TRES VAQUEROS WINDFARM PROJECT

Draft Environmental Impact Report
SCH No. 2009032077
County File No. LP09-2005

Contra Costa County
Department of Conservation
and Development

May 2011

Notice of Completion & Environmental Document Transmittal

Mail to: State Clearinghouse, P.O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

SCH #2009032077

Project Title: Tres Vaqueros Windfarm Repowering Project

Lead Agency: Contra Costa County Dept. of Conservation & Development
Contact Person: William Nelson, Principal Planner
Mailing Address: 651 Pine Street, 4th Floor - North Wing
Phone: (925) 335-1208
City: Martinez
Zip: 94553
County: Contra Costa

Project Location: County: Contra Costa
City/Nearest Community: Byron
Cross Streets: Vasco Road
Zip Code: 94513
Longitude/Latitude (degrees, minutes and seconds): 37 ° 49 ' 12 " N / -121 ° 41 ' 48 " W
Total Acres: 2.664
Assessor's Parcel No.: 005-160-001 and 14 others
Section: 25, 30
Twp.: 1S
Range: 2E, 3E
Base: Mt. Diablo
Within 2 Miles: State Hwy #: None; nearest is SR 4
Waterways:
Airports: Byron
Railways: None
Schools: None

Document Type:

CEQA:
- ☐ NOP
- ☐ Early Cons
- ☐ Neg Dec
- ☐ Mit Neg Dec
- ☑ Draft EIR
- ☐ Supplement/Subsequent EIR (Prior SCH No.) _____
- Other: _____

NEPA:
- ☐ NOI
- ☐ EA
- ☐ Draft EIS
- ☐ FONSI

Other:
- ☐ Joint Document
- ☐ Final Document
- ☐ Other: _____

Local Action Type:

- ☐ General Plan Update
- ☐ General Plan Amendment
- ☐ General Plan Element
- ☐ Community Plan
- ☐ Specific Plan
- ☐ Master Plan
- ☐ Planned Unit Development
- ☐ Site Plan
- ☐ Rezone
- ☐ Prezone
- ☑ Use Permit
- ☐ Land Division (Subdivision, etc.)
- ☐ Annexation
- ☐ Redevelopment
- ☐ Coastal Permit
- ☐ Other: _____

Development Type:

- ☐ Residential: Units _____ Acres _____
- ☐ Office: Sq.ft. _____ Acres _____ Employees _____
- ☐ Commercial: Sq.ft. _____ Acres _____ Employees _____
- ☐ Industrial: Sq.ft. _____ Acres _____ Employees _____
- ☐ Educational: _____
- ☐ Recreational: _____
- ☐ Water Facilities: Type _____ MGD _____
- ☐ Transportation: Type _____
- ☐ Mining: Mineral _____
- ☑ Power: Type Wind Turbines MW Approx. 42
- ☐ Waste Treatment: Type _____ MGD _____
- ☐ Hazardous Waste: Type _____
- ☐ Other: _____

Project Issues Discussed in Document:

- ☑ Aesthetic/Visual
- ☑ Agricultural Land
- ☑ Air Quality
- ☑ Archeological/Historical
- ☑ Biological Resources
- ☐ Coastal Zone
- ☑ Drainage/Absorption
- ☑ Economic/Jobs
- ☐ Fiscal
- ☑ Flood Plain/Flooding
- ☑ Forest Land/Fire Hazard
- ☑ Geologic/Seismic
- ☑ Minerals
- ☑ Noise
- ☑ Population/Housing Balance
- ☑ Public Services/Facilities
- ☑ Recreation/Parks
- ☑ Schools/Universities
- ☑ Septic Systems
- ☐ Sewer Capacity
- ☑ Soil Erosion/Compaction/Grading
- ☑ Solid Waste
- ☑ Toxic/Hazardous
- ☑ Traffic/Circulation
- ☑ Vegetation
- ☑ Water Quality
- ☑ Water Supply/Groundwater
- ☑ Wetland/Riparian
- ☑ Growth Inducement
- ☑ Land Use
- ☑ Cumulative Effects
- ☑ Other: Greenhouse Gases

Present Land Use/Zoning/General Plan Designation:

Please see attachment.

Project Description: *(please use a separate page if necessary)*
Please see attachment.

Note: The State Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g. Notice of Preparation or previous draft document) please fill in.

Reviewing Agencies Checklist

Lead Agencies may recommend State Clearinghouse distribution by marking agencies below with and "**X**".
If you have already sent your document to the agency please denote that with an "**S**".

X	Air Resources Board		Office of Emergency Services
	Boating & Waterways, Department of	X	Office of Historic Preservation
X	California Highway Patrol		Office of Public School Construction
X	Caltrans District # 4	X	Parks & Recreation, Department of
X	Caltrans Division of Aeronautics		Pesticide Regulation, Department of
	Caltrans Planning	X	Public Utilities Commission
	Central Valley Flood Protection Board	X	Regional WQCB # 5S
	Coachella Valley Mtns. Conservancy	X	Resources Agency
	Coastal Commission		S.F. Bay Conservation & Development Comm.
	Colorado River Board		San Gabriel & Lower L.A. Rivers & Mtns. Conservancy
X	Conservation, Department of		San Joaquin River Conservancy
	Corrections, Department of		Santa Monica Mtns. Conservancy
	Delta Protection Commission		State Lands Commission
	Education, Department of		SWRCB: Clean Water Grants
X	Energy Commission		SWRCB: Water Quality
X	Fish & Game Region # 3		SWRCB: Water Rights
	Food & Agriculture, Department of		Tahoe Regional Planning Agency
X	Forestry and Fire Protection, Department of	X	Toxic Substances Control, Department of
	General Services, Department of	X	Water Resources, Department of
	Health Services, Department of		
	Housing & Community Development	X	Other: Attorney General's Office
	Integrated Waste Management Board		Other:
X	Native American Heritage Commission		

Local Public Review Period (to be filled in by lead agency)

Starting Date Tuesday, May 31, 2011 Ending Date Thursday, July 14, 2011

Lead Agency (Complete if applicable):

Consulting Firm: Environmental Science Associates
Address: 1425 N. McDowell Blvd., Suite 200
City/State/Zip: Petaluma, CA 94954
Contact: Tim Morgan
Phone: (707) 795-0903

Applicant: Tres Vaqueros Windfarms, LLC
Address: 1600 Smith Street, Suite 4025
City/State/Zip: Houston, TX 77002
Phone: (713) 308-4233

Signature of Lead Agency Representative: [signature] **Date:** May 27, 2011

Authority cited: Section 21083, Public Resources Code. Reference: Section 21161, Public Resources Code.

TRES VAQUEROS WINDFARM PROJECT

Draft Environmental Impact Report
SCH No. 2009032077
County File No. LP09-2005

Contra Costa County
Department of Conservation
and Development

May 2011

651 Pine Street
4th Floor - North Wing
Martinez, CA 94553
(925) 335-1210
www.co.contra-costa.ca.us

209132

TABLE OF CONTENTS

Tres Vaqueros Windfarm Repowering Project Draft Environmental Impact Report

Page

Executive Summary **ES-1**

1. Introduction 1-1
1.1 Purpose of This Document 1-1
1.2 Project Overview 1-1
1.3 Key Areas of Environmental Concern 1-1
1.4 Organization of the Document 1-2
1.5 Use of this Document by Agencies 1-2
1.6 Permit and Approvals 1-3

2. Summary of Environmental Impacts 2-1

3. Project Description 3-1
3.1 Project Overview and Location 3-1
3.1.1 Introduction 3-1
3.1.2 Location 3-3
3.2 Project Objectives 3-4
3.3 Project Components 3-10
3.3.1 Wind Turbines 3-13
3.3.2 Power Collection, Interconnection, and Transmission 3-16
3.3.3 Related Infrastructure 3-17
3.4 Project Implementation 3-19
3.4.1 Decommissioning of Existing Turbines 3-19
3.4.2 Construction 3-20
3.4.3 Construction Labor Force, Equipment, and Traffic 3-26
3.5 Project Operation and Maintenance 3-29
3.5.1 Operations 3-29
3.5.2 Maintenance Activities 3-31
3.6 Final Decommissioning 3-34
3.7 Project Schedule 3-35
3.8 Permits and Approvals 3-35

4. Environmental Setting, Impacts, and Mitigation Measures 4-1
4.0 Approach to the Analysis of Impacts 4-1
4.1 Aesthetics 4.1-1
4.2 Agriculture and Forestry Resources 4.2-1
4.3 Air Quality 4.3-1
4.4 Biological Resources 4.4-1
4.5 Cultural Resources 4.5-1

Page

4. Environmental Setting, Impacts, and Mitigation Measures (continued)
4.6 Energy Conservation 4.6-1
4.7 Geology and Soils 4.7-1
4.8 Greenhouse Gas Emissions 4.8-1
4.9 Hazards and Hazardous Materials 4.9-1
4.10 Hydrology and Water Quality 4.10-1
4.11 Land Use and Planning 4.11-1
4.12 Mineral Resources 4.12-1
4.13 Noise 4.13-1
4.14 Population and Housing 4.14-1
4.15 Public Services 4.15-1
4.16 Recreation 4.16-1
4.17 Transportation/Traffic 4.17-1
4.18 Utilities and Service Systems 4.18-1

5. CEQA Statutory Sections 5-1
5.1 Significant Unavoidable Impacts 5-1
5.2 Significant Irreversible Environmental Effects 5-2
5.3 Growth-Inducing Impacts 5-3
5.4 Cumulative Impacts 5-4
5.5 Effects Found Not to be Significant 5-27

6. Alternative s Analysis 6-1
6.1 General Consideration of Alternatives 6-1
6.2 Project Objectives 6-2
6.3 Potentially Significant Impacts of the Project 6-3
6.4 Alternatives Considered but Dismissed from Consideration in this EIR 6-3
6.5 Alternatives to the Project 6-4
6.5.1 No Project Alternative 6-4
6.5.2 Alternative 1 – Complete Decommissioning of Windfarm 6-10
6.5.3 Alternative 2 – Partial Repowering to Existing Capacity 6-12
6.5.4 Alternative 3 – Alternative Site Layouts 6-16
6.5.5 Alternative 4 – Reduction of Daily Construction Emissions 6-18
6.5.6 Alternative 5 – Increased Tip-to-Ground Clearance 6-20
6.6 Environmentally Superior Alternative 6-21

7. Report Preparation 7-1
7.1 Report Authors 7-1
7.2 Consultation 7-2
7.3 Agencies and Organizations Contacted 7-2

8. Glossary and Acronyms 8-1
8.1 Glossary 8-1
8.2 Acronyms and Abbreviations Used in This EIR 8-2

9. Refer ences 9-1

Page

Appendices

A. Scoping Report, Notice of Preparation A-1
A1 Scoping Report A1-1
A2 Notice of Preparation A2-1
B. Example Wind Turbine Brochures B-1
B1 Gamesa G90-2.0 MW Wind Turbine Brochure B1-1
B2 Siemens Wind Turbine SWT-2.3-101 Brochure B2-1
C. Air Quality Technical Addendum C-1
D. Biological Data Addendum D-1
D1 Biological Resources-Species Descriptions D1-1
D2 Baseline Avian and Bat Fatality Rates D2-1
D3 Literature Review of Avian and Bat Collision Impacts Information D3-1
D4 Micrositing Reports D4-1

List of Figures

3-1 Project Vicinity Map 3-2
3-2a Property Ownership with Existing Facilities 3-5
3-2b Ownership Wind Rights with the Repowered Project 3-6
3-2c Property Ownership with the Repowered Project 3-7
3-2d Project Area 3-9
3-3 Project Overview Map – Site Plan 3-11
3-4 Schematic Illustration of an Inverted T Foundation 3-15
3-5 Cross-sections of Typical Access Road 3-23
4.1-1 Viewpoint Map 4.1-3
4.1-2a Setting Photos 4.1-4
4.1-2b Setting Photos 4.1-5
4.1-2c Setting Photos 4.1-6
4.1-2d Setting Photos 4.1-7
4.1-2e Setting Photos 4.1-8
4.1-3 Visual Simulation 4.1-27
4.1-4 Visual Simulation 4.1-28
4.1-5 Visual Simulation 4.1-29
4.1-6 Visual Simulation 4.1-30
4.1-7 Visual Simulation 4.1-31
4.1-8 Visual Simulation 4.1-32
4.1-9 Visual Simulation 4.1-33
4.1-10 Visual Simulation 4.1-34
4.1-11 Visual Simulation 4.1-35
4.1-12 Visual Simulation 4.1-36
4.1-13 Visual Simulation 4.1-37
4.2-1 Important Farmland 4.2-3
4.2-2 Williamson Act Lands 4.2-5
4.4-1 Fairy Shrimp Occurrences in the Project Area 4.4-5
4.4-2 Critical Habitat in the Project Area 4.4-8
4.4-3 Vegetation Communities in the Project Area 4.4-14
4.4-4 Wetlands in the Project Area 4.4-17
4.4-5 Special Status Bird Occurrences in the Project Area 4.4-37

Page

List of Figures (continued)

4.4-6 Avian Habitat Comparison of Existing and Repowered Project Footprints and Blade Swept Areas 4.4-39
4.4-7 California Red Legged Occurrences in the Project Area 4.4-52
4.4-8 California Tiger Salamander Occurrences in the Project Area 4.4-53
4.4-9 Special Status Reptile Occurrences in the Project Area 4.4-57
4.4-10 Special Status Mammal Occurrences in the Project Area 4.4-62
4.4-11 Special Status Plant Occurrences in the Project Area 4.4-66
4.7-1 Regional Fault Map 4.7-5
4.9-1 Blade Throw Setback Area 4.9-15
4.10-1 Planning Watersheds 4.10-2
4.10-2 Creeks and Drainages with FEMA Flood Zones 4.10-5
4.11-1 Contra Costa County General Plan Land Use 4.11-2
4.13-1 Typical A-Weighted Sound Levels 4.13-2
4.13-2 Estimated Project Noise (dbA) 4.13-14
4.17-1 Project Area Roadways 4.17-2
5-1 Cumulative Projects in the Tres Vaqueros Project Vicinity 5-8
5-2 Visual Simulation 5-15
5-3 Visual Simulation 5-16

List of Tables

2-1 Summary of Impacts and Mitigation Measures for the Vasco Winds Repowering Project 2-2
3-1 Parcel Numbers and Ownership 3-4
3-2 Summary of Turbine Specifications 3-13
3-3 Access Road Requirements 3-19
3-4 Approximate Area of the Energy Facility and Related or Supporting Facilities 3-27
3-5 Construction Equipment List 3-28
3-6 Estimated Vehicle Trips for Construction of the Project 3-29
3-7 Anticipated Project Schedule 3-35
3-8 Potential Permits and Approvals and Consultations 3-36
4.1-1 Summary of Visual Sensitivity Findings, Viewer Types, Visual Exposures, and Visual Quality 4.1-11
4.1-2 Guidelines for Determining Adverse Visual Impact Significance 4.1-25
4.1-3 Simulation Viewpoints 4.1-26
4.1-4 Summary of Visual Sensitivity, Degree of Visual Change and Significance 4.1-39
4.2-1 Recent Agricultural Land Conversions in Contra Costa County 4.2-2
4.3-1 Air Quality Data Summary (2006–2010) for the Project Area 4.3-4
4.3-2 Ambient Air Quality Standards and Bay Area Air Basin Attainment Status 4.3-7
4.3-3 Project Construction Exhaust Emissions Estimates 4.3-13
4.4-1 Special-Status Species Known to Occur in the Project Area or with Potential to be Affected by the Project 4.4-20
4.4-2 Tres Vaqueros Baseline Avian and Bat Fatality Estimates 4.4-29
4.4-3 Potential Impacts on Potentially Jurisdictional Waters 4.4-70
4.5-1 Paleontological Potential Criteria 4.5-2
4.5-2 Archaeological Sites within a Half-Mile Radius of the Project Area 4.5-7
4.6-1 Comparison of Turbine Swept Area 4.6-6
4.7-1 Soil Types Identified within the Project Construction Disturbance Areas 4.7-3
4.7-2 Active Regional Faults 4.7-4

Page

List of Tables (continued)

4.7-3 Modified Mercalli Intensity Scale 4.7-10
4.8-1 Recommended Actions of Climate Change Scoping Plan..... 4.8-5
4.8-2 Project GHG Emissions Estimates 4.8-10
4.11-1 Project Consistency with the East County HCP/NCCP 4.11-7
4.13-1 Land Use Compatibility for Community Noise Environments 4.13-9
4.13-2 Typical Noise Levels from Construction Equipment and Vehicles..... 4.13-16
4.17-1 Existing Average Daily Traffic Volumes on Highways in the Project Area..... 4.17-3
4.17-2 Collision History on Vasco Road in Project Area (Walnut Boulevard to I-580) ... 4.17-4
4.17-3 Estimated Total Truck Trips for Project Construction 4.17-9
5-1 Cumulative Projects Scenario 5-9
6.6-1 Project vs. Alternatives – Summary of Environmental Impact Conclusions..... 6-23

EXECUTIVE SUMMARY

ES-1 Introduction

This Environmental Impact Report (EIR) is an informational document intended to disclose to the public and decision-makers the environmental consequences of the Tres Vaqueros Windfarm Repowering Project (the Project) proposed by Tres Vaqueros Windfarm, LLC (Applicant). This Executive Summary includes the following sections:

- Introduction (ES-1)
- Project Objectives (ES-2)
- Project Setting and Location (ES-3)
- Project Description (ES-4)
- Alternatives (ES-5)
- Environmentally Superior Alternative (ES-6)
- Areas of Controversy and Issues to be Resolved (ES-7)
- Summary of Impacts and Mitigation Measures (ES-8)

A comparative summary of the impacts of the Project and the alternatives to the Project is provided in Table 2-1 in Chapter 2. The EIR assesses the direct, indirect and cumulative environmental impacts that could occur as a result of the construction, operation, maintenance and eventual decommissioning of the Project. The analysis in this document is based upon information contained in the Applicant's Land Use Permit (LUP) application to the Contra Costa County Department of Conservation & Development, Community Development Division (County), as supplemented by data requests and supplemental submissions by the Applicant.

ES-2 Project Objectives

The California Renewable Portfolio Standard legislation enacted in 2002 (Senate Bill 1078) and accelerated in 2005 requires retail sellers of electricity to obtain 20 percent of their supply of electricity from renewable energy sources, such as wind, by 2010. In April 2011, the Governor of California codified legislation requiring all electricity retailers to achieve a 33 percent renewable energy share by 2020.

In this context, the Applicant is proposing the Project to provide an economically viable source of clean, renewable electricity generation that meets California's growing demand for power and supports numerous State and national renewable energy policies. The Applicant's additional objectives for the Project are as follows:

1. Achieve increased performance, lower cost, higher reliability, and longer service life that will produce up to 42 MW of electricity in an area with proven wind resources.

2. Develop an economically viable wind energy project that will support commercially available financing.

3. Maximize renewable energy production and economic viability by replacing aging assets with newer and more efficient wind turbines in the Altamont Pass Wind Resource Area (APWRA).

4. Minimize avian and bat impacts, to the maximum extent feasible.

5. Support Renewable Energy Portfolio requirements by substantially contributing to its portfolio of wind-generated power, which is no longer subject to curtailment restrictions.

6. Contribute positively to economic activity during construction and operation.

7. Increase local short-term and long-term employment opportunities for communities within 90 miles of the Project (which is an acceptable commuting distance for construction and skilled labor resources).

8. 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.

9. Produce electricity without the need for large amounts of water; conventional power plants consume more water than wind energy.

ES-3 Project Setting and Location

The Project would decommission existing outdated and inefficient wind turbines and replace them with fewer and more efficient turbines. The Project would be implemented at the site of an existing wind energy facility in southeastern Contra Costa County, California, in the APWRA. The Altamont Pass is a topographical low point in the interior coastal range, providing a "doorway" into California's Central Valley, and this doorway combines with the favorable wind currents that make the area ideal for wind energy development.

The APWRA is one of the most significant resource areas for wind energy development in California. It is designated by the State and recognized by Contra Costa County as a Wind Resource Area because it maintains winds at a level that supports economically viable wind energy projects. The existing facility site / proposed Project site is an ideal location for generating electrical power from wind based on the strong, predictable wind currents that occur there.

The existing wind energy facility is located east of Los Vaqueros Reservoir, south of Brentwood, and west of Byron Airport, with Vasco Road bordering the site to the east through the south. The wind turbines and related civil/electrical improvements for the Project are located on several contiguous parcels owned by East Bay Regional Park District (EBRPD) and/or the Contra Costa Water District (CCWD).

ES-4 Project Description

Overview

The Applicant proposes to "repower" the existing wind energy facility by decommissioning and removing 91 existing wind turbines and associated infrastructure (including concrete foundations, transformers, and electrical equipment), and replacing them with up to 21 new, larger and more efficient turbines. The larger and more efficient new turbines would produce approximately 110,000 megawatt hours (MWh) per year or 38 percent more energy than the existing facility, and would increase the aggregate nominal nameplate generating capacity from approximately 29.1 MW to up to 42 MW of electricity.

The Project also would construct a new underground electrical collection system, construct new turbine access roads, and reclaim and restore those areas of the existing wind energy facility that would no longer be used. Construction of the Project would include one approximately 3-acre temporary staging area to store equipment and materials, a temporary laydown area at each turbine pad, and upgrades to the existing on-site substation that would add an additional 5,000 square feet and new electrical equipment.

Decommissioning and removal of the 91 existing turbines and associated infrastructure and some roads is scheduled to begin in Fall of 2011 and last approximately four to five months. Existing roads and other disturbed areas not needed for the Project's new turbines would be decommissioned and recontoured, as appropriate, to maintain slope stability and return the affected property to approximately the condition that existed before the establishment of these facilities. Construction of the new turbines is expected to begin in January 2012. The entire construction process, including initial decommissioning and final reclamation, would last about12 months. Power delivery from the Project is expected to occur in Spring 2012. Final decommissioning and reclamation would occur at the end of the Project's anticipated lifespan, the duration of which depends primarily on the demand for power, but which could be greater than 30 years.

Project Components

The Project would decommission and remove the existing wind turbines at the site, install new and fewer turbines, and make improvements to related infrastructure. Specifically, the Project would comprise the following components and activities:

- Remove 91 wind turbines, including their transformers and associated electrical equipment.
- Install up to 21 multi-megawatt (MW) wind turbine generators (e.g., Gamesa G90 2.0 MW, Siemens 2.3 MW, or a comparable 3-blade upwind turbine with nameplate capacity of at least 2 MW) with an aggregate nominal nameplate generating capacity of up to 42 MW of electricity.
- Construct a site supervisory control and data acquisition system (SCADA).

- Construct a 22-kilovolt (kV) power collection system of collector cables linking turbines to each other and to the Tres Vaqueros substation. The collector cables would be placed in trenches and buried underground between turbine locations. The underground collection system would terminate at the Tres Vaqueros substation, where power from the collection system would be stepped up to the voltage required for the interconnection to the regional transmission system.

- Replace the existing operations and maintenance (O&M) building with a new building on the existing site, to be used for continuing support of the Project. The O&M building would include a maintenance shop, control room, maintenance yard, and other amenities typical of the requirements for wind generation O&M.

- Construct a temporary on-site staging area to store materials and equipment and house construction trailers during construction.

- Construct turbine laydown areas near the individual turbine pads to accommodate cranes and heavy equipment needed for turbine installation.

- Construct approximately 42,885 feet (8.1 miles) of new gravel-surfaced access roads and turbine string roads and turn-around areas.

- Improve approximately 11,815 feet (2.2 miles) of existing roads.

- Decommission existing roads that would not be used for the Project.

- Upgrade the existing on-site substation to include 5,000 square feet of additional space that would be graded and used to house new substation equipment including, but not limited to, medium-voltage circuit breakers, a generation step-up transformer, and a nominal 250 square foot control house.

The Project would use the existing meteorological tower network already on-site. No new meteorological towers would be installed nor would existing towers be modified.

Project construction would proceed after all construction-related permits were issued.[1] Construction would occur sequentially over 12 months. Construction would occur on a rolling basis, with reclamation of some areas occurring as disturbance commenced in other areas.

ES-5 Alternatives

No Project Alternative

Under the No Project Alternative, the Tres Vaqueros windfarm would continue operating using its existing facilities. For the purposes of this alternative, continued operation is assumed to involve all 91 existing turbines, not just the 60 turbines that were operating when the windfarm was shut down in 2009. Furthermore, the Applicant holds the lease for the windfarm through December 19, 2014, at which point, again for the purposes of this alternative, the Applicant would have the option to extend for an additional 30 years and would exercise that option. At that point in

[1] Except where otherwise noted or clear from the context, “construction” in this analysis includes decommissioning.

approximately 2044, the Applicant would potentially have to decommission the site and restore it to its initial condition. It is assumed that as part of this continued operation, the Applicant would continue maintenance of their turbines and generation/transmission infrastructure as well as site access roads. Furthermore, some replacement of existing equipment likely to occur although the extent and timing of this are not foreseeable.

Alternative 1: Complete Decommissioning of Windfarm

Under this alternative, the Project would not be built and the Applicant would decommission and remove all 91 existing turbines and related roads and infrastructure per existing permits. Decommissioning of the turbines and roads would require approximately four to five months, and would proceed after required approvals have been issued by the County and responsible agencies. The timing of this decommissioning is unknown but it is reasonable to assume that this alternative, if selected, would be performed by or before the expiration date of the existing lease in 2014. Turbine pads would be reclaimed to follow natural topography and would be seeded with native vegetation seeds. All above-ground facilities, foundations, and related systems would be removed to a depth of at least three feet below grade. Concrete foundations would be decommissioned in place so that no part of the foundation is located within three feet of grade or would be removed from the site for appropriate disposal. Roads and other disturbed areas no longer desired for use by the land owner would be decommissioned as appropriate to maintain slope stability and topographic recontouring. Following recontouring, surface soils would be prepared for planting and spread with native vegetation seeds, and temporary erosion control measures would be implemented to maintain topsoil and revegetation.

Alternative 2: Partial Repowering to Existing Capacity

Under this alternative, the Project would be constructed but only to the extent that it would replace the existing windfarm's 29.1 MW capacity. Decommissioning of the 91 existing turbines would take place similar to the Project. Assuming that turbines with nameplate capacities of at least 2 MW were used for this alternative, 13 to 15 turbines would be required to provide approximately 28 to 30 MW. Given the sensitivity of turbine siting, it is assumed that the layout presented in Figure 3-3 would be used, with the principal difference being that only 13 to 15 of the 24 potential turbine locations[2] would be developed. It is unknown which 13 to 15 sites would be developed. It is assumed that all six strings (A-F) would be built, generally with fewer turbines per string. This reduction of installed turbines would reduce the total amount of affected area for pad sites and roads, and would likely have a shorter construction schedule than the Project.

[2] Note that as is discussed in Section 3, *Project Description*, only 21 the 24 turbine locations shown on Figure 3-3 would be used for the Project.

Alternative 3: Site Layout

Description of Alternative 3A – Project without A-string

Under Alternative 3A the Project would be constructed, but the two potential turbine sites shown as A1 and A3 in Figure 3-3 would be eliminated for the purpose of reducing potential impacts to cultural resources. Eliminating these potential turbine sites would not reduce the number of turbines. Instead, the Applicant's options for siting turbines would be reduced from 24 locations to 22; up to 21 turbines with a generating capacity of up to 42 MW would still be constructed. Decommissioning of the 91 existing turbines would take place as proposed under the Project. The construction schedule for Alternative 3A would be the same as the Project's.

Description of Alternative 3B – Project without full F-string

Under Alternative 3B the Project would be constructed, but the three potential turbine sites shown as F1, F2, and F3 in Figure 3-3 would be eliminated for the purpose of reducing a significant and unavoidable impact to aesthetic/visual resources. Eliminating these potential turbine sites would not reduce the number of turbines. Instead, the Applicant's options for siting turbines would be reduced from 24 locations to 21; up to 21 turbines with a generating capacity of up to 42 MW would still be constructed. Decommissioning of the 91 existing turbines would take place as proposed under the Project. The construction schedule for Alternative 3B would be the same as the Project's.

Alternative 4: Reduction of Daily Construction Emissions

This alternative would be identical to the Project in every respect except that the construction schedule would be adjusted to reduce the daily amount of NO_x emitted by construction equipment on-site and vehicles used in transportation of materials to and from the Project during construction. This adjustment to the construction schedule would be done either by drawing out the construction duration or by requiring that only a fixed amount of construction equipment and transportation vehicles be used on a daily basis, such that the amount of NO_x potentially emitted by these sources would be at or below the BAAQMD significant level for NO_x (54 pounds of NO_x per day).

Alternative 5: Increased Tip-to-Ground Clearance

This alternative would be identical to the Project in every respect except that the heights of the turbine towers would be raised such that the turbine blade tip-to-ground clearance would be 90 feet (27.4 meters), a change (increase) of 18 feet from the proposed turbine design. Some studies in the APWRA have indicated that a tip-to-ground clearance of 90 feet (or more) may be beneficial in lowering raptor strike deaths in wind farms. The intent of this alternative is to explore the consequences of this Project design change. Again, all other aspects of this alternative would be identical to the Project.

ES-6 Environmentally Superior Alternative

CEQA Guidelines section 15126.6(e)(2) requires an EIR to identify an environmentally superior alternative. If the environmentally superior alternative is the No Project Alternative, the EIR also must identify an environmentally superior alternative from among the other alternatives. In general, the environmentally superior alternative is defined as that alternative with the least adverse impacts to the project area and its surrounding environment.

Alternative 1 (Complete Decommissioning of the Windfarm) would reduce all significant and unavoidable impacts of the Project in Aesthetics, Air Quality, and Biological Resource to less-than-significant levels. However, this alternative would achieve this reduction in significance at the cost of failing to meet almost all Project objectives. It would result in a loss of renewable generating capacity to the electrical grid and potentially result in an increase in greenhouse gas emissions if the equivalent power produced by the Project would have to be generated by the use of fossil fuels elsewhere in the grid. The full effects of this potential loss of renewable generating capacity cannot be determined, and potential increases in greenhouse gas emissions cannot be quantified, without considerable speculative assumptions. Therefore, the significance of this potential impact is unknown. It is reasonably certain, however, that Alternative 1 would have greater adverse impacts to Energy Conservation and Greenhouse Gas Emissions compared to the Project. Nevertheless, as Alternative 1 would reduce all identified significant and unavoidable impacts to less-than-significant levels, Alternative 1 is the Environmentally Superior Alternative.

ES-7 Areas of Controversy and Issues to be Resolved

Areas of controversy known to lead agencies, including issues raised by agencies and the public, must be identified in the Executive Summary of an EIR (Cal. Code Regs. § 15123). The scoping phase of the EIR, conducted between March 23, 2009 and July 7, 2009, identified the following key areas of concern for consideration in the EIR:

- Avian and bat mortality;
- Impacts to other biological resources, including burrowing owls, sensitive species, rare plants and consistency with habitat conservation planning efforts;
- Impacts to visual resources, such as the increased height and visibility of the proposed wind turbines;
- Impacts to agricultural resources, including potential impacts on grazing;
- Construction-related impacts on air quality;
- Potential hazardous materials releases during decommissioning, construction and operation of the Project;
- Impacts related to hydrology, including erosion within the watershed; and
- Access and site security for adjacent properties.

Issues to be resolved, including a choice among alternatives, and whether and how to mitigate potential significant impacts, also must be identified in an Executive Summary (Cal. Code Regs. § 15123). The main issue to be resolved in this EIR is which among the alternatives would meet most of the basic Project objectives with the least environmental impact. Balancing sometimes competing environmental values can be challenging because it rests on assumptions of relative value. Decision-makers may elect to balance relative values of environmental resources and, thereby, resolve the issues considered in this EIR with a different conclusion than the one summarized in Section ES-6 and discussed in Section 6.6, *Environmentally Superior Alternative*.

ES-8 Summary of Impacts and Mitigation Measures

This section summarizes the resource areas evaluated in this EIR as well as impacts of repowering the existing wind energy facility as described for the Project and alternatives.

Resource Areas Evaluated

This section summarizes the potential impacts resulting from implementation of the Project or alternatives. The affected environment and the potential direct and indirect effects of the Project are described and evaluated in Chapter 4 of this EIR for the resource areas listed below. Other CEQA considerations, including the cumulative impact analysis, are in Chapter 5, and the alternatives analysis is in Chapter 6. Chapter 4 is organized into the following 18 environmental resource or issue areas:

- 4.1 Aesthetics
- 4.2 Agriculture and Forestry Resources
- 4.3 Air Quality
- 4.4 Biological Resources
- 4.5 Cultural Resources
- 4.6 Energy Conservation
- 4.7 Geology, Soils and Seismicity
- 4.8 Greenhouse Gas Emissions
- 4.9 Hazards and Hazardous Materials
- 4.10 Hydrology and Water Quality
- 4.11 Land Use and Planning
- 4.12 Mineral Resources
- 4.13 Noise
- 4.14 Population and Housing
- 4.15 Public Services
- 4.16 Recreation
- 4.17 Transportation and Traffic
- 4.18 Utilities and Service Systems

A summary table (Table 2-1 in Chapter 2) provides a comparative overview of the impacts of the Project and the alternatives for each of the resource areas assessed in this EIR. Detailed analysis of impacts is contained in Chapter 4.

Summary of Impacts

Implementing the Project could result in the potential for impacts to occur to the resources listed in ES-8. Where potentially significant impacts are identified, mitigation measures are proposed to reduce the extent of the impacts to a less-than-significant level.

CHAPTER 1
Introduction

1.1 Purpose of This Document

This Environmental Impact Report (EIR) is an informational document intended to disclose to the public and decision-makers the environmental effects of the proposed Tres Vaqueros Windfarm Repowering Project (referred to herein as the Project). This document assesses the direct and indirect environmental impacts, as well as the cumulative environmental impacts, that could occur as a result of the construction, operation, maintenance and eventual decommissioning of the Project. The analyses in this document are based upon information contained in the Tres Vaqueros Land Use Permit (LUP) application to Contra Costa County's Department of Conservation & Development, Community Development Division and subsequent data requests. This EIR is intended as an informational document that, in itself, does not determine whether the Project would be approved, but informs the local planning and decision-making process.

1.2 Project Overview

The Project is located in the Byron Hills of the Diablo Range in eastern Contra Costa County, east of the Los Vaqueros Reservoir and west of Vasco Road. The applicant, Tres Vaqueros Windfarms, LLC (Tres Vaqueros), proposes to "repower" the existing Tres Vaqueros Windfarm by replacing all 91 existing turbines and civil/electrical infrastructure (except for the on-site substation) with up to 21 modern wind turbines. The larger and more efficient turbines would produce approximately 110,000 megawatt hours (MWh) per year or 38 percent more energy than the existing facility. The Project would consist of up to 21 multi-Megawatt (MW) wind turbine generators (e.g., Gamesa G90 2.0 MW, Siemens SWT 2.3 101, or comparable 3-blade upwind turbine with nameplate of at least 2 MW) with an aggregate nominal nameplate generating capacity of up to 42 MW of electricity.

Construction of the Project is scheduled to begin in the last quarter of 2011 and extend through the last quarter of 2012. Power delivery from the Project is expected to occur in the last quarter of 2012.

1.3 Key Areas of Environmental Concern

This EIR examines the potential impacts of the Project. All of the topics (resources areas) in the current California Environmental Quality Act (CEQA) Checklist and other topics pertinent to the Project were studied. The key areas of environmental concern for this Project were: Aesthetics; Air Quality; Biological Resources; Cultural Resources; Geology and Soils; Greenhouse Gas Emissions; Hazards and Hazardous Materials; Hydrology and Water Quality; Noise; Transportation and Traffic; Utilities and Service Systems; and Cumulative Impacts.

1.4 Organization of the Document

This document is organized into the following chapters:

- **Chapter 1 – Introduction**
- **Chapter 2 – Summary of Environmental Impacts:** Summarizes environmental impacts that could result from implementation of the Project. The summary of each resource area indicates the level of significance of potential impacts to those resources.
- **Chapter 3 – Project Description:** Provides a detailed description of the Project, including its location, background information, major objectives, and technical characteristics.
- **Chapter 4 – Environmental Settings, Impacts, and Mitigation Measures:** Contains an analysis of environmental resource areas. Discussion of each resource area is divided into: a) the setting, which describes environmental conditions and regulatory information including the baseline for analysis; b) the standards of significance for determining the degree or level of potential environmental impacts for each issue; c) a discussion of no impacts; d) potential impacts, which indicate the environmental effects that are anticipated from the Project, and e) mitigation measures.
- **Chapter 5 – CEQA Statutory Sections:** Provides discussions of various CEQA-mandated considerations including significant and unavoidable environmental impacts, cumulative impacts, and growth-inducing impacts.
- **Chapter 6 – Analysis of Alternatives:** Describes alternatives to the Project and analyzes their associated environmental effects.
- **Chapter 7 – Report Preparation:** Lists report authors by section and County staff that assisted with the preparation and review of the EIR as well as agencies and organizations consulted.
- **Chapter 8 – Glossary and Acronyms:** Presents definitions of terms used throughout the report. For some terms, expanded definitions are included to further assist the reader's understanding of wind energy in general and specific to the Project. A list of acronyms used in the report is included as well.
- **Appendices:** Present background information pertaining to the Project and the CEQA process, including but not limited to the Project's Notice of Preparation and Scoping Report (Appendix A), Example Wind Turbine Brochures (Appendix B), Air Quality Technical Addendum (Appendix C), and Biological Data Addendum (Appendix D).

1.5 Use of this Document by Agencies

In accordance with CEQA, Contra Costa County will consider the environmental implications of the Project before making a decision to grant or deny the Applicant's request for a LUP to authorize continued operation of a wind energy facility on the Project area. Other agencies that may rely on this EIR when considering approvals for the Project include the State Water Resources Control Board, California Department of Fish and Game, and Alameda County.

1.6 Permits and Approvals

Several permits and approvals are required before Project construction could begin. These include, but are not limited to, a LUP, Encroachment Permit, Demolition Permit, Grading Permit and Building Permit from Contra Costa County. Details about requisite permits are provided in Section 3.9, *Permits and Approvals.*

CHAPTER 2
Summary of Environmental Impacts

This chapter provides a summary of the environmental impacts of the proposed Project, as identified and analyzed in this EIR. Table 2-1 includes statements of impact and related mitigation measures. Statements of Project-specific impacts and mitigation measures have been extracted from the analysis set forth in Chapter 4 of this document; statements of cumulative impacts and mitigation measures have been extracted from Chapter 5. The information in Table 2-1 is arranged in four columns: 1) environmental impacts; 2) level of significance without mitigation; 3) adopted or recommended mitigation measures; and, 4) level of significance with mitigation measures applied.

TABLE 2-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE TRES VAQUEROS WINDFARM REPOWERING PROJECT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Aesthetics			
Impact 4.1-1: Construction of the Project, decommissioning of the existing turbines, and the process of decommissioning the Project at the end of its life, would have a substantial adverse effect on views from Vasco Caves Regional Preserve.	Less than Significant with Mitigation	**Mitigation Measure 4.1-1a:** The Applicant shall not place equipment or materials in laydown areas visible from Vasco Caves tours any sooner than two weeks prior to their required use. **Mitigation Measure 4.1-1b:** All laydown areas visible from the Vasco Caves tour route shall be visually screened using 12-foot tall temporary fencing. Fencing shall incorporate aesthetic treatment through use of appropriate, non-reflective materials, such as chain link fence with light brown or green vinyl slats. The Applicant shall submit final construction plans demonstrating compliance with this measure to the County Zoning Administrator for review and approval at least 30 days prior to issuance of grading permits or building permits. Alternatively, the Applicant may coordinate with the East Bay Regional Park District to schedule construction of those turbines whose laydown areas would be visible from the Vasco Caves tour route during times when tours would not be conducted.	Less than Significant
Impact 4.1-2: Operation and maintenance of the Project would have a substantial adverse effect on scenic vistas.	Significant and Unavoidable	**Mitigation Measure 4.1-2:** All turbines shall be painted light gray and treated with a non-reflective finish. The Applicant shall submit proposed color finishes with final construction plans demonstrating compliance with this measure to the County Zoning Administrator for review and approval at least 30 days prior to issuance of building permits.	
		Los Vaqueros Watershed: Vista Grande Trail	Significant and Unavoidable
		Los Vaqueros Watershed: Los Vaqueros Shoreline Trail	Significant and Unavoidable
		Los Vaqueros Watershed: Marina	Significant and Unavoidable
		Los Vaqueros Watershed: Los Vaqueros Reservoir Office	Significant and Unavoidable
		Los Vaqueros Watershed: Los Vaqueros Interpretive Center	Significant and Unavoidable
		Vasco Caves Regional Preserve: None required.	
		Morgan Territory Regional Preserve	Significant and Unavoidable
		Round Valley Regional Preserve: None required.	
Impact 4.1-3: Operation and maintenance of the Project would adversely impact views of designated scenic ridges.	Less than Significant	None required.	
Impact 4.1-4: The Project would not substantially damage scenic resources within a state- or County-designated scenic highway or route.	Less than Significant	None required.	

TABLE 2-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE TRES VAQUEROS WINDFARM REPOWERING PROJECT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Aesthetics (cont.)			
Impact 4.1-5: The Project would alter, but not substantially degrade the existing visual character or quality of the Project area.	Less than Significant	None required.	
Impact 4.1-6: Night lighting required during construction could adversely affect nighttime views in the Project area.	Less than Significant	None required.	
Impact 4.1-7: The Project would create new sources of light that would affect nighttime views in the area.	Less than Significant	None required.	
Impact 4.1-8: During normal operation, the moving shadow of the turbine blades could create visual flicker and a related strobe-like phenomenon that could be a nuisance to nearby residents and/or create a visual hazard for Vasco Road motorists.	Less than Significant	None required.	
Agriculture and Forestry Resources			
Because implementation of the Project would result in no impact to agriculture and forestry resources, there are no impacts and no mitigation measures to be analyzed in this section.			
Air Quality			
Impact 4.3-1: The Project would not conflict with or obstruct implementation of the applicable air quality plan.	Less than Significant	None required.	
Impact 4.3-2: The Project would result in short-term construction emissions of criteria pollutants that would contribute to existing air quality violations.	Significant and Unavoidable	**Mitigation Measure 4.3-2a:** The Applicant shall reduce construction-related air pollutant emissions by implementing applicable BAAQMD basic control measures. The Applicant shall require all contractors to comply with the following requirements for all areas with active construction activities: • All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day or at a frequency adequate to maintain minimum soil moisture of 12 percent. Moisture content can be verified by lab samples or moisture probe. • All haul trucks transporting soil, sand, or other loose material off-site shall be covered;	Implementation of Mitigation Measures 4.3-2a and 4.3-2b would ensure that dust-related impacts would be less than significant. By contrast, although it is estimated that implementation of Mitigation Measures 4.3-2a and 4.3-2b would reduce total NO_x exhaust emissions identified in

TABLE 2-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE TRES VAQUEROS WINDFARM REPOWERING PROJECT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Air Quality (cont.)			
Impact 4.3-2 (cont.)		• All vehicle speeds on unpaved roads shall be limited to 15 mph; • All roadways and driveways to be paved shall be completed as soon as possible. Foundation pads shall be laid as soon as possible after grading unless seeding or soil binders are used; • All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation; • Post a publically visible sign with the Applicant's telephone number and person to contact regarding dust complaints. This person shall respond and take corrective action within 48 hours. The BAAQMD's phone number shall also be visible to ensure compliance with applicable regulations. **Mitigation Measure 4.3-2b:** The Applicant shall reduce construction-related air pollutant emissions by implementing measures based on BAAQMD's additional construction mitigation measures. The Applicant shall require all contractors to comply with the following requirements for all areas with active construction activities: • All excavation, grading, and/or demolition activities shall be suspended when average ground level wind speeds exceed 20 miles per hour. • Wind breaks (e.g., fences) shall be installed on the windward side(s) of actively disturbed areas of construction. Wind breaks should have a maximum 50 percent air porosity. • Vegetative ground cover shall be planted in disturbed areas as soon as possible and watered appropriately until vegetation is established. The seed mix and plant varieties must be approved by the County Zoning Administrator prior to planting. • A wash-off station shall be established at each Project exit point. All trucks and equipment, including their tires, shall be washed off prior to leaving the site. • Site accesses to a distance of 100 feet from the paved road shall be treated with a six to 12 inch compacted layer of wood chips, mulch, or gravel. • Consistent with the approved Storm Water Pollution Prevention Plan, sandbags or other erosion control measures shall be installed to prevent silt runoff to public roadways from sites with a slope greater than one percent. • The idling time of diesel-powered construction equipment shall be limited to two minutes. • For off-road construction equipment of more than 50 horsepower and all on-road heavy-duty trucks, the Applicant shall ensure achievement of a Project-wide fleet-average 20 percent NOx reduction compared to the most recent CARB fleet average. A plan to achieve these reductions shall be submitted to Contra Costa County for review and approval prior to commencement of construction activities. Construction activities cannot commence until the plan has been approved. Acceptable options for reducing emissions include the use of late	Table 4.3-3 by approximately 20 percent, this emission reductions would not reduce Project exhaust emissions of NO_x to below the significance level. Consequently, this impact would remain significant and unavoidable with regard to NO_x emissions.

TABLE 2-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE TRES VAQUEROS WINDFARM REPOWERING PROJECT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Air Quality (cont.)			
Impact 4.3-2 (cont.)		model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, and/or other options as such become available.	
Impact 4.3-3: The Project would result in long-term emissions of criteria pollutants.	Less than Significant	None required.	
Biological Resources			
The following are general biological resources mitigation measures that would reduce Project impacts and benefit multiple species. They are consolidated here to eliminate redundancy. Measures are presented generally in the order in which they would occur, from pre-construction through end-of-life decommissioning.		**Mitigation Measure 4.4 – General.** The Applicant shall implement the following in order to reduce potential impacts to various species and their habitats: 1. Prior to issuance of a grading permits or building permit, the Applicant shall submit a final site plan for review and approval by the County Zoning Administrator. The site plan shall indicate the final locations of all Project components, including but not limited to wind turbines; temporary and permanent roads; electrical collection lines; substation upgrades; drainage and hydrological improvement; and staging and laydown areas, and shall indicate any tree proposed for removal along with its species and diameter. [This general biological resources mitigation measure addresses Impact 4.4-2, Burrowing Owl; Impact 4.4-4, California Red-legged Frog and California Tiger Salamander; Impact 4.4-5, Alameda Whipsnake, Western Pond Turtle, and San Joaquin Coachwhip; Impact 4.4-6, San Joaquin Kit Fox; Impact 4.4-7 American Badger and San Joaquin Pocket Mouse; Impact 4.4-9, Special-status Plants; Impact 4.4-10, Sensitive Natural Communities; Impact 4.4-11, Wetlands; Impact 4.4-12, Breeding Birds; and Impact 4.4-14 Protected Trees by clearly delineating the construction area and identifying areas where pre-construction surveys shall be conducted.] 2. Prior to issuance of a grading permit or building permit, the Applicant shall submit for review and approval by the County Zoning Administrator, a plan for reclaimed areas and temporarily-impacted areas describing pre-Project site conditions, restoration, a timetable for implementation, and monitoring-success criteria. [This general biological resources mitigation measure addresses Impact 4.4-4, California Red-legged Frog and California Tiger Salamander and Impact 4.4-6, San Joaquin Kit Fox by detailing plans for grassland restoration and post-construction monitoring.] 3. Prior to issuance of a grading permit or building permit, the Applicant shall submit for review and approval by the County Zoning Administrator and the County Public Works Department, a stormwater pollution prevention plan (SWPPP) and water pollution control plan as described in Section 4.10, *Hydrology and Water Quality,* to allow prompt and effective response to accidental spills. [This general biological resources mitigation measure addresses Impact 4.4-4, California Red-legged Frog and California Tiger Salamander; and Impact 4.4-11, Wetlands by protecting water bodies and aquatic species habitat.]	

TABLE 2-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE TRES VAQUEROS WINDFARM REPOWERING PROJECT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Biological Resources (cont.)			
		4. No more than 30 days prior to commencing construction, which includes groundbreaking activities as well as establishing staging and laydown areas and the arrival of construction equipment and materials, additional pre-construction surveys shall be performed in the Project area for special-status plants and sensitive wildlife species as identified in the mitigation measures below. [This general biological resources mitigation measure addresses Impact 4.4-2, Burrowing Owl; Impact 4.4-6, San Joaquin Kit Fox; Impact 4.4-7 American Badger and San Joaquin Pocket Mouse; and Impact 4.4-12, Breeding Birds by requiring pre-construction identification of on-site species.]	
		5. Prior to commencing construction, exclusion and/or silt fencing shall be installed to clearly demarcate all areas within the construction area that have been identified for avoidance by the County- and USFWS-approved biologist. A County- and USFWS-approved biologist shall be present at the active work sites until initial groundbreaking activities have been completed. Thereafter, the County, in consultation with the Applicant, shall approve one or more persons to monitor on-site compliance with all mitigation measures. The Applicant shall ensure, and demonstrate to the satisfaction of the County Zoning Administrator, that the designated monitor(s) receives training consistent with USFWS requirements. [This general biological resources mitigation measure addresses Impact 4.4-2, Burrowing Owl; Impact 4.4-6, San Joaquin Kit Fox; Impact 4.4-7 American Badger and San Joaquin Pocket Mouse; Impact 4.4-9, Special-status Plants; Impact 4.4-10, Sensitive Natural Communities; Impact 4.4-11, Wetlands, and Impact 4.4-12, Breeding Birds by ensuring avoidance of protected resources.]	
		6. The Applicant shall ensure that habitat disturbances and all Project activities are restricted to the work area identified in the final site plan approved by the County Zoning Administrator. [This general biological resources mitigation measure addresses Impact 4.4-2, Burrowing Owl; Impact 4.4-4, California Red-legged Frog and California Tiger Salamander; Impact 4.4-5, Alameda Whipsnake, Western Pond Turtle, and San Joaquin Coachwhip; Impact 4.4-6, San Joaquin Kit Fox; Impact 4.4-7 American Badger and San Joaquin Pocket Mouse; Impact 4.4-9, Special-status Plants; Impact 4.4-10, Sensitive Natural Communities; Impact 4.4-11, Wetlands; and Impact 4.4-12, Breeding Birds by limiting the areas of direct and indirect impacts.]	
		7. Construction personnel shall be restricted to the immediate construction area and shall not venture beyond the work area identified in the approved final site plan. [This general biological resources mitigation measure addresses Impact 4.4-2, Burrowing Owl; Impact 4.4-4, California Red-legged Frog and California Tiger Salamander; Impact 4.4-5, Alameda Whipsnake, Western Pond Turtle, and San Joaquin Coachwhip; Impact 4.4-6, San Joaquin Kit Fox; Impact 4.4-7 American Badger and San Joaquin Pocket Mouse; Impact 4.4-9, Special-status Plants; Impact 4.4-10, Sensitive Natural Communities; Impact 4.4-11, Wetlands; and Impact 4.4-12, Breeding Birds by limiting the areas of direct impacts.]	

TABLE 2-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE TRES VAQUEROS WINDFARM REPOWERING PROJECT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Biological Resources (cont.)			
		8. All construction personnel shall receive training from a County- and USFWS-approved biologist addressing sensitive vegetation communities and special-status plant and wildlife species. At a minimum, the training shall include species descriptions and identification, identification of their habitat, the importance of these species and their habitat, the measures being implemented to conserve the species as they relate to the Project, and the boundaries within which Project activities can occur. [This general biological resources mitigation measure addresses Impact 4.4-2, Burrowing Owl; Impact 4.4-4, California Red-legged Frog and California Tiger Salamander; Impact 4.4-5, Alameda Whipsnake, Western Pond Turtle, and San Joaquin Coachwhip; Impact 4.4-6, San Joaquin Kit Fox; Impact 4.4-7 American Badger and San Joaquin Pocket Mouse; Impact 4.4-9, Special-status Plants; Impact 4.4-10, Sensitive Natural Communities; Impact 4.4-11, Wetlands; Impact 4.4-12, Breeding Birds; and Impact 4.4-14 Protected Trees by alerting construction personnel to the presence of biological resources and explaining what they can do to protect them.]	
		9. Environmental monitoring shall be part of Project activities, and shall include daily inspection of contractor-compliance with Best Management Practices and mitigation measures. Monitoring shall also include weekly inspection of exclusion and silt fences. [This general biological resources mitigation measure addresses Impact 4.4-2, Burrowing Owl; Impact 4.4-4, California Red-legged Frog and California Tiger Salamander; Impact 4.4-5, Alameda Whipsnake, Western Pond Turtle, and San Joaquin Coachwhip; Impact 4.4-6, San Joaquin Kit Fox; Impact 4.4-7 American Badger and San Joaquin Pocket Mouse; Impact 4.4-9, Special-status Plants; Impact 4.4-10, Sensitive Natural Communities; Impact 4.4-11, Wetlands; Impact 4.4-12, Breeding Birds; and Impact 4.4-14 Protected Trees by providing third-party oversight.]	
		10. Each morning before the start of Project activities, after breaks, and anytime construction equipment has remained in one location for more than 15 minutes, construction personnel shall check for species beneath tires and underneath equipment before its operation. If any wildlife are observed, the equipment shall remain stationary until either the animal has relocated (without harassment) or the arrival of the approved biological monitor, who will identify the species and determine whether the species can be actively or passively relocated, or whether construction activities must remain halted. [This general biological resources mitigation measure addresses Impact 4.4-4, California Red-legged Frog and California Tiger Salamander and Impact 4.4-5, Alameda Whipsnake, Western Pond Turtle, and San Joaquin Coachwhip by protecting reptiles and amphibians that commonly seek shelter and/or shade underneath construction vehicles and that could get crushed during their operation.]	

TABLE 2-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE TRES VAQUEROS WINDFARM REPOWERING PROJECT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Biological Resources (cont.)			
		11. To prevent accidental entrapment of animals during construction, all excavated holes or trenches greater than one foot deep shall be covered at the end of each work day with suitable materials, such as plywood or sheet metal, or shall be adequately fenced, or contain escape routes constructed of earthen materials or wooden planks. Before work occurs in or around these holes or trenches, and before filling, such areas shall be thoroughly inspected for trapped animals. [This general biological resources mitigation measure addresses Impact 4.4-4, California Red-legged Frog and California Tiger Salamander; Impact 4.4-5, Alameda Whipsnake, Western Pond Turtle, and San Joaquin Coachwhip; Impact 4.4-6, San Joaquin Kit Fox and Impact 4.4-7 American Badger and San Joaquin Pocket Mouse by protecting animals that seek shelter in excavations or are at risk of falling into excavations.]	
		12. To prevent harassment and mortality of species, and to prevent transmission of diseases, no pets shall be allowed in the Project area. [This general biological resources mitigation measure addresses Impact 4.4-2, Burrowing Owl and Impact 4.4-6, San Joaquin Kit Fox by prohibiting pets that could harass, injure, kill, or transfer diseases to on-site wildlife.]	
		13. To avoid attracting predators during Project construction activities, all food-related trash shall be properly contained and, at the end of each construction day, the contractor shall remove all food trash from work areas or place the items in an enclosed bin or dumpster. The bin or dumpster shall be emptied and the contents hauled off-site to an approved waste facility at a minimum weekly. No food related trash shall be allowed to overtop the bin or dumpster. [This general biological resources mitigation measure addresses Impact 4.4-6, San Joaquin Kit Fox by preventing accumulation of trash that is attractive to kit fox and their predators, the coyote and red fox.]	
		14. All fueling and maintenance of Project-related vehicles and other equipment shall occur at designated staging areas located at least 75 lateral feet from any riparian habitat or water body. [This general biological resources mitigation measure addresses Impact 4.4-4, California Red-legged Frog and California Tiger Salamander; and Impact 4.4-11, Wetlands by protecting water bodies and aquatic species habitat.]	
		15. All Project-related vehicles shall observe a maximum 20 miles per hour speed limit on private roads within the Project area. Nighttime vehicle traffic shall observe a maximum 15 miles per hour speed limit. Off-road traffic outside the designated construction areas is prohibited. [This general biological resources mitigation measure addresses Impact 4.4-2, Burrowing Owl; Impact 4.4-4, California Red-legged Frog and California Tiger Salamander; Impact 4.4-5, Alameda Whipsnake, Western Pond Turtle, and San Joaquin Coachwhip; Impact 4.4-6,	

TABLE 2-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE TRES VAQUEROS WINDFARM REPOWERING PROJECT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Biological Resources (cont.)			
		San Joaquin Kit Fox; Impact 4.4-7 American Badger and San Joaquin Pocket Mouse; and Impact 4.4-13, Common Wildlife Species by implementing slow traffic speeds, minimizing night-time traffic when many wildlife species are active, and prohibiting off-road traffic.] 16. After construction had been completed, the Applicant shall restore the topographic contours of all areas temporarily disturbed by the Project and hydroseed them with an appropriate assemblage of native vegetation suitable to the area as determined by the County. [This general biological resources mitigation measure addresses Impact 4.4-4, California Red-legged Frog and California Tiger Salamander and Impact 4.4-6, San Joaquin Kit Fox by requiring grassland restoration that will restore ecosystem functionality.] 17. Fill material gathered on-site must be incidental fill resulting from other approved Project activities. If for any reason there is a deficiency in required fill material, then the necessary material shall be imported from off-site. No on-site area shall be excavated solely for the purpose of providing fill material. If gathered from on-site, this extra fill material must be collected incidental to other described and permitted Project activities. [This general biological resources mitigation measure addresses Impact 4.4-2, Burrowing Owl; Impact 4.4-4, California Red-legged Frog and California Tiger Salamander; Impact 4.4-5, Alameda Whipsnake, Western Pond Turtle, and San Joaquin Coachwhip; Impact 4.4-6, San Joaquin Kit Fox; Impact 4.4-7 American Badger and San Joaquin Pocket Mouse; and Impact 4.4-12, Breeding Birds by limiting areas of grassland habitat disturbance.[1]]	
Impact 4.4-1: Project construction, operation, and maintenance would result in short-term and permanent direct and indirect impacts on birds, including species listed under FESA and CESA, eagles protected under the BGEPA, Fully Protected species, State Species of Special Concern, and birds protected under the MBTA.	Significant and Unavoidable	**Mitigation Measure 4.4-1a:** The following mitigation measures shall be implemented during Project design, construction, and operation to reduce avian mortality: i. Gravel shall be placed at least 5 feet around each tower foundation to discourage small mammals from burrowing near turbine bases. ii. Boulders (rocks measuring larger than 12 inches in diameter) excavated during Project construction shall be relocated greater than 500 feet from turbines. These boulders may be used in a functional manner at other locales in the Project area, such as below road culverts to diffuse runoff, provided that rock piles are not created within 656 feet (200 meters) of a turbine. iii. Turbine towers shall have internal ladders; external ladders are prohibited in order to eliminate possible perches for birds. iv. Turbines that must be lighted for compliance with Federal Aviation Administration regulations shall use white strobe lights, which are not as attractive to night-migrating birds, unless otherwise required by FAA regulations.	Significant and Unavoidable

[1] Habitat disturbance impacts may be temporary or permanent. The USFWS typically considers habitat disturbance impacts to be permanent if they last longer than one growing season.

TABLE 2-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE TRES VAQUEROS WINDFARM REPOWERING PROJECT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Biological Resources (cont.)			
Impact 4.4-1 (cont.)		v. Electric distribution poles or towers being modified or integrated with the Project shall be compliant with measures defined by the Avian Power Line Interaction Committee (APLIC). vi. The Applicant shall not direct or participate in rodent control programs in the Project area and shall not use rodenticides within the Project area. **Mitigation Measure 4.4-1b:** The Applicant shall implement a post-construction avian monitoring program as follows: i. The post-construction monitoring program shall use red-tailed hawks, golden eagles, American kestrels and burrowing owls (the "Focal Raptor Species") and bats as benchmarks for evaluating the effectiveness of the overall Project repowering in reducing turbine-related mortality and informing and updating future siting analyses. The post-construction monitoring program shall commence no later than 3 months after the commercial operation date of the Project. ii. The post-construction monitoring program shall be 5 years in duration. Following the first 3 years of post-construction monitoring, 2 years of further monitoring shall commence on the 10th anniversary of the Project's commercial operation date. The initial 3-year monitoring period and the subsequent 2-year monitoring period together shall constitute the post-construction monitoring period. iii. The monitoring program shall be conducted by a qualified consultant ("Monitor") approved by Contra Costa County. iv. Post-construction monitoring shall include collecting field data on behavior, utilization and distribution patterns of affected avian species in addition to fatalities and shall report data in aggregated and by-turbine by-month formats. v. The program shall monitor each repowered turbine at least once per month for the duration of the post-construction monitoring period for fatalities of the Focal Raptor Species and all other bird species, as recommended by the Contra Costa County Technical Advisory Committee (TAC) or an equivalent entity, which will be convened by the County for this purpose. The Applicant shall monitor a subset (30 percent) of the repowered turbines at least twice per month for the duration of the post-construction monitoring period for fatalities and bird utilization and behavior. vi. The Monitor shall prepare interim, annual monitoring reports and submit them to Contra Costa County and the Altamont Pass Wind Resource Area Scientific Review Committee (APWRA SRC) within 3 months of completing each year of post-construction monitoring, and shall prepare and submit a final 3-year Monitoring Report within 6 months of completing 3 years of post-construction monitoring and a final 2-year Monitoring Report within 6 months of completing 2 years of post-construction monitoring. All monitoring reports shall report adjusted and unadjusted annual fatalities for the Focal Raptor Species and all other bird species on a per-turbine and per-megawatt basis. Monitoring reports also shall summarize the results of the bird behavior and use studies for the preceding 1 to 3 years, as applicable.	

