Chapter 2
Project Description

2.1 Chapter Summary

This chapter describes the physical changes that would result from the repowering program proposed by the Applicant (Sand Hill Wind, LLC) to replace its existing wind turbine assets with a new type of wind turbine referred to in this document as a shrouded wind turbine. This chapter defines the goals and objectives of the proposed Sand Hill Wind Project, identifies the project's regional location and project area boundaries, outlines Sand Hill's existing project permits, facilities and operations, and identifies how the proposed Initial and Full Repower phases relate to the existing facilities and operations. This chapter also describes mitigation measures the Applicant has proposed to undertake to address avian mortality, some of which will depend on the results of the Avian Validation Study. However, the focus of this chapter is on the physical changes that would occur if the Applicant's requested CUP is approved for an Initial Repower phase.

The repowering program proposed by the Applicant would take place in two phases, beginning with an Initial Repower phase of installing 40 shrouded turbines and followed by one or more Full Repower phases. Both phases involve multiple parcels that total approximately 1,000 acres, on which the Applicant currently has lease agreements, within the Alameda County portion of the APWRA in northern California. The primary purpose of the Initial Repower phase is to support an ongoing, 3-year Avian Validation Study, commenced in April 2012 under the guidance of the Alameda County Scientific Review Committee[1] (SRC). The Avian Validation Study, which is primarily funded by a Public Interest Energy Research (PIER) Grant from the California Energy Commission (CEC), would evaluate the extent to which the shrouded turbine could reduce impacts on birds compared to the existing turbines. The Applicant would use the test results of the Avian Validation Study and turbine performance data to inform its approach to repowering the remainder of the existing turbines in future phases under the Full Repower.

2.2 Regional Setting and Project Area

2.2.1 Altamont Pass Wind Resource Area

The APWRA comprises approximately 50,000 acres (over 75 square miles) and is located north and south of Interstate 580 (I-580) in the Altamont Hills of eastern Alameda and Contra Costa Counties, near their boundaries with San Joaquin County and at the geographic interface between the coastal mountains and the Central Valley (Figure 2-1). The Altamont Pass area sustains a strong and predictable wind resource due mainly to the funneling of cool marine winds from the Pacific Ocean eastward through the pass to replace the rising hot summer air of the Central Valley. The APWRA was designated first by the state and subsequently by Alameda and Contra Costa Counties as well-suited for the capture and utilization of energy from the wind.

[1] The SRC provides direction to the Alameda County Monitoring Team responsible for conducting avian use surveys, fatality monitoring, and/or avian behavior surveys within the APWRA. Avian studies in the APWRA have been ongoing for more than 20 years.

2.2.2 Project Area, Existing Conditions and Land Uses

The project area is within the rural, unincorporated eastern Alameda County portion of the APWRA, east of the San Francisco Bay Area and near the western edge of the San Joaquin Valley in northern California. The project area is comprised of eight parcels grouped in three distinct areas: four west parcels (only three would be part of the Initial Repower phase), two northeast parcels, and two southeast parcels (Figure 2-2), but all within roughly 1–2 miles of each other. These may also be identified as the project parcels. The project vicinity refers to a larger area that encompasses land uses or activities beyond the area defined by the project parcels, but that may experience effects from the proposed Initial and Full Repower activities.

The project area consists largely of cattle-grazed land on which operating wind turbines and ancillary facilities are currently installed. The region is mostly treeless and is generally characterized by rolling foothills of annual grassland, steeper on the west and gradually flatter on the east, sloping toward the floor of the Central Valley. Much of the region currently serves as cattle grazing land, and existing wind turbines and associated facilities are highly visible both within and surrounding the project area. Major features in and near the project area include the existing wind turbines and ancillary facilities, an extensive grid of high voltage power transmission lines, substations, microwave towers, I-580 and local roadways, and scattered rural residences and businesses.

The project area is subject to Alameda County's East County Area Plan (ECAP), adopted in 1994 and amended substantially in November 2000 by the voter-approved Ordinance/Initiative Measure D. The ECAP designates the project area as Large Parcel Agriculture (LPA). Subject to the provisions, policies, and programs of the 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 compatible with agriculture. Lands in the project area are zoned A (Agricultural District) under the Alameda County Zoning Ordinance, which allows for agricultural and other non-urban uses. Within the A District, privately owned wind-electric generators are a conditionally permitted use subject to approval by the East County Board of Zoning Adjustments (EBZA).

2.2.3 Existing Use Permits

The existing turbines in the APWRA were originally developed under CUPs approved between the early 1980s and mid 1990s. Seawest Power Resources (or AES), which previously owned the wind turbines now held by the Applicant, held five permits on the eight properties for the operation of 433 wind turbines with a reported nameplate generating capacity, as of 2005, of roughly 25.4 MW. These permits expired between 2002 and 2004, and were renewed in 2005 along with 26 other CUPs for other wind-energy companies, with specific conditions that were directed towards reducing avian mortality and establishing a repowering program. Among other requirements, these conditions required the removal of individual turbines defined as uniquely or especially hazardous to birds, established a Scientific Review Committee for the APWRA, and instituted a Monitoring Team to evaluate progress on reducing avian mortality. These CUPs also established the winter season shut down protocol, in which the applicable turbines ceased operations from the first of November until mid-February, a practice which the Monitoring Team has determined has had the greatest effect in reducing avian mortality.

