2648	2714	3036	3326	4914	4235	4571	5774	5850	3434
8	1906	1371	1976	2037	2116	2181	2274	2373	2388	2548	2495	2525	2619	2674	2991	3274	4790	4071	4682	5744	5860	3665
9	1356	852	1490	1559	1638	1719	1794	1875	1904	2054	2033	2065	2136	2204	2525	2816	4428	3781	4127	5263	5352	3181
10	1031	469	1097	1165	1244	1325	1401	1485	1511	1662	1640	1671	1743	1810	2131	2422	4049	3430	3812	4870	4967	3056
11	883	262	774	836	914	985	1072	1172	1186	1346	1301	1332	1418	1476	1795	2083	3697	3088	3618	4544	4650	3079
12	1123	1710	1354	1362	1323	1389	1249	1083	1177	1052	1320	1325	1136	1238	1318	1475	3248	3170	1668	3214	3120	1927
13	1415	1965	1520	1509	1456	1495	1350	1182	1255	1098	1352	1348	1149	1226	1217	1308	2995	3007	1458	2864	2767	2153
14	1710	2222	1713	1687	1624	1637	1495	1337	1387	1214	1435	1424	1230	1278	1177	1188	2739	2844	1348	2514	2422	2430
15	1982	2441	1873	1832	1760	1747	1615	1475	1499	1322	1494	1476	1301	1315	1125	1042	2406	2597	1448	2153	2103	2795
16	2369	2803	2210	2162	2087	2058	1935	1810	1817	1644	1780	1757	1602	1593	1348	1184	2199	2534	1492	1756	1713	3119
17	2871	3294	2689	2636	2560	2520	2405	2288	2287	2118	2229	2203	2064	2040	1766	1554	2102	2624	1613	1280	1211	3504
18	3409	3813	3194	3137	3059	3010	2902	2797	2788	2622	2708	2681	2558	2521	2227	1983	2055	2752	1950	762	893	3990
19	2372	2745	2122	2064	1986	1939	1830	1725	1713	1550	1640	1613	1485	1451	1169	954	1885	2205	1822	1693	1765	3355
20	3328	3624	2976	2907	2828	2752	2672	2604	2564	2425	2437	2406	2332	2263	1942	1656	1304	2040	2517	854	1237	4332
21	3621	3892	3240	3168	3090	3008	2935	2878	2831	2700	2692	2661	2602	2524	2202	1910	1184	2032	2811	755	1268	4658
22	3970	4238	3587	3514	3436	3352	3282	3227	3178	3049	3037	3006	2949	2871	2548	2256	1304	2227	3044	637	1233	4963
23	559	1076	710	730	707	799	676	536	648	603	843	861	726	846	1074	1331	3175	2904	2317	3516	3523	2277
24	775	1233	755	750	704	764	624	458	558	455	719	730	583	680	887	1110	2958	2720	2222	3291	3311	2409
25	1821	2094	1449	1382	1303	1238	1145	1073	1035	894	927	898	803	743	439	239	1895	1864	2254	2327	2480	3282

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DECIBEL - Main Result

Calculation: Summit 082714 proposed sound

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WTG	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
26	2126	2105	1512	1429	1371	1248	1269	1333	1229	1226	1020	994	1103	981	836	769	1593	1080	3248	2822	3144	4052
27	1625	1014	1324	1349	1416	1427	1567	1704	1674	1850	1707	1732	1880	1895	2180	2435	3779	3017	4291	4905	5099	3828
28	2346	2890	3011	3083	3116	3241	3178	3092	3199	3200	3408	3432	3325	3448	3674	3911	5749	5502	3358	5873	5462	1184
29	2166	2541	2831	2902	2932	3056	2988	2896	3005	3000	3213	3236	3125	3247	3468	3701	5536	5303	3149	5451	5243	1018
30	696	1266	1321	1381	1396	1515	1431	1327	1437	1426	1644	1666	1550	1673	1901	2147	3991	3729	2410	4152	4066	1589
31	2087	1475	1755	1771	1832	1826	1963	2119	2077	2253	2082	2104	2269	2268	2531	2765	3948	3112	4731	5205	5436	4276
32	1921	1306	1784	1826	1900	1933	2052	2182	2170	2343	2232	2259	2389	2419	2716	2984	4358	3582	4681	5461	5633	3948
33	2217	1594	2002	2032	2101	2116	2245	2389	2362	2539	2397	2422	2571	2585	2867	3117	4368	3543	4947	5579	5785	4293

WTG	W	X	Y	Z
1	2067	4390	3571	6321
2	2684	4778	3559	6481
3	2619	4510	3180	6125
4	2604	4309	2883	5847
5	3419	5355	3799	6837
6	3234	5036	3435	6475
7	3413	5043	3280	6353
8	3652	5141	3226	6321
9	3180	4588	2771	5842
10	3073	4260	2377	5449
11	3113	4046	2037	5122
12	2042	2112	1487	3770
13	2279	1857	1333	3418
14	2562	1674	1225	3068
15	2930	1666	1091	2714
16	3258	1583	1240	2315
17	3647	1538	1612	1825
18	4135	1737	2040	1285
19	3490	1905	1012	2269
20	4471	2402	1705	1409
21	4797	2664	1955	1240
22	5103	2849	2300	991
23	2363	2741	1316	4091
24	2505	2621	1099	3867
25	3401	2465	294	2905
26	4154	3448	729	3362
27	3854	4692	2380	5473
28	1061	3861	3905	6196
29	909	3656	3696	5975
30	1646	2905	2136	4712
31	4301	5121	2709	5765
32	3955	5109	2930	6032
33	4302	5360	3062	6143

WindPRO version 2.9.269 Nov 2013

Project
Summit

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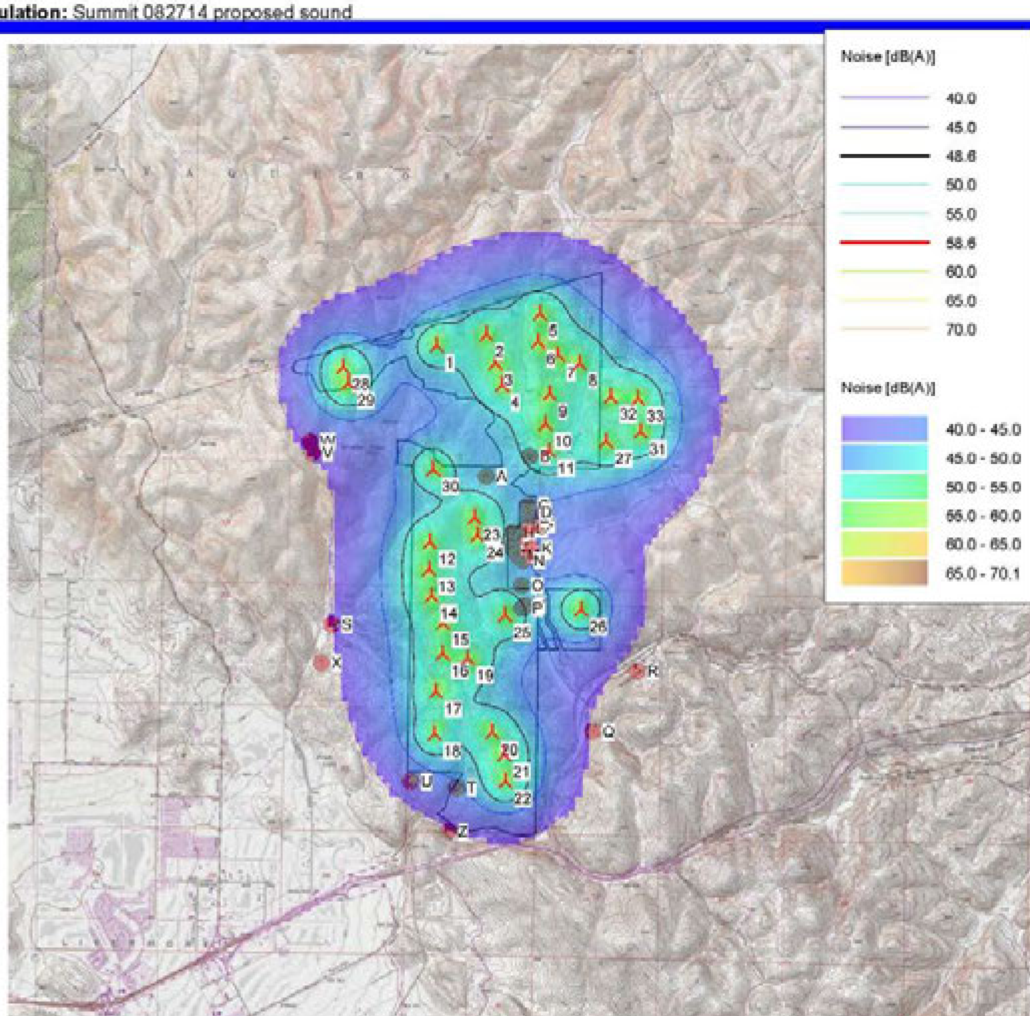
DECIBEL - Map 8.0 m/s