TABLE 2-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE TRES VAQUEROS WINDFARM REPOWERING PROJECT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Biological Resources (cont.)			
Impact 4.4-1 (cont.)		vii. Adaptive Management Plan: Contra Costa County will review the final three (3) year Monitoring Report for the Project to evaluate whether any repowered turbines are causing significantly disproportionate Focal Raptor and/or bat fatalities relative to other turbines. If one or more turbines are causing significantly disproportionate Focal Raptor or bat fatalities, then Contra Costa County may, in consultation with the TAC, consider additional focused monitoring and/or management measures designed to reduce the fatalities attributable to those turbines, with the least impact on wind energy production, by continually incorporating effective mitigation measures that are based on the best available science over the life of the Project. Binding instruments of this Plan could include: a. Specific percentage-goal reductions in avian mortality or type-specific avian mortality, such as a reduction in overall raptor mortality or species-specific raptor mortality achieved within a specified time period. The percentage-goal reductions will be measured from site-specific baseline fatalities presented in Table 4.4-2 (Smallwood, 2010a). b. Seasonal or weather condition-specific shutdowns of individual turbines identified by data included in the annual monitoring reports required by Mitigation Measure 4.4-1b.ii if, in the best professional judgment of the biologist approved by the County, annual fatality monitoring data identifies the need (e.g., 50 percent more raptor kills than other turbines), and identifies that it cannot be effectively met in any other fashion. c. Extension of the 3-year monitoring period in up to 3-year increments. d. Binding instruments of this Plan shall not include relocation or permanent shutdown of any repowered turbine.	
Impact 4.4-2: Project construction would result in direct and indirect impacts on burrowing owls, including temporary and permanent loss of potential habitat.	Less than Significant with Mitigation	**Mitigation Measure 4.4-2:** The Applicant shall implement the measures listed below within grassland habitats to reduce potential impacts to and avoid incidental take of burrowing owls during construction. These measures shall apply to all construction activities within the project footprint and within a 150-meter (approximately 500 foot) buffer, to avoid, minimize, or mitigate impacts on burrowing owls. The Applicant shall follow current CDFG burrowing owl survey guidance, which is presently the Burrowing Owl Consortium multi-phase approach, to evaluate burrowing owl use (CBOC, 1993). i. Pre-construction surveys shall be performed to assess burrowing owl presence as close as possible to the date that ground-disturbing activities will begin, generally within 7 days, but no more than 30 days before disturbance will occur. a. Additional surveys may be required by CDFG when the initial disturbance is followed by periods of inactivity that could allow owl colonization (e.g., 30 days or longer during the breeding season) or the development is phased spatially and/or temporally over the Project area. Four or more survey visits performed on separate days may be required to assure with a high degree of certainty that site modifications, such as grading, do not take owls. b. A follow-up report shall be provided to CDFG by the surveying biologist.	Less than Significant

TABLE 2-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE TRES VAQUEROS WINDFARM REPOWERING PROJECT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Biological Resources (cont.)			
Impact 4.4-2 (cont.)		ii. Construction exclusion areas (e.g., marked with orange exclusion fence and signage) shall be established around occupied burrows, where no disturbance shall be allowed. During the non-breeding season (September 1 through January 31), exclusion areas shall extend at least 160 feet (approximately 50 meters) around occupied burrows. During the breeding season (February 1 through August 31), exclusion areas shall extend at least 250 feet (approximately 75 meters) around occupied burrows. a. During the breeding season (February 1 through August 31), occupied burrows shall not be disturbed unless a qualified, County- and CDFG-approved biologist verifies through non-invasive methods that either the birds have not begun egg-laying and incubation, or that juveniles from the occupied burrows are foraging independently and are capable of independent survival. b. During the non-breeding season (September 1 through January 31), if work areas conflict with occupied burrows in construction exclusion areas, passive relocation techniques could be used with CDFG approval. The approach to owl relocation and burrow closure will vary depending on the number of occupied burrows. Passive relocation shall be accomplished, consistent with CDFG guidance (CDFG, 1995), by: 1. Enhancing existing unsuitable burrows (e.g., by enlarging or clearing them of debris) or creating new burrows (i.e., by installing artificial burrows) outside the 160-foot buffer zone. The alternate burrows shall be monitored daily for 7 days to confirm whether the owls have moved in and acclimated to the new burrow. 2. Installing one-way doors on the entrances of burrows within 160 feet of the work site. The one-way doors shall be left in place for at least 48 hours to ensure the owls have left the burrow and the area shall be monitored daily for one week to confirm owl use of the replacement burrows before formerly-occupied burrows may be excavated. Burrows shall be excavated with a qualified biologist present. c. Unoccupied burrowing owl burrows within the construction exclusion area shall be excavated with a qualified biologist present, and then filled to prevent reoccupation. If any burrowing owls are discovered during the excavation, the excavation shall cease and the owl shall be allowed to escape. Excavation could be completed when the biological monitor confirms the burrow is empty.	
Impact 4.4-3: Project operation would result in direct impacts on special-status and common bats.	Significant and Unavoidable	**Mitigation Measure 4.4-3:** The Applicant shall implement the following measures, which are based upon the California Bat Working Group *Guidelines for Assessing and Minimizing Impacts to Bats at Wind Energy Development Sites in California* (CBWG, 2006). These measures shall help to mitigate the Project's effects on bats by addressing the data gaps that prevent adequate assessment of the Project's effects on bats, such as what bat species are using the APWRA and how they are using the Project area.	Significant and Unavoidable

TABLE 2-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE TRES VAQUEROS WINDFARM REPOWERING PROJECT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Biological Resources (cont.)			
Impact 4.4-3 (cont.)		i. Pre-construction surveys shall be performed in the Project area. Bat investigations shall be conducted in the Project area by a qualified biologist to identify species that may be present in the immediate Project vicinity and in the existing and proposed rotor-swept zones, and to identify any maternal roosts. The qualified biologist shall be experienced in bat research and detection methods, and could employ such methods as acoustic surveys, use of image intensifiers and/or thermal imaging, and radar. ii. Post-construction bat monitoring shall be conducted in the Project area and reported in accordance with the same terms and conditions as provided in Mitigation Measure 4.4-1b, but for bats, and with the following measures: a. Post-construction monitoring shall utilize long-term acoustic monitoring equipment. The Applicant shall install and maintain, in working order, acoustic monitoring equipment for the duration of the survey period. b. Post-construction fatality surveys shall be conducted throughout the Project area as directed by a qualified biologist. These surveys may be seasonal, or dependent upon an initial intense survey, as directed by the designing biologist. iii. The Applicant shall prepare and implement the same Adaptive Management Plan principles for bats that are being applied to avian species under Mitigation Measure 4.4-1b. Binding instruments of an adaptive management plan for bats could include, for example, increasing the cut-in speed of one or more turbines (curtailment) during times of increased bat activity.	
Impact 4.4-4: Project construction would result in temporary and permanent impacts on California red-legged frog and California tiger salamander, including loss of upland aestivation habitat for these species.	Less than Significant with Mitigation	**Mitigation Measure 4.4-4:** The Applicant shall avoid or minimize take of individual California red-legged frogs and California tiger salamanders by implementing temporary protection measures before and during construction, and by providing habitat compensation and enhancement for permanent impacts. *Construction Measures* *Before Construction (i.e., before staging activities)* i. A Sensitive Species Relocation Plan shall be prepared and submitted to Contra Costa County, USFWS, and CDFG for review and approval at least three weeks before the start of groundbreaking. The purpose of the plan is to standardize relocation methods and relocation sites. ii. The Applicant shall submit the name and credentials of a biologist qualified to act as construction monitor to the County, USFWS, and CDFG for review and approval at least 15 days before construction work begins. General minimum qualifications are a four-year degree in biological sciences or other appropriate training and/or experience in surveying, identifying, and handling California tiger salamanders and California red-legged frogs.	Less than Significant

TABLE 2-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE TRES VAQUEROS WINDFARM REPOWERING PROJECT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Biological Resources (cont.)			
Impact 4.4-4 (cont.)		iii. At least 15 days before groundbreaking, the Applicant and its contractors shall install frog-exclusion fencing (i.e., silt fences) around all construction areas that are within 100 feet of potential California red-legged frog or California tiger salamander aquatic breeding habitat. iv. The County-, USFWS- and CDFG-approved biologist shall survey the work sites no more than two weeks before the onset of construction. If California tiger salamanders or California red-legged frogs are found, the biologist shall inform the County and contact USFWS and CDFG to determine whether moving these individuals is appropriate. If USFWS and CDFG approve moving the animals, then the Applicant shall allow the approved biologist sufficient time to move frogs and/or salamanders from the work sites before work begins. If these species are not identified, construction can proceed at these sites. v. To-be-reclaimed turbine pad areas shall be reviewed on a case-by-case basis, by a qualified biologist, to determine the presence and extent of burrow complexes. Survey results shall be provided to the County to inform the reclamation of turbine pad areas (further details are provided in "After Construction," below). *During Construction* vi. Active work areas, including areas where construction equipment and materials are staged, shall be monitored during construction to identify, capture, and relocate sensitive amphibians, if present. vii. The County-, USFWS- and CDFG-approved biologist shall use professional judgment to determine whether (and if so, when) the California tiger salamanders and/or California red-legged frogs are to be moved. The approved biologist shall have authority to halt construction work, if necessary, to avert avoidable take of listed species. *After Construction* viii. Depending on the pre-construction survey results of to-be-reclaimed turbine pad areas, pads shall be restored in a manner that achieves the benefits of restoration while retaining the benefits of existing burrow-complex habitat. ***Other Measures***[2] ix. The Applicant shall provide compensation for permanent impacts on California tiger salamander and California red-legged frog aestivation habitat at a **1:1 ratio** (at least one square foot of compensation for each square foot of net impact) **or a higher ratio if required**	

[2] Concerning mitigation ratios: this mitigation measure provides for a minimum mitigation ratio of 1:1, however, determination of the final ratio as applied to the Project is expressly under the authority of the resource agencies with jurisdiction over the subject matter (i.e., the USFWS, CDFG) and has not been determined at this time. The County understands that resource agencies like USFWS and CDFG are concerned primarily with the quality of the habitat to be conserved. While mitigation ratios of 1:1 for temporary impacts and 3:1 for permanent impacts commonly are imposed, the actual ratios imposed for this Project will depend on site-specific, project-specific, impact-specific considerations for each of the affected species.

TABLE 2-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE TRES VAQUEROS WINDFARM REPOWERING PROJECT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Biological Resources (cont.)			
Impact 4.4-4 (cont.)		**by USFWS or CDFG** during the permitting process. A "higher ratio" may result in a less than 1 square foot by 1 square foot replacement on the ground if higher quality habitat than that affected by the Project is obtained. Compliance with required mitigation ratios shall be verified by the USFWS and CDFG. x. The Applicant shall provide compensation for temporary impacts on California tiger salamander and California red-legged frog aestivation habitat at a **1:1 ratio** (at least one square foot of compensation for each square foot of net impact) **or a higher ratio if required by USFWS or CDFG** during the permitting process. A "higher ratio" may result in a less than 1 square foot by 1 square foot replacement on the ground if higher quality habitat than that affected by the Project is obtained. Compliance with required mitigation ratios shall be verified by the USFWS and CDFG. xi. Suitable compensation consists of: (1) purchasing and enhancing suitable habitat, converting it to a conservation easement, and conveying the easement to a managing agency or institution in perpetuity; (2) participating in a resource agency-approved mitigation bank that provides offset mitigation credits for loss of California tiger salamander and California red-legged frog habitat; or (3) a combination of both.	
Impact 4.4-5: Project construction activities could affect listed and special-status reptiles such as Alameda whipsnake, western pond turtle, and San Joaquin coachwhip.	Less than Significant with Mitigation	**Mitigation Measure 4.4-5:** The Applicant shall perform pre-construction surveys, perform ongoing relocation of identified animals out of construction areas, and compensate for temporary and permanent habitat impacts as follows: i. No more than two weeks prior to commencement of surface-disturbing activities, concurrent with other pre-construction wildlife surveys, a County-, CDFG-, and USFWS-approved biologist shall survey for special-status reptile populations. If individuals of these species are found within the work site, they shall be relocated to suitable habitat 0.5 mile or farther from the work site. ii. Immediately prior to the fill of any aquatic habitat (e.g., during road-widening activities), an approved biologist shall conduct a survey for western pond turtle. If encountered, turtle(s) shall be relocated to suitable habitat 0.5 mile or farther from the work site.	Less than Significant
Impact 4.4-6: Project construction would have temporary and permanent impacts on potential San Joaquin kit fox habitat.	Less than Significant with Mitigation	**Mitigation Measure 4.4-6a:** To reduce impacts to San Joaquin kit fox and its habitat, the Applicant shall implement the following measures along construction work corridors, work sites, and staging areas: i. Pre-construction surveys shall be conducted within 200 feet of work areas to identify potential San Joaquin kit fox dens or other refugia in and surrounding work areas. A qualified biologist shall conduct the survey for potential kit fox dens 14 to 30 days before construction begins. All identified potential dens shall be monitored for evidence of kit fox use by placing an inert tracking medium at den entrances and monitoring for at least 3 consecutive nights. ii. If no activity is detected at these den sites, they shall be closed following guidance established in USFWS documents referenced above.	Less than Significant

TABLE 2-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE TRES VAQUEROS WINDFARM REPOWERING PROJECT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Biological Resources (cont.)			
Impact 4.4-6 (cont.)		iii. If kit fox occupancy is determined at a given site, the construction manager shall be immediately informed that work shall be halted within 200 feet of the den and the USFWS and CDFG shall be contacted within 24 hours. Depending on the den type, reasonable and prudent measures to avoid effects to kit foxes would include seasonal limitations on project construction at the site (i.e., restricting the construction period to avoid spring-summer pupping season), and/or establishing a construction exclusion zone around the identified site, or resurveying the den a week later to determine species presence or absence. **Mitigation Measure 4.4-6b:** The Applicant shall compensate for impacts on San Joaquin kit fox grassland habitat by providing mitigation either through acquiring and dedicating lands into conservation easements or purchasing mitigation credits at compensation ratios that have been approved by USFWS and CDFG. The Applicant shall acquire San Joaquin kit fox mitigation lands based on anticipated impacts on up to approximately 111 acres of suitable habitat (18 acres of permanent impacts; 93 acres of temporary impacts). Mitigation ratios applied for impacts on San Joaquin kit fox habitat shall be 1:1 for temporary impacts and 1:1 for permanent impacts (at least one square foot of compensation for each square foot of net impact) **or a higher ratio if required by USFWS or CDFG** during the permitting process. A "higher ratio" may result in a less than 1 square foot by 1 square foot replacement on the ground if higher quality habitat than that affected by the Project is obtained. Compliance with required mitigation ratios shall be verified by the USFWS and CDFG. **Mitigation Measure 4.4-6c:** To maintain under conservation easement the full acreage required for the original Los Vaqueros Reservoir Expansion Project, the Applicant shall replace any affected acreage of existing kit fox easement with an equivalent amount of acreage. The Applicant shall provide compensation for permanently affected conservation easement acreage at a 1:1 ratio **or a higher ratio if required by USFWS or CDFG** during the permitting process. Compensation for temporary impacts to lands within conservation easements shall be provided at a ratio of 1:1 **or a higher ratio if required by USFWS or CDFG**. A "higher ratio" may result in a less than 1 square foot by 1 square foot replacement on the ground if higher quality habitat than that affected by the Project is obtained. Compliance with required mitigation ratios shall be verified by the USFWS and CDFG. Temporarily impacted areas shall be reseeded with native species as described in the General Biological Resources Mitigation Measures.	
Impact 4.4-7: Project construction could affect non-listed special-status mammal species (American badger and San Joaquin pocket mouse).	Less than Significant with Mitigation	**Mitigation Measure 4.4-7:** The Applicant shall minimize impacts on American badger and San Joaquin pocket mouse by minimizing the Project footprint, performing pre-construction surveys, and passively or actively relocating animals. i. Limiting the Project footprint to the smallest possible area shall minimize impacts on San Joaquin pocket mouse. ii. Concurrent with other required winter/spring month pre-construction surveys (e.g., pre-construction surveys for kit fox and burrowing owl), a qualified biologist shall perform a	Less than Significant

TABLE 2-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE TRES VAQUEROS WINDFARM REPOWERING PROJECT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Biological Resources (cont.)			
Impact 4.4-7 (cont.)		survey to identify the presence of American badgers. If this species is not found, no further mitigation of potential impacts on American badgers shall be required. iii. If American badgers are identified in the impact area, they shall be passively relocated using burrow exclusion (e.g., installing one-way doors on burrows) or similar CDFG-approved exclusion methods. Under some situations, it might be necessary to actively relocate American badgers (e.g., using live traps) to protect individuals from potentially harmful situations. Such relocation shall only be performed with advance CDFG coordination and concurrence. iv. When unoccupied dens are encountered outside of work areas but within 100 feet of proposed activities, vacated dens shall be inspected to ensure they are empty and temporarily covered using plywood sheets or similar materials. Temporary covers shall be removed when Project construction is complete. v. If, during construction, American badger occupancy is determined at a given site within the work area, the construction manager shall be informed and work halted immediately. Depending on the den type, reasonable and prudent measures to avoid harming American badgers shall be implemented and would include seasonal limitations on Project construction near the site (i.e., restricting the construction period to avoid spring-summer pupping season), and/or establishing a construction exclusion zone around the identified site, or resurveying the den a week later to determine species presence or absence.	
Impact 4.4-8: Project construction activities could result in impacts on longhorn fairy shrimp and vernal pool fairy shrimp and their habitat.	Less than Significant with Mitigation	**Mitigation Measure 4.4-8:** The Applicant shall perform a habitat assessment of the F-string to identify potential fairy shrimp habitat. If potential habitat is identified, then a 250-foot buffer shall be established around the potential habitat.	Less than Significant
Impact 4.4-9: Project construction could affect populations of special-status plant species.	Less than Significant with Mitigation	**Mitigation Measure 4.4-9:** To reduce the potential impact on special-status plant populations, the Applicant shall implement the following: i. Floristic surveys shall be performed along the F-string in accordance with CDFG and USFWS rare plant survey guidelines, and the results of those surveys shall be made available to CDFG and the USFWS during the Project permitting process. ii. In areas where floristic surveys have already been completed, surveys shall be supplemented to meet CDFG requirements (CDFG, 2009) which include appropriately timed and numbered survey visits[3]. iii. Construction activities shall avoid identified crownscale, ball saltbush, fragrant cudweed, hop tree, and elderberry shrubs that occur on the Project area and Mitigation Measure 4.4-9.v shall also apply to these species; Mitigation Measure 4.4-9.vi, shall also apply to crownscale and elderberry shrubs.	Less than Significant

[3] Surveys should be conducted at the time of year when species are both evident and identifiable, usually during flowering or fruiting, with visits spaced throughout the growing season. Many times this involves multiple visits to the same site (e.g., in early, mid, and late-season for flowering plants) to capture the floristic diversity at a level necessary to determine if special-status plants are present (CDFG, 2009).

TABLE 2-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE TRES VAQUEROS WINDFARM REPOWERING PROJECT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Biological Resources (cont.)			
Impact 4.4-9 (cont.)		iv. Exclusion fencing and/or silt fencing shall be installed around special-status plant populations with as large a buffer as possible to minimize the potential for direct and indirect impacts, such as fugitive dust and accidental intrusion into sensitive areas. v. Where avoidance is not feasible, the Applicant shall compensate for the loss of special-status plants by hiring a qualified ecologist to develop and implement a restoration and mitigation plan according to CDFG guidelines and in coordination with CDFG and USFWS. At a minimum, the plan shall include collection of reproductive structures from affected plants, a full description of microhabitat conditions necessary for each affected species, seed germination requirements, restoration techniques for temporarily disturbed occurrences, assessments of potential transplant and enhancement sites, a timetable for implementation, success and performance criteria, a monitoring program, and measures to ensure long-term sustainability. vi. The Applicant shall develop and implement a Noxious Weed and Invasive Plant Control Plan consistent with standard Best Management Practices (see for example: Department of Transportation, State of California (2003); Storm Water Quality Handbooks; and Project Planning and Design Guide Construction Site Best Management Practices Manual). The plan shall be subject to review and approval by Contra Costa County and shall, at a minimum, address any required cleaning of construction vehicles to minimize spread of noxious weeds and invasive plants.	
Impact 4.4-10: Project construction activities could result in impacts on Sensitive Natural Communities, including Creeping Rye Grass Turfs.	Less than Significant with Mitigation	**Mitigation Measure 4.4-10:** To reduce impacts on Sensitive Natural Communities, the Applicant shall implement the following: i. Based on the documented distribution of Sensitive Natural Communities, Project design shall avoid and minimize impacts on these areas to the extent feasible ii. Where Sensitive Natural Communities cannot be avoided by Project design (e.g., on road alignments that must follow topographic contours or traverse low-lying areas), the Applicant shall provide on-site restoration and enhancement at a 1:1 ratio, **or a higher ratio if required by CDFG**, to redress temporary and permanent impacts. A “higher ratio” may result in a less than 1 square foot by 1 square foot replacement on the ground if higher quality habitat than that affected by the Project is obtained. iii. Upon project completion, the Applicant shall seed disturbed Creeping Rye Grass Turfs and Purple Needlegrass Grassland areas with native Creeping Rye Grass and Purple Needlegrass Grassland seed collected within or in the vicinity of impacts. Additional seed could be used to supplement seed mixes, but seed shall be from locally collected (within the ecoregion) source material and shall be appropriately selected for site conditions.	Less than Significant
Impact 4.4-11: Project construction could affect potentially jurisdictional wetlands or waters, and streambeds and banks.	Less than Significant with Mitigation	**Mitigation Measure 4.4-11:** To reduce impacts on jurisdictional wetlands or waters, and streambeds and banks, the Applicant shall implement the following: i. Consistent with USACE, CDFG, and RWQCB, permit requirements, the final Project design shall avoid and minimize the fill of wetlands and other waters to the greatest practicable extent.	Less than Significant

TABLE 2-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE TRES VAQUEROS WINDFARM REPOWERING PROJECT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Biological Resources (cont.)			
Impact 4.4-11 (cont.)		ii. Areas that are avoided shall be subject to current Best Management Practices (BMPs) under the County's most recent General National Pollutant Discharge Elimination System Permit (NPDES), including implementation of an effective Stormwater Pollution Prevention Program (SWPPP), presence of an on-site spill kit, and installation of silt fences along/around construction areas to inhibit soil movement into wetland features. iii. Where jurisdictional wetlands and other waters cannot be avoided, the following measures shall apply: a. Construction activities in drainage channel crossings shall be limited to low-flow periods: approximately April 15 to October 15, unless otherwise authorized by CDFG, RWQCB and/or the USACE. Excavation and grading activities performed during the wet season (October 15 to April 30) shall be conducted in accordance with the conditions of Mitigation Measure 4.10-3a and 4.10-3b. For channels or wetlands for which temporary soil removal is necessary, the top layer of the drainage or wetland bottom shall be stockpiled and preserved during construction. After Project construction, the stockpiled material shall be placed back into the drainage or wetland feature to return the beds to approximately their original composition. iv. To offset temporary and permanent impacts that occur as a result of the Project, restoration and compensatory mitigation shall be provided through the following mechanisms: a. The square footage of impacted jurisdictional waters shall be determined based on the USACE-approved wetland delineation and during USACE permitting. The Applicant shall then identify lands to provide for wetland preservation, restoration (enhancement) or creation at a 1:1 ratio, **or a ratio acceptable to USACE and/or RWQCB**. On-site mitigation is preferable and shall be implemented if such opportunities are available. Development rights to the on-site mitigation land shall be grant deeded to the County or another acceptable public agency. b. If the Applicant restores and/or creates wetlands on site, the Applicant shall prepare a wetland mitigation and monitoring plan. The plan, developed by a qualified biologist in coordination with USACE, CDFG, and/or RWQCB, shall detail mitigation and monitoring obligations for temporary and permanent impacts to wetlands and other waters as a result of construction activities. The plan shall quantify the total acreage lost and describe the following: mitigation ratios for lost habitat; annual success criteria; mitigation sites; monitoring and reporting requirements; and site-specific plans to compensate for wetland losses resulting from the Project. c. The Applicant shall submit the wetland mitigation and monitoring plan to the appropriate regulatory agencies for approval (e.g., USACE, CDFG, and/or RWQCB).	

TABLE 2-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE TRES VAQUEROS WINDFARM REPOWERING PROJECT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Biological Resources (cont.)			
Impact 4.4-12: Project construction activities could temporarily affect active breeding bird nest sites.	Less than Significant with Mitigation	**Mitigation Measure 4.4-12:** To reduce the impact on active raptor nests and nests of other special-status birds, the Applicant shall implement the following: i. To the greatest extent practicable, construction activities shall not take place during the nesting season (February 1 through August 31). If construction activities avoid the nesting season, then no further mitigation is required. ii. If seasonal avoidance is not possible and active construction work (i.e., ground clearing and grading, including removal of trees or shrubs) is scheduled to take place during the nesting season, then the following measures shall be implemented: a. No more than 30 days prior to commencement of construction, a qualified wildlife biologist shall conduct preconstruction surveys of all potential nesting habitat within 500 feet of work areas. b. If pre-construction surveys indicate that nests are inactive or potential habitat is unoccupied, no further mitigation shall be required in this regard. c. If active nests are found during preconstruction surveys, no-disturbance buffer zones shall be established around active nests. The buffer zones shall not be encroached upon during the breeding season or until it is determined by a qualified wildlife biologist that all young have fledged. Typical buffers include 500 feet for raptors and 250 feet for other nesting birds (e.g., shorebirds, waterfowl, and passerine birds). The size of the buffer zones and types of construction activities allowed in these areas, if any, could be further modified during construction in coordination with CDFG and shall be based on existing noise and human disturbance levels in the Project area. d. If construction commences during the nonbreeding season and continues into the breeding season, most songbirds that choose to nest next to active construction sites are generally considered to acclimate to construction activities. However, since nest abandonment may occur in some instances, nesting site monitoring shall be conducted by a qualified wildlife biologist and “no-disturbance” buffer zones shall be established in coordination with CDFG around active nests to prevent impacts on nesting birds and their young.	Less than Significant
Impact 4.4-13: Project construction and operation would result in direct and indirect impacts on common wildlife species.	Less than Significant	None required.	
Impact 4.4-14: Project construction may impact trees that are protected under Contra Costa County’s Tree Protection and Preservation Ordinance.	Less than Significant	None required.	

TABLE 2-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE TRES VAQUEROS WINDFARM REPOWERING PROJECT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Cultural Resources			
Impact 4.5-1: The Project would cause a substantial adverse change in the setting of a historical resource.	Less than Significant	None required.	
Impact 4.5-2: The Project could cause an intentional and/or inadvertent impact to the significance of a historical resource.	Potentially Significant	**Mitigation Measure 4.5-2a:** Prior to commencing construction, a qualified archaeologist and a Native American representative shall assess the current site condition of CA-CCO-310, CA-CCO-417, CA-CCO-456, and CA-CCO-434/H (for comparative purposes following construction activity). Three sites have not been formally recorded by an archaeologist within the last 10 years (1996 [CA-CCO-310; CA-CCO-456] and 1987 [CA-CCO-434/H]). Site record updates on a Department of Parks and Recreation Form 523 shall be completed, that include thorough photo documentation, description, GIS location information, and detailed sketch maps and plan drawings. The site records shall be provided to EBRPD for inventory and interpretive potential. **Mitigation Measure 4.5-2b:** Following construction activities, a qualified archaeologist and a Native American representative shall reassess the site condition of CA-CCO-310, CA-CCO-417, CA-CCO-456, and CA-CCO-434/H. **Mitigation Measure 4.5-2c:** Construction contracts shall require avoidance of cultural sites. **Mitigation Measure 4.5-2d:** Temporary fencing shall be installed around the boundaries of CA-CCO-310 and the northernmost extent of CA-CCO-434/H during Project construction to prevent inadvertent or intentional damage to the site by construction personnel. Visitors to cultural sites shall only include those with professional or scientific interests or Native American representatives. **Mitigation Measure 4.5-2e:** Project personnel, including construction crews, shall be alerted to the archaeological sensitivity of the Project area and the importance of protecting cultural resources. Project personnel shall be required to attend a mandatory on-site instruction led by a qualified archaeologist and a Native American representative that discusses what types of cultural materials are and could be present in the Project area. The instruction shall include appropriate training to identify and protect cultural resources in the event that they are inadvertently unearthed. All Project personnel shall be informed that they are prohibited from entering the adjacent Vasco Caves Regional Preserve property owned by the East Bay Regional Park District and that entry onto said property constitutes trespassing punishable by law. Information about the specific locations of cultural resources on the Project site and in the surrounding area shall be kept confidential and provided only on a need-to-know basis. **Mitigation Measure 4.5-2f:** All ground-disturbing activity in String A, removal of the L1-L5 turbines, and construction of the new O&M building shall be monitored by a qualified archaeologist and a Native American representative. An Archaeological Monitoring Plan shall be prepared prior to commencement of any ground-disturbing activities that includes:	Less than Significant

TABLE 2-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE TRES VAQUEROS WINDFARM REPOWERING PROJECT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Cultural Resources (cont.)			
Impact 4.5-2 (cont.)		• Person(s) responsible for conducting monitoring activities, including Native American monitors; • How the monitoring shall be conducted and the required format and content of monitoring reports; • Person(s) responsible for overseeing and directing the monitors; • Schedule for submittal of monitoring reports and person(s) responsible for review and approval of monitoring reports; • Physical monitoring boundaries; • Protocol for notifications in case of encountering of cultural resources, as well as methods of dealing with the encountered resources (e.g., collection, identification, curation); • Methods to ensure security of cultural resources sites; and • Protocol for notifying local authorities (i.e. County Sheriff, EBRPD Police) should site looting and other illegal activities occur during construction	
Impact 4.5-3: The Project could cause a substantial adverse change in the significance of unique archaeological resources that are within the Project area, but have not yet been discovered.	Less than Significant with Mitigation	**Mitigation Measure 4.5-3:** The Applicant and its contractors shall take a proactive role in protecting archaeological resources encountered during implementation of the Project. Prehistoric archaeological materials that might be present in the area include obsidian and chert flaked-stone tools (e.g., projectile points, knives, scrapers) or toolmaking debris; culturally darkened soil (“midden”) containing heat-affected rocks, artifacts, or shellfish remains; stone milling equipment (e.g., mortars, pestles, handstones, or milling slabs); and battered stone tools, such as hammerstones and pitted stones. Historic-period materials might include stone, concrete, or adobe footings and walls; filled wells or privies; and deposits of metal, glass, and/or ceramic refuse. If archaeological resources are encountered, the Applicant shall immediately halt all activity within 100 feet of the find and notify the Contra Costa County Department of Conservation & Development (DCD). The find shall be evaluated by an archaeologist who meets the Secretary of the Interior’s Professional Qualification Standards and if necessary, an appropriate Native American representative. If the archaeologist or Native American representative determines that the resources may be significant, then they shall consult with the DCD to formulate an appropriate treatment plan for the resources. Avoidance shall be considered the default mitigation, though the DCD will ultimately determine whether avoidance is necessary and feasible in light of factors such as the nature of the find, Project design, costs, and other considerations. If avoidance is infeasible, other appropriate measures (e.g., data recovery) will be instituted. Work may proceed in other parts of the Project area while mitigation for archaeological resources is being carried out, but work within 100 feet of the find shall remain halted until the DCD explicitly gives authority to proceed.	Less than Significant

TABLE 2-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE TRES VAQUEROS WINDFARM REPOWERING PROJECT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Cultural Resources (cont.)			
Impact 4.5-4: The Project could directly or indirectly destroy a unique paleontological resource or site or a unique geological feature.	Less than Significant with Mitigation	**Mitigation Measure 4.5-4:** The Applicant and its contractors shall take a proactive role in protecting paleontological resources encountered during implementation of the Project. Paleontological resources that might be present in the area include fossilized bone, teeth, shell, tracks, trails, casts, molds, and impressions. If paleontological resources are encountered, the Applicant shall immediately halt all activity within 100 feet of the find and notify the DCD. The find shall be evaluated by a qualified paleontologist. If the paleontologist determines that the resources may be significant, then they shall consult with the DCD to formulate an appropriate treatment plan for the resources. Avoidance shall be considered the default mitigation, though the DCD will ultimately determine whether avoidance is necessary and feasible in light of factors such as the nature of the find, Project design, costs, and other considerations. If avoidance is infeasible, other appropriate measures (e.g., data recovery) will be instituted in conformance with Society of Vertebrate Paleontology Guidelines (SVP, 1995; SVP, 1996). Work may proceed in other parts of the Project area while mitigation for paleontological resources is being carried out, but work within 100 feet of the find shall remain halted until the DCD explicitly gives authority to proceed.	Less than Significant
Impact 4.5-5: The Project could disturb human remains that are located within the Project area, but have not yet been discovered.	Less than Significant with Mitigation	**Mitigation Measure 4.5-5:** The Applicant and its contractors shall take a proactive role in protecting human remains encountered during implementation of the Project. If potential human remains are encountered, the Applicant shall halt work within 100 feet of the find and immediately contact the Contra Costa County coroner in accordance with Public Resources Code Section 5097.98 and Health and Safety Code Section 7050.5. The DCD shall then be contacted. If the coroner determines that the remains are Native American, the coroner will contact the Native American Heritage Commission (NAHC) within 24 hours. As provided in Public Resources Code Section 5097.98, the NAHC will identify the person or persons believed to be most likely descended from the deceased Native American. The most likely descendent makes recommendations for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods as provided in Public Resources Code Section 5097.98.	Less than Significant
Energy Conservation			
Impact 4.6-1: Construction and operation of the Project would result in consumption of energy.	Less than Significant	None required.	
Impact 4.6-2: Construction and operation of the Project would require use of transportation energy.	Less than Significant	None required.	
Impact 4.6-3: The Project's overall use of efficient transportation alternatives would be limited.	Less than Significant	None required.	

TABLE 2-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE TRES VAQUEROS WINDFARM REPOWERING PROJECT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Geology and Soils			
Impact 4.7-1: Project implementation would expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault.	Less than Significant	None required.	
Impact 4.7-2: Project implementation would expose people or structures to potential substantial adverse effects as a result of strong seismic ground shaking.	Less than Significant with Mitigation	**Mitigation Measure 4.7-2:** The Applicant shall comply with and implement all of the following measures designed to reduce potential substantial adverse effects resulting from strong seismic ground shaking: (A) A California licensed geotechnical engineer and engineering geologist shall perform a comprehensive geotechnical investigation of all Project facilities based on adequate subsurface exploration, laboratory testing of selected samples, and engineering/ geologic analysis of the data gathered. The information shall be compiled and presented as a geotechnical report that provides an evaluation of potential seismic and geologic hazards, and provides 2007 CBC seismic design parameters, along with providing specific standards and criteria for site grading, drainage and foundation design. (B) The Project geotechnical engineer or engineering geologist shall prepare an Original Geologic Map of the Project area based on subsurface exploration, field geologic mapping and interpretation of historic aerial photographs. The map shall show the details of site geologic conditions, including lithologic units (i.e., bedrock units/stratigraphy), geologic structure, and the distribution of surficial deposits (e.g. colluvium, landslides and artificial fill). (C) The information shall be compiled and presented as a geotechnical report that provides an evaluation of potential seismic hazards, including secondary seismic ground failures such as liquefaction and collapse, lateral spread and earthquake induced settlement, and other geologic hazards, and provides 2007 CBC seismic design parameters, along with providing specific standards and criteria for site grading, drainage and foundation design. (D) The geotechnical report shall be subject to technical review by the County Peer Review Geologist and review and approval by the County Zoning Administrator prior to issuance of grading permits or building permits. The recommendations in the approved geotechnical report shall be incorporated into the design and construction specifications and shall be implemented during build-out of the Project. Also prior to issuance of grading or building permits, the Project geotechnical engineer or engineering geologist shall review grading and improvement plans to verify their consistency with the recommendations in the approved geotechnical report.	Less than Significant

TABLE 2-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE TRES VAQUEROS WINDFARM REPOWERING PROJECT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Geology and Soils (cont.)			
Impact 4.7-2 (cont.)		(E) The Project geotechnical engineer shall provide observation and testing services during grading and foundation-related work, and shall submit a grading completion report to the County prior to requesting the final inspection. This report shall provide full documentation of the geotechnical monitoring services provided during construction, including the results of ASTM testing as well as geologic mapping of all cut slopes that are constructed. The Final Grading Report shall also certify compliance of the as-built Project with the recommendations in the approved geotechnical report.	
Impact 4.7-3: In the event of a major earthquake in the region, people and property could be exposed to seismically-induced ground failure, including liquefaction, lateral spreading and earthquake-induced settlement.	Less than Significant with Mitigation	**Mitigation Measure 4.7-3:** Implement Mitigation Measure 4.7-2.	Less than Significant
Impact 4.7-4: Project implementation would result in substantial erosion or loss of topsoil.	Less than Significant with Mitigation	None required.	
Impact 4.7-5: Project implementation would expose people or structures to potential substantial adverse effects as a result of landslides.	Less than Significant with Mitigation	**Mitigation Measure 4.7-5:** Perform Site-Specific Slope Stability Evaluation. The Applicant shall perform a site-specific slope stability evaluation for Project improvements that require grading or excavation in areas where slopes exceed 30 percent. The slope stability evaluation shall assess the localized potential for slope instability in these areas, and shall identify appropriate design and construction measures to incorporate into final Project plans. The site-specific slope stability evaluation shall include, but not be limited to, the following measures: (A) Where landslides are confirmed within or immediately adjacent to planned improvements, provide a slope stability evaluation (report) for static and pseudo-static conditions. The approach utilized shall be consistent with the California Geological Survey, 2008, Guidelines for Evaluating and Mitigating Seismic Hazards in California (CGS Special Publication 117A) or other generally accepted methodoloty. The Project geologic consultant shall explain the methodology used and justify the assumptions that are made regarding the engineering properties of soil, rock and saturation. (B) The slope stability evaluation report shall provide specific geotechnical design measures to achieve long-term stability. These shall include, but will not necessarily be limited to, corrective grading of landslides or colluvial wedges that present the potential to effect improvements. Additionally, standard practices such as minimizing the amount of grading required in areas that are deemed to be stable in their existing condition; installing adequate drainage; avoiding grading activities and excavations during and immediately following periods of heavy rainfall; geotechnical monitoring of slopes for stability during construction; minimizing the gradient of engineered slope; following natural topography; and, salvaging topsoil for use during final grading to facilitate revegetation, shall be implemented during construction.	Less than Significant

TABLE 2-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE TRES VAQUEROS WINDFARM REPOWERING PROJECT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Geology and Soils (cont.)			
Impact 4.7-5 (cont.)		(C) For construction requiring excavations, such as foundations, appropriate support and protection measures shall be implemented to maintain the stability of excavations and to protect construction worker safety. Where excavations are adjacent to existing structures, utilities, or other features that may be adversely affected by potential ground movements, bracing, underpinning, or other methods of support for the affected facilities shall be implemented. **Mitigation Measure 4.7-4b:** The slope stability evaluation shall be subject to technical review by the County Peer Review Geologist and review and approval by the County Zoning Administrator prior to issuance of grading permits or building permits. The recommendations in the approved slope stability evaluation shall be incorporated into the design and construction specifications and shall be implemented during build-out of the Project. Also prior to issuance of grading or building permits, the Project geotechnical engineer or engineering geologist shall review grading and improvement plans to verify their consistency with the recommendations in the approved slope stability evaluation.	
Impact 4.7-6: Project implementation would occur on expansive soils, creating risks to life and property.	Less than Significant	None required.	
Impact 4.7-7: Project implementation could require installation of septic tanks or alternative waste disposal systems in an area containing unsuitable soils.	Less than Significant	None required.	
Greenhouse Gas Emissions			
Impact 4.8-1: The Project would result in emissions of greenhouse gases that would contribute to global climate change.	Less than Significant	None required.	
Impact 4.8-2: The Project could conflict with CARB's Climate Change Scoping Plan.	Less than Significant with Mitigation	**Mitigation Measure 4.8-2:** Low SF_6 Leak Rate Circuit Breakers and Monitoring. Prior to issuance of building permits for the substation, the Applicant shall ensure that the new circuit breakers installed at Tres Vaqueros Substation have a guaranteed SF_6 leak rate of 0.5 percent per volume or less. The Applicant shall provide Contra Costa County with documentation of compliance, such as specification sheets. In addition, the Applicant shall monitor SF_6-containing circuit breakers at Tres Vaqueros Substation consistent with Scoping Plan Measure H-6 for the detection and repair of leaks.	Less than Significant

TABLE 2-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE TRES VAQUEROS WINDFARM REPOWERING PROJECT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Hazards and Hazardous Materials			
Impact 4.9-1: Project construction, operation and maintenance could, through routine transport, use or disposal, accidentally release hazardous materials, thereby exposing construction workers, Project personnel and the public to hazardous materials or releasing hazardous materials into the environment.	Less than Significant with Mitigation	Implement Mitigation Measure 4.10-3a.	Less than Significant
Impact 4.9-2: Grading and excavation for Project construction could cause a release of hazardous materials into the environment or expose construction workers to these substances, if hazardous materials are present in the subsurface.	Less than Significant	None required.	
Impact 4.9-3: Project construction could cause a significant hazard related to accidental rupture of the natural gas pipeline that crosses the Project area.	Less than Significant with Mitigation	**Mitigation Measure 4.9-3:** At least 30 days prior to commencement of construction activities, the Applicant shall provide PG&E with the Project construction plans, notify the County that it has done so, and make arrangements with PG&E to identify underground utilities potentially affected by the Project so that the Applicant can modify its construction plans to avoid utility conflicts. Prior to beginning construction, the Applicant shall make further arrangements with PG&E regarding protection of the existing gas pipeline, possibly to include having a PG&E monitor present during excavation near the pipelines to ensure that the facilities are not damaged.	Less than Significant
Impact 4.9-4: The Project could cause a safety hazard through interference with air navigation.	Less than Significant with Mitigation	**Mitigation Measure 4.9-4:** The Applicant shall submit the FAA Determination of No Hazard on the final turbine selection and layout to the County prior to issuance of building permits.	Less than Significant
Impact 4.9-5: Improper handling or use of flammable or combustible materials such as internal combustion equipment could result in wildland fires, exposing people or structures to a significant risk of loss, injury, or death.	Less than Significant with Mitigation	**Mitigation Measure 4.9-5:** Prior to commencement of construction activities, the Applicant shall submit a Fire Safety Plan to, and obtain approval from, CalFire and the Contra Costa County Fire Protection District. The Applicant shall submit the approved plan to the County Zoning Administrator. The measures contained in the approved plan shall be strictly enforced. The Fire Safety Plan shall describe on-site BMPs to reduce the potential for accidental fires which shall include, but not necessarily be limited to, the following (unless deemed unnecessary or modified by CalFire or the Fire Protection District): 1) All equipment used during construction must have an approved spark arrestor. 2) Fire-suppression equipment and tools shall be readily available at all work locations and workers shall be trained in their use. 3) Construction workers will receive fire hazard training to identify actions that will reduce the risk of ignition and facilitate immediate control of an incipient fire. The training shall also include emergency communication protocols. 4) Adequate water supplies for fire prevention shall be maintained at all times.	Less than Significant

TABLE 2-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE TRES VAQUEROS WINDFARM REPOWERING PROJECT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Hazards and Hazardous Materials (cont.)			
Impact 4.9-6: 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	None required.	
Impact 4.9-7: Because of their large size and proposed location, the proposed turbines have the potential to interfere with microwave, radar, and communications signals and be a hazard to public safety.	Less than Significant with Mitigation	**Mitigation Measure 4.9-7a:** The Applicant shall notify the NTIA of the Project and request review of the Project's potential impacts to microwave and radar communications systems. Should potential impacts to microwave and/or radar systems be identified, the Applicant shall coordinate with the relevant agency or agencies to resolve concerns. These actions shall be completed prior to issuance of building permits. **Mitigation Measure 4.9-7b:** Prior to issuance of building permits, the Applicant shall consult with local public safety providers, such as the California Highway Patrol, Calfire, the Contra Costa County Fire Protection District, the Contra Costa County Sheriff's Office, and private ambulance service providers, regarding their use of LMR systems and the Project's potential to impact those systems. If it is determined through consultation that the Project will or is likely to impact LMR systems, then the Applicant shall take the necessary steps to ensure that LMR communications will not be disrupted during Project construction and operation, possibly by repositioning LMR repeaters or adding repeaters at appropriate locations. If at any time local public safety providers inform the Applicant that the Project is interfering with LMR communications, then the Applicant shall implement any additional measures necessary to restore LMR communications to no less than their pre-Project levels.	Less than Significant
Hydrology and Water Quality			
Impact 4.10-1: The Project could violate a water quality standard during operations, or result in other water quality degradation during operations.	Less than Significant with Mitigation	**Mitigation Measure 4.10-1:** In order to ensure that accidental spills of fuels, oils, greases, coolant, transformer oil, and other chemicals used on-site do not result in water quality degradation, the Applicant shall prepare a spill prevention and control plan for Project operations. The Applicant shall implement the recommendations of this plan prior to commencement of Project operations. The plan shall provide for compliance with local, State, and federal regulations regarding on-site storage and use of fluids and compounds, including: • Storage and handling criteria for fuels, oils, lubricants, antifreeze, and other fluids that minimize fluid release; • Storage and handling criteria for waste oils, lubricants, transformer oil, and other fluids that minimize fluid release; • Use of secondary containment surrounding transformers and any on-site transformer oil storage areas, as relevant; • Use of secondary containment for temporary storage of waste/spent oils, lubricants, transformer oil, or other fluids on-site;	Less than Significant

TABLE 2-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE TRES VAQUEROS WINDFARM REPOWERING PROJECT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Hydrology and Water Quality (cont.)			
Impact 4.10-1 (cont.)		• Operational spill prevention measures including staff training for the recognition and proper handling of potentially hazardous fluids; and • Cleanup procedures that, in the event of a spill, provide for identification and response procedures to contain spills, and properly dispose of contaminated soils or other materials, so as to minimize potential water quality effects.	
Impact 4.10-2: The Project could interfere with groundwater recharge or deplete groundwater supplies.	Less than Significant	None required.	
Impact 4.10-3: Project construction and operation could alter drainage patterns on-site in a manner which could result in erosion, sedimentation, or flooding on-site or off site.	Less than Significant with Mitigation	**Mitigation Measure 4.10-3a:** To control and manage stormwater runoff during construction and decommissioning, the Applicant shall prepare and implement a Stormwater Pollution Prevention Plan (SWPPP) as required under the General Construction Permit for Discharges of Storm Water Associated with Construction Activities, for all construction and decommissioning phases of the Project. The SWPPP shall identify pollutant sources that may affect the quality of stormwater discharge and shall require implementation of Best Management Practices (BMPs) to reduce pollutants in stormwater discharges. BMPs shall include, but would not be limited to: 1. Excavation and grading activities in areas with slopes greater than 30 percent or directly adjacent to open water shall, to the extent possible, be conducted during the dry season (April 30 to October 15). If Excavation and grading activities must performed during the wet season (October 15 to April 30), they shall be conducted in accordance with County requirements and the requirements of the General Construction Permit for Discharges of Storm Water Associated with Construction Activities. 2. If excavation occurs during the rainy season, storm runoff from the construction area shall be regulated through a storm water management/erosion control plan that shall include temporary on-site silt traps and/or basins with multiple discharge points to natural drainages and energy dissipaters. Stockpiles of loose material shall be covered and runoff diverted away from exposed soil material. If work stops due to rain, a positive grading away from slopes shall be provided to carry the surface runoff to areas where flow would be controlled, such as the temporary silt basins. Sediment basins/traps shall be located and operated to minimize the amount of off-site sediment transport. Any trapped sediment shall be removed from the basin or trap and placed at a suitable location on-site, away from concentrated flows, or removed to an approved disposal site. 3. Temporary erosion control measures (such as fiber rolls, staked straw bales, detention basins, check dams, geofabric, sandbag dikes, and temporary revegetation or other ground cover) shall be provided until perennial revegetation or landscaping is established and can minimize discharge of sediment into nearby waterways. For construction within 500 feet of a water body, appropriate erosion control measures shall be placed between the potential source of sediment and the water body.	Less than Significant

TABLE 2-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE TRES VAQUEROS WINDFARM REPOWERING PROJECT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Hydrology and Water Quality (cont.)			
Impact 4.10-3 (cont.)		4. Sediment shall be retained on-site by a system of sediment basins, traps, or other appropriate measures. 5. No disturbed surfaces will be left without erosion control measures in place during the rainy season, from October 15th through April 30th. 6. Erosion protection shall be provided on all cut-and-fill slopes. Revegetation shall be facilitated by mulching, hydroseeding, or other methods and shall be initiated as soon as possible after completion of grading and, to the extent feasible, prior to the onset of the rainy season (by October 15). 7. A vegetation and/or engineered buffer shall be maintained, to the extent feasible, between the construction zone and all surface water drainages including riparian zones. 8. Vegetative cover shall be established on the construction site as soon as possible after disturbance. 9. BMPs selected and implemented for the Project shall be in place and operational prior to the onset of major earthwork on the site. The construction phase facilities shall be maintained regularly and cleared of accumulated sediment as necessary. Effective mechanical and structural BMPs that shall be implemented at the Project area include the following: a. Mechanical storm water filtration measures, including oil and sediment separators or absorbent filter systems such as the Stormceptor® system, shall be installed as appropriate within the storm drainage system to provide filtration of stormwater prior to discharge; b. Vegetative strips, high infiltration substrates, and grassy swales shall be used where appropriate throughout the Project area to reduce runoff and provide initial stormwater treatment; c. Permanent energy dissipaters shall be included for all permanent drainage outlets; d. The water quality detention basins and their maintenance procedures shall be designed to provide effective water quality control measures including the following: i. Maximize detention time for settling of fine particles; ii. Establish maintenance schedules for periodic removal of sedimentation, excessive vegetation, and debris that may clog basin inlets and outlets; iii. Maximize the detention basin elevation to allow the highest amount of infiltration and settling prior to discharge. 10. Hazardous materials such as fuels and solvents used on the construction sites shall be stored in covered containers and protected from rainfall, runoff, vandalism, and accidental release to the environment. All stored fuels and solvents will be contained in an area of impervious surface with containment capacity equal to the volume of materials stored. A	

TABLE 2-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE TRES VAQUEROS WINDFARM REPOWERING PROJECT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Hydrology and Water Quality (cont.)			
Impact 4.10-3 (cont.)		stockpile of spill cleanup materials shall be readily available at all construction sites. Employees shall be trained in spill prevention and cleanup, and individuals shall be designated as responsible for prevention and cleanup activities. 11. Equipment shall be properly maintained in designated areas with runoff and erosion control measures to minimize accidental release of pollutants. **Mitigation Measure 4.10-3b:** Prior to issuance of grading or building permits and initiation of construction activities for the Project, the Applicant shall prepare a Drainage Management Plan. The plan shall be submitted to the Contra Costa County Flood Control and Water Conservation District for review and approval as part of the Flood Control District's issuance of a Drainage Permit, as required by the County's 1010 Drainage Ordinance. The Applicant shall be required to implement and adhere to the plan approved by the reviewing agency. The plan shall include measures necessary to ensure that stormwater drainage from the proposed roadways, new substation, and other facilities is channeled into appropriately-sized drainage ditches, channels, culverts, stormwater retention ponds, and/or stormwater infiltration facilities. The plan shall require that all new or modified facilities are designed so as to ensure no net increase in stormwater discharge rates, flow velocities, or sediment transport would result from Project implementation, and that discharges from these facilities are designed so as to avoid concentrating of flow and subsequent downstream scouring or sedimentation. Proposed roadways shall be designed so as to ensure that potential for slope failure and erosion is minimized. The Drainage Management Plan shall be incorporated into all design drawings and specifications as appropriate.	
Impact 4.10-4: The Project could create or contribute additional runoff water, which could exceed the capacity of drainage systems, and could create additional sources of polluted runoff.	Less than Significant with Mitigation	**Mitigation Measure 4.10-4:** Implement Mitigation Measures 4.10-3a and 4.10-3b.	Less than Significant
Impact 4.10-5: The Project could place structures in a 100-year flood hazard area, which could impede or redirect flood flows.	Less than Significant with Mitigation	**Mitigation Measure 4.10-5:** The Applicant shall ensure that the proposed stream crossings are designed so as to not substantially interfere with flood flows within the Project area. Specifically, the Applicant shall ensure that all stream crossings are sized to allow a 100-year flood to pass without backing up or ponding of water upstream of the crossing. For areas where 100-year flood flows have not been evaluated by FEMA, the Applicant shall complete a study that quantifies the 100-year flood flows along the stream reach where the crossing would be installed, and design the crossings as indicated previously. This study, where necessary, shall be incorporated into the Drainage Management Plan (see Mitigation Measure 4.10-3b).	Less than Significant

TABLE 2-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE TRES VAQUEROS WINDFARM REPOWERING PROJECT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Land Use and Planning			
Impact 4.11-1: The Project could conflict with an applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect.	Less than Significant	None required.	
Mineral Resources			
Because implementation of the Project would cause no impact on mineral resources, there are no impacts and no mitigation measures to be analyzed in this section.			
Noise			
Impact 4.13-1: Operation of the Project would increase local ambient noise levels.	Less than Significant	None required.	
Impact 4.13-2: Project construction and decommissioning activities would temporarily increase local ambient noise levels.	Less than Significant with Mitigation	**Mitigation Measure 4.13-2a:** The Applicant shall provide at least 30 days advance notice to the East Bay Regional Park District of all construction and decommissioning activities that would occur within 1,000 feet of either the Vasco Caves caretaker residence or the Vasco Caves guided tour route in order to limit disturbance to any persons that may be staying at the caretaker residence or participating in the guided tour. The notice shall include the construction time-of-day restrictions, the anticipated date of commencement, and the anticipated duration of construction activities that would occur within 1,000 feet of the residence or guided tour route. The Applicant shall simultaneously transmit a copy of the notice to the County Zoning Administrator. **Mitigation Measure 4.13-2b:** The Applicant construction contractor(s) shall schedule all nighttime deliveries to ensure a free flow of truck traffic. Trucks making nighttime deliveries shall proceed directly into the Project area without stopping, idling, or queuing on any portion of on-site access roads within 4,000 feet of the Vasco Caves caretaker residence. Use of compression release engine brakes (also known as “Jake brakes”) shall be prohibited within 4,000 feet of the Vasco Caves caretaker residence. In addition, all on-site nighttime delivery routes shall be planned in a fashion that would eliminates the need for delivery trucks to drive in reverse thereby eliminating after hours back-up alarm soundings. For example, the nighttime delivery drop-off staging area shall include an access road loop and all drivers shall be instructed to use the loop as opposed to driving in reverse at the staging area. **Mitigation Measure 4.13-2c:** The Applicant shall install a noise shield that would block the line of sight between the water extraction pump at Camino Diablo Road and the nearest residences, all water extraction activities shall be limited to approved daytime hours, and water tanker trucks shall not idle at the water extraction and delivery sites.	Less than Significant

TABLE 2-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE TRES VAQUEROS WINDFARM REPOWERING PROJECT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Noise (cont.)			
Impact 4.13-3: Construction, operation, and decommissioning of the Project would expose workers to aircraft overflight noise.	Less than Significant	None required.	
Population and Housing			
Because implementation of the Project would cause no impact on population or housing, there are no impacts and no mitigation measures to be analyzed in this section.			
Public Services			
Because implementation of the Project would result in no impacts related to public services, there are no impacts and no mitigation measures to be analyzed in this section.			
Recreation			
Because implementation of the Project would result in no impact on recreation, there are no impacts or mitigation measures to be analyzed in this section.			
Transportation/Traffic			
Impact 4.17-1: Project construction activities would intermittently and temporarily increase traffic congestion on area roadways due to vehicle trips generated by construction workers and construction vehicles.	Less than Significant with Mitigation	**Mitigation Measure 4.17-1:** Prior to the start of construction-related activities, the Applicant shall prepare and implement a Traffic Management and Safety Plan that will reduce or eliminate impacts associated with the Project. The plan shall adhere to Contra Costa County and Caltrans requirements, and must be submitted for the review and approval of the Contra Costa County Public Works Department prior to implementation. In preparing this plan, the Applicant shall take into account the cumulative traffic impacts of the overlapping construction schedules of the Contra Costa County's Vasco Road Safety Improvements Project, the Vasco Winds Repowering Project, and any other projects in the area that could combine with the Project to create cumulative traffic impacts. The traffic management plan shall include, at a minimum, the following elements: ***Part A - Scheduling and Delivery Requirements.*** To the maximum extent feasible, schedule Project-related construction truck trips on Vasco Road, State Route 4, and State Route 4 Bypass outside the peak morning and evening commute hours. Restrict slow-	Less than Significant

TABLE 2-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE TRES VAQUEROS WINDFARM REPOWERING PROJECT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Transportation/Traffic (cont.)			
Impact 4.17-1 (cont.)		moving trucks to nighttime deliveries if required by the Contra Costa County Public Works Department or other agency, such as Caltrans, the California Highway Patrol, the State Route 4 Bypass Authority or the Alameda County Public Works Department, that has jurisdiction over a portion of the haul route. Implement road closures during delivery of oversized loads as directed by any agency with jurisdiction over the haul route. ***Part B - Permits.*** Comply with transportation permit requirements of the Contra Costa County Public Works Department, Caltrans, the California Highway Patrol, the State Route 4 Bypass Authority, and the Alameda County Public Works Department for Project-related construction truck trips carrying oversized loads. Implement a road closure in Contra Costa County by submitting a road closure approval request to the Contra Costa County Public Works Department at least two months prior to the planned closure. Contact the other agencies listed above regarding authorization for road closures within their jurisdictions and submit copies of road closure requests within those jurisdictions to the Contra Costa County Public Works Department. ***Part C - Coordination with County Projects.*** Coordinate Project-related construction activities with activities related to Contra Costa County projects on Vasco Road. Contra Costa County projects, such as the Vasco Road Safety Improvements Project, shall have priority access at all times, and the delivery of oversized equipment and other heavy equipment shall be scheduled around Contra Costa County projects, which might limit the delivery hours. ***Part D - Emergency Services Notification.*** Provide a minimum of five days advance notification to local police, fire, and emergency service providers of the timing, location, and duration of construction activities that could affect the movement of emergency vehicles on area roadways. The names and 24-hour contact numbers of the Project superintendent and foreman shall be included as part of the advance notification. The County Public Works Department's resident engineer(s) for Vasco Road projects shall also be provided with the advance notification. ***Part E - Signage.*** Place signs along appropriate roads throughout the duration of the construction period to notify drivers of the presence of construction traffic. At a minimum, signs shall be placed along Vasco Road, SR 4, SR 4 Bypass, and Camino Diablo.	
Impact 4.17-2: Project construction activities could substantially increase traffic hazards due to construction in or adjacent to roads or due to possible road wear.	Less than Significant with Mitigation	**Mitigation Measure 4.17-2a:** Where needed to maintain safe driving conditions, traffic control devices and procedures shall be installed/implemented as specified in Caltrans' *California Manual on Uniform Traffic Control Devices, Part 6: Temporary Traffic Control*. The Applicant shall submit a plan for temporary traffic control to the Contra Costa County Public Works Department for review and approval prior to implementation. This plan may be part of the Traffic Management and Safety Plan required by Mitigation Measure 4.17-1. If directed to do so by any agency that has jurisdiction over a right-of-way that would be impacted by the Project, the Applicant shall submit a temporary traffic control plan or its equivalent to that agency for review and approval.	Less than Significant

TABLE 2-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE TRES VAQUEROS WINDFARM REPOWERING PROJECT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Transportation/Traffic (cont.)			
Impact 4.17-2 (cont.)		**Mitigation Measure 4.17-2b:** The Applicant shall be responsible for repairing all damage to County roads resulting from construction activities. Prior to issuance of grading, building, or encroachment permits, the Applicant shall prepare a plan for mitigating construction-related damage to County roads. The plan shall be submitted for the review and approval of the Contra Costa County Public Works Department and shall include, at minimum, the following elements: ***Part A - Haul Routes*.** Indicate County roads to be used as haul routes. An exhibit shall be provided that shows haul routes and county lines. ***Part B - Road Survey and Monitoring*.** Perform pre- and post-construction surveys of the approved haul routes in order to document their condition before and after Project construction. Monitor roads during Project construction to identify any damage that requires immediate repair. ***Part C - Financial Security*.** Provide a security, such as a bond or other acceptable instrument, to ensure that funding is available to undertake any necessary road repairs. The Applicant shall calculate the amount of the required security and submit the calculation to the Contra Costa County Public Works department for review and approval. **Mitigation Measure 4.17-2c:** If any severe road damage results from construction activities, especially damage that would make the impacted road unsafe to the public, then the Applicant shall complete necessary repairs immediately, per the direction either the Contra Costa County or Alameda County Public Works Department depending on the agency having jurisdiction over the damaged road segment. Emergency road repairs shall be completed at the Applicant's expense. Any potentially hazardous road segment must be flagged until the road is repaired.	
Impact 4.17-3: Project construction activities would intermittently and temporarily interfere with response times for emergency service providers using area roadways.	Less than Significant with Mitigation	**Mitigation Measure 4.17-3a:** Comply with stipulations of Mitigation Measure 4.17-1 – Part A pertaining to the scheduling of Project-related construction truck trips on Vasco Road, State Route 4, and State Route 4 Bypass outside the peak morning and evening commute hours, and restricting delivery of oversized loads (and related road closure) to nighttime hours if directed by any agency with jurisdiction over the haul route. **Mitigation Measure 4.17-3b:** Comply with Mitigation Measure 4.17-1 – Part D to ensure that the East Bay Regional Park District, local police, fire, and emergency services providers receive adequate advance notice of road closures. **Mitigation Measure 4.17-3c:** To ensure access for emergency vehicles to the Project area (including Vasco Caves Regional Preserve), and through the Project area, shall be maintained open at all times.	Less than Significant

TABLE 2-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE TRES VAQUEROS WINDFARM REPOWERING PROJECT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Utilities and Service Systems			
Impact 4.18-1: The Project would require or result in the construction of new storm water drainage facilities, the construction of which could cause significant environmental effects.	Less than Significant	None required.	
Impact 4.18-2: Project construction would temporarily increase the flow of solid waste to area landfills.	Less than Significant	None required.	
Cumulative Impacts			
Impact 5-1: The Project would make a cumulatively considerable contribution to adverse effects on scenic vistas in the Project area.	Significant and Unavoidable	The combined impact of the Project and the Vasco Winds Repowering Project on aesthetics/visual resources would be significant and unavoidable. No additional mitigation is feasible.	Significant and Unavoidable
Impact 5-2: Construction associated with the Project would result in short-term emissions of criteria pollutants that would be cumulatively considerable.	Significant and Unavoidable	The Project-specific construction impact related to NOx emissions, when combined with NOx emissions of other projects would be significant and unavoidable. No additional mitigation is feasible.	Significant and Unavoidable
Impact 5-3: The Project would cause a cumulatively considerable contribution to a significant adverse cumulative impact on avian and bat species.	Significant and Unavoidable	No additional mitigation is feasible.	Significant and Unavoidable
Impact 5-4: Construction of the Project, when combined with construction of other projects, could contribute to short-term cumulative impacts to traffic and transportation (traffic congestion, traffic safety, and pavement wear-and-tear).	Less than Significant with Mitigation	**Mitigation Measure 5-4:** The Project-specific less-than-significant contribution to transportation and traffic impacts would not be cumulatively considerable.	Less than Significant

CHAPTER 3
Project Description

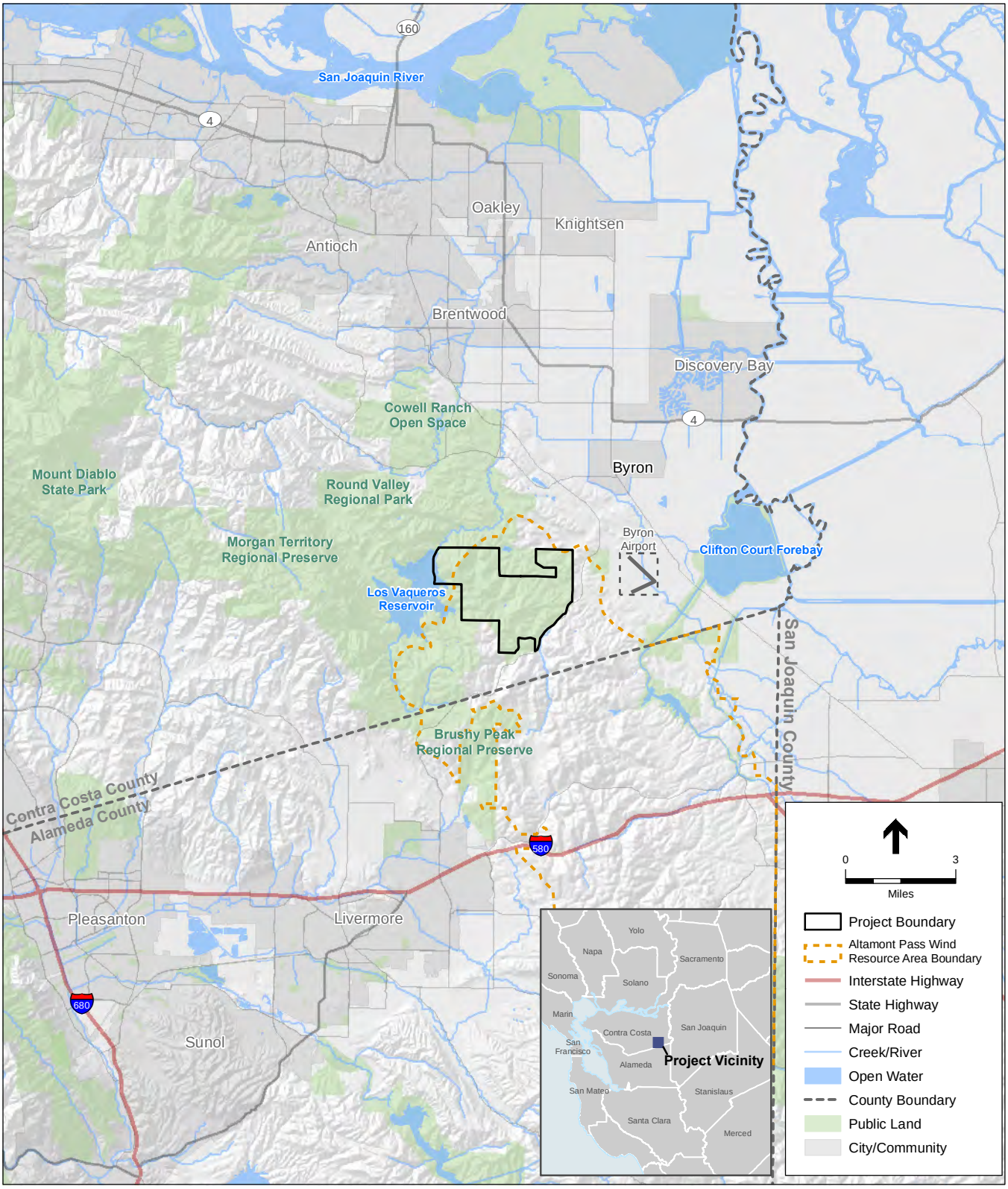
3.1 Project Overview and Location

3.1.1 Introduction

The Applicant proposes to decommission the existing Tres Vaqueros Wind Farm and then construct, operate, maintain and eventually decommission the Tres Vaqueros Windfarm Repowering Project in Contra Costa County, California. The existing wind farm is located east of Los Vaqueros Reservoir and west of Vasco Road in southeastern Contra Costa County (see Figure 3-1). The Project proposes to "repower" Tres Vaqueros by replacing all 91 existing turbines and civil/electrical infrastructure (except for the on-site substation) with up to 21 modern new wind turbines. The larger and more efficient new turbines would produce approximately 110,000 megawatt hours (MWh) per year or 38 percent more energy than the existing facility. The Project would consist of up to 21 multi-megawatt (MW) wind turbine generators (e.g., Gamesa G90 2.0 MW, Siemens 2.3 MW, or a comparable 3-blade upwind turbine with nameplate capacity of at least 2 MW) with an aggregate nominal nameplate generating capacity of up to 42 MW of electricity.

Originally constructed and placed in service in 1984/85, the existing Tres Vaqueros Windfarm includes 91 first generation Howden turbines, including 85 330-kilowatt (kW), 5 60-kW and 1 750-kW wind turbines totaling approximately 29.1 MW. The site also includes a maintenance facility/office, a substation[1] that connects the existing facility (and would connect the proposed Project) into a 230-kilovolt (kV) Pacific Gas & Electric (PG&E) transmission line running east of and Project area[2], related electrical infrastructure, and approximately 10 miles of turbine access and maintenance roads. All existing turbines were shut down in 2009 in anticipation of repowering. At the time of shut down, approximately 60 of the existing turbines were operational and the workforce included four full-time and, depending on the time of year, two part-time employees. The Applicant holds the lease for the wind farm through December 19, 2014, at which point it would have the option to extend the term for an additional 30 years.

1 The substation is called the Tres Vaqueros substation in this document.
2 A portion of the PG&E transmission line actually crosses the eastern portion of the Project area.



SOURCE: ESRI, 2010

Tres Vaqueros Windfarm Repowering Project . 209132

Figure 3-1

Project Vicinity Map

3.1.2 Location

The Project area is located in the Byron Hills of southeastern Contra Costa County. In conjunction with the Altamont Hills of northeastern Alameda County, the area is known as the Altamont Pass Wind Resource Area (APWRA).The APWRA covers approximately 50,000 acres in the Central California Coast Range and is one of the most significant resource areas for wind energy development in California. The APWRA is designated by the State and recognized by Contra Costa County as a Wind Resource Area because it maintains winds at a level that supports economically viable wind energy projects. The Tres Vaqueros Windfarm is located directly east of Los Vaqueros Reservoir, south of the city of Brentwood, and west of Byron Airport, with Vasco Road bordering the south and east sides.

Primary land uses in the vicinity of the Project area are wind power generation, agriculture, parks and recreation, and water supply reservoir watershed. The Contra Costa County General Plan land use designations for the Project area are Watershed (WS), Agricultural Land (AL), and Parks and Recreation (PR). The Project area is zoned for agricultural use, with wind power development as a potentially compatible use.

The wind turbines and related civil/electrical improvements for the Project are located on several contiguous parcels owned by the East Bay Regional Park District (EBRPD) and/or the Contra Costa Water District (CCWD). Table 3-1 indicates the Assessor's Parcel Number (APN), section number, parcel ownership, and ownership of the wind rights for each parcel involved in the Project. Figure 3-2a shows the land owners while Figure 3-2b shows the wind rights owner of the Project parcels.