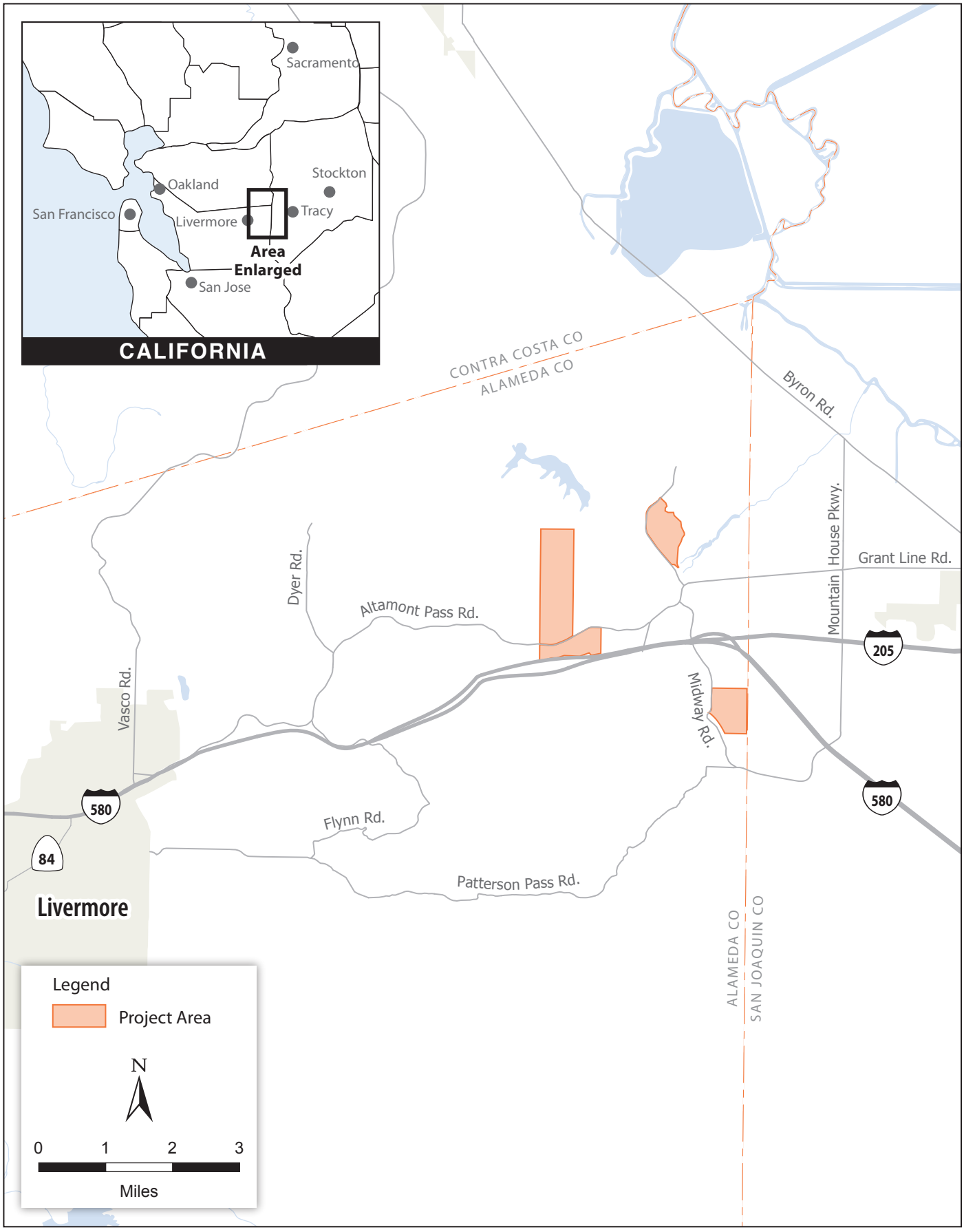

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Figure 2-1
Project Location

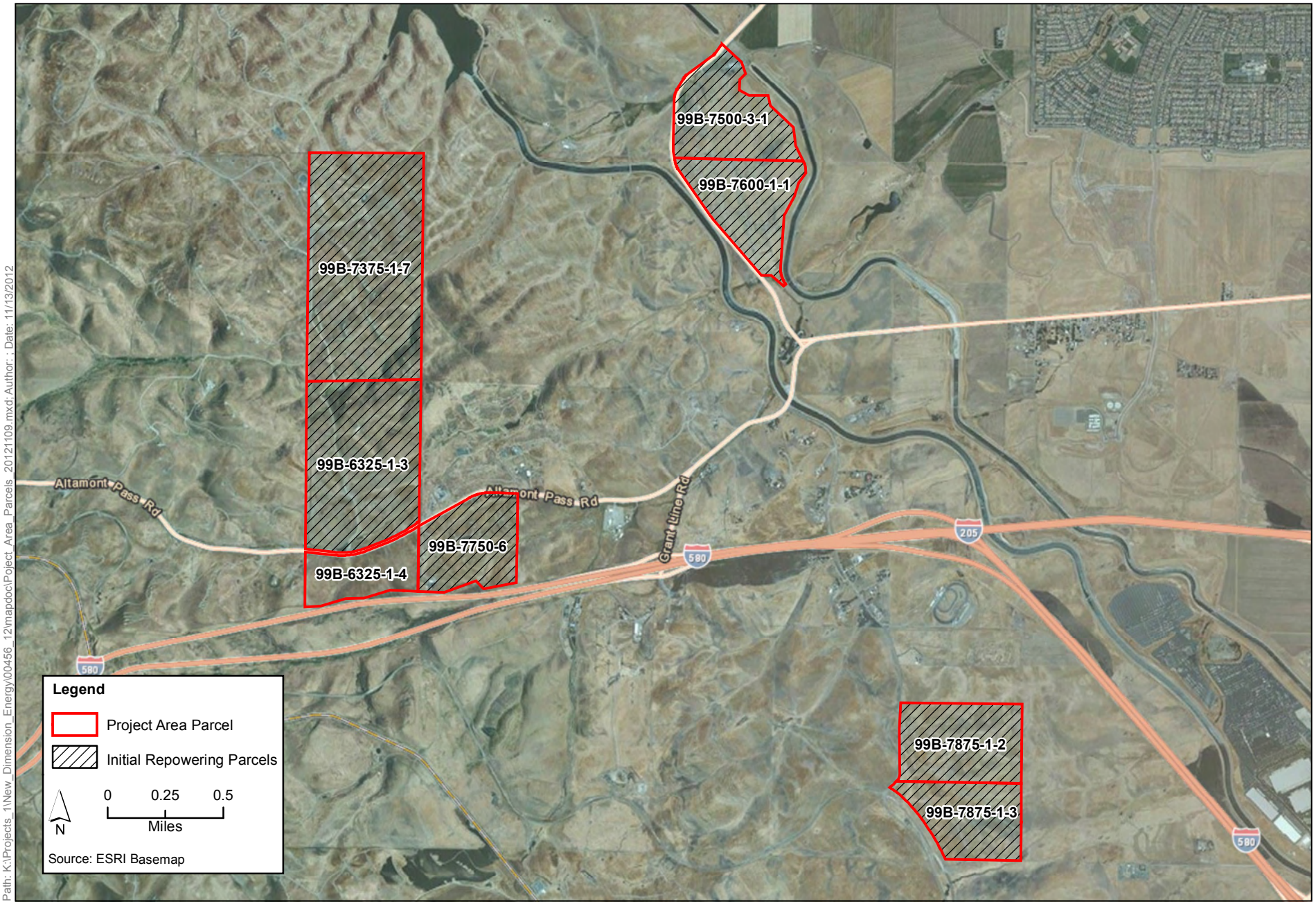

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Figure 2-2
Project Area Parcels

In 2007, the Golden Gate Audubon Society, 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 in 2005. The 2007 Settlement Agreement, including Exhibit G-1 (modified from the 2005 CUPs) required the companies and the County to develop a Natural Communities Conservation Plan (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." The NCCP or similar agreement was to be approved by the California Department of Fish and Wildlife[2] (CDFW); however, with the consent of the Settling Parties in 2009, the NCCP process ceased and was effectively replaced by commitments by the wind-energy companies to accelerate repowering, based on expectations that it would have the greatest benefit of reducing avian mortality. An Avian Protection Plan for the APWRA is being developed for the use of the parties to the Settlement Agreement to serve that purpose.

More importantly, the 2007 Settlement Agreement committed the wind companies to achieve, by November of 2009, a 50 percent reduction in avian fatalities from the estimated annual fatalities of four focal raptor species (golden eagle [*Aquila chrysaetos*], burrowing owl [*Athene cunicularia*], American kestrel [*Falco sparverius*], and red-tailed hawk [*Buteo jamaicensis*]), from estimated levels in 2004. Companies who 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. The Alameda County SRC determined in December 2012 that the turbines within the Sand Hill Wind project area (along with other turbines subject to the Agreement) had met the 50 percent avian fatality reduction target. The focus of the Monitoring Team on these four focal species since 2007 provides a vitally important source of data for use in this EIR as well as for the Avian Validation Study.

The existing project facilities are constructed entirely on private land, leased under long-term agreements with the landowners. The lease agreements and turbine assets and infrastructure were acquired in 2012 by FloDesign Wind Turbine Corporation (FloDesign) from AES Seawest, one of the original participants in the 2007 Settlement Agreement. With its acquisition of the AES Seawest permits, FloDesign became a participant to the Settlement Agreement. FloDesign (through a subsidiary) owns Sand Hill Wind LLC, as well as Forebay Wind, LLC. Sand Hill Wind, LLC has wind energy easements over all of the properties. Forebay Wind, LLC owns the existing generation assets and operates them by a sub easement through Sand Hill Wind, LLC. The proposed facilities would occupy the same parcels. Table 2-1 shows the assessor parcel number(s) (APNs), ownership, and parcel acreage associated with each of the existing project-related CUP parcels, as well as the number of turbines previously permitted on each parcel (or on adjoining parcels) and the numbers of shrouded turbines to be installed in the Initial Repower phase. Table 2-2 provides the acreage occupied by existing project facilities and components.

[2] In 2007, the agency was known as the California Department of Fish and Game (CDFG); the name was officially changed to the California Department of Fish and Wildlife (CDFW) January 1, 2013.

Table 2-1. Parcels and Turbines Included in Repower Project

Applicable Existing CUP	Assessor Parcel Number	Parcel Ownership	Approxi-mate Acreage	Permitted Turbines as of 2005	Included in Initial Repower (40 Turbines)	Existing Turbines to Be Removed for Initial Repower	Shrouded Turbines Proposed for Initial Repower
C-8023	99B-6325-1-4	Johnston	67.9	30	No	--	--
C-8161	99B-7750-6-0	Pombo	99.4	38	Yes	15	9
C-8182	99B-6325-1-3 99B-7375-1-7	Ralph	222.5 60	182	Yes	28	15
C-8201	99B-7875-1-2 99B-7875-1-3	Griffith	115.1 92.8	52	Yes	7	4
C-8203	99B-7500-3-1 99B-7600-1-1	Castello Arnaudo	112.9 104.9	131	Yes	23	12

Table 2-2. Existing Project Facilities and Components

Facilities	Area of Each Facility/Component	Number of Units	Total Area (approx. acres)
Existing turbine tower foundation areas[a]	400 square feet per tower	407 foundations	3.7
Access roads (main)	32 square feet per linear foot of road	5,283 linear feet	3.9
Access roads (turbine access) [b]	12–14 square feet per linear foot of road	99,752 linear feet	29.6
Transmission and substation areas	--	--	10
Total			47.2

[a] The existing tower foundation area includes the area between the access roads and the turbines, the turbine foundations, all the disturbed area under and around the turbines, and the areas around the nearby transformers.

[b] Turbine access roads: 54,946 linear feet at 12 square feet per linear foot of road plus 44,806 linear feet at 14 square feet per linear foot of road.

2.3 Project Objectives

The underlying purpose of the project is two-fold, first to facilitate and Avian Validation Study that proposes to test and demonstrate how a new wind energy generation technology would be compatible with avian species use in the project area, and second, after review of that study's results, to repower the project parcels with an economically viable wind energy project in a proven wind resource area. Sand Hill Wind's fundamental objectives for this project are interrelated and are as follows.

- Through a phased permitting and development process, test and demonstrate a new wind energy generation technology in a proven wind resource area with a strong research record on wind-avian impacts in order to establish a scientifically-supported avian impact research record for this new technology.
- By March 2015, complete a BACI Avian Validation Study primarily funded by a PIER Grant from the CEC. The study would test whether 40 FloDesign shrouded wind turbines on the project parcels are safer to birds than existing open-blade turbines on the same parcels, and would help to develop predictive turbine siting tools for shrouded and open-blade turbines, with the following study objectives.
    - Compare avian wind turbine interactions between FloDesign shrouded turbines and multiple types of existing 1980s–'90s-era conventional wind turbines, at sites with known high avian fatality rates, during day and night and various wind and terrain conditions.
    - Compare avian fatality rates between FloDesign shrouded turbines and existing turbines at known high fatality sites, using a short search interval and a BACI design.
    - Explain variation in fatality rates by turbine design, flight patterns, and avian interactions with wind turbines (e.g., avoidance behaviors).
    - Develop field-tested behavior survey methods and data that inform avoidance rates for use in collision risk models and map-based collision hazard models, with the eventual goal of using model results to assist with wind turbine siting.
- Use information derived from the Avian Validation Study to evaluate potential refinements to the FloDesign shrouded turbine design and to inform FloDesign's repowering plans for the entire project area.
- Use information derived from the Avian Validation Study and project operations to inform a long-term solution for repowering the APWRA that reduces impacts on avian species and potentially reduces costs to ratepayers by using surplus transmission capacity at the Tesla substation and locating wind energy facilities close to Bay Area load centers.
- Develop an economically viable wind energy project through commercially available financing that would maximize renewable energy production and economic viability by initially replacing 4 megawatts (MW) of aging wind energy assets with newer and more efficient shrouded turbines placed in service no later than March 2015 to substantiate the Avian Validation Study, with subsequent repowering phases of up to an additional 30 MW anticipated in later years.

The following are secondary objectives of the Sand Hill Wind Project.

- Provide a comparison between the shrouded turbine design and current-generation, large-scale wind turbines, to determine if shrouded turbines would have a lower rate of avian mortality per MW of energy produced, as well as achieve greater energy efficiency and output.
- Minimize environmental impacts by using existing power transmission, access infrastructure and other existing ancillary facilities to the maximum extent feasible.
- Develop a viable source of clean energy to help California achieve its Renewables Portfolio Standard (RPS) with a low MW-to-acre disturbance ratio and without the need for large amounts of water.

- Offset the need for additional electricity generated from fossil fuels, and thereby assist the state in meeting its air quality goals and reducing greenhouse gas emissions.
- Contribute positively to economic activity during construction and operation.
- Increase local short-term and long-term employment opportunities.