Calculation: Summit 082714 proposed sound



Map: 50k topo cropped , Print scale 1:75,000, Map center UTM (north)-WGS84 Zone: 10 East: 615,808 North: 4,179,644

New WTG   Noise sensitive area

Noise calculation model: ISO 9613-2 General. Wind speed: 8.0 m/s

Height above sea level from active line object

WindPRO is developed by EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

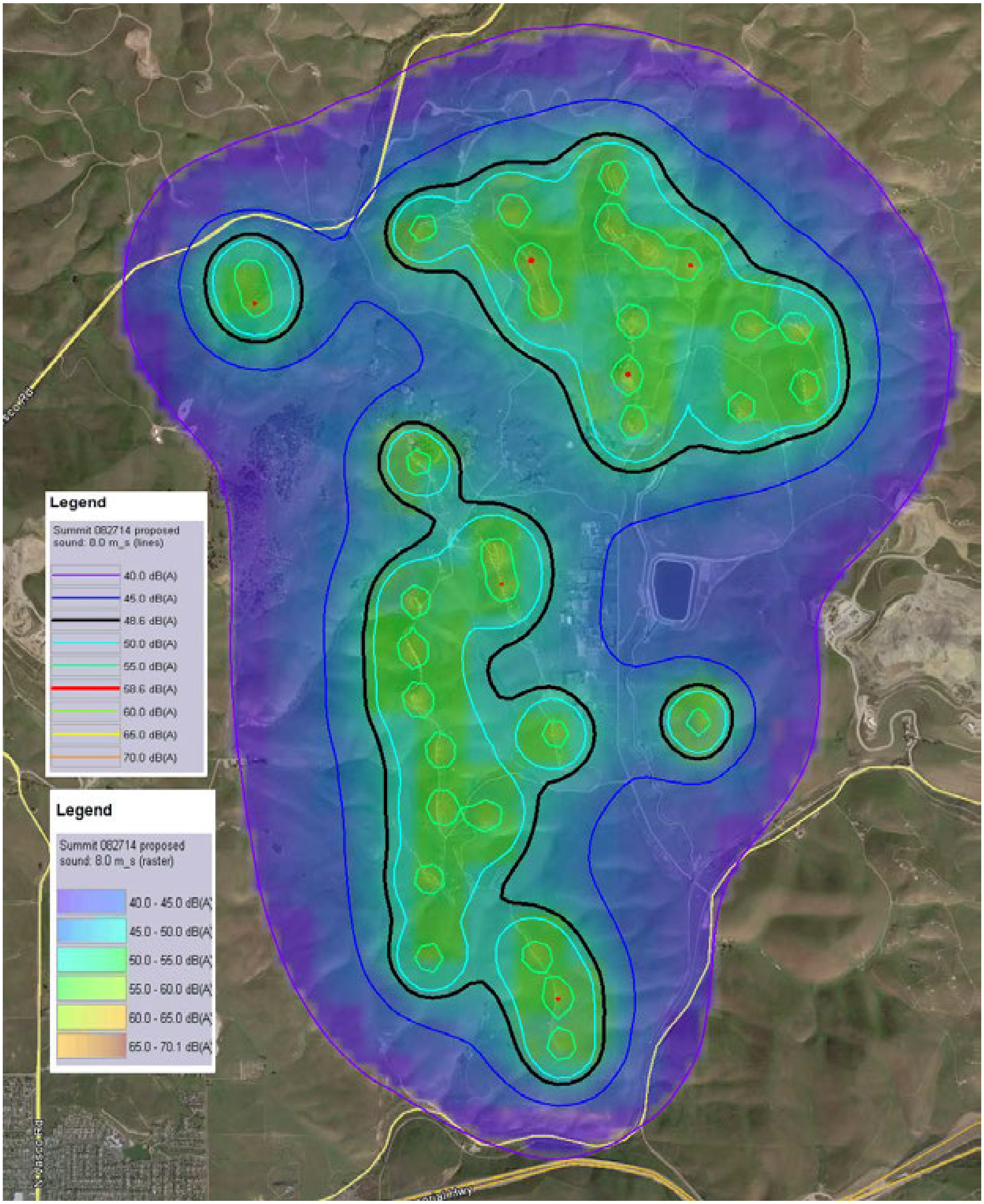

Legend
Summit 082714 proposed sound: 8.0 m_s (lines)
40.0 dB(A)
45.0 dB(A)
48.6 dB(A)
50.0 dB(A)
55.0 dB(A)
58.6 dB(A)
60.0 dB(A)
65.0 dB(A)
70.0 dB(A)
Legend
Summit 082714 proposed sound: 8.0 m_s (raster)
40.0 - 45.0 dB(A)
45.0 - 50.0 dB(A)
50.0 - 55.0 dB(A)
55.0 - 60.0 dB(A)
60.0 - 65.0 dB(A)
65.0 - 70.1 dB(A)

Table 3.1 Summit Wind Repower Project Receptor Sound Pressure Levels vs. FPEIR Thresholds