EBRPD owns land in the southern and eastern portions of the Project area. At present, this property contains all 91 existing turbines. As shown in Figure 3-2c, the Project would include up to 12 turbines plus related civil and electrical infrastructure on EBRPD-owned parcels totaling approximately 1,215 acres. Of the total parcel size, the new turbines and related infrastructure improvements would occupy less than 20 acres.

CCWD owns land in the western and northern portions of the Project area. There are no existing Tres Vaqueros Windfarm turbines on CCWD property. As shown in Figure 3-2c, the Project would include up to 12 turbines on CCWD-owned parcels totaling approximately 1,449 acres. The new turbines and related infrastructure improvements would occupy up to approximately 20 acres.

Access to the Project area is permitted for windfarm purposes under existing agreements (easements and wind leases) with the land owners. The Applicant is either in the process of obtaining or has already obtained long-term agreements with these land owners to develop the Project.

For the purposes of this CEQA analysis, based on the land ownership of the area both currently used by the Applicant for its existing wind turbines (see Figure 3-2a) and that proposed for use with the Project (see Figure 3-2c), the definition of the Project boundary is considered to be the outside edge of any APN that includes some physical change as a result of the Project. These

TABLE 3-1
PARCEL NUMBERS AND OWNERSHIP

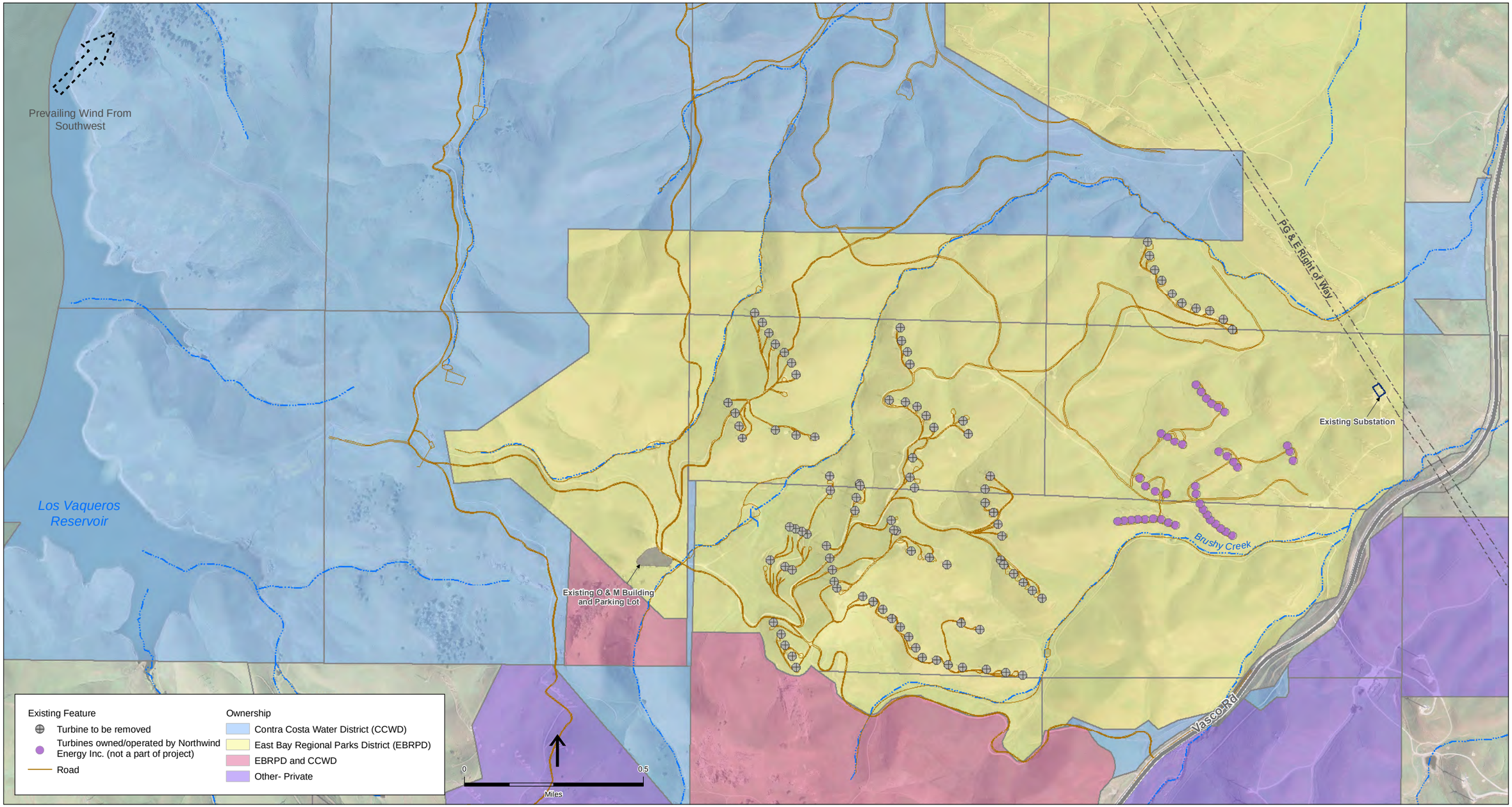
Assessor's Parcel Number	Section Number	Parcel Owner	Wind Rights Owner
005-100-004	24	CCWD	Vaquero Farms Conservation, LLC and Vaquero Farms, Inc.
005-100-005	24	EBRPD	Vaquero Farms Conservation, LLC and Vaquero Farms, Inc.
005-090-006	25	EBRPD	Vaquero Farms Conservation, LLC and Vaquero Farms, Inc.
005-090-008	25	CCWD	Vaquero Farms Conservation, LLC and Vaquero Farms, Inc.
005-090-007	25	EBRPD & CCWD	Vaquero Farms Conservation, LLC and Vaquero Farms, Inc.
005-150-002	19	CCWD	Vaquero Farms Conservation, LLC and Vaquero Farms, Inc.
005-150-004	19	EBRPD	Vaquero Farms Conservation, LLC and Vaquero Farms, Inc.
005-160-001	30	EBRPD	Vaquero Farms Conservation, LLC and Vaquero Farms, Inc.
005-160-005	30	EBRPD	EBRPD
005-170-006	31/32	EBRPD & CCWD	Vaquero Farms Conservation, LLC
005-170-007	31	EBRPD	Not Applicable
005-170-008	32	EBRPD	Not Applicable
005-170-011	32	CCWD	Not Applicable
005-140-003	20	EBRPD	Vaquero Farms Conservation, LLC and Vaquero Farms, Inc.
005-160-004	29	EBRPD	Vaquero Farms Conservation, LLC and Vaquero Farms, Inc.

SOURCE: Pattern Energy, 2009, 2010

changes would include removal of the existing turbines and restoration activities, as well as new construction/installation/operation of the repowered windfarm. This definition of the Project boundary, referred to as the *Project area* in this document, is shown on Figure 3-2d. The figure also shows how this boundary will change as a result of decommissioning the existing wind turbines. However, unless noted in this document, the term "Project area" is defined to mean the Project boundary shown on Figure 3-2d.

3.2 Project Objectives

The California Renewables Portfolio Standard legislation enacted in 2002 (Senate Bill 1078) and accelerated in 2005 requires retail sellers of electricity to obtain 20 percent of their supply of electricity from renewable energy sources, such as wind, by 2010. The Governor of California has also set a statewide goal of achieving a 33 percent renewable energy share by 2020. Recently, on April 12, 2011 Governor Brown, signed SBX1-2 which essentially puts S-14-08 in to the state

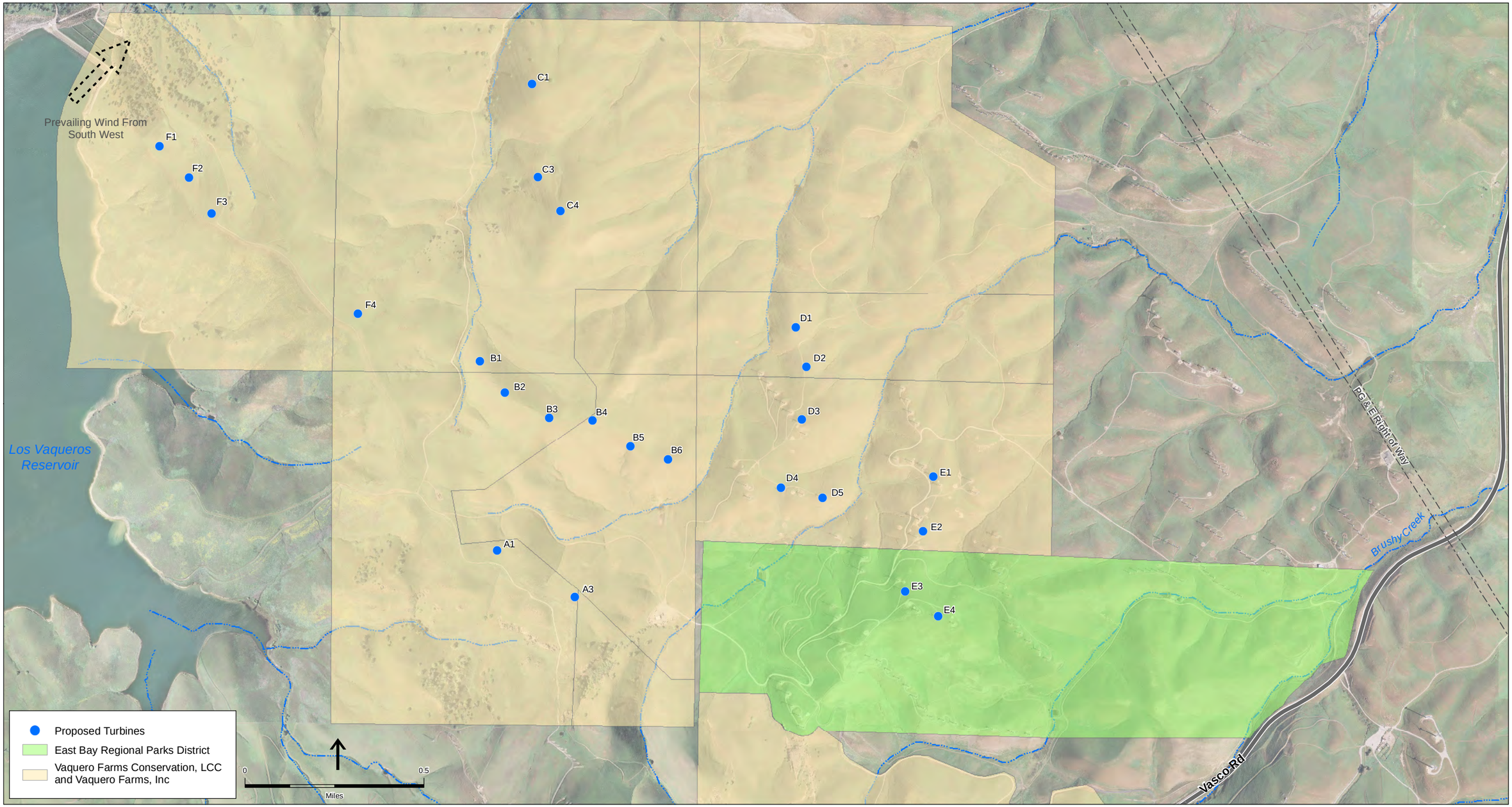


SOURCE: PERMCO, 2009; County of Contra Costa, 2009

Tres Vaqueros Windfarm Repowering Project . 209132.02

Figure 3-2a

Property Ownership with Existing Facilities



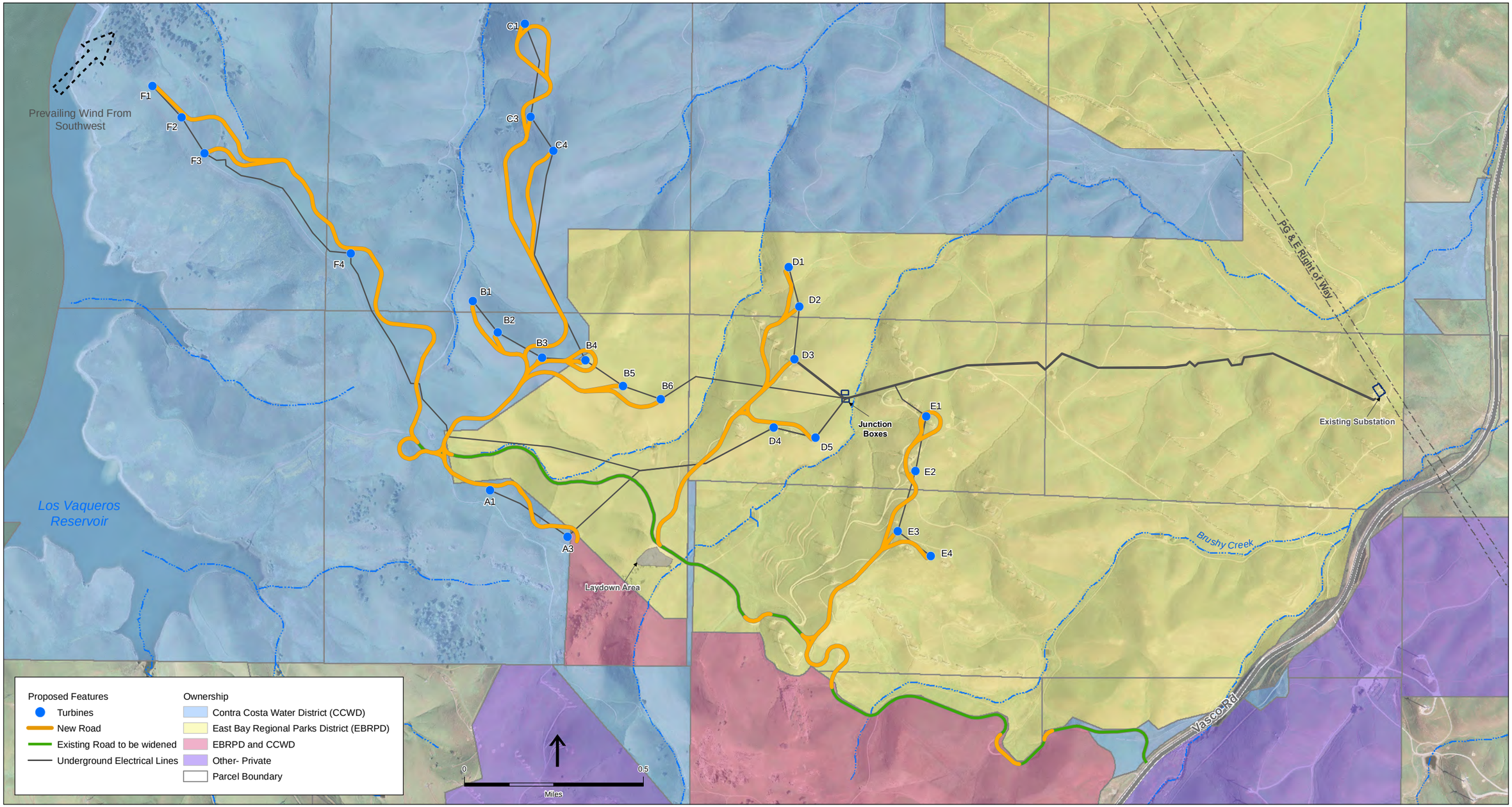
SOURCE: PERMCO, 2010; County of Contra Costa, 2009

Notes: 1. Locations are approximate.
2. While 24 turbine site locations are shown, only 21 turbines will be installed

Tres Vaqueros Windfarm Repowering Project . 209132.02

Figure 3-2b

Ownership of Wind Rights with the Repowered Project



SOURCE: PERMCO, 2009; County of Contra Costa, 2009

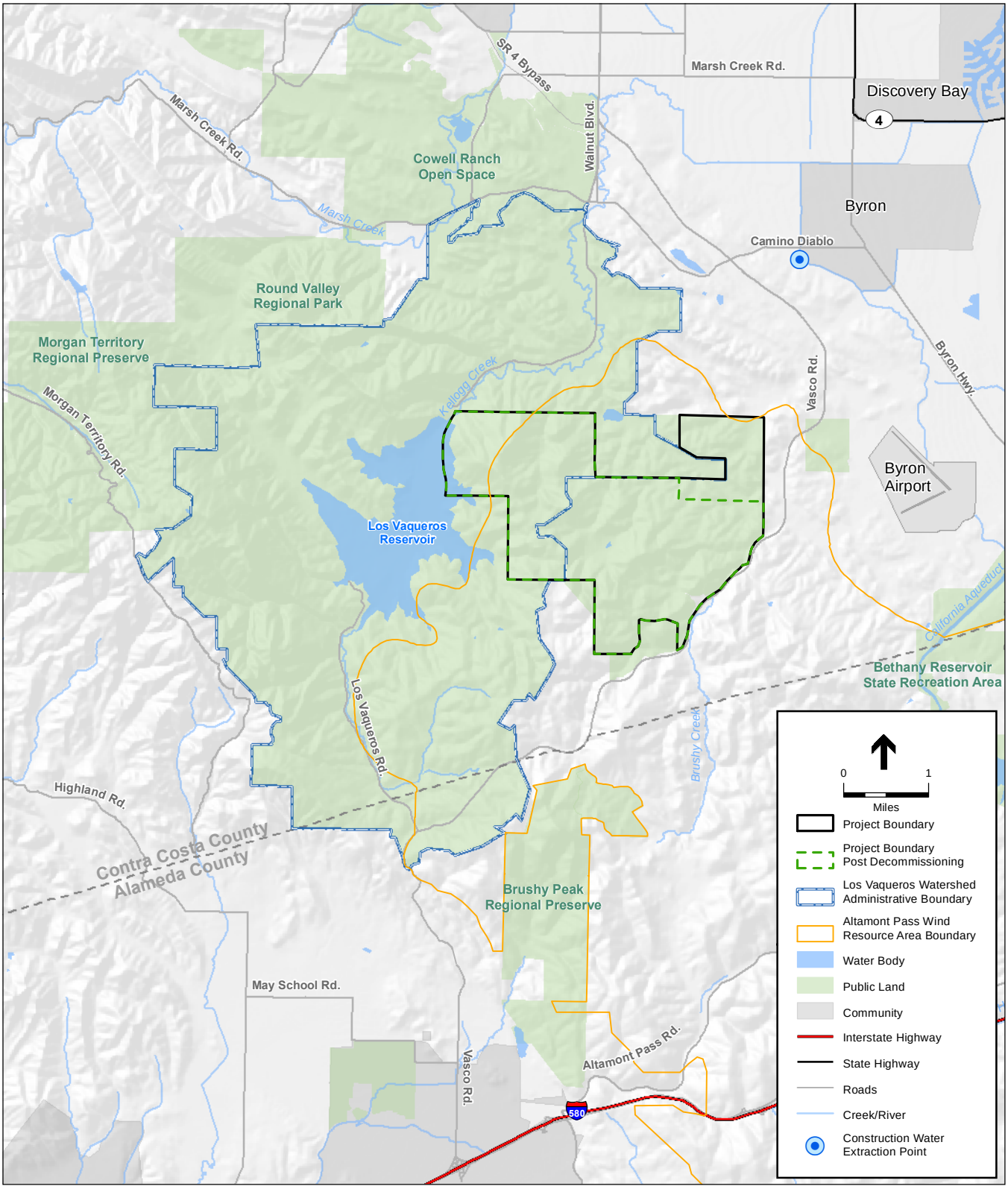
Notes: 1. Locations are approximate.
2. While 24 turbine site locations are shown, only 21 turbines will be installed

Tres Vaqueros Windfarm Repowering Project . 209132.02

Figure 3-2c

Property Ownership with the Repowered Project

THIS PAGE INTENTIONALLY LEFT BLANK



SOURCES: EBRPD, 2010

Tres Vaqueros Windfarm Repowering Project . 209132.02

Figure 3-2d
Project Area

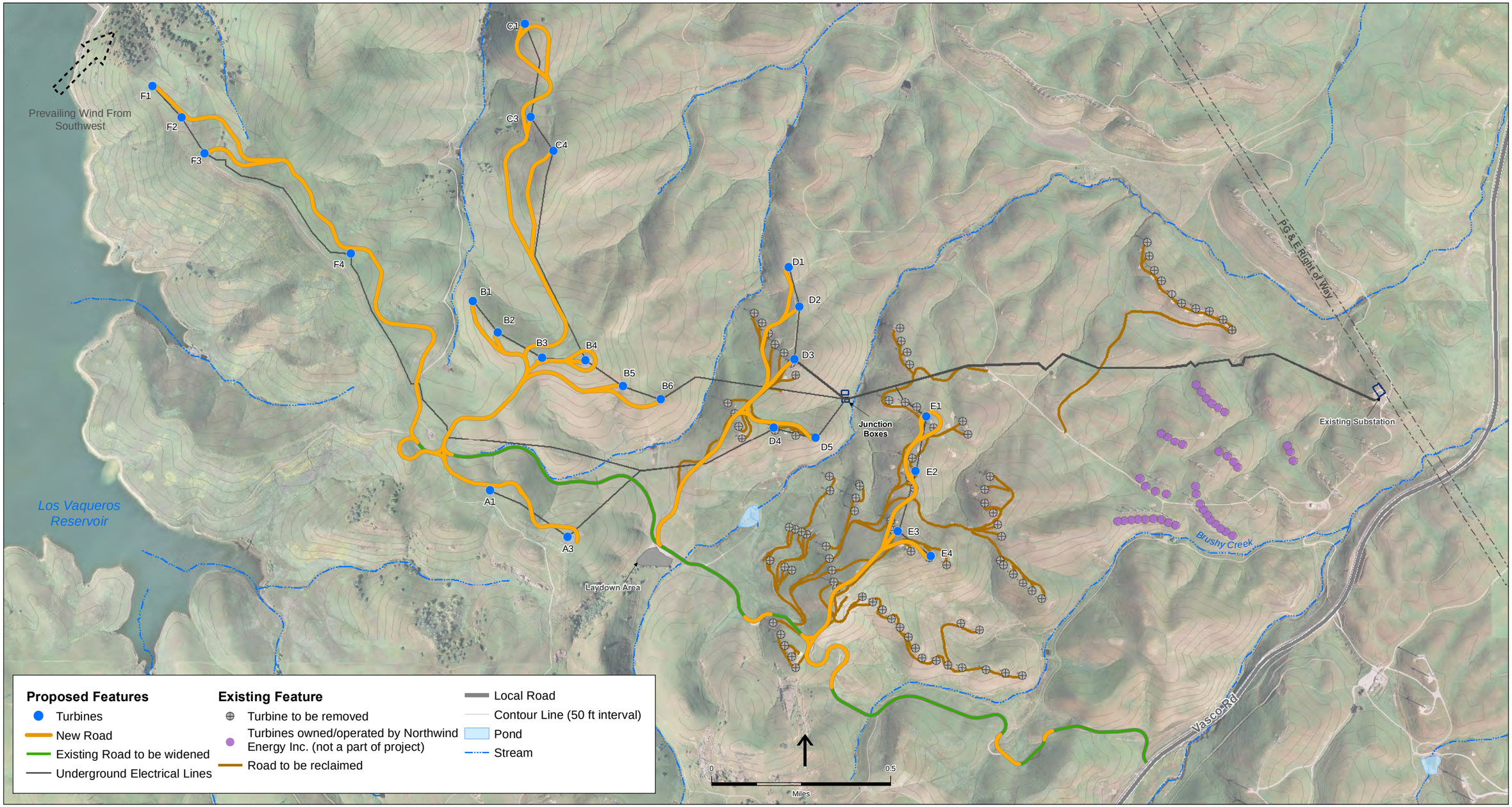
code and established the 33 percent renewable portfolio as the state target by December 31, 2020. Consequently, the Applicant's primary objective for the Project is to provide an economically viable source of clean, renewable electricity generation that meets California's growing demand for power and fulfills numerous state and national renewable energy policies. The Applicant's additional objectives for the Project are as follows:

- Achieve increased performance, lower cost, higher reliability, and longer service life that will produce up to 42 MW of electricity in an area with proven wind resources.
- Develop an economically viable wind energy project that will support commercially available financing.
- Maximize renewable energy production and economic viability by replacing aging wind turbines with newer and more efficient turbines in the APWRA.
- Minimize avian and bat impacts, to the maximum extent feasible.
- Support Renewable Energy Portfolio requirements by contributing to its portfolio of wind-generated power, which is no longer subject to curtailment restrictions.
- Contribute positively to economic activity during construction and operation.
- Increase local short-term and long-term employment opportunities for communities within 90 miles of the Project (which is an acceptable commuting distance for construction and skilled labor resources).
- 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.
- Produce electricity without the need for large amounts of water.[3]

3.3 Project Components

The Project would consist of up to 21 wind turbines with an anticipated total generating capacity of approximately 42 MW. The approximate locations of these turbines are shown in Figure 3-3.The final turbine locations would be determined by various siting criteria, such as optimal wind speed, geotechnical conditions, and environmental considerations such as the presence of sensitive biological or cultural resources. All final turbine locations would be within the environmental study corridors established for the Project. As evidence of this, 24 potential turbine locations are indicated on Figure 3-3, while the Project described here considers installation of only 21 turbines. This document analyzes these 24 turbine locations and their potential environmental effects while still considering installation of up to 21 turbines. For information on this document's methodology for analyzing impacts when exact final locations are unknown, see

[3] Conventional power plants consume more water than wind energy. Wind energy uses approximately 1/600 as much water per unit of electricity produced compared with nuclear and approximately 1/500 as much as coal (AWEA, 2009).



SOURCE: PERMCO, 2010

Notes: 1. Locations are approximate.
2. While 24 turbine site locations are shown, only 21 turbines will be installed

Tres Vaqueros Windfarm Repowering Project . 209132

Figure 3-3

Project Overview Map- Site Plan

THIS PAGE INTENTIONALLY LEFT BLANK

Section 4.0, *Approach to the Analysis of Impacts*. Table 3-2 provides a range of basic specifications for the Project turbines. See Appendix B for the turbine and tower specifications for Gamesa G90 2.0 MW and Siemens 2.3 MW capacity turbines.

TABLE 3-2
SUMMARY OF TURBINE SPECIFICATIONS

Specifications:	GamesaG90 2.0 MW, Siemens 2.3 MW or comparable wind turbine
Hub Height:	213 - 263 feet (65-80 meters)
Rotor Diameter:	Up to 332 feet (101 meters)
Total Height:	Up to 429 feet (130.5 meters)
Swept Area:	Up to 86,239square feet (8,012square meters)
Tip Ground Clearance:	At least 72 feet (22 meters)
Blades:	3

SOURCE: Pattern Energy, 2010

In addition to turbines, the Project includes the following:

- Approximately 42,885 feet (8.1 miles) of newly constructed access roads, turbine string roads and turn-around areas, as well as 11,815 feet (2.2 miles) of existing roads requiring improvement;
- A site supervisory control and data acquisition system (SCADA);
- A 22-kV power collection system of collector cables linking turbines to each other and to the Tres Vaqueros substation.
- Use of an existing overhead 230-kV transmission line to transmit power from the Tres Vaqueros substation to the PG&E regional transmission system; and
- A new operations and maintenance (O&M) building, constructed on the site of the existing O&M building, to be used for continuing support of the Project.

3.3.1 Wind Turbines

Current wind turbine design consists of three main physical components that are assembled and erected on-site: the tower, nacelle, and rotor. The general specifications of the proposed turbines are given in Table 3-2. Although selection of the actual manufacture of the wind turbines proposed for the Project has not been finalized, the turbines considered typical for the Project would have a maximum hub height of 262 feet (80 meters), a maximum rotor diameter of 331 feet (101 meters), and a maximum height of 429 feet (130.5 meters) with the blade tip in the 12 o'clock position. The turbine would operate automatically in all wind conditions; it would self-start when the wind reaches approximately 8.95 miles/hr (3-4 meters/sec) and would cut out at an average wind speed of 55.9 miles/hr (25 meters/sec). Associated with the turbines are foundations, transformers, safety lighting, and lightning protection.

Turbine Pad

The pad for each turbine would encompass an approximately 114-foot diameter circle (10,351 square feet) surrounding the turbine.

Tower

The tower would be free-standing, painted steel, conical-type (tubular) structure manufactured in multiple sections. Towers would be delivered to the site and erected in two or three sections each. Each tower would have an access door located at its base and an internal ladder that would run up the tower to provide access to the nacelle. The tower would be equipped with interior lighting.

Nacelle

The gearbox (which includes a fail-safe mechanical disc brake), generator, and various control equipment would be enclosed within the nacelle, which is the housing atop the tower that protects the turbine mechanics and electronics from environmental exposure. A yaw system would be mounted between the nacelle and the top of the tower. The yaw system would be composed of a bearing surface for directional rotation of the turbine and a drive system consisting of a drive motor(s) to keep the turbine pointed into the wind to maximize energy capture. A wind vane and anemometer would be mounted at the rear of the nacelle to provide the controller with wind speed and direction information.

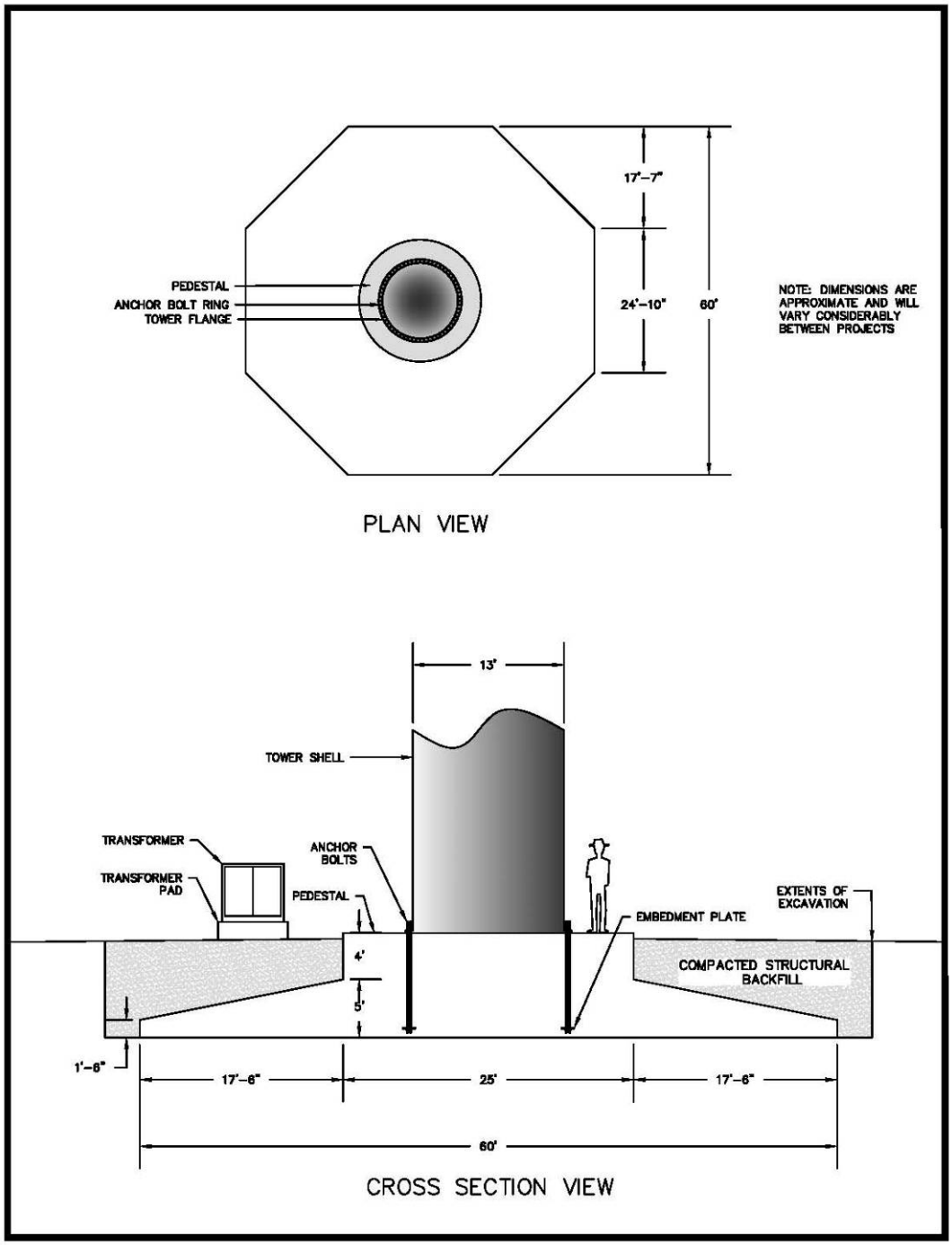
Rotor

All of the wind turbines being considered for the Project are powered by three composite (i.e., glass-reinforced polyester) or fiberglass blades connected to a central rotor hub. The blades would be up to 160.8 feet (49 meters) long and would have a tip-to-ground clearance of at least 72 feet (22 meters).Wind turbines operate when wind creates lift on the blades, causing the rotor hub to spin. This rotation is transferred to the gearbox where the speed of rotation is increased to the speed required for the attached electric generator. Rotors typically turn at a rate of 9.0-19.0 revolutions per minute[4].The blade tip and other mechanical components are designed to minimize noise emissions. The turbine would also include a noise control system, which could be designed to reduce noise emissions depending on data, time, or wind direction for compliance with local noise regulations.

Foundation

A canister or inverted “T” foundation would be used, as illustrated in Figure 3-4. Foundations would be formed by pouring concrete in an excavated footing containing reinforcing steel. Each foundation would require approximately 6,900 square feet of temporary land disturbance. Concrete would be obtained from a local supplier, mostly likely from the nearby community of Byron.

[4] The revolutions for the Gamesa G90 turbine are 14.5 per minute. This translates to a rotor tip speed of 153 miles per hour (68.3 meters per second). Other turbines in this class would have similar performance.



Tres Vaqueros Windfarm Repowering Project▪209132

Figure 3-4
Schematic Illustration of an Inverted T Foundation
(dimensions are approximate)

Transformers

The turbines generate electricity at 690 volts. Each turbine would have a transformer located at its base that would step-up (increase) the voltage to the 22-kV level of the power collection system described below.

Safety Lighting

The proposed turbines would be more than 200 feet high and, per FAA regulations, would require aviation safety lighting. Through its Notice of Proposed Construction or Alteration (Notice), the FAA would review the Project prior to construction (14 Code of Federal Regulations [CFR] Part 77). The FAA has already provided the Applicant with a Determination of No Presumed Hazard for a turbine height that corresponds to the Gamesa G90 turbine. If the Applicant elects to pursue a taller turbine, it would file an updated Notice corresponding to the taller turbine.

The FAA's recommendations on marking and lighting of structures vary depending on terrain, local weather patterns, geographic location, and in the case of windfarms, the cumulative number of towers and overall site layout. The turbine lighting would likely be L-864 Red Flashing/Strobe Lights with peak 2000 candelas, minimum 750 candelas, and a 3° vertical beam spread to conform to FAA Advisory Circular 70/7460-1K, Change 2.Depending on turbine string length, every third or fourth turbine (including end row turbines) would be lighted.

The minimum number of required lights would be used in order to minimize attractants for birds during night migrations. It is expected that approximately 11 turbines would be lighted.

Lightning Protection

Each wind turbine would be equipped with a lightning protection system connected to an underground grounding arrangement to help ensure that lightning would flow safely to the ground.

3.3.2 Power Collection, Interconnection, and Transmission

Figure 3-3 indicates the proposed locations of the power collection, interconnection, and transmission system components described below.

Collection Lines

The power collection system would consist of medium-voltage, high-density, insulated underground collection cables that would connect each turbine to the substation. These collection cables would be buried in trenches that generally follow the roadbed of the turbine access roads. The cable trenches would sometimes be located in other areas to minimize their length.

Junction Boxes

All of the underground power collection cables would be routed from the turbines to two junction boxes, each measuring approximately 3 feet by 4 feet, to be located generally in the center of the Project area.

Home Runs

The electrical circuits that would run from the two junction boxes to the substation, termed “home runs,” would be located in two 8,000-foot long parallel trenches, each approximately 20 feet wide.

Substation

The existing on-site substation would be upgraded as part of the Project. The main function of the substation is to step-up the voltage from the 22-kV collection lines to the 230-kV transmission level and to provide fault protection. The existing substation generally consist of a control house, a bank of main transformers, outdoor breakers, capacitor banks, relaying equipment, high-voltage bus work, steel support structures, an underground grounding grid, and overhead lightning suppression conductors. The substation is currently fenced with an 8-foot-high chain-link fence to prevent public and wildlife access to high-voltage equipment.

Electrical upgrades would be constructed in an approximately 5,000 square foot area adjacent to either the north or south side of the existing substation. This area would be graded and the existing fence would be extended to enclose the new substation equipment which would include medium-voltage circuit breakers, a generation step-up transformer, a disconnect switch, bus work, capacitors, various controls and metering, and a nominal 250 square foot control house. The circuit breakers would be 22 kV and 230 kV and would both use sulfur hexafluoride (SF_6), which is a greenhouse gas.

Transmission Interconnect Lines

The substation would connect the Project to the existing regional transmission grid via the existing aboveground transmission interconnect line.

Safety Signage

Safety signs would be posted around towers, transformers, and other high-voltage facilities, and along roads, in conformance with applicable State and federal regulations

3.3.3 Related Infrastructure

In addition to the wind turbines and related electrical system, other infrastructure required for the Project would include access roads, a communications system, an O&M building, and existing meteorological towers. While no new water or wastewater systems would be developed, a new septic system would be required for the O&M building.

Access Roads

To the greatest extent possible, the Project would use the existing access road network. Any required new roads would be located to minimize disturbance and avoid sensitive resources, while maximizing transportation efficiency. The proposed turbines have specific equipment transport and crane requirements that dictate road width and turning radii. To allow safe passage of the large transport equipment used in construction, all-weather gravel roads would be built

with adequate drainage and compaction to handle maximum expected loads, both for load weight and for maneuverability.

Permanent roads would be approximately 16 feet wide. All construction roads would be 32 feet wide, which includes up to 4 feet of temporary shoulder (2 feet on each side of the road) to allow for the mobilization of heavy equipment and turbine equipment transport trucks, as well as to provide enough room for trucks and equipment to pass areas where turbines would be erected.

It would be necessary to improve existing on-site access roads (grade and/or widen) during construction to accommodate construction equipment and equipment transport trucks. The Applicant would restore access roads after construction where improvements to existing public roads are necessary, as agreed with the County. It may also be necessary to repair, repave, or reconstruct existing County roads (such as Vasco Road) damaged by Project construction. The Applicant would promptly repair any Project-related damage to existing County roads after construction to standards specified by the County Public Works Department, and agreed upon before construction begins.

Each of the access road entrances would be wider than the road width to provide sufficient space for the 150-foot minimum turning radius of vehicles transporting turbine equipment to the site. Improved roads or new roads would be constructed with minimal cuts and fills. Maximum road grade on all access roads used during construction, operations and maintenance would be 14 percent.

Roads would be rough graded, consist of approximately six inches of gravel over compacted native material and generally constructed at-grade. Approximately 37,000 tons of gravel would be obtained off-site from local crushed rock gravel pits and most likely purchased at CEMEX in Byron**.** Gravel would be used only where needed to supplement the existing base or to blend the road into the surroundings. Culverts may be installed if washes cannot be crossed at grade and damage to the road would occur. After construction, roads necessary to remain for O&M would be graded where low spots and ruts had occurred and culverts would be left in place. Table 3-3 summarizes access road requirements.

Communications/SCADA System

Each wind turbine would contain electronic devices that would constantly monitor turbine performance. A Supervisory Control and Data Acquisition (SCADA) system would be installed to collect operating and performance data from each turbine and the Project as a whole and to provide remote operation of the wind turbines. The SCADA system would be operated and housed in the new O&M building and connected to the turbines via an underground fiber optic communications system buried in the same trenches as the medium-voltage electrical system. The SCADA software would consist of applications developed by the turbine manufacturer or a third-party SCADA vendor.

TABLE 3-3
ACCESS ROAD REQUIREMENTS

	Length			Construction/Operation		Max grade
Associated with	**Feet**	**Miles**	**Type**	**Road Width (feet)**	**Acres[a]**	**Percent**
A-row turbines	2,772	0.5	New	32/16	2.0	14
B-row turbines	9,066	1.7	New	32/16	6.6	14
C-row turbines	9,324	1.8	New	32/16	6.8	14
D-row turbines	7,265	1.4	New	32/16	5.3	14
E-row turbines	6,599	1.2	New	32/16	4.8	14
F-row turbines	9,237	1.7	New	32/16	6.8	14
A portion of the Entrance Road	12,526	2.4	Improved	20 to 32	9.2	N/A
A portion of the Entrance Road	3,947	0.7	New	32/16	2.9	N/A
Total	60,736	11.5	N/A		44.4	N/A

[a] Acreage based on maximum potential disturbed area (i.e., 32 foot road width).

SOURCE: Pattern Energy, 2010

Operations & Maintenance Facility

As noted earlier, an O&M building is currently located on-site. As part of the Project a new O&M building would be constructed in the footprint of the existing O&M building, requiring demolition of the existing O&M building. The new O&M building would be approximately the same size as the existing O&M building, about 5,000 square feet. The new O&M building would have several offices, a small crew room, a SCADA room, a restroom that would be connected to a new septic system, and an open-bay storage and maintenance area. An existing well would continue to supply non-potable water while drinking water would be bottled.

Meteorological Towers

The Project would use the existing meteorological tower network already on-site. No new meteorological towers would be installed and there would be no modifications to existing towers.

3.4 Project Implementation

3.4.1 Decommissioning of Existing Turbines

Decommissioning would generally be conducted in a two-step process. The first step, which would not involve soil disturbance, would consist of removal of the existing 91 turbines and associated equipment from concrete pads or footings to be hauled away to a local metal recycler. No specialized equipment would be needed to remove the existing turbines other than standard flatbed trucks and cranes. Approximately six haul trucks would be required per decommissioned turbine.

Step one of decommissioning is anticipated to take approximately four to five months depending on the start time and weather conditions.

The second step, which would be conducted during the construction period of the new turbines, would consist of removal of or burying below-ground infrastructure to a depth of at least three feet below grade per County ordinance, and reclamation of the existing turbine sites and roads not needed for use or service with the Project. More detailed information is provided below in Section 3.4.2, *Construction*.

3.4.2 Construction

A general description of the planned construction steps for the major components of the Project, including the general activities and design approaches as currently understood and anticipated is included below. It is anticipated that construction would occur in one continuous sequence as shown on Table 3-7, with the exception of limited new construction during the winter months due to California red-legged frog and tiger salamander winter breeding restrictions. Typical construction would involve the following activities, which are described further in the following sections:

- Demarcation of sensitive resources;
- Preparation of staging/equipment laydown areas;
- Road grading and installation;
- Turbine foundation construction;
- Turbine installation;
- Power collection system and communication lines installation;
- Substation construction;
- Final road construction; and
- Cleanup and restoration, including reclamation of existing turbines pads, overhead power lines, roads, etc.

Demarcation of Sensitive Resources

Sensitive resources identified for avoidance through the environmental review and permitting process would be marked. Before construction began at any given site, an environmental monitor, the contractor, and any subcontractors that would be working within that area would conduct a pre-construction walk-through of areas to be affected, or potentially affected, to identify sensitive resources to be avoided, limits of clearing, the location of drainage features, and the layout for sedimentation and erosion control measures. When these features had been identified, specific construction measures would be reviewed, and any modifications to construction methods or locations would be agreed upon prior to construction beginning. Appropriate agency representatives would be consulted or included on these walk-throughs as required.

Preparation of Staging and Laydown Areas

Construction of the Project would require an approximately 3-acre temporary staging area to store materials and equipment (e.g., turbine components, construction equipment, and other supplies) and house construction trailers. The existing O&M building would be razed and that area along with the adjacent parking lot would be used as the staging area (as shown on Figure 3-3). The staging area would require surface grading and would incorporate stormwater runoff controls (see discussion of stormwater pollution and prevention, below).

Construction contractors would require on-site mobile trailers to provide for management of and communication to the workforce. The mobile trailers would also house a first aid station, emergency shelter, restrooms[5], and a hand-tool storage area. The construction trailer pad would be located adjacent to or near the existing O&M building. Vegetation would be cleared and the ground leveled over an area of about 200 by 500 feet[6]. The ground surface would be graveled to limit dust and mud in the area.

A laydown area would be required at each turbine pad for off-loading and storage of the tower sections, nacelle, rotor hub, and blades. Ideally, the laydown area would be 22,052 square feet, but environmental constraints could cause some laydown areas to be smaller. Each laydown area would include a crane pad (constructed adjacent to the turbine access road) to allow a large track-mounted crane to access the turbine foundations.

In level or near-level terrain, laydown areas would not have to be graded or cleared of vegetation. If the turbine pad areas (including the laydown area and crane pads) are not near-level they would be graded to one percent surface grade. The crane pad would be nearly flat to allow the crane to lift the large and extremely heavy turbine components safely. The crane pad would be constructed using standard cut-and-fill road construction procedures.

Some crushing of vegetation and soil compaction would be expected to occur. Following construction, the temporarily disturbed area would be recontoured and seeded.

Road Grading and Installation

The roads needed for temporary construction access would be graded as necessary for use. Gravel from local commercial sources would be used for road construction. Any material cut on-site would be used as fill on-site during the construction process.

Once all installation activities have been completed, roads would be inspected to determine if and where any additional grading or gravel would be necessary. Additionally, final road shaping would be completed to ensure proper water flow away from cut and fill slopes and into ditches and outlets. Erosion control devices would also be installed or completed. Disturbed areas adjoining the roads would be restored and the appropriate erosion control devices would be installed. Final road width would be 16 feet.

[5] Groundwater is currently available at the existing O&M building.
[6] This area is included in the approximately three acres of the laydown area.

The road alignment requires the following design features:

- The turbine string roads (32 feet wide during construction) and improved or newly constructed access roads (16 feet wide during operations and maintenance) would have gravel surfaces, with less than two percent crown or inslope with ditch and culverts as required on uphill side. The turbine string roads along the ridgelines would be 32 feet wide with 16 feet of temporary shoulder. Cut-and-fill slopes would be at a ratio of 2:1.
- Maximum grade would be 14 percent.
- Maximum allowable dip would be six inches in 50 feet. Maximum allowable bump would be six inches in 50 feet.
- On turns, the minimum inside radius would be 82 feet and outside radius would be 115 feet (so at the apex of a 180-degree turn, the road would be 32 feet wide). However for turbine blade trucks the minimum inside turning radius would be 145 feet.

While Figure 3-3 shows the proposed locations of the roads, the final locations of the roads and the cut-and-fill volumes would be based on grading, construction and environmental permitting requirements, topography, and sound engineering principles. Cross-sections of typical access roads are shown in Figure 3-5.

The Project would include approximately 8.1 miles of newly constructed access roads, turbine string roads and turn-around areas, as well as 2.2 miles of existing roads requiring improvement.

Water trucks would be used to minimize the quantity of airborne dust created by construction activities. Approximately 8,205,000 gallons of water would be obtained from the Byron Bethany Irrigation District for dust suppression on access roads and for site work including at the substation.

Turbine Foundation Construction

Once the roads were installed, the steel-reinforced concrete turbine foundations would be constructed. As part of the engineering design process, a geotechnical report would be prepared to identify the appropriate foundation design and a licensed engineer would prepare a special inspection report for each foundation pour. Pending completion of the geotechnical analysis, each foundation is expected to require an excavation approximately 8 to 10 feet deep and 60 feet in diameter. Approximately 210,000 gallons of water (i.e., 10,000 gallons per foundation) would be obtained from the Byron Bethany Irrigation District for construction of the turbine foundations.

Once the foundation is cured, it would be buried and backfilled with the excavated on-site material. The top of the foundation would rise approximately one foot above grade to provide an attachment point for the turbine tower. Gravel would be placed in a minimum five-foot radius around each tower foundation.

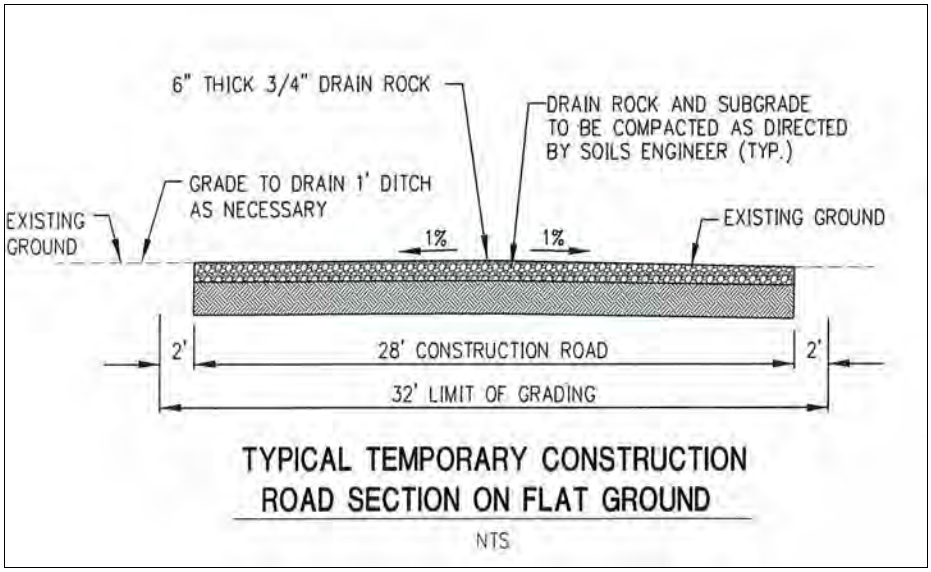


Figure 3-5a. Typical Cross-Section for Project Access Roads

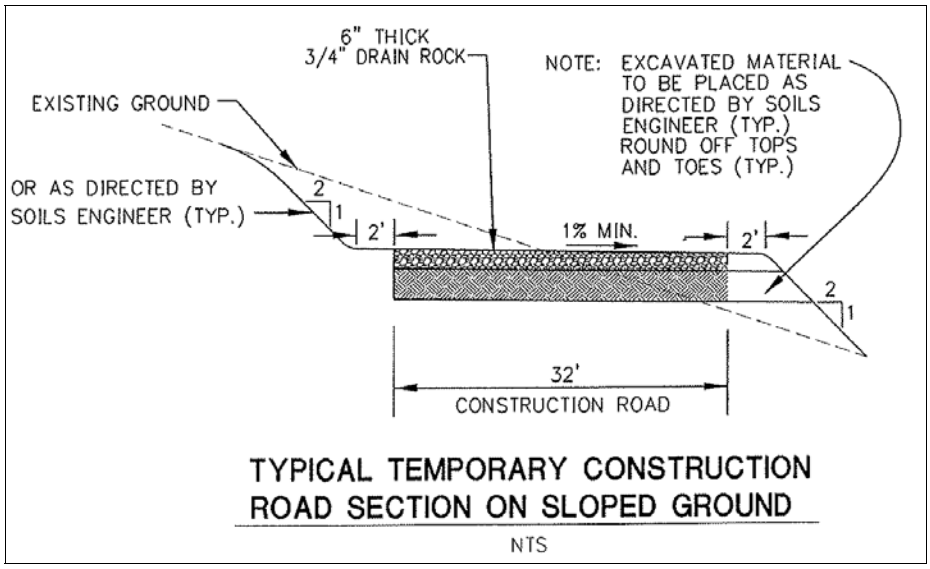


Figure 3-5b. Typical Cross-Section for Project Access Roads on Sloped Ground

Tres Vaqueros Windfarm Repowering Project▪209132

Figure 3-5

Cross-sections of Typical Access Road

Turbine Installation

A rectangular area approximately 40 feet by 120 would be developed at the base of each tower as a gravel crane pad, within the 146-foot by 146-foot laydown area discussed above. The turbine towers, nacelles, rotor hubs, and blades would be delivered to each foundation-site and unloaded by crane. Tower construction would require the use of one large track-mounted crane and one or two smaller wheeled cranes. The large crane would be used for turbine assembly, while the two smaller cranes would be used to off-load turbine components from trucks and assist in the precise alignment of tower sections.

The large crane would first raise the conical steel bottom section of the tower and lower it over the threaded foundation bolts, where it would be bolted to the foundation. Each remaining tower section would then be hoisted into place and bolted to the section below by using internal flanges. The nacelle would then be hoisted and set into place on top of the tower. The blades would be attached to the rotor hub while on the ground and the entire rotor would be hoisted up to the nacelle height and bolted to it.

Crane crews would erect the turbines soon after all components arrive to minimize the amount of time equipment is on the ground.

Power Collection System and Communication Lines Installation

The power collection system would consist of underground cables between individual turbines and the junction boxes, and underground cables between the junction boxes and the substation (“home runs”). Fiber optic communication lines for remote-sensing equipment used to monitor each turbine would be collocated in the same trenches as the power collection system cables.

In most cases, underground cables and fiber optic lines would be installed parallel to the roads connecting turbines pads and/or junction boxes. Trenching equipment would be used to excavate trenches in or near roads to bury the cables that would connect each turbine to the substation. The trenches would be approximately 42 inches deep and 18 to 24 inches wide. The cables and fiber optic lines would be placed (and packed in sand or native materials depending on the soil properties at the Project area) within the trenches, connected to the wind turbines and transformers and then covered to protect the cables from damage or possible contact. The ground over the trench would be replaced to its natural state (slope) after installation. The extent of open trench at any given time would be minimized to only those distances necessary to conduct work.

In order to reduce the length of cable runs, trenches would also be aligned directly between turbine clusters. These runs would follow ridge lines and be installed perpendicular to the existing ground slope wherever possible. Trenching routes between turbine rows remain subject to final electrical engineering plans but would seek to minimize distances between turbine clusters to minimize ground disturbance. From the junction boxes to the substation, each of the two home run trenches would be approximately 20 feet wide and 8,000 feet long. The number of trenches would be determined by the size of the cable required and the thermal conductivity of the soil or rock surrounding the trench.

Buried underground cables associated with the Project would be installed with safety markings, as required by law. The locations of the facilities would be on file with Underground Service Alert. Visual and magnetic identification tape will be installed above the lines in the excavation prior to backfilling.

Substation Expansion

The Project would retain the existing substation and add electrical upgrades that would increase the footprint by approximately 5,000 square feet. The area of the expansion would be graded, new equipment would be installed and connected, and the existing fence would be extended to enclose the entire substation. Construction of the substation expansion would require approximately 10,000 gallons of water.

Final Road Construction

As described earlier, when construction has been completed, some access roads used during construction would be left in place to provide access for O&M. These roads would be inspected and graded where low spots and ruts have occurred. Culverts would be left in place and the road edges would be restored. All roads left for O&M would be returned to a 16 foot width. Unused roads and temporary turn-around areas used by hauler equipment would be removed and reclaimed. Techniques for reclamation would include regrading, spot replacement of topsoil, and revegetation of all disturbed areas with an approved native seed mix.

Site Cleanup and Restoration

Site Cleanup

Clearing and disposing of trash, debris, and scrub on those portions of the site where construction would occur would be performed at the end of each work day through all stages of construction. Waste materials would be removed from the area and recycled or disposed of at approved facilities. All construction-related waste would be properly handled in accordance with State and federal regulations and permit requirements. This waste may include trash and litter, garbage, other solid waste, petroleum products, and other potentially hazardous materials (such as, lubricants, solvents, paints, etc.). Materials including construction equipment and old turbine pieces (e.g., housing components, broken turbine blades) would be moved to the staging area and removed from the Project area within 90 days from the end of construction.

A County or State-approved local sanitation company would provide and maintain appropriate sanitation facilities. The sanitation facilities would be located at each of the crane assembly areas, the substation, and the trailer pad area. When necessary, additional facilities would be placed at specific construction locations.

Restoration

All temporarily disturbed areas would be restored through recontouring and revegetation. Material placed in the areas of the foundations or roads would be compacted to 80 percent or greater as

required for soil stability. A weed-free, native seed mix would be used for replanting. Between existing disturbed areas that would be reclaimed as part of repowering and areas temporarily impacted by Project activities, approximately 29 acres would be restored to pre-Project conditions.

Stormwater Pollution and Prevention

National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction Activity (Construction General Permit) would be obtained from the California State Water Resources Control Board (SWRCB) - Division of Water Quality. A Stormwater Pollution Prevention Plan (SWPPP) would be prepared that includes detail of locations that hazardous materials may be stored during construction, and the protective measures, notifications, and cleanup requirements for any accidental spills or other releases of hazardous materials that could occur as well as erosion control measures that would be generated and implemented on-site for the Project. The SWPPP would include the elements described in Section A of the Construction General Permit, including a site map(s), which shows the construction-site perimeter, existing and proposed buildings, lots, roadways, storm water collection and discharge points, general topography both before and after construction, and drainage patterns across the Project. The SWPPP would also list Best Management Practices (BMPs), including erosion control BMPs that would be used to protect storm water runoff, and would include the placement of those BMPs and a description of required monitoring programs.

The SWPPP would be based on the U.S. Environmental Protection Agency (EPA) document entitled “Storm Water Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices.” Guidance from other documents, such as the Caltrans publications “The Construction-site BMPs Manual” and “SWPPP and Water Pollution Control Program (WPCP) Preparation Manual,” may also be included in the SWPPP.

The SWPPP would be developed with the civil engineering design of the Project.

Land Disturbance

The approximate areas impacted by construction of the Project (temporary) and the final Project footprint (permanent) are provided in Table 3-4.

3.4.3 Construction Labor Force, Equipment, and Traffic

Based on data provided for typical wind energy projects of similar size, it is anticipated that at peak construction (i.e., the middle of the construction period) approximately 30 to 40 workers per day would be required. Local construction contractors and suppliers would be used to the extent possible.

Craft workers that would be involved in the construction of the Project would include the following:

- Millwrights
- Iron Workers
- Electricians
- Equipment Operators
- Carpenters
- Laborers
- Truck Drivers

TABLE 3-4
APPROXIMATE AREA OF THE ENERGY FACILITY AND RELATED OR SUPPORTING FACILITIES

Facilities[a]	Approximate No. of Units	Approximate Total Disturbance Area (acres)	
		Temporary	Permanent
Turbine Pads/Towers (75' diameter around turbine; 4' x 100' crane pad)	21	5.8	2.3
Roads, New	9 miles	29.4	14.7
Roads, Improved	2.5 miles	5.1	1
Roads, Graded		61.8	0
Underground Electrical Collection System (single/double circuit)	8 miles	22.8	0
Overhead Transmission Line Route	4 miles	8.1	0
Overhead Transmission Line Poles	105	1.9	0
Substation expansion	1	0	0.1
Turn-around areas	8	3	0
Meteorological Towers[b]	2	0	0
O&M Building	1	0	0.1[c]
O&M Building Property (not including the O&M Building but including parking and laydown area)	1	0	1[c]
Potential Disturbance		*137.9*	*19.2*
Potential Disturbance in Already Disturbed Areas		44.8	1.1
Actual Disturbance[7]		*93.1*	*18.1*
Restored/Reclaimed Areas		93.1	29.1
Total Disturbance (Net)		***0***	***11.0***

[a] There is an approximate 29 acre overlap from areas already disturbed by existing facilities and areas listed here as impacted by proposed Project activities.
[b] The meteorological towers are an existing feature on the site and would not change.
[c] The area is already disturbed.

SOURCE: Pattern Energy, 2010

Construction activities would typically be scheduled during the daylight hours from 8:00 a.m. to 5:00 p.m. Monday through Friday. If extended hours are necessary or desired, the Applicant would seek approvals from the County.

Up to 30 pieces of construction equipment are expected on-site during peak construction. During the various stages of construction they generally would consist of the types of equipment listed in Table 3-5.

[7] Actual Disturbance equals the total amount of area potentially disturbed by the Project minus the area of already disturbed lands that would also be affected by the Project.

TABLE 3-5
CONSTRUCTION EQUIPMENT LIST

Equipment Qua	ntity	Use	Miles/day	Hours/day	Days
Remove Existing 91 Howden turbines					
Excavator	1	Remediation	1	8	30
Semi-trailer trucks	2	Equipment removal	20	4	45
Pick-up trucks	4	Staff transport	40	3	45
Small hydraulic cranes/forklifts	1	Disassembly and loading	1	6	45
Rough terrain forklifts	1	Loading	1	6	45
Construct New turbines/Infrastructure					
Bulldozer	2		5	10	24
Grader	2		30	10	24
Water truck	3		20	10	24
Compactor	2		10	10	24
Excavator	1		2	8	21
Truck-mounted drilling rig	1		2	4	12
Concrete trucks & pumps	672		20	4	21
Heavy & intermediate cranes	4		1	6	21
Cement &gravel haul trucks	125		30		24
Semi-trailer trucks	178		70		8
Pick-up trucks	12		5	3	90
Small hydraulic cranes/forklifts	2		1	4	60
Rough terrain forklifts	2		1	4	60

SOURCE: Pattern Energy, 2010

Construction of the Project roads, facilities, and electrical/communication lines would occur at about the same time, using individual vehicles for multiple tasks. Based on data provided for typical wind energy projects of similar size, it is anticipated that during the construction period, there would be approximately 50 daily round trips by vehicles transporting construction personnel to the site. Over the entire construction period, there would be 126 trips of large trucks delivering the turbine components and related equipment. In addition, there would be approximately 2,322 truck trips by dump trucks, concrete trucks, water trucks, cranes, and other construction and trade vehicles (Table 3-6). After construction, O&M of the Project would require three round trips per day using pickups or other light-duty trucks.

It is not known exactly from where the new turbine components would be coming. While it is likely that they would be shipped to the Port of Oakland for delivery to the Project site, this has not been established yet. In general, it can be said that the turbines would either come from the east or the west on Interstate 580 into Alameda County. They would go north on Vasco Road and turn left into the site access road. State Route 4 is not expected to be used for any oversize or overweight trucks.

A Traffic Management Plan would be prepared for the construction of the Project to ensure that no significant hazards would result from increased truck traffic and so traffic flow on local public roads and highways would be minimally affected. This plan would incorporate measures such as informational signs, traffic cones, and flashing lights to identify any necessary temporary changes

TABLE 3-6
ESTIMATED VEHICLE TRIPS FOR CONSTRUCTION OF THE PROJECT

Turbine Component Types	Number of Components Required per Turbine	Number of Components per Truck Load	Number of Truck Loads per Turbine
Tower Sections	3	1	3
Blades	3	2	1.5
Nacelle	1	1	1
Rotor Hub	1	2	0.5
Foundation Equipment	2.5	1	2.5
Foundation Concrete (Cubic Yards)	250	8	31.25
Total Truck Loads per Turbine			**39.75**

Purpose for Truck Load	Number of Truck Loads
Deliver Turbine Components (Assumes 21 Turbines)	126
Road Construction	1,558
Turbine Foundation Construction	709
Crane Delivery and Removal	20
Deliver Substation and Other Electrical Components	25
Deliver O&M Building Materials	10
Total Large Truck Loads	2,448

NOTE: Dismantling of existing turbines would require approximately 6 truck loads per turbine.

SOURCE: Pattern Energy, 2010

in lane configuration. Flaggers with two-way radios would be used to control construction traffic and reduce the potential for accidents. Speed limits would be set commensurate with road type, traffic volume, vehicle type, and site-specific conditions as necessary to ensure safe and efficient traffic flow. The entrance to the Project site is equipped with a turnout for vehicle stacking. On-site construction traffic would be restricted to the roads developed for the Project.

3.5 Operation and Maintenance

The Project would employ approximately four people full time. It is anticipated that the majority of permanent positions would continue to be filled from the local labor pool. The typical activities necessary for O&M are described in general below.

3.5.1 Operations

Public Access

As discussed above, the Project is located entirely on land owned by EBRPD and/or CCWD. Public access to the Project area is, and would continue to be, restricted.

Project Administration

The administration of the Project includes the business activities associated with operating a wind farm. These include staffing the facility, scheduling and facilitating maintenance, providing for

necessary training, monitoring the performance of the facility, and reporting on the results of the environmental monitoring program. Several of these activities are discussed in more detail below.

Project Plans

Health, Safety, and Environmental Management Plan

Prior to start-up and operation of the facilities, a Health, Safety, and Environmental Management Plan (HSE) would be developed with requirements for the operation and maintenance of the facility.

Project Operation and Maintenance Plan

As with all power generation facilities, the Project would require some direct operation and maintenance to achieve reliable and safe operation. The Project's operations team would develop a comprehensive Project Operation and Maintenance Plan once the design is complete. This plan would define specifically how the Project's required operation and maintenance activities would be conducted in accordance with the requirements of the equipment vendors, good industry practice and applicable regulatory agencies. Situations requiring potential closure of the Project area would be discussed in the comprehensive Project Operation and Maintenance Plan.

Orientation and Training

Maintenance employees would require specific training regarding safe work on wind turbines, and the specific tasks necessary to provide scheduled and unscheduled wind turbine maintenance. Additionally, it may be necessary to provide orientations for visitors as to those aspects of environmental management they may impact by their on-site activities. These would likely include general site procedures for:

- Avoidance of wildlife
- Requirements for control of livestock
- Noxious weed control
- Excessive dust avoidance
- Noise requirements
- Motorized access limited to site access roads
- Other procedures as appropriate for their on-site activities

Wind Farm Performance Monitoring

Wind turbines generally operate automatically, without the need for centralized plant operators. The site manager and staff would monitor the performance of the turbines, but initiate manual control only as needed for maintenance and troubleshooting.

Periodically, the plant management would analyze the performance trends of the wind turbines to ascertain the overall efficiency of operation. This analysis would utilize data collected from the wind turbines and the permanent met towers. It is possible some scheduled maintenance activities would be added or adjusted to improve the performance of the facility.

3.5.2 Maintenance Activities

The activities necessary to perform preventative maintenance, as well as equipment repairs as needed, are described in general below.

Project Drive-By Inspections

Through the process of performing the O&M activities discussed in this section, O&M personnel would drive through the entire facility at least once every few days. As personnel drive through the facility to perform these activities, they would also be performing a visual inspection to identify any obvious problems with the wind turbines that may require maintenance. If a turbine is identified that may require maintenance or is operating in an unsafe manner, that turbine would be stopped (remotely) until the condition could be fixed. This inspection is a redundant check, as the turbine has many internal sensors to watch for maintenance problems and potentially unsafe operational conditions.