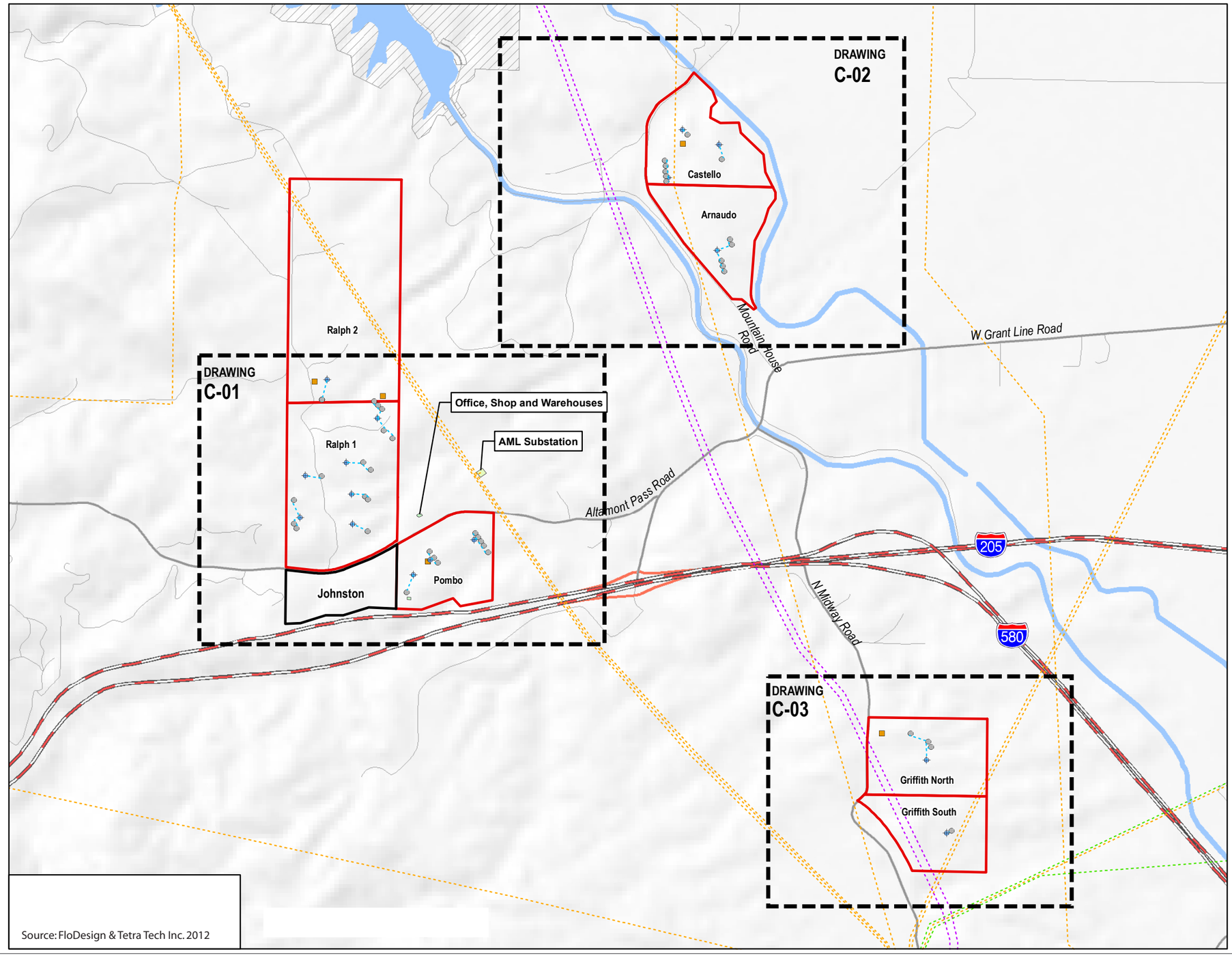
2.4 Project Overview

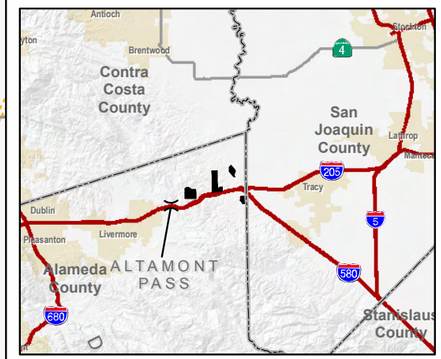
The proposed Sand Hill Wind Project consists of two phases. The Initial Repower phase would involve the decommissioning of about 70–80 existing 1980s–'90s-era turbines, and their replacement with 40 shrouded turbines with a combined generating capacity of 4 MW, while concurrently carrying out the Avian Validation Study. The existing individual twentieth century turbines have nameplate generating capacities of between 40 and 100 kilowatts (kW), whereas the shrouded turbines would have a consistent nameplate capacity of 100 kW. The nameplate generating capacity permitted on all eight of the project parcels (for the CUPs approved in 2005) was 25.42 MW.

The Full Repower phase, subject to a separate conditional use permit application and additional environmental review, would involve decommissioning the remaining 300-plus original turbines, and constructing up to 30 MW of generating capacity, resulting in a total nameplate capacity of 34 MW, a potential increase in production capacity of about 33 percent. These phases are described generally below, and in greater detail in Sections 2.3.1 and 2.3.2. Figure 2-2 depicts the project area. Figures 2-3 through 2-6 show project area site plans.

The overall repowering process, regardless of the technology employed, is one of decommissioning old, existing wind turbines installed in the 1980s and 90s and installing new, more efficient wind turbines. Decommissioning includes removal of turbine rotors (blades), nacelles (generator motor and housing) towers and their foundations. For the purpose of this EIR, however, the last phase of decommissioning – foundation removal – is considered distinctly separate from the turbine and tower removal process, because as a ground-disturbing activity, it is recognized as having the greatest potential for adverse effects on protected terrestrial species. The steps involved in foundation removal are described in detail below, in Section 2.5.2.

The shrouded wind turbine consists of a foundation, tower, and turbine at the top of the tower. The turbine apparatus includes an electrical generator in a nacelle housing, and wind rotor (three blades) surrounded by two shrouds. The maximum height of the assembled turbine to the top of the outer shroud would be less than 200 feet, with the outer shroud having an outside diameter of approximately 66 feet. The hub height of the rotor would be up to120 feet above the ground surface. Figure 2-7 provides a schematic of the shrouded turbine design. The advantage of this design is that airflow approaching the gap between the shrouds is channeled directly to the rear of the turbine, resulting in reduced back pressure and, as a consequence, improved energy production over a standard turbine. Shrouded turbines are also referred to or defined in some sources as a mixer-ejector wind turbine (MEWT).





Legend

- Phase 1 Parcels
- Other Parcels
- Collection Lines
- Proposed Turbines
- Proposed Underground to Pad Mount Tie-In
- Existing MET Towers

Transmission Lines

- 100-161 kV Transmission Line
- 230-287 kV Transmission Line
- 500 kv Transmission Line

0 1,100 2,200 4,400
Feet

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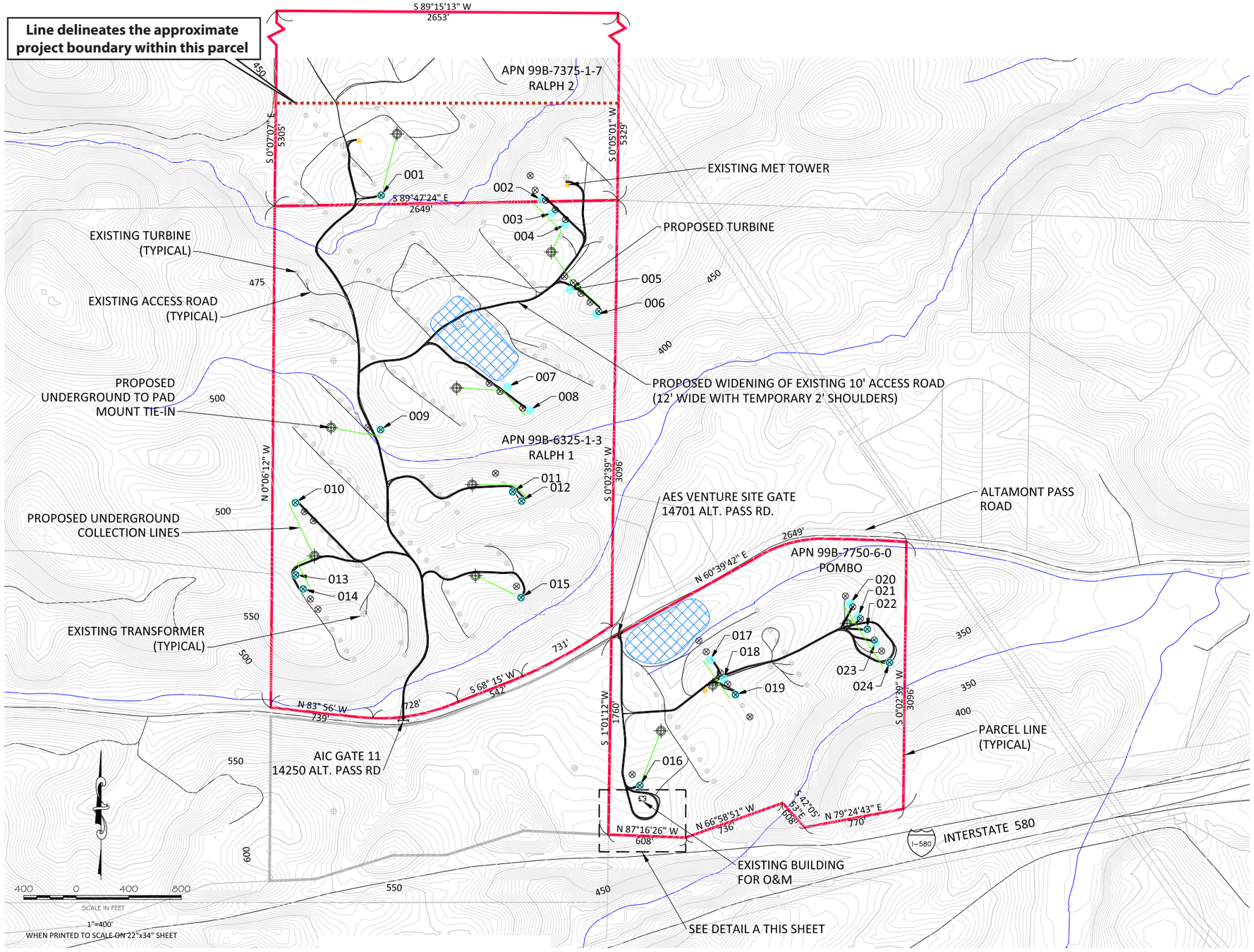
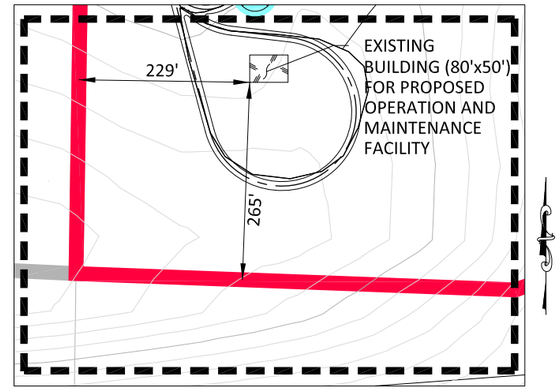
Figure 2-3
Project Area Site Plans



DETAIL A - SCALE 1"=100'



LEGEND

- EXISTING TURBINE TO BE REMOVED
- EXISTING TURBINE IN PLACE
- PROPOSED TURBINE
- EXISTING MET TOWER
- PROPOSED UNDERGROUND COLLECTION LINE
- PROPOSED UNDERGROUND TO PAD MOUNT TIE-IN
- PHASE 1 PARCEL BOUNDARY
- EXISTING TRANSFORMER
- 450 EXISTING CONTOUR
- PROPOSED WIDENING OF EXISTING ACCESS ROAD
- EXISTING ROADS
- APN ASSESSOR'S PARCEL NUMBER
- EXISTING BLUELINE STREAM OR WATERWAY
- PRIMARY ACCESS GATE
- EXISTING BUILDING FOR O&M
- PROPOSED LAYDOWN AREA

TURBINE SCHEDULE	
MAP ID	FULL ID
001	MEWT100-001
002	MEWT100-002
003	MFWT100-003
004	MEWT100-004
005	MEWT100-005
006	MEWT100 006
007	MEWT100-007
008	MEWT100-008
009	MEWT100-009
010	MEWT100-010
011	MEWT100-011
012	MEWT100 012
013	MEWT100-013
014	MEWT100-014
015	MEWT100-015
016	MEWT100-016
017	MEWT100 017
018	MEWT100-018
019	MEWT100-019
020	MEWT100-020
021	MEWT100-021
022	MEWT100-022
023	MEWT100-023
024	MEWT100-024

NOTE

PARCEL BOUNDARIES, DIMENSIONS, AND ORIENTATION ARE BASED ON ALAMEDA COUNTY ASSESSOR'S OFFICE PARCEL MAPS.