Receptor Letter	Receptor Name	Easting	Northing	Elevation (m)	Near what road?	Receptor Type	CUP threshold dB(A) (Ldn)	Existing SPL dB(A)	Existing SPL dB(A) (Ldn)	Existing distance from threshold boundary (m)	Existing Pass CUP Test?	FPEIR threshold dB(A) (Ldn)	Summit SPL dB(A)	Summit SPL dB(A) (Ldn)	Summit distance to threshold boundary (m)	Summit Pass FPEIR threshold test?	Summit Change from existing WTs dB(A)	Summit below threshold amount, dB(A)
A	SR1	615,761	4,180,554	265	Dyer	Residential (within project area)	65	50.9	57.3	403	Yes	**65**	46.6	**53.0**	762	**Yes**	-4.3	18.4
B	SR2	616,318	4,180,833	226.9	Dyer	Residential (within project area)	65	51.7	58.1	197	Yes	**65**	50.1	**56.5**	469	**Yes**	-1.6	14.9
C	SR3	616,312	4,180,181	258	Dyer	Residential	55	49.5	55.9	-1,098	No	**55**	45.5	**51.9**	346	**Yes**	-4.0	9.5
D	SR4	616,347	4,180,106	258	Dyer	Residential	55	49.5	55.9	-1,015	No	**55**	45.3	**51.7**	360	**Yes**	-4.2	9.7
E	SR5	616,330	4,180,029	261	Dyer	Residential	55	49.6	56.0	-958	No	**55**	45.3	**51.7**	328	**Yes**	-4.3	9.7
F	SR6	616,418	4,179,938	255	Dyer	Residential	55	49.4	55.8	-834	No	**55**	44.8	**51.2**	407	**Yes**	-4.6	10.2
G	SR7	616,287	4,179,877	260	Dyer	Residential	55	50.1	56.5	-863	No	**55**	45.5	**51.9**	273	**Yes**	-4.6	9.5
H	SR8	616,126	4,179,826	265	Dyer	Residential	55	51.6	58.0	-938	No	**55**	47.0	**53.4**	114	**Yes**	-4.6	8.0
I	SR9	616,226	4,179,776	260	Dyer	Residential	55	50.8	57.2	-832	No	**55**	46.0	**52.4**	216	**Yes**	-4.8	9.0
J	SR10	616,104	4,179,648	266	Dyer	Residential	55	52.6	59.0	-832	No	**55**	47.0	**53.4**	123	**Yes**	-5.6	8.0
K	SR11	616,372	4,179,626	255	Dyer	Residential	55	50.2	56.6	-623	No	**55**	44.9	**51.3**	386	**Yes**	-5.3	10.1
L	SR12	616,375	4,179,594	254	Dyer	Residential	55	50.2	56.6	-598	No	**55**	44.9	**51.3**	397	**Yes**	-5.3	10.1
M	SR13	616,181	4,179,548	258	Dyer	Residential	55	52.3	58.7	-710	No	**55**	46.1	**52.5**	229	**Yes**	-6.2	8.9
N	SR14	616,272	4,179,466	251	Dyer	Residential	55	51.6	58.0	-588	No	**55**	45.4	**51.8**	345	**Yes**	-6.2	9.6
O	SR15	616,256	4,179,144	252	Dyer	Residential	55	53.2	59.6	-488	No	**55**	46.6	**53.0**	150	**Yes**	-6.6	8.4
P	SR16	616,271	4,178,850	244.1	Dyer	Residential (within project area)	65	54.0	60.4	127	Yes	**65**	49.3	**55.7**	1,124	**Yes**	-4.7	15.7
Q	SR17	617,233	4,177,275	230	Altamont Pass	Residential	55	43.0	49.4	699	Yes	**55**	39.7	**46.1**	872	**Yes**	-3.3	15.3
R	SR18	617,786	4,178,075	234.4	Altamont Pass	Residential	55	42.8	49.2	836	Yes	**55**	38.6	**45.0**	833	**Yes**	-4.2	16.4
S	SR19	613,804	4,178,577	196.6	Laughlin	Residential	55	43.6	50.0	663	Yes	**55**	39.9	**46.3**	986	**Yes**	-3.7	15.1
T	SR20	615,489	4,176,498	252.9	Goecken	Residential	55	46.6	53.0	165	Yes	**55**	44.4	**50.8**	326	**Yes**	-2.2	10.6
U	SR21	614,885	4,176,567	225	Altamont Pass	Residential	55	43.9	50.3	538	Yes	**55**	42.1	**48.5**	428	**Yes**	-1.8	12.9
V	SR22	613,490	4,180,809	382.5	Vasco	Residential	55	43.1	49.5	988	Yes	**55**	40.0	**46.4**	721	**Yes**	-3.1	15.0
W	SR23	613,455	4,180,953	403.5	Vasco	Residential	55	43.3	49.7	931	Yes	**55**	40.5	**46.9**	612	**Yes**	-2.8	14.5
X	SR24	613,682	4,178,076	195.9	Laughlin	Residential	55	42.6	49.0	757	Yes	**55**	38.7	**45.1**	1,200	**Yes**	-3.9	16.3
Y	BP	614,210	4,180,818	502.9	Laughlin	Regional Preserve	60	46.2	52.6	504	Yes	**60**	48.2	**54.6**	936	**Yes**	2.0	11.8
Z	BP trail	614,790	4,179,875	290	Laughlin	Regional Preserve	60	51.5	57.9	115	Yes	**60**	39.7	**46.1**	212	**Yes**	-11.8	20.3

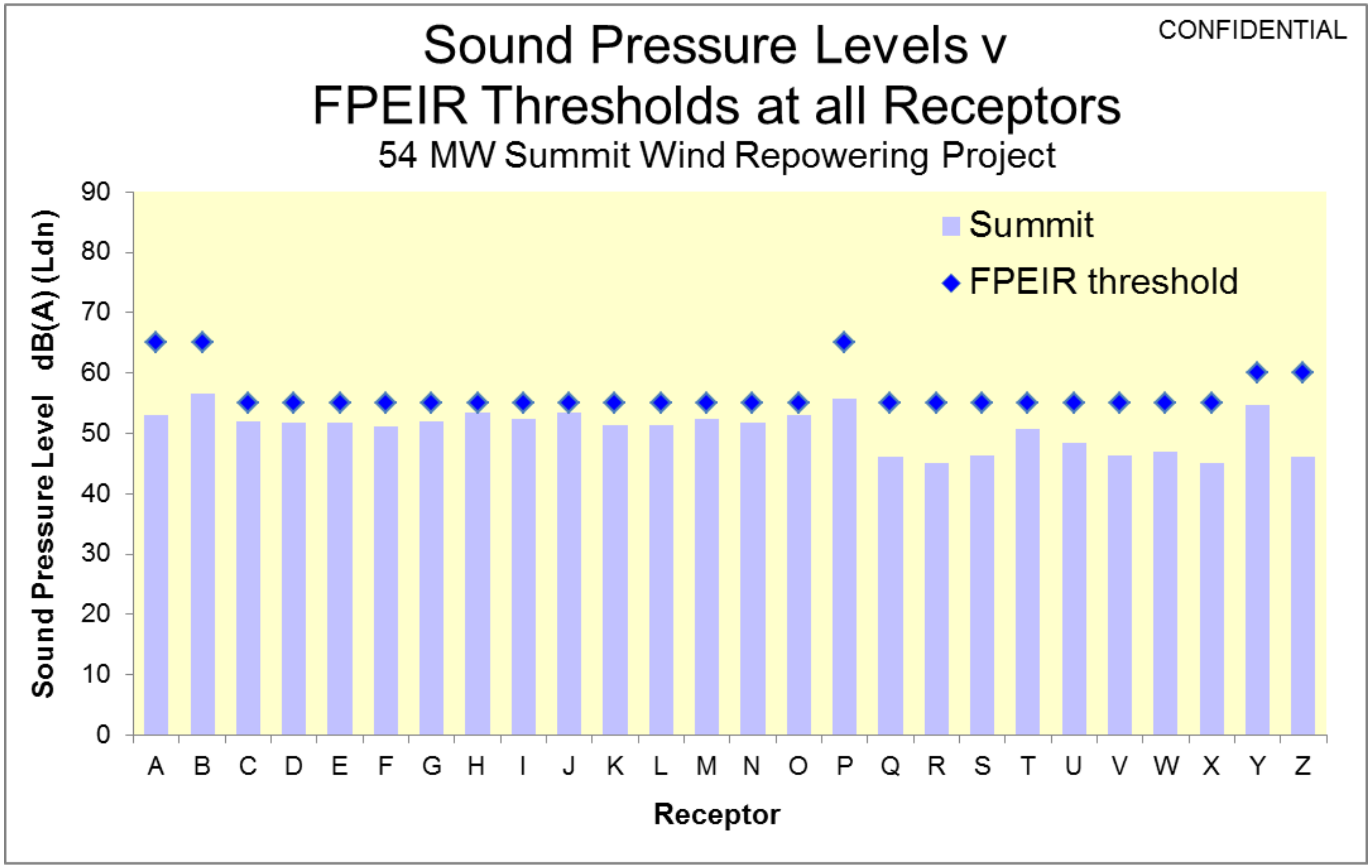


Figure 3.1 Summit Wind Repower Project Sound Power Levels v FPEIR Thresholds for all Sound Receptors