Along with the turbines, personnel would review the condition of the roads and other visible aspects of the wind farm's infrastructure. This would include reviewing the condition of substation fencing and components, looking for any loose trash on the site, and checking for any vandalism. Conditions found that could impact human safety, wildlife, livestock, or the environment in general that cannot be immediately fixed would be reported to the facility's manager and appropriate regulatory agencies as required by permit conditions and applicable regulatory requirements.

While normal operations would allow these inspections to occur very frequently, there may be periods during which the site cannot be accessed and these inspections are suspended. Conditions causing such suspensions could include inclement weather (i.e., extremely high winds, or very heavy rain). The criteria for conditions in which the site would not be accessible would be described in detail in the HSE plan, and would also be subject to the judgment of the facility's manager and maintenance staff.

Scheduled Wind Turbine Maintenance

The Project's O&M Plan would include the scheduled minor and major maintenance and inspection activities anticipated during the calendar year. Various inspections, such as visual inspections inside the rotor head, nacelle, and tower, would be performed on a daily, weekly, or monthly basis. Results and information collected on these inspections are logged and may be used to plan future maintenance activities.

Regularly scheduled preventive maintenance activities also are performed on a daily, weekly, or monthly basis. A list of scheduled preventive maintenance activities would be included in the O&M Plan. Two annual wind turbine maintenance cycles are anticipated. These would likely be planned for the spring and fall months of each year. Activities would be conducted in accordance with applicable regulatory requirements and industry standards.

Over the Project's operational period, significant maintenance or repair events are recorded, so that underlying causes can be determined and analyzed. These analyses may lead to modifications to the turbines, or operation or maintenance practices, to improve the efficiency and safety of the facility.

Unscheduled Wind Turbine Maintenance

Wind turbine maintenance and internal inspection activities are normally performed on a scheduled basis. However, when problems occur, unscheduled maintenance would be required in order to maintain the operating efficiency of the facility.

Turbines experiencing mechanical difficulties that could result in safety or environmental risks or damage to the equipment would be taken off-line until repairs could be completed. Otherwise, repairs would be planned for the first convenient opportunity.

The three general levels of unscheduled maintenance are discussed below.

Minor Repairs and Component Replacement

Making minor repairs to the turbines or replacing faulty internal components is the most common form of unscheduled turbine maintenance. These repairs could include:

- Replacement of wind turbine sensors
- Replacement of small motors (such as those for the yaw drive or fans)
- Replacement of small pumps (such as those for the hydraulic system or cooling system)
- Replacement of gear oil
- Replacement of coolant
- Replacement of hydraulic fluid
- Replacement of seals on generator or gearbox

In general, these repairs can be done using small tools and the turbine's integrated winch system. Pick-ups or utility maintenance vehicles (e.g., medium duty pick-up truck or similar) would likely be needed for repair activities. These vehicles would stay on the Project roads and at the clearing beneath each wind turbine.

Major Repairs and Component Replacement

Although far less common, it is possible that major components could need to be replaced during the operational phase of the Project. These components could include:

- Blades
- Generator
- Gearbox
- Transformer (if in nacelle)

Such a replacement would likely require at least one large crane. Trucks would be needed to bring the crane to the turbine location, where it would be assembled. A new crane pad at the turbine site may be required.

If a major component became damaged and required replacement, the turbine would be stopped and placed out-of-service until the component replacement was complete. It is anticipated that component replacement would take less than five days after the crane and replacement component arrived on-site and were prepared for service. Once the new component was installed, the crane would be removed from the site and the turbine returned to service. This activity would be planned to minimize the crane's time on-site.

Wind Turbine Replacement

Replacement of a complete wind turbine at a project prior to decommissioning the facility is extremely uncommon. It would likely only be necessary if there were problems with the tower or foundation, as all other components can be replaced without removing the entire turbine as discussed above.

The replacement of an entire wind turbine would require crane assembly as noted above and could require substantial effort including temporary earth disturbances at the pad site and/or potentially along the access roads into the Project area. The components that are removed and not used on the replacement wind turbine would be loaded onto trucks and removed from the site. Replacement components would be transported to the site, off-loaded and the wind turbine would be erected using the appropriate combination of original and replacement components. Given the need to remove old components and bring new components to the site after the original wind turbine was dissembled, the entire wind turbine replacement activity could require the crane to remain on-site for a week or longer.

While the Project would make efforts to replace the turbine as quickly as possible, unanticipated conditions such as inclement weather or equipment failure could result in an extended construction period.

Site Maintenance

While the wind turbines are the component of the Project expected to require the most maintenance services, some maintenance would be needed for the remainder of the windfarm. Those maintenance services are described below.

Substation Maintenance

The substation would be inspected periodically to look for obvious problems or areas of concern. Additionally, the substation would undergo an annual inspection and maintenance cycle to ensure that protection equipment is functioning properly. This generally involves inspection of the breakers and switches to be certain they would operate as needed in a fault or emergency. Electrical connections would also be inspected and tested as needed to ensure no unsafe situations exist.

Maintenance to the substation's transformer, switchgear, and bus work would require that the substation be de-energized. De-energizing the substation would result in Project shut-down. O&M personnel would attempt to schedule this maintenance during low wind months. In general, most maintenance activities can be performed during a single day each year.

Road Maintenance

Most road maintenance would be performed on an as-needed basis. It is expected that minor amounts of surface dragging, blading, or grading would be required to remove vehicle ruts that may develop due to maintenance traffic or after periods of heavy rainfall. Culverts, drains, or other water management devices would have to be kept clear to allow effective drainage. During active maintenance, to reduce dust, the road surfaces would be watered or otherwise treated with dust control measures.

O&M Building Maintenance

Maintenance requirements for the O&M Building are expected to be typical for a building of Class III metal construction and would be performed on an as needed basis. Exterior maintenance would be performed in a timely manner so as to maintain a presentable appearance. Housekeeping and area cleanup would be done on a regular basis so as to avoid buildup of litter and other unsightly materials.

3.6 Final Decommissioning

Decommissioning refers to the dismantling of the Project components and recontouring and revegetating the site upon completion of the Project's operational life. The anticipated life of the wind farm could be greater than 30 years. Upgrading and replacing equipment can extend the operating life indefinitely, assuming there would be future demand (after the 30-year term) for the electricity generated by the Project. Therefore, the estimated life of the Project depends primarily on the demand for power, which would be expected to increase in the foreseeable future.

Decommissioning would be similar to the construction process except considerably less intensive (i.e., no concrete trucks, no trucks delivering cable, no cable trenching, etc.). It is expected that three to four days would be required for removal of each turbine over a period of two to three months. A single large crane would be used to disassemble the wind turbines and one or two smaller cranes would lift the parts onto trucks to be hauled off. The existing service roads would be used.

Site reclamation after decommissioning would be based on-site-specific requirements and techniques commonly employed at the time the area would be reclaimed. Techniques could include regrading, spot replacement of topsoil, and revegetation of all disturbed areas with an approved native seed mix. Turbine towers and substation foundations would be removed to a depth of three feet below grade and any underground cables below three feet would be left in place. Road reclamation would be accomplished using scrapers, and gravel trucks. Road in remaining infrastructure reclamation would be expected to occur during the two to three months of turbine removal and up to one month after the last turbine was removed.

3.7 Project Schedule

Table 3-7 summarizes the length of time anticipated for each phase of the Project.

TABLE 3-7
ANTICIPATED PROJECT SCHEDULE

Time Reference	Project Activity
Fall 2011	Final approval of EIR
	Turbine and Balance of Plant (BOP) contracts finalized and closing of construction financing
Beginning Fall 2011and last approximately 4 to 5 months	Decommissioning: Demolition and removal of existing turbines
January 2012	Limited construction possible, consistent with USFWS guidance, due to red-legged frog and tiger salamander winter breeding restrictions. Demolition and removal of existing turbines and passage over existing roads and foundations may be permissible.
February 2012	
March 2012	
March through November 2012	Equipment mobilization, removal of existing below-ground infrastructure, road construction, trenching, and restoration of decommissioned turbine areas and roads
April through July 2012	Foundation construction and electrical equipment installation
July 2012	Tower and blade installation
August 2012	Mechanically Complete
October 2012	Testing and energizing
October 2012	Power delivery

SOURCE: Pattern Energy, 2011

3.8 Permits and Approvals

The Applicant would obtain permits and/or approval as needed from, and would participate in reviews and consultation as needed with, federal, State and local agencies as show in Table 3-8.

TABLE 3-8
POTENTIAL PERMITS AND APPROVALS AND CONSULTATIONS

Agency Permit/	Approval Required
FEDERAL	
Federal Aviation Administration (FAA)	Notice of Proposed Construction or Alteration; Determination of No Hazard.
U.S. Army Corps of Engineers (USACE)	Clean Water Act, Section 404 Nationwide Permit if jurisdictional waters of the U.S. may be affected by construction or operation of the Project.
U.S. Fish and Wildlife Service (USFWS)	If USFWS biologists determine that the Project has the potential to adversely affect a species listed under the federal Endangered Species Act (ESA), the Project would be subject to review under either Section 7 or Section 10 of the ESA. The Section 7 process would apply if any federal approval, such as a USACE Section 404 Permit, would be required. The Section 7 process would result in inter-agency consultation and could result in the issuance of a biological opinion and/or an incidental take statement. The Section 10 process would apply if the Project could cause take of a federally-listed species and no other federal approval would be required. The Section 10 process would require preparation of a Habitat Conservation Plan and would result in issuance of an incidental take permit.
STATE	
State Historic Preservation Office	Delegated Section 106 compliance by Advisory Council on Historic Preservation
State Water Resources Control Board	Construction Stormwater General Permit; Notice of Intent to Comply with Section 402 of the Clean Water Act, Construction SWPPP and SPCCP; Industrial Stormwater General Permit; Approval of O&M SWPPP and SPCCP. Section 401 Certification if USACE determines jurisdictional waters of the U.S. would require a Section 404 permit.
California Department of Fish and Game (CDFG)	Consultation with CDFG is needed to address potential effects to State-listed species under Section 2080 of the Fish and Game Code. Upon reviewing the federal Biological Opinion, CDFG will determine if it is “consistent” with the requirements of the California Endangered Species Act (CESA) for jointly-listed State/federal listed species. If CDFG determines that the federal statement/permit is not consistent with CESA, or to address impacts to State listed species that are not federally listed, then the Applicant must apply for a State Incidental Take Permit under section 2081(b) of the Fish and Game Code.
California Department of Transportation	Single-Trip Transportation Permit; Right-of-Way Encroachment Permit
California Highway Patrol	Notification of Transportation of Oversize/ Overweight Loads
LOCAL	
Alameda County, Public Works Department	Application to Use Right-of-Way
Cities of Brentwood and Livermore	Application to Use Right-of-Way.
Contra Costa County, Department of Conservation & Development	Land Use Permit Demolition Permit Building Permit Grading Permit
Contra Costa County, Public Works Department	Encroachment Permit Drainage Permit
East Bay Regional Parks District	Encroachment Permit

CHAPTER 4
Environmental Setting, Impacts, and Mitigation Measures

4.0 Approach to the Analysis of Impacts

Organized by environmental resource area, this chapter provides an integrated discussion of the environmental setting (including the regional, local and/or Project setting; regulatory setting; and Project baseline) and environmental consequences (including environmental impacts and mitigation measures for potentially significant impacts) associated with decommissioning of the existing Tres Vaqueros windfarm and construction, operation, maintenance, and decommissioning of the Project.

As discussed in Chapter 3, *Project Description*, the Tres Vaqueros Windfarm Repowering Project consists of repowering the existing windfarm by decommissioning and removing all 91 existing wind turbines and certain related infrastructure and installing of up to 21 modern wind turbines and associated infrastructure and access roads. Figure 3-3 shows the approximate locations of 24 potential turbine sites, from which the final 21 turbine sites would be chosen based on various siting criteria, such as optimal wind speed, geotechnical conditions, and environmental considerations such as the presence of sensitive biological or cultural resources. Because the final 21 sites have not yet been determined, most environmental resource areas considered in this chapter conservatively analyze all 24 potential sites. Four resource areas (*Air Quality, Energy Conservation, Greenhouse Gas Emissions, and Transportation and Traffic*) only analyze 21 turbine locations because the potential environmental effects associated with these resource areas are a function of the total number of turbines, rather than final turbine location.

4.0.1 CEQA Requirements

CEQA and the CEQA Guidelines explain that the environmental analysis in an EIR must evaluate impacts associated with a project and identify mitigation measures for any potentially significant impacts. All phases of a project are evaluated in the analysis. The CEQA Guidelines state:

- An EIR shall identify and focus on the significant environmental effects of the proposed project. In assessing the impact of a proposed project on the environment, the lead agency should normally limit its examination to changes in the existing physical conditions in the affected area as they exist at the time the Notice of Preparation (NOP) is published, or where no notice of preparation is published, at the time environmental analysis is commenced. Direct and indirect significant effects of the project on the environment shall be clearly identified and described, giving due consideration to both the short-term and

long-term effects. The discussion should include relevant specifics of the area, the resources involved, physical changes, alterations to ecological systems, and changes induced in population distribution, population concentration, the human use of the land (including commercial and residential development), health and safety problems caused by the physical changes, and other aspects of the resource base such as water, historical resources, scenic quality, and public services. The EIR shall also analyze any significant environmental effects the project might cause by bringing development and people into the area affected (CEQA Guidelines Section 15126.2[a]).

- An EIR must discuss any inconsistencies between the proposed project and applicable general plans and regional plans, including, without limitation, the applicable air quality attainment or maintenance plan or State Implementation Plan, area-wide waste treatment and water quality control plans, regional transportation plans, regional housing allocation plans[1], habitat conservation plans, natural community conservation plans and regional land use plans (CEQA *Guidelines* Section 15125[d]).

- An EIR must describe feasible measures that could minimize significant adverse impacts; such measures must be fully enforceable through permit conditions, agreements, or other legally-binding instruments. Mitigation measures are not required for effects that are found to be less than significant (CEQA *Guidelines* Section 15126.4[a]).

4.0.2 Section Contents and Definition of Terms

Chapter Organization

Chapter 4 is organized into the following 18 environmental resource or issue areas:

4.1 Aesthetics
4.2 Agriculture and Forestry Resources
4.3 Air Quality
4.4 Biological Resources
4.5 Cultural Resources
4.6 Energy Conservation
4.7 Geology and Soils
4.8 Greenhouse Gas Emissions
4.9 Hazards and Hazardous Materials
4.10 Hydrology and Water Quality
4.11 Land Use and Planning
4.12 Mineral Resources
4.13 Noise
4.14 Population and Housing
4.15 Public Services
4.16 Recreation
4.17 Transportation/Traffic
4.18 Utilities and Service Systems

[1] This EIR cites neither the Contra Costa County Transportation Authority 2009 Regional Transportation Plan nor a specific regional housing allocation plan, as neither is applicable to the Project. This EIR does cite the Contra Costa County General Plan, however, which addresses regional housing and regional transportation.

Section Contents

Sections 4.1 through 4.18 generally follow the same format:

Regional, Local and/or Project Setting

This subsection provides an overview of the physical environmental conditions in the area at the time of, or prior to, the publication of the NOP, that could be affected by implementation of the Project in accordance with State CEQA Guidelines Section 15125.

Regulatory Setting

This subsection identifies the laws, regulations, ordinances, plans, and policies that are relevant to each resource area.

Project Baseline

This subsection identifies the actual existing physical conditions to provide a point of comparison between pre-Project conditions (the baseline) and post-Project conditions in order to determine whether the change in the environment caused by the Project is significant under CEQA. The baseline is tailored to each resource area, and is predicated on the significance criteria under which the impacts are assessed.

For most resource areas, the baseline is the same as the "environmental setting," i.e., the physical environmental conditions in the vicinity of the Project and at the Project site as they existed in the spring of 2009[2], when the NOP was published for the Project. (CEQA Guidelines §§ 15125(a), 15126.2(a)). See, for example, Aesthetics, Agriculture and Forestry Resources, Air Quality, Cultural Resources, Geology and Soils, Hydrology and Water Quality, Land Use and Planning, Mineral Resources, Noise, Public Services, and Utilities and Service Systems.

For other resource areas where conditions fluctuate, it is necessary to choose a baseline that most accurately reflects actual conditions, including averaging actual levels in order to avoid using an analytical baseline that reflects a spike or a dip. The resulting average provides a truer picture of the existing physical conditions rather than a single point in time (i.e., the publication date of the NOP). For the Project, actual conditions varied from those reflecting operation of all 91 existing turbines to no operating turbines (which was true on the date the County published the NOP). Specifically, a baseline that reflects operational conditions more realistically portrays actual conditions for Section 4.6, *Energy Conservation*, where the baseline reflects the average energy production rate at the wind farm at the time of shut down, at which time approximately 60 of the existing turbines were operational. This approach is consistent with the State Supreme Court's decision in *SCE v. SCAQMD* which states: "Neither CEQA nor the CEQA *Guidelines* mandates a uniform, inflexible rule for determination of the existing conditions baseline. Rather, an agency enjoys the discretion to decide, in the first instance, exactly how the existing physical conditions without the project can most realistically be measured, subject to review, as with all CEQA factual determinations, for support by substantial evidence."

[2] The County issued the NOP for the Project on three dates: March 23, March 31, and June 5, 2009.

Significance Criteria

This subsection provides the criteria used in this document to define the level at which an impact would be considered significant in accordance with CEQA. Significance criteria are based on CEQA Guidelines Section 15064.5, Appendix F, and the checklist presented in Appendix G; factual or scientific information and data; and regulatory standards of Contra Costa County, and federal, State and local agencies.

Impact Identification

This subsection lists impacts numerically and sequentially. An impact statement precedes the discussion of each impact and provides a summary of the impact topic. Each impact is categorized as one of the following:

- **No Impact:** Would not cause any change in the environment as measured by the applicable significance criteria; therefore, no mitigation would be required.
- **Less-than-Significant Impact:** Would not cause a substantial adverse change in the environment as measured by the applicable significance criteria; therefore, no mitigation would be required.
- **Less-than-Significant Impact with Mitigation Incorporated:** Would cause a substantial adverse change in the physical conditions of the environment; however, one or more feasible mitigation measures would reduce the environmental effects to less-than-significant levels.
- **Significant and Unavoidable Impact:** Would cause a substantial adverse change in the physical conditions of the environment; there is either no feasible mitigation available or, even with implementation of feasible mitigation measures, the Project would still cause a significant adverse effect on the environment.

Mitigation Measures

Mitigation measures are recommended where feasible to avoid, minimize, rectify, reduce, or compensate for potential significant, adverse impacts of the Project in accordance with CEQA Guidelines Section 15126.4. Each mitigation measure is identified numerically to correspond with the number of the impact it addresses.

4.0.3 Other Impact Analysis

Cumulative impacts resulting from a combination of Project-specific incremental impacts with the impacts of other projects in the area are analyzed in Chapter 5, *CEQA Statutory Sections.* Chapter 6, *Alternatives Analysis*, analyzes alternatives to the Project that could reduce significant and unavoidable environmental impacts identified from the Project.

4.1 Aesthetics

4.1.1 Introduction

This section analyzes the Project's relationship to visual/aesthetic resources. Discussed herein are the physical and regulatory setting; the baseline for determining environmental impacts; the criteria used for determining the significance of environmental impacts; potential impacts associated with decommissioning the existing wind farm and construction, operation, maintenance, and decommissioning of the Project; and mitigation measures to reduce or avoid environmental impacts determined to be potentially significant.

4.1.2 Setting

The geographic area relevant to the analysis of impacts on visual/aesthetic resources encompasses the landscapes directly affected by, and the surrounding areas that would be within the view of, Project-related facilities and activities. This analysis focuses on travel route views and views of and within parks and recreational areas.

Visual/aesthetic resources consist of the landforms, vegetation, rock and water features, and human modifications that create the visual character and sensitivity of a landscape. A number of factors are documented for the existing visual/aesthetic resources of the Project area to help determine the manner in which those resources or characteristic landscapes may be modified by the Project. The primary existing visual/aesthetic condition factors considered in this EIR are defined below and include: Visual Quality, Viewer Types and Volumes, Viewer Exposure, and Visual Sensitivity.

Visual Quality is defined as the overall visual impression or attractiveness of an area as determined by the arrangement of particular landscape features, including landforms, rock forms, water features, and vegetation patterns. The attributes of line, form and color combine in various ways to create landscape characteristics such as variety, vividness, coherence, uniqueness, harmony and pattern, which all contribute to the overall visual quality of an area. For the purposes of this EIR, visual quality is defined according to three levels:

- *Indistinctive*, sometimes industrial, defined as generally lacking in natural or cultural visual resource amenities typical of the region.
- *Representative*, defined as visual resources typical or characteristic of the region's natural and/or cultural visual amenities.
- *Distinctive*, defined as visual resources that are unique or exemplary of the region's natural or cultural scenic amenities.

Viewer Exposure addresses the variables that affect viewing conditions from potentially sensitive areas. Viewer exposure considers the following factors:

- Landscape visibility (the ability to see the landscape).

- Viewing distance (i.e., the proximity of viewers to the Project).
- Viewing angle — whether the Project would be viewed from above (superior), below (inferior) or from a level (normal) line of sight.
- Extent of visibility — whether the line of sight is open and panoramic to the Project area or restricted by terrain, vegetation and/or structures.
- Duration of view.

Viewer Types and Volumes of use pertain to the types (i.e., public viewers including recreationalists and motorists) and amounts of use (i.e., number of recreational users or motorists) that various land uses receive.

Visual Sensitivity is the overall measure of an existing landscape's susceptibility to adverse visual changes. People in different visual settings, typically characterized by different land uses surrounding a Project, have varying degrees of sensitivity to changes in visual conditions depending on the overall visual quality of the place. In areas of more distinctive visual quality, such as designated scenic highways, designated scenic roads, parks, and recreation and natural areas, visual sensitivity is characteristically more pronounced. In areas of more indistinctive or representative visual quality, sensitivity to change tends to be less pronounced, depending on the level of visual exposure. This analysis of visual sensitivity is based on the combined factors of visual quality, viewer types and volumes, and visual exposure to the Project. Visual sensitivity is reflected according to high, moderate, and low visual sensitivity ranges.

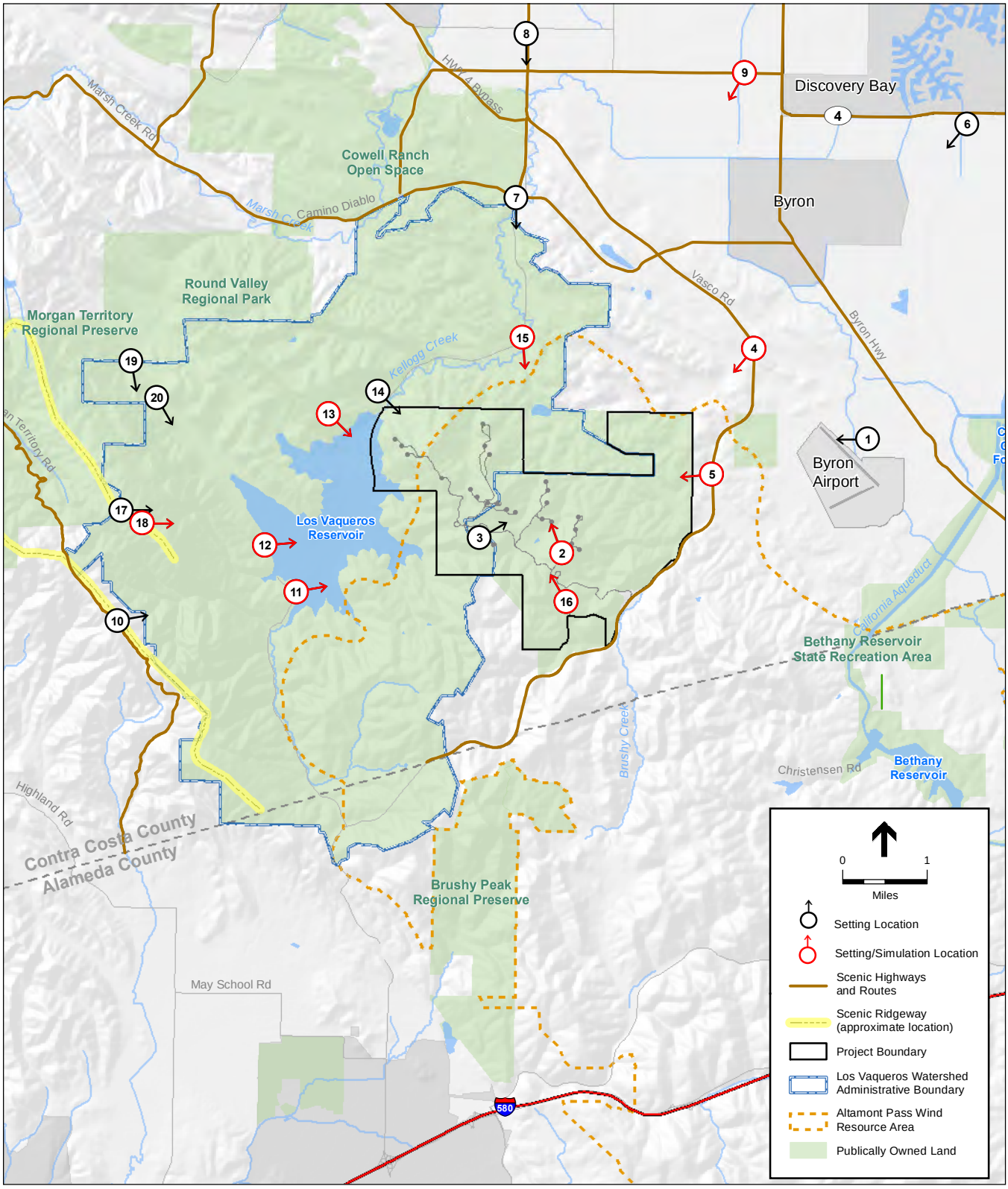
4.1.2.1 Regional and Local Setting

Section 3.1.2, *Location*, provides detailed information about the Project's regional and local setting. This section (4.1.2.1) provides setting information specific to visual/aesthetic resources, including the existing visual character of the region and the Project area, followed by a discussion of the visual character of public viewpoints (i.e., locations from which the Project would be visible to the public). Figure 4.1-1 is a viewpoint map that depicts photograph numbers and provides the location and approximate direction from which photographs of the region and Project area were taken. The photographs, presented together as a single group in Figures 4.1-2a through 4.1-2e, were assigned numbers by order of mention in this section.

Existing Visual Quality of the Region

The Project is located in the Byron Hills, in a rural part of southeastern Contra Costa County. The visual character of eastern Contra Costa County is typified by the undulating hills of grassland typical of the northern San Joaquin Valley, agricultural and rural landscapes, and the Delta. The hills provide a backdrop to the agricultural landscape and the Delta, where open views of distant horizons are available and are generally unobstructed by local topography or tall vegetation.

Wind turbines are a common and established industrial visual feature of the region, as shown in Figure 4.1-2a, Photo 1, a photo taken just west of Byron Highway in Contra Costa County looking west at the turbine-dotted hillsides. The California Energy Resources Conservation and



SOURCES: EBRPD, 2010; Environmental Vision, 2010

Tres Vaqueros Windfarm Repowering Project . 209132.02

Figure 4.1-1
Viewpoint Map

Photo 1: Byron Hot Spring Road, North of Holey Road, looking West

Photo 2: Existing Tres Vaqueros Windfarm near Proposed turbine E4 looking northwest

Photo 3: Existing Tres Vaqueros Windfarm near Proposed turbine A3 looking northeast

Photo 4: Vasco Road approximately 1.6 miles south of the intersection with Camino Diablo, looking southwest

SOURCE: Environmental Vision, 2010; ESA, 2010

Tres Vaqueros Windfarm Repowering Project . 209132.02

Figure 4.1-2a
Setting Photos

Photo 5: Vasco Road approximately 3.3 miles south of the intersection with Camino Diablo, looking west/southwest

Photo 6: State Route 4 near Discovery Bay looking southeast

Photo 7: Camino Diablo at Walnut Boulevard looking south

Photo 8: Walnut Boulevard south of Concord Avenue looking south

SOURCE: Environmental Vision, 2010; ESA, 2010

Tres Vaqueros Windfarm Repowering Project . 209132.02

Figure 4.1-2b
Setting Photos

Photo 9: Marsh Creek Road near Byron Highway looking south

Photo 10: Morgan Territory Road looking east

Photo 11: Los Vaqueros Marina looking east

Photo 12: Los Vaqueros Reservoir, Los Vaqueros Trail looking east

SOURCE: Environmental Vision, 2010; ESA, 2010

Tres Vaqueros Windfarm Repowering Project . 209132.02

Figure 4.1-2c
Setting Photos

Photo 13: Los Vaqueros Reservoir, Vista Grande Trail looking southeast

Photo 14: Los Vaqueros Reservoir, Interpretive Center looking east/southeast

Photo 15: Los Vaqueros Reservoir, Watershed Office looking south

Photo 16: Vasco Caves Regional Preserve looking north

SOURCE: Environmental Vision, 2010; ESA, 2010

Tres Vaqueros Windfarm Repowering Project . 209132.02

Figure 4.1-2d
Setting Photos

Photo 17: Whipsnake trail in Morgan Territory Regional Preserve, looking east

Photo 18: Upper Whipsnake trail in Los Vaqueros Watershed, east of Morgan Territory Regional Preserve, looking east

Photo 19: Miwok trail in Round Valley Regional Preserve, looking south

Photo 20: Miwok trail in Los Vaqueros Watershed, south of Round Valley Regional Preserve, looking southeast

SOURCE: Environmental Vision, 2010; ESA, 2010

Tres Vaqueros Windfarm Repowering Project . 209132.02

Figure 4.1-2e
Setting Photos

Development Commission has identified the APWRA, including the southeastern portion of Contra Costa County, as an area with high wind energy potential (Contra Costa County, 2010a). The APWRA has experienced alterations in recent years, as many wind farms have been repowered or are in the planning stages for repowering, to replace smaller older turbines with newer, larger and more efficient models.

The Project is also located in the eastern portion of the Los Vaqueros Watershed (i.e., those lands within the Contra Costa Water District (CCWD) Los Vaqueros Watershed boundary line). Los Vaqueros Reservoir was created by establishing a dam on upper Kellogg Creek. The watershed area surrounding the reservoir is characterized by moderate-to-low elevation and northwest-southeast trending ridgelines, and is divided by valleys of varying steepness and width. Ridgelines surrounding the reservoir rise to 2,550 feet mean sea level (msl) while the reservoir's high water level is at 472 feet msl. The visual character of the watershed lands is typically open rolling grassy hills and the landscape downstream of the dam is a mixture of open grasslands, rolling hills with sparse oak savannah, and scrub habitat.

Existing Visual Quality of Project Area

The Project area's current primary land use is the existing wind energy facility, though the property is also used for grazing and livestock are often part of the visual landscape. Other uses include park land (i.e., Vasco Caves Regional Preserve) and water supply reservoir watershed. As discussed in Section 4.5, Cultural Resources, a portion of the Project area owned by CCWD and East Bay Regional Park District (EBRPD) includes a series of archaeological sites including prehistoric rock shelters and other archaeological features that are contributing elements to the Upper Kellogg Creek Historic District. The archaeological features are eligible for listing on the National Register of Historic Places.

Topography at the Project area is hilly, with grassland ridges interspersed with rock outcroppings. Figure 4.1-2a, Photos 2 and 3, show the existing Project area. As seen in the photos, the visual setting is characterized by these rolling hills and smooth contours and is dominated by the presence of the Tres Vaqueros Wind Farm. Features within the wind farm include: 91 first generation "Howden" turbines, including 85 34 kilowatt (kW), five 60 kW and one 750 kW wind turbines totaling approximately 28.3 MW; the O&M Building; one on-site substation that connects the Project into a 230 kilovolt (kV) PG&E transmission line running east of and adjacent to the Project area; related electrical infrastructure; and approximately 10 miles of turbine access and maintenance roads. The turbines have a total height (tower plus rotor blade height) ranging from approximately 90 to 174 feet. Existing turbines are located on a concrete pad or have concrete footings. The area also provides views of Los Vaqueros Reservoir to the west and rocky outcroppings throughout the site.

Photo 2 is taken just south of proposed turbine E4 looking northwest, with wind turbines, grazing land and utility lines in the foreground, and valley floor and distant mountains in the background. Photo 3 is taken between proposed turbines A1 and A3 looking northeast, with turbines, grazing land, and access roads in the foreground and middle ground, and the Northwind wind farm, valley floor, and Clifton Court Forebay in the background. In summary, the visual quality of the Project

area is representative of the southeastern portion of Contra Costa County and the APWRA, including visually distinct rolling hills, livestock, archaeological sites, and turbines turning in the rural landscape.

Viewer Types and Exposures

Viewer types and exposure conditions vary substantially in the Project area. Public viewer groups and vantage points evaluated include:

- Motorists along Vasco Road, State Route (SR) 4, and Marsh Creek Road (County-designated scenic highways and expressways); and Camino Diablo, Walnut Boulevard, Byron Highway, and Morgan Territory Road (County-designated scenic routes); and
- Visitors to recreational areas including the Los Vaqueros Watershed and three EBRPD regional preserves – Vasco Caves, Round Valley, and Morgan Territory.

For each of the viewer groups identified, viewer exposure conditions were determined based on review of a variety of data, including Project maps and drawings, aerial and ground level photographs of the Project area, a site visit to the Project area, number of viewers or visitors, conversations with EBRPD representatives, and local planning documents. Variables include the viewing distance, angle of view, the extent to which views are screened or open, and duration of view. Viewing distances are described according to whether the Project activities would be viewed within a foreground (within 0.5 mile), middleground (0.5 to 2.0 miles), or background (beyond 2.0 miles) zone. Viewing angle and extent of visibility consider the relative location of the Project to the viewer and whether visibility conditions are open or panoramic, or limited by intervening vegetation, structures or terrain.

Duration of view pertains to the amount of time the Project facilities or area would typically be seen from a sensitive viewpoint. In general, duration of view would be less for motorists on major travel routes and other locations where the Project would be seen for short or intermittent periods. Viewer durations increase to a moderate level for travelers on slower speed destination roads and viewers that are out of their cars with repeated views of the Project, such as from nearby public use areas. Duration becomes greater when the Project may be seen regularly and repeatedly, with the viewer facing the Project for an extended period of time.

Motorists on Major or Scenic Travel Routes

As discussed above, scenic highways and routes near the Project area include Vasco Road, SR 4, Marsh Creek Road, Camino Diablo, Walnut Boulevard, Byron Highway, and Morgan Territory Road. No other major roads are located in the study area. Traffic volumes are classified as low (less than 10,000 vehicle trips per day), moderate (10,000 to 20,000) and high (more than 20,000 vehicle trips per day), given the average traffic volumes in the vicinity of the Project. Table 4.1-1 summarizes major and scenic travel routes in the vicinity of the Project. For additional information on local roadways, see Section 4.17, *Transportation and Traffic*.

TABLE 4.1-1
SUMMARY OF VISUAL SENSITIVITY FINDINGS
VIEWER TYPES, VISUAL EXPOSURES, AND VISUAL QUALITY

Viewer Type/Location	Visual Quality	Viewer Exposure and Volumes	Visual Sensitivity
Motorists			
Vasco Road	Distinct	Open and Panoramic Views in Middleground, Partially to Fully Obstructed Views in Background Moderate to High Number of Viewers Medium View Duration	High
SR 4	Representative/ Distinct	Open to Fully Obstructed Views in Background High Number of Viewers Medium View Duration	Moderate to High
Camino Diablo	Representative/ Distinct	Open to Fully Obstructed Views in Background Low Number of Viewers Short to Medium View Duration	Low to Moderate
Walnut Boulevard	Representative/ Distinct	Partially to Fully Obstructed Views in Background Moderate Number Of Viewers Short to Medium View Duration	Moderate
Byron Highway	Representative/ Distinct	Open to Partially Obstructed Views in Background Moderate Number of Viewers Medium View Duration	Moderate to High
Marsh Creek Road	Distinct	Partially Obstructed to Open and Panoramic Views in Background Low to Moderate Number Of Viewers Medium View Duration	Moderate
Morgan Territory Road	Distinct	Partially to Fully Obstructed Views in Background Low Number Of Viewers Short View Duration	Low
Parks/Recreational Users			
Los Vaqueros Watershed	Distinct	Open and Panoramic to Fully Obstructed Views in Middle ground and Background Low Number of Viewers Short to Long View Duration	Moderate to High
Vasco Caves Regional Preserve	Distinct	Open and Panoramic Views in Foreground and Middleground Low Number of Viewers Medium View Duration	Moderate to High
Morgan Territory Regional Preserve	Distinct	Open and Panoramic to Fully Obstructed Views in Background Low Number of Viewers Medium to Long View Duration	Moderate to High
Round Valley Regional Preserve	Distinct	Partially to Fully Obstructed Views in Background Low Number of Viewers Medium to Long View Duration	Moderate
Scenic Ridges			
County-Designated Scenic Ridges Paralleling Morgan Territory Road	Distinct	Open and Panoramic to Fully Obstructed Views in Foreground, Middleground, and Background High Number of Viewers Short to Long View Duration	High

Vasco Road

Vasco Road is a County-designated scenic highway generally running north-south and ranging from two to four lanes (Contra Costa County, 2010a). The visual character of the landscape is characterized by grassland hills with wind energy facilities, as is common to the APWRA. The area is dominated by turbines of varying sizes and configurations, and views generally encompass a rural landscape characterized by wind turbines and associated infrastructure such as access roads and distribution and transmission lines. The visual quality of the area is distinctive, and is exemplary of natural scenic amenities of the southeastern County area. Second to the natural oak studded hillsides, the existing wind turbines are the most distinctive feature in this landscape.

Traffic volumes on Vasco Road are moderate to high, estimated at 19,300 vehicles per day (Marks Data Service, 2010). The Project would be located west of and adjacent to Vasco Road, and views from the road would be within the middleground and background ranges. Figure 4.1-2a, Photo 4, shows the view from the perspective of a motorist traveling south on Vasco Road, approximately 1.6 miles south of the intersection with Camino Diablo, looking southwest. This location represents motorists' first view of the Project area when traveling south on the road. Motorists experiencing this perspective would be traveling east of the Project area, with views of the turbines to the west of Vasco Road at a distance of approximately 2.5 miles, sometimes against a backdrop of rolling hills and other times atop the ridgelines. Views range from open and panoramic to partially/fully obscured by the surrounding hilly terrain and curves, depending on the motorist's location on Vasco Road. Figure 4.1-2b, Photo 5, shows a different perspective from Vasco Road, approximately 3.3 miles south of the intersection with Camino Diablo looking west/southwest. This location is closer to the Project area, a distance of roughly 1.5 miles from the nearest proposed turbine. From this location, motorists have clear middleground views of the existing turbines to the west of Vasco Road along the ridgeline and against the sky, and would have similar views of the Project. Assuming a traffic speed of 55 miles per hour (mph) and that the Project would be visible from portions of Vasco Road along an approximate 4.5 mile stretch of road, the Project would be visible (on and off) for approximately five minutes. Viewer sensitivity to replacement of wind turbines in this particular landscape view is moderated by the existing turbines in the landscape. Still, given the distinct visual quality of the winding road, the moderate to high number of viewers, the medium view duration and open visibility, overall viewer sensitivity is high for Vasco Road.

State Route 4

SR 4 is a two- to four-lane highway running in a generally east-west direction across most of Contra Costa County. From its intersection with SR 160 in Antioch to the border between Contra Costa and San Joaquin counties, SR 4 trends in a more northwest-southeast direction and varies in width depending on the surroundings. SR 4 is an eligible State Scenic Highway from SR 160 to its intersection with Sellers Avenue southeast of Brentwood (Caltrans, 2010), and is a County-designated scenic route from Walnut Boulevard in downtown Brentwood to the Contra Costa-San Joaquin county line (Contra Costa County, 2010a).

The character of SR 4 varies between SR 160 and the county line. The highway first passes through developed sections, including the downtown areas, of the suburban cities of Oakley and

Brentwood. This segment of the highway is generally four lanes. East of Brentwood the road narrows to two lanes as it passes through a rural area dominated by agricultural land uses. The agricultural landscape is characterized by row crops, orchards, and homes/farms with associated out buildings and infrastructure. Finally, just prior to reaching the county line, the highway skirts the southern edge of the unincorporated community of Discovery Bay. The visual quality of the area between Brentwood and Discovery Bay is generally representative of the agricultural areas adjacent to the APWRA that are common to southeastern Contra Costa County, with portions that can be considered distinctive and exemplary of natural scenic amenities of the area.

The Project area is located approximately 4 miles south of the closest segment of SR 4, meaning from the highway it would be viewed in the far background distance. Along the segment of SR 4 closest to the Project area, traffic volumes are high, estimated at 27,400 vehicles per day (Mark Thomas & Company, 2008). While the area that the highway passes through is flat, views of the hills to the west and southwest, and the wind energy facilities among them, vary greatly for motorists on different segments due primarily to intervening vegetation and structures that cause partial or full screening. However, the segment of SR 4 between the San Joaquin County line and the intersection with Sellers Avenue is unique in that views to the south and southwest are panoramic and generally unobstructed or only partially obstructed. Figure 4.1-2b, Photo 6, shows the view from the perspective of a motorist traveling west on SR 4, near the intersection with Discovery Bay Boulevard in the community of Discovery Bay, approximately 7 miles from the Project area. Wind turbines in background distance in the APWRA are an existing feature in the SR 4 viewshed. Motorists' views of the Project area would generally be of medium duration because they usually would not be facing the turbines directly. Visual sensitivity is considered moderate to high due to the representative/distinct visual quality of the area, the high number of viewers, medium view duration, medium to high visibility, and distance at which the Project would be viewed.

Camino Diablo

Camino Diablo is a two-lane road that is a County-designated scenic route (Contra Costa County, 2010a). The visual character of the landscape is a winding road through generally rural areas, with some development. The area is dominated by rolling hills and rural residential developments. Therefore, views range from open space with oak woodlands to rural, agricultural landscape characterized grazing areas, homes/farms and associated out-buildings, fences, and infrastructure such as road signs and utility lines. The visual quality of the area ranges from representative to distinctive and exemplary of natural scenic amenities of southeastern Contra Costa County.

In the Project area traffic volumes are low, estimated at 7,785 vehicles per day (Vasco Road to Walnut Boulevard segment) (Contra Costa County Traffic Engineering Division, 2005). The Project would be located approximately 2.5 miles south of Camino Diablo at its closest point, and therefore would be in background distance. The proposed turbines would be visible to motorists from locations on the eastern portion of the road, near Byron Highway, and at the intersection with Walnut Boulevard. However, from many locations on the road views would be fully screened by intervening hills, vegetation, and structures. Motorists' views would be of short to medium duration because they would not be directly facing the turbines. Figure 4.1-2b, Photo 7,

shows the view from the perspective of a motorist looking south from the intersection of Camino Diablo and Walnut Boulevard. From this location, views of the Project would be partially to fully screened by intervening hills to the south. Visual sensitivity is considered low to moderate due to the representative/distinct visual quality of the road, the low number of viewers, short to medium view duration, and limited visibility.

Walnut Boulevard

Walnut Boulevard is a two-lane road that is a County-designated scenic route (Contra Costa County, 2010a). The visual character of the landscape is flat and generally rural with some development, with views of hills to the south and west. The area is dominated by rural agricultural areas, residential developments, and some rural commercial areas including farm stands. Therefore, views range from a rural, agricultural landscape characterized by homes/farms and associated out-buildings and infrastructure, to more urbanized portions with residential developments and commercial areas. The Buena Vista wind project (which is adjacent to the Project area) is visible from some locations along the road. The visual quality of the area is generally representative of the rural residential areas adjacent to the APWRA, common to southeastern Contra Costa County, with portions that can be considered distinctive and exemplary of scenic amenities of the area.

In the Project area, traffic volumes on Walnut Boulevard are moderate, estimated at 17,840 vehicles per day (Contra Costa County Traffic Engineering Division, 2005). The Project would be located a minimum of approximately three miles to the south of Walnut Boulevard, and would be in the background distance. Partially screened views of the northernmost turbines would be visible to motorists from some locations on Walnut Boulevard, with full screening from intervening hills, range land, utility and other structures along most locations of the highway. Figure 4.1-2b, Photo 8, shows the view from the perspective of a motorist traveling south on Walnut Boulevard, just south of the intersection with Concord Avenue in unincorporated Contra Costa County. As shown in the photo, the existing Buena Vista wind project is visible in the background. Motorists' views of the Project would be similarly visible and, like views of Buena Vista, of short to medium duration and temporary as they traveled along the road. Visual sensitivity on Walnut Boulevard is considered moderate because of the representative/distinct visual quality of the road, the moderate number of viewers, short to medium view duration and limited visibility.

Byron Highway

Byron Highway is a two-lane County-designated scenic route that runs in a north-south and northwest-southeast direction (Contra Costa County, 2010a). The areas surrounding the road are flat and generally dominated by agricultural land uses. South of SR 4, wind energy facilities are visible in the hills to the south and southwest. Therefore, views generally encompass a rural, agricultural landscape characterized by crops and livestock, homes/farms, out-buildings, and infrastructure including farm roads, utility lines, and wind turbines. The visual quality of the area ranges from representative of the east and southeast portions of Contra Costa County, to distinctive and exemplary of natural scenic amenities of these areas.

The Project would be located approximately four miles to the west-southwest of Byron Highway, and would be within background views. In the vicinity of the Project, traffic volumes are moderate, estimated at 10,980 vehicles per day (Contra Costa County Traffic Engineering Division, 2005). Figure 4.1-2a, Photo 1, shows a view from a location just west of Byron Highway, in the general vicinity of Byron Airport, where Project turbines would be visible. As seen in the photo, to viewers on Byron Highway, wind turbines covering the hillside to the west/southwest of the road are the dominant feature in the viewshed. Motorists' views would be within background distance, of medium duration and open and panoramic as they traveled along the road. Taking into account the moderate number of viewers and the distinct visual quality of Byron Highway, visual sensitivity to the changes proposed by the Project is moderate to high.

Marsh Creek Road

Marsh Creek Road is a two-lane County road that generally runs in an east-west direction. The eastern portion of the road, between the SR 4 Bypass and SR 4, is a County-designated scenic highway, while the western portion of the road is a County-designated scenic route (Contra Costa County, 2010a). The visual character of the landscape is generally flat and rural, and views encompass a rural, agricultural landscape characterized by crops, homes/farms, out-buildings and infrastructure including farm roads, utility lines, and wind turbines. The visual quality of the area is generally distinctive and exemplary of scenic amenities of the southeastern County area, including rolling hillsides and farmland.

In the vicinity of the Project, traffic volumes along Marsh Creek road is low to moderate, estimated at 9,500 ADT vehicles per day (Mark Thomas and Company, 2011). The Project would be located approximately four miles south of March Creek Road, and would be within background views. Figure 4.1-2c, Photo 9, shows a motorist's view looking south from Marsh Creek Road near Byron Highway, and is exemplary of views in southeastern Contra Costa County. As seen on the left side of the photo, existing wind turbines at the Buena Vista Wind Energy Project are visible along the ridgeline of the hills in the far background. The proposed turbines would be to the right of the Buena Vista turbines. Views from some locations on Marsh Creek Road would be open and panoramic, while from other locations views would be partially screened by intervening structures, topography, and vegetation. The visual sensitivity to the changes proposed by the Project is moderate due to the distinct visual quality of Marsh Creek Road, medium view duration, low to moderate number of viewers, partially screened to open visibility, and background distance.

Morgan Territory Road

Morgan Territory Road is a one- to two-lane County road that generally runs in a northwest-southeast direction west of the Project area, and is a County-designated scenic route (Contra Costa County, 2010a). The road follows a portion of a designated scenic ridgeline in southern unincorporated Contra Costa County, and then travels in a valley between two scenic ridgelines, through Morgan Territory Regional Preserve. The visual character of the landscape is generally mountainous and rural with some residential development, with views of scenic ridgelines and the Preserve to the east and west. The area is dominated by undeveloped park areas within the Preserve, as well as low-density residential areas and farms in the more southern and far northern

portions of the road. Views range from pristine park land to a rural, agricultural landscape characterized by grazing areas, homes/farms and associated out-buildings, and infrastructure such as utility lines. Views of wind farms at lower elevations to the east are available from some locations along the road. The visual quality of the road is generally distinctive and exemplary of natural scenic amenities of the area.

Traffic volumes on Morgan Territory Road are low. The closest portion of the Project would be located approximately 4.2 miles east of the road. Partially screened views of the Project within background distance would be available to motorists from some locations along southern stretches of the road; however, from most locations views would be fully screened by intervening hills, vegetation, and structures. Figure 4.1-2c, Photo 10, shows the view from the perspective of a motorist on Morgan Territory Road looking due east towards the lower portion of Los Vaqueros Reservoir.[1] The reservoir is visible to the left of the farm structure and existing turbines are visible on the hills on the far side of the reservoir. Motorists' views of the Project would be few, intermittent and of short duration as they traveled along the road. Despite the distinct visual quality of the road, visual sensitivity to the changes proposed under the Project is considered low due to the short view duration, low number of viewers, and very limited visibility.

Park and Recreation Areas

Parks and recreational areas near the Project area include the Los Vaqueros Watershed, and three EBRPD regional preserves: Vasco Caves, Round Valley, and Morgan Territory. Round Valley and Morgan Territory Regional Preserves border the Los Vaqueros Watershed to the north and west, respectively. While the Project would not be visible from within preserve borders because of the preserves' locations on the far side of watershed ridgelines, since trails from both preserves continue into the watershed, visitors to the preserves who follow such trails would have views of the Project. Therefore, potential impacts on views from Morgan Territory and Round Valley Regional Preserves are analyzed in this document.

Based on relative rates of annual visitorship in the recreational areas in the vicinity of the Project, recreational volumes are classified as low (less than 30,000 visitors per year), moderate (30,000 to 100,000) and high (more than 100,000 visitors per year). Table 4.1-1 summarizes recreational areas in the Project area. For additional information on recreational areas, see Section 4.16, *Recreation*.

Los Vaqueros Watershed

The visual character of Los Vaqueros Watershed is defined by natural landscapes and man-made facilities and recreation areas including the reservoir itself, a marina, fishing areas, and many hiking trails. The area is dominated by Los Vaqueros Reservoir and surrounding grassy hills. Views within the watershed generally encompass the reservoir and associated features including boats and the marina, rolling grassy hillsides, grazing livestock, large oak trees, and other trees

[1] The view shown in Photo 10 represents one of the only places where the Project area can be clearly seen from Morgan Territory Road. This is due to the fact that substantial portions of Morgan Territory Road generally have intervening terrain between the road and the Project area. In many respects the view shown is fairly unique for motorists traveling the road.

and vegetation. Wind turbines are an established feature along a portion of the ridgeline east and southeast of the reservoir, and are visible from many locations throughout the watershed. The visual quality of the area is distinctive because, with the exception of the wind turbines, the natural foothills landscape has been largely preserved and unaltered.

Visitor data, documenting attendance by month over a 7-year period (July 2001 through June 2008), indicates that annual attendance ranges by year from 28,966 (year ending June 30, 2002) to 23,717 (year ending June 30, 2008) with most visits to the watershed occurring during spring (March to May) and autumn (September and October) (Los Vaqueros Draft EIR, 2009). Recreational use in fiscal year 2009 was approximately 24,300 visitors (Colby, 2010).

The Project would be visible to recreational users throughout the watershed, with views ranging from open and panoramic to obstructed. View duration would be short to medium from locations where recreational users are generally not facing the Project area, such as hiking trails that follow a north-south trajectory, but would be long for any users facing eastward. Figure 4.1-2c, Photo 11, shows the view from the reservoir's marina, looking east toward the Project area from a distance of just over two miles. While existing turbines at the Vasco Winds project are visible to the south of the Project area, hills to the east of the reservoir fully obscure views of the existing Tres Vaqueros Windfarm. Figure 4.1-2c, Photo 12, shows the view from the Los Vaqueros Shoreline Trail bordering the west side of the reservoir, looking southeast, approximately 2.5 miles from the Project. Again, the existing Tres Vaqueros turbines are screened by intervening topography. Figure 4.1-2d, Photo 13, shows the view from the Vista Grande Trail to the north of the reservoir, looking southeast toward the Project from a distance of just under two miles. The existing Tres Vaqueros turbines are just perceptible from this viewpoint, in the hills to the southeast of the reservoir. Turbines associated with other wind farms are also just perceptible due east, and to the south of the reservoir. From recreational areas including the marina, Los Vaqueros Shoreline Trail, and Vista Grande Trail, visual sensitivity is considered moderate to high due to the distinct visual quality of the watershed, the relatively close viewing distance from the Project, the open visibility and opportunities for long view durations. The low number of viewers does partially offset these other factors.

Two non-hiking or fishing areas that are nonetheless frequented by visitors to the watershed are the Los Vaqueros Interpretive Center and the Los Vaqueros Watershed Office. The Interpretive Center is located north of Los Vaqueros Reservoir, in close proximity to the dam. Figure 4.1-2d, Photo 14, shows the view from the Interpretive Center parking lot, looking east, approximately 1.2 miles from the Project. From this location, views of the existing Tres Vaqueros Windfarm are fully obscured by intervening hills. However, the Project would be visible from the Interpretive Center, as the new turbines would be both taller and closer than existing turbines. Specifically, the blades and towers of some turbines would be visible from this location, while other turbines would be fully screened by intervening topography. Given the distinct visual quality of the location, low number of viewers, and open to fully obscured views of the turbines, visual sensitivity from the Interpretive Center is considered moderate. Figure 4.1-2d, Photo 15, shows the view from the Los Vaqueros Watershed Office, approximately one mile north of the Project. The Watershed Office is located on Walnut Boulevard (south of the designated scenic portion),

which leads into the watershed, and provides a location for recreational visitors to purchase fishing permits. From this location, views of the existing Tres Vaqueros Windfarm are generally obscured by intervening hills to the south, though portions of some existing turbines are visible along the ridgeline, as seen on the left side of Photo 15. The visual quality of the area is generally distinctive and exemplary of natural scenic amenities of the area. The number of visitors is low, but visitors would have open and panoramic views of the turbines for a short period of time. As such, visual sensitivity would be moderate.

Regional Preserves

Vasco Caves Regional Preserve. The Vasco Caves Regional Preserve is a cultural resource site located within and adjacent to the Project area to the south. The visual character of the landscape is comprised of a combination of scenic resources, including spectacular rock outcrops and rolling foothills. Views primarily encompass robust grasslands and the Vasco Caves archaeological site. The preserve also provides views of existing wind energy facilities, including the Tres Vaqueros Windfarm to the north, the Vasco Winds Wind Energy Facility to the south and west, and the Buena Vista Wind Energy Project to the east. Generally, the visual quality of the area is distinctive because of the rolling hills and outcrops and further increased with the presence of unique archaeological artifacts and the associated Vasco Caves site.

Access to the preserve is by advance-reservation, guided tours only. According to the EBRPD, public access to the preserve is limited (total annual visits averaged 256 persons from 2008 through 2010) and visitors generally are not allowed to venture far beyond the established guided tour route. Figure 4.1-2d, Photo 16, shows the view of the Project area from a landing near the preserve caretaker's residence, which is the starting point for tours of Vasco Caves. As shown in the photo, visitors to the preserve have open and panoramic views of the existing Tres Vaqueros Windfarm to the north within foreground distance. The duration of views would be of medium duration, as hikers would have clear views of the turbines for a portion of one-third of the 3.5 hour tour. Visual sensitivity is considered moderate to high because of the distinct visual quality of the preserve, medium view duration, and open visibility. The low number of viewers is partially offset by the higher than normal expectations for reservation-only visitors.

Morgan Territory Regional Preserve. As discussed above, the Project would not be visible from within Morgan Territory Regional Preserve boundaries. Figure 4.1-2e, Photo 17, shows the view at the edge of the eastern preserve boundary, where the Whipsnake Trail exits the preserve and enters the Los Vaqueros Watershed. As seen in the photograph, topography and vegetation fully obscure views of the Project area. Nevertheless, the Project would be visible to hikers following the Whipsnake and Miwok trails from the eastern portion of preserve into the Los Vaqueros Watershed, and therefore would be visible to park visitors. The visual character of the landscape at the preserve and outgoing trails is scenic parkland, dominated by annual grassland and oak trees, sandstone hills, wildflowers and a variety of wildlife species. Expansive ridgetop views include Mount Diablo to the west, Mount St. Helena to the north, and the Sierra to the east. The trails extending to the east outside of the Preserve offer middleground and background views of Los Vaqueros Reservoir and wind turbines on the eastern hills of the reservoir. The visual quality of the area is distinctive because the natural landscape has been largely preserved and unaltered.

Recreational use is moderate at the preserve, estimated at 76,541 visitors in 2009 (Kenny, 2010). However, not all of these visitors would follow the Miwok or Whipsnake trails out of the Preserve's boundaries into the watershed, and the number of viewers who follow the Miwok and Whipsnake trails out of the preserve is estimated to be low, at less than 1,000 hikers annually (Caufield, 2010). Views of the Project area to hikers on these trails would range from open and panoramic to fully obscured by vegetation and topography, from a distance of approximately four miles. Figure 4.1-2e, Photo 18, shows the view looking east from the Upper Whipsnake Trail where it first offers a view of the Project area, in the Los Vaqueros Watershed. The view includes Los Vaqueros Reservoir and surrounding features, including rolling hills, oak trees, and utility poles in the foreground and middleground, and existing turbines including the Tres Vaqueros Windfarm and other wind farms in the background. The duration of hikers' views would range from medium to long, as views would be available from many locations on the 1.6 mile Miwok and 9.6 mile Whipsnake trails; however, hikers would generally not be directly facing the Project area (EBRPD, 2010; CCWD, 2010). Visual sensitivity is considered moderate to high due to the distinct visual quality of the preserve, the low number of viewers, medium to long view duration, and open visibility.

Round Valley Regional Preserve. As discussed above, the Project would not be visible from within Round Valley Regional Preserve boundaries. Figure 4.1-2e, Photo 19, shows the view at the southern edge of the preserve, where the Miwok Trail exits the preserve and enters Los Vaqueros Watershed. The fence in the photo delineates the southern boundary of the preserve. As seen in the photograph, topography and vegetation fully obscure views of the Project area. Nevertheless, the Project would be visible to hikers following the Miwok Trail from the southern portion of the preserve into Los Vaqueros Watershed, and therefore would be visible to park visitors. The visual character of the landscape at the preserve and outgoing trails is scenic parkland, dominated by non-native grassland, oak woodland/savannah, shrubland and riparian woodland plant communities, wildflowers and a variety of wildlife species. The Miwok Trail leading out of the preserve to the south offers middleground views of Los Vaqueros Reservoir and background views of wind turbines. The visual quality of the area is distinctive because the natural landscape has been largely preserved and unaltered.

Recreational use at the preserve is high, estimated at 135,227 visitors in 2009 (Kenny, 2010). However, not all of these visitors would follow the Miwok Trail out of the preserve boundaries into the watershed, and as discussed under Morgan Territory Regional Preserve, the number of viewers to follow the Miwok Trail between the Round Valley and Morgan Territory regional preserves is low. Views of the Project area available to hikers on the Miwok Trail would be partially to fully obscured by topography and vegetation, from a distance of approximately four miles. Figure 4.1-2e, Photo 20, shows the view from the Miwok Trail where it first provides a view of the Project area, in Los Vaqueros Watershed looking south. The view includes Los Vaqueros Reservoir and surrounding features, including rolling hills and oak trees in the foreground and middleground, and existing wind turbines from the Vasco Winds project to the south of the Project area in the background. The existing Tres Vaqueros Windfarm is not visible from this vantage point, and the Project would only become visible as hikers continued south on the trail, well into the watershed. The length of hikers' views would be medium to long, as views

would be available from numerous locations on the Miwok Trail further into the watershed. Visual sensitivity is considered moderate due to the distinct visual quality of the preserve, the low number of viewers, medium to long view duration, and limited visibility.

Scenic Ridges

As stated in Section 9.6, *Scenic Resources*, of the Contra Costa County General Plan, "Contra Costa County is perceived by many as a desirable place to live and work. A major component in that perception is the scenic vistas that are available throughout the County… [including] scenic ridges, hillsides and rock outcroppings…The largest and most prominent of these hills form the backdrop for much of the developed portions of the area. Views of these major ridgelines help to reinforce the rural feeling of the County's rapidly growing communities. These major ridges provide an important balance to current and planned development" (Contra Costa County, 2010a). While no designated scenic ridges are located within the Project area, the County has two designated scenic ridges in the vicinity of the Project area, both of which pass through Morgan Territory Regional Preserve (see Figure 4.1-1) and into Los Vaqueros Watershed. The western ridge generally parallels the west side of Morgan Territory Road, eventually crossing the road, trending northwest-southeast, for approximately 10 miles. The eastern ridge generally parallels the east side of Morgan Territory Road, also trending northwest-southeast, for approximately eight miles. Views of the ridges are available from Los Vaqueros Watershed, all three regional preserves discussed in this section, and numerous roads within Contra Costa and Alameda counties. Because the scenic ridges are visible over such a wide geographic area, views range from open and panoramic to fully obstructed (by structures and vegetation), view duration ranges from short to long, and viewer distance ranges from close-up (foreground) to far (background). Given the significance of the scenic ridges, visual sensitivity is considered high.

Visual Sensitivity

Visual sensitivity is a composite measurement of the overall susceptibility of an area or viewer group to adverse visual or aesthetic impacts, given the combined factors of landscape visual quality, viewer types, volumes, and exposure conditions. Table 4.1-1 summarizes the visual sensitivity of the major viewer types that would be affected by the Project, as discussed in previous sections.

4.1.2.2 Regulatory Setting

Federal

Federal Aviation Administration

Federal Aviation Administration (FAA) regulations require lighting on structures over 200 feet tall. Through its Notice of Proposed Construction or Alteration (Form 7460.1), the FAA would review the Project prior to construction (14 Code of Federal Regulations [CFR] Part 77). Recommendations on marking and lighting structures vary depending on terrain, local weather patterns, geographic location, and, in the case of wind energy facilities, the cumulative number of towers and overall site layout.

As a result of its review process, the FAA might recommend that tower markings or aviation safety lighting be installed on all or only a portion of the proposed turbine towers. Lighting must be in compliance with FAA Obstruction Marking and Lighting Advisory Circular 70/7460-1K, Change 2. Intensity of the lights would be based on a level of ambient light, with illumination below two foot-candles being normal for the night and illumination of above five foot-candles being standard for the day. On recent wind energy projects, white flashing lights were used during the daytime and red flashing lights were used at night to warn aviators away from the area. The FAA has changed the requirement to only a red flashing light at night.

State of California

California Scenic Highway Program

In 1963, the California legislature created the Scenic Highway Program to protect scenic highway corridors from changes that would diminish the aesthetic value of lands next to the highways. The state statutes governing the Scenic Highway Program are found in the Streets and Highways Code, Section 260 et seq. A highway may be designated as “scenic” depending on how much of the natural landscape can be seen by travelers, the scenic quality of the landscape, and the extent to which development intrudes upon travelers’ enjoyment of the view. New visual intrusions in views from State Eligible Scenic Highways could impact their future designation as Scenic Highways.

No state-designated scenic routes are in the immediate vicinity of the Project area. Contra Costa County contains two state-designated scenic highways (Interstate 680 and SR 24), neither of which is near or has views of the Project area. As discussed above, a portion of SR 4 in Contra Costa County is an eligible State Scenic Highway (Caltrans, 2010). The Project area is located approximately four miles south of SR 4, and approximately five miles south of the eligible State Scenic Highway portion of SR 4. Interstate 580 (I-580) in Alameda County is also an eligible State Scenic Highway, and is located approximately 6.5 miles south of the Project area. However, the Project would not be visible to motorists on I-580, as views would be fully screened by intervening topography.

Contra Costa County

Contra Costa County General Plan

As discussed above in Section 4.1.2 *Setting*, the County General Plan designates many scenic resources in the County, including roads, highways, and ridges. The General Plan also designates scenic waterways (none of which are located in the vicinity of the Project) and states that the County has many smaller, localized scenic resources such as isolated hilltops, rock outcroppings, mature stands of trees, lakes, reservoirs, and other natural features that, although not designated as scenic resources, should be treated as providing aesthetic opportunities (Contra Costa County, 2010a).

Furthermore, the General Plan contains goals and policies that are applicable to all development projects in the unincorporated areas of the County. Examples are goals and policies that preserve

and protect areas of identified high scenic value, as well as the ecological, cultural/historic, scenic, and recreational resources lands of the County; protect major scenic ridges from development of structures and roadways, and other activities which would harm their scenic qualities; restore the natural contours and vegetation of land after grading and other land disturbances; design public and private projects to minimize damage to significant trees and other visual landmarks; restrict commercial wind energy facilities to the south Byron Hills portion of the County; and ensure that all new wind turbine applications comply with the site-specific criteria included in the wind energy conversion systems regulations in the County Code (Contra Costa County, 2010a).

Contra Costa County Code

The County Code addresses aesthetic issues pertaining to wind energy facilities in Chapter 88-3 Wind Energy Conversion Systems (WECS) (Contra Costa County, 2010b). This ordinance specifies that all WECS be of a non-reflective, unobtrusive color, and that all buildings and structures associated with WECS be sited to minimize visual impact to residences within one mile, adjacent roadways, and County scenic routes. The ordinance also provides guidance pertaining to signs posted on wind energy sites, and requires a reclamation plan prior to the establishment or expansion of any WECS. Among other provisions, the reclamation plan must identify the specific properties it applies to; indicate removal of all buildings, structures, WECS, and foundations to three feet below finish grade; and ensure all regrading and revegetation necessary to return the subject property to the condition existing prior to establishment or expansion of the WECS (Contra Costa County, 2010b).