C-01

Source: FloDesign & Tetra Tech Inc. 2012

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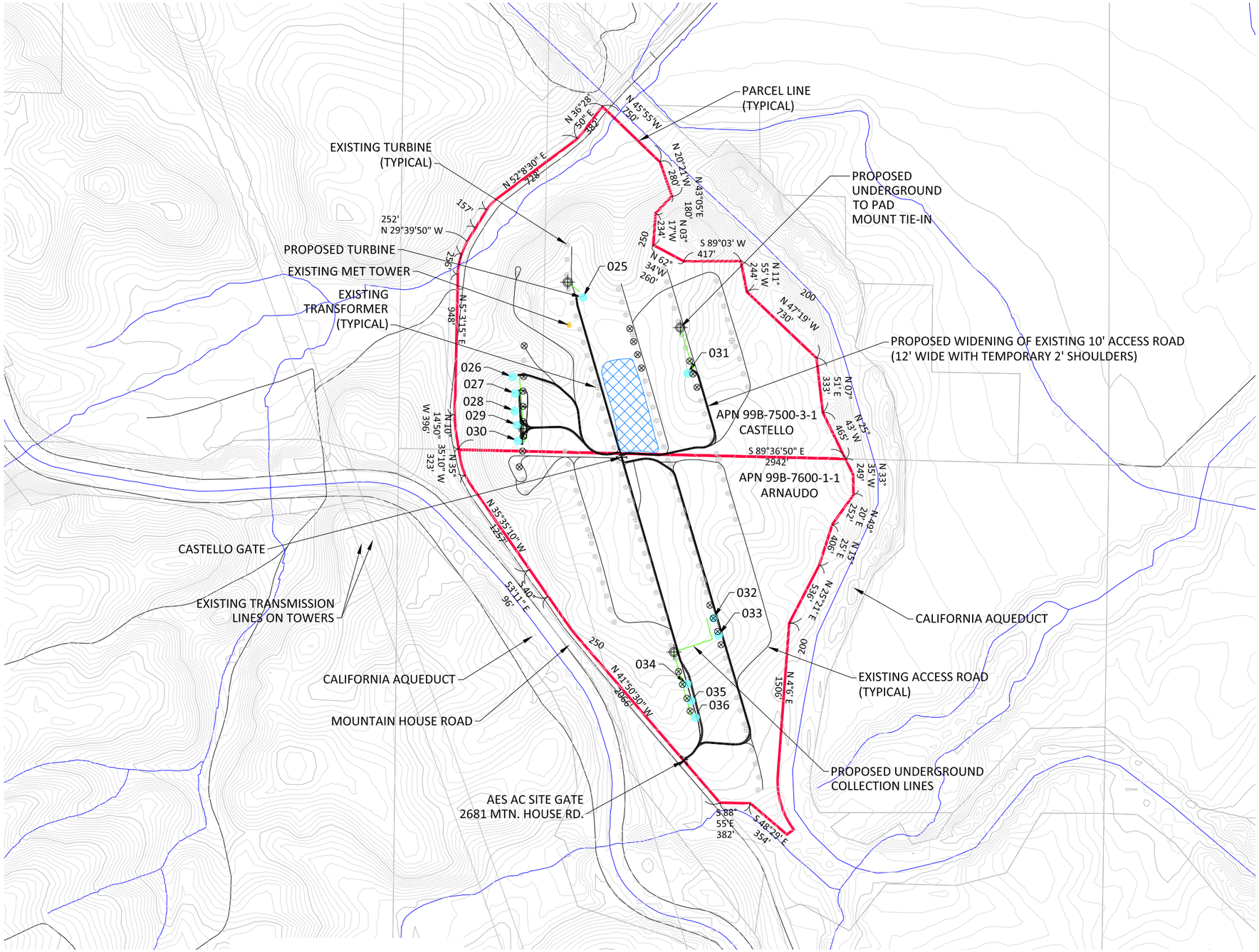
Figure 2-4
Ralph-Pombo Parcels



LEGEND

- EXISTING TURBINE TO BE REMOVED
- EXISTING TURBINE IN PLACE
- PROPOSED TURBINE
- EXISTING MET TOWER
- PROPOSED UNDERGROUND COLLECTION LINE
- PROPOSED UNDERGROUND TO PAD MOUNT TIE-IN
- PHASE 1 PARCEL BOUNDARY
- EXISTING TRANSFORMER
- 450 EXISTING CONTOUR
- PROPOSED WIDENING OF EXISTING ACCESS ROAD
- EXISTING ROADS
- APN ASSESSOR'S PARCEL NUMBER
- EXISTING BLUELINE STREAM OR WATERWAY
- PRIMARY ACCESS GATE
- PROPOSED LAYDOWN AREA

TURBINE SCHEDULE	
MAP ID	FULL ID
025	MEWT100-025
026	MEWT100-026
027	MEWT100-027
028	MEWT100-028
029	MEWT100-029
030	MEWT100-030
031	MEWT100-031
032	MEWT100-032
033	MEWT100-033
034	MEWT100-034
035	MEWT100-035
036	MEWT100-036

NOTE

PARCEL BOUNDARIES, DIMENSIONS, AND ORIENTATION ARE BASED ON ALAMEDA COUNTY ASSESSOR'S OFFICE PARCEL MAPS.

400 0 400 800

SCALE IN FEET

1"=400'
WHEN PRINTED TO SCALE ON 22"x34" SHEET

C-02

Source: FloDesign & Tetra Tech Inc. 2012

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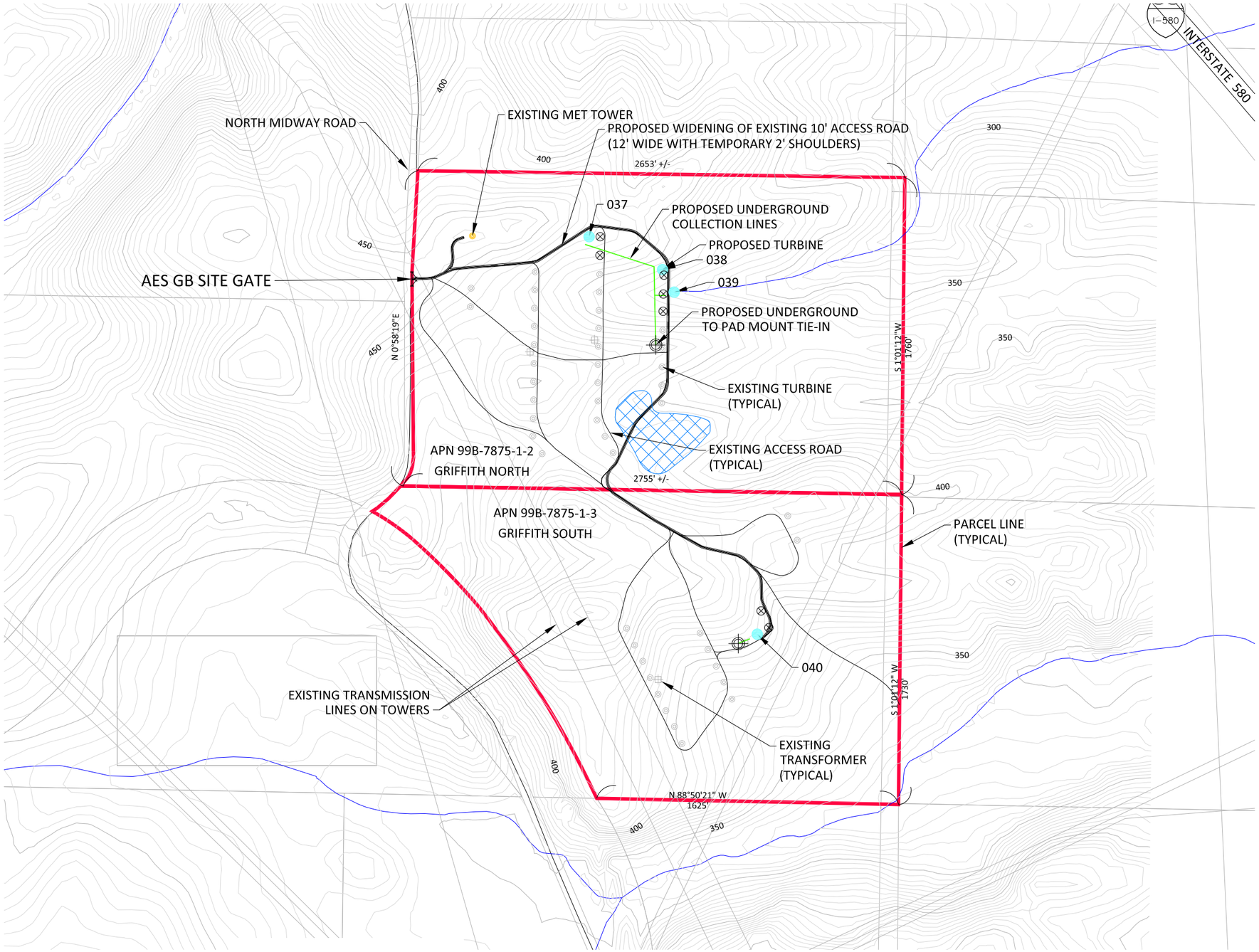
Figure 2-5
Castello-Arnaudo Parcels



LEGEND

- EXISTING TURBINE TO BE REMOVED
- EXISTING TURBINE IN PLACE
- PROPOSED TURBINE
- EXISTING MET TOWER
- PROPOSED UNDERGROUND COLLECTION LINE
- PROPOSED UNDERGROUND TO PAD MOUNT TIE-IN
- PHASE 1 PARCEL BOUNDARY
- EXISTING TRANSFORMER
- 450 EXISTING CONTOUR
- PROPOSED WIDENING OF EXISTING ACCESS ROAD
- EXISTING ROADS
- APN ASSESSOR'S PARCEL NUMBER
- EXISTING BLUELINE STREAM OR WATERWAY
- PRIMARY ACCESS GATE
- PROPOSED LAYDOWN AREA

TURBINE SCHEDULE	
MAP ID	FULL ID
037	MEWT100-037
038	MEWT100-038
039	MEWT100-039
040	MEWT100-040

NOTE

PARCEL BOUNDARIES, DIMENSIONS, AND ORIENTATION ARE BASED ON ALAMEDA COUNTY ASSESSOR'S OFFICE PARCEL MAPS.