ATTACHMENT A11: SHADOW FLICKER ANALYSIS

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Altamont Winds LLC

SHADOW FLICKER ANALYSIS
54 MW Summit Wind Repower Project
Alameda County, California

23 September 2015

15850P Jess Ranch Road • Tracy, California 95377
phone 925.724.0178 • e-mail as@powerworks.com • www.powerworks.com

Table of Contents

1. INTRODUCTION

Shadow flicker is the term used to describe the effect caused from shadows cast by moving wind turbine blades when the sun is visible. This can result in alternating changes in light intensity perceived by viewers. Since wind turbines are usually located relatively far from potential shadow receptors, shadow flicker typically occurs only at times and locations of low sun angles; this is most common just after sunrise and just before sunset, and in relatively higher latitudes (e.g., more northerly areas in the Northern Hemisphere).

Shadow flicker does not occur when:

> the sun is obscured by clouds or fog
> wind turbines are not operating
> the blades are at a 90º angle to the receptor

While shadow flicker can be perceived outdoors, it tends to be more noticeable in rooms with windows oriented to the shadows. A wind turbine's shadow flicker impact area does not generally extend beyond 2 kilometers, and high-impact durations (>200 hours per year) are generally located within approximately 300 meters of the turbine. Shadow flicker typically lasts less than 20 minutes.

The potential for shadow flicker has been raised as a visual issue by close neighbors of wind farm projects. Shadow flicker analysis for a wind farm is typically performed through computer-based mapping and modeling. The software packages that wind energy developers commonly use to locate wind farms and evaluate feasibility contain modules that perform shadow flicker analysis. The analysis is based on a digital terrain model, turbine locations and elevations, density and location of trees, receptor locations and elevations, and data relating to sun exposure and turbine operating times. Through the model analysis, it's possible to calculate the specific frequency, timing, and duration of shadow flicker at a specific receptor location. When such an analysis is performed for a wind farm, the focus is usually on the number of affected receptors and the numbers of hours per year in which they may experience shadow flicker. Thus, this analysis often requires the early identification of the location(s) of all residences or other sensitive receptors within the project vicinity.

This report summarizes the shadow flicker analysis performed for the 54 MW Summit Wind Repower Project (**"Project"**). A layout of the Project is attached as <u>Exhibit 1</u>.

2. ENVIRONMENTAL SETTING

2.1 General

There is limited scientific evidence of an association between annoyance from prolonged shadow flicker (exceeding 30 minutes per day) and potential transitory cognitive and physical health effects. However, contrary to claims, scientific evidence suggests that shadow flicker does not pose a risk for eliciting seizures as a result of photic stimulation.

Shadow flicker should be determined as a pre-construction activity. Reports can be provided so that the possible shadow effects on properties, buildings, and roadways can be understood. A reasonable standard can rely on micro-siting modeling to ensure that shadow flicker will not exceed 30 hours per year or 30 minutes per day at any occupied building, which are the most commonly used guidelines. However, the standard should also allow for property owners to waive the shadow flicker maximum and for mitigation options, which could include changes in landscaping or window treatments to minimize concerns. It's even conceivable that a contract between a wind farm operator and property owner would provide for shadow flicker limits through operational control, simply curtailing a particular turbine during those times when shadow flicker would otherwise constitute a nuisance in excess of the local standard or some other agreed limit.

2.2 FPEIR Standards

Section 3.1.3, Environmental Impacts, of the FPEIR, sets the following standards for shadow flicker for the APWRA Program Area, which includes the Project area:

"Mitigation Measure AES-5: Analyze shadow flicker distance and mitigate effects or incorporate changes into Project design to address shadow flicker

Where shadow flicker could result from the installation of wind turbines proposed near residences (i.e., within 500 meters [1,640 feet] in a generally east or west direction to account for seasonal variations), the Project applicant will prepare a graphic model and study to evaluate shadow flicker impacts on nearby residences. No shadow flicker in excess of 30 minutes in a given day or 30 hours in a given year will be permitted. If it is determined that existing setback requirements, as established by the County, are not sufficient to prevent shadow flicker impacts on residences, Alameda County will require an increase in the required setback distances to ensure that residences are not affected. If any residence is affected by shadow flicker within the 30-minute/30-hour thresholds, the applicant will implement measures to minimize the effect, such as relocating the turbine; providing opaque window coverings, window awnings, landscape buffers, or a combination of these features to reduce flicker to acceptable limits for the affected receptor; or shutting down the turbine during the period shadow flicker would occur. Such measures may be undertaken in consultation with owner of the affected residence. If the shadow flicker study indicates that any given turbine would result in shadow flicker exceeding the 30-minute/30-hour thresholds and the property owner is not amenable to window coverings, window awnings, or landscaping, and the turbine cannot be shut down during the period of shadow flicker, then the turbine will be relocated to reduce the effect to acceptable limits."

3. SHADOW FLICKER ANALYSIS

3.1 Modeling Methodology

The shadow flicker impacts were modeled using a software package, WindPRO version 2.9.269 (EMD International A/S, 2013). WindPRO is a software suite used for assessing potential environmental impacts from wind turbines. Shadow flicker impacts in the area surrounding the wind turbines were calculated based on data inputs including:

> Type of wind turbine (Suzlon S97 2,100 kW)
> Location of the wind turbines (33 selected locations and 1 alternative)
> Location of all receptors (26 receptors within the project area)
> Wind turbine dimensions (rotor diameter of 97 meters; hub height of 90 meters)
> Terrain data

Based on this data, the model was able to incorporate the appropriate sun angle and maximum daily sunlight for this latitude into the calculations. The WindPRO shadow flicker module incorporates sunshine probabilities and wind turbine operational estimates by wind direction over the course of a year.

26 receptors were included in the shadow flicker analysis. Every receptor was assumed to have windows facing all directions (“greenhouse” mode) which yields the most conservative results. In the model, a switch was enabled limiting calculations to a total of 10 rotor diameters (970 meters) from a wind turbine. Therefore, impacts at receptors greater than 970 meters from a wind turbine were zero. In addition, shadow flicker impacts were calculated only when the angle of the sun was at least 3° above the horizon.

Monthly sunshine probability data from a Fresno climate station, provided by WindPRO, were used for the calculation.

The number of hours the wind turbines are expected to operate are based on met data from mast 4413, commissioned on 05 May 2011, currently operational, located NW 1/4 of section 18 T2S, R3E, approximately 211 meters northwest of wind turbine 23, as shown in Exhibit 1.

3.2 Results

Using the assumptions stated in Section 3.1, WindPRO calculated shadow flicker for the 26 nearest receptors. The results for the entire wind farm are shown graphically in Exhibit 4, and a shadow flicker map in Exhibit 5. Exhibit 2 presents the results for all 26 receptors. Exhibit 3 presents the total amount of flickering on the receptors caused by each wind turbine.

Four (4) of the 26 receptors were predicted to have total annual impacts over 30 hours per year. Additionally, four (4) of the 33 wind turbines produce a noticeably high amount of shadow flickering hours on the receptors.

3.3 Discussion

The data generated by WindPRO provides a conservative assessment of potential shadow flicker for several reasons, as follows:

> The model was run in “greenhouse” mode, where the receptors faced all directions.