4.1.3 Project Baseline

Baseline views include those described above in Section 4.1.2.1, *Regional and Local Setting*, and documented in Figures 4.1-2a through 4.1-2e. These include views from scenic and major roadways, recreational areas, and views of designated scenic ridges. Baseline conditions reflect views of 91 turbines (ranging from approximately 90 to 174 feet tall), overhead electrical lines, the substation, the O&M Building, and on-site roadways. On-site lighting consists of lighting at the substation and the O&M Building with no external lighting at the turbines. Lighting at the substation includes one large area light located at the manual disconnect switch, which was off-line when the wind farm ceased operation in 2009. The O&M Building has three exterior lights: one facing the road, one facing the entrance to the building, and one facing the back side of the building toward the fuel tanks. Prior to shut-down, the first two of these lights were left on 24 hours a day, seven days a week, and were high intensity mercury vapor lamps. The Project area also is used as a grazing area for livestock, and maintenance and operations activities at the site visible to viewers include truck trips for turbine maintenance, repair and replacement, as well as trucks associated with grazing and ranching.

As described in the setting, one or more of these features can be viewed from public areas, as indicated in Figure 4.1-1. These public areas include scenic or major roadways and recreational areas, including Vasco Road, SR 4, Marsh Creek Road, Camino Diablo, Walnut Boulevard, Byron Highway, and Morgan Territory Road, the Los Vaqueros Watershed, and the Vasco Caves, Morgan Territory, and Round Valley regional preserves (see Figure 4.1-1 and Figures 4.1-2a

through 4.1-2e). Descriptions of the visual quality of the Project area and views from these locations are provided in Section 4.1.2.1.

4.1.4 Significance Criteria

Based on CEQA Guidelines Appendix G, a project would cause adverse impacts to visual/aesthetic resources if it would:

a) Have a substantial adverse effect on a scenic vista;

b) Substantially damage scenic resources, including but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway;

c) Substantially degrade the existing visual character or quality of the site and its surroundings; or

d) Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.

Definition and Use of Significance Criteria

The determination of impact significance is based on combined factors of visual sensitivity and the degree of adverse visual change that the Project would cause. In the context of the Appendix G criteria, an adverse impact to visual/aesthetic resources may occur when: (1) an action perceptibly changes the existing physical features of the landscape that are characteristic of the region or locale; (2) an action introduces new features to the physical landscape that are perceptibly uncharacteristic of the region or locale, or become visually dominant in the viewshed; or (3) an action blocks or totally obscures aesthetic features of the landscape. Determining the significance of visual changes in the landscape depends on how noticeable the Project features would be from different views, and varying viewing conditions (angle of view, distance, and primary viewing directions) from which the Project could be seen. The primary elements in determining the significance of overall visual change caused by the Project are visual contrast, Project dominance, and view blockage, as discussed below.

Visual Contrast

Visual contrast is a measure of the degree of change in line, form, color, and texture that the Project would create, when compared to the existing landscape. Visual contrast ranges from none to strong, and is defined as:

- *None* – The contrast between Project elements and the existing landscape is not visible or perceived.
- *Weak* – The element contrast can be seen but does not attract attention.
- *Moderate* – The Project elements begin to attract attention, but are not so strong that they could dominate the characteristic landscape.

- *Strong* – The element contrast demands the viewer's attention and cannot be overlooked.

Project Dominance

Visual dominance is a measure of a project feature's apparent size relative to other visible landscape features in the viewshed, or seen area. A feature's dominance is affected by its relative location in the viewshed and the distance between the viewer and feature. The levels of visual dominance are:

- *Subordinate* – Where the new feature(s) would be visible, but would not be the primary object(s) in the view;
- *Co-dominant* – Where the new feature(s) share the viewers attention with other existing features in the view; and
- *Dominant* – Where the new feature(s) demand the viewer's attention over existing features of the view.

View Blockage or Impairment

View blockage or impairment is a measure of the degree to which a project's features would obstruct or block views to aesthetic features due to the project's position and/or scale. Blockage of aesthetically pleasing landscape features or views can cause adverse impacts, particularly in instances where scenic or view orientations are important to the use, value or function of a particular land use.

Overall Adverse Visual Impact

As stated above, the determination of impact significance is based on combined factors of visual sensitivity and the degree of visual change that the Project would cause. The inter-relationship of these two overall factors in determining whether adverse visual impacts are significant is shown in Table 4.1-2. For reference, visual sensitivities are identified in Table 4.1-1 and the Overall Degree of Visual Change is addressed in the impact discussions following Table 4.1-2.

4.1.5 Discussion of No Visual/Aesthetic Impacts

Comparison of the baseline conditions and Project characteristics shows that the Project would have impacts with respect to each of the significance criteria.

4.1.6 Discussion of Impacts and Mitigation Measures

As explained in Chapter 3, *Project Description*, all 91 existing turbines would be removed and replaced with up to 21 new turbines, resulting in a net reduction of at least 70 turbines. The new turbine towers would be tubular instead of lattice, and would be significantly taller than the existing turbines. Specifically, at 429 feet tall, the new turbines would range from 3.3 to 4.8 times larger than existing turbines. Some of the new turbines would be fitted with FAA-approved safety lighting. The electrical collector cables would be placed in trenches and buried underground between turbine locations, and a new O&M Building would be constructed. Additional Project

TABLE 4.1-2
GUIDELINES FOR DETERMINING ADVERSE VISUAL IMPACT SIGNIFICANCE

Overall Visual Sensitivity	Overall Degree of Visual Change				
	Low Lo	w to Moderate Modera	te	Moderate to High High	
Low	Not Significant	Not Significant	Adverse, but Not Significant	Adverse, but Not Significant	Adverse, but Not Significant
Low to Moderate	Not Significant	Adverse, but Not Significant	Adverse, but Not Significant	Adverse, but Not Significant	Adverse, but Not Significant
Moderate	Adverse, but Not Significant	Adverse, but Not Significant	Adverse, but Not Significant	Adverse and Potentially Significant	Adverse and Potentially Significant
Moderate to High	Adverse, but Not Significant	Adverse, but Not Significant	Adverse and Potentially Significant	Adverse and Potentially Significant	Significant
High	Adverse, but Not Significant	Adverse and Potentially Significant	Adverse and Potentially Significant	Significant	Significant

Not Significant impacts may or may not be perceptible and are considered minor in the context of existing landscape characteristics and view opportunity.

Adverse, but Not Significant Impacts are perceived as negative but would not substantially alter the landscape to a degree that would conflict with significance criteria of CEQA Appendix G.

Adverse and Potentially Significant Impacts are perceived as negative and may, depending on Project- and site-specific circumstances, substantially alter the landscape to a degree that would conflict with significance criteria of CEQA Appendix G.

Significant impacts with feasible mitigation may be reduced to less-than-significant levels or avoided all together. Without mitigation or avoidance measures, significant impacts would conflict with significance criteria of CEQA Appendix G.

elements include: a temporary three-acre staging/laydown area to be used for storage of turbine components, construction equipment, supplies, and office trailers, as well as equipment marshalling; construction of a new internal road system; decommissioning of existing roads not used for the Project; and improvements to the existing Tres Vaqueros substation.

End of Life Decommissioning

The Project would be decommissioned at the conclusion of its useful life (assumed to be greater than or equal to 30 years). Decommissioning would involve dismantling and removing Project components and restoring the site to its pre-development topographical and vegetative conditions. All above-ground facilities, foundations, and related systems would be removed to a depth of at least three feet below grade per County ordinance. As such, decommissioning would remove industrial features from the viewshed.

Activities relating to the decommissioning process would likely have impacts similar to initial construction of the Project. Those impacts are evaluated below. However, decommissioning ultimately would result in improved aesthetic conditions overall. Therefore, impacts from the final decommissioning of the Project would be beneficial, and are not further evaluated in this analysis.

Visual Simulations

The visual simulations represent "before and after" views of the Project area. The views were selected by the County, with input from CCWD and EBRPD, to represent a broad set of views of the Project in the surrounding landscape. Simulations were created for accuracy using computer generated three-dimensional models of the proposed equipment and 'viewed' in the computer from locations that directly correspond to the actual photo points on the ground. The image of the proposed turbines from the appropriate perspective then was superimposed into the photograph and rendered. The evaluation of potential impacts associated with the Project is based, in part, on comparing the "before" and "after" visual conditions as portrayed in the set of simulations and assessing the degree of visual change that the Project would cause. Significance determinations are based on the evaluation criteria described above.

The simulations illustrate the location, scale, and conceptual appearance of the Project as seen from 11 key viewing locations in eastern Contra Costa County. Figure 4.1-1 indicates the viewpoint locations for the visual simulations in Figures 4.1-3 through 4.1-13. The visual simulations are presented in color, two images per page with the existing visual condition photograph at the top of the page (image a) and a simulation depicting the proposed layout at the bottom of the page (image b). Most of these images were photographed in April 2010, with the exception being Figure 4.10 which was photographed in January 2011. The simulation viewpoints are summarized below in Table 4.1-3.

TABLE 4.1-3
SIMULATION VIEWPOINTS

Figure	Corresponding Photo Number on Figure 4.1-1 (VP)	Description of View	Direction of View	Approximate Distance to Project (miles)
4.1-3	2	Tres Vaqueros Windfarm (not a public viewing location[a])	NW	Within Project
4.1-4	16	Vasco Caves Regional Preserve	N	Within Project
4.1-5	4	Vasco Road 1.6 miles south of intersection with Camino Diablo	W/SW	1.5
4.1-6	5	Vasco Road 3.3 miles south of intersection with Camino Diablo	W/SW	0.5
4.1-7	13	Los Vaqueros Watershed, Vista Grande Trail	E/SE	2.0
4.1-8	12	Los Vaqueros Watershed, Los Vaqueros Shoreline Trail	E	2.5
4.1-9	11	Los Vaqueros Watershed Marina	N/NE	1.8
4.1-10	15	Los Vaqueros Watershed Office	S	0.5
4.1-11	18	Los Vaqueros Watershed east of Morgan Territory Regional Preserve	E	4.0
4.1-12	14	Los Vaqueros Watershed Interpretive Center	E/SE	0.8
4.1-13	9	Marsh Creek Road near Byron Highway	SE/S	2.5

NOTES:

[a] this view point was provided at the request of EBRPD staff during consultation.

a: Existing view from south edge of Project Site (VP 2)

b: Visual simulation of Project

SOURCE: Environmental Vision

Tres Vaqueros Windfarm Repowering Project . 209132

Figure 4.1-3
Visual Simulation

a: Existing view from Vasco Caves (VP 16)

b: Visual simulation of Project

SOURCE: Environmental Vision

Tres Vaqueros Windfarm Repowering Project . 209132

Figure 4.1-4
Visual Simulation

a: Existing view from Vasco Road (VP 4)

b: Visual simulation of Project

SOURCE: Environmental Vision

Tres Vaqueros Windfarm Repowering Project . 209132

Figure 4.1-5
Visual Simulation

a: Existing view from Vasco Road (VP 5)

b: Visual simulation of Project

SOURCE: Environmental Vision

Tres Vaqueros Windfarm Repowering Project . 209132

Figure 4.1-6
Visual Simulation

a: Existing view from Los Vaqueros Vista Grande Trail (VP 13)

b: Visual simulation of Project

SOURCE: Environmental Vision

Tres Vaqueros Windfarm Repowering Project . 209132

Figure 4.1-7
Visual Simulation

a: Existing view from Los Vaqueros Shoreline Trail (VP 12)

b: Visual simulation of Project

SOURCE: Environmental Vision

Tres Vaqueros Windfarm Repowering Project . 209132

Figure 4.1-8
Visual Simulation

a: Existing view from Los Vaqueros Marina (VP 11)

b: Visual simulation of Project

SOURCE: Environmental Vision

Tres Vaqueros Windfarm Repowering Project . 209132

Figure 4.1-9

Visual Simulation

a: Existing view from Los Vaqueros Watershed Office (VP 15)

b: Visual simulation of Project

SOURCE: Environmental Vision

Tres Vaqueros Windfarm Repowering Project . 209132

Figure 4.1-10

Visual Simulation

a: Existing view from Whipsnake Loop Trail / Morgan Territory (VP 18)

b: Visual simulation of Project

SOURCE: Environmental Vision

Tres Vaqueros Windfarm Repowering Project . 209132

Figure 4.1-11
Visual Simulation

a: Existing view from Los Vaqueros Reservoir Interpretive Center looking east/southeast (VP 14)

b: Visual simulation of Project

SOURCE: Environmental Vision

Tres Vaqueros Windfarm Repowering Project . 209132

Figure 4.1-12
Visual Simulation

a: Existing view from Marsh Creek Road (VP 9)

b: Visual simulation of Project

SOURCE: Environmental Vision

Tres Vaqueros Windfarm Repowering Project . 209132

Figure 4.1-13
Visual Simulation

THIS PAGE INTENTIONALLY LEFT BLANK

Summary of Visual Change in Simulations

The overall degree of visual change was evaluated in the 13 visual simulations by comparing the existing views, typically with older wind turbines, with views of the Project's larger, but fewer turbines. The overall degree of visual change considers changes in contrast, levels of dominance, and degree of blockage, as described previously. A summary of the overall degree of visual changes is presented in Table 4.1-4, below. The last column, "Potential Significance of Changes" is derived from Table 4.1-2 by comparing the overall degree of visual change with the described visual sensitivity of the setting.

TABLE 4.1-4
SUMMARY OF VISUAL SENSITIVITY, DEGREE OF VISUAL CHANGE AND SIGNIFICANCE

Figure #	Description of View	Approximate Distance to Project (miles)	Visual Sensitivity	Overall Degree of Visual Change	Potential Significance of Changes (Table 4.1-2)
4.1-3	Tres Vaqueros Windfarm (not a public viewing location)	Within Project area	N/A[a]	Moderate to High	N/A[a]
4.1-4	Vasco Caves Regional Preserve	Within Project area	Moderate to High	Moderate	Potentially Significant (Beneficial)
4.1-5	Vasco Road 1.6 miles south of intersection with Camino Diablo	1.5	High	Low	Adverse, not Significant
4.1-6	Vasco Road 3.3 miles south of intersection with Camino Diablo	0.5	High	Low	Adverse, not Significant
4.1-7	Los Vaqueros Watershed, Vista Grande Trail	2.0	Moderate to High	High	Significant
4.1-8	Los Vaqueros Watershed, Los Vaqueros Shoreline Trail	2.5	Moderate to High	Moderate to High	Potentially Significant
4.1-9	Los Vaqueros Watershed Marina	1.8	Moderate to High	Moderate to High	Potentially Significant
4.1-10	Los Vaqueros Watershed Office	0.5	Moderate	Moderate to High	Potentially Significant
4.1-11	Los Vaqueros Watershed east of Morgan Territory Regional Preserve	4.0	Moderate to High	Moderate to High	Potentially Significant
4.1-12	Los Vaqueros Watershed Interpretive Center	0.8	Moderate	Moderate to High	Potentially Significant
4.1-13	Marsh Creek Road near Byron Highway	2.5	Moderate	Low to Moderate	Adverse, not Significant

NOTES:

[a] This view point was provided at the request of EBRPD staff during consultation. As this view point is not from a public viewing location, evaluation of the CEQA significance is not applicable.

Analysis

a) Would the Project have a substantial adverse effect on a scenic vista?

As discussed in the Section 4.1.2, *Setting*, the Contra Costa County General Plan states that a major component to the perception that Contra Costa County is a desirable place to live and work is the scenic vistas that are available throughout the County. The General Plan specifically protects views of designated scenic ridges, but also recognizes the visual quality of the many smaller, localized scenic resources such as isolated hilltops, rock outcroppings, mature stands of trees, lakes, reservoirs, and other natural features in the County (Contra Costa County, 2010a). Therefore, for purposes of this CEQA analysis, "scenic vista" encompasses views of County-designated scenic ridges, as well as views from publically accessible scenic hillsides, rock outcroppings, and reservoirs. These include:

- Los Vaqueros Watershed
- Vasco Caves Regional Preserve
- Morgan Territory Regional Preserve
- Round Valley Regional Preserve
- The County-designated scenic ridge along and to the east of Morgan Territory Road
- The County-designated scenic ridge to the west of Morgan Territory Road

As explained below, construction, operation and maintenance, and decommissioning of the Project would result in impacts on scenic vistas. Other scenic resources and viewpoints, including scenic ridges and scenic highways, are discussed below under Impacts 4.1-3 and 4.1-4, respectively.

Impact 4.1-1: Construction of the Project, decommissioning of the existing turbines, and the process of decommissioning the Project at the end of its life, would have a substantial adverse effect on views from Vasco Caves Regional Preserve. (*Less-than-Significant Impact with Mitigation Incorporated*)

Construction/Decommissioning

Construction-related impacts to visual quality would occur during decommissioning of the existing wind energy facility, construction of the Project, and decommissioning of the Project at the end of its life (assumed to be 30-plus years). Potential impacts resulting from the presence of construction areas, equipment, materials, and work crews within the Project area and on local access roads would be relatively short-term (i.e., approximately 12 months for initial decommissioning and construction and up to four months for end-of-life decommissioning).

The closer a scenic vista is to the Project area, the more susceptible it is to construction- and decommissioning-related visual impacts. From most of the scenic vista points (the exceptions being Vasco Caves Regional Preserve, which is discussed below, and Round Valley Regional Preserve), construction equipment and activities would be visible within middle ground and background range. At these distances, most construction equipment and activities would appear as small features within the landscape; however, the tall cranes the Project would employ would be nearly as prominent in the open hillside environment as the turbines themselves. Construction

equipment would be skylined when work occurred on or near ridgelines, which would likely increase its visibility. However, given the distances from which construction and decommissioning activities normally would be viewed, visual contrast from all scenic vistas except Vasco Caves Regional Preserve would be weak. Also because of the distance, construction and decommissioning activities would not dominate viewsheds and would not block scenic views. For most of the scenic vistas, which range in visual sensitivity from moderate to high, construction and decommissioning activities would generally result in a low degree of visual change and impacts would be adverse but less than significant.

Decommissioning of existing turbines and construction and decommissioning of new turbines would occur in close proximity to Vasco Caves Regional Preserve. While most decommissioning and new turbine and road construction would occur behind ridges and within middleground and background distances, decommissioning of some existing turbines and construction of some D- and E-string turbines and some roads would occur within foreground distances of the preserve. Close-up views of construction equipment would attract attention, particularly during the westernmost portion of the Vasco Caves guided tour where existing and proposed turbines locations are closest to visitors. From the trail where views of construction activities would be within foreground distance (depicted in Figure 4.1-4), construction activities would temporarily co-dominate the landscape with the turbines and create a moderate to strong visual contrast. Construction equipment would not block views of the Vasco Caves, due to the equipment's position north and northwest of the caves and the tour route, but would temporarily increase viewers' perception of the area as being somewhat industrial. As such, construction and decommissioning activities would represent a temporary but moderate degree of visual change. Because of the moderate to high visual sensitivity of the site, temporary construction impacts would be potentially significant. Implementation of Mitigation Measures 4.1-1a and 1b would reduce temporary impacts to a less-than-significant level.

> **Mitigation Measure 4.1-1a:** The Applicant shall not place equipment or materials in laydown areas visible from Vasco Caves tours any sooner than two weeks prior to their required use.
>
> **Mitigation Measure 4.1-1b:** All laydown areas visible from the Vasco Caves tour route shall be visually screened using 12-foot tall temporary fencing. Fencing shall incorporate aesthetic treatment through use of appropriate, non-reflective materials, such as chain link fence with light brown or green vinyl slats. The Applicant shall submit final construction plans demonstrating compliance with this measure to the County Zoning Administrator for review and approval at least 30 days prior to issuance of grading permits or building permits.
>
> Alternatively, the Applicant may coordinate with the East Bay Regional Park District to schedule construction of those turbines whose laydown areas would be visible from the Vasco Caves tour route during times when tours would not be conducted.

Significance of Impact after Mitigation: Less than Significant.

Operation and Maintenance

Impact 4.1-2: Operation and maintenance of the Project would have a substantial adverse effect on scenic vistas. (*Significant and Unavoidable Impact*)

Los Vaqueros Watershed: Vista Grande Trail

Figure 4.1-7 shows existing and simulated views from the Vista Grande Trail in Los Vaqueros Watershed recreational area, looking southeast toward the Project. The trail follows a ridgeline to the north of Los Vaqueros Reservoir, and provides scenic vista points looking out over the reservoir with clear views of the water, recreational areas, and the Project area. To hikers on the trail, as portrayed in the simulation in Figure 4.1-7b, the Project would appear within a backdrop of the reservoir, rolling hills, and sky. At the foreground and middleground distances the Project turbines, like the existing turbines, would be seen clearly. Despite being fewer in number than the existing turbines, the proposed turbines would dominate the landscape to a greater extent. The new turbines would be substantially taller and closer than the existing turbines and would be spread across a wider area, causing them to be more visually prominent and noticeable. Visual contrast would be strong, primarily due to the stark white color of the turbines being highly visible against the hillsides. Overall, the degree of visual change would be high. Considering the moderate to high visual sensitivity of the Vista Grande Trail and connecting trails within Los Vaqueros Watershed, the impact would be significant. Implementation of Mitigation Measure 4.1-2 would help to soften the appearance of the proposed turbines, but would not mitigate the visual impact to less-than-significant level.

> **Mitigation Measure 4.1-2:** All turbines shall be painted light gray and treated with a non-reflective finish. The Applicant shall submit proposed color finishes with final construction plans demonstrating compliance with this measure to the County Zoning Administrator for review and approval at least 30 days prior to issuance of building permits.

Significance of Impact after Mitigation: Significant and Unavoidable.

Los Vaqueros Watershed: Los Vaqueros Shoreline Trail

Figure 4.1-8 shows existing and simulated views of the Project from the Los Vaqueros Shoreline Trail, located on the western edge of the reservoir. This view represents a vantage point approximately 2.5 miles from the Project area. As seen from the simulation, to visitors at this vista point, turbines in the Project area would appear on the ridgeline among the rolling grassy hills across the reservoir, against a backdrop of sky. Industrial infrastructure including transmission towers and turbines at the Vasco Winds project to the south of the Project area are established features in the visual setting; however, the existing Tres Vaqueros Windfarm is not currently visible. As a result, the Project would cause an increase in structure prominence within the landscape. The resulting visual contrast would be moderate, as the Project turbines would attract attention atop the hills, but would not dominate the viewshed. When backdropped by the blue sky the contrast is high; however on less-than-perfectly clear days, the light-colored turbines would blend somewhat into grayer skies. The bases of the turbines would be behind the ridge.

Thus, the turbines would be about one-half to two-thirds the overall relative height of the hills when viewed from across the reservoir.

Implementation of Mitigation Measure 4.1-2 would lessen the visual impact to visitors. Although the turbines that would be seen from this vista point would be skylined and would not appear against a backdrop of hills, towers painted light gray would present less of a visual contrast than turbines painted stark white, resulting in decreased visual prominence and Project dominance. However, even with mitigation, the visual change from the Los Vaqueros Shoreline Trail would remain moderate to high, and impacts would be significant.

Significance of Impact after Mitigation: Significant and Unavoidable.

Los Vaqueros Watershed: Marina

Figure 4.1-9 shows existing and simulated views from the Los Vaqueros marina located on the southwest corner of Los Vaqueros Reservoir. The marina provides boater access, with scenic views looking across the reservoir toward the Project area. Boaters, anglers, and other visitors at the marina would have views of the Project from an inferior position, with turbines on the skyline of the hills across the reservoir and water and boats in the foreground. As shown in Figure 4.1-9a, existing turbines at the Vasco Winds Project south of the Project area are features in the landscape. However, no existing turbines from the Tres Vaqueros Windfarm are currently visible from the marina. At a distance of approximately 1.8 miles, the new turbines would clearly be seen and would attract attention. The model of proposed turbines would be substantially taller than the existing model, bringing Tres Vaqueros Windfarm turbines into the viewshed where there currently are none. The Project would co-dominate the landscape along with the natural features of the site, including rolling hills, trees, and marina facilities. The relative height of the turbines would be high when compared to the height of the hills on which they would be located, increasing the dominance of the structures. Therefore, visual contrast would be moderate-high. The turbines would not block views from the marina, but their increased dominance could impair viewers' perception of the marina as a natural area, compared to baseline conditions. Overall visual change from baseline conditions would be moderate to high. In conjunction with the marina's moderate to high visual sensitivity, impacts would be adverse and potentially significant.

Implementation of Mitigation Measure 4.1-2 would lessen the visual impact to viewers at the marina. As the turbines that would be seen from this vista point would be skylined, towers painted light gray would present less of a visual contrast than turbines painted stark white, resulting in decreased visual prominence and Project dominance. However, even with mitigation, the visual change from the Los Vaqueros marina would remain moderate to high, and impacts would be significant and unavoidable.

Significance of Impact after Mitigation: Significant and Unavoidable.

Los Vaqueros Watershed: Los Vaqueros Watershed Office

Figure 4.1-10 shows existing and simulated views from the Los Vaqueros Watershed Office. The simulation portrays the view visitors would have from the office parking lot. From this vantage point, the Project would appear along the skyline of the rolling hills to the south, at a distance of approximately one mile. As seen in Figure 4.1-10a, some turbines in the existing Tres Vaqueros Windfarm are visible in the background of the current viewshed. Under the Project, turbines would be located much closer to the office and would be substantially taller than existing turbines, which would cause a perceptible increase in structure prominence and industrial character within the landscape. The Project turbines attract attention and would be co-dominant with the natural features of the site, which include the rolling hills and oak trees. The resulting visual contrast would be strong. However, the turbines would not block the view of the scenic hillside from the office. Therefore, visual change would be moderate to high. Taking into account the office's moderate visual sensitivity, visual impacts would be adverse and potentially significant.

Implementation of Mitigation Measure 4.1-2 would lessen the visual impact to viewers at the Watershed Office. Although the turbines that would be seen from this vista point would be skylined and would not appear against a backdrop of hills, towers painted light gray would present less of a visual contrast than turbines painted bright white, resulting in decreased visual prominence and Project dominance. However, even with mitigation, the visual change from the Watershed Office would remain moderate to high, and impacts would be significant and unavoidable.

Significance of Impact after Mitigation: Significant and Unavoidable.

Los Vaqueros Watershed: Los Vaqueros Interpretive Center

Figure 4.1-12 shows existing and simulated views from the Los Vaqueros Watershed Interpretive Center. From this vantage point, the Project would appear along the skyline of the rolling hills to the south, at a distance of approximately one-half mile. As seen in Figure 4.1-10a, no turbines from the existing Tres Vaqueros Windfarm are visible in the current viewshed. Under the Project, the northern three turbines from the proposed F-string would be located close to the Interpretive Center, which would cause a prominence of these structures and increase industrial character within the landscape. The turbines would attract attention and would be co-dominant with the natural features of the site, which include the rolling hills and oak trees. The resulting visual contrast would be moderate to high. Therefore, visual change would be moderate to high. Taking into account the Interpretive Center's moderate visual sensitivity, visual impacts would be potentially significant.

Implementation of Mitigation Measure 4.1-2 would lessen the visual impact to viewers at the Interpretive Center. Although the turbines that would be seen from this vista point would be skylined and would not appear against a backdrop of hills, towers painted light gray would present less of a visual contrast than turbines painted bright white, resulting in decreased visual prominence and Project dominance. However, even with mitigation, the visual change from the Interpretative Center would remain moderate to high, and impacts would be significant and unavoidable.

Significance of Impact after Mitigation: Significant and Unavoidable.

Vasco Caves Regional Preserve

Figure 4.1-4 shows existing and simulated views of the Project from Vasco Caves Regional Preserve. Specifically, these figures illustrate the views of visitors standing near the caretaker's residence, which is the staging area for tours of Vasco Caves. As seen from the simulations, to visitors at this vista, the Project would appear against a backdrop of rolling grassy hill and sky. The increased height of the structures compared to existing turbines would be mitigated by the fact that Project turbines would be further from the vista point than existing turbines and would be partially obstructed by intervening hills, as well as by the reduction in the number of turbines. As a result, the Project would not cause an increase in visitors' perception of structure prominence or industrial character within the landscape. Because the turbines demand the viewer's attention and cannot be overlooked, visual contrast would be considered strong. However, the turbines would attract attention and be co-dominant in the landscape with the scenic hillside to a similar degree as the existing wind farm, or to less of a degree. As seen in Figure 4.1-4b, visitors would see fewer turbines, and because the turbines would be located further from the observation point than existing turbines, the increased size of the turbines would be less perceptible. The resulting degree of visual change would be moderate but positive, as the Project would represent an improvement from baseline conditions. Furthermore, the Project would not block scenic views of the caves, as the turbines would be located entirely to the north of the caves and the tour route. Taking into consideration the preserve's moderate to high visual sensitivity, the overall aesthetic effect would be beneficial; therefore there would be no impact to aesthetic and visual resources at Vasco Caves.

Mitigation: None required.

Morgan Territory Regional Preserve

Figure 4.1-11 represents the view from a vista point on the Whipsnake Trail in the Los Vaqueros Watershed to the east of Morgan Territory Regional Preserve, capturing the perspective of a hiker looking east. From this vantage point, the Project would appear against a backdrop of grassy hills and wind energy facilities, within background distance. The new turbines would be significantly taller and consequently more visually prominent than existing turbines and, despite the distance (approximately four miles), the Project would attract substantially more attention than the existing wind farm. Although the Project would result in a net reduction of 70 turbines, the increased height of the turbines and their placement further west of the existing wind farm would make turbines more visible to the public and increase the industrial characteristics within the view. The location of the turbines in the far reaches of the viewshed would make it such that the turbines would co-dominate the characteristic landscape with views of the reservoir, stands of oak trees, and grassy hillsides. The resulting visual contrast would be moderate to strong. The Project would not block the view, as the scenic elements of the vista point, including the reservoir, hillsides and oak knolls are located in front of the Project. However, the overall degree of visual

change would nevertheless be high. Taking into account the moderate to high visual sensitivity of the Morgan Territory Regional Preserve, impacts from operations and maintenance would be significant.

Implementation of Mitigation Measure 4.1-2 would result in the proposed turbines being painted light gray with a non-reflective finish. As explained above for the Vista Grande Trail, the hills surrounding the reservoir are green during the rainy season (i.e., late fall through early spring) and a brown to golden wheat color the rest of the year. As views of the Project area from the Upper Whipsnake Trail are from a superior position, some of the turbines would be viewed against the hills, which would cause the color contrast to be more evident. The painted towers would be more muted than the proposed stark white towers, which would cause them to more effectively blend into the landscape. Therefore, with implementation of Mitigation Measure 4.1-2, the visual change would be reduced to moderate-high; however, impacts to this scenic vista would remain significant.

Significance of Impact after Mitigation: Significant and Unavoidable.

Round Valley Regional Preserve

Figure 4.1-2e, Photo 20, shows the existing view from a vista point within the Los Vaqueros Watershed, south of Round Valley Regional Preserve. The viewpoint captures hikers' first view of the wind farms adjacent to the reservoir while hiking on the Miwok Trail out of the preserve and into the watershed. From this vantage point, the Project would not be visible, as it would be entirely obscured by intervening hills and oak trees. The Project would not become visible to the public until further south along the Miwok Trail, well into the Los Vaqueros Watershed (views from the watershed are evaluated above). Because the Project would not be visible until hikers were well into the watershed, there would be no impact to views from Round Valley Regional Preserve.

Mitigation: None required.

Impact 4.1-3: Operation and maintenance of the Project would adversely impact views of designated scenic ridges. *(Less-than-Significant Impact)*

As discussed above, Contra Costa County General Plan provisions serve to protect views of County-designated scenic ridges. County policies regarding protection of views of scenic ridges serve the purpose of protecting the ridges themselves from development (see General Plan policies 9-19 through 9-26). The Project would not be located on a designated scenic ridge, and therefore would not impact either scenic ridge in the Project area.

Views of the two ridges immediately west of the Project area are available from various roads and recreational areas within Contra Costa and Alameda counties. Because the Project is located near the southern termini of the ridges, only views of the ridges from locations east and south of the

Project would be subject to potential blockage. Thus, this analysis considers impacts to views from Vasco Road, Byron Highway, and Vasco Caves Regional Preserve.

Vasco Road

Vasco Road follows a meandering, northeast-southwest trajectory as it passes east of the Project area. Because Vasco Road follows a depression between the hills as it east of the Project area, views of the scenic ridges are generally not available from this portion of the road. Figure 4.1-2a, Photo 4, and Figure 4.1-2b, Photo 5, are representative of views along Vasco Road in the vicinity of the Project, and illustrate the limited visibility. North of the Project area there are intermittent locations where the ridges are visible, but the Project would not block or interfere with these views of the ridges. Because there would not be direct interference with views of the ridges, the impact would be less than significant.

Mitigation: None required.

Byron Highway

Byron Highway generally runs in a north-south direction, approximately four miles east of the Project area. Views along Byron Highway that are most susceptible to impact are the westward views that become available south of the community of Byron. Views in this area are open and panoramic and the Project area is visible in the distance. However, at the latitude of the Project area, the scenic ridges are not tall enough to be visible behind the hilltops within the site. Therefore, the proposed turbines would not block views of the ridges from Byron Highway and there would be no impact.

Mitigation: None required.

Vasco Caves Regional Preserve

As with the existing wind energy facility, most of the Project would be located north/northwest of Vasco Caves Regional Preserve. Figure 4.1- 4 shows an existing and simulated northward view of the Project from a landing near the preserve caretaker's residence, which is the starting point for tours of Vasco Caves. At this elevation the scenic ridges are not visible. However, a portion of the Vasco Caves guided tour route reaches an elevation of approximately 910 feet and from this height Mount Diablo is visible to the northwest, but the scenic ridges are not visible due to intervening hills. Nevertheless, Project's turbines are located north of the preserve, and would not be located within the vista that includes Mount Diablo. Views of scenic ridges and Mount Diablo from Vasco Caves Regional Preserve would not be blocked. Thus, there would be no impact.

Mitigation: None required.

---

b) Would the Project substantially damage scenic resources, including but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

Impact 4.1-4: The Project would not substantially damage scenic resources within a state- or County-designated scenic highway or route. ***(Less-than-Significant Impact)***

As indicated above in the discussion of the Project's visual setting, there are no State-designated scenic highways with views of the Project. Thus, there would be no impact within a State-designated scenic highway. However, there are numerous County-designated scenic highways and routes in the vicinity of the Project. As indicated above in the discussion of the visual setting, Vasco Road, SR 4, and portions of Marsh Creek Road are County-designated scenic highways and expressways, and Camino Diablo, Walnut Boulevard, Byron Highway, and Morgan Territory Road are County-designated scenic routes. The following viewpoint analysis assesses the impacts to views from these designated scenic highways and routes.

Construction/Decommissioning

As discussed under Impact 4.1-1, above, construction-related impacts to visual quality from the presence of construction equipment, materials, and work crews within the Project area and on local access roads would be relatively short-term (i.e., approximately 12 months for construction of the Project, and up to four months for decommissioning at the end of the Project's life). Disturbed areas would be recontoured and revegetated upon completion of construction and would naturalize within a short period of time. With the exception of Vasco Road, for motorists on scenic highways and routes, the presence of construction crews and equipment would result in a weak visual contrast in that construction equipment would mostly be screened by intervening topography. From the locations along scenic roadways where construction activities could be seen, construction could attract attention and possibly partially block views, but only temporarily. Construction equipment would temporarily become co-dominant with the wind energy facility infrastructure, depending on the location of the equipment and the motorist's perspective. Therefore, temporary construction activities would result in a low degree of visual change. While SR 4 and Byron Highway have moderate to high visual sensitivity, temporary impacts to scenic views from these roads resulting from construction activities would be adverse but not significant.

Motorists on Vasco Road would be exposed to a much higher degree of construction activity, given both the close proximity of turbine sites and because the road itself would undergo some changes during construction of turbines and improvements to access roads. The Applicant would repair, repave, or reconstruct those portions of existing County roads adversely affected during construction, in accordance with the applicable County design standards. Again, the presence of construction crews would be relatively short-term, lasting less than 12 months. For motorists on Vasco Road the presence of construction equipment would result in moderate visual contrast, in that construction activities would attract attention, but would not dominate the characteristic landscape. Construction of the Vasco Road improvements would not block views from the scenic roadway. Therefore, construction on Vasco Road would result in a low degree of visual change. Given Vasco Road's high visual sensitivity, temporary impacts to scenic roadways from construction activities would be adverse but not significant.

Mitigation: None required.

Operations and Maintenance

Vasco Road

The Project area is west of and adjacent to Vasco Road, with the nearest wind turbines located approximately 0.8 miles from the road. The Project would be visible to motorists from select locations along the road for up to 4.5 miles. As noted above, views of the Project from Vasco Road would range from open and panoramic to fully obstructed. Assuming a traffic speed of 55 mph and that the Project would be visible from portions of Vasco Road along an approximate 4.5 mile stretch of road, the Project would be visible (on and off) for approximately five minutes.

Figure 4.1-5 shows existing and simulated views from the perspective of a motorist traveling south on Vasco Road, approximately 1.6 miles south of the intersection with Camino Diablo, looking southwest. This location represents motorists' first view of the Project area when traveling south on the road. From this perspective, motorists would be traveling east of the Project area, with clear background views of the turbines to the west of Vasco Road, against a backdrop of rolling hills and sky. Figure 4.1-6 shows a different perspective from Vasco Road approximately 3.3 miles south of the intersection with Camino Diablo looking west/southwest, closer to the Project area. From this perspective, motorists would have clear middleground views of the turbines to the west of Vasco Road against the skyline. From both locations, turbines associated with the Northwind facility appear in front of Project turbines and would attract attention and partially screen views of the Project. The turbines' contrast against the background would attract, but not demand viewers' attention, and the Project would be co-dominant with views of the Northwind facility and the hilly terrain. The existing Tres Vaqueros Windfarm is an established feature within the viewshed, and wind turbines of various shapes and sizes are an existing feature along a long segment of Vasco Road. Currently the presence of turbines is a part of the scenic quality of the road. The simulations in Figures 4.1-5b and 4.1-6b demonstrate that the Project would result in taller but fewer turbines. Because the new turbines are fewer and would be located further from the road than existing turbines, the overall effect is a small decrease in visual clutter within the landscape. The increased size of the turbines would result in a slight increase in dominance and viewer perception of turbines from baseline conditions, as turbines would be visible from further distances. At the same time, the Project would not change the existing fundamental character of the landscape, which is a wind energy facility. Furthermore, the relatively slender turbine towers would not block scenic views from the roadway. Therefore, overall degree of visual change from baseline conditions would be low. Taking into account Vasco Road's high visual sensitivity, the resulting visual impact from Vasco Road would be adverse but not significant.

Mitigation: None required.

State Route 4

The Project would be located approximately four miles southwest of the nearest portion of SR 4. As indicated in the discussion of the Project's setting, motorists would have open and panoramic to fully obstructed views of the Project depending on their location along the road. Figure 4.1-2b, Photo 6, shows the view from the perspective of a motorist traveling west on SR 4, near the intersection with Discovery Bay Boulevard in the community of Discovery Bay. From this location and other locations on SR 4, portions of the Project would be partially visible to motorists while other portions would be obscured by intervening topography. As seen in the photograph, wind turbines are an established feature in the hills to the south of the road, within background distance. The landscape also includes utility structures, agricultural structures, and range land. New turbines associated with the Project would add to a landscape that is already co-dominated by turbines; therefore, the Project would cause an incremental increase in structure prominence and industrial character within the landscape. As such, the visual contrast would be low to moderate. In addition, the Project would not block or impair motorists' views from the scenic road. Overall visual change would be low. Taking into account the moderate to high visual sensitivity of the highway, impacts to views from SR 4 would be adverse but not significant.

Mitigation: None required.

Camino Diablo

The Project would be located approximately 2.5 miles south-southwest of Camino Diablo at its closest point. As indicated above in the discussion of the Project's setting, motorists' views of the Project would be partially to fully screened by intervening topography, range land, and utility and other structures depending on location. The turbines would be visible to motorists from some locations on the eastern portion of the road, near Byron Highway, and from the intersection of Camino Diablo and Walnut Boulevard. Figure 4.1-2b, Photo 7, shows the view from the perspective of a motorist looking south down Walnut Boulevard at the intersection with Camino Diablo. From this location, a portion of the Project area would be visible, with the bases of visible turbines partially screened by the hills. From this intersection the Project represents an increase in industrial features in a viewshed that currently does not contain turbines. As seen in Photo 7, the viewshed does contain utility structures, road signs, and others structures. From other locations on Camino Diablo where the Project could be perceptible, the landscape contains residential buildings, utility structures, agricultural structures, ancillary farming equipment, range land, and turbines associated with Tres Vaqueros and other wind farms. New turbines associated with the Project would be subordinate to other features in the viewshed, in particular given the topography, distance, and other structures listed above. As such, the Project would cause an incremental increase in structure prominence and industrial character within the landscape. Overall, the visual contrast would be moderate. The Project would not dominate the landscape or block motorists' views from the scenic road. Therefore, the degree of visual change would be low to moderate. Taking into account the low to moderate visual sensitivity of the route, visual impacts from Camino Diablo would be adverse but not significant.

Mitigation: None required.

Walnut Boulevard

The Project would be located approximately 2.7 miles to the south of the nearest designated scenic portion of Walnut Boulevard (at the intersection with Camino Diablo). As indicated in the discussion above on setting, motorists' would have partially screened views of the Project from select locations along the road. Figure 4.1-2b, Photo 8, shows the view from the perspective of a motorist traveling south on Walnut Boulevard, just south of the intersection with Concord Avenue, while Figure 4.1-2b, Photo 7, (discussed above) shows the view of a motorist traveling south on Walnut Boulevard, at the intersection with Camino Diablo. From Walnut Boulevard, the Project would appear in the far distance against a backdrop of rolling hills, with trees, utility lines, and traffic lights in the foreground. Although the northern-most Project turbines would be visible to motorists from some locations, from most locations on Walnut Boulevard the landscape is cluttered with turbines from other wind farms (including Buena Vista), utility structures, agricultural structures, and range land. As such, the Project would cause an incremental increase in structure prominence and industrial character within the landscape. Because the turbines would be seen but would be subordinate in the landscape, the perceived visual contrast would be moderate. The Project would not block motorists' views from this scenic road. Therefore, the degree of visual change would be low to moderate. Taking into account the moderate visual sensitivity of the route, visual impacts to the scenic portion of Walnut Boulevard would be adverse but not significant.

As Walnut Boulevard traverses Camino Diablo heading south, it is no longer a designated scenic road. However, this portion of Walnut Boulevard provides access to the Los Vaqueros Watershed. Views of the Project would increase as motorists travel south on Walnut Boulevard into the watershed, culminating in the views from the Watershed Office and Interpretive Center. These views are evaluated under Impact 4.1-2.

Mitigation: None required.

Byron Highway

The Project would be located approximately four miles southwest of the nearest portion of Byron Highway. As discussed in the description of the Project's setting, motorists' would have partially to fully screened views of the Project from select locations along the road. Figure 4.1-2a, Photo 1, shows the view from the perspective of a motorist traveling south on Byron Highway, in the vicinity of the Byron Airport. From this location and other locations on Byron Highway, portions of the Project would be partially visible to motorists while other portions would be obscured by intervening topography. As seen in the photograph, the landscape is dotted with turbines from numerous other wind farms, as well as utility structures, agricultural structures, and range land. The new turbines associated with the Project would blend into a landscape that is already

dominated by turbines; therefore, the Project would cause an imperceptible to incremental increase in structure prominence and industrial character within the landscape. As such, the visual contrast would be weak. In addition, the Project would not block or impair motorists' views from this scenic road. Therefore, the degree of visual change would be low. Taking into account the moderate to high visual sensitivity of the highway, impacts to views from Byron Highway would be less than significant.

Mitigation: None required.

Marsh Creek Road

Figure 4.1-13 shows motorists' views looking south from Marsh Creek Road near Byron Highway, and are exemplary of views of the area in southeastern Contra Costa County. From this location, the Project would be visible on the north side of the hills in the background, approximately 5.5 miles from the viewer. As seen in the photograph, the existing landscape includes turbines from other wind farms, agriculture, and range land. Viewers traveling east-west along the road would have to turn their heads south to see the Project. Project components could be seen and would attract attention, but would not dominate the characteristic landscape; therefore, the visual contrast would be moderate. The Project would cause an increase in structure prominence and industrial character within the landscape, though it would not block or impair motorists' views from the scenic road. Therefore, the overall degree of visual change would be moderate. Taking into account the moderate visual sensitivity of the road, visual impacts from Marsh Creek Road and this portion of unincorporated Contra Costa County would be adverse but not significant.

Mitigation: None required.

Morgan Territory Road

Morgan Territory Road is about four miles west of the closest proposed turbine location. Figure 4.1 2c, Photo 10, shows the view from the perspective of a motorist on Morgan Territory Road looking east, from a distance of approximately 4.5 miles. As seen in the photo, the Project area is at a lower elevation and the Project would appear within a background of reservoir, grassy foothills, and valley, amidst other existing wind energy facilities. The foreground and middleground landscape includes myriad other features, including homes and agricultural structures, ancillary farming equipment, utility structures, vegetation, and range land. As indicated above in the discussion of the Project's setting, motorists would have partially screened views of the Project from select locations along Morgan Territory Road. From locations where the Project could be seen, viewers would have to turn their heads to the east, and views would be quick, intermittent, and seen only as glimpses between structures. As the Project could be seen but does not attract attention, the visual contrast would be weak. The Project would not dominate the characteristic landscape or block motorists' views from the scenic road. Therefore, the degree

of visual change would be low. Taking into account the low visual sensitivity of the road, visual impacts from Morgan Territory Road would be not significant.

Mitigation: None required.

---

c) Would the Project substantially degrade the existing visual character or quality of the site and its surroundings?

Impact 4.1-5: The Project would alter, but not substantially degrade the existing visual character or quality of the Project area. *(Less-than-Significant Impact)*

As discussed in Chapter 3, *Project Description*, the Project is located entirely on private property and public property with restricted public access. Physical access to the area would be allowed only with authorization. The Project area is visually accessible to the public from local roadways and nearby recreational areas. However, these locations are discussed above in Section 4.1.2, and public views of the site are analyzed under Impacts 4.1-1 and 4.1-2 (scenic vistas), 4.1-3 (scenic ridges), and 4.1-4 (scenic highways). Therefore, the analysis of this potential impact focuses on possible degradation of the existing visual character or quality of the Project area itself.

As discussed in Section 4.1.2 above, the Project area is characterized by rolling hills and smooth contours, and is dominated by the presence of the existing wind energy facility. Features within the facility include 91 wind turbines, access roads, utility lines, meteorological towers, maintenance areas, the Tres Vaqueros substation, and the O&M Building. Livestock also are an existing feature. See Chapter 3, *Project Description*, for a detailed description of the features that would be replaced or constructed.

Visual contrast is a measure of the degree of change in line, form, color, and texture that the Project would create, when compared to the existing landscape. Because the existing landscape is already a wind energy facility consisting of the same kinds of features as the Project (e.g., wind turbines and associated infrastructure, access roads, and a substation), the Project would not fundamentally change the character of the site when viewed from within. Although the Project features would demand viewer attention and could not be overlooked, so do the features of the existing wind energy facility; therefore, visual contrast of both the existing facility and the Project would be strong.

Figure 4.1-2a, Photos 2 and 3, show views from within the Project area. These views are not public vantage points; rather they are provided to capture the characteristic landscape of the site. The Project would alter the visual dominance of wind energy facilities, given the substantial increase in turbine height and size (taller towers and larger rotors). At approximately four times the size of existing turbines, Project turbines would be more visually prominent relative to other visible landscape features in the viewshed. In some cases, the greater height of the turbines would mean that more of the turbine is viewed against the sky, a factor that generally contributes to the

structure's visual prominence. Also, given the significant height increase of the new structures, the Project would result in new turbines being visible from some additional viewing locations.

At the same time, the significant overall reduction in the number of turbines would result in the landscape appearing less cluttered. As shown in Figures 4.1-3 and 4.1-4, the greater spacing between turbines within each string coupled with shorter string lengths would affect perceptions of the overall density of turbine installations visible within the Project area. Furthermore, the streamlined form of the turbine towers and the inferior position of viewers would ensure that the Project would not block views of the site or surrounding areas more than existing features. The general character of the site as a wind energy facility would not change. Visual contrast would increase as would Project dominance, but the Project would not block views and other visual clutter would be eliminated. Therefore overall visual change of the Project area would be moderate.

As discussed in Section 4.1.2, above, the visual quality of the Project area ranges from representative to visually distinct. Nevertheless, there are relatively few visitors to the Project area, as it is not accessible to the public. Because the site is not accessible to the public and receives a very low number of viewers, the overall visual sensitivity of the site would be considered low to moderate. Overall, the Project would not substantially degrade the existing visual character or quality of the Project area, and impacts would be less than significant.

Mitigation: None required.

---

d) Would the Project create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?

Impact 4.1-6: Night lighting required during construction could adversely affect nighttime views in the Project area. ***(Less-than-Significant Impact)***

Construction would occur on a schedule consistent with County requirements for work days and hours. The County typically prohibits nighttime construction activity, but in order to reduce impacts related to traffic flow and emergency response, it may be necessary to deliver large turbine components and construct Vasco Road improvements at night. If nighttime construction activity was necessary, then for safety and operational reasons temporary lighting would be necessary on-site and on one or more area roadways. Because the Project area is in a rural area with no constant sources of light, such as streetlights, any increase in ambient light levels during the nighttime hours would be a change from baseline conditions. A substantial increase in light and glare would constitute a significant impact.

Roadway construction lighting is regulated through Caltrans's *Manual on Uniform Traffic Control Devices* (MUTCD). The MUTCD requires use of floodlights and prohibits positioning them in a way that produces "disabling glare" for approaching motorists and neighbors. The MUTCD also includes recommendations for light intensity. Because construction of Vasco Road

improvements would take no more than five months and compliance with the MUTCD inherently mitigates some potential impacts associated with construction lighting, the temporary light impacts associated with construction of Vasco Road improvements would be less than significant.

To facilitate safe nighttime delivery of turbine components, temporary lighting would likely be necessary along on-site roadways and at the proposed staging and laydown areas. Because deliveries would occur only intermittently during a relatively short 12-month construction period, the impacts are considered less than significant.

Mitigation: None required.

Impact 4.1-7: The Project would create new sources of light that would affect nighttime views in the area. ***(Less-than-Significant Impact)***

New Aviation Safety Lighting

The new turbines would be over 350 feet tall, and would therefore require appropriate obstruction lighting, per FAA Obstruction Marking and Lighting Advisory Circular 70/7460-1K, Change 2. The FAA would review the Project prior to construction (14 CFR Part 77). As a result of its review process, the FAA could recommend that tower markings or aviation safety lighting be installed on all or only a portion of the turbine towers. Recommendations on marking and lighting structures vary depending on terrain, local weather patterns, geographic location, and, in the case of wind farms, the cumulative number of towers and overall site layout. Lights would be L-864 Red Flashing/Strobe models with peak 2000 candelas, minimum 750 candelas, and a 3° vertical beam spread. Depending on turbine string length, every third or fourth turbine (including end row turbines) would be lighted. The minimum number of required lights would be used in order to minimize attractants for birds during night migrations. It is expected that overall about 11 of the turbines would be lighted.

Nighttime lighting at the Buena Vista Wind Energy Project in Contra Costa County and the Shiloh Wind Power Plant in Solano County is visible from various locations in eastern Contra Costa County. Because of the heights of the turbines constructed at these two projects, their lighting is representative of the type of FAA-compliant lighting that is anticipated for the Project. While these projects' flashing red lights are visible over a wide geographic area, their intensity and dispersal is such that they are not overpowering or especially attracting to the eye.

The FAA-required aviation safety lighting for the Project would be visible at night over a wide geographic area. However, because the lighting would be the minimum amount necessary for aviation safety, and like the lighting at the Buena Vista and Shiloh projects would not be especially overpowering or attracting to the eye, the impact would be less than significant.

Mitigation: None required.

Expanded Tres Vaqueros Substation

The existing Tres Vaqueros substation would be expanded by approximately 5,000 square feet, and new equipment would be installed including: medium voltage circuit breakers, a generation step-up transformer, a disconnect switch, bus work, capacitors, various controls and metering, and a nominal 250 square foot control house. A lighting specialist would design the lighting system (e.g., type of bulbs/fixtures, locations, and screenings) to meet the constraints shown below, as well as safety constraints for workers following National Electrical Safety Code (NESC) lighting recommendations for safety of workers on task.

1. Lights must be shielded and directed downward or toward the specific area requiring illumination.

2. Lights must be activated by motion sensors or switches (continuous lighting would be prohibited).

3. Lights must be the most-energy-efficient type that is appropriate for the use.

4. The system must employ the minimum number of lights and minimum brightness necessary to ensure worker safety.

As discussed in the baseline, the existing substation has one large area light that was not functional at the time the wind farm was shut down in 2009. As such, the new equipment and lighting to be installed at Tres Vaqueros substation would represent an increase above baseline conditions. However, the new lighting would be of the same nature as what formerly existed at the substation and, as described above, the lighting plan would ensure that lighting impacts would be minimized to the highest degree possible. The substation is not visible to nearby recreational users. It is visible to motorists traveling on Vasco Road, though views are of short duration. Therefore, installation of new equipment and lighting at the substation would not create a new source of substantial light or glare which would adversely affect day or nighttime views in the area, and impacts would be less than significant.

Mitigation: None required.

General Lighting and Glare Issues

During Project operation, access roads would not be equipped with lighting and on-site activity would generally be limited to daylight hours. As required by Contra Costa County Code Section 88-3.618 (Site Aesthetics), wind turbines must be of a non-reflective, unobtrusive color. Mitigation Measure 4.1-2 requires the turbines to be painted light gray with a non-reflective finish. Because the only lighting on the new turbines would be the FAA-required aviation safety lights, the roads providing access to the turbines would not be lit, and the Project would adhere to County Code requirements and the requirements of Mitigation Measure 4.1-2, there would not be a significant increase in light or glare associated with Project operation. Therefore, impacts associated with new sources of light and glare would be less than significant.

Mitigation: None required.

Impact 4.1-8: During normal operation, the moving shadow of the turbine blades could create visual flicker and a related strobe-like phenomenon that could be a nuisance to nearby residents and/or create a visual hazard for Vasco Road motorists. *(Less-than-Significant Impact)*

Effects on Residents

Shadow Flicker. The tower, nacelle, and rotor blades of a wind turbine block the sun and cast shadows on surrounding areas; these shadows move when the rotor turns. The resulting alternating shadows and changes in light intensity are referred to as shadow flicker. The frequency with which a blade's shadow interrupts the sunlight is the frequency of rotation of the rotor multiplied by the number of blades on the rotor; for the proposed turbines, this frequency would be approximately 0.5 to 1.0 per second, or 0.5 to 1.0 Hz. Although this frequency is low enough to be harmless to people[2], the alternating variation in brightness on the ground or on walls, ceilings or floors inside a close-by residence has the potential to annoy residents. Shadow flicker effects vary based on several factors, including the distance between the location of people relative to the turbine, local topography, the wind speed and direction, and the presence of any obstructions (NRC, 2007). Shadow flicker does not occur at night, when fog or clouds obscure the sun or when turbines are not operating. No adopted County, State or federal standards regulate shadow flicker.

Shadow flicker differs from a related strobe-like phenomenon that is caused by intermittent chopping of sunlight by the rotating blades on a distant wind turbine. Another visual phenomenon is due to strobe-like mirror reflections of sunlight from the moving blades of the turbines.

As discussed in Section 4.13, *Noise*, and shown in Figure 4.13-2, there are sensitive receptors near the Project area. Vasco Caves Regional Preserve includes a caretaker residence, which is located approximately 1,000 feet south of one of the existing access roads to be widened, approximately 2,000 feet southeast of one of the turbines to be removed, and approximately 3,500 feet south-southwest of a proposed new turbine. Residences along Armstrong Road are the closest off-site sensitive receptors to a proposed feature of the Project. These residences are located east of Vasco Road, and are approximately 0.9 mile (approximately 4,750 feet) east of the existing substation site. There are also two residences off the west side of Vasco Road, the closest of which is located approximately 1.8 miles (approximately 9,500 feet) northeast of the closest proposed turbine site and approximately 1.1 miles (approximately 5,800 feet) north-northeast of the closest existing turbine to be removed.

---

2 The Epilepsy Foundation of America reports that exposure to flashing lights at certain intensities can trigger seizures in about 90,000 Americans (about 3% of three million epileptics); the frequency or speed of flashing light most likely to trigger epileptic seizures is between 5 and 30 flashes per second (i.e., 5-30 Hz) (EFA, 2010).

Even at the shortest distance (0.9 mile) from a residence to a wind turbine site, no distinct shadow from a wind turbine blade would be perceived because the disk of the sun would appear wider than the width of either a Gamesa G90 2.0 MW, Siemens 2.3-101, or a similar 3-blade 2.0 MW turbine blade at distances greater than approximately 0.5 mile from the turbine. Although the size of the sun's disk remains unchanged to an observer, the apparent width of the turbine blade decreases as the distance between the observer and the wind turbine increases. As a result, the sun's disk appears to surround the distant blade and the shadow from the turbine becomes increasingly less distinct as the distance from the observer to the wind turbine increases. Without a distinct shadow, flicker effects would not appear. For residents to observe strong flicker effects, they would have to be close enough that a distinct shadow of the turbine blade could reach them.

Strobe-like Effect. The strobe-like chopping of sunlight by the rotating blades on a distant wind turbine would occur whenever that distant wind turbine stands between the observer and the sun. At a level distance of 0.9 mile from a wind turbine, the sun would have to be at an elevation angle between 3.5 degrees and 8 degrees above the horizon in order for it to appear behind the rotating turbine blades of either the Gamesa G90 2.0 MW, Siemens 2.3-101, or a similar 3-blade 2.0 MW turbine. Regardless of the season, the sun gets this close to the horizon less than an hour before sunset or less than an hour after sunrise. For a wind turbine on a hilltop and an observer in a valley, the times would be different, but would still be close to sunset or sunrise.

Strobe-like reflections of sunlight from moving turbine blades would occur only if there were reflective surfaces on the moving blades. However, the proposed blades would be painted with a non-reflective finish, so such reflections would not occur.

The potential for the actual occurrence of each of these effects at any of the existing residences is limited by the daily and seasonal variation of the path that the sun takes through the sky. In winter, on the solstice, the sun rises approximately 30 degrees south of East, rises to an elevation of nearly 29 degrees at solar noon and sets approximately 30 degrees south of West. The sun rises a bit farther north in the sky each day between the winter solstice and the summer solstice. On the spring and fall equinoxes, the sun rises due East, reaches an elevation of nearly 53 degrees at solar noon and sets due West. In summer, on the solstice, the sun rises approximately 30 degrees north of East, rises to an elevation of just over 72 degrees at solar noon and sets approximately 30 degrees north of West.

Consideration of the sun path leads to the conclusion that the off-site residences, which generally lie to the south or well east and west of the area, cannot be directly shadowed by the turbines. Therefore, they could not be affected by shadow flicker.

Effects on Drivers

Motorist and passengers on Vasco Road would be exposed to shadow flicker and to the strobe-like visual effects that are described above. However, both drivers and passengers would be moving along the road and therefore would experience these effects sporadically from varying locations over a few minutes' time.

As discussion in Section 4.17, *Transportation and Traffic*, the posted speed limit on Vasco Road is 55 miles per hour. The average daily traffic volume on Vasco Road in the Project area is about 19,300 vehicles. For the three-year period between 2006 and 2008, there was an average of 50 recorded collisions per year over the 16.5-mile stretch of Vasco Road between Walnut Boulevard and I-580. This accident rate is lower than the average for two lane roads in rural areas of Contra Costa County.

Typical views of the site and simulations of the Project as seen from Vasco Road are presented in Figures 4.1-5 and 4.1-6. As these figures show, several turbines would be within motorists' view when driving north and south on Vasco Road.

Shadow Flicker. Vasco Road runs along the southern and eastern borders of the Project area. Along the southern border, drivers would not be exposed to shadow flicker because all of the wind turbines would lie to the north. However, while passing along the eastern border of the Project, there is a potential that early afternoon shadow from one or more turbines could reach the roadway, resulting in some shadow flicker.[3] Approximately three miles of Vasco Road could be exposed to shadow flicker, both for northbound and southbound traffic, primarily during the fall and winter. Given the topography and the alignment of Vasco Road, each motorist would see only a few of the proposed turbines and their shadows at any one time.

Strobe-like Effect. The topography of the area adjacent to Vasco Road, the elevations and directional orientations of the proposed turbines, and the speed of travel along the roadway, when considered together, would limit the amount of time that the proposed turbines would stand between drivers and the rising or setting sun. The sun orientation and driver position which could lead to the possibility of a strobe-like effect is also the same orientation for which motorists on Vasco Road already have to face directly into the rising or setting sun. Any strobe-like effect would be of limited duration and is unlikely to result in any material worsening of the already existing hazard of motorist facing into the sun. Furthermore, dense fog can occur in the Altamont Pass during summer and winter, with winter fog conditions frequently lingering for many consecutive days. These seasonal fog conditions would further reduce the likelihood of adverse shadow or sunlight effects to Vasco Road drivers.

Mitigation: None required.

[3] In connection with the installation of six wind turbines near a highway onramp and merge lanes in southern Ontario, Canada, it was suggested that road safety risks could result in dangers to motorist and others who share the road if a motorist who suffers from susceptibility to flickering light becomes incapacitated, and from increased distraction or confusion caused by flickering near on- and off-ramps and the overpass (Wrightman, 2010).

4.2 Agriculture and Forestry Resources

4.2.1 Introduction

This section analyzes the Project's relationship to agriculture and forestry resources. Discussed herein are the physical and regulatory setting; the baseline for determining environmental impacts; the criteria used for determining the significance of environmental impacts; and potential impacts associated with decommissioning the existing windfarm and construction, operation, maintenance, and decommissioning of the Project.

4.2.2 Setting

4.2.2.1 Regional and Local Setting

Section 3.1.2, *Location*, provides general information about the Project's regional and local setting. This section (4.2.2.1) provides setting information specific to agriculture and forestry resources in the Project area.

As depicted in Figures 3-2a and 3-2c in Chapter 3, *Project Description*, Contra Costa Water District (CCWD) is the sole owner for approximately half of the property within the Project area The rest of the Project area is located to the east or south of the CCWD lands and is either owned solely by East Bay Regional Park District (EBRPD) or jointly between these two agencies.

The Project area is zoned for agricultural use, with wind power development as a potentially compatible use (see Section 4.11, *Land Use and Planning*). The Project area consists of parcels zoned A-2 (General Agriculture, 5-acre minimum parcel) and A-3 (Heavy Agriculture, 10-acre minimum parcel).[1] Surrounding areas are also zoned for agricultural use. There are no areas of forest land or timberland located within the Project vicinity. Grazing is the only agricultural use currently conducted within the Project area; no crops are currently cultivated or timber harvested within the Project area. Livestock grazing activities are particularly well-suited for the upland areas where the topography is relatively steep and local surface or groundwater supplies are limited. The Project area contains no designated areas of forest land or timberland and very few trees exist relative to the site's acreage. With the exception of the hills bordering the site's western boundary and Brushy Peak to the south, the surrounding areas also are sparsely populated with trees.

4.2.2.2 Regulatory Setting

State of California

California Farmland Mapping and Monitoring Program

The California Department of Conservation maintains the Farmland Mapping and Monitoring Program (FMMP), which monitors the conversion of farmland to and from agricultural use. Farmlands are divided into the following categories based on their suitability for agriculture:

[1] Wind turbines are permitted in both of these zoning districts, subject to approval of a Land Use Permit.

- *Prime Farmland*. This land has the best combination of physical and chemical characteristics for crop production. When treated and managed, its soil quality, growing season, and irrigation supply produce sustained high crop yields.
- *Farmland of Statewide Importance*. This is land other than Prime Farmland that has a good combination of physical and chemical characteristics, including irrigation, for crop production.
- *Unique Farmland*. This land does not meet the criteria for Prime Farmland or Farmland of Statewide Importance, but has produced specific crops with high economic value.
- *Farmland of Local Importance*. This land is either currently producing crops or has the capability to produce, but does not meet the criteria of the categories above.
- *Grazing Land*. This is land whose vegetation is suitable for grazing livestock.
- *Other Lands*. This land does not meet the criteria of any of the other categories.

Additional categories used in the FMMP mapping system are "urban and built-up lands" and "lands committed to non-agricultural use." The system uses a 10-acre minimum mapping unit.