300 0 300 600

SCALE IN FEET

1"=300'

WHEN PRINTED TO SCALE ON 22"x34" SHEET

C-03

Source: FloDesign & Tetra Tech Inc. 2012

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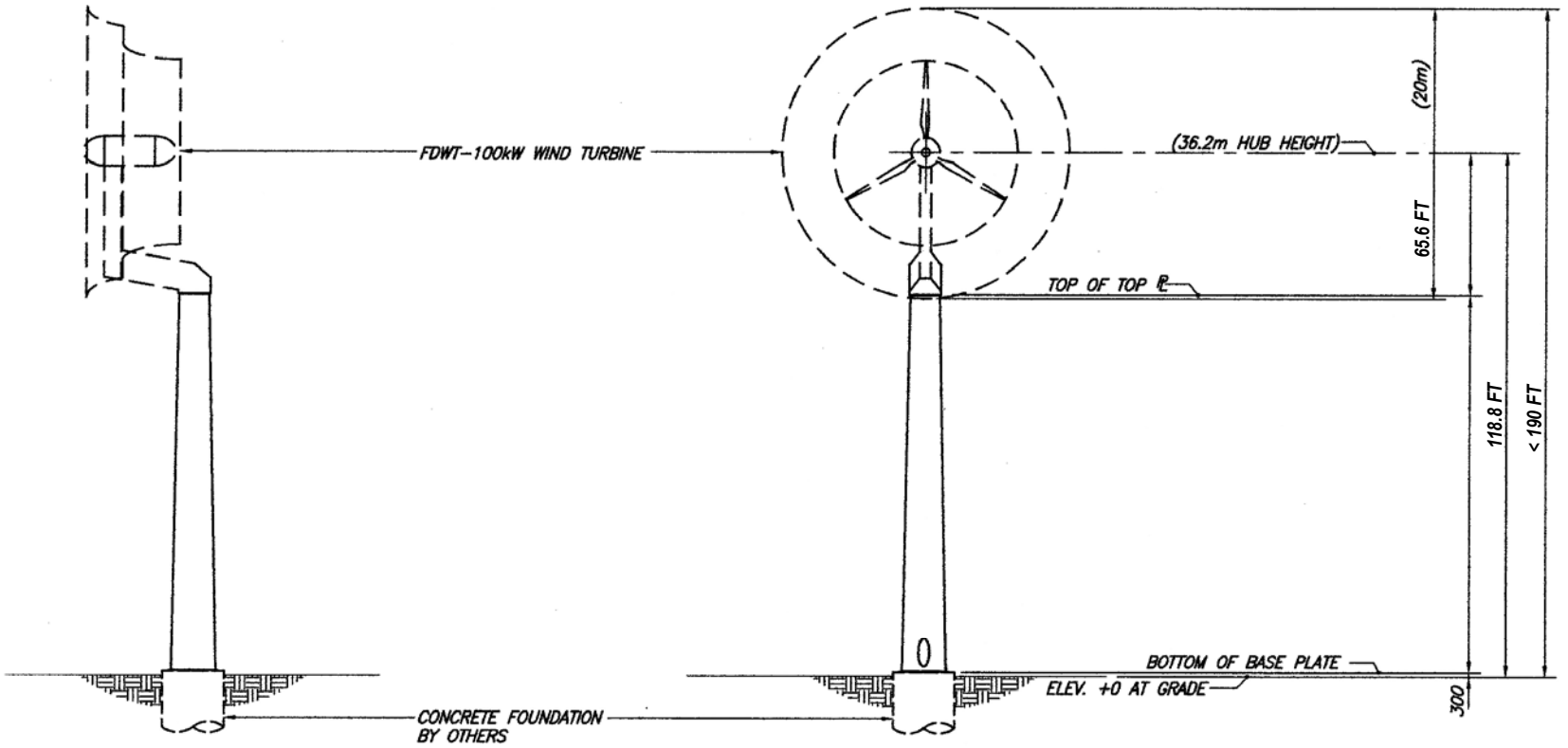
Figure 2-6
Griffith Parcels



Source: FloDesign

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Figure 2-7
100 kW Wind Turbine

2.4.1 Initial Repower Overview

The first phase of the Sand Hill Wind Project, referred to as the Initial Repower, would involve the removal of 70–80 existing turbines (approximately 4 MW) and installation of 40 shrouded turbines of equal total capacity (approximately 4 MW). Figure 2-8 provides a photograph of a shrouded turbine installed in another location.

The Initial Repower would support an ongoing, 3-year Avian Validation Study, under the guidance of the Alameda County SRC and primarily funded by a PIER Grant from the CEC. The Avian Validation Study commenced in April 2012 in the form of a twice-weekly fatality survey of the existing 1980s-'90s-era turbines and will evaluate the extent to which the shrouded turbine could reduce impacts on birds compared to the existing turbines. Impact comparisons will be based on a randomized, statistically rigorous study framework that will evaluate the 40 shrouded turbines installed during the Initial Repower at locations interspersed throughout the existing facilities and compare their performance against 157 existing 1980s-'90s-era turbines that will act as a control group. Figure 2-9 provides a comparison of the different turbines at the project site. Study objectives include the following.

- Compare avian wind turbine interactions between FloDesign shrouded turbines and multiple types of existing conventional wind turbines at sites with known high avian fatality rates during day and night and various wind and terrain conditions.
- Compare avian fatality rates between FloDesign shrouded turbines and conventional turbines at known high fatality sites, using a short search interval and a BACI design.
- Explain variation in fatality rates by turbine design, flight patterns, an avian interactions with wind turbines (e.g., avoidance behaviors).
- Develop field-tested behavior survey methods and data that inform avoidance rates for use in collision risk models and map-based collision hazard models, with the eventual goal of using model results to assist with wind turbine siting.

For additional detail, please refer to Section 3.4, *Biological Resources*, and Appendix B, *Avian Study Design*.

Because the Initial Repower turbines would be located among existing turbines, no new access roads, substation facilities, interconnection lines, or operations and maintenance (O&M) facilities would be necessary. However, some internal access roads would require widening from an existing width of 10 feet to a width of 16 feet to accommodate construction traffic. In addition, new pads, new connections to the existing power collection system, and temporary laydown areas would be constructed for the shrouded turbines.

2.4.2 Full Repower Overview

The full repowering phase would decommission all existing turbines remaining after the Initial Repower and replace them with up to 300 shrouded turbines to provide up to 30 MW of additional generating capacity (Full Repower). The Full Repower would take place after completion of the Initial Repower but before 2017 and would be subject to a separate CUP and additional environmental review under CEQA. The Full Repower would occur within the same project area as the Initial Repower, but would also include an additional parcel (the 67.9-acre Johnston parcel,

APN 99B-6325-1-4; Figure 2-2) that has no existing turbine facilities as identified in Table 2-1. The Applicant intends to use the test results of the Avian Validation Study and turbine performance data to inform its approach to repowering the remainder of the existing turbines under the Full Repower phase. For example, if the results of the BACI Avian Validation Study demonstrate that the Full Repower would likely cause avian fatality rates in excess of the Initial Repower performance standards, the Applicant would analyze the results of the Avian Validation Study to identify design and/or operational measures to reduce the effects of the Full Repower to or below specified performance standards.

2.5 Project Decommissioning and Construction Activities and Facilities

2.5.1 Initial Repower Project Components

The Initial Repower facilities would include wind turbines and related components; turbine pads and crane pads; power collection lines; transmission interconnection lines; temporary laydown and assembly areas; and permanent meteorological towers. The project would use the existing electrical substation, switch yard and O&M facilities as well as upgraded existing access roads. New connections to the existing electrical collection system would be required to connect the new turbines to the existing network. The following sections describe each of the components of the Initial Repower.

Wind Turbines

The 40 shrouded turbines would consist of foundations, towers, and the energy-generating turbine. Each new wind turbine would be less than 200 feet tall, with a maximum hub height of up to 120 feet. The shrouded turbine would have a maximum diameter of 70 feet. Figure 2-7 illustrates shrouded turbine proportions. Each of these components is described in more detail in the following subsections.

Tower Foundations

The project is expected to use one of three options for the foundation: (1) a large spread footing (inverted “T”), (2) a single pier foundation, or (3) four individual steel reinforced concrete caissons. The type of foundation employed will depend on the specific soil conditions at the individual turbine sites as well as the type of tower selected. The spread footing foundation would typically be an inverted “T” shape with a pedestal diameter of 12 feet to mate up with the monopole and an approximately 45-foot diameter spread footing buried underground to a depth of approximately 7 feet. The single pier foundation would have a 12-foot diameter footprint and extend up to 30 feet below the ground. If four caissons are used, each would be approximately 8 feet in diameter, spaced approximately 12 feet apart (center to center) from the adjoining caissons, and buried to a depth of 8–10 feet. Exact dimensions are not known at this time for any of these options and would be based on the final tower design and site-specific conditions.