> There may be structures and/or vegetation lying between a receptor and a wind turbine to block shadows created by the rotating blades. These are termed “obstacles” by WindPRO and were excluded from the analysis.

> Any existing window treatments such as awnings, shades, or blinds on a window facing a wind turbine were not included to reduce potential shadow flicker at a receptor.

3.4 Conclusion

Prior to construction, further analysis will be performed to reduce the conservatism employed in this analysis, if necessary.

If shadow flicker at any receptors still exceed Alameda County’s FPEIR standards, then, mitigation measures as described in Section 2 will be considered for implementation to alleviate these shadow flicker issues. The Project is prepared to move or shut down any wind turbines that are ultimately installed and impose shadow flicker on receptors in excess of the FPEIR standards, during morning and afternoon shadow flicker hours, to reduce the shadow flicker impact on the nearby receptors to within FPEIR standards.

4. REFERENCES

> AWEA Siting Handbook, 2008.

> NARUC Wind Energy & Wind Park Siting and Zoning Best Practices and Guidance for States, 2012.

> Rich Lampeter Evaluating Shadow Flicker in the Current Regulatory Environment, 2013.

EXHIBITS

1 Project layout
2 Expected shadow hours per year at receptor locations
3 Total amount of flickering on the receptors caused by each wind turbine
4 Graphical shadow calendar per wind turbine
5 Shadow map

EXHIBIT 1
Project layout

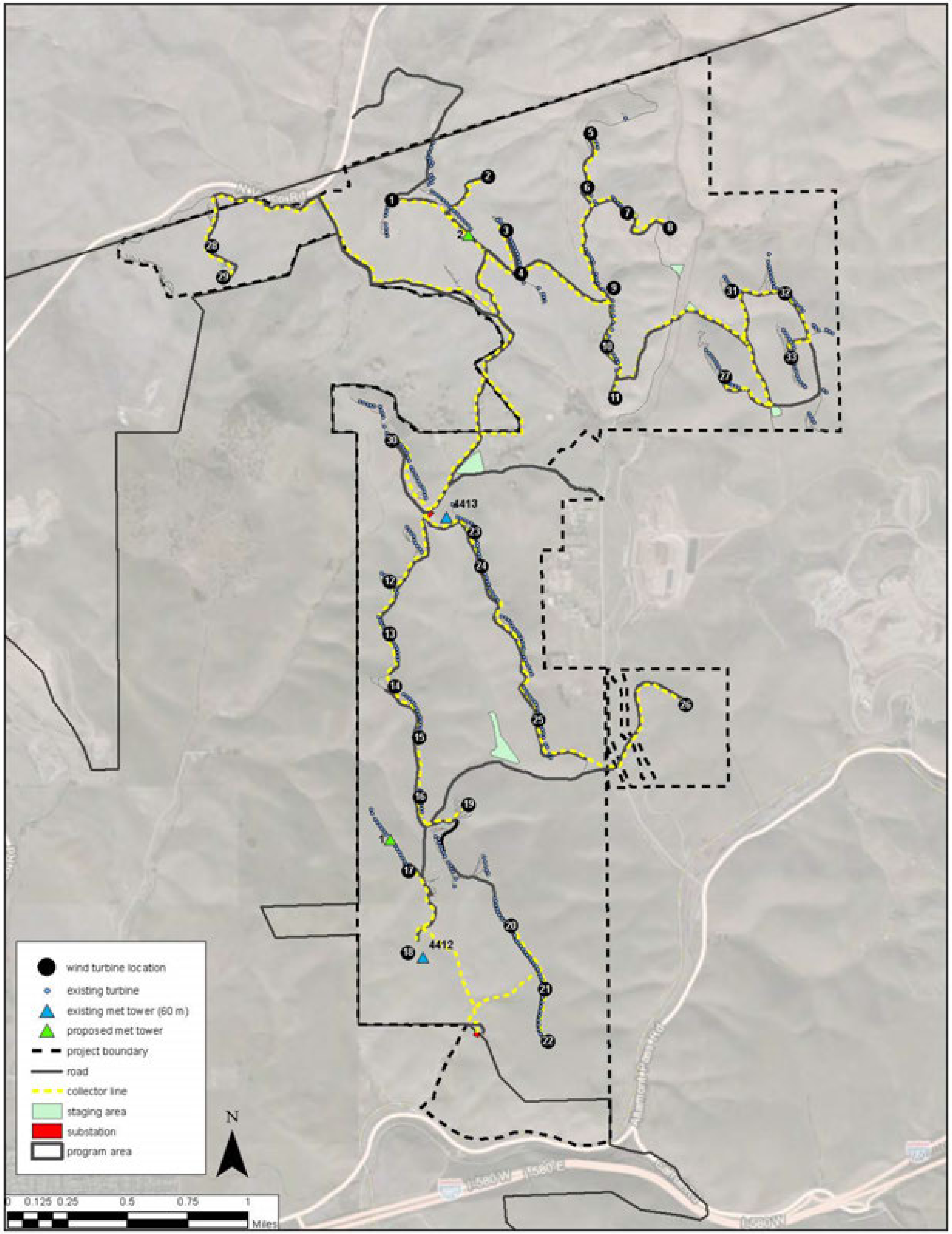

EXHIBIT 2
Expected shadow hours per year at receptor locations

Receptor	hours/year
A	29:40
B	67:09
C	18:16
D	17:20
E	18:53
F	15:49
G	26:14
H	32:06
I	23:27
J	23:15
K	13:13
L	17:38
M	0:00
N	0:00
O	7:18
P	75:25
Q	0:00
R	0:00
S	0:00
T	17:34
U	0:00
V	0:00
W	0:00
X	0:00
Y	52:04
Z	0:00

Receptors with shadow flicker hours exceeding 30 hours per year highlighted in yellow.

EXHIBIT 3
Total amount of flickering on the receptors caused by each wind turbine

	Expected
WT No.	[h/year]
1	0:00
2	0:00
3	0:00
4	0:00
5	0:00
6	0:00
7	0:00
8	0:00
9	0:00
10	0:00
11	85:21
12	0:00
13	0:00
14	0:00
15	0:00
16	0:00
17	0:00
18	0:00
19	5:31
20	0:00
21	0:00
22	17:34
23	59:18
24	101:57
25	75:02
26	18:37
27	0:00
28	0:00
29	0:00
30	11:31
31	0:00
32	0:00
33	0:00