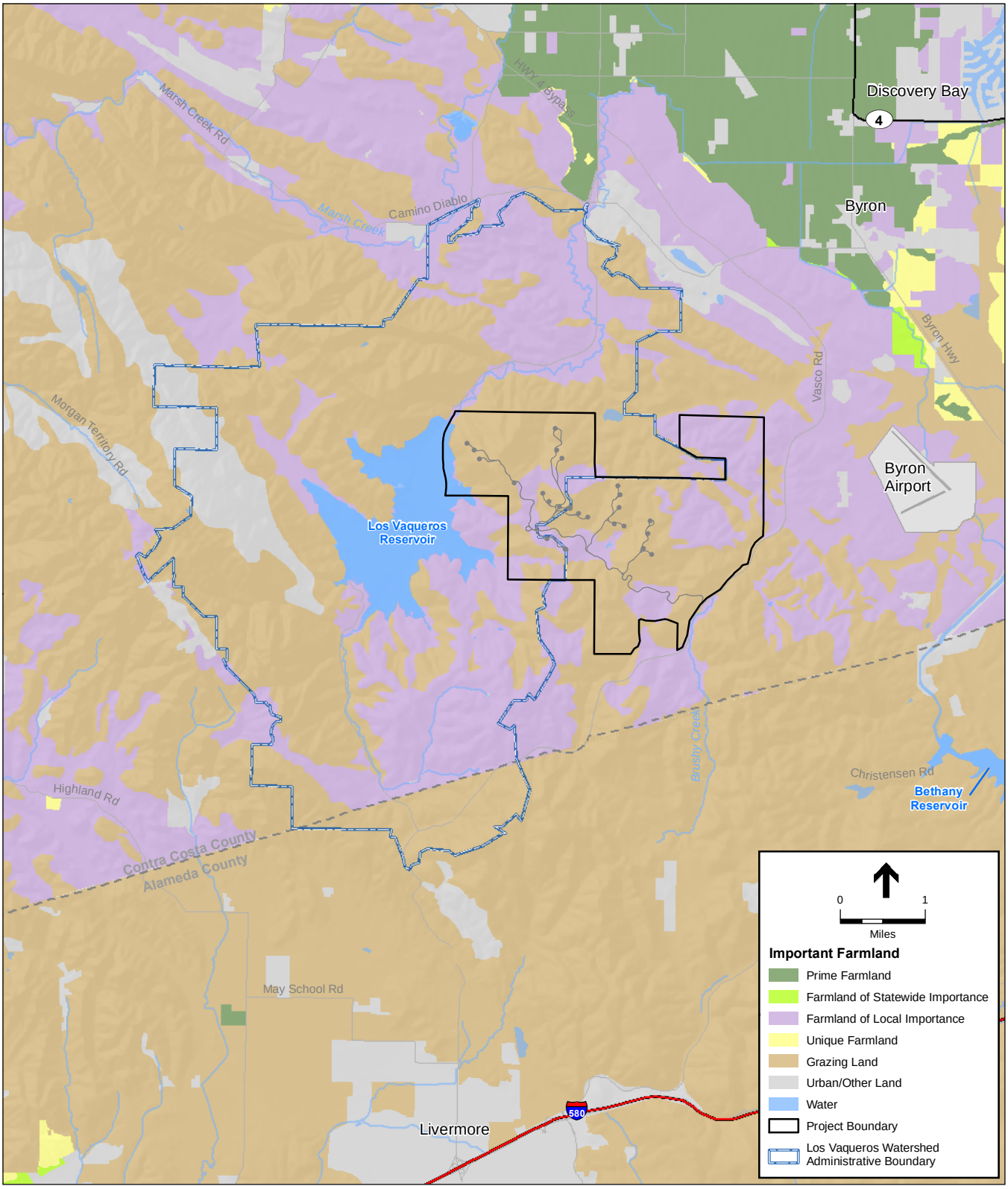
FMMP classifications are based on soil quality and irrigation status and are used as part of its neutral reporting program that classifies land based on its suitability for agriculture (FMMP, 2010). The classifications differ from general plan and zoning designations in that they are used to evaluate farmland by type and acreage, rather than to designate appropriate sites for particular land uses and regulate use and development. Figure 4.2-1 illustrates the FMMP classifications for the Project site and vicinity. As the figure shows, all farmland within the Project site is classified as either Farmland of Local Importance (2,804 acres) or Grazing Land (1,423 acres) and all farmland surrounding the site has the same designations.

The FMMP also produces a biannual report on the amount of land converted from agricultural to non-agricultural use. Table 4.2-1 summarizes recent changes to FMMP-classified agricultural land within Contra Costa County. The County experienced a net loss of 2,528 acres of agricultural land between 2006 and 2008. The most significant net loss was in Prime Farmland. Net gains were realized during this time period for the two types of farmland present on the Project site (i.e., Farmland of Local Importance and Grazing Land).

TABLE 4.2-1
RECENT FARMLAND CONVERSIONS IN CONTRA COSTA COUNTY

	Total Acres Inventoried		2006–2008 Acreage Changes		
Farmland Category	**2006**	**2008**	**Acres Lost**	**Acres Gained**	**Net Change**
Prime Farmland	29,937	26,788	3,234	85	(3,149)
Farmland of Statewide Importance	8,092	7,555	633	96	(537)
Unique Farmland	3,588	3,123	566	101	(465)
Farmland of Local Importance	52,070	53,449	1,825	3,204	1,379
Grazing Land	168,661	168,905	898	1,142	244
Agricultural Land Subtotal	**262,348**	**259,820**	**7,156**	**4,628**	**(2,528)**

SOURCE: California Department of Conservation, Division of Land Resource Protection, 2010



SOURCE: FMMP, 2008; ESRI, 2009

Tres Vaqueros Windfarm Repowering Project . 209132.02

Figure 4.2-1
Important Farmland

California Public Resource Code

The California Public Resources Code governs forestry, forests and forestry resources, as well as range and forage lands, within the State. “Forest land” is defined by Public Resources Code section 12220(g) as “land that can support 10-percent native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of one or more forestry resources, including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits.” Relatedly, “timberland” is defined by Public Resources Code section 4526 as, “land, other than land owned by the federal government..., which is available for, and capable of, growing a crop of trees of any commercial species used to produce lumber and other forest products, including Christmas trees.”

California Government Code

Chapter 6.7 of the California Government Code (§§ 51100-51155) regulates timberlands within the State. “Timberland production zone” is defined in Section 51104(g) as an area that has been zoned pursuant to Government Code Section 51112 or 51113 and is devoted to and used for growing and harvesting timber, or for growing and harvesting timber and compatible uses. In this context, “compatible uses” include any use that “does not significantly detract from the use of the property for, or inhibit, growing and harvesting timber” (Gov’t Code § 51104(h)). Watershed management, grazing and the erection, construction, alteration, or maintenance of electric transmission facilities are examples of compatible uses.

California Land Conservation Act of 1965 – “Williamson Act”

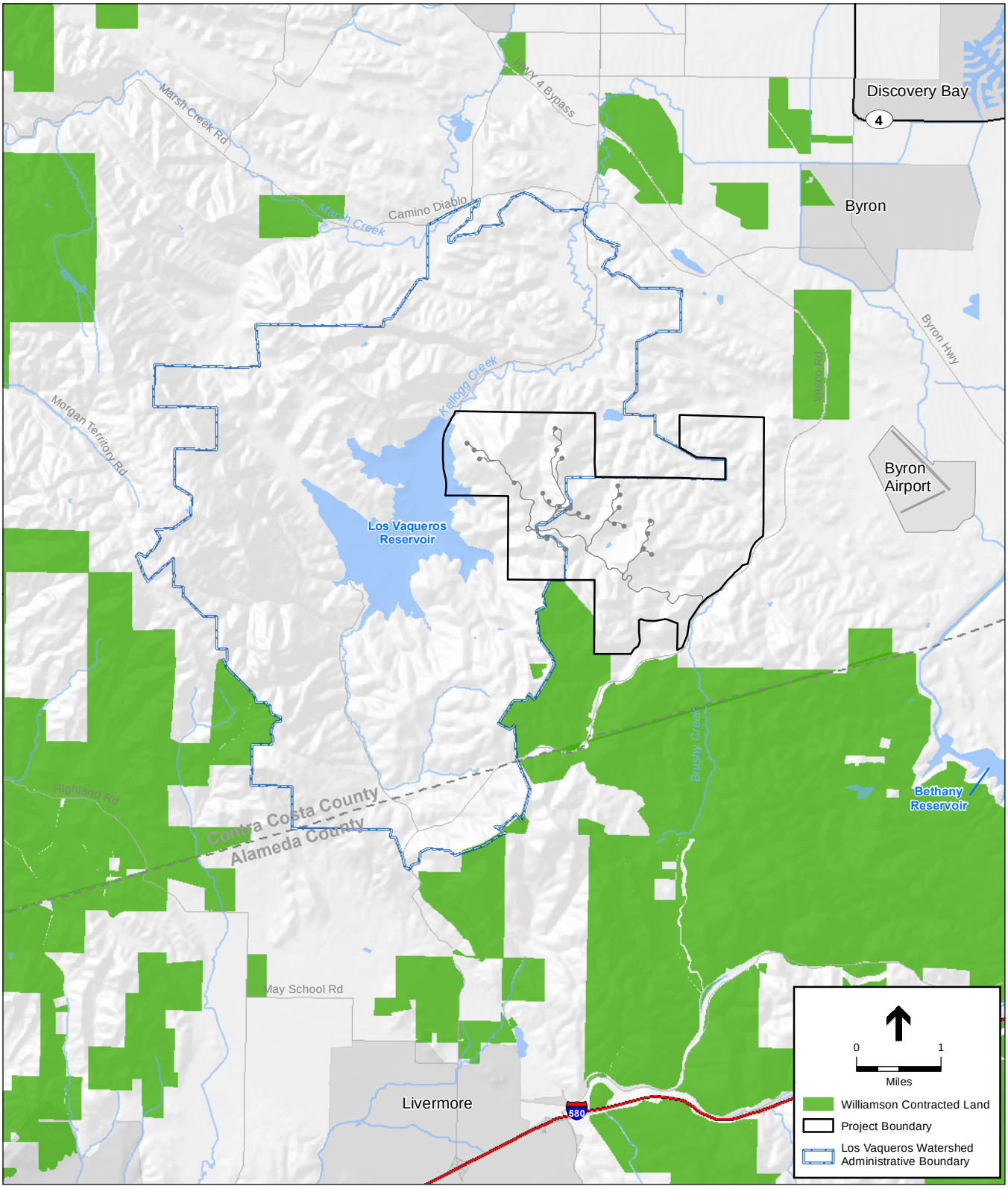
The California Land Conservation Act of 1965 (Williamson Act) authorizes local governments to enter into contracts with private landowners to restrict specific parcels of land to agricultural or related open space use for a rolling 10-year period (Gov’t Code § 51200 et seq.). In return, landowners’ property taxes are assessed at a much lower than normal rate because they are based upon farming and open space uses as opposed to full market value. Local governments receive an annual subvention of forgone property tax revenues from the state via the Open Space Subvention Act of 1971. Pursuant to Government Code Section 51238 (a)(1), “the erection, construction or maintenance of…electric (facilities)…are hereby determined to be compatible uses within any agricultural preserve.”

Figure 4.2-2 shows those lands under Williamson Act contract in the vicinity of the Project. The Project would not be located on any land under a Williamson Act contract.

Regional

Contra Costa County General Plan

Land Use Designations. The Project area is designated in the County General Plan as Watershed, Agricultural Lands, and Parks and Recreation. These land use designations allow for a range of agricultural uses, including the livestock grazing and ranching that currently occurs and would likely continue onsite after Project implementation.



SOURCE: Willamson Act, 2006; ESRI, 2009

Tres Vaqueros Windfarm Repowering Project . 209132.02

Figure 4.2-2

Williamson Act Lands

Goals, Policies, and Implementation Measures. The General Plan identifies goals, policies, and implementation measures related to the preservation of agricultural uses that apply County-wide. These goals and policies include protection and enhancement of the agricultural economy (Goal 8-6), conservation of prime productive agricultural lands (Goal 8-H), and protection and enhancement of agricultural operations to retain designated areas in agricultural use (Policy 8-38) (Contra Costa County, 2010a).

Contra Costa County Zoning Ordinance (Contra Costa County Code, Title 8)

Allowable Uses. Section 84-38.404(6) of Division 84 (Land Use Districts) of the Contra Costa County Code allows development of wind energy conversion systems in the A-2 General Agricultural District upon the issuance of a Land Use Permit (LUP). Section 84-40.404 similarly allows wind energy systems in the A-3 Heavy Agricultural District upon issuance of a LUP.

Contra Costa County does not specifically recognize forest land and timberland distinct from land zoned for agricultural production. Areas zoned as A-2 and A-3 allow for forestry as a permitted use without the requirement of any LUP.

Wind Energy Conversion Systems (WECS). Chapter 88-3 of the County Code specifies the planning and zoning requirements for WECS operating within Contra Costa County. The purposes of the ordinance are to promote effective and efficient use of WECS, regulate their placement, and ensure adequate safeguards to protect public health, safety and welfare. The ordinance specifies the applicable permitting requirements, design standards and site reclamation requirements for WECS. Non-residential WECS are only permitted within agricultural zoning districts and must not adversely affect existing or planned land uses their vicinity.

Right to Farm. Contra Costa County's "Right-to-Farm" ordinance is set forth in Title 8, Division 820-2 of the County Code. This ordinance is designed to protect and promote agricultural activities, especially at the urban/agriculture interface (Contra Costa County, 2010b). For the most part, a Right-to-Farm ordinance is designed to protect farmland by requiring disclosure to purchasers and users of property next to or near agricultural operations of the inherent potential concerns associated with living near actively farmed land. Such concerns include, but are not limited to, the noise, odors, dust, chemicals, smoke, and atypical hours of operation that may accompany agricultural operations. It is intended through such mandatory disclosures that purchasers and users will better understand the impact of living near agricultural operations and be prepared to accept the attendant conditions.

Implementation of the Project would replace an existing non-agricultural (i.e., utility) use within lands designated for agricultural use. The Right-to-Farm ordinance with its mandatory disclosures and deed restrictions is not considered applicable since there are existing wind turbines within most of the affected properties and no land purchases or changes to the local farm practices are proposed as part of the Project.

Agricultural Land Conservation. Contra Costa County regulates agricultural land conservation pursuant to Division 810 of the County Code. Agricultural preserves are regulated by Chapter 810-2 and land conservation contracts are regulated by Chapter 810-4.

4.2.3 Project Baseline

The baseline consists of parcels zoned A-2 and A-3 within the Project area, with surrounding areas also zoned for agricultural use. All of the agricultural area within the existing wind farm is used for grazing and no crops are currently cultivated, as discussed above. As demonstrated in Figure 4.2-1, land in the Project area is designated by the FMMP as Grazing Land and Farmland of Local Importance. Figure 4.2-2 shows those lands under Williamson Act contract in the vicinity of the Project. Note that there are no lands within the Project area under Williamson Act contracts. There are also no areas of forest land or timberland located within the Project area and no timber is harvested within the Project area.

4.2.4 Significance Criteria

Based on CEQA Guidelines Appendix G, a project would cause adverse impacts to agricultural and forestry resources if it would:

a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use;

b) Conflict with existing zoning for agricultural use, or a Williamson Act contract;

c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g));

d) Result in the loss of forest land or conversion of forest land to non-forest use; or

e) Involve other changes in the existing environment, which due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use.

4.2.5 Discussion of No Agriculture and Forestry Resources Impacts

Important Farmlands, defined as Prime Farmland, Unique Farmland, and Farmland of Statewide Importance, are identified using data from the California Department of Conservation FMMP. Farmland of Local Importance, Grazing Land, and Other Lands are also mapped to provide agricultural land-use context and disclosure, but are not considered Important Farmland per CEQA Appendix G. The Project is analyzed for its potential to cause temporary impacts to Important Farmland during construction, or permanent impacts by converting Important

Farmland to non-agricultural uses. Potential conflicts with agricultural zoning designations, potential incompatibility with a Williamson Act contract, or other changes resulting from Project implementation that would remove Important Farmlands from agricultural production also are discussed. The Project also is analyzed for its potential to temporarily impact forest land during construction, or to permanently convert forest land to non-forest uses.

As explained below, development of the Project would have no impact on agriculture and forestry resources.

a) The Project would neither temporarily nor permanently convert any Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to non-agricultural use.

As shown in Figure 4.2-1, none of the farmland within the Project area is classified as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. Consequently, the Project would not convert any of these categories of Farmland to non-agricultural use and no impact would occur.

b) The Project would not conflict with zoning for agricultural use or a Williamson Act contract.

As discussed above in Section 4.2.2.2, *Regulatory Setting*, all land within the Project area is zoned for agricultural use. Wind turbines are permitted within the A-2 and A-3 zoning districts upon approval of a LUP. In order to approve a LUP, the County must make the following findings, which are enumerated in Chapter 26-2 of the County Code:

1. That the proposed conditional land use shall not be detrimental to the health, safety and general welfare of the County;

2. That it shall not adversely affect orderly development of property within the County;

3. That it shall not adversely affect the preservation of the property values and the protection of the tax base within the County;

4. That it shall not adversely affect the policy and goals as set by the General Plan;

5. That it shall not create a nuisance and/or enforcement problem within the neighborhood or community;

6. That it shall not encourage marginal development within the neighborhood;

7. That special conditions or unique characteristics of the subject property and its location or surroundings are established.

Approval of a LUP is required because a wind energy system is the type of land use that may or may not be compatible with other uses at its proposed location. The LUP process provides the County with the opportunity to analyze a wind energy project to determine the extent of its environmental impacts and its compatibility with surrounding uses.

The County cannot approve a LUP for the Project unless it can make all seven of the findings stated above, meaning that if one or more findings cannot be made, then the Project would be denied and there would be no impact. If the evidence in the record allowed the County to make all seven findings, then the Project's compatibility with surrounding land uses as well as its consistency with the A-2 and A-3 zoning designations would be affirmed. In either case, the County's action would result in no conflict with an agricultural zoning designation, and therefore there would be no impact.

As discussed above in Section 4.2.2.2, the Project is not located on any lands currently under a Williamson Act contract. Furthermore, wind power generation is compatible with Williamson Act contracts per Government Code Section 51238 (a)(1) which states, "the erection, construction or maintenance of…electric (facilities)…are hereby determined to be compatible uses within any agricultural preserve." Thus, there would be no impact related to Williamson Act status of parcels within the Project area.

Since the Project cannot be approved if found to conflict with the Project area's agricultural zoning designations, and the State Legislature has found electric facilities to be compatible with agricultural preserves established under the Williamson Act, there is no possibility of the Project conflicting with agricultural zoning or a Williamson Act contract.

c) The Project would not conflict with existing zoning for, or cause rezoning of forest land, timberland or timberland zoned Timberland Production.

As discussed above in Section 4.2.2.2, "Forest land" is defined by Public Resources Code Section 12220(g) as, "land that can support 10-percent native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of one or more forestry resources, including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits." Relatedly, "timberland" is defined by Public Resources Code Section 4526 as, "land, other than land owned by the federal government..., which is available for, and capable of, growing a crop of trees of any commercial species used to produce lumber and other forest products, including Christmas trees."

The Project area is not currently zoned specifically for forest land or timberland uses and currently lacks the presence of timber resources necessary to be considered a Timberland Production Zone. However, the Project area consists of lands zoned A-2 and A-3, which allow for forestry as a permitted use without the requirement of any LUP. Consequently, the project area could potentially qualify as a Timberland Production Zone (as defined by California Government Code Section 51104(g)) in the future if the property's use is successfully managed for the development of timber resources. Because timber production would remain a compatible future land use with the proposed new wind energy facilities, the Project would not conflict with existing zoning for, or cause rezoning of, forest land or timberland. As result, no impact to forest land or timberland would occur.

d) The Project would not result in the loss of forest land or conversion of forest land to non-forest use.

As discussed previously and shown in Figure 4.2-1, none of the land within the Project area is specifically classified as forest land, and the land currently lacks the presence of forest or timber resources necessary to be considered forest land. The Project area consists of lands zoned A-2 and A-3, which allow for forestry as a permitted use without the requirement of any LUP. Therefore, it is conservatively assumed for the forest land analysis that the Project area consists of land that could be used as forest land. Nonetheless, the Project would result in a *net increase* in land available for potential forest land (due to the removal of existing wind turbines and their replacement with a smaller number of new turbines) within the Project area. Furthermore, forest land would remain a compatible future land use with the proposed new wind turbine facilities. Therefore, the Project would not result in the loss of forest land or conversion of forest land to non-forest use. As result, no impact to forest land would occur.

e) The Project would not involve other changes to the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use, or conversion of forest land to non-forest use.

None of the agricultural land within the Project area is classified as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (i.e. Farmland). Consequently, implementation of the Project would not result in conversion of Farmland to a non-agricultural use; there would be no impact.

As discussed previously**,** none of the land within the Project area is specifically classified as forest land or timberland, but the Project area could potentially qualify as a Timberland Production Zone in the future if the property's use is successfully managed for the development of timber resources. However, because the area currently does not contain any forest land resources, the Project would not result in any changes to the existing environment which would indirectly convert forest land to non-forest use. As a result, no impact to forest land or timberland would occur.

4.2.6 Discussion of Impacts and Mitigation Measures

Because implementation of the Project would result in no impact to agriculture and forestry resources, there are no impacts and no mitigation measures to be analyzed in this section.

4.3 Air Quality

4.3.1 Introduction

This section analyzes the Project's relationship to air quality. Discussed herein are the physical and regulatory setting; the baseline for determining environmental impacts; the criteria used for determining the significance of environmental impacts; potential impacts associated with decommissioning the existing windfarm and construction, operation, maintenance, and decommissioning of the repowering Project; and mitigation measures to reduce or avoid environmental impacts determined to be potentially significant.

4.3.2 Setting

4.3.2.1 Regional and Local Setting

Section 3.1.2, *Location*, provides general information about the Project's regional and local setting. This section (4.3.2.1) provides setting information specific to air quality. The Project area is within the San Francisco Bay Area (Bay Area) Air Basin. The Bay Area Air Basin encompasses a nine-county region including all of Alameda, Contra Costa, Santa Clara, San Francisco, San Mateo, Marin, and Napa Counties, and the southern portions of Solano and Sonoma Counties.

Regional Topography, Meteorology, and Climate

The topography of the Project area is dominated by northwest-southeast-trending ridge lines that reach an elevation of approximately 800 to 1,400 feet above mean sea level (msl). The elevations of intervening valley bottoms in the Project area are approximately 400 to 800 feet above msl.

The climate of the Bay Area Air Basin is determined largely by a high-pressure system that is almost always present over the eastern Pacific Ocean off the West Coast of North America. High-pressure systems are characterized by an upper layer of dry air that warms as it descends, which restricts the mobility of cooler marine-influenced air near the ground surface and results in the formation of subsidence inversions. During the winter, the Pacific high-pressure system shifts southward, thereby allowing storms to pass through the region. During summer and fall, emissions generated within the Bay Area Air Basin can combine with abundant sunshine under the restraining influences of topography and subsidence inversions to create conditions that are conducive to the formation of photochemical pollutants, such as ozone.

The Project area is generally well-ventilated by winds. Winter prevailing wind directions span the north-northeast through east-northeast sectors, caused by drainage off the hills and flow out of the Altamont Pass. During the summer months, cold water upwelling along the coast and hot inland temperatures can cause a strong onshore pressure gradient that translates into a strong, afternoon wind. The Bay Area Air Quality Management District (BAAQMD) operates a regional air quality monitoring network; the closest station to the Project area is the Livermore Monitoring Station on Rincon Avenue in the City of Livermore, which is approximately nine miles to the south-southwest. In Livermore, over 70 percent of the wind is from the south-southwest to west-southwest, and by

the afternoon 35 percent of the wind speed is about 11 miles per hour (mph). However, the Project area tends to be a receptor of ozone and ozone precursors from San Francisco, Alameda, western and northern Contra Costa County, and Santa Clara County and, during the summer months, temperatures tend to be warm, which promotes the formation of ozone (BAAQMD, 2010a).

Temperature and precipitation data collected in Livermore indicate that the Project area typically has average maximum and minimum winter (i.e., January) temperatures of 58 and 37 degrees Fahrenheit (ºF), respectively, while average summer (i.e., July) maximum and minimum temperatures are 89 and 59 ºF, respectively. Precipitation in the Project area averages approximately 14 inches per year (WRCC, 2010).

Air Pollutants of Concern

The U.S. Environmental Protection Agency (USEPA) has identified criteria air pollutants that are a threat to public health and welfare. These pollutants are called "criteria" air pollutants because standards have been established for each of them to meet specific public health and welfare criteria (see Section 4.3.2.3, *Regulatory Setting*). Below are descriptions of criteria pollutants that are a concern in the Project area.

Ozone

Ozone is a respiratory irritant and an oxidant that increases susceptibility to respiratory infections and that can cause substantial damage to vegetation and other materials. Ozone is not emitted directly into the atmosphere, but is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving reactive organic gases (ROG) and nitrogen oxide (NO_x). ROG and NO_x are known as precursor compounds for ozone. Significant ozone production generally requires ozone precursors to be present in a stable atmosphere with strong sunlight for approximately three hours.

Ozone is a regional air pollutant because it is not emitted directly by sources, but is formed downwind of sources of ROG and NO_x under the influence of wind and sunlight. Ozone concentrations tend to be higher in the late spring, summer, and fall, when the long sunny days combine with regional subsidence inversions to create conditions conducive to the formation and accumulation of secondary photochemical compounds, like ozone.

Nitrogen Dioxide

Nitrogen dioxide (NO_2) is an air quality pollutant of concern because it acts as a respiratory irritant. NO_2 is a major component of the group of gaseous nitrogen compounds commonly referred to as NO_x. A precursor to ozone formation, NO_x is produced by fuel combustion in motor vehicles, industrial stationary sources (such as industrial activities), ships, aircraft, and rail transit. Typically, NO_x emitted from fuel combustion is in the form of nitric oxide (NO) and NO_2. NO is often converted to NO_2 when it reacts with ozone or undergoes photochemical reactions in the atmosphere.

Carbon Monoxide

Carbon monoxide (CO) is a non-reactive pollutant that is a product of incomplete combustion and is mostly associated with motor vehicle traffic. High CO concentrations develop primarily during winter when periods of light winds combine with the formation of ground level temperature inversions (typically from the evening through early morning). These conditions result in reduced dispersion of vehicle emissions. Motor vehicles also exhibit increased CO emission rates at low air temperatures. When inhaled at high concentrations, CO combines with hemoglobin in the blood and reduces the oxygen-carrying capacity of the blood. This results in reduced oxygen reaching the brain, heart, and other body tissues. This condition is especially critical for people with cardiovascular diseases, chronic lung disease, or anemia.

Particulate Matter

Particulate matter less than 10 microns in diameter (PM10) and particulate matter less than 2.5 microns in diameter (PM2.5) represent fractions of particulate matter that can be inhaled into air passages and the lungs and can cause adverse health effects. Particulate matter in the atmosphere results from many kinds of dust- and fume-producing industrial and agricultural operations, fuel combustion, and atmospheric photochemical reactions. Some sources of particulate matter, such as demolition and construction activities, are more local in nature, while others, such as vehicular traffic, have a more regional effect. Very small particles of certain substances (e.g., sulfates and nitrates) can cause lung damage directly, or can contain adsorbed gases (e.g., chlorides or ammonium) that may be injurious to health. According to a recent study by the California Air Resources Board (CARB), exposure to ambient PM2.5 can be associated with approximately 14,000 to 24,000 premature annual deaths statewide (CARB, 2009). Particulates can also damage materials and reduce visibility.

Other Criteria Pollutants

Sulfur dioxide (SO_2) is a combustion product of sulfur or sulfur-containing fuels such as coal. SO_2 is also a precursor to the formation of atmospheric sulfate and particulate matter (both PM10 and PM2.5) and contributes to potential atmospheric sulfuric acid formation that could precipitate downwind as acid rain.

Lead has a range of adverse neurotoxin health effects, and was formerly released into the atmosphere primarily via the combustion of leaded gasoline. The phase-out of leaded gasoline in California resulted in decreasing levels of atmospheric lead.

Ambient Air Quality

The BAAQMD's regional monitoring network measures the ambient concentrations of criteria pollutants. Existing levels of air quality in the general Project area can be inferred from ambient air quality measurements conducted by BAAQMD at its closest station: the Livermore Monitoring Station. Table 4.3-1 shows a five-year (2006 through 2010) summary of ozone, NO_2, CO, PM10, and PM2.5 monitoring data collected at the Livermore station. The data are compared to the California Ambient Air Quality Standards (CAAQS) and National Ambient Air Quality Standards (NAAQS) that were applicable during the measurement summary period (see Table 4.3-1 notes).

TABLE 4.3-1
AIR QUALITY DATA SUMMARY (2006–2010) FOR THE PROJECT AREA

Pollutant	Current Standard	Monitoring Data by Year				
		2006 2007	2008	2009		2010
Ozone						
Highest One-Hour Average (ppm)		0.13	0.12	0.14	0.11	0.15
Days over State Standard	0.09	13	2	5	0	0
Highest Eight-Hour Average (ppm)		0.101	0.091	0.110	0.086	NA
Days over State Standard[a]	0.070	15	3	8	8	NA
Days over Federal Standard[a]	0.075	5	1	6	6	NA
Nitrogen Dioxide						
Highest One-Hour Average (ppm)		0.064	0.052	0.058	0.052	0.058
Days over State Standard	0.18	0	0	0	0	0
Annual Average (ppm)		0.014	0.013	0.013	0.011	0.011
Exceed State Standard?	0.030	No	No	No	No	No
Carbon Monoxide						
Highest One-Hour Average (ppm)[d]		3.3	3.3	2.4	2.4	NA
Days over State Standard	20	0	0	0	0	NA
Particulate Matter (PM10)b						
Highest 24-Hour Average (µg/m^3)		69	75	46	NA	NA
Days over State Standard	50	3	2	NA	NA	NA
Days over Federal Standard	150	0	0	NA	NA	NA
Annual Average (µg/m^3)[c]		21.8	19.8	NA	NA	NA
Exceed State Standard?	20	Yes	No	NA	NA	NA
Particulate Matter (PM2.5)						
Highest 24-Hour Average (µg/m^3)		50.3	54.9	38.6	45.7	NA
Days over Federal Standard[c]	35	3	3	2	4	NA

NOTES: NA = Data not available. ppm = parts per million; µg/m^3 = micrograms per cubic meter.

a The first California eight-hour ozone standard of 0.07 ppm was implemented on May 17, 2005, and on May 17, 2008, the USEPA implemented a more stringent national eight-hour ozone standard, revising it from 0.080 ppm to 0.075 ppm. State ozone standard exceedance days for 2005 through 2008 and federal ozone standard exceedance days for 2008 are based on these new standards. Eight-hour ozone data for 2010 was not available.

b PM10 monitoring was discontinued at the Livermore Station on June 8, 2008. Therefore, 2008 and 2009 PM10 data for the Livermore Station are not available.

c On December 17, 2006, the USEPA implemented a more stringent National 24-hour PM2.5 standard, revising it from 65 µg/m^3 to 35 µg/m^3; and revoked the national annual average PM10 standard. PM2.5 exceedance days for 2006 through 2008 reflect the new standard. PM2.5 data for 2010 was not available.

d In June 2009, the BAAQMD discontinued CO monitoring at the Livermore Station, as such 2009 represents only a partial year. There is no representative station for the Project at this time for CO data.

SOURCE: BAAQMD, 2010b (for years 2005 through 2008) and BAAQMD 2010c (for year 2009; this data source does not provide eight-hour or annual average data)

As shown in Table 4.3.1, the State one-hour ozone standard was exceeded between two and 13 times per year between 2006 and 2008, and was not exceeded in 2009 or 2010. The State eight-hour ozone standard was exceeded between three and 15 times per year between 2006 and 2008, while the national eight-hour ozone standard was exceeded between once and six times per year between 2006 and 2009.

The 24-hour State PM10 standard was exceeded three times in 2006 and twice in 2007, and there were no exceedances of the federal 24-hour PM10 standard recorded during the two years with available data during the summary period. The annual average PM10 concentrations exceeded the State standard during the summary period in 2006. From 2006 through 2009, the federal PM2.5 standard was exceeded two to four times per year.

As indicated in the table, no violations of the applicable NO_2 or CO standards were recorded at the Livermore station during the five year period.

Sensitive Receptors

For the purposes of this air quality analysis, sensitive receptors are places with people who are considered to be more sensitive than others to air pollutants. The reasons for greater-than-average sensitivity include pre-existing health problems, proximity to emissions sources, or duration of exposure to air pollutants. Schools, hospitals and convalescent homes are considered to be sensitive to poor air quality because children, elderly people and the infirm are more susceptible to respiratory distress and other air quality-related health problems than the general public. Residential areas are considered sensitive to poor air quality because people usually stay home for extended periods of time, with associated greater exposure to ambient air quality. Recreational uses also are considered sensitive due to the greater exposure to ambient air quality conditions because vigorous exercise associated with some forms of recreation places a high demand on the human respiratory system.

The Vasco Caves Regional Preserve, which is jointly owned by the East Bay Regional Park District (EBRPD) and the Contra Costa Water District (CCWD) and operated by the EBRPD, is located adjacent to the southern portion of the Project area. Public access to the preserve is limited to guided tours; however, the preserve includes a caretaker residence, which for the purposes of this analysis is assumed to be occupied, which is located approximately 1,000 feet south of one of the existing access roads to be widened, approximately 2,000 feet southeast of one of the turbines to be removed, and approximately 3,500 feet south-southwest of the proposed location of one of the new turbines. For the purposes of this analysis, the residence is considered a sensitive receptor. This area is also considered a sensitive receptor as a recreational area because the Vasco Caves guided foot tour starts at the caretaker residence.

The closest off-site sensitive receptors to a location of a proposed feature of the Project are residences along Armstrong Road. These residences are located east of Vasco Road, and are approximately 0.9 mile (approximately 4,750 feet) to the east of the existing substation site. There are also two residences off the west side of Vasco Road, the closest of which is located approximately 1.8 miles (approximately 9,500 feet) northeast of the closest proposed new turbine

site and approximately 1.1 miles (approximately 5,800 feet) north-northeast of the closest existing turbine to be removed.

In addition, the Project area is located partially within and adjacent to the CCWD Los Vaqueros Watershed property, which includes recreational opportunities such as hiking, biking, boating, fishing, and horseback riding. The closest watershed recreational area is in the vicinity of Los Vaqueros Dam, which is approximately 0.25 miles (1,320 feet) from the closest proposed new turbine location.

4.3.2.2 Regulatory Setting

Criteria Air Pollutants

Regulation of air pollution is achieved through both national and State ambient air quality standards and emission limits for individual sources of air pollutants. As required by the federal Clean Air Act (CAA), the USEPA has identified criteria pollutants and has established NAAQS to protect public health and welfare. NAAQS have been established for ozone, CO, NO_2, SO_2, PM10, PM2.5, and lead.

To protect human health and the environment, the USEPA has set “primary” and “secondary” maximum ambient thresholds for each of the criteria pollutants. Primary thresholds were set to protect human health, particularly sensitive receptors such as children, the elderly, and individuals suffering from chronic lung conditions such as asthma and emphysema. Secondary standards were set to protect the natural environment and prevent further deterioration of animals, crops, vegetation, and buildings.

The NAAQS are defined as the maximum acceptable concentration that may be reached, but not exceeded more than once per year. California has adopted more stringent ambient air quality standards for most of the criteria air pollutants. Table 4.3-2 presents both sets of ambient air quality standards (i.e., national and State) and the Bay Area Air Basin’s attainment status for each standard. California has also established State ambient air quality standards for sulfates, hydrogen sulfide, and vinyl chloride; however, given that these types of air emissions are either not present or exist in negligible amounts in diesel and gasoline exhaust, these pollutants are not discussed further in this EIR.

As shown in the table, the Bay Area is currently classified as “non-attainment” for the one-hour State ozone standard as well as for the federal and State eight-hour standards. Additionally, the Basin is classified as non-attainment for the State 24-hour and annual arithmetic mean PM10 standards as well as the State annual arithmetic mean and the national 24-hour PM2.5 standards. The Bay Area Air Basin is unclassified or classified as attainment for all other pollutant standards (BAAMQD, 2010d).

TABLE 4.3-2
AMBIENT AIR QUALITY STANDARDS AND BAY AREA AIR BASIN ATTAINMENT STATUS

Pollutant	Averaging Time	State Standard		National Standard	
		Concentration	Attainment Status	Concentration	Attainment Status
Ozone	One-Hour	0.09 ppm	Non-attainment	–	
	Eight-Hour	0.07 ppm	Non-attainment	0.075 ppm	Non-Attainment
Carbon Monoxide	One-Hour	20 ppm	Attainment	35 ppm	Attainment
	Eight-Hour	9.0 ppm	Attainment	9 ppm	Attainment
Nitrogen Dioxide	One-Hour	0.18 ppm	Attainment	–	
	Annual	0.030 ppm	Attainment	0.053 ppm	Attainment
Sulfur Dioxide	One-Hour	0.25 ppm	Attainment	–	
	Three-Hour	–		0.5 ppm	Attainment
	24-Hour	0.04 ppm	Attainment	0.14 ppm	Attainment
	Annual	–		0.03 ppm	Attainment
Respirable Particulate Matter (PM10)	24-Hour	50 µg/m^3	Non-attainment	150 µg/m^3	Unclassified
	Annual	20 µg/m^3	Non-attainment	–	
Fine Particulate Matter (PM2.5)	24-Hour	–		35 µg/m^3	Non-attainment
	Annual	12 µg/m^3	Non-attainment	15 µg/m^3	Attainment
Lead	30-Day	1.5 µg/m^3	Attainment	–	
	Quarterly	–		1.5 µg/m^3	Attainment

NOTES: ppm = parts per million; µg/m^3 = micrograms per cubic meter

SOURCE: BAAQMD, 2010d

Federal

USEPA is responsible for implementing the programs established under the federal CAA, such as establishing and reviewing the NAAQS and judging the adequacy of State Implementation Plans (SIPs), but has delegated the authority to implement many of the federal programs to the states while retaining an oversight role to ensure that the programs continue to be implemented.

State of California

CARB is responsible for establishing and reviewing the State standards, compiling the California SIP and securing approval of that plan from USEPA, conducting research and planning, and identifying toxic air contaminants. CARB also regulates mobile sources of emissions in California, such as construction equipment, trucks, and automobiles, and oversees the activities of California's air quality management districts, which are organized at the county or regional level. County or regional air quality management districts are primarily responsible for regulating stationary sources at industrial and commercial facilities within their geographic areas and for preparing the air quality plans that are required under the federal CAA and California CAA.

California's Diesel Risk Reduction Plan / Diesel Fuel Regulations

As part of California's Diesel Risk Reduction Plan, CARB has passed numerous regulations to reduce diesel emissions from vehicles and equipment that are already in use. Combining these retrofit regulations with new engine standards for diesel fueled vehicles and equipment, CARB intends to reduce diesel particulate matter (PM) emissions by 85 percent from year 2000 levels by 2020.

California Diesel Fuel Regulations (13 Cal. Code Regs. §§ 2281-2285; 17 Cal. Code Regs. § 93114) provide standards for motor vehicle fuels and diesel fuel.

Bay Area Air Quality Management District

BAAQMD is the regional agency with jurisdiction over the nine-county region located in the Bay Area Air Basin. The Association of Bay Area Governments (ABAG) and the Metropolitan Transportation Commission, county transportation agencies, cities and counties, and various non-governmental organizations also join in the efforts to improve air quality through a variety of programs. These programs include the adoption of regulations and policies, as well as implementation of extensive education and public outreach programs.

BAAQMD is responsible for attaining and/or maintaining air quality in the Bay Area Air Basin within federal and State air quality standards. Specifically, BAAQMD has the responsibility to monitor ambient air pollutant levels throughout the Bay Area and to develop and implement strategies to attain the applicable federal and State standards.

CEQA Guidelines

On June 2, 2010, the BAAQMD Board adopted an update to its *CEQA Air Quality Guidelines* (BAAQMD, 2010e), which is a guidance document to provide uniform procedures for assessing air quality impacts and preparing the air quality sections of environmental documents for projects subject to CEQA. The document describes the criteria that BAAQMD uses when reviewing and commenting on the adequacy of environmental documents. It recommends quantitative thresholds for use in determining whether construction and operational activities associated with projects would have significant adverse environmental impacts, identifies methodologies for predicting project emissions and impacts, and identifies measures that can be used to avoid or reduce air quality impacts.

Air Quality Plans

Air quality plans developed to meet federal requirements are referred to as SIPs. The federal CAA and the California CAA require plans to be developed for areas designated as non-attainment (with the exception of areas designated as non-attainment for the State PM10 standard). The BAAQMD recently adopted the Bay Area 2010 Clean Air Plan (CAP), which replaced the Bay Area 2005 Ozone Strategy as the applicable air quality plan for the Project area. The Bay Area 2010 CAP also serves as a multi-pollutant air quality plan to protect public health and the climate. The Bay Area 2010 CAP control strategy includes revised, updated, and new measures in the three traditional control measure categories: stationary sources measures, mobile

source measures, and transportation control measures. In addition, the Bay Area 2010 CAP identifies two new categories of control measures, including land use and local impact measures and energy and climate measures. In other words, the Bay Area 2010 CAP defines a control strategy that the BAAQMD and its partners will implement to: (1) reduce emissions and decrease ambient concentrations of harmful pollutants; (2) safeguard public health by reducing exposure to air pollutants that pose the greatest health risk, with an emphasis on protecting the communities most heavily impact by air pollution; and (3) reduce greenhouse gas emissions to protect the climate (BAAQMD, 2010g).

Regulation 2, Rule 2

The BAAQMD's New Source Review Rule (Regulation 2, Rule 2) requires that new or modified sources of air pollutants undergo permit review for Best Available Control Technology (BACT) and/or Best Available Control Technology for Toxics (TBACT) when certain thresholds are exceeded. Pursuant to Regulation 2, Rule 2, any new or modified source which results in an increase in emissions of ROC, NOx, SO2, PM10, or CO in excess of 10 pounds per highest day must be reviewed for possible application of BACT (BAAQMD, 2010e). The BAAQMD has established BACT guidelines for concrete batch plants and rock and aggregate processing (e.g., crushing) that would be directly applicable to the Project.

Local

Contra Costa County General Plan

The Contra Costa County General Plan Conservation Element contains an Air Quality Resources discussion (Section 8.14) that identifies general goals and policies designed to address air pollution. The majority of the goals and policies are not directly applicable to the Project and tend to focus on improvements to the transportation system, reducing long distance commuting, encouraging and supporting non-auto transportation, and reducing future land use conflicts related to air pollution. However, two of the policies (i.e., Policies 8-103 and 8-104) are directly applicable to the Project. Policy 8-103 requires mitigation to be imposed when there is a finding that air quality would be significantly affected, and Policy 8-104 requires proposed projects to be reviewed for potential to generate hazardous air pollutants (Contra Costa County, 2010).

4.3.3 Project Baseline

Baseline air quality conditions for this analysis reflect the conditions at the existing wind farm in Spring 2009, when the Notice of Preparation was issued for the EIR. At that time, the wind farm had been completely shut down, none of the existing 91 turbines were operational, and there were no wind farm-related direct or indirect air quality pollutants being emitted. As stated above, the Project baseline includes the area classified as non-attainment for ozone, PM10, and PM2.5 standards and the closest on-site and off-site sensitive receptors are residences approximately 1,000 feet and 4,750 feet from any proposed component at the Project area, respectively.

4.3.4 Significance Criteria

Based CEQA Guidelines Appendix G, a project would cause adverse impacts to air quality if it would:

a) Conflict with or obstruct implementation of the applicable air quality plan;

b) Violate any air quality standard or contribute to an existing or projected air quality violation;

c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);

d) Expose sensitive receptors to substantial pollutant concentrations; or

e) Create objectionable odors affecting a substantial number of people.

Approach to Analysis

As discussed previously, the BAAQMD recently adopted updated its CEQA Air Quality Guidelines. The analysis used in this document tiers from methodologies provided in the updated CEQA Air Quality Guidelines (herein referred to as the BAAQMD Guidelines). The BAAQMD Guidelines have quantitative significance thresholds for construction related exhaust emissions. Therefore, construction impacts associated with fugitive dust are discussed qualitatively with regard to the applicable BAAQMD-recommended mitigation measures for dust abatement, and construction impacts associated with equipment exhaust emissions are discussed quantitatively with respect to construction activity thresholds identified in the BAAQMD Guidelines.

Under the BAAQMD Guidelines, a project would have a significant short-term construction-related or long-term operational air quality impact if it would result in average construction-related emissions of ROG, NO_x, or PM2.5 (non-inclusive of fugitive dust) of more than 54 pounds per day or emissions of PM10 (non-inclusive of fugitive dust) of more than 82 pounds per day. The BAAQMD recommends calculating the average daily construction emissions by dividing the total construction emissions by the number of workdays (BAAQMD, 2010f).

Based on BAAQMD guidance, if a project would result in an increase in ROG, NO_x, PM10, or PM2.5 of more than its respective average daily mass thresholds, then it would also be considered to contribute considerably to a significant cumulative impact. In developing thresholds of significance for air pollutants, BAAQMD considered the emission levels for which a project's individual emissions would be cumulatively considerable. Therefore, if a project would exceed the identified significance thresholds, its emissions would be cumulatively considerable, and if a project would not exceed the significance thresholds, its emissions would not be cumulatively considerable.

4.3.5 Discussion of No Air Quality Impacts

Comparison of baseline conditions and Project characteristics with respect to each of the significance criteria stated above shows that no impacts would result for criteria d) and e).

d) The Project would not expose sensitive receptors to substantial pollutant concentrations.

Long-term operations that would be associated with the Project would result in virtually no new emissions. Construction activities would generate air pollutant emissions, including suspended and inhalable particulate matter as well as equipment exhaust emissions. However, construction activities would occur over a relatively short period of approximately 12 months and associated emissions would be spatially dispersed over the Project area. In addition, the closest sensitive receptor to the Project area is the Vasco Caves caretaker residence/Vasco Caves guided tour area that is approximately 1,000 feet from the nearest construction area (a portion of an existing access road that would be widened). All other receptors in the vicinity of the Project area are off-site, and would be at least 4,750 feet (nearly a mile) from the closest components of Project-related construction. Therefore, Project-related construction emissions would be sufficiently diluted at the nearest sensitive receptor locations. There would be no impacts related to the Project exposing sensitive receptors to substantial pollutant concentrations.

e) The Project would not create objectionable odors affecting a substantial number of people.

Typical odor sources of concern include 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, rendering plants, and coffee roasting facilities. The Project involves installation and operations of new wind turbine generators that would not result in objectionable odors. Although Project construction would include the use of diesel equipment that could result in the creation of odors associated with exhaust emissions, the construction activities would be temporary and spatially dispersed, and would take place in areas that are not in the vicinity of sensitive receptors (i.e., the closest sensitive receptors are approximately 1,000 feet from a portion of an access road that would be widened under the Project). Therefore, the Project would not affect a substantial number of people and no odor-related impact would occur.

4.3.6 Discussion of Impacts and Mitigation Measures

a) Would the Project conflict with or obstruct implementation of the applicable air quality plan?

Impact 4.3-1: The Project would not conflict with or obstruct implementation of the applicable air quality plan. (*Less-than-Significant Impact*)

The most recently adopted air quality plan for the Air Basin is the Bay Area 2010 CAP. The Bay Area 2010 CAP is an update to the BAAQMD's 2005 Ozone Strategy to comply with State air

quality planning requirements. The Bay Area 2010 CAP also serves as a multi-pollutant air quality plan to protect public health and the climate. The Bay Area 2010 CAP control strategy includes revised, updated, and new measures in the three traditional control measure categories: stationary sources measures, mobile source measures, and transportation control measures. In addition, the Bay Area 2010 CAP indentifies two new categories of control measures, including land use and local impact measures and energy and climate measures.

A determination of consistency with the Bay Area 2010 CAP must demonstrate that a plan or project does not exceed the population or vehicle miles traveled assumptions contained in the CAP and that the project or plan implements transportation control measures as applicable. Implementation of the Project would result in up to four new permanent employees relative to baseline conditions (which are four full-time employees and two part-time employees). It is anticipated that the majority of the new temporary construction-related positions would be filled from the local labor pool in Contra Costa County and Alameda County. Therefore, the Project would not result in substantial population growth and would likely result in no net increase or a negligible increase in vehicle miles traveled in the Bay Area. Potential impacts on population and housing are discussed in Section 4.14, *Population and Housing*, of this EIR; potential transportation-related impacts are discussed in Section 4.17, *Transportation/Traffic*.

Although short-term mitigated emissions resulting from Project construction would exceed the BAAQMD significance threshold for NO_x (see Impact 4.3-2, below), this renewable wind-generated energy project would result in long-term benefits, including reduction of NO_x emissions relative to the production of comparable energy from fossil fuel sources. Accordingly, the Project would be consistent with the Bay Area 2010 CAP regardless of this short-term impact. Therefore, the Project would not conflict with or obstruct implementation of the applicable air quality plan and impacts would be less than significant.

Mitigation: None required.

---

b) Would the Project violate any air quality standard or contribute to an existing or projected air quality violation?

Impact 4.3-2: The Project would result in short-term construction emissions of criteria pollutants that would contribute to existing air quality violations. (*Significant and Unavoidable Impact*)

Construction of the Project would occur over a period of approximately 12 months and it is estimated that there would be approximately 135 workdays that would include the use of heavy construction equipment. Construction activities at the Project area would be associated with existing turbine removal and installation of the new turbines and associated infrastructure, including access roads, power collection systems, communication lines, and upgrades to the existing substation. It is estimated that approximately 24 pieces of off-road construction equipment, including cranes, excavators, graders, rough terrain forklifts, dozers, etc., would be

required between four and 10 hours per day, depending on the specific equipment type and construction activity, to construct the Project.

In addition to the off-road equipment, on-road truck trips would be required to deliver materials and equipment to the construction sites as well as to transport workers to and from the construction sites. It is estimated that an average of approximately 100 round trips per day, including truck trips and commuting worker trips, would be required during the construction period. The truck trips that would be required to deliver the turbine components would originate at the Port of Oakland and it is anticipated that the trips required to deliver the other materials, including concrete, road gravel, etc., and the trips that would be required to remove the existing turbine debris, would occur in the greater Bay Area.

Criteria pollutant emissions of ROG, NOx, CO, PM10, and PM2.5 from construction equipment would incrementally add to the regional atmospheric loading of these pollutants during construction of the Project. The average daily exhaust emissions that would be associated with Project construction activities have been estimated and are presented in Table 4.3-3. Construction exhaust emissions were estimated using CARB's Offroad 2007 and EMFAC 2007 emissions models to develop emission factors for off-road and on-road sources, respectively. Refer to Appendix C for additional information on the assumptions, emission factors, and methodologies used to estimate the construction exhaust emissions inventory for the Project. As indicated in Table 4.3-3, exhaust emissions of NOx would exceed the BAAQMD's significance thresholds, resulting in a significant impact. Implementation of Mitigation Measures 4.3-2a and 4.3-2b would reduce construction-related exhaust emissions.

TABLE 4.3-3
PROJECT CONSTRUCTION EXHAUST EMISSIONS ESTIMATES

	Estimated Average Daily Emissions (pounds/day)				
Construction Activity	**ROG**	**NOx**	**CO**	**PM10**	**PM2.5**
Existing Turbine Removal	1.06	9.79	3.03	0.39	0.36
New Turbine and Infrastructure Installation	5.70	53.26	17.77	2.06	1.90
Off-site Vehicle Trips	4.28	36.32	40.66	1.62	1.49
Total Average Emissions in Bay Area	11.04	**99.37**	61.46	4.07	3.75
BAAQMD Significance Thresholds	54	54	NA	82	54
Significant Impact?	No	Yes	No	No	No

NOTES: Project construction emissions estimates were made using CARB's Offroad 2007 and EMFAC 2007 emission models. Equipment numbers and types are based on information provided by the applicant and experience of the consultant. See Appendix C for details.

In addition to exhaust emissions, emissions of fugitive dust would also be generated by Project-related construction activities associated with grading and earth disturbance, travel on paved and unpaved roads, etc. With regard to fugitive dust emissions, the BAAQMD Guidelines focus on implementation of dust control measures rather than comparing estimated levels of fugitive dust to quantitative significance thresholds. New and more comprehensive fugitive dust control

measures have been identified by the BAAQMD in its new guidelines. Therefore, the BAAQMD's new applicable recommended fugitive dust control measures, which are contained in Mitigation Measures 4.3-2a and 4.3-2b, would be implemented to reduce impacts associated with fugitive dust emissions to a less-than-significant level.

Mitigation Measure 4.3-2a: The Applicant shall reduce construction-related air pollutant emissions by implementing applicable BAAQMD basic control measures. The Applicant shall require all contractors to comply with the following requirements for all areas with active construction activities:

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day or at a frequency adequate to maintain minimum soil moisture of 12 percent. Moisture content can be verified by lab samples or moisture probe.
- All haul trucks transporting soil, sand, or other loose material off-site shall be covered;
- All vehicle speeds on unpaved roads shall be limited to 15 mph;
- All roadways and driveways to be paved shall be completed as soon as possible. Foundation pads shall be laid as soon as possible after grading unless seeding or soil binders are used;
- All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation;
- Post a publically visible sign with the Applicant's telephone number and person to contact regarding dust complaints. This person shall respond and take corrective action within 48 hours. The BAAQMD's phone number shall also be visible to ensure compliance with applicable regulations.

Mitigation Measure 4.3-2b: The Applicant shall reduce construction-related air pollutant emissions by implementing measures based on BAAQMD's additional construction mitigation measures. The Applicant shall require all contractors to comply with the following requirements for all areas with active construction activities:

- All excavation, grading, and/or demolition activities shall be suspended when average ground level wind speeds exceed 20 miles per hour.
- Wind breaks (e.g., fences) shall be installed on the windward side(s) of actively disturbed areas of construction. Wind breaks should have a maximum 50 percent air porosity.
- Vegetative ground cover shall be planted in disturbed areas as soon as possible and watered appropriately until vegetation is established. The seed mix and plant varieties must be approved by the County Zoning Administrator prior to planting.
- A wash-off station shall be established at each Project exit point. All trucks and equipment, including their tires, shall be washed off prior to leaving the site.

- Site accesses to a distance of 100 feet from the paved road shall be treated with a six to 12 inch compacted layer of wood chips, mulch, or gravel.
- Consistent with the approved Storm Water Pollution Prevention Plan, sandbags or other erosion control measures shall be installed to prevent silt runoff to public roadways from sites with a slope greater than one percent.
- The idling time of diesel-powered construction equipment shall be limited to two minutes.
- For off-road construction equipment of more than 50 horsepower and all on-road heavy-duty trucks, the Applicant shall ensure achievement of a Project-wide fleet-average 20 percent NOx reduction compared to the most recent CARB fleet average. A plan to achieve these reductions shall be submitted to Contra Costa County for review and approval prior to commencement of construction activities. Construction activities cannot commence until the plan has been approved. Acceptable options for reducing emissions include the use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, and/or other options as such become available.

Significance if Impact after Mitigation: Implementation of Mitigation Measures 4.3-2a and 4.3-2b would ensure that dust-related impacts would be less than significant. By contrast, although it is estimated that implementation of Mitigation Measures 4.3-2a and 4.3-2b would reduce total NO_x exhaust emissions identified in Table 4.3-3 by approximately 20 percent, this emission reductions would not reduce Project exhaust emissions of NO_x to below the significance level. Consequently, this impact would remain significant and unavoidable with regard to NO_x emissions.

---

c) Would the Project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?

Impact 4.3-3: The Project would result in long-term emissions of criteria pollutants. (*Less-than-Significant Impact*)

Operation of the Project would not result in new stationary sources of criteria pollutants, nor would it increase criteria pollutant emissions from any existing stationary sources. However, up to four new workers would be employed under the Project. Assuming that each new worker would generate an average of one and a half 40-mile round trips per day, daily emissions of each of the criteria pollutants would be less than one pound, with the exception of CO, which would be approximately four pounds. This increase in daily mobile source emissions would be well below the BAAQMD's significance thresholds and would not constitute a significant contribution to existing air quality violations. Therefore, the impact associated with long-term increases in criteria pollutant emissions from operations of the Project would be less than significant.

Mitigation: None required.

4.4 Biological Resources

4.4.1 Introduction

This section analyzes the Project's impacts to biological resources. Discussed herein are the physical and regulatory setting; the baseline for determining environmental impacts; the criteria used for determining the significance of environmental impacts; potential impacts associated with decommissioning the existing windfarm and construction, operation, maintenance, and decommissioning of the repowering Project; and mitigation measures to reduce or avoid environmental impacts determined to be potentially significant.

This analysis considers those portions of the Project area that would be directly or indirectly affected by Project activities, such as at existing and proposed turbine sites, access roads to be decommissioned and developed, the O&M Building, Tres Vaqueros Substation, and proposed alignments for underground electrical collection lines. Wetlands and other biological resources were catalogued within the study area defined as a 328-foot buffer zone around existing and proposed turbine sites, a 164-foot buffer zone along new and existing access roads and centered on the trench for electrical facilities, and all wetland and alkaline soil areas within the overall project area providing high potential habitat for several target plant species (Ecology and Environment, Inc. (E&E), 2009). Several biological reports provided information for evaluating the Project's direct and indirect impacts on biological resources.

4.4.2 Setting

4.4.2.1 Regional and Local Setting

Section 3.3.2 (*Location*) provides general information about the regional and local setting. This section (4.4.2.1) provides setting information specific to biological resources in the Project area.

The geographic area relevant to analysis of direct and indirect impacts on biological resources encompasses the actual ground subject to disturbance and other areas that could be affected (i.e., downhill or downstream areas that could experience runoff or sedimentation; trees; rock outcrops that could contain vernal pools; etc.) by Project implementation, as well as buffer zones as described above. This section presents an overview of the regional setting in the Altamont Pass Wind Resource Area (APWRA) and the local vicinity of the Project area. The Project site comprises lands owned by the Contra Costa Water District (CCWD) and East Bay Regional Park District (EBRPD), as described in Chapter 3, *Project Description*.

Altamont Pass Wind Resource Area

The Project area is within the APWRA, which is an approximately 50,000-acre area of open land situated east of the City of Livermore, in the Altamont Hills of the interior Central California Coast Range. The APWRA refers to an area within the Altamont Hills where wind energy development is commercially viable. This region is characterized by rolling foothills of relatively

treeless annual grassland, interspersed with drainages and stock ponds in valleys and low-lying areas. The average difference between hilltops and valleys within the APWRA is roughly 450 feet in elevation. Seep-fed drainages contribute to occasional alkali wetlands, and intermittent creeks support strings of riparian habitat. Topography in the western APWRA is steep, becoming more gradual in the east as the Altamont Range transitions into the Central Valley floor. Scattered sandstone rock outcrops occur along ridgelines and hill slopes.

Annual grasslands throughout the APWRA support abundant ground squirrel and other rodent populations, which in turn support vast numbers of common and special-status raptors and mammals. Area wetlands support dense breeding populations of special-status amphibians (ECCCHC, 2007), and area grasslands provide upland aestivation[1] habitat for these species. In addition to supporting large resident bird populations of burrowing owls and golden eagles (CEC, 2009; EBRPD, 2009; CEC, 2002) and less common species such as prairie falcon (EBRPD, 2009b), the area serves as a migratory corridor for birds and, based on fatality data indicating seasonal presence, possibly for bats (Smallwood, 2010a; Insignia Environmental, 2009).

As older-generation turbines in the APWRA are being repowered with modern wind turbines, bird researchers note that protective measures applied to old-generation wind turbines to reduce bird fatalities were not effective and that repowering with fewer and more efficient turbines could reduce avian mortalities. Preliminary monitoring results from two repowered projects in the APWRA, Diablo Winds and Buena Vista, suggest a reduction in avian fatalities (Smallwood, 2010a; Smallwood and Karas, 2009).

Regional Conservation Efforts

East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan

The East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan (East County HCP/NCCP) was approved in July 2007 (ECCCHC, 2007). It provides a comprehensive framework for species and ecosystem conservation, short- and long-term local land use decision-making and environmental permitting processes in the vicinity of the Project. Implementation of the plan is managed by the East Contra Costa County Habitat Conservancy, which is a Joint Powers Authority formed by Contra Costa County and the cities of Brentwood, Clayton, Oakley, and Pittsburg. The East County HCP/NCCP authorizes incidental take for 28 listed and non-listed species ("covered species") under the Federal Endangered Species Act (FESA) and the California Natural Community Conservation Planning Act (NCCPA). To be covered under the permits issued in connection with East County HCP/NCCP, the authorized take must be incidental to the otherwise lawful activities identified as "covered activities" in the plan. Such activities broadly include all ground-disturbing activities controlled by permit holders via their land use planning process, as well as specific rural infrastructure projects and preserve management activities. The East County HCP/NCCP's definition of covered activities expressly excludes wind turbine expansion and operation (ECCCHC, 2007).

[1] "Aestivation" is a condition of dormancy or torpidity, similar to hibernation, experienced by various amphibian and reptile species as a way to endure temperature extremes.

APWRA NCCP/HCCP

Current conservation efforts in progress in the APWRA include the Altamont Pass Wind Resource Area Conservation Plan (APWRA NCCP/HCP), which is being developed to minimize impacts to birds caused by wind turbine operations, and to conserve birds and other terrestrial species while allowing wind energy development and operations in the APWRA. When completed, the plan will outline how wind energy projects within the APWRA can occur while reducing impacts to specific species and their habitats. The plan's conservation strategy will specify how the impacts to these covered species will be mitigated and also how covered and select non-covered species will be conserved and managed. The Draft APWRA NCCP/HCP and related environmental review documents were anticipated to be released for public review in March 2011, but no information has been updated on the NCCP/HCCP website. The Final APWRA NCCP/HCP is scheduled to be completed in late 2011 (APWRA, 2010). Because the plan remains a draft and because Contra Costa County is not a participant in it, the APWRA NCCP/HCP would not apply in the Contra Costa County portion of the APWRA or to the Project.

Contra Costa Water District Lands

The Project area includes approximately 1,449 acres owned and managed by the CCWD as part of the Los Vaqueros Watershed and on which up to 12 turbines would be constructed. No existing turbines are on the property (see Figure 3-2a). Various protective measures that were developed and imposed as conditions of the creation of Los Vaqueros Reservoir would apply on watershed lands. Such measures include a proposed on-site conservation easement and mitigation commitments which incorporate three U.S. Fish and Wildlife Service (USFWS) Biological Opinions (BOs) that were issued pursuant to FESA for Los Vaqueros Reservoir. The protective provisions of the BOs apply throughout the Los Vaqueros Watershed, including CCWD conservation easement lands and non-easement lands. The Project footprint includes approximately six acres of CCWD’s proposed conservation easement that would be directly affected by the Project. Because the Project includes portions of Los Vaqueros Watershed, these BOs are discussed below in the context of how the conditions pertain to the Project.

The BOs address the effects of reservoir creation on the San Joaquin kit fox and bald eagle (issued September 3, 1993), California red-legged frog and Alameda whipsnake (issued November 8, 1996), and the longhorn fairy shrimp and vernal pool fairy shrimp (Conference Opinion issued in 1995 and adopted as BO in 1995).

- *San Joaquin Kit Fox and Bald Eagle BO:* Protective measures contained in the BO require protecting, in perpetuity, a specified amount of San Joaquin kit fox habitat within and outside the Watershed; abiding to a recreation plan that addresses impacts on these species; and implementing a bald eagle monitoring program. This BO states that additional development under existing wind energy leases may proceed under the County’s permitting process and that designation of compensation lands will not affect the use of lands for wind energy. The Project boundary overlaps 1,449 acres of CCWD lands, with 196 acres occurring within proposed or conveyed San Joaquin kit fox conservation easements. Six acres within the easements would experience disturbance as a result of project activities, with five acres temporarily disturbed and one acre permanently disturbed.

- *California Red-Legged Frog and Alameda Whipsnake BO*: Protective measures contained in the BO require a California red-legged frog habitat monitoring program, wetland monitoring, establishment of an alkali marsh wetland, livestock fencing, a predator management plan, land use and recreational restrictions, USFWS approval for mosquito abatement, and establishment of fire breaks. The portion of the CCWD lands that would be affected by Project-related disturbance contains suitable upland and aquatic habitat for California red-legged frog. The Project area includes Alameda whipsnake "core" habitat within Vasco Caves Regional Preserve, conservatively described as scrub habitat and non-scrub areas up to 2,500 feet from scrub habitat. All Project area grasslands are within the movement capabilities of this species (up to 4 miles from scrub habitat).

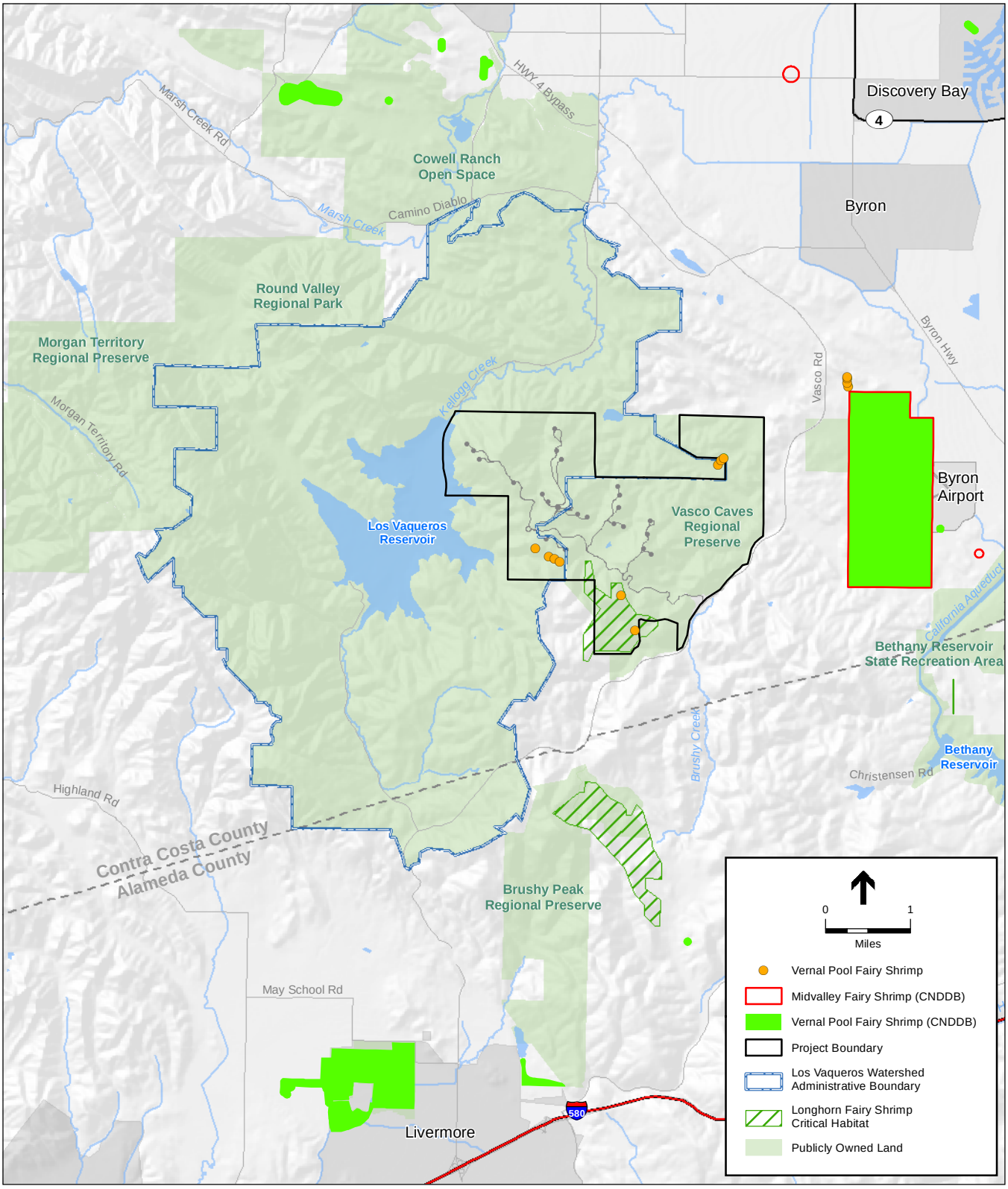
- *Fairy Shrimp BO (Two Species)*: Protective measures contained in the BO restrict recreation and access and require human-exclusion areas, fencing and patrolling of excluded areas, and protection in perpetuity and management of these areas. Occupied habitat and critical habitat occur at Vasco Caves Regional Preserve; however, suitable habitat was not detected in the Project area (E&E, 2009). See Figure 4.4-1.