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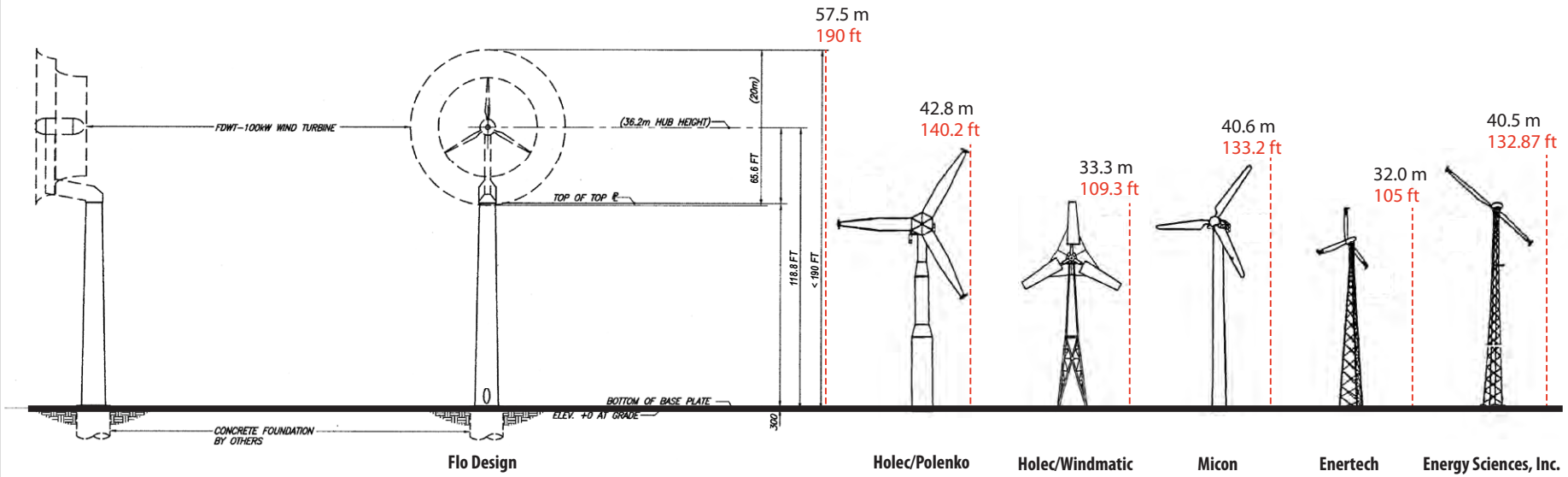
Figure 2-8
Photograph of Shrouded Wind Turbine



	Name	Size (kW)	Hub Height (m)	Rotor Diameter (m)	Total Height (m)	
	Flo Design	100	36.2	21.3	57.5	190 ft
15	Energy Sciences, Inc.	80	24	16.5	40.5	132.87 ft
2	Holec/Windmatic	65	18.5	14.8	33.3	109.25 ft
1	Holec/Polenko	100	24.6	18.2	42.8	140.2 ft
10	Enertech	40	18.5	13.5	32	104.9 ft
4	Micon	65	24.6	16.0	40.6	133.2 ft

Source: Smallwood, K. S.. 2004. Developing Methods to Reduce *Bird Mortality in the Altamont Pass Wind Resource Area, California*. California Energy Commission 500-01-019.

Graphics/00151.13 003 Sand Hill EIR/Turbine Comparisons (09-13) SS

Figure 2-9
Wind Turbine Comparison

Turbine Towers

Either a free-standing, lattice steel tower with a sheathed covering or a monopole tower would support the shrouded turbines. The towers would be freestanding and have a smooth exterior surface painted a neutral bright white or light off-white color. A computerized control cabinet would be located inside and at the base of the tower. Both the door and control cabinet would be locked to prevent unauthorized access.

Shrouded Wind Turbine

The shrouded turbine is made up of several components. The internal components consist of the electrical generator and wind rotor. The external components include two concentric shrouds surrounding the turbine face. Figure 2-7 provides dimensions for a prototype shrouded turbine recently installed in Kern County. The advantage of the shrouded turbine design is that airflow is channeled directly to the rear of the turbine resulting in reduced back pressure and improved energy production over a standard turbine. This reduction in back pressure allows the air to flow freely as though the blades were not creating force and extracting energy from the air.

Safety Lighting

Wind projects must be constructed and operated in accordance with Federal Aviation Administration (FAA) standards for obstruction marking and/or lighting specific to wind farms. The shrouded turbines are not expected to require FAA marking or lighting because they would be less than 200 feet tall.

Lightning Protection

For protection from potential lightning strikes, each wind turbine would be equipped with a lightning protection system. The lightning protection system would be connected to an underground grounding arrangement to facilitate lightning flowing safely to the ground. In addition, all equipment, cables, and structures comprising the wind turbines would be connected to a metallic, project-wide grounding network.

Turbine Base and Crane Pad Areas

For each turbine, a level area approximately 40 feet in diameter would be needed to provide sufficient space for turbine O&M. This area would be graveled to provide all-weather access for maintenance and to inhibit vegetation. A larger construction area of approximately 110-foot by 110-foot assembly area would be required for turbine erection. Each turbine would also need an approximately 3,500-square-foot crane pad, graveled and compacted to support the large cranes that hoist the nacelle and assembled rotor blades and shrouds to the top of the tower. Any displaced excavated material would be spread around the turbine base, and no dirt would be hauled offsite. Allowing an additional 20 percent for cut and fill, construction at each turbine site would typically disturb less than 0.25 acre, for a total of less than 10 acres of construction disturbance for the 40 turbine pads. [3]

[3] The turbine foundation would be placed within the crane pad construction area; the estimated size of these pads is intentionally conservative—the actual area needed for construction may be less than used for the analysis.

Access Roads

Existing public roads provide access to the project area as shown in Figure 2-2. I-580 would be the primary highway used for access to the project area. Secondary roads in the project vicinity include Altamont Pass Road, Patterson Pass Road, Mountain House Road, North Midway Road and Grant Line Road. Existing gated entrances on Altamont Pass Road, North Midway Road, and Mountain House Road would be used to directly access the project area. Within the project area, existing access roads would be used to carry out the work because the smaller size of the shrouded turbines relative to conventional new generation turbines would not require the use of oversized vehicles for delivery. However, some minor improvements, such as grading, adding aggregate base, and widening of these existing internal access roads may be necessary. As currently planned, no new roads would be needed; only upgrades to existing roads are proposed. These upgrades would involve a 6-foot width increase to most of the existing internal access roadways and some resurfacing on existing internal access roadways.

Power Collection System

Transformers

One pad-mounted, 21 kilovolt (kV) transformer within a footprint measuring approximately 7 feet by 7 feet would be required for approximately every five new shrouded turbines. Each transformer would comply with the U.S. Environmental Protection Agency's (EPA's) Spill Prevention, Control, and Countermeasure (SPCC) Rule.

Power Collection Lines

The power generated by the turbines would be collected and conveyed to the existing substation by a 21 kV electrical power collection system. The majority of the electrical collection system is in place but the new shrouded turbines would need to be connected to it. New cables, buried approximately 42 inches deep would connect from the base of the new shrouded turbines to the pad-mounted transformers and to the existing system. Buried splice boxes would be installed at each junction to house the splices and provide for future maintenance access.

Supervisory Control and Data Acquisition System

A Supervisory Control and Data Acquisition (SCADA) System would be installed to enable communication for remote monitoring of turbines and other assets at the wind farm. Fiber-optic cables or other types of data communication line would be installed in the same trenches as the power collection system or data can be transmitted wirelessly if terrain conditions require. Data is transmitted from the turbine to a point where the data can access the internet for data transmission to the local site, the project owner's primary monitoring center and the turbine manufacturer's data center.

Substation and Transmission Interconnection

The Initial Repower would use the existing substation and transmission interconnection lines located in the project area. These facilities would not need to be expanded to accommodate the Initial Repower.

Operations and Maintenance Facility

The Initial Repower would use the existing O&M facility currently located in the Pombo parcel. The facility would need to be upgraded internally but would not be expanded for the Initial Repower. An area of approximately 1 acre adjacent to the O&M facility would be graded and finished with a gravel surface to be used for additional parking and storage.

Temporary Laydown Areas

The Initial Repower would require four temporary laydown areas each occupying approximately 5 acres. The actual acreage needed for each laydown area would depend on timing and logistics. The laydown areas would be used for storage of turbine components, construction equipment, job trailers, and project construction materials. Upon completion of construction, the temporary laydown areas would be removed, and the sites would be revegetated.

Assembly Pads

The anticipated disturbance at each turbine location, includes an assembly pad area to be used primarily for shroud assembly. The pads would be level areas approximately 110 by 110 feet in area with gravel cover to support the construction equipment and to reduce dust. The pads would be temporary and would be removed after construction is complete. The assembly pad sites would be revegetated once they are no longer in use.

Table 2-3 presents the expected disturbance area associated with Initial Repower decommissioning and construction activities and components. The decommissioning and removal of existing turbines would not occupy a larger footprint than the eventual construction activities needed to install the new shrouded turbines. The disturbance estimates in Table 2-3 apply to both construction and decommissioning activities.

Table 2-3. Potential Area of Disturbance for Initial Repower Activities and Components

Initial Repower Activity/Component	Temporary Disturbance (Total Acres)	Long-Term Disturbance (Total Acres)
Access Roads – Grading and Repair as Needed	10	6
Turbine Foundation and Base Areas (40)	–	1.2
Power Collection System and Communication Lines	0.6	–
Temporary Laydown Areas (4)	20.0	–
Assembly Pads (40)	13	–
Operations and Maintenance Facility Parking/Storage Area	–	1.0
Crane Pad	–	3.2
Pad-Mount Transformers	–	0.4
Total	43.6	11.8

2.5.2 Initial Repower Activities

The Initial Repower would consist of the removal of 70–80 existing foundations and their replacement with 40 shrouded turbines. The 70 to 80 old turbine nacelles and towers (but not foundations) to be replaced by the Initial Repower would be removed prior to the foundation removal, under the authority of the existing CUPs which allows and under certain circumstances requires the removal of existing wind turbine nacelles and towers (e.g., for removal of hazardous turbines). The following paragraphs describe the steps and facilities associated with removal of the existing foundations and installation of the new, shrouded turbines for the Initial Repower.

Schedule, Equipment, and Construction Workforce

Foundation removal and construction activities are expected to commence in 2014. Foundation removal (removal, site restoration, and reclamation) activities associated with the existing turbine foundation sites would occur concurrent with construction activities for the new turbines. Foundation removal and construction would take place over a 6- to 9-month period. Construction activities would occur between 7:00 a.m. and 7:00 p.m. Monday through Friday and between 8:00 a.m. and 6:00 p.m. on Saturdays and Sundays. Typical construction equipment used for wind farm facilities, as outlined in Table 2-4, is expected to be used for both foundation removal and construction activities.