EXHIBIT 4
Graphical shadow calendar per wind turbine

WindPRO version 2.9.269 Nov 2013

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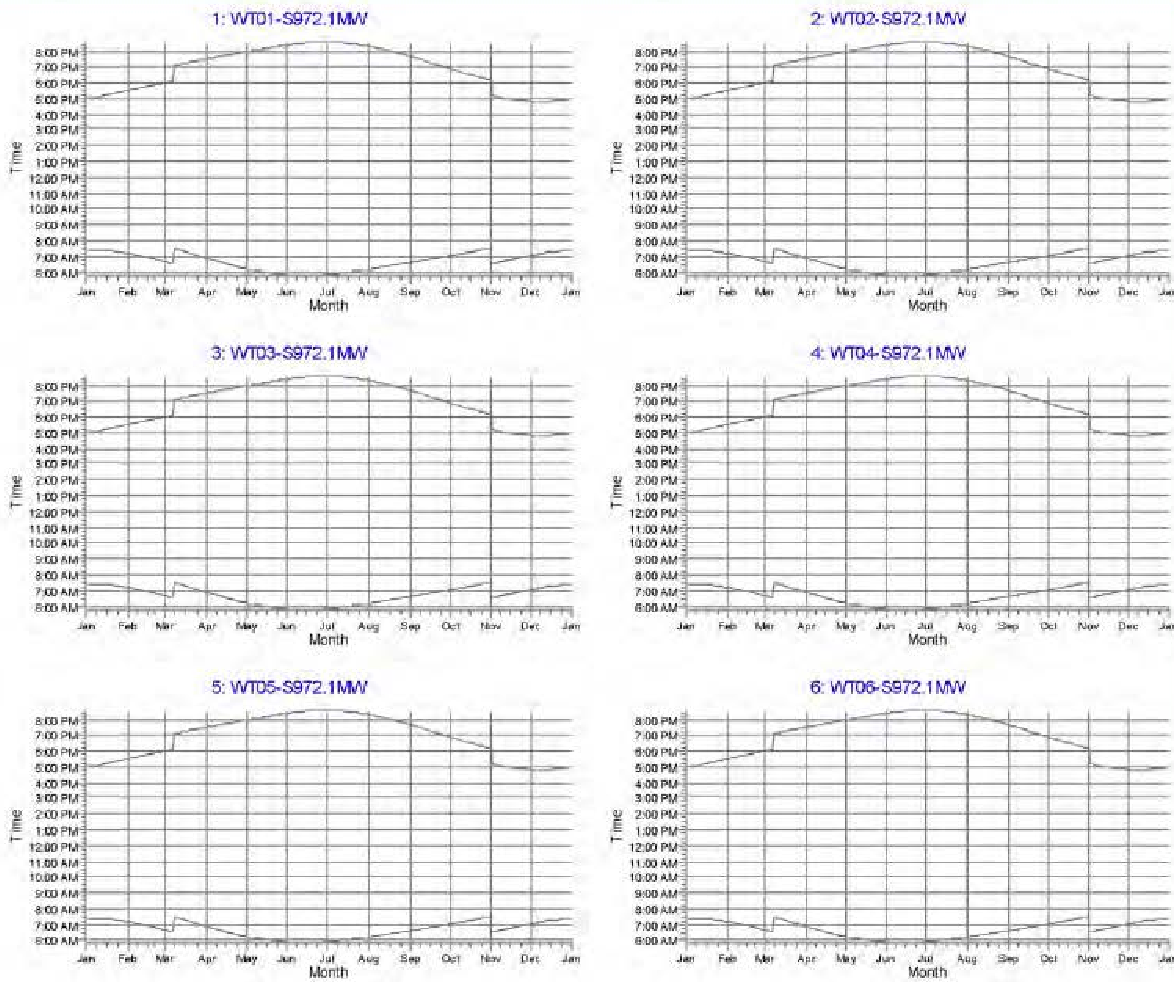
Ryan Darlow / rd@powerworks.com

Calculated:
8/27/2014 11:57 AM/2.9.269

SHADOW - Calendar per WTG, graphical

Calculation: Suzlon S97 33WT 082714 no obstacles



Shadow receptors

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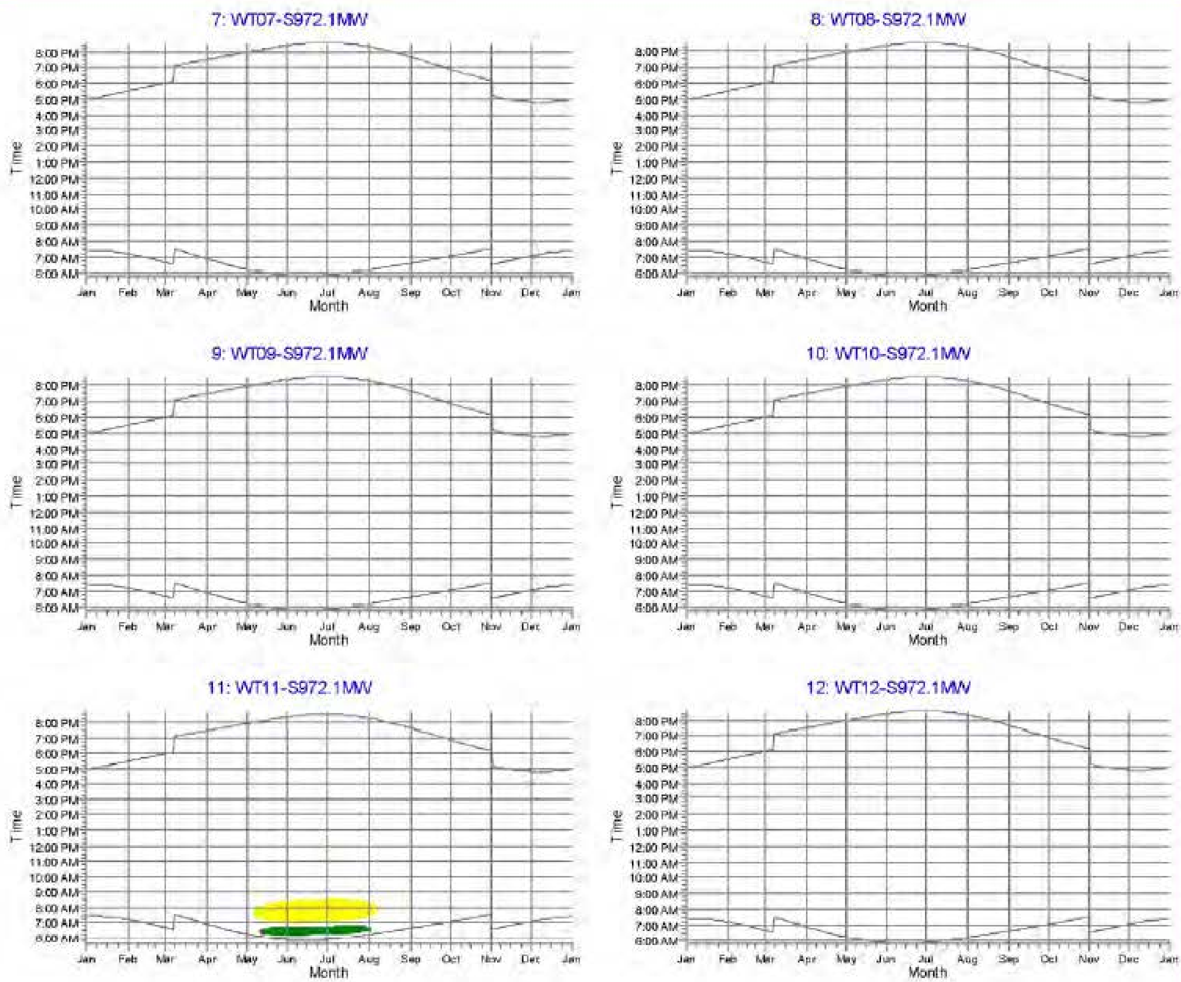
SHADOW - Calendar per WTG, graphical

Calculation: Suzlon S97 33WT 082714 no obstacles



Shadow receptors

A: Shadow Receptor 1

B: Shadow Receptor 2

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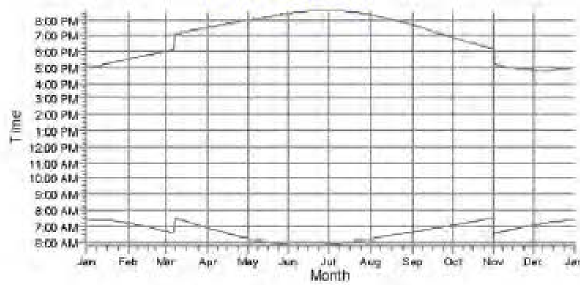
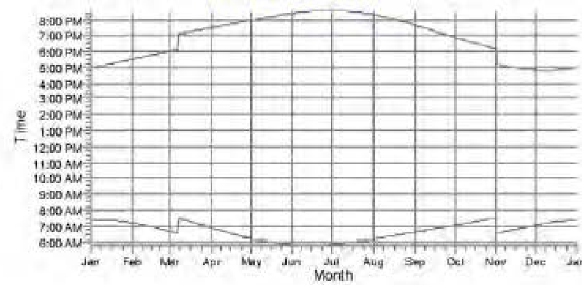
SHADOW - Calendar per WTG, graphical