Mitigation measures recommended in the combined EIR/EIS and imposed as conditions of approval for the creation of the Los Vaqueros Reservoir, as well as compliance with federal law, require CCWD to monitor golden eagle nesting and to avoid disturbing nesting golden eagles during activities such as construction and recreation.

CCWD and the California Department of Fish and Game (CDFG) signed a memorandum of understanding (MOU) for San Joaquin kit fox pursuant to the California Endangered Species Act (CESA) for the Los Vaqueros Reservoir Project on February 16, 1994. The MOU outlines many of the conservation measures that were included in the BO for this species, including the acquisition of conservation areas, legal conveyance of conservation easements to CDFG, monitoring of kit fox habitat, and several construction-related measures. Other measures included in the MOU prohibit the widespread use of rodenticides in the Los Vaqueros Watershed.

East Bay Regional Park District Lands

The Project area includes approximately 1,215 acres owned by the EBRPD, on which up to 12 turbines would be constructed. The existing 91 turbines occur solely on EBRPD lands. EBRPD has developed a Master Plan to protect natural resources within all of its regional preserves (E&E, 2009), and manages the Vasco Caves Regional Preserve in the southern Project area. The Preserve provides habitat for multiple species listed under FESA and CESA, as well as habitat for nesting raptors. As a result, the EBRPD restricts public access to protect and preserve natural and cultural resources on the site. Since 2005, the EBRPD has acquired lands to manage and preserve as part of the East County HCP, and has also acquired lands to expand their regional preserves. Some of these lands do not have existing wind turbines, and some have a combination of existing wind turbines and/or wind energy rights. Portions of the Project area contains existing turbines for which repowering is proposed under the Project.



SOURCES: EBRPD, 2010; ESA, 2008;
CNDDB, 2010; Ecology and Environment, 2009

Tres Vaqueros Windfarm Repowering Project . 209132.02

Figure 4.4-1

Fairy Shrimp Occurrences in the Project Area

EBRPD Conservation Easement

In February 2008, a conservation easement deed was recorded with Contra Costa County as part of the Agricultural - Natural Resources Trust of Contra Costa (E&E, 2009). The easement covers central portions of the area now owned by EBRPD, and was placed on the property to serve as mitigation for development of an off-site parcel. The easement serves to ensure the property is managed for the benefit of listed species including California red-legged frog, California tiger salamander, San Joaquin kit fox, and western burrowing owl– a Species of Special Concern in California. The easement does allow for wind farm activities such as turbine replacement, removal, repair, and maintenance, and related improvements.

4.4.2.2 Regulatory Setting

Federal Wildlife Laws and Regulations

U.S. Fish and Wildlife Service

The USFWS administers the FESA, Migratory Bird Treaty Act (MBTA), and Bald and Golden Eagle Protection Act (BGEPA).

Federal Endangered Species Act (16 U.S.C. 1531–1543). Under FESA Section 4, the Secretary of the Interior and the Secretary of Commerce have joint authority to list a species as threatened or endangered. Two federal agencies oversee FESA: the USFWS has jurisdiction over plants, wildlife, and resident fish, and the National Oceanic and Atmospheric Administration's Fisheries Service (NOAA Fisheries Service or NMFS) has jurisdiction over anadromous fish, marine fish and mammals. Section 4 requires USFWS and/or NMFS to designate critical habitat for any species listed under FESA. Critical habitat designations indicate specific geographic areas that are determined to be essential for the conservation of a listed species and that may require special management and protection. Critical habitat may include areas that are not currently occupied by the species but that will be needed for its recovery.

FESA Section 7 requires all federal agencies to consult with USFWS and/or NMFS to ensure that the actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of a threatened or endangered species or result in the destruction or adverse modification of critical habitat for these species. Under FESA Section 7(b)(3), the appropriate wildlife agency provides a written statement setting forth the agency's opinion, and a summary of the information on which the opinion is based detailing how the proposed action affects the species or its critical habitat. If jeopardy or adverse modification is found, the agency suggests reasonable and prudent alternatives that can be taken in implementing the agency action. This written statement is called a Biological Opinion.

FESA Section 9 lists actions that are prohibited under the Act. The "take" of a listed species is prohibited. "Take" is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct of any listed species." Take that is incidental to an otherwise lawful activity may be allowed in either of two ways: Section 7 provides for the issuance of an incidental take statement for federal agency actions and, for non-federal actions, Section 10 provides for the incidental take of a listed species pursuant to an incidental take permit.

FESA Section 10 requires the issuance of an incidental take permit before any non-federal public or private action may be undertaken that would potentially result in the take of an endangered or threatened species. Section 10(a)(2)(A) requires an applicant for an incidental take permit to submit a habitat conservation plan that specifies, among other things, the impact that is likely to result from the taking and what steps the applicant will take to minimize and mitigate such impacts. The East County HCP/NCCP, approved in July 2007, was created pursuant to Section 10 to minimize and mitigate impacts of take that could be caused by projects within the eastern portion of the County, including the Project area (see Figure 4.4-2). Consistency of the Project with the East County HCP/NCCP is analyzed in Section 4.11, *Land Use and Planning*.

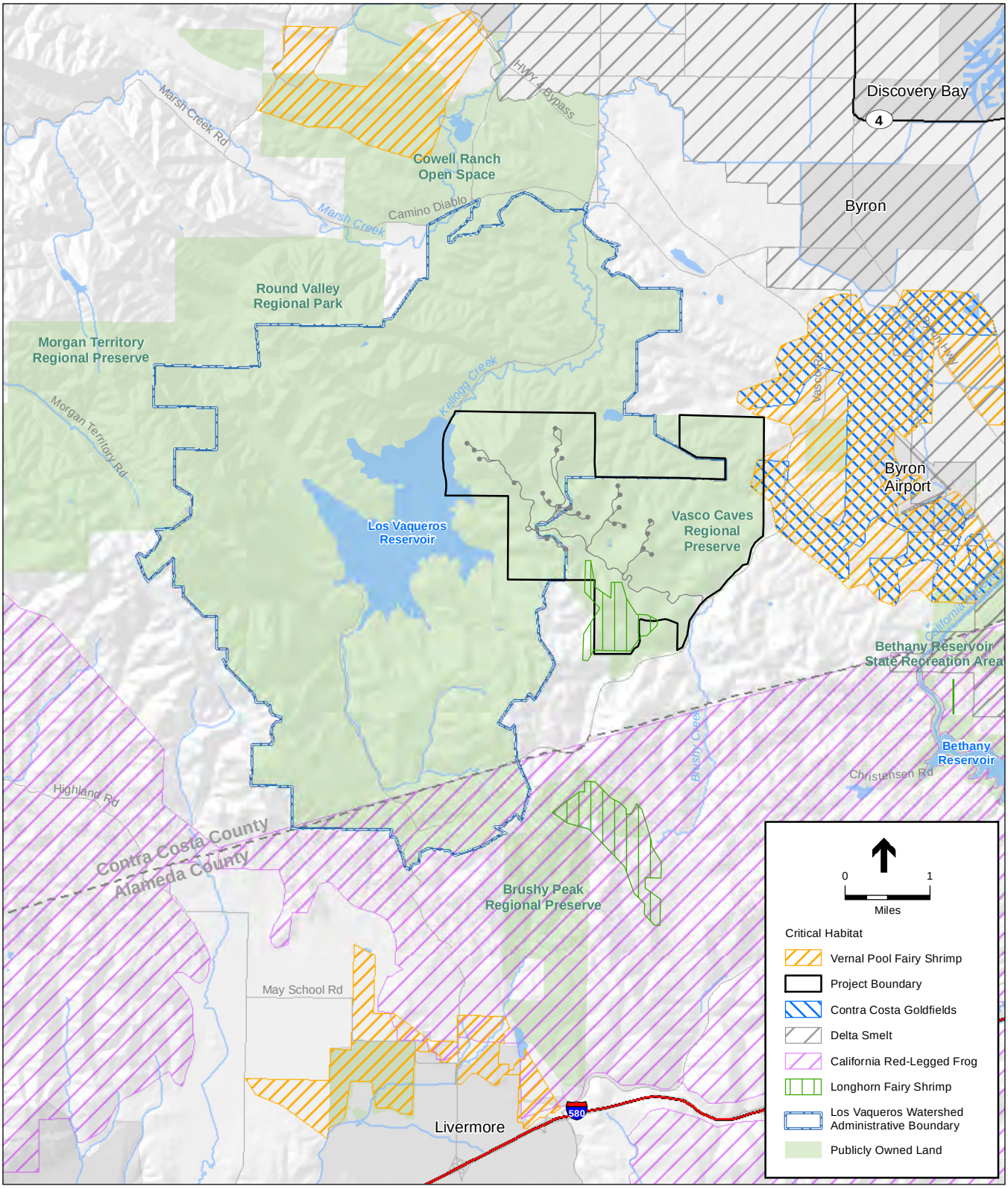
Migratory Bird Treaty Act (16 USC 703-712, Supp. I, 1989). Among other things, the MBTA makes it "unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, kill, attempt to take, capture, or kill" migratory birds, bird parts, eggs, or nests, except in accordance with regulations prescribed by the Secretary of the Interior (50 CFR Part 21). The MBTA prohibits direct and indirect acts, though harassment and habitat modification are not included unless they result in direct loss of birds, eggs, or nests. The list of birds covered by MBTA essentially includes all native birds.

Bald and Golden Eagle Protection Act (16 U.S.C. 668a-d). Under BGEPA, it is illegal to import, export, take (which includes molest or disturb), sell, purchase, or barter any bald eagle or golden eagle or part thereof. The USFWS oversees enforcement of this act. The Secretary of the Interior is authorized to permit the take of golden eagle nests that interfere with resource development or recovery operations subject to new regulations that became effective November 10, 2009 (50 CFR 22.26, 22.27). Although the permit program is under development, the regulations provide for individual and programmatic permits that are consistent with the goal of stabilizing or increasing the breeding populations. With adequate population data and projections for take and mitigation, programmatic permits may authorize take over an extended period of time or across a large area by a given industry, agency, or company (USFWS, 2010a). Interim guidelines suggest using the best available information and risk analysis tools to assess project impacts; at the earliest opportunity collecting data on home ranges, nesting locations, and foraging and migration behavior; full disclosure of risks to eagles; full disclosure of data and analysis limitations; and maximum consideration of impact-reduction measures and mitigation to reduce take (USFWS, 2010a).

Federal Wetland Laws and Regulations

U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers (Corps) administers Section 404 of the Clean Water Act of 1972 (33 U.S.C. 1251 et seq.) as amended (CWA). Section 404 regulates activities in wetlands and "other waters of the United States." Wetlands are a subset of "waters of the United States" that are defined in the Code of Federal Regulations as waters used for interstate or foreign commerce, including all waters that are subject to the ebb and flow of the tide; interstate waters including wetlands; all other waters—such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural



Tres Vaqueros Windfarm Repowering Project . 209132.02

SOURCES: EBRPD, 2010; NextEra, 2010; USFWS, 2010

Figure 4.4-2

Critical Habitat in the Project Area

ponds—which could affect interstate or foreign commerce; water impoundments; tributaries of waters; territorial seas; and adjacent wetlands.

State Wildlife Laws and Regulations

California Department of Fish and Game

CDFG administers a number of laws and programs designed to protect fish and wildlife resources, as discussed below.

California Endangered Species Act (Fish and Game Code 2050 et seq.). CESA generally parallels the main provisions of FESA. CDFG administers the listing and authorizes the "take" of endangered and threatened species under CESA. CDFG may allow take of such species through its issuance of permits pursuant to Fish and Game Code Section 2081, except for designated "Fully Protected" and certain other species. Unlike its federal counterpart, CESA adopts a narrower definition of "take," and CESA's protections apply to candidate species that have been petitioned for listing.

> *Fully Protected Species*. Collectively, Fish and Game Code sections 3511, 4700, 5050, and 5515 identify 37 fully protected species. These species may not be taken or possessed at any time and no licenses or permits may be issued for their take, except for necessary scientific research.
>
> *Migratory Nongame Birds*. Section 3513 prohibits any take or possession of birds that are designated by the MBTA as migratory nongame birds except as allowed by the rules and regulations promulgated pursuant to the MBTA.
>
> *Nesting Birds*. Section 3503.5 makes it unlawful to take, possess or destroy birds of prey in the orders Falconiformes (e.g., bald eagle, golden eagle, Swainson's hawk, American kestrel, peregrine falcon, prairie falcon) and Strigiformes (e.g., burrowing owl, short-eared owl), or to take, possess or destroy the nests or eggs of these birds. Disturbance that causes nest abandonment and/or reproductive failure is prohibited under the Fish and Game Code. This statute does not provide for the issuance of an incidental take permit.
>
> *State Species of Special Concern*. California designates State Species of Special Concern, which are species of limited distribution, declining populations, diminishing habitat, or unusual scientific, recreational, or educational value. These species do not have the same legal protection as State-listed species or Fully Protected species, but may be added to official lists in the future. CDFG intends the Species of Special Concern list to be a management tool for consideration in future land use decisions.

Native Plants Protection Act (California Fish and Game Code sections 1900–1913). This Act is intended to preserve, protect, and enhance endangered or rare native plants in California. Vascular plants identified as rare or endangered by the CDFG and the California Native Plant Society (CNPS) (Skinner and Pavlik, 1994), but which may have no designated status or protection under federal or State endangered species legislation, are defined according to a California Rare Plant Rank (CRPR) as follows:

- *List 1A*: Plants presumed extinct

- *List 1B*: Plants rare, threatened, or endangered in California and elsewhere
- *List 2*: Plants rare, threatened, or endangered in California, but more numerous elsewhere
- *List 3*: Plants about which more information is needed (a review list)
- *List 4*: Plants of limited distribution (a watch list)

Consistent with CEQA Guidelines Section 15380, plants designated with a CRPR of 1A, 1B or 2 are considered to meet the criteria of endangered, rare, or threatened, and so are analyzed as "special-status species" in this document. A CRPR 4 species and several Locally Unusual and Significant species were identified and mapped in the Project area. Also pursuant to CEQA Guidelines Section 15380, CRPR 3 and 4 species and species deemed Locally Unusual and Significant (LU&S) by the CNPS East Bay Chapter may be analyzed under CEQA if there is sufficient information to assess potential impacts (CDFG, 2009).

State Wetlands Laws and Regulations

California Department of Fish and Game

CDFG regulates activities that would interfere with the natural flow of, or substantially alter, the channel, bed, or bank of a lake, river, or stream. The regulatory definition of a stream is a body of water that flows at least periodically or intermittently through a bed or channel having banks, and supports wildlife, fish, or other aquatic life. These activities are regulated under California Fish and Game Code Section 1600 et seq. Requirements to protect the integrity of biological resources and water quality are often conditions of Lake and Streambed Alteration Agreements.

State Water Resources Control Board and Regional Water Quality Control Boards

Responsibility for the protection of State waters resides with the State Water Resources Control Board (SWRCB) and nine Regional Water Quality Control Boards (RWQCBs), including the Central Valley RWQCB. Waters of the State are defined as "any surface water or groundwater, including saline waters, within the boundaries of the state" (Water Code section 13050(e)). All waters of the United States that are within the borders of California also are "waters of the State." The Federal government, through the Corps, may have concurrent jurisdiction over such waters, but California still retains authority to regulate discharges. Any person discharging, or proposing to discharge, waste within any region that could affect "waters of the State" first must file a report of waste discharge with the appropriate RWQCB (Water Code section 13260).

Local Regulations

Contra Costa County

General Plan. The Contra Costa County General Plan identifies 41 Significant Ecological Resource Areas (SERAs), which it defines as areas where there is a high likelihood to encounter rare, threatened, or endangered species; unique natural areas; and wetlands and marshes (Contra Costa County, 2010). The Los Vaqueros SERA (Area 30), which includes the Project area, is recognized as a SERA because this broad area supports alkali meadows and vernal pools, and provides habitat for California tiger salamander, California red-legged frog, Alameda whipsnake, and San Joaquin kit fox, among other rare species. Other SERAs local to the Project include areas

west of the Project area that support native bunchgrass (Area 26) and alkali meadows and northern claypan vernal pools north of the Project area (Area 29) (Contra Costa County, 2010). The recognition of SERAs in the General Plan provides no additional regulatory protection, and is meant to raise awareness of decisions that may affect ecological resources in these areas.

The General Plan contains numerous goals, policies, and programs related to the protection of wildlife and vegetation. Such goals and policies include: protection of rare, threatened, and endangered species and their habitats (Goals 8-D and 8-E); recognition and protection of the critical ecological characteristics of rangelands and wildlands (Policy 8-13); identification and protection of seasonal wetlands in grassland areas (Policy 8-27); conservation of upland habitat areas adjacent to wetlands that are critical to the survival of wetland species (Policy 8-24); protection of marshes, wetlands, and riparian corridors from the effects of potential industrial spills (Policy 8-25); thorough evaluation of the environmental impacts of using poisons to control ground squirrel populations in grasslands (Policy 8-26); and retention of existing vegetation and wildlife habitat areas in large open areas sufficient to support wildlife populations (Policy 8-15).

Wind Energy Conversion Systems. Contra Costa County Code [Title 8- Zoning, Division 88- Special Land Uses] Chapter 88-3 Wind Energy Conversion Systems (WECS) defines a permitting process for commercial wind energy facilities, requiring that a Land Use Permit be obtained prior to establishing any commercial wind turbines. This ordinance was enacted to promote systems that effectively and efficiently capture wind energy while regulating their placement. Regulations that correlate to direct impacts on species and their habitats include Sections 88-3.412 (a)(1) through (a)(6), which require a site plan to be filed as part of the Land Use Permit application depicting the existing topography, trees and drainage channels; the direction of the prevailing winds; the location, height, and dimensions of all existing and proposed structures and fencing; the location and height above ground of all proposed WECS and aboveground utility lines; the locations, grades, and dimensions of all temporary and permanent on-site roads; and preliminary grading for all roadways, structures, WECS sites, and other site work; Sections 88-3.412 (d), (e), and (g) which require a regrading and revegetation program for temporary roadways no longer needed after Project construction; a reclamation plan consistent with Article 88-3.8 (see following); identification of the proposed construction access route from the nearest highway; and Section 88-3.614 which requires the construction of on-site roadways to be minimized and for temporary access roads to be regraded and revegetated to natural conditions after construction.

Reclamation plan requirements are established in the following sections: Section 88-3.802, which requires that a reclamation plan be submitted (along with a bond or security deposit to insure compliance with the plan) and approved prior to construction; Section 88-3.804, which requires the reclamation plan to identify the specific properties it applies to and indicate removal of all buildings, structures, WECS, and foundations to three feet below finish grade, to identify all regrading and revegetation necessary to return the site to pre-Project conditions, and that reclamation reflect the site-specific character including topography, vegetation, drainage, and any unique environmental features; and Section 88-3.806 which enforces compliance with the reclamation plan by requiring the Applicant, operator, and permittee to guarantee and accept responsibility for all reclamation work for a period of two years after completion, and by

requiring a cash deposit or surety bond to be deposited in an amount determined by the Zoning Administrator, to include all material and labor costs, adjusted for inflation.

County Code Section 88-3.412(f) protects water quality by requiring a preliminary erosion, drainage, and sediment collection and control plan. Section 88-3.606 requires that each WECS, or turbine, be equipped with both manual and automatic controls to limit the rotational speed of the blade within the design limits of the rotor; such controls can be useful for limiting biological impacts by changing cut-in speed.

Tree Protection and Preservation Ordinance. Contra Costa County Code Chapter 816-6 provides protection for a specific list of native trees as well as non-native trees that meet certain criteria. In most instances, whether or not the tree is native, it must measure at least 20 inches in circumference at 4.5 feet above grade. Protected trees may not be removed, and construction activities may not encroach within their driplines, without prior County approval.

Other Applicable Regulations

2007 Altamont Pass Wind Resource Area Settlement Agreement

Over recent years, wind power generated in the APWRA provided about 700 gigawatt-hours (GWH) annually of renewable energy to California, but also caused the deaths of an estimated 2,230 raptors and 9,300 total birds per year (Smallwood and Karas, 2009). In 2005, environmental organizations challenged Alameda County decisions concerning avian impacts and wind energy facilities. The settlement agreement resolving the lawsuit established avian fatality-reduction success criteria and achievement time frames for wind energy facility operations, and established an HCP/NCCP Committee for the APWRA. The settlement identified four species disproportionately affected by existing wind energy facilities throughout the United States: golden eagle, red-tailed hawk, American kestrel, and burrowing owl. These focal raptor species were considered as species of local concern and focus for continued monitoring and research in the APWRA. The settlement also required the development and implementation of an Adaptive Management Plan (AMP) that requires adaptive management measures if a 50 percent reduction in focal raptor mortality is not achieved. Results of the studies are used to inform best practices and estimate mortality for these species throughout the region and were considered in this analysis.

2006 Agreement to Repower Turbines at the Buena Vista and Tres Vaqueros Sites

In 2006, Babcock and Brown Renewable Holdings (Babcock & Brown[2]) sought to acquire Buena Vista Energy, LLC, and Tres Vaqueros Wind Farms, LLC. To resolve avian mortality and liability concerns at the Buena Vista and Tres Vaqueros facilities, Babcock & Brown entered into a voluntary agreement with the California State Attorney General's office. Under this agreement, executed May 10, 2006 (Agreement for Avian Mitigation), Babcock & Brown agreed, among other things, to shut down all existing 179 wind turbines and all electrical lines at the Buena Vista site, and initiate repowering by the end of 2006; to make the Adaptive Management Program and monitoring plan described in the Buena Vista Windfarm Repowering Project Draft EIR

[2] In 2009 Babcock and Brown Renewable Holdings became Pattern Energy Group, LLC.

mandatory as modified by the agreement; to make monitoring data publicly available; to engage in an initial three-year monitoring effort, with long-term monitoring performed for a period of 15 years; and to conduct turbine-specific or full-facility winter shutdowns if specified percent reductions in avian mortality are not achieved.

Babcock & Brown or their affiliate also agreed to decommission existing wind turbines at the Tres Vaqueros site by September 1, 2012, and begin repowering by September 11, 2011; to seasonally shut down all turbines between November 15 and February 28 until decommissioning occurred; to pay a mitigation fee of $1,000 per MW per year until the existing turbines are removed; and to pay $350,000 to a fund administered by CDFG for mitigation efforts benefiting raptors and raptor habitat in and surrounding the APWRA.

In return, the State Attorney General agreed not to oppose repowering of the Tres Vaqueros facility by Babcock & Brown or other affiliate if post-construction monitoring data at the Buena Vista repowering project found a 50 percent or greater average annual reduction in focal raptor mortality from the base case of 54 focal raptors per year.

4.4.2.3 Environmental Setting

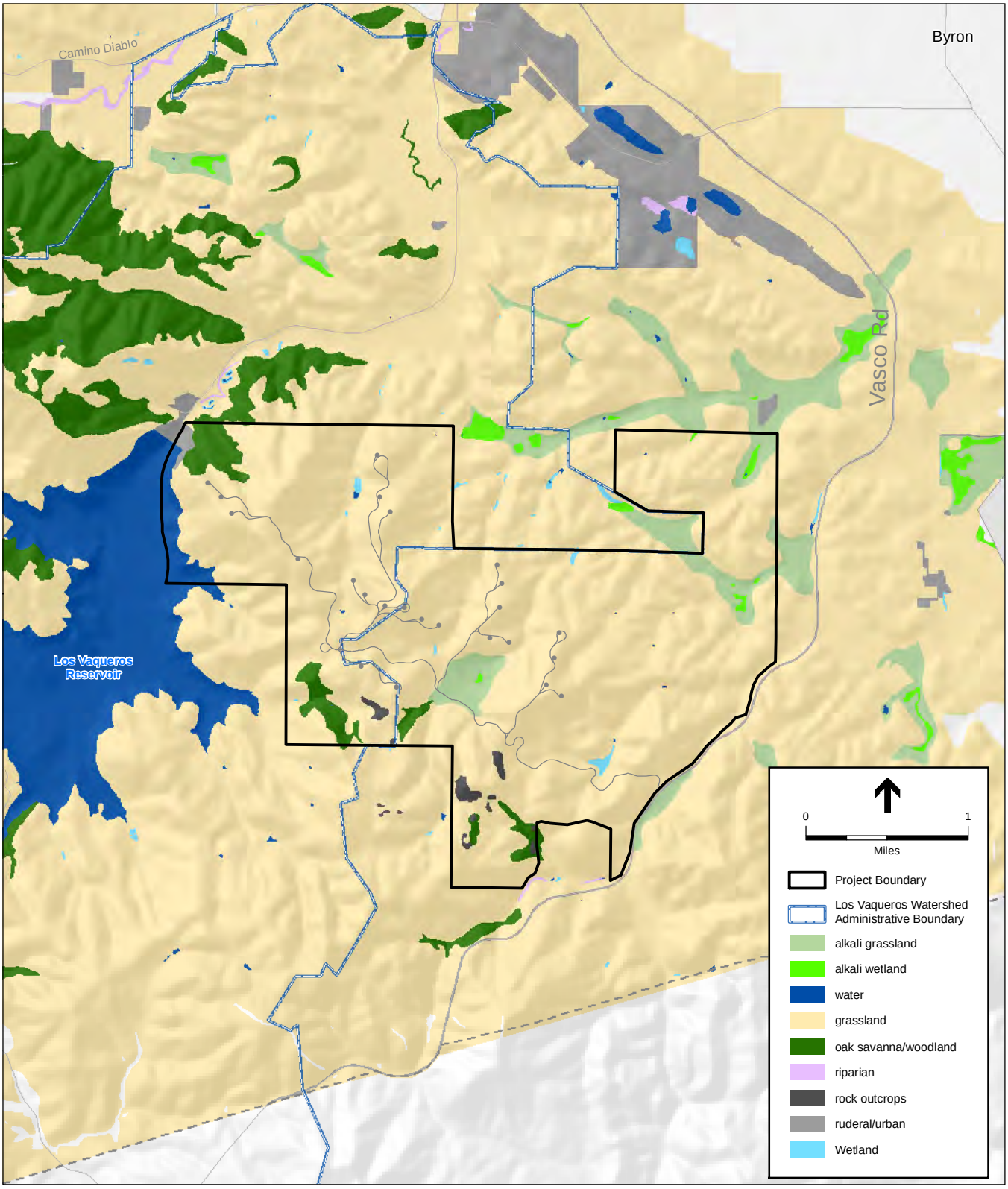
The following descriptions of the biological resources are derived from Project-specific surveys and reports (E&E, 2010; E&E, 2009) as well as environmental reports for other projects in the surrounding area (CCWD and Reclamation, 2010; CH2M HILL 2010a, 2010b, 2010c, 2010d, and 2010e; Pandion, 2010; Sycamore Environmental Consultants, 2010; TetraTech, 2008). Additional documents related to the general area and Project presented in the text below and in Chapter 9, *References,* of this document.

The study area surveyed for the Project generally consisted of areas within 328 feet from existing and proposed turbine locations, a 164-foot buffer zone along existing and proposed access roads and centered on the trench for new electrical facilities, and all wetland and alkaline soil areas within the overall project area providing high potential habitat for several target plant species. The environmental setting discussed below is organized by Vegetation Communities and Biogeographical Features, Wetlands, and Special-Status Species.

Vegetation Communities and Biogeographical Features

Annual Grassland

Annual grassland is the most common biological community in the Project area, occurring at or near all areas proposed for Project activities. Figure 4.4-3 shows the distribution of vegetation communities in the Project area. Grassland habitat includes perennial and alkali grassland, and the much more extensive annual grassland vegetation. Annual grasslands in the study area support a substantial number of non-native invasive plants, with limited potential for encountering special-status plant species. Two of the perennial grassland stands in the study area are large enough to be considered Special Plant Communities by CDFG (E&E, 2009). Alkali soils within the study area have the greatest potential for encountering special-status plant species.



Tres Vaqueros Windfarm Repowering Project . 209132.02

SOURCES: EBRPD, 2010; NextEra, 2010; Contra Costa County, 2006

Figure 4.4-3

Vegetation Communities in the Project Area

Annual grasslands in the study area are comprised primarily of non-native species, most commonly wild oats (*Avena fatua*), Mediterranean mustard (*Hirshfieldia incana*), and soft chess (*B. hordaceous*). The most common native species is Great Valley gumplant (*Grindelia camporum* var. *camporum*). Other plant species observed include ripgut brome (*Bromus diandrus*), red brome (*B. madritensis* ssp. *rubens*), hare barley (*Hordeum murinum* ssp. *Leporinum*), winter vetch (*Vicia villosa* ssp. *villosa*), rose clover (*Trifolium hirtum*), yellow star-thistle (*Centaurea solstitialis*), prickly wild lettuce (*Lactuca serriola*), Italian thistle (*Carduus pycnocephalus*), filarees (*Erodium* spp.), and other mustards (*Brassica* spp.) (E&E, 2009). Native wildflowers that are expected within the annual grassland community include fiddleneck (*Amsinckia* spp.), lupine (*Lupinus* spp.), popcorn flower (*Plagiobothrys* spp.), and California poppy (*Eschscholzia californica*), among many others.

Many common reptiles, amphibians, birds, and mammals occur in Project area grasslands. Reptiles commonly found in grasslands include the western fence lizard (*Sceloporus occidentalis*), common garter snake (*Thamnophis sirtalis*), and western rattlesnake (*Crotalus viridis*). Most Project area grasslands also provide habitat for the California tiger salamander (*Ambystoma californiense*).

Bird species that nest in Project area grasslands include burrowing owl (*Athene cunicularia*), western meadowlark (*Sturnella neglecta*), and California horned lark (*Eremophila alpestris*). Suitable nesting and foraging habitat also exists for northern harrier (*Circus cyaneus*). Birds that commonly forage in grasslands include the turkey vulture (*Cathartes aura*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), golden eagle (*Aquila chrysaetos*) and white-tailed kite (*Elanus leucurus*).

Mammal species known to inhabit Project area grasslands include the western harvest mouse (*Reithrodontomys megalotis*), California ground squirrel (*Spermophilus beecheyi*), black-tailed jackrabbit (*Lepus californicus*) and black-tailed deer (*Odocoileus hemionus columbianus*). San Joaquin kit fox (*Vulpes macrotis mutica*) are sparsely distributed throughout the region in annual grasslands habitat, and also use adjacent oak woodlands, riparian woodlands, and other habitats.

Native Perennial Grassland. Native perennial grassland habitat occurs intermittently in the study area, scattered within the non-native grasslands. These native stands are comprised of purple needlegrass (*Nassella pulchra*), creeping wildrye (*Leymus triticoides*), blue wildrye (*Elymus glaucus* ssp. *glaucus*), and California melic (*Melica californica*) (E&E, 2009). Some hillsides in the Project area, particularly on steep north- and west-facing slopes, support large stands of purple needlegrass. Lower, flatter areas contain large stands of creeping wildrye. Large stands of purple needlegrass and creeping ryegrass constitute Purple Needlegrass Grassland and Creeping Rye Grass Turf communities, and are identified as sensitive plant communities by CDFG. Stands within the study area with a minimum width of 100 feet were identified; fourteen stands of Purple Needlegrass Grassland and one stand of Creeping Rye Grass Turf were mapped in the study area (E&E, 2009)[3]. Purple Needlegrass Grassland occurs along the B, C, D, and E

[3] In the February 2009 report, Creeping Rye Grass Turf was identified as Creeping Ryegrass Grassland, and Purple Needlegrass Grassland was identified as Valley Needlegrass Grassland. The nomenclature for these natural communities changed in the September 2010 CDFG Natural Communities Lists.

strings, and south of the existing O&M Building. Creeping Rye Grass Turf occurs southeast of the existing O&M Building.

Alkali Grassland. The existing O&M Building, along with the northeasternmost existing turbine string, occurs on or adjacent to Pescadero clay loam soils, which are moderate to strongly alkali. Alkali soils have the potential to support special-status plant species including round-leaved filaree (*California macrophylla*), alkali milk-vetch (*Astragalus tener* var. *tener*), heartscale (*Atriplex cordulata*), brittlescale (*Atriplex depressa*), and San Joaquin spearscale (*Atriplex joaquiniana*), among others, but only non-native grasses and weeds such as stork's bill (*Erodium botrys*), bur clover (*Medicago polymorpha*), and Italian ryegrass (*Lolium multiflorum*) were identified in these areas (E&E, 2009).

Oregon Oak Woodland

Oregon oak woodland occurs behind the existing O&M Building in the upper section of an unnamed drainage (E&E, 2009). This woodland contains a 10 to 30 percent canopy of Oregon oaks (*Quercus garryana*) and a co-dominant overstory of California buckeye (*Aesculus californica*) (E&E, 2009).

Rock Outcrop

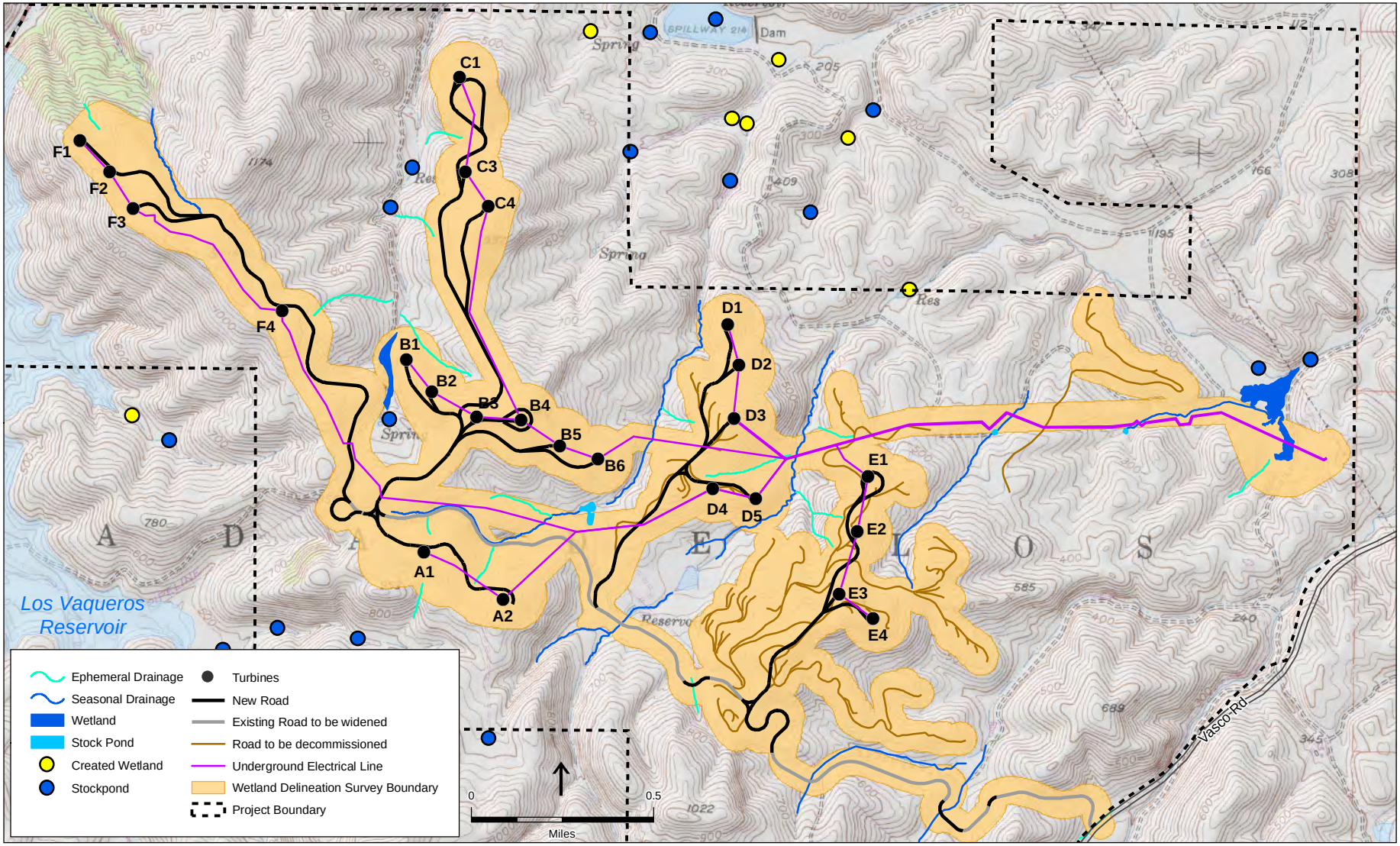
Rock outcrops were not identified in the study area. However, rock outcrops are distributed intermittently throughout the Project area, occurring mainly along hilltops and hillsides. The southeastern portion of the Project area encompasses portions of Vasco Caves Regional Preserve, where large rock outcrops with vertical walls greater than 20 feet tall provide nesting habitat for raptors such as prairie falcon (*Falco mexicanus*), great horned owl (*Bubo virginianus*), barn owl (*Tyto alba*), golden eagle, and other large birds, as well as refuge for mammals such as coyotes (*Canis latrans*) and bobcats (*Lynx rufus*). Rock outcrops are also often associated with, or allow the formation of, associated microhabitats such as vernal pools, which can provide habitat for special-status fairy shrimp. Federally-listed species such as longhorn fairy shrimp and vernal pool fairy shrimp are both documented to occur at the Preserve (CDFG, 2010a), along with California tiger salamander, California red-legged frog, and Alameda whipsnake (EBRPD, 2009b).

Wetlands

Project area wetlands include seasonal wetlands, cismontane alkali marsh and seep, seasonal and perennial stock ponds, and intermittent and ephemeral drainages (see Figure 4.4-4).

Seasonal Wetlands

Three large seasonal creeks traverse the Project area, with typical channel widths ranging from approximately 5 to 20 feet; channels are bound by generally steep banks (E&E, 2009). Sections measuring greater than 25 feet wide were identified and mapped as seasonal wetlands in the study area (E&E, 2009). Wide and shallow, these areas support rabbit's-foot grass (*Polypogon monspeliensis*), dense Baltic rush (*Juncus balticus*), and bristly ox-tongue (*Picris echiodes*) in addition to perennial wetland vegetation such as common tule (*Scirpus acutus* var. *occidentalis*), iris-leaved rush (*Juncus xiphioides*), and cattails (*Typha* spp.).



SOURCE: NextEra, 2010; ESA, 2008;
Ecology and Environment, 2011

Tres Vaqueros Windfarm Repowering Project . 209132.02

Figure 4.4-4
Wetlands in the Project Area

Wildlife species that typically use this habitat type include the Sierran treefrog (*Pseudacris sierra*), California red-legged frog (*Rana draytonii*), and western pond turtle (*Actinemys marmorata*). Common bird species using this habitat include the marsh wren (*Cistothorus palustris*), common yellowthroat (*Geothlypis trichas*), and red-winged blackbird (*Agelaius phoeniceus*). Mammals may use these aquatic features for water or forage.

Cismontane Alkali Marsh and Seep

There were 3 cismontane alkali marshes and 1 alkali seep identified in the study area, with dry meadows interspersed (E&E, 2009). Cismontane alkali marshes occur below 1,000 feet elevation, and are defined as areas where standing water or saturated soil is present most or all of the year. High evaporation rates and little input of fresh water result in a high alkalinity, or saltiness. Alkali seeps are permanently moist alkali areas that support a relatively solid ground-cover of low-growing perennials.

Cismontane alkali marshes occur in low topographical areas, with dry meadows occurring between and in surrounding, higher-elevation areas. Cismontane alkali marshes are located east of the proposed O&M Building and south of the E-string. On the western edge of the study area, a small alkali seep feeds a surrounding alkali marsh. These areas support stands of chenopods (*Atriplex* spp. and *Chenopodium* spp.), salt grass (*Distichlis spicata*), and alkali heath (*Frankenia salina*), along with white hedge-nettle (*Stachys albens*), alkali mallow (*Malvella leprosa*), bird's-foot trefoil (*Lotus corniculatus*), and common knotweed (*Polygonum arenastrum*). Deeper, saturated wetlands support the growth of Mexican rush (*Juncus mexicanus*), common tule, and broadleaf cattail (*Typha latifolia*). Alkali habitats often support special-status plants such as alkali milk-vetch, heartscale, crownscale (*Atriplex coronata* var. *coronata*), brittlescale, San Joaquin spearscale, round-leaved filaree, hispid bird's beak (*Cordylanthus mollis* spp. *hispidus*), Livermore tarplant (*Deinandra bacigalupi*), recurved larkspur (*Delphinium recurvatum*), and little mousetail (*Myosurus minimus* spp. *apus*), among others.

Seasonal and Perennial Stock Ponds

Stock ponds occupy low-lying drainages and valley bottoms throughout the Project area, often as impoundments along area creeks and drainages. There are 6 seasonal and 2 perennial or nearly-perennial stock ponds in the study area (E&E, 2009), and an additional twelve ponds in the Project area (CCWD and Reclamation, 2010) with unknown hydroperiods. Seasonal surveyed ponds were largely unvegetated, but supported the growth of bristly ox-tongue, cocklebur (*Xanthium* spp.), and curly dock (*Rumex crispus*). Perennial wetlands support the growth of common tule, broad-leaved cattail (*Typha latifolia*), big bulrush (*Scirpus robustus*) and watercress (*Rorippa nasturtium-aquaticum*).

Wildlife species that typically use this habitat type include California tiger salamander, Sierran treefrog, California red-legged frog, and western pond turtle. Common bird species using this aquatic habitat include mallard (*Anas platyrhynchos*) and American coot (*Fulica americana*). Mammals may use these aquatic features for water or forage.

Intermittent and Ephemeral Drainages

Creeks and drainages are relatively uncommon in the Project and study areas, occurring in low-lying areas and valley bottoms. Within the study area, three large seasonal creeks traverse north-northeast, two through the center of the Project area and one along the western edge (E&E, 2009). Additionally, steep hills in the Project area are drained by a network of small, shallow drainages that support a low-to-moderate cover of grasses and forbs including Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*), narrow-leaved plantain (*Plantago lanceolata*), and Italian ryegrass. A few red willows (*Salix laevigata*) and Fremont cottonwoods (*Populus fremontii*) are scattered along drainages, but not in the densities that constitute riparian woodland or forest (E&E, 2009).

Intermittent creeks and drainages provide important habitat for many terrestrial and avian wildlife species, including amphibians such as California red-legged frog and reptiles such as western pond turtle. These areas are also movement and dispersal corridors, allowing animals to move between uplands and other aquatic habitats.

Special-Status Species

A comprehensive list of special-status plant and wildlife species in the Project area was compiled to assess the likelihood of species occurrences and potential Project impacts to these species. Sources used in preparing this list include the California Natural Diversity Database (CNDDB) (CDFG, 2010a), consultation with CDFG and USFWS, the CNPS's electronic database (CNPS, 2010), scoping letters, biological literature of the region, ongoing avian monitoring and associated reports, and regional and site-specific field surveys. Table 4.4-1 lists, and Appendix D-1 *Biological Resources-Species Descriptions* describes, the special-status plant and wildlife species that have been identified, or are expected to occur in the Project area based on local sightings and/or available habitat.

4.4.3 Project Baseline

A comparison of pre- and post-Project avian and bat fatality rates is used to assess the potential Project-related change in avian and bat fatalities. Based on pre-Project site-specific data, the fatality baselines for avian and bat species are presented in Table 4.4-2. Baseline fatality estimates incorporate APWRA-wide data from other older-generation wind turbines throughout the APWRA in order to represent fatality rates that were likely caused by the existing Tres Vaqueros Howden turbines prior to their operational decline over the period of 2004 through 2009 (Smallwood, 2010a). This report is included as Appendix D-2.

For other biological resources, the baseline is the environmental setting (including the species and their breeding, foraging, dispersal, and aestivation habitat; resident or migratory corridors; wetlands; natural communities; and conservation efforts described above) on the date of the NOP. These conditions reflect the ongoing operation and maintenance of the existing wind energy facility, including noise, lights, traffic and presence of personnel associated with the operation and maintenance of turbines and related infrastructure.

TABLE 4.4-1
SPECIAL-STATUS SPECIES KNOWN TO OCCUR IN THE PROJECT AREA OR WITH POTENTIAL TO BE AFFECTED BY THE PROJECT

Scientific Name **Common Name**	**Listing Status[4] USFWS/ CDFG/CRPR**	**General Habitat**	**Potential for Species Occurrence in the Project Area or to be Affected by the Project**	**Period of Identification or Blooming Period**
Invertebrates				
FEDERAL OR STATE THREATENED AND ENDANGERED SPECIES				
Branchinecta longiantenna Longhorn fairy shrimp	FE/--/--	Rock outcrop pools or other areas capable of ponding water seasonally	**Present.** Longhorn fairy shrimp is present at Vasco Caves Regional Preserve (CDFG, 2010a). The nearest documented occurrence is greater than 500 feet from Project activities.	Year-round (eggs in dry season, adult shrimp in winter)
Branchinecta lynchi Vernal pool fairy shrimp	FT/--/--	Vernal pools or other areas capable of ponding water seasonally	**Present.** Vernal pool fairy shrimp is present on CCWD lands and at Vasco Caves Regional Preserve (CDFG, 2010a; E&E, 2009). The nearest documented occurrence is greater than 500 feet from Project activities.	Year-round (eggs in dry season, adult shrimp in winter)
Desmocerus californicus dimorphus Valley elderberry longhorn beetle	FT/--/--	Riparian habitat, levee and riprap lined stream banks containing its host plant, elderberry shrubs (*Sambucus* spp.)	**Low to Moderate.** Suitable habitat is present in isolated elderberry shrubs identified in the Project area (E&E, 2009).	Year round, emergence March-June
Amphibians				
FEDERAL OR STATE THREATENED AND ENDANGERED SPECIES				
Ambystoma californiense California tiger salamander	FT/ST/--	Wintering sites occur in grasslands occupied by burrowing mammals; breed in ponds and vernal pools	**Present.** At least 12 aquatic sites in the Project area support breeding (E&E, 2009) and additional breeding locations are known within 1.2 miles (CCWD and Reclamation, 2010). Uplands with refugia throughout the Project area provide dispersal habitat. The species also has been documented along Vasco Road in the immediate vicinity of the Project area (Condor Consulting, 2009).	Winter rains and March-April
Rana draytonii California red-legged frog	FT/CSC/--	Breed in stock ponds, pools, and slow-moving streams	**Present.** There are 15 wetlands in the Project area that support breeding (CCWD and Reclamation, 2010) and tens of additional breeding locations are known within 5 miles (CDFG, 2010a; CCWD and Reclamation, 2010). Uplands with refugia throughout the Project area provide aestivation habitat. The species also has been documented along Vasco Road in the immediate vicinity of the Project area (Condor Consulting, 2009).	Year-round
Reptiles				
FEDERAL OR STATE THREATENED AND ENDANGERED SPECIES				
Masticophis laterals euryxanthus Alameda whipsnake (=striped racer)	FT/ST/--	Coastal ranges, in chaparral and riparian habitat and adjacent grasslands	**Present.** Occupied scrub habitat occurs at the Vasco Caves Regional Preserve (EBRPD, 2009b). Project activities occur within 1,500 feet of Preserve boundaries.	Spring/summer

3 Status code meanings are defined at the end of Table 4.4-2 on Page 4.4-27.

TABLE 4.4-1 (Continued)
SPECIAL-STATUS SPECIES KNOWN TO OCCUR IN THE PROJECT AREA OR WITH POTENTIAL TO BE AFFECTED BY THE PROJECT

Scientific Name **Common Name**	**Listing Status[4] USFWS/ CDFG/CRPR**	**General Habitat**	**Potential for Species Occurrence in the Project Area or to be Affected by the Project**	**Period of Identification or Blooming Period**
Reptiles (cont.)				
FEDERAL OR STATE SPECIES OF SPECIAL CONCERN				
Actinemys marmorata Western pond turtle	--/CSC/--	Lakes, ponds, reservoirs, and slow-moving streams and rivers, primarily in foothills and lowlands	**Presumed present.** Likely present in stock ponds and drainages on the Project area. May be encountered in upland areas as well.	Year-round
Masticophis flagellum ruddocki San Joaquin coachwhip (=whipsnake)	--/CSC/--	Open grassland, pasture, and alkali scrub	**Presumed present.** Suitable grassland habitat is present at the Project area, the Project is within the species' known range, and the species is known to occur in nearby contiguous grassland habitat within 1,500 feet of Project activities (CDFG, 2010a).	Spring/summer
Phrynosoma coronatum Coast horned lizard	--/CSC/--	Valley woodland, coniferous forest, riparian, and grassland habitats; most commonly in sandy washes with scattered shrubs	**Moderate.** Suitable alkali grassland/ flats habitat is present at the Project area, the Project is within the species' known range, and the species is known to occur within 2 miles of the Project area (CDFG, 2010a).	Spring/summer
Birds				
FEDERAL OR STATE THREATENED AND ENDANGERED SPECIES				
Buteo swainsoni Swainson's hawk	--/ST/--	Nests in large trees, often near water, open grasslands, or agricultural lands; forages over open grasslands	**Nesting Low/ Foraging Present.** Largely a Central Valley species. Historical nesting is reported within 5 miles east of the Project area, in the Central Valley; current nesting has not been documented at the Project area and is not expected. Project area grasslands provide ample foraging habitat. APWRA monitoring indicates the potential for turbine-related mortality.	Spring/summer
Falco peregrinus American peregrine falcon	FD/SD/--	Nests on cliffs or escarpments, often near lakes, rivers or marshes; hunts birds from cliffs and other high perches, or on the wing	**Nesting Low/ Foraging Present.** Largely a migratory species. Nearest known nesting locations are approximately 10 miles North from the Project near Mt. Diablo State Park and Antioch. APWRA monitoring indicates the potential for turbine-related mortality.	Intermittent
Haliaeetus leucocephalus Bald eagle	BEPA-FD/SE-CFP/--	Winter foraging at lakes and along major rivers; a fish specialist restricted to foraging in lakes and rivers	**Nesting Absent/ Foraging Moderate.** The Los Vaqueros Watershed supports occupied wintering and foraging habitat, but no active nesting (CCWD and Reclamation, 2010). Foraging by this species was observed on a neighboring wind farm (CH2M HILL, 2010c). Bald eagle has not been identified in APWRA fatality studies.	Intermittent

TABLE 4.4-1 (Continued)
SPECIAL-STATUS SPECIES KNOWN TO OCCUR IN THE PROJECT AREA OR WITH POTENTIAL TO BE AFFECTED BY THE PROJECT

Scientific Name **Common Name**	**Listing Status[4] USFWS/ CDFG/CRPR**	**General Habitat**	**Potential for Species Occurrence in the Project Area or to be Affected by the Project**	**Period of Identification or Blooming Period**
Birds (cont.)				
FEDERAL OR STATE THREATENED AND ENDANGERED SPECIES (cont.)				
Pelecanus occidentalis californicus California brown pelican	--/SE/--	Migratory; in early May, disperse from breeding colonies in Mexico and Channel Islands	**Nesting Absent/ Foraging Absent/ Migratory Present.** Breeding does not occur in California's mainland. The Project area provides a potential migratory corridor. APWRA monitoring indicates the potential for turbine-related mortality.	Intermittent
FEDERAL OR STATE SPECIES OF SPECIAL CONCERN				
Agelaius tricolor Tricolored blackbird	--/CSC/--/	Nests in freshwater marshes with dense stands of cattails or bulrushes, occasionally in willows, thistles, mustard, blackberry brambles, and dense shrubs and grains	**Nesting High/ Foraging Present.** There are 2 Project area wetlands that provide occupied breeding habitat (E&E, 2009). APWRA monitoring indicates the potential for turbine-related mortality.	Spring/summer
Aquila chrysaetos Golden eagle	BEPA/CSC-CFP/-- APWRA focal species	Nests in canyons and large trees in open habitats; a contour flier, this species forages over grasslands	**Nesting Present/ Foraging Present.** Nesting is documented 0.3 mile between the F-string and the C-string; 0.3 mile northeast of the C-string; 0.5 mile southwest from the B-string (E&E, 2009); and throughout the Los Vaqueros Watershed (CCWD and Reclamation, 2010). Study area grasslands provide high quality foraging habitat. APWRA monitoring indicates the potential for turbine-related mortality.	Year-round
Ardea herodias Great blue heron	--/--/--	Common California resident of estuaries, wetlands, riparian corridors, croplands, and grasslands	**Nesting Moderate/ Foraging Present.** Project area trees provide potential roosting and nesting habitat. Rookeries are protected by CDFG, and the nearest rookery is reported 17 miles north of the Project area (CDFG, 2010a). APWRA monitoring indicates the potential for turbine-related mortality.	Spring/summer
Athene cunicularia hypugea Western burrowing owl	--/CSC/-- APWRA focal species	Nests and forages in low-growing grasslands with burrowing mammals	**Breeding Present/ Foraging Present.** Resident populations are present in the Project area (CDFG, 2010a; E&E, 2009). The species also has been documented along Vasco Road in the immediate vicinity of the Project area (Condor Consulting, 2009). APWRA monitoring indicates the potential for turbine-related mortality.	Year-round
Asio flammeus Short-eared owl	--/CSC/--	Inhabits open fields, meadows, and marshes	**Nesting High/ Foraging High.** Nesting and foraging habitat is present in grasslands throughout the Project area. This species has not been reported in turbine fatality data.	Year-round

TABLE 4.4-1 (Continued)
SPECIAL-STATUS SPECIES KNOWN TO OCCUR IN THE PROJECT AREA OR WITH POTENTIAL TO BE AFFECTED BY THE PROJECT

Scientific Name **Common Name**	**Listing Status[4] USFWS/ CDFG/CRPR**	**General Habitat**	**Potential for Species Occurrence in the Project Area or to be Affected by the Project**	**Period of Identification or Blooming Period**
Birds (cont.)				
FEDERAL OR STATE SPECIES OF SPECIAL CONCERN (cont.)				
Buteo regalis Ferruginous hawk	FSC/CSC/--	Migratory; found in California from September to April. Inhabits grasslands and foothills where prey is abundant; nest in low cliffs, cut banks, large trees	**Nesting Absent/ Foraging Present/ Migratory Present.** Breeding occurs outside of California. Project area grasslands provide ample foraging habitat. APWRA monitoring indicates the potential for turbine-related mortality.	Spring/summer
Circus cyaneus Northern harrier	--/CSC/--	Ground nester found in grasslands and in adjacent wetlands or upland/wetland areas; forages over marshlands, tidal flats, fields, and open grasslands	**Nesting High/ Foraging Present.** Grasslands throughout the study area provide potential nesting and foraging habitat. Species observed in the Project area (E&E, 2009). APWRA monitoring indicates the potential for turbine-related mortality.	Spring/summer
Elanus leucurus White-tailed (=black shouldered) kite	--/CFP/--	Nests in shrubs and trees next to grasslands; forages over grasslands and agricultural lands	**Nesting High/ Foraging Present.** Nesting occurrences are not reported in the study area, but the Project area contains suitable nesting habitat and study area grasslands provide ample foraging habitat. APWRA monitoring indicates the potential for turbine-related mortality.	Year-round
Eremophila alpestris actica California horned lark	--/CSC/--	Nests and forages in short-grass prairie, mountain meadow, coastal plain, fallow fields, and alkali flats	**Nesting High/ Foraging Present.** Study area grasslands provide ample breeding and foraging habitat. Species observed in the Project area (E&E, 2009). APWRA monitoring indicates the potential for turbine-related mortality.	Spring/summer
Falco mexicanus Prairie falcon	--/CSC/--	Inhabits hills, canyons, and mountainous areas with grasslands; nests on cliffs or abandoned raptor nests	**Nesting Present/ Foraging Present.** Nesting occurs at Vasco Caves Regional Preserve, and Project area grasslands provide ample foraging habitat. APWRA monitoring indicates the potential for turbine-related mortality.	Year-round
Lanius ludovicianus Loggerhead shrike	--/CSC/--	Scrub, open woodlands, and grasslands	**Nesting High/ Foraging Present.** May nest in brush and scrub in the Project area, and Project area grasslands provide ample foraging habitat. Species observed in the Project area (E&E, 2009). APWRA monitoring indicates the potential for turbine-related mortality.	Year-round
SPECIES OF LOCAL CONCERN				
Buteo jamaicensis Red-tailed hawk	APWRA focal species	Common California resident found in nearly all habitats and elevations; forages over open grasslands; roosts/nests in large trees, cliffs, and low ledges	**Nesting High/ Foraging Present.** Project area trees provide suitable nesting habitat and Project area grasslands provide ample foraging habitat. Species observed in the Project area (E&E, 2009). APWRA monitoring indicates the potential for turbine-related mortality.	Year-round

TABLE 4.4-1 (Continued)
SPECIAL-STATUS SPECIES KNOWN TO OCCUR IN THE PROJECT AREA OR WITH POTENTIAL TO BE AFFECTED BY THE PROJECT

Scientific Name **Common Name**	**Listing Status[4] USFWS/ CDFG/CRPR**	**General Habitat**	**Potential for Species Occurrence in the Project Area or to be Affected by the Project**	**Period of Identification or Blooming Period**
Birds (cont.)				
SPECIES OF LOCAL CONCERN (cont.)				
Falco sparverius American kestrel	APWRA focal species	Common California resident of open grasslands, shrub and early successional forests, and forest openings; nest in cavities, and roost in trees, snags, rock outcrops, cut banks, and buildings	**Nesting High/ Foraging Present.** Project area trees provide suitable nesting habitat and Project area grasslands offer ample foraging habitat. Species observed in the Project area (E&E, 2009). APWRA monitoring indicates the potential for turbine-related mortality.	Year-round
Mammals				
FEDERAL OR STATE THREATENED AND ENDANGERED SPECIES				
Vulpes macrotis mutica San Joaquin kit fox	FE/ST/--	Annual grasslands or grassy open areas with shrubs, loose-textured soils for burrows and prey base	**Presumed present.** High quality habitat is present throughout the Project area, and potential burrows were identified. The nearest recently confirmed sighting was within the Los Vaqueros Watershed in 2003 (CDFG, 2010a; CCWD and Reclamation, 2010).	Year-round
FEDERAL OR STATE SPECIES OF SPECIAL CONCERN				
Antrozous pallidus Pallid Bat	--/CSC/--	Roosts in buildings, caves, or cracks in rocks	**Roosting High/ Foraging Present.** Suitable roosting habitat is present at Vasco Caves Regional Preserve. Active roost is reported 8.5 miles northwest of the Project area. Nearby acoustical monitoring indicates this species may be present in the area (Pandion, 2010).	Spring/summer
Corynorhinus townsendii Townsend's big-eared bat	--/CSC/--	Oak and coniferous woodland and arid grasslands. Roosts in caves, buildings, etc.	**Roosting High/ Foraging High/ Migratory High.** Suitable roosting habitat is present at Vasco Caves Regional Preserve. Nearest reported roost is 13 miles southwest in the Livermore Area Regional Parks District (CDFG, 2010a).	Spring/summer
Eumops perotis californicus Greater western mastiff bat	FSC/CSC/-	Semiarid and arid habitats over rocky terrain; uncommon and widespread residents of coastal lowlands south of San Francisco Bay; roosts in rock crevices	**Roosting High/ Foraging High/ Migratory High.** Suitable roosting habitat is present at Vasco Caves Regional Preserve. The nearest documented roost is located 14 miles southeast of the Project area. Project area grasslands provide foraging habitat.	Spring/summer
Lasiurus blossevillii Western red bat	--/CSC/--	Associated with riparian vegetation adjacent to fields, orchards, and open areas; roosts in trees and shrubs	**Roosting Low/ Foraging Present.** Suitable roosting habitat is present at Vasco Caves Regional Preserve; Project area grasslands provide ample foraging habitat. The nearest reported roost is 14 miles north near Antioch, from 1998. APWRA monitoring indicates the potential for turbine-related mortality. This species has been acoustically documented at a neighboring wind farm (Pandion, 2010).	Spring/summer

TABLE 4.4-1 (Continued)
SPECIAL-STATUS SPECIES KNOWN TO OCCUR IN THE PROJECT AREA OR WITH POTENTIAL TO BE AFFECTED BY THE PROJECT

Scientific Name Common Name	Listing Status[4] USFWS/ CDFG/CRPR	General Habitat	Potential for Species Occurrence in the Project Area or to be Affected by the Project	Period of Identification or Blooming Period
Mammals (cont.)				
FEDERAL OR STATE SPECIES OF SPECIAL CONCERN (cont.)				
Myotis ciliolabrum Small-footed myotis bat	FSC/--/--	Forages over grasslands and roosts in caves and rock crevices	**Roosting Moderate/ Foraging Moderate.** Suitable roosting habitat is present at Vasco Caves Regional Preserve and study area grasslands provide ample foraging habitat. Roost sites are not documented within 90 miles of the study area (CDFG, 2010a).	Spring/summer
Myotis thysanodes Fringed myotis bat	FSC/--/--	Inhabits a variety of habitats including pinyon-juniper woodland, valley-foothill hardwood, hardwood-conifer forests, and desert scrub; generally not in Central Valley	**Roosting Moderate/ Foraging Moderate.** Common in oak woodlands and found in grasslands. Suitable roosting habitat is present at Vasco Caves Regional Preserve. Study area grasslands provide ample foraging habitat. Nearest reported occurrence is 42 miles west of the study area.	Spring/summer
Myotis yumanensis Yuma myotis bat	FSC/CSC/-	Open forests and woodlands below 8,000-foot elevation in close association with water bodies	**Roosting Moderate/ Foraging Present.** Suitable roosting habitat is present at Vasco Caves Regional Preserve. Los Vaqueros Reservoir offers a permanent water source. Project area grasslands provide ample foraging opportunities. The nearest reported occurrence is 12 miles southeast of the Project area. Nearby acoustical monitoring indicates this species may be present in the area (Pandion, 2010).	Spring/summer
Neotoma fuscipes annectens San Francisco dusky-footed woodrat	--/CSC/--	Forested areas, scrub, and grasslands	**Moderate.** Oregon Oak Woodland provides potential habitat within the Project area. The nearest reported occurrence is 3.5 miles west (CDFG, 2010a).	Year-round
Perognathus inornatus inornatus San Joaquin pocket mouse	--/CSC/--	Annual grasslands, saltbush scrub, and oak savannah habitats; usually found in areas with friable soils	**Moderate.** Alkali grasslands in the Project area provide potential habitat. The nearest reported occurrence is 3 miles east.	Spring/summer
Taxidea taxus American badger	--/CSC/--	Dry, open grasslands	**Present.** Recent badger activity was observed within the Project area (E&E, 2009). High quality habitat is present throughout Project area grasslands.	Spring/summer
SPECIES OF LOCAL CONCERN				
Lasionycteris noctivagans Silver-haired bat	WBWG medium-priority species	Primarily a forest bat but seasonally present in dry, low-elevation areas	**Roosting Low/ Foraging Present.** No roosts are documented in California and this species has not been documented in APWRA fatality reports. However, this species has been acoustically documented at a neighboring wind farm (Pandion, 2010).	Spring/summer

TABLE 4.4-1 (Continued)
SPECIAL-STATUS SPECIES KNOWN TO OCCUR IN THE PROJECT AREA OR WITH POTENTIAL TO BE AFFECTED BY THE PROJECT

Scientific Name **Common Name**	**Listing Status[4] USFWS/ CDFG/CRPR**	**General Habitat**	**Potential for Species Occurrence in the Project Area or to be Affected by the Project**	**Period of Identification or Blooming Period**
Mammals (cont.)				
SPECIES OF LOCAL CONCERN (cont.)				
Lasiurus cinereus Hoary bat	WBWG medium-priority species	The most widespread of all North American bats; strongly associated with forests in the western U.S.; roosts in caves, rock ledges, under woody debris	**Roosting High/ Foraging Present.** Known roosts are reported from Concord and Lake Del Valle, pre-1950s. Suitable habitat is present at Vasco Caves Regional Preserve. Thought to be migratory during fall and spring. APWRA monitoring indicates the potential for turbine-related mortality. This species has been acoustically documented at a neighboring wind farm (Pandion, 2010).	Spring/summer
Plants				
FEDERAL OR STATE THREATENED AND ENDANGERED SPECIES				
Amsinckia grandiflora Large-flowered fiddleneck	FE/CE/1B	Grassy slopes in non-native grasslands	**Low.** There are only two known reintroduced populations, on Lawrence Livermore Lab lands near Corral Hollow and Lougher Ridge in Alameda County. Not observed during June/July 2008 floristic surveys (E&E, 2009).	March-June
Cordylanthus palmatus Palmate-bracted bird's beak	FE/CE/1B	Valley and foothill grassland, alkali grassland, chenopod scrub	**Moderate.** Suitable habitat is present. Not observed during June/July 2008 floristic surveys (E&E, 2009).	May-October
Lasthenia conjugens Contra Costa goldfields	FE/--/1B	Vernal pools and seasonal wetlands in grassland and woodland	**Moderate to High.** Suitable habitat is present and a historical record in the area, though not observed during June/July 2008 floristic surveys (E&E, 2009).	March-June
FEDERAL OR STATE SPECIES OF SPECIAL CONCERN				
Amsinckia lunaris Bent-flowered fiddleneck	--/--/1B	Grasslands, coastal bluff scrub, woodland	**Low.** Suitable habitat is present. This species was not observed during June/July 2008 floristic surveys (E&E, 2009).	March-June
Arctostaphylos auriculata Mt. Diablo manzanita	--/--/1B	Chaparral, cismontane woodland	**Low.** Limited suitable habitat is present, though this species was not observed during June/July 2008 floristic surveys (E&E, 2009). An historical record occurs in the Altamont quad (CNPS, 2010).	January-March
Astragalus tener var. *tener* Alkali milk-vetch	--/--/1B	In poor draining low ground of alkali playa, grasslands and vernal pools; usually in dry adobe soil	**Low.** Suitable habitat is present but this species is thought to be extirpated from the Project area (CNPS, 2010). Not observed during June/July 2008 floristic surveys (E&E, 2009).	March-June
Atriplex cordulata Heartscale	FSC/--/1B	Sandy soils in chenopod scrub and alkaline grasslands	**Moderate.** Suitable habitat is present in alkali grasslands, though this species was not identified during June/July 2008 floristic surveys (E&E, 2009).	May-October

TABLE 4.4-1 (Continued)
SPECIAL-STATUS SPECIES KNOWN TO OCCUR IN THE PROJECT AREA OR WITH POTENTIAL TO BE AFFECTED BY THE PROJECT

Scientific Name **Common Name**	**Listing Status[4] USFWS/ CDFG/CRPR**	**General Habitat**	**Potential for Species Occurrence in the Project Area or to be Affected by the Project**	**Period of Identification or Blooming Period**
Plants (cont.)				
FEDERAL OR STATE SPECIES OF SPECIAL CONCERN (cont.)				
Atriplex depressa Brittlescale	--/--/1B	Alkaline or clay grasslands, chenopod scrub, and playas; occasionally in riparian areas, marshes, or vernal pools	**Present.** Previously identified in northeast portions of the Project area (CCWD and Reclamation, 2010), greater than 500 feet from Project activities.	May-October
Atriplex joaquiniana San Joaquin spearscale	--/--/1B	Alkaline seasonal wetlands and sinks in grasslands, chenopod scrub, and alkali grasslands and meadows	**Present.** Previously identified in northern and southern portions of the Project area (CCWD and Reclamation, 2010). The nearest occurrence is 200 feet from Project activities, across Vasco Road (CDFG, 2010a).	April-September
Balsamorhiza macrolepis var. *macrolepis* Big-scale balsamroot	--/--/1B	Valley and foothill grassland, chaparral, cismontane woodland	**Low.** Marginal habitat is present but this species was not observed during June/July 2008 floristic surveys (E&E, 2009).	March-June
Blepharizonia plumosa Big tarplant	--/--/1B	In annual grasslands of dry hills and plains; soils are clay to clay-loam; often found in burned areas and usually on slopes	**Low.** Marginal habitat is present but this species was not observed during June/July 2008 floristic surveys (E&E, 2009).	July-October
California macrophylla Round-leaved filaree	--/--/1B	On clay soils in woodland and grasslands; may occur in disturbed areas where competition from non-native annuals has been reduced	**Moderate.** Suitable grassland habitat is present within the Project area. There are multiple occurrences within 5 miles of the Project area; the closest, but possibly extirpated occurrence is approximately 1.8 miles northwest (CDFG, 2010a), and a newly discovered occurrence is approximately 2 miles west (CH2M Hill, 2010).	March-May
Calochortus pulchellus Mt. Diablo fairy-lantern	--/--/1B	Valley and foothill grassland, cismontane woodland, chaparral, riparian woodland	**Low.** Suitable habitat is present but this species was not observed during June/July 2008 floristic surveys (E&E, 2009).	April-June
Centromadia parry var. parryi Congdon's tarplant	--/--/1B	Alkaline soils in grasslands	**Moderate.** Suitable habitat is present but this species was not observed during June/July 2008 floristic surveys (E&E, 2009).	May-October
Cordylanthus mollis ssp. hispidus Hispid bird's-beak	--/--/1B	Valley and foothill grassland, alkali grasslands, playas, meadows and seeps	**Moderate.** Suitable habitat is present but this species was not observed during June/July 2008 floristic surveys (E&E, 2009).	March-June
Deinandra bacigalupi Livermore tarplant	--/--/1B	Alkali meadows and seeps	**Moderate.** Suitable habitat is present but this species was not observed during June/July 2008 floristic surveys (E&E, 2009).	March-June
Delphinium recurvatum Recurved larkspur	--/--/1B	On alkaline soils mostly in saltbush scrub and chenopod scrub but also grasslands and woodland	**Moderate to High.** Suitable habitat is present but this species was not observed during June/July 2008 floristic surveys (E&E, 2009).	March-May

TABLE 4.4-1 (Continued)
SPECIAL-STATUS SPECIES KNOWN TO OCCUR IN THE PROJECT AREA OR WITH POTENTIAL TO BE AFFECTED BY THE PROJECT

Scientific Name Common Name	Listing Status[4] USFWS/ CDFG/CRPR	General Habitat	Potential for Species Occurrence in the Project Area or to be Affected by the Project	Period of Identification or Blooming Period
Plants (cont.)				
FEDERAL OR STATE SPECIES OF SPECIAL CONCERN (cont.)				
Eschscholzia rhombipetala Diamond-petaled poppy	--/--/1B	On grassland slopes and flats; substrate clay and alkaline	**Moderate to High.** Suitable habitat is present but this species was not observed during June/July 2008 floristic surveys (E&E, 2009). This species is known to historically occur in the Project area (CDFG, 2010a).	March-April
Helianthella castanea Diablo helianthella	--/--/1B	Forest, woodland, chaparral, coastal scrub, riparian woodland, and grassland; usually in chaparral/oak woodland ecotone	**Low.** Suitable habitat is present but this species was not observed during June/July 2008 floristic surveys (E&E, 2009).	April-June
Hesperolinon breweri Brewer's western flax	--/--/1B	Chaparral, cismontane woodland, valley and foothill grassland	**Low.** Marginal habitat is present but this species was not observed during June/July 2008 floristic surveys (E&E, 2009).	April-June
Madia radiata Showy madia	--/--/1B	Cismontane woodland, valley and foothill grassland	**Low.** Suitable habitat is present but this species was not observed during June/July 2008 floristic surveys (E&E, 2009).	April-June
Senecio aphanactis Chaparral ragwort	--/--/2.2	Chaparral, cismontane woodland, some alkaline scrub	**Low.** Marginal habitat is present but this species was not observed during June/July 2008 floristic surveys (E&E, 2009).	January-April
Tropidocarpum capparideum Caper-fruited tropidocarpum	--/--/1B	Grassland slopes with alkaline soils	**Moderate to High.** Suitable habitat is present but this species was not observed during June/July 2008 floristic surveys (E&E, 2009). This species is known to historically occur in the Project area (CDFG, 2010a).	March-April

STATUS CODES:

Federal (U.S. Fish and Wildlife Service):
BEPA = Bald and Golden Eagle Protection Act
FE = Listed as Endangered by the Federal Government
FT = Listed as Threatened by the Federal Government
FPE = Proposed for Listing as Endangered
FPT = Proposed for Listing as Threatened
FSC = Former Federal Species of Special Concern (list is no longer maintained)
FD = Federal Delisted Species
FC = Candidate for Federal listing

State (California Department of Fish and Game):
SE = Listed as Endangered by the State of California; ST = Listed as Threatened by the State of California
SR = Listed as Rare by the State of California (plants only); CSC= California Species of Special Concern
CFP = California Fully Protected species

California Rare Plant Rank: List 1A = Plants believed extinct; List 1B= Plants rare, threatened, or endangered in California and elsewhere; List 2= Plants rare, threatened, or endangered in California but more common elsewhere
WBWG = Western Bat Working Group

DEFINITIONS:
Low = Not observed; no suitable habitat.
Moderate = Not observed; marginal habitat observed or nearby documented occurrences.
High = Species detected during APWRA monitoring, or likely to occur based on known distribution or presence of suitable habitat.
Present = Species documented on the Project area, either as a resident or migrant.