Table 2-4. Typical Wind Farm Facility Construction Equipment for Initial Repower

Equipment Type	Project Use	Duration of Use
CAT D6 Dozer (3)	Road and pad construction	3 months
Large Dirt Graders (2)	Road and pad construction; yards	3 months
Compactor	Road and pad compaction	3 months
Water Trucks	Compaction, erosion, and dust control	6 months
Backhoe	Excavating trenches for underground utilities	3 months
CAT Excavators (2)	Foundation construction	3 months
Loader, rubber-tired and skid	Move and carry soils and other construction debris/ equipment	6 months
CAT Rollers (2)	Compaction, erosion, and dust control	3 months
Concrete trucks and pumps	Pouring tower and other structure foundations	850 trips to site
Manitowoc 2250 Crane (1)	Off-loading and erecting towers and turbines	3 months
Link-Belt 108 Cranes (2)	Off-loading and erecting towers and turbines	3 months
Link-Belt 218 Crane (1)	Off-loading and erecting towers and turbines	3 months
60-ft. Aerial Lift (5)	Loading and unloading equipment	4 months
Flatbed haul trucks (2)	Hauling road and pad construction materials	3 months
Semi-trailer trucks	Delivering towers, turbines and other equipment	240 trips to site
Pickup trucks (80)	General use and hauling minor equipment	6 months
Four-wheeled all-terrain vehicles	Access and underground electrical line installation	6 months
11k Forklift (7)	Lifting equipment and materials	5 months

Decommissioning activities and new (replacement) facility construction would require the personnel categories and workforce levels, in full-time equivalents (FTEs), outlined in Table 2-5. The project management category includes field engineers, safety monitors, quality assurance/quality control (QA/QC) personnel, technicians, and the project manager.

Table 2-5. Construction Workforce

Personnel	Full-Time Equivalent (FTE)
Carpenters	10
Electricians	25
Equipment operators	25
Foremen	15
Iron workers	30
Project management	16
Truck drivers	25

Decommissioning and Construction Activities

The equipment and workforce described above under *Schedule, Equipment, and Construction Workforce*, would be utilized to perform the following foundation removal and construction activities for the Initial Repower.

Demarcation of Sensitive Resources and Construction Area Boundaries

The Applicant would mark the sensitive resources in the project area and demarcate the limits of construction to ensure that construction activities are limited to the area around the facilities and avoid sensitive resources. Both areas would be staked and flagged, as appropriate, according to the environmental approval and permitting process.

Grading and Road Repair as Needed

Most of the existing 10-foot wide roads would require widening to 16 feet to accommodate construction vehicles. During construction the crane may need a path as large as 40 feet to traverse the site, of which the 16-foot-wide road would only make up a portion of the width of the route. In addition, some of the existing road surfaces may need to be graded, covered with road base aggregate, and compacted in preparation for construction traffic.

Temporary Staging Areas

Up to four 5-acre temporary staging areas would be needed to support the Initial Repower. The preparation of these areas may include grading and placement of aggregate to accommodate the staging of materials and equipment. Site preparation would be coincident with the grading of roads and turbine foundations. Staging areas would be needed to store turbine components, construction equipment, job trailers, and materials for project construction. Upon completion of construction, the laydown areas would be restored to preproject conditions.

Decommissioning and Removal of Existing Turbines

Preparation of the project parcels to receive new shrouded turbines would require decommissioning (disassembly and removal) of existing wind turbines to provide space for the new turbines. Generally this is a two-step process; the first step being the removal of the turbine nacelles, towers and associated aboveground equipment, and the second step being the removal of foundations and associated underground equipment. The first step described above, removal of nacelles, towers and above-ground equipment, would take place under the authority of existing CUPs and is not expected to require or involve ground-disturbing activities. This first step would employ only conventionally-sized cranes and haul trucks for specialized equipment, as well as standard pickup trucks and service vehicles. Although this step would be performed concurrently with construction activities related to road upgrades and other grading activities, it would, as indicated above, be authorized under existing CUP provisions and would not be part of the project for which Sand Hill Wind, LLC has submitted an application.

The second step would demolish and remove the existing turbine foundations or turbine pads (whichever is encountered at each turbine site) so that proper foundations can be installed for the proposed new shrouded turbines. This step would be performed concurrently with other site preparation and turbine foundation installation activities, and would involve ground disturbance at each turbine foundation. Actual work related to foundation removal is expected to require about 1 day to complete per turbine. Equipment requirements and durations for onsite decommissioning work are included in the construction requirements detailed in Table 2-4.

Turbine Foundation Construction

Once the roads are upgraded, turbine foundations would be constructed. As part of the detailed engineering design, a geotechnical report would be developed to determine the appropriate turbine foundation design. Each foundation would be constructed of steel-reinforced concrete as appropriate for the foundation type selected for use on the project. The “inverted T” foundation, is expected to require an excavation approximately 7 feet deep and 45 feet in diameter. A pier-type foundation would require a 30-foot-deep excavation. If caissons are used, each structure would be approximately 8 feet in diameter, spaced approximately 12 feet apart (center to center) from the adjoining caisson and be set to a depth of about 7 feet below grade. The tower foundation would be located within the crane pad area.

Power Collection System and Communication Lines Installation

The power collection system would consist of underground conduits and cables between individual turbines, pad mounted transformers and the exiting collection system. Underground cables would be installed by digging a trench approximately 12 inches wide and 42 inches deep and burying the cable. Communication lines for remote sensing equipment, used to monitor each turbine, would be installed in the same trenches as the power collection system or data would instead be transmitted wirelessly. If necessary to avoid trenching through sensitive areas such as wetlands, overhead lines or horizontal directional drilling (HDD) methods would be used.

Turbine Installation

The turbine towers and turbines would be brought to the project area after construction of the turbine foundations was complete. Cranes would be brought onsite to lift the multiple tower sections and turbines into place. The first step would be to lift and secure the base section of the

tower to the foundation. Subsequent tower sections would be connected to the base tower section. The turbine, including the blades, nacelle and shroud assembly, would then be lifted into place atop the tower.

The crane pad area, 3,500 square feet, at each turbine would provide enough space to stage the crane and store and assemble the turbine shroud and other turbine components while the tower is being erected. No additional area would be required at the crane pads for construction equipment turnaround areas.

Erosion and Sediment Control

Erosion and sediment from disturbed construction areas would be controlled using well-established best management practices (BMPs) to minimize soil erosion, sedimentation of drainages downslope of the project area, and other environmental impacts. Prior to construction, the Applicant would develop a Temporary Erosion and Sedimentation Control Plan to be used throughout the life of the project. Erosion control procedures would comply with the County Public Works Engineering Division requirements.

Examples of likely erosion measures are listed below.

- Use of straw wattles, silt fences/straw bale dikes, and straw bales to minimize erosion and collect sediment.
- Hydroseeding and restoration of the site.
- Maintenance of all erosion-control measures until disturbed areas are stabilized.
- Regular inspection and maintenance of erosion-control measures.
- Removal or covering of stockpiled soils if rain is forecast or apparent.

Other BMPs that would be implemented for the Initial Repower would include the following.

- Designated Work Areas: Construction would occur within the flagged and staked project boundaries. Clearing of vegetation would be minimized where feasible.
- Construction Traffic Plan: Construction traffic routing would be established in a Construction Traffic Plan, as further discussed in Section 3.11, *Transportation and Traffic*. The plan would define hours, routes, and safety and management requirements.
- Dust Control Plan: Dust arising from exposed soil would be controlled using water trucks.
- Site Reclamation: To reduce erosion and restore the original land use, all temporarily disturbed areas would be revegetated.

Because of its rural location, there is no water service that supplies water to the existing project area facilities. The Alameda County Flood Control and Water Conservation District (Zone 7 Water Agency) sells treated water to local water agencies as well as untreated water directly to agricultural and other customers. As noted above, during construction, water trucks would bring water to the sites for dust control and revegetation. Water for dust suppression would be obtained from the Zone 7 Water Agency.

Water necessary for construction would be used for dust control and revegetation activities. These activities would require no more than 2,172,342 gallons of water per month during the 6-month construction period of the Initial Repower. Water needed for Initial Repower operations and maintenance, including blade washing, would not be expected to exceed 400 gallons per year.

System Installation/Testing

Large cranes would be used to erect the turbine towers and install the turbines. After construction, all project systems, controls, and safety equipment would be calibrated and tested before bringing the equipment online.

Final Cleanup and Restoration

As a final step in construction, the construction site would be cleaned and restored. Construction trash and debris would be collected and properly disposed of at a landfill or other appropriate facility. Any final erosion control and revegetation measures would be completed.

After construction is completed, all temporarily disturbed areas of the project area would be seeded with appropriate vegetation in order to conform to adjacent land areas, as required by Alameda County and landowner agreements. To minimize subsurface water migration, trench plugs would be installed in the trenches on steep slopes. All trenches and excavated areas would be backfilled with subsurface soil and covered with topsoil and any vegetation that was cleared during site preparation. To the extent feasible, original land contours would be restored to preconstruction conditions, and permanent erosion control measures such as water bars would be installed (water bars slow runoff and prevent water from collecting or draining down disturbed slopes).

Operation and Maintenance Activities

Upon completion of construction, operation and maintenance (O&M) activities would commence for the Initial Repower. Existing operations employ approximately 12 full-time staff members, including field technicians and an operations manager. Sand Hill anticipates that the limited nature of the Sand Hill Wind Project would not change the onsite workforce needs because it replaces rather than augments existing facilities.

These employees would be stationed at the existing O&M building to provide periodic maintenance and monitoring of the project area. The employees would work normal work shifts, from approximately 8:00 a.m. to 5:00 p.m., except during emergency situations when additional hours may be necessary.

Routine maintenance of the turbines would be necessary to maximize performance and detect potential difficulties. Sand Hill would follow an O&M protocol, which would specify routine turbine maintenance and inspection activities in accordance with the program developed by the turbine manufacturer. Scheduled maintenance of each wind turbine would be conducted approximately every 6 months. On average, each turbine would require 10–20 hours of scheduled mechanical and electrical maintenance per year. O&M personnel would perform routine maintenance, including replacing lubricating fluids periodically, checking parts for wear, and recording data from data-recording chips in the anemometers. All roads, pads, and trenched areas would be inspected regularly and maintained to minimize erosion.

In addition to visual inspections, the turbines would be monitored continuously by a SCADA system. Each turbine would be equipped with monitors to communicate major aspects of operation to the O&M facility through communication lines. Alarm systems would be triggered if operational characteristics fall outside established limits. Each turbine would have an automatic braking system to shut down the turbine blades in the event of malfunction or excessive wind speeds. Any problems would be promptly reported to onsite O&M personnel for correction.

Avian Fatality Monitoring and Reduction Program

Section 15126.4(a)(1)(A) of the State CEQA Guidelines requires an EIR to distinguish between measures proposed by project proponents and measures, proposed by the lead agency or others, which are not included as part of the project itself but "could reasonably be expected to reduce adverse impacts if required as conditions of approving the project."