Calculation: Suzlon S97 33WT 082714 no obstacles

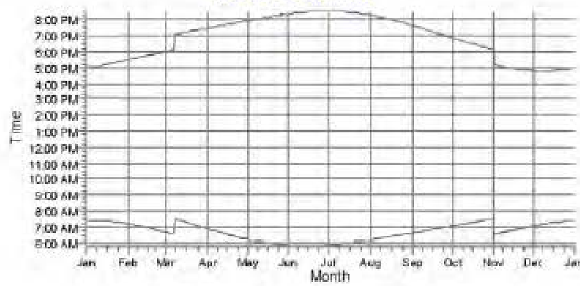
13: WT13-S972.1MW



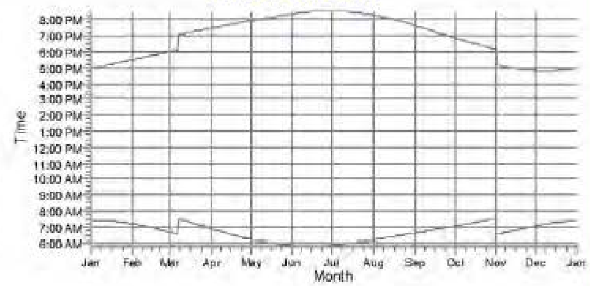
14: WT14-S972.1MW



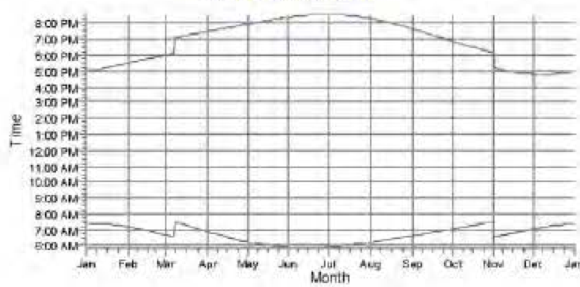
15: WT15-S972.1MW



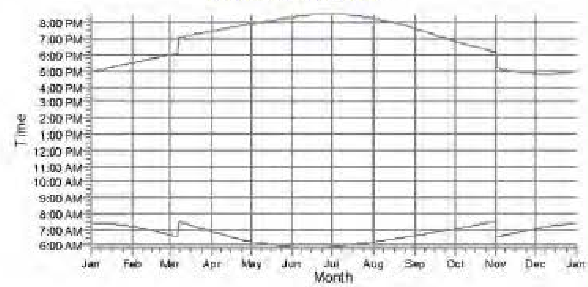
16: WT16-S972.1MW



17: WT17-S972.1MW



18: WT18-S972.1MW



Shadow receptors

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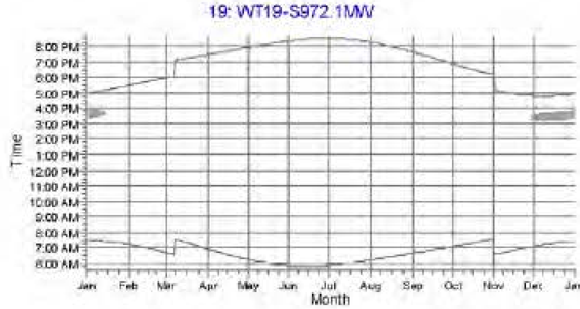
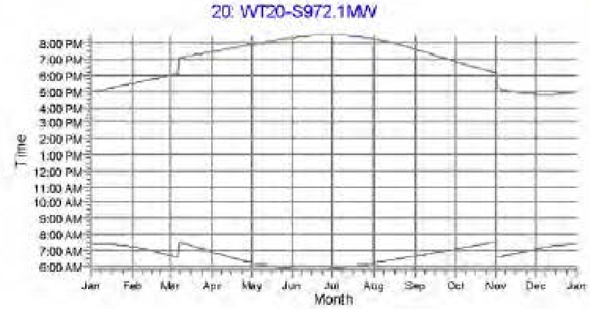
SHADOW - Calendar per WTG, graphical

Calculation: Suzlon S97 33WT 082714 no obstacles

19: WT19-S972.1MW



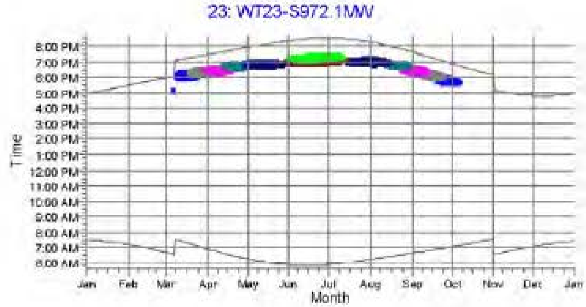
20: WT20-S972.1MW



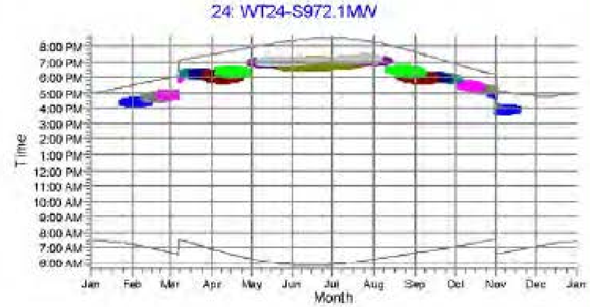
21: WT21-S972.1MW

22: WT22-S972.1MW

23: WT23-S972.1MW



24: WT24-S972.1MW



Shadow receptors

- C: Shadow Receptor 3
- D: Shadow Receptor 4
- E: Shadow Receptor 5
- F: Shadow Receptor 6
- G: Shadow Receptor 7
- H: Shadow Receptor 8
- I: Shadow Receptor 9
- J: Shadow Receptor 10
- K: Shadow Receptor 11
- L: Shadow Receptor 12
- P: Shadow Receptor 16
- T: Shadow Receptor 20

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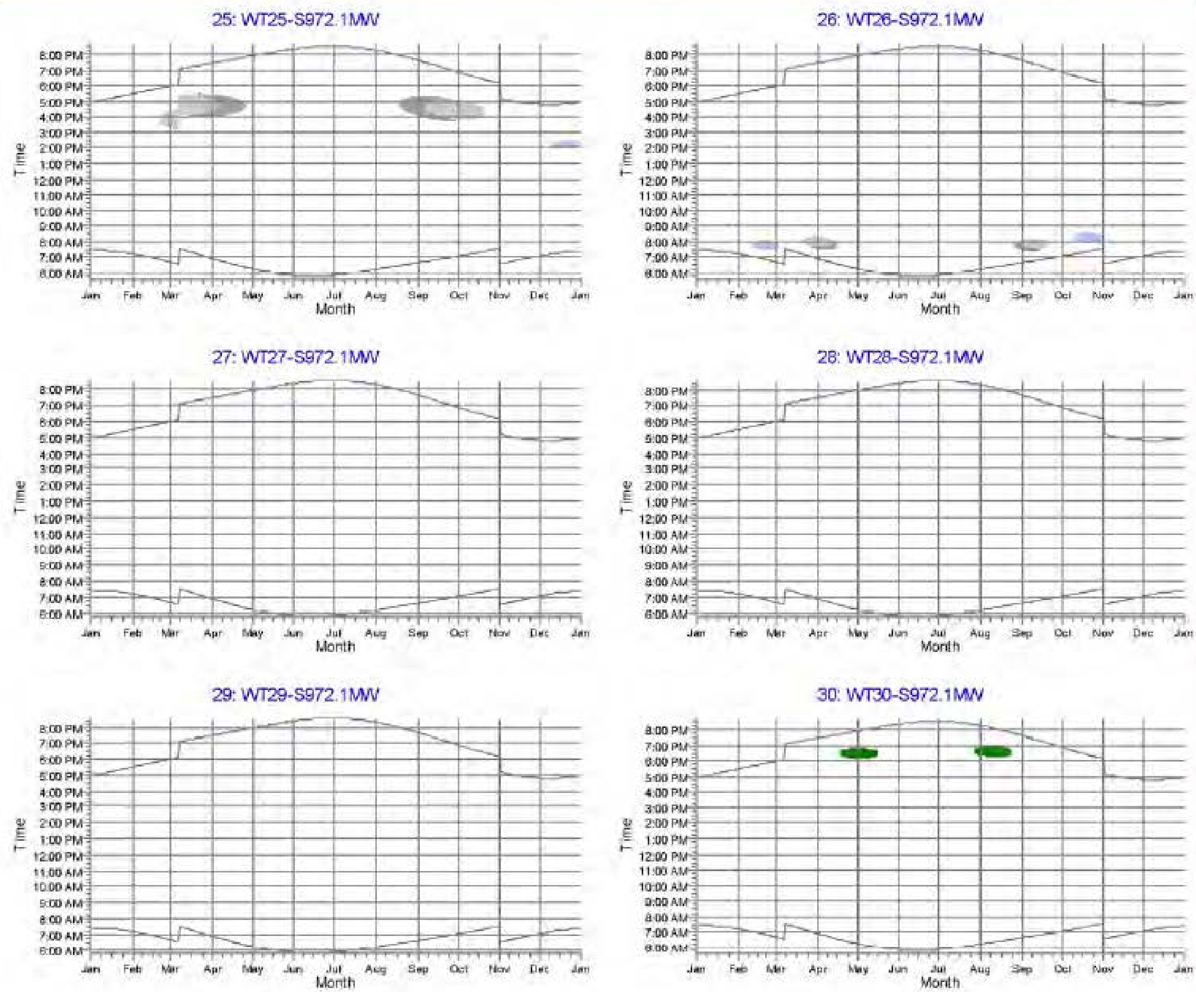
SHADOW - Calendar per WTG, graphical

Calculation: Suzlon S97 33WT 082714 no obstacles



Shadow receptors

A: Shadow Receptor 1 | O: Shadow Receptor 15 | P: Shadow Receptor 16 | Y: Shadow Receptor 25

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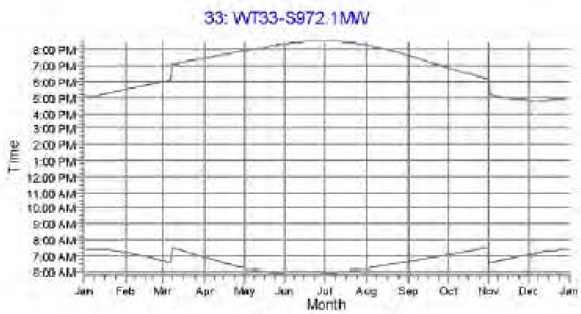
SHADOW - Calendar per WTG, graphical

Calculation: Suzlon S97 33WT 082714 no obstacles



Shadow receptors

EXHIBIT 5
Shadow map

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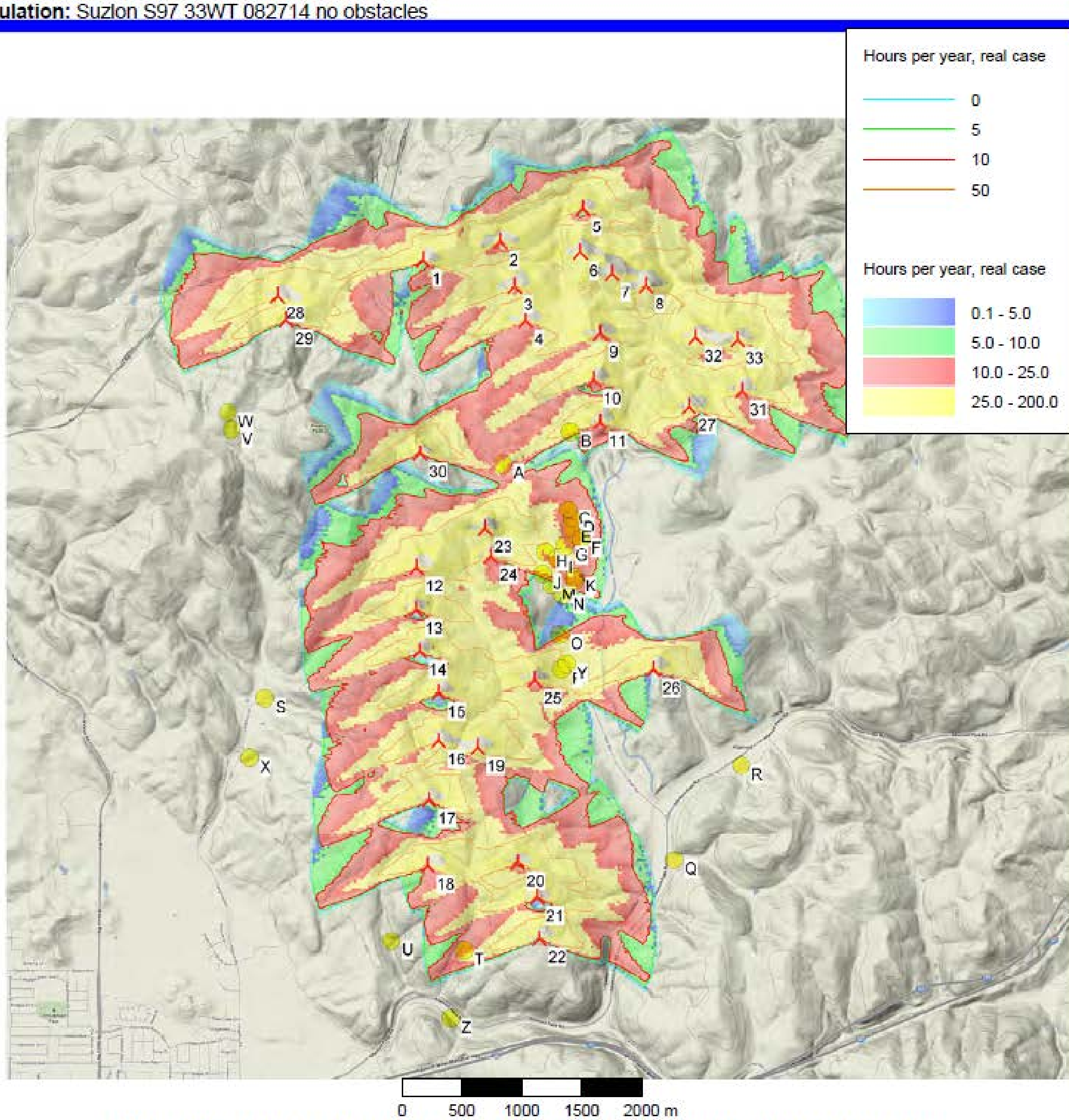
SHADOW - Map
Calculation: Suzlon S97 33WT 082714 no obstacles



Map: topo north , Print scale 1:50,000, Map center UTM (north)-WGS84 Zone: 10 East: 615,860 North: 4,179,673

New WTG   Shadow receptor

Flicker map level: HCL 30kmsq 5mres