As discussed in general terms above, as part of the project the Applicant will support a 3-year Avian Validation Study, which commenced in April 2012 under the guidance of the Alameda County SRC. The Avian Validation Study is intended to evaluate the extent to which the shrouded turbine could reduce impacts on birds compared to the existing turbines. Following construction of the Initial Repower, the Applicant will continue the Study for a minimum of one year. The Applicant will provide Alameda County with the Avian Validation Study results and will provide an assessment of the fatality rates for each of the four focal species and for all birds, if not otherwise included in the Avian Validation Study report. The results of the Avian Validation Study are intended to guide both the County in its consideration of the Full Repower phase, and the Applicant in making decisions about the timing of the Full Repower and, if necessary due to the outcome of the Avian Validation Study, to initiate specific steps that would avoid or reduce potentially significant adverse impacts on avian species, when compared to existing levels of avian mortality.

The Applicant has outlined an Avian Fatality Monitoring and Reduction Program that it would implement in addition to the mitigation required by the County under this EIR, as its own mitigation measures or strategy. The research and BACI testing of new wind technologies as a means to understanding and reducing avian impacts is a recognized form of avian impact mitigation as well as an Advanced Conservation Practice for the potential minimization and avoidance of risk to bald and golden eagles. Notwithstanding the foregoing, the Applicant proposes the following additional measures to address potential avian fatalities resulting from the Initial Repower, separate from mitigation measures required by this EIR, and which are therefore considered part of the project. These Applicant proposed measures (APMs) would be comprised of two main components: Avian and Bat Fatality Monitoring (APM-1), and if deemed necessary, Seasonal Shutdowns (APM-2). These components and the decision-making protocol for the seasonal shutdowns are described below.

Applicant Proposed Measure 1: Conduct Avian and Bat Fatality Monitoring

As part of the CEC/PIER Avian Validation Study the Applicant will provide Alameda County with its results, including an assessment of the fatality rates for each of the four focal species and for all birds and all bats, if not otherwise included in the CEC/PIER report. As a separate and subsequent measure, if estimated fatality rates for any of the focal species exceed the baseline estimates (birds/MW/year) of 0.562 (American kestrel), 3.126 (burrowing owl), 0.190 (red-tailed hawk), or 0.06 (golden eagle), the Applicant shall either implement APM-2 or, at their discretion, may continue the monitoring program for a period of an additional 2 years to determine if the average fatality rates observed over a longer timeframe demonstrate a reduction below the baseline fatality rates. If, at the end of 3 years of monitoring, the fatality rates still exceed baseline rates, the Applicant will implement APM-2, to reduce fatality rates below the baseline rates. In either case, the Full Repower would not be implemented until reductions from the baseline rates for all four focal species have been documented and accepted by the county.

If either monitoring option (i.e., through the third year of the ongoing Study, or in additional years) shows a reduction in fatality rates of less than identified targets or objectives stated in specific percentages of the baseline fatality rates shown below for each individual focal species, APM-2 will be implemented to reduce fatality rates to levels below the applicable, species-specific baseline fatality rate. If any monitoring option (year 1, or year 1 and year 2 combined, or years 1–3 combined) identifies fatality rates below the applicable species-specific baseline rate, no additional APMs will be implemented.

Applicant Proposed Measure 2: Implement Seasonal Shutdowns

The Applicant will implement seasonal shutdowns to reduce fatality rates to the focal species to an appropriate target percentage of the individual baseline fatality rates described below for each focal species, as determined by the monitoring program outlined in APM-1. Turbines will be turned off prior to November 1 each year and will remain off through February 15 of the following year. No operational modifications would be implemented within the February 16 to October 31 period. The Applicant will notify Alameda County each year when the turbines have been shut down, and again when they have resumed operating.

Seasonal shutdowns will remain in effect until the Applicant demonstrates to the County that improvements to the technology have been identified and implemented that would reduce the fatality rates to less than the target percentage reduction for each focal species, as identified below. If the Applicant makes such improvements, operation during the seasonal shutdown periods for the purposes of monitoring and testing improvements would be conducted. Once the Applicant demonstrates that fatality rates for each of the four focal species have been reduced to the appropriate target percentage of the baseline fatality rates, through an approved monitoring program, the seasonal shutdown period will be lifted, allowing year-round operations to resume. The threshold rates are as follows:

- For red-tailed hawk, if fatalities decrease by an amount less than 50 percent below baseline, the Applicant may, at its discretion, either implement APM-2, or delay implementation of APM-2 for up to 2 years for the purpose of continuing monitoring. If continued monitoring demonstrates a reduction of more than 50 percent below baseline over the long term, then no further APM would be implemented. If, at the end of 3 years, the average fatality rate across those years is not greater than 50 percent below the baseline, the Applicant would implement APM-2 until such time as improvements to the technology demonstrably reduce fatalities by 50 percent.
- Because burrowing owls exhibit large variability from year to year in fatality rates, have a very high reproductive potential, are regularly predated upon by other species, and the cause of death (i.e. turbine collision or predation) for many carcasses found during carcass searches cannot be determined, the threshold for reduction in fatalities is lower than that set for red-tailed hawks. For burrowing owls, if fatalities decrease by an amount less than 25 percent below baseline, the Applicant may implement APM-2 or delay implementation of APM-2 for up to 2 years for the purpose of continuing monitoring. If continued monitoring demonstrates a reduction of more than 25 percent below baseline over the long term, then no further APM's would be implemented. If, at the end of 3 years, the average fatality rate across years is not greater than 25 percent below baseline, the Applicant would implement APM-2 until such time as improvements to the technology demonstrably reduce fatalities by 25 percent.

- There is evidence to suggest that American kestrels may be subject to predation in a manner similar to burrowing owls, and many carcasses are found as feather spots, for which the cause of death cannot be determined. Therefore, the threshold for American kestrel is a fatality rate 30 percent below the baseline fatality rates. For American kestrel, if fatalities decrease by an amount less than 30 percent below baseline, the Applicant may implement APM-2 or delay implementation of APM-2 for up to 2 years for the purpose of continuing monitoring. If continued monitoring demonstrates a reduction of more than 30 percent below baseline over the long term, then no further APM's would be implemented. If, at the end of 3 years, the average fatality rate across years is not greater than 30 percent below baseline, the Applicant would implement APM-2 until such time as improvements to the technology demonstrably reduce fatalities by 30 percent.
- For golden eagle, the baseline fatality rate as defined above is 0.06. Therefore, for golden eagle, if eagle fatalities exceed this rate in a single year, the Applicant would implement APM-2 or delay implementation of APM-2 for up to 2 years for the purpose of continuing monitoring. If continued monitoring demonstrates no additional eagle fatalities over an additional 2 years of monitoring, no additional APM's would be implemented. If one additional eagle fatality is documented, then APM-2 would be required to be implemented immediately, and additional mitigation in the form of electric pole retrofits, consistent with USFWS guidelines and/or requirements would also be implemented at the discretion of the Applicant or the County.

2.5.3 Full Repower Activities and Components

Activities associated with repowering of the remaining 320–330 existing old technology wind turbines are expected to be the same as those described above in Sections 2.4.1 and 2.4.2 for the Initial Repower, although on a larger scale. As with the Initial Repower, activities associated with the Full Repower of the remaining turbines would include decommissioning and removal of existing turbines, construction of new turbine foundations, power collection system and communication lines installation, turbine installation, and final cleanup and restoration.

As with the Initial Repower, appropriate erosion and sediment control measures would be implemented for the Full Repower. The Full Repower would include the erection of additional met towers and may involve the construction of a new O&M building on one of the parcels. The physical components of the Full Repower would be generally the same as described in Section 2.4.2 and Table 2-4 . For purposes of programmatic analysis, it has been assumed that construction of the Full Repower would occur in a single phase.

Also, as identified for the Initial Repower, water necessary for construction of the Full Repower would be used for dust control and revegetation activities. These activities would require no more than 1,448,228 gallons of water per month during a 9-month construction period. As for the Initial Repower, the Full Repower operations requiring water would include blade washing and would not be expected to exceed 100,000 gallons per year.

A new O&M facility for the Full Repower could potentially involve disturbance of up to 5 acres of land that would include a building footprint, additional parking and storage space, a 25-foot gravel surfaced access road, and gated access. This facility would involve construction of a building up to 30 feet in height, and would have an installed septic system to provide for onsite bathrooms.

Final Decommissioning Activities

After the expected useful life of the project (anticipated to be 30 years in the absence of any major equipment upgrades) the Sand Hill facility would be decommissioned and the area revegetated. This would include the breakdown and removal of all turbine components, all facility structures, any other above-ground infrastructure, and below-ground structures (like foundations) to a reasonable depth, if not removed entirely. Grading would be performed to the extent needed to return the land surface to near natural conditions and reasonable drainage functions.

2.6 Required Approvals

Implementation of the proposed Sand Hill Wind Project may require discretionary actions and approvals from the following agencies.

2.6.1 Alameda County

- Consideration and Certification of a Final EIR with appropriate Findings of Fact and Mitigation Monitoring and Reporting Program, if applicable, and approval of the CUPs by the Alameda County EBZA.
- Issuance of grading permits by the Grading Section of the Alameda County Public Works Agency.
- Minor roadway encroachment permits from the Alameda County Public Works Agency for transporting large pieces of equipment.
- Application to Use Right-of-Way from the Alameda County Public Works Agency .
- Land Use Permit, Demolition Permit, and a Building Permit from Alameda County.
- Airport Land Use Plan Consistency Determination from the Alameda County Airport Land Use Commission

2.6.2 Other Responsible Agencies

- The U.S. Fish and Wildlife Service may require incidental take authorization under the Endangered Species Act for federal threatened and endangered species.
- U.S. Army Corps of Engineers may require a Section 404 CWA permit or Water Quality Certification (Section 401).
- FAA may require a Notice of Proposed Construction or Alteration; Determination of No Hazard.
- CDFW may require incidental take authorization under CESA for state threatened and endangered species.
- CDFW may require a Lake and Streambed Alteration Agreement if state jurisdictional streams may be affected by the Sand Hill Wind Project.
- The State Water Resources Control Board will require a Construction Stormwater General Permit for management of storm water during decommissioning and construction activities, and a Notice of Intent as required under Section 401.

- California Highway Patrol may require a Notification of Transportation of Oversize/Overweight Loads.
- California Department of Transportation may require a Single-Trip Transportation Permit; and/or a Right-of-Way Encroachment Permit.
- Central Valley Regional Water Quality Control Board to issue a National Pollutant Discharge Elimination System (NPDES) stormwater permit.
- U.S. Army Corps of Engineers may require dredge and fill authorization under Section 404 of the Clean Water Act if jurisdictional waters of the U.S. may be affected by construction of the project.
- State Historic Preservation Office may require Section 106 compliance in conjunction with a federal permit associated with the project.