SOURCES: CCWD and Reclamation, 2010 ; CNPS, 2010; CDFG, 2010a; CH2M HILL, 2010a, 2010b, 2010c, 2010d; Pandion, 2010; Sycamore, 2010 ; Ecology and Environment, Inc., 2009 ; TetraTech, 2008

TABLE 4.4-2
TRES VAQUEROS BASELINE AVIAN AND BAT FATALITY ESTIMATES

Species or Group	Average Number of Individual Birds Killed per Year	Fatalities per MW per Year
Species		
Golden eagle (*Aquila chrysaetos*)	0.5 (1 every other year)	0.02
Red-tailed hawk (*Buteo jamaicensis*)	>12	0.5
American kestrel (*Falco sparverius*)	9	0.4
Burrowing owl (*Athene cunicularia*)	51	2.1
All Raptors as a Group	57	2.3
All Small Endemic Non-Raptors as a Group	123	4.9
All Birds as a Group	206	8.2
All Bats as a Group	>7	0.3

SOURCE: Smallwood, 2010a

4.4.4 Significance Criteria

Based on CEQA Guidelines Appendix G, a project would cause significant adverse impacts to biological resources if it would:

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

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

c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;

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

e) Conflict with any local policies or ordinances protecting biological resources, such as tree preservation policy or ordinance; or

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

4.4.5 Discussion of No Biological Resource Impacts

As discussed below, construction, operation and decommissioning of the Project would have no impact on biological resources with respect to the decommissioning process or criterion f).

Construction relating to the decommissioning process would likely have impacts similar to construction of the proposed wind turbines and related infrastructure; such impacts are evaluated below. However, decommissioning itself (i.e., the removal of wind turbines, roads and other wind energy facility features and restoration of the site to pre-Project conditions) would improve biological resource-related conditions overall because it would eliminate impacts of the existing and more numerous turbines (91 existing decommissioned compared with up to 21 new turbines maximum), which is likely to result in substantial reductions in avian mortality compared with existing conditions.

Decommissioning would occur at the beginning and the end of the Project. Initial decommissioning would retire the 91 existing older-generation turbines. Portions of the site that would not be used for the Project would be reclaimed and restored to pre-wind energy facility topographical and other conditions in accordance with County Code Section 88-3.804. Decommissioning of the existing wind turbines and related infrastructure in anticipation of repowering with new, more efficient, and fewer turbines would be accomplished by removing above ground infrastructure, burying or off-hauling foundations, removing gravel pavements, ripping to loosen soils in the affected areas, recontouring as-needed, and reseeding with an appropriate native grass seed mix. All areas affected temporarily by construction would be reclaimed within one year of ground disturbance.

Decommissioning would cause ground disturbance to existing developed areas that are located within the dispersal range of California tiger salamander, California red-legged frog, and Alameda whipsnake, and are adjacent to foraging and potential denning habitat for San Joaquin kit fox. The extent of potential take on these species during decommissioning was assessed relative to the likelihood that these species occur within or immediately adjacent to the decommissioning areas.

At the conclusion of the Project’s useful life (assumed to be greater than or equal to 30 years), decommissioning would involve dismantling Project components and restoring the site to pre-wind energy facility topographical and other conditions. The areas subject to decommissioning would be restored, including ripping to loosen compacted soils in the wind turbine locations and reseeding with native grass species. All wind turbine facilities, foundations, and related systems would be removed to a depth of at least three feet below grade in accordance with County Code Section 88-3.804. Because decommissioning would improve habitat conditions overall relative to existing conditions, such impacts are not further evaluated in this analysis.

f) The Project would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional or state habitat conservation plan.

The East County HCP/NCCP is the only adopted habitat conservation plan that could be affected by the Project. As analyzed with respect to criterion c) in Section 4.11.5, *Discussion of No Land Use and Planning Impacts*, the Project would be consistent with the East County HCP/NCCP and so would have no impact related to this issue.

4.4.6 Discussion of Impacts and Mitigation Measures

The following discussion assesses potential impacts on biological resources resulting from implementation of the Project. Project-specific impacts and mitigation measures are based upon the most up-to-date research and monitoring studies in the APWRA, including fall 2005 through spring 2009 baseline bird and bat fatality reports for the Project area. As described in Section 4.4.1, this area includes a 328-foot study buffer around existing and proposed turbine sites, a 164-foot study for roads, and all wetland and alkaline soil areas within the overall Project area.

4.4.6.1 General Biological Resources Mitigation Measures

The following are general biological resources mitigation measures that would reduce Project impacts and benefit multiple species. They are consolidated here to eliminate redundancy. Measures are presented generally in the order in which they would occur, from pre-construction through end-of-life decommissioning.

Mitigation Measure 4.4 – General: The Applicant shall implement the following in order to reduce potential impacts to various species and their habitats:

1. Prior to issuance of a grading permits or building permit, the Applicant shall submit a final site plan for review and approval by the County Zoning Administrator. The site plan shall indicate the final locations of all Project components, including but not limited to wind turbines; temporary and permanent roads; electrical collection lines; substation upgrades; drainage and hydrological improvement; and staging and laydown areas, and shall indicate any tree proposed for removal along with its species and diameter.

   [This general biological resources mitigation measure addresses Impact 4.4-2, Burrowing Owl; Impact 4.4-4, California Red-legged Frog and California Tiger Salamander; Impact 4.4-5, Alameda Whipsnake, Western Pond Turtle, and San Joaquin Coachwhip; Impact 4.4-6, San Joaquin Kit Fox; Impact 4.4-7 American Badger and San Joaquin Pocket Mouse; Impact 4.4-9, Special-status Plants; Impact 4.4-10, Sensitive Natural Communities; Impact 4.4-11, Wetlands; Impact 4.4-12, Breeding Birds; and Impact 4.4-14 Protected Trees by clearly delineating the construction area and identifying areas where pre-construction surveys shall be conducted.]

2. Prior to issuance of a grading permit or building permit, the Applicant shall submit for review and approval by the County Zoning Administrator, a plan for reclaimed

areas and temporarily-impacted areas describing pre-Project site conditions, restoration, a timetable for implementation, and monitoring-success criteria.

[This general biological resources mitigation measure addresses Impact 4.4-4, California Red-legged Frog and California Tiger Salamander and Impact 4.4-6, San Joaquin Kit Fox by detailing plans for grassland restoration and post-construction monitoring.]

3. Prior to issuance of a grading permit or building permit, the Applicant shall submit for review and approval by the County Zoning Administrator and the County Public Works Department, a stormwater pollution prevention plan (SWPPP) and water pollution control plan as described in Section 4.10, *Hydrology and Water Quality*, to allow prompt and effective response to accidental spills.

   [This general biological resources mitigation measure addresses Impact 4.4-4, California Red-legged Frog and California Tiger Salamander; and Impact 4.4-11, Wetlands by protecting water bodies and aquatic species habitat.]

4. No more than 30 days prior to commencing construction, which includes groundbreaking activities as well as establishing staging and laydown areas and the arrival of construction equipment and materials, additional pre-construction surveys shall be performed in the Project area for special-status plants and sensitive wildlife species as identified in the mitigation measures below.

   [This general biological resources mitigation measure addresses Impact 4.4-2, Burrowing Owl; Impact 4.4-6, San Joaquin Kit Fox; Impact 4.4-7 American Badger and San Joaquin Pocket Mouse; and Impact 4.4-12, Breeding Birds by requiring pre-construction identification of on-site species.]

5. Prior to commencing construction, exclusion and/or silt fencing shall be installed to clearly demarcate all areas within the construction area that have been identified for avoidance by the County- and USFWS-approved biologist. A County- and USFWS-approved biologist shall be present at the active work sites until initial groundbreaking activities have been completed. Thereafter, the County, in consultation with the Applicant, shall approve one or more persons to monitor on-site compliance with all mitigation measures. The Applicant shall ensure, and demonstrate to the satisfaction of the County Zoning Administrator, that the designated monitor(s) receives training consistent with USFWS requirements.

   [This general biological resources mitigation measure addresses Impact 4.4-2, Burrowing Owl; Impact 4.4-6, San Joaquin Kit Fox; Impact 4.4-7 American Badger and San Joaquin Pocket Mouse; Impact 4.4-9, Special-status Plants; Impact 4.4-10, Sensitive Natural Communities; Impact 4.4-11, Wetlands, and Impact 4.4-12, Breeding Birds by ensuring avoidance of protected resources.]

6. The Applicant shall ensure that habitat disturbances and all Project activities are restricted to the work area identified in the final site plan approved by the County Zoning Administrator.

   [This general biological resources mitigation measure addresses Impact 4.4-2, Burrowing Owl; Impact 4.4-4, California Red-legged Frog and California Tiger Salamander; Impact 4.4-5, Alameda Whipsnake, Western Pond Turtle, and San

Joaquin Coachwhip; Impact 4.4-6, San Joaquin Kit Fox; Impact 4.4-7 American Badger and San Joaquin Pocket Mouse; Impact 4.4-9, Special-status Plants; Impact 4.4-10, Sensitive Natural Communities; Impact 4.4-11, Wetlands; and Impact 4.4-12, Breeding Birds by limiting the areas of direct and indirect impacts.]

7. Construction personnel shall be restricted to the immediate construction area and shall not venture beyond the work area identified in the approved final site plan.

   [This general biological resources mitigation measure addresses Impact 4.4-2, Burrowing Owl; Impact 4.4-4, California Red-legged Frog and California Tiger Salamander; Impact 4.4-5, Alameda Whipsnake, Western Pond Turtle, and San Joaquin Coachwhip; Impact 4.4-6, San Joaquin Kit Fox; Impact 4.4-7 American Badger and San Joaquin Pocket Mouse; Impact 4.4-9, Special-status Plants; Impact 4.4-10, Sensitive Natural Communities; Impact 4.4-11, Wetlands; and Impact 4.4-12, Breeding Birds by limiting the areas of direct impacts.]

8. All construction personnel shall receive training from a County- and USFWS-approved biologist addressing sensitive vegetation communities and special-status plant and wildlife species. At a minimum, the training shall include species descriptions and identification, identification of their habitat, the importance of these species and their habitat, the measures being implemented to conserve the species as they relate to the Project, and the boundaries within which Project activities can occur.

   [This general biological resources mitigation measure addresses Impact 4.4-2, Burrowing Owl; Impact 4.4-4, California Red-legged Frog and California Tiger Salamander; Impact 4.4-5, Alameda Whipsnake, Western Pond Turtle, and San Joaquin Coachwhip; Impact 4.4-6, San Joaquin Kit Fox; Impact 4.4-7 American Badger and San Joaquin Pocket Mouse; Impact 4.4-9, Special-status Plants; Impact 4.4-10, Sensitive Natural Communities; Impact 4.4-11, Wetlands; Impact 4.4-12, Breeding Birds; and Impact 4.4-14 Protected Trees by alerting construction personnel to the presence of biological resources and explaining what they can do to protect them.]

9. Environmental monitoring shall be part of Project activities, and shall include daily inspection of contractor-compliance with Best Management Practices and mitigation measures. Monitoring shall also include weekly inspection of exclusion and silt fences.

   [This general biological resources mitigation measure addresses Impact 4.4-2, Burrowing Owl; Impact 4.4-4, California Red-legged Frog and California Tiger Salamander; Impact 4.4-5, Alameda Whipsnake, Western Pond Turtle, and San Joaquin Coachwhip; Impact 4.4-6, San Joaquin Kit Fox; Impact 4.4-7 American Badger and San Joaquin Pocket Mouse; Impact 4.4-9, Special-status Plants; Impact 4.4-10, Sensitive Natural Communities; Impact 4.4-11, Wetlands; Impact 4.4-12, Breeding Birds; and Impact 4.4-14 Protected Trees by providing third-party oversight.]

10. Each morning before the start of Project activities, after breaks, and anytime construction equipment has remained in one location for more than 15 minutes, construction personnel shall check for species beneath tires and underneath equipment before its operation. If any wildlife are observed, the equipment shall

remain stationary until either the animal has relocated (without harassment) or the arrival of the approved biological monitor, who will identify the species and determine whether the species can be actively or passively relocated, or whether construction activities must remain halted.

[This general biological resources mitigation measure addresses Impact 4.4-4, California Red-legged Frog and California Tiger Salamander and Impact 4.4-5, Alameda Whipsnake, Western Pond Turtle, and San Joaquin Coachwhip by protecting reptiles and amphibians that commonly seek shelter and/or shade underneath construction vehicles and that could get crushed during their operation.]

11. To prevent accidental entrapment of animals during construction, all excavated holes or trenches greater than one foot deep shall be covered at the end of each work day with suitable materials, such as plywood or sheet metal, or shall be adequately fenced, or contain escape routes constructed of earthen materials or wooden planks. Before work occurs in or around these holes or trenches, and before filling, such areas shall be thoroughly inspected for trapped animals.

    [This general biological resources mitigation measure addresses Impact 4.4-4, California Red-legged Frog and California Tiger Salamander; Impact 4.4-5, Alameda Whipsnake, Western Pond Turtle, and San Joaquin Coachwhip; Impact 4.4-6, San Joaquin Kit Fox and Impact 4.4-7 American Badger and San Joaquin Pocket Mouse by protecting animals that seek shelter in excavations or are at risk of falling into excavations.]

12. To prevent harassment and mortality of species, and to prevent transmission of diseases, no pets shall be allowed in the Project area.

    [This general biological resources mitigation measure addresses Impact 4.4-2, Burrowing Owl and Impact 4.4-6, San Joaquin Kit Fox by prohibiting pets that could harass, injure, kill, or transfer diseases to on-site wildlife.]

13. To avoid attracting predators during Project construction activities, all food-related trash shall be properly contained and, at the end of each construction day, the contractor shall remove all food trash from work areas or place the items in an enclosed bin or dumpster. The bin or dumpster shall be emptied and the contents hauled off-site to an approved waste facility at a minimum weekly. No food related trash shall be allowed to overtop the bin or dumpster.

    [This general biological resources mitigation measure addresses Impact 4.4-6, San Joaquin Kit Fox by preventing accumulation of trash that is attractive to kit fox and their predators, the coyote and red fox.]

14. All fueling and maintenance of Project-related vehicles and other equipment shall occur at designated staging areas located at least 75 lateral feet from any riparian habitat or water body.

    [This general biological resources mitigation measure addresses Impact 4.4-4, California Red-legged Frog and California Tiger Salamander; and Impact 4.4-11, Wetlands by protecting water bodies and aquatic species habitat.]

15. All Project-related vehicles shall observe a maximum 20 miles per hour speed limit on private roads within the Project area. Nighttime vehicle traffic shall observe a maximum 15 miles per hour speed limit. Off-road traffic outside the designated construction areas is prohibited.

    [This general biological resources mitigation measure addresses Impact 4.4-2, Burrowing Owl; Impact 4.4-4, California Red-legged Frog and California Tiger Salamander; Impact 4.4-5, Alameda Whipsnake, Western Pond Turtle, and San Joaquin Coachwhip; Impact 4.4-6, San Joaquin Kit Fox; Impact 4.4-7 American Badger and San Joaquin Pocket Mouse; and Impact 4.4-13, Common Wildlife Species by implementing slow traffic speeds, minimizing night-time traffic when many wildlife species are active, and prohibiting off-road traffic.]

16. After construction had been completed, the Applicant shall restore the topographic contours of all areas temporarily disturbed by the Project and hydroseed them with an appropriate assemblage of native vegetation suitable to the area as determined by the County.

    [This general biological resources mitigation measure addresses Impact 4.4-4, California Red-legged Frog and California Tiger Salamander and Impact 4.4-6, San Joaquin Kit Fox by requiring grassland restoration that will restore ecosystem functionality.]

17. Fill material gathered on-site must be incidental fill resulting from other approved Project activities. If for any reason there is a deficiency in required fill material, then the necessary material shall be imported from off-site. No on-site area shall be excavated solely for the purpose of providing fill material. If gathered from on-site, this extra fill material must be collected incidental to other described and permitted Project activities.

    [This general biological resources mitigation measure addresses Impact 4.4-2, Burrowing Owl; Impact 4.4-4, California Red-legged Frog and California Tiger Salamander; Impact 4.4-5, Alameda Whipsnake, Western Pond Turtle, and San Joaquin Coachwhip; Impact 4.4-6, San Joaquin Kit Fox; Impact 4.4-7 American Badger and San Joaquin Pocket Mouse; and Impact 4.4-12, Breeding Birds by limiting areas of grassland habitat disturbance.[5]]

4.4.6.2 Specific Biological Resources Mitigation Measures

The following specific mitigation measures address the Project's construction-related and operational impacts on: special-status species and their habitat; sensitive natural communities; wetlands; the movement of native wildlife species; and biological resources protected by local policies or ordinances. The discussion generally follows the CEQA Environmental Checklist significance criteria, however, avian and bat impacts are presented first, and only under a), to avoid redundancy where more than one checklist item could apply.

[5] Habitat disturbance impacts may be temporary or permanent. The USFWS typically considers habitat disturbance impacts to be permanent if they last longer than one growing season.

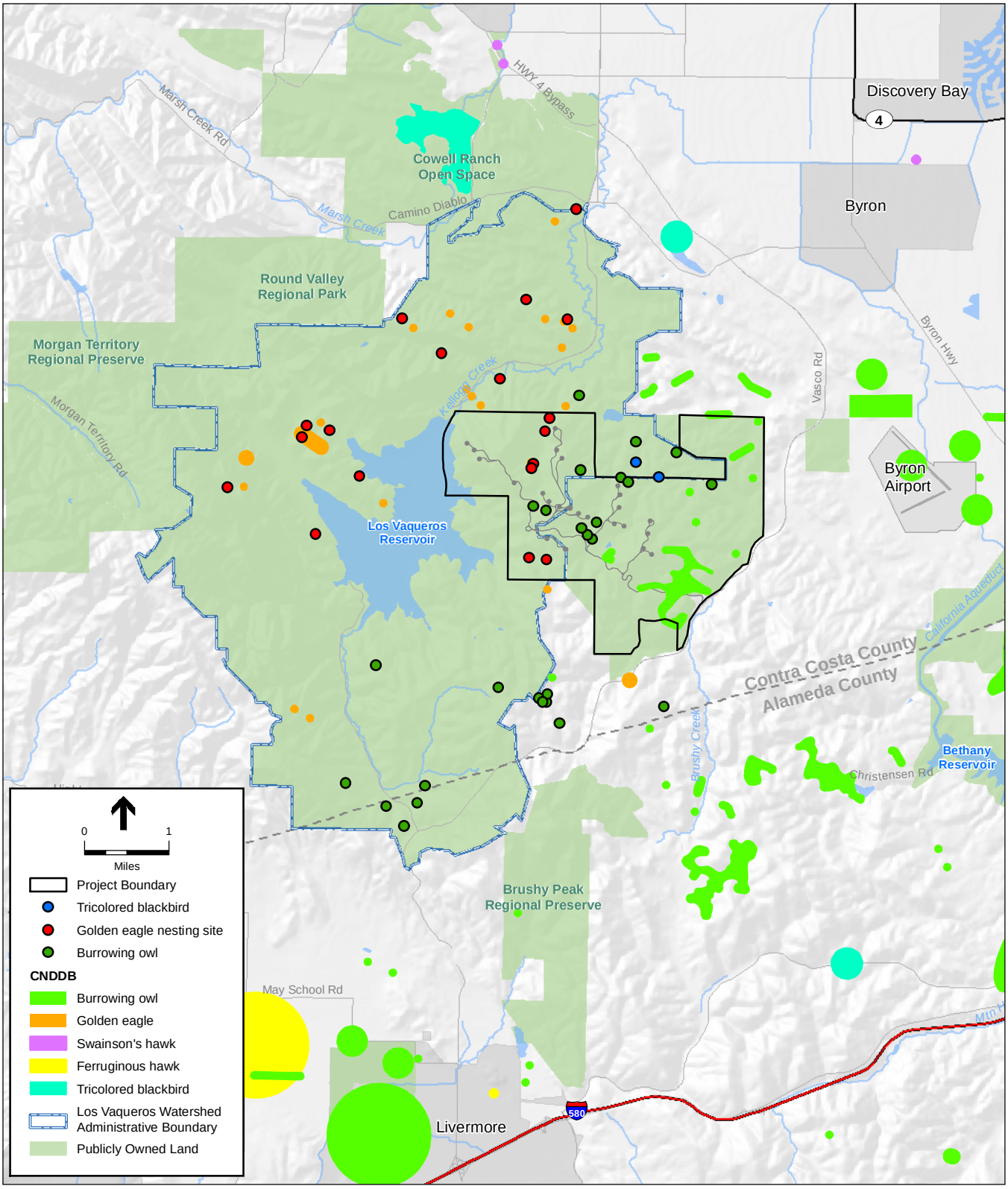
a) Would the Project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish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

Impact 4.4-1: Project construction, operation, and maintenance would result in short-term and permanent direct and indirect impacts on birds, including species listed under FESA and CESA, eagles protected under the BGEPA, Fully Protected species, State Species of Special Concern, and birds protected under the MBTA. (*Significant and Unavoidable Impact*)

In 1970 and 1984, the California Legislature enacted CEQA and CESA, respectively, to protect the State's environment, including its wildlife and wildlife habitat. In 1980, the California Energy Commission created the APWRA in response to federal legislation encouraging the development of alternative energy sources; the APWRA became the first area in the United States to be developed intensively for wind energy. Wind power generated in the APWRA provides about 700 gigawatt-hours annually of renewable energy to California, but also causes the deaths of an estimated 2,230 raptors and 9,300 total birds per year (Smallwood and Karas, 2009).

The presence of certain contributing factors appears to correlate with a higher incidence of avian mortality. As identified by the USFWS (2010b), such factors include: (1) placement of a wind energy facility within a migration corridor; (2) placement in areas where the microclimate impedes visibility; and (3) placement within areas of high bird abundance. The APWRA appears to meet all these criteria. The Altamont Pass is a topographical low point in the interior coastal range, providing a "doorway" into California's Central Valley. This doorway combines with the favorable wind currents that make the area attractive for wind energy facilities to provide an energy-efficient flyway for migratory birds. Documented fatalities are higher during fall and winter seasonal migrations than during spring and summer operation (Smallwood and Spiegel, 2005); however, the APWRA does not have the mass-mortality (e.g., tens of birds or hundreds of bats in one night) associated with turbine collisions in other geographic areas, especially in the eastern United States. The Altamont Pass is also an area of dense fog, both winter fog and summer "tule" fog that impedes visibility and may contribute to avian collision mortality (Drewitt and Langston, 2008). Lastly, the Altamont Pass and vicinity (e.g., 15-mile radius) is an area of high raptor abundance, supporting large resident populations of golden eagle, burrowing owl, red-tailed hawk, and American kestrel, along with lesser numbers of prairie falcon and Swainson's hawk (see Figure 4.4-5).

Wind energy facilities have been demonstrated to cause a variety of avian impacts including: (1) loss of ecosystem structure and functioning; (2) habitat avoidance and displacement of some species; and (3) direct mortality through turbine collision (National Academy of Sciences, 2007). When the construction or operation of a wind energy facility alters the landscape such that it no longer provides the essential habitat functions for a species-habitat (i.e. for occupation, foraging, reproduction, and dispersal), loss of ecosystem structure and functioning occurs. Habitat avoidance is the phenomenon whereby certain birds avoid areas that have undergone wind energy facility or other development, presumably because they perceive a flight risk from the operating turbines or because they are bothered by the sight, noise, or vibration of them.



SOURCES: EBRPD, 2010;
Tetra Tech, 2008; CCWD, 2007; Ecology and Environment Inc, 2009

Tres Vaqueros Windfarm Repowering Project . 209132.02

Figure 4.4-5
Special Status Bird Occurrences
in the Project Area

Loss of Ecosystem Structure and Functioning

The construction and maintenance of wind energy facilities alter ecosystem structure through vegetation clearing, soil disruption, soil compaction, changes in hydrologic features, and the potential for erosion (National Academy of Sciences, 2007). This has been identified as especially problematic in areas that are difficult to reclaim or restore, such as desert, shrub-steppe, and forested areas. The Project is not anticipated to substantially alter the grassland habitat that characterizes the site, or to cause any substantive changes in ecosystem structure and functioning for land-based animals.

Wind energy development that is focused on specific topographical features (e.g., ridgelines) that represent key habitat for some species may have disproportionately detrimental impacts on those species that depend, or are closely related with, these habitats (National Academy of Sciences, 2007). As the Project would reduce the number of turbines present on ridgelines, any existing impact on ridgeline-associated species would likely be reduced. On the other hand, to the extent that three-dimensional airspace is avian habitat, the Project would alter the structure and functioning of the airspace by: (1) significantly increasing the rotor- or blade-swept area; and (2) expanding the Project's domain[6] by 479 acres by establishing turbines on ridgelines that were previously turbine-free (see Figure 4.4-6). It is unknown what impact on avian species would result from a Project with a greater domain but decreased turbine density.

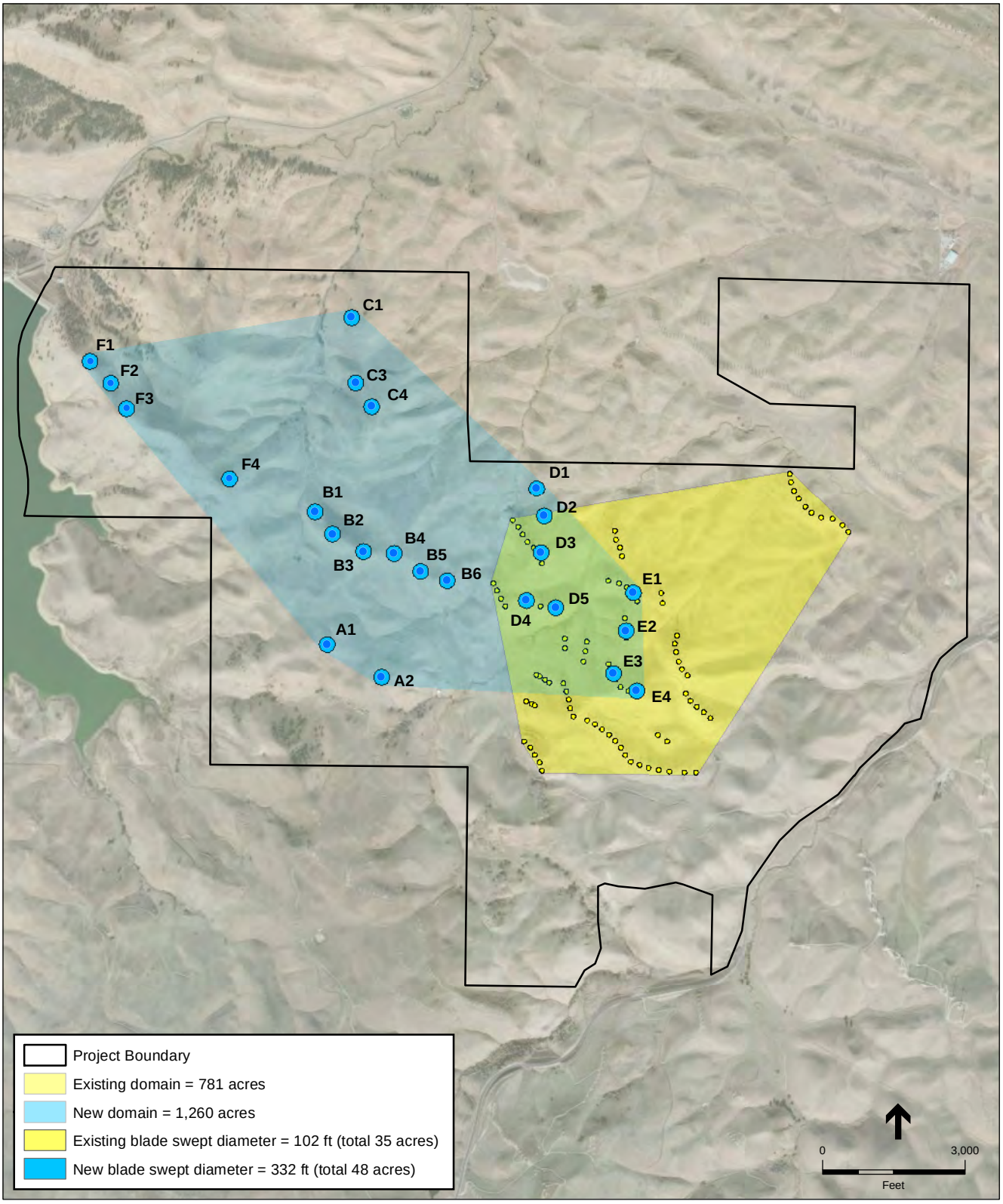
Habitat Avoidance

No habitat avoidance studies were identified from the APWRA, and neither the existing facility's displacement impact nor the Project's potential displacement impact on songbirds and raptors are known. Relatively few displacement studies have been performed in the United States, and results are mixed. However, the indirect impacts of wind energy facilities on avian habitat in Europe are considered to be greater than the direct impacts caused by collision (National Academy of Sciences, 2007). The most relevant study was an assessment of the golden eagle population in and around the APWRA (CEC, 2006) that found all golden eagle territories occupied by eagle pairs in 2000 to be occupied in 2005. While it is uncertain whether enough golden eagles from the local population survived to keep these territories occupied or whether emigrants from other areas moved in to fill vacancies (caused by mortality from all natural and manmade sources, e.g., disease, starvation, predation, competition, habitat loss, reduced prey abundance, turbine collisions, or collisions with other structures such as buildings or transmission lines), displacement from the area was not indicated in this study. It is unknown whether the Project would result in habitat avoidance by bird species in the APWRA.

Avian Collision

Avian mortality in the APWRA has been documented since the mid-1980s (Smallwood and Thelander, 2004), which prompted a multitude of studies and technical reports that have investigated and characterized the various ways that turbines can pose a hazard to birds, including

6 A minimum convex polygon was drawn around all Project turbines to compare the existing and proposed domain, or geographic area encompassed by turbine activity.



Tres Vaqueros Wind Energy Project . 209132.02

SOURCE: NextEra, 2010; ESA, 2011

Figure 4.4-6

Avian Habitat Comparison of Existing and Repowered Project Footprints and Blade Swept Areas

turbine characteristics, turbine arrangements within wind energy facilities, avian use (e.g., flight behavior), avian perception of turbines, avian abundance, seasonal presence, and the effectiveness of mitigation measures. A summary of the existing body of research as it relates to the Project is included as Appendix D-3. Presently, tower height and associated ground-to-blade tip clearance, and micrositing placement are believed to have the greatest influence on avian collision (Smallwood, pers. comm., 2010).

Repowering has been identified as the most effective method for reducing avian fatality associated with wind energy facilities in the APWRA (see, e.g., CEC, 2009), seconded by the incorporation of micrositing turbines during the repowering process. Accordingly, the Project proposes to repower first generation turbines by reducing the number of existing turbines and replacing them with fewer and more efficient turbines whose locations are based on the results and indications of predictive modeling and other available science as well as a site-specific micrositing report designed to reduce hazards to avian species.

Anticipated Repowering-related Reductions in Avian Mortality

Preliminary results of studies of the two operational repowering projects in the APWRA – the Diablo Winds repowering project and the Buena Vista repowering project – indicate that repowering with newer generation turbines has resulted in a reduction in the estimated total number of avian fatalities and the overall mortality rate per MW of capacity for all species groups and for all individual species (ICF International, 2010). The Diablo Winds project replaced 169 FloWind, vertical-axis turbines with 31 660-kW Vestas V47 turbines in 2005. Although the Vestas turbines were larger than the FloWind turbines and structurally very different (vertical-axis turbines versus horizontal turbines on tubular towers), they are smaller than the modern turbines, rated at 1 MW or more, that have become standard. The Diablo Winds repowering project was evaluated for avian mortality by WEST (2006), Smallwood and Karas (2009), and ICF Jones & Stokes (2009). The Buena Vista project site was repowered in 2005 and became operational in December 2006. It replaced 179 older-generation 150- and 160-kW turbines with 38 new Mitsubishi 1-MW turbines. Avian monitoring of the Buena Vista repowering project is being conducted by Insignia Environmental (2009). The first year of post-project monitoring data (February 2008 through February 2009) from the Buena Vista Repowering Project was evaluated in this analysis (Insignia Environmental, 2009).

Preliminary results of studies of these two repowering project sites indicate that repowering with newer-generation turbines has resulted in a reduction in the estimated total number of avian fatalities and the overall mortality rate per megawatt of nameplate capacity, for all species groups and for all individual species. In addition, the amount of energy produced by new-generation turbines is greater. Therefore, the total number of fatalities per megawatt would be even less for repowered project sites.

The contemporary strategy for reducing potential impacts of wind energy facilities on avian species is to combine repowering with micrositing of individual turbines in areas or orientations that are less risky for eagles and other raptors. The Project would accomplish repowering by replacing 91 existing older-generation turbines that are thought to contribute inordinately to avian

fatalities in the APWRA (Smallwood, 2010b) with up to 21 new turbines. This ratio of turbines removed to turbines installed would be greater than occurred as part of either the Diablo Winds or Buena Vista project. The conclusion that avian mortality would decrease as a result of the Project is based on the available monitoring data documenting a decrease in avian mortality for the two operational repowered projects in the APWRA and the fact that the Project would decommission close to the same percentage of turbines as either of those operating repowered projects (77 percent compared to 71 percent and 78 percent, respectively).

Site-Specific Micrositing

In their report for the California Energy Commission, *Developing Methods to Reduce Bird Mortality in the Altamont Pass Wind Resource Area*, Smallwood and Thelander (2004) hypothesize that micrositing of turbines could contribute more to reducing avian fatality than 16 other mitigation measures evaluated. Effective micrositing relies on thorough evaluation of existing fatality data and an understanding of avian behavior, which combine to predict places where avian collisions are most likely to occur and which topographical areas are safest for birds. Fatality monitoring studies throughout the APWRA have identified that some turbines kill more birds than others, and that the location of an individual turbine relative to other turbines around it provides an indication of avian risk. Avian use can be equal among turbine strings, while a specific string can result in much higher fatality rates (Insignia Environmental, 2009). Cattle grazing near turbines also can contribute to the likelihood of a raptor fatality: Smallwood and Thelander (2004) found that prey densities are often higher near turbines, which they hypothesized as an effect that starts with cattle congregation below turbines; their droppings are fodder for vast numbers of insects, which in turn attracts both birds and small mammals, which in turn attract larger, foraging raptors.

State and federal guidelines provide three common strategies for micro- and meso-siting of turbines. First, State and federal guidelines recommend the collection of preliminary information to evaluate risk and the regulatory framework. While risk cannot be eliminated, incorporation of micro- and meso-site conditions into the turbine siting process is likely to provide a considerable benefit relative to the low investment necessitated by such an effort. The regulatory framework—the sensitive species that might be affected and the regulatory agencies with regulatory authority—is important in evaluating the mortality risk associated with a given project. Second, the guidelines recommend avoidance of high prey areas, water sources, and certain topographic configurations as a priority in the siting process because avoidance of these areas could reduce exposure to turbines by raptors foraging or in search of water. Third, the guidelines recognize the importance of turbine configuration in turbine siting: setbacks from cliff and rim edges and siting turbines outside saddles or canyons can reduce the risk of turbine collision (Orloff and Flannery, 1992). Similarly, orienting turbine rows parallel to apparent flyways can reduce the exposure of migrating birds to turbine blades.

In designing the proposed turbine layout for the Project, the Applicant relied on a site-specific micrositing report and follow-up evaluations that incorporated these State and federal strategies, and supplemented them for site-specific conditions (Smallwood and Neher, 2010; Smallwood,

2010b; Smallwood, 2010c; Smallwood, 2010d); the Smallwood reports are included as Appendix D-4. The report modeled golden eagle flights, red-tailed hawk and American kestrel hovering and kiting, and burrowing owl nest burrow locations, and provided micrositing suggestions to reduce avian collision. The models included utilization data; digital elevation modeling; slope attributes; techniques to identify saddles, notches, and benches; and associations between bird utilization and topography. The report recommended against locating wind turbines in the hazard areas on ridge saddles, notches, and benches, or where there are other breaks in the slope of the ridge or hill. It also recommended avoiding the lowest terrain, such as in valley or ravine bottoms. Although significant uncertainties remain concerning the mechanisms of avian-turbine collisions (Smallwood and Neher, 2010), the models result in a delineation of areas with predicted high activity where wind turbine siting should be avoided. The Applicant considered these micrositing constraints when designing the Project and Smallwood found that the proposed layout is consistent with the report's recommendations.

Project design also incorporates best practices and "lessons learned" from older generation wind energy facilities, such as installing gravel around the base of each turbine to prevent ground squirrels and rodents from colonizing turbine bases, and reducing the risk for avian electrocution through undergrounding power lines wherever possible and retrofitting above-ground power lines to be compliant with the recommendations of the Avian Power Line Interaction Committee (APLIC) (see, e.g., CEC, 2009). Decommissioning of the old turbines is identified as the first step in Project construction, a process which has been identified as critical for reducing avian fatality: "…[R]emoval of the existing operational turbines may reduce avian fatality more than the potential reductions achieved by repowering over a phased period of time" (Audubon, 2010).

Assessment of Avian Risk

Smallwood and Thelander (2004) found that repowering may be the most effective approach to reducing turbine-related avian mortality in the APWRA because it appears that fewer, taller, and larger-output turbines offer lower risk than do many, smaller, lower-output turbines. Additionally, preliminary results of all studies of repowered sites in the APWRA indicate that repowering with newer generation turbines has resulted in a reduction in the estimated total number of avian fatalities and the overall mortality rate per MW of capacity for all species groups and for all individual species (ICF International, 2010). Nonetheless, avian deaths are still expected to occur over the Project area. Despite anticipated reductions in avian mortality, in the absence of site-specific monitoring data following repowering, it cannot be ascertained whether the reductions would be below the estimated baseline fatality rates presented in Table 4.4-2 as reported in Smallwood (Smallwood, 2010a). Based on this uncertainty and to exercise a conservative approach to impact assessment, impacts to avian species are considered to be significant and unavoidable.

As indicated in Chapter 3, *Project Description*, Project design incorporates the use of turbine towers with internal ladders to discourage avian perching, gravelling for a radius of at least five feet around each turbine base to discourage small mammal burrowing, and using strobe lights for compliance with FAA safety lighting requirements to reduce the attraction of night-migrating birds.

Implementation of the General Biological Resources Mitigation Measures in Section 4.4.6.1 and implementation of the mitigation measures below are likely to reduce avian mortality relative to the Project as proposed; however, in light of uncertainty about their effectiveness, impacts to avian species would remain significant and unavoidable.

The adaptive management approach presented below would obtain operational data specific to the Project area. The Project is anticipated to have a lifespan of about 30 years, although this could extend beyond that time based on energy demand and other factors. Given the variable findings of scientific studies of APWRA mortality data and avian population level impacts, and influencing factors under both current and future operating conditions, effective mitigation requires an adaptive management approach that incorporates the best science available at any given time. In recently published recommendations, the Wind Turbine Guidelines Advisory Committee (2010) recommends active adaptive management as the preferred approach when there is considerable uncertainty over the appropriate mitigation for a project (USFWS, 2010b). A tiered approach would accommodate adaptive management during and after Project construction by using information gathered in the pre-construction assessment to guide possible Project modifications, mitigation, or the need for and design of post-construction studies; post-construction studies can test design modifications and operational activities to determine their effectiveness in avoiding or minimizing significant adverse impacts (USFWS, 2010b).

Mitigation Measure 4.4-1a: The following mitigation measures shall be implemented during Project design, construction, and operation to reduce avian mortality:

i. Gravel shall be placed at least 5 feet around each tower foundation to discourage small mammals from burrowing near turbine bases.

ii. Boulders (rocks measuring larger than 12 inches in diameter) excavated during Project construction shall be relocated greater than 500 feet from turbines. These boulders may be used in a functional manner at other locales in the Project area, such as below road culverts to diffuse runoff, provided that rock piles are not created within 656 feet (200 meters) of a turbine.

iii. Turbine towers shall have internal ladders; external ladders are prohibited in order to eliminate possible perches for birds.

iv. Turbines that must be lighted for compliance with Federal Aviation Administration regulations shall use white strobe lights, which are not as attractive to night-migrating birds, unless otherwise required by FAA regulations.

v. Electric distribution poles or towers being modified or integrated with the Project shall be compliant with measures defined by the Avian Power Line Interaction Committee (APLIC).

vi. The Applicant shall not direct or participate in rodent control programs in the Project area and shall not use rodenticides within the Project area.

Mitigation Measure 4.4-1b: The Applicant shall implement a post-construction avian monitoring program as follows:

i. The post-construction monitoring program shall use red-tailed hawks, golden eagles, American kestrels and burrowing owls (the "Focal Raptor Species") and bats as benchmarks for evaluating the effectiveness of the overall Project repowering in reducing turbine-related mortality and informing and updating future siting analyses. The post-construction monitoring program shall commence no later than 3 months after the commercial operation date of the Project.

ii. The post-construction monitoring program shall be 5 years in duration. Following the first 3 years of post-construction monitoring, 2 years of further monitoring shall commence on the 10th anniversary of the Project's commercial operation date. The initial 3-year monitoring period and the subsequent 2-year monitoring period together shall constitute the post-construction monitoring period.

iii. The monitoring program shall be conducted by a qualified consultant ("Monitor") approved by Contra Costa County.

iv. Post-construction monitoring shall include collecting field data on behavior, utilization and distribution patterns of affected avian species in addition to fatalities and shall report data in aggregated and by-turbine by-month formats.

v. The program shall monitor each repowered turbine at least once per month for the duration of the post-construction monitoring period for fatalities of the Focal Raptor Species and all other bird species, as recommended by the Contra Costa County Technical Advisory Committee (TAC) or an equivalent entity, which will be convened by the County for this purpose. The Applicant shall monitor a subset (30 percent) of the repowered turbines at least twice per month for the duration of the post-construction monitoring period for fatalities and bird utilization and behavior.

vi. The Monitor shall prepare interim, annual monitoring reports and submit them to Contra Costa County and the Altamont Pass Wind Resource Area Scientific Review Committee (APWRA SRC) within 3 months of completing each year of post-construction monitoring, and shall prepare and submit a final 3-year Monitoring Report within 6 months of completing 3 years of post-construction monitoring and a final 2-year Monitoring Report within 6 months of completing 2 years of post-construction monitoring. All monitoring reports shall report adjusted and unadjusted annual fatalities for the Focal Raptor Species and all other bird species on a per-turbine and per-megawatt basis. Monitoring reports also shall summarize the results of the bird behavior and use studies for the preceding 1 to 3 years, as applicable.

vii. Adaptive Management Plan: Contra Costa County will review the final three (3) year Monitoring Report for the Project to evaluate whether any repowered turbines are causing significantly disproportionate Focal Raptor and/or bat fatalities relative to other turbines. If one or more turbines are causing significantly disproportionate Focal Raptor or bat fatalities, then Contra Costa County may, in consultation with the TAC, consider additional focused monitoring and/or management measures designed to reduce the fatalities attributable to those turbines, with the least impact on wind energy production, by continually incorporating effective mitigation measures that are based on the best available science over the life of the Project. Binding instruments of this Plan could include:

a. Specific percentage-goal reductions in avian mortality or type-specific avian mortality, such as a reduction in overall raptor mortality or species-specific raptor mortality achieved within a specified time period. The percentage-goal reductions will be measured from site-specific baseline fatalities presented in Table 4.4-2 (Smallwood, 2010a).

b. Seasonal or weather condition-specific shutdowns of individual turbines identified by data included in the annual monitoring reports required by Mitigation Measure 4.4-1b.ii if, in the best professional judgment of the biologist approved by the County, annual fatality monitoring data identifies the need (e.g., 50 percent more raptor kills than other turbines), and identifies that it cannot be effectively met in any other fashion.

c. Extension of the 3-year monitoring period in up to 3-year increments.

d. Binding instruments of this Plan shall not include relocation or permanent shutdown of any repowered turbine.

Significance of Impact after Mitigation: Significant and Unavoidable.

Impact 4.4-2: Project construction would result in direct and indirect impacts on burrowing owls, including temporary and permanent loss of potential habitat. (*Less-than-Significant Impact with Mitigation Incorporated*)

Resident burrowing owl populations occur throughout the APWRA, with an unknown number of individuals residing within the Project area. During pre-2008 surveys, a biologist observed 10 nesting pairs in the Project area (E&E, 2009). During 2008 biological surveys, breeding owls were observed at nine locations within in, and two locations outside but in close proximity to, the Project area (E&E, 2009).

Construction activities associated with the Project, including grading and removal of grassland, could result in direct mortality of burrowing owls. Indirect impacts from construction noise, vibrations, and increased human presence could spook adult birds, causing burrow abandonment, or nest abandonment, death of young, or loss of reproductive potential at active nests near the Project area. Owl survival can be adversely affected by foraging habitat loss and disturbance even when impacts to individual owls and burrows are avoided (CDFG, 1995). Generally, more intensive construction activities could impact breeding owls within a larger sphere of influence. This is also true for activities that may have a short duration, but are loud and therefore potentially disruptive to resident owls. Ground-clearing activities could disrupt burrowing owls that occur in or near grassland areas proposed for new turbine siting, new or modified roads, in-ground electrical infrastructure, and other Project activities.

Consistent with CDFG guidance (CDFG, 1995), the Project would have a significant impact on burrowing owl if it would cause: 1) disturbance within 50 meters (approximately 160 feet) of occupied burrows during the non-breeding season (September 1 to January 31), which may cause

harassment; 2) disturbance within 75 meters (about 250 feet) of occupied burrows during the breeding season (February 1 to August 31); 3) destruction of natural and artificial burrows (culverts, concrete slabs, and debris piles that provide shelter to burrowing owls); or 4) destruction and/or degradation of foraging habitat within 100 meters (about 330 feet) of an occupied burrow(s).

Project construction would cause the direct, temporary disturbance to about 93.1 acres of annual grasslands that provide potential burrowing owl foraging and nesting habitat (see Table 3-4 in Section 3.4, *Project Implementation*). In addition, a temporary, indirect reduction in foraging habitat availability may occur in areas within 328 feet (100 meters). This analysis conservatively assumes the entire area provides potentially suitable burrowing owl foraging habitat. However, because temporarily disturbed areas would be reclaimed prior to initiating subsequent construction (i.e., the acreages temporarily disturbed would not occur concurrently during the construction period) and because more foraging habitat would be created than destroyed, the Project would have a less-than-significant impact in terms of foraging habitat destruction and/or degradation.

In terms of potential permanent impacts, the Project's proposed removal of existing turbines, foundations and roads that no longer would be needed and restoration of the affected areas to pre-wind energy facility conditions would result in an approximately 11-acre increase in annual grassland habitat potentially available to burrowing owls. As shown in Table 3-4, the Project would result in reclamation of approximately 29 acres, offset by the permanent disturbance of approximately 18 acres, for a net restoration of 11 acres. Thus, the Project would restore more acres of potential habitat than it would permanently disturb.

Ground disturbance would result in the temporary and permanent loss of foraging habitat, and potential burrowing and nesting habitat. Project construction would result in the permanent loss of 18 acres of undeveloped annual grasslands. Project construction would also cause the direct and temporary loss of 93 acres of annual grasslands. Areas of temporary disturbance would ultimately be restored to annual grasslands after Project construction. Project construction would also restore unnecessary roads and old turbine pads, for a total of 29 acres of restored annual grasslands.

Implementation of General Biological Resources Mitigation Measures 1, 5–10, 13, and 16, along with the following specific mitigation requiring pre-construction surveys and protection measures to avoid burrowing owls during the breeding season, would reduce impacts to burrowing owls to a less-than-significant level.

> **Mitigation Measure 4.4-2:** The Applicant shall implement the measures listed below within grassland habitats to reduce potential impacts to and avoid incidental take of burrowing owls during construction. These measures shall apply to all construction activities within the project footprint and within a 150-meter (approximately 500 foot) buffer, to avoid, minimize, or mitigate impacts on burrowing owls. The Applicant shall follow current CDFG burrowing owl survey guidance, which is presently the Burrowing Owl Consortium multi-phase approach, to evaluate burrowing owl use (CBOC, 1993).
>
> i. Pre-construction surveys shall be performed to assess burrowing owl presence as close as possible to the date that ground-disturbing activities will begin, generally within 7 days, but no more than 30 days before disturbance will occur.

a. Additional surveys may be required by CDFG when the initial disturbance is followed by periods of inactivity that could allow owl colonization (e.g., 30 days or longer during the breeding season) or the development is phased spatially and/or temporarily over the Project area. Four or more survey visits performed on separate days may be required to assure with a high degree of certainty that site modifications, such as grading, do not take owls.

b. A follow-up report shall be provided to CDFG by the surveying biologist.

ii. Construction exclusion areas (e.g., marked with orange exclusion fence and signage) shall be established around occupied burrows, where no disturbance shall be allowed. During the non-breeding season (September 1 through January 31), exclusion areas shall extend at least 160 feet (approximately 50 meters) around occupied burrows. During the breeding season (February 1 through August 31), exclusion areas shall extend at least 250 feet (approximately 75 meters) around occupied burrows.

a. During the breeding season (February 1 through August 31), occupied burrows shall not be disturbed unless a qualified, County- and CDFG-approved biologist verifies through non-invasive methods that either the birds have not begun egg-laying and incubation, or that juveniles from the occupied burrows are foraging independently and are capable of independent survival.

b. During the non-breeding season (September 1 through January 31), if work areas conflict with occupied burrows in construction exclusion areas, passive relocation techniques could be used with CDFG approval. The approach to owl relocation and burrow closure will vary depending on the number of occupied burrows. Passive relocation shall be accomplished, consistent with CDFG guidance (CDFG, 1995), by:

1. Enhancing existing unsuitable burrows (e.g., by enlarging or clearing them of debris) or creating new burrows (i.e., by installing artificial burrows) outside the 160-foot buffer zone. The alternate burrows shall be monitored daily for 7 days to confirm whether the owls have moved in and acclimated to the new burrow.

2. Installing one-way doors on the entrances of burrows within 160 feet of the work site. The one-way doors shall be left in place for at least 48 hours to ensure the owls have left the burrow and the area shall be monitored daily for one week to confirm owl use of the replacement burrows before formerly-occupied burrows may be excavated. Burrows shall be excavated with a qualified biologist present.

c. Unoccupied burrowing owl burrows within the construction exclusion area shall be excavated with a qualified biologist present, and then filled to prevent reoccupation. If any burrowing owls are discovered during the excavation, the excavation shall cease and the owl shall be allowed to escape. Excavation could be completed when the biological monitor confirms the burrow is empty.

Significance of Impact with Mitigation: Less than Significant.

Impact 4.4-3: Project operation would result in direct impacts on special-status and common bats. (*Significant and Unavoidable Impact)*

Based on their known range and available habitat in the region, along with fatality data from various wind energy facilities in the APWRA and surrounding counties, bat species that could be affected by the Project include the pallid bat, Townsend's big-eared bat, greater western mastiff bat, western red bat, silver-haired bat, hoary bat, small-footed myotis bat, fringed myotis bat, Yuma myotis bat, and Mexican free-tailed bat. Dense woodlands and crevices in large rock outcrops present at Vasco Caves Regional Preserve could provide roosting habitat for bats; however, the main source of impacts on bat species, including mortality, would be turbine collisions, not roosting site disturbance.

Collision-related mortality would be a direct impact to bats. Potential indirect impacts to bats from wind energy facilities include disturbance of local populations and subsequent displacement or avoidance of the site and disruption to migratory or movement patterns (CEC, 2007). Substantial interference with the movement of a native wildlife species is considered a significant impact under CEQA. The Project has the potential to interfere with the movement of native bats through the Project area, and thus no distinction is made between common and special-status species. The Western Bat Working Group indicates that wind turbines can have significant impacts on bats although the potential for collision varies among locations (Johnson, et al., 2004) and reasons are poorly understood (Kunz, 2007). Data gathered nationally or in other geographic areas may not predict impacts in California, since preferred topography, vegetation and climate varies among species and regions. However, like birds, migrating bats use predictable winds to move across the landscape, and fatality data evaluated by season corresponds to known bat migrations; most mortality is observed in late summer and early fall (Kerlinger, et al., 2006).

Methods currently employed for predicting APWRA-wide annual bat fatalities rely on scavenger-removal-rate calculations and carcass-detection survey periods that have been reported to greatly underestimate actual and estimated fatality (CBWG, 2006). Several studies from around the country have found that bat carcasses are readily scavenged and easily overlooked; weekly searches underestimated the fatality rates by nearly a factor of three compared to the results of daily searches (Keeley, et al., 2001; Arnett and Tuttle, 2004). Carcass surveys in the APWRA were conducted at monthly, not daily, intervals, and were not conducted every month at the same location for the entire study period. Additionally, scavenging rates – the rate at which other animals in the landscape consume (e.g., eat, drag away to cache, or otherwise remove from the area) bat carcasses in the APWRA – were determined using bird carcasses, which may not be representative for bats (CBWG, 2006).

Recent acoustical monitoring performed as part of the environmental review process for wind energy repowering at the adjacent Vasco Winds Repowering Project found that the area supported relatively low bat activity from May 2010 through September 2010, the full period for which data was available (Pandion, 2010). Acoustic detectors were positioned on meteorological towers at and below rotor height to capture bat activity at various heights. Preliminary analysis using data from eight detectors through September 2010 found an average of 2.5 bat passes per

detector per night. Bat activity was approximately three times higher in September than in the month with the next highest activity level (May) and lowest during the summer months (June and July). Six bat species (i.e., big brown bat, western red bat, hoary bat, silver-haired bat, canyon bat, and Mexican free-tailed bat) and four bat complexes (i.e., bat species grouped based on similarities of calls, and that cannot be indentified to one species: pallid bat/big brown bat; big brown bat/silver-haired bat/Mexican free-tailed bat; California myotis/Yuma myotis; Mexican free-tailed bat/silver-haired bat) were present in the neighboring project area. Hoary bat and Mexican free-tailed bat accounted for the highest number of passes; both species are considered common and widespread throughout California.

Documented bat fatalities in the APWRA include western red bat, silver-haired bat, hoary bat, and Mexican free-tailed bat. These species have also been affected at the High Winds wind energy facility in nearby Solano County (CBWG, 2006) in much larger relative numbers, with 279 documented fatalities between 2004 and 2005 (Kerlinger, et al., 2006). It is not known whether fatality surveys were conducted differently at the High Winds project, or whether varying turbine models account for the discrepancy, but the large difference in fatalities deserves more investigation (97 estimated at the APWRA over four years versus 279 confirmed at High Winds in one year (CBWG, 2006; Insignia Environmental, 2009; Smallwood, 2010a)).

The effects of taller turbines on bats have not yet been investigated with the same level of effort that has been expended on some species of raptors and other diurnal birds (CEC, 2007). However, there is some indication that taller turbines may increase bat fatalities (CEC, 2007). Studies indicate that a substantial portion of bat fatalities occur during low-wind conditions coinciding with the summer-fall migration period (Arnett, et al., 2008). Higher bat activity and fatalities have been consistently related to periods of low wind speed and weather conditions typical of the passage of storm fronts (Arnett, et al., 2009); lower activity is associated with strong winds, low temperatures, and rain (Eckert, 1982; Erickson, et al., 2002).

Research surrounding these issues indicates that increasing turbine "cut-in"[7] speed will substantially reduce bat fatalities. This speed varies by turbine type, but is generally 11.5 feet (three meters) to 13 feet (four meters) per second (ft/sec) on modern turbines (Arnett, et al., 2009). The basic concept is if bats are more active during low-wind conditions, then bat fatalities are not as likely to occur if turbines are not operating in these low-wind conditions. In one study, increasing the cut-in speed to 18 ft/sec resulted in at least a 50 percent reduction in bat fatalities compared to normally-operating turbines; in some turbine strings, there was a 92 percent reduction (Arnett, et al., 2009). According to the study, both fatality reductions were achieved with minimal annual power loss. Additional national and site-specific studies are needed to test changes in cut-in speed among different sizes and types of turbines, wind regimes, and habitat conditions to fully evaluate the effectiveness of this mitigation strategy and to identify the most effective balance between reducing fatalities and minimizing power loss (Arnett, et al., 2009).

Bats feed on concentrations of insects at lights (CEC, 2007). However, aviation lighting does not appear to affect the incidence of foraging bats around turbines, and no studies have found

7 Cut-in speed is the minimum wind speed at which the wind turbine will generate usable power.

differences in bat fatalities between turbines that were unlighted and those that were equipped with red, flashing FAA lights (CEC, 2007). Consequently, the introduction of FAA lighting on some Project turbines (see Project Description Section 3.4.1, *Turbine Lighting*) is expected to have no impact on bats.

Existing information about bat migration and habitat use is limited in California (CBWG, 2006), so there is no corollary data set to the detailed level of knowledge that has emerged about turbine micrositing in relationship to raptor use of the landscape. However, attempts are being made to model and predict effects on bats (CBWG, 2006; CEC, 2007).

Implementation of the following specific mitigation measure would likely reduce Project impacts on bats; however, in the absence of site-specific monitoring data following repowering, it cannot be ascertained whether the expected reductions would reduce the impact to a less-than-significant level. Based on this uncertainty and to exercise a conservative approach to impact assessment, impacts to bat species are considered to be significant and unavoidable.

Mitigation Measure 4.4-3: The Applicant shall implement the following measures, which are based upon the California Bat Working Group *Guidelines for Assessing and Minimizing Impacts to Bats at Wind Energy Development Sites in California* (CBWG, 2006). These measures shall help to mitigate the Project's effects on bats by addressing the data gaps that prevent adequate assessment of the Project's effects on bats, such as what bat species are using the APWRA and how they are using the Project area.

i. Pre-construction surveys shall be performed in the Project area. Bat investigations shall be conducted in the Project area by a qualified biologist to identify species that may be present in the immediate Project vicinity and in the existing and proposed rotor-swept zones, and to identify any maternal roosts. The qualified biologist shall be experienced in bat research and detection methods, and could employ such methods as acoustic surveys, use of image intensifiers and/or thermal imaging, and radar.

ii. Post-construction bat monitoring shall be conducted in the Project area and reported in accordance with the same terms and conditions as provided in Mitigation Measure 4.4-1b, but for bats, and with the following measures:

    a. Post-construction monitoring shall utilize long-term acoustic monitoring equipment. The Applicant shall install and maintain, in working order, acoustic monitoring equipment for the duration of the survey period.

    b. Post-construction fatality surveys shall be conducted throughout the Project area as directed by a qualified biologist. These surveys may be seasonal, or dependent upon an initial intense survey, as directed by the designing biologist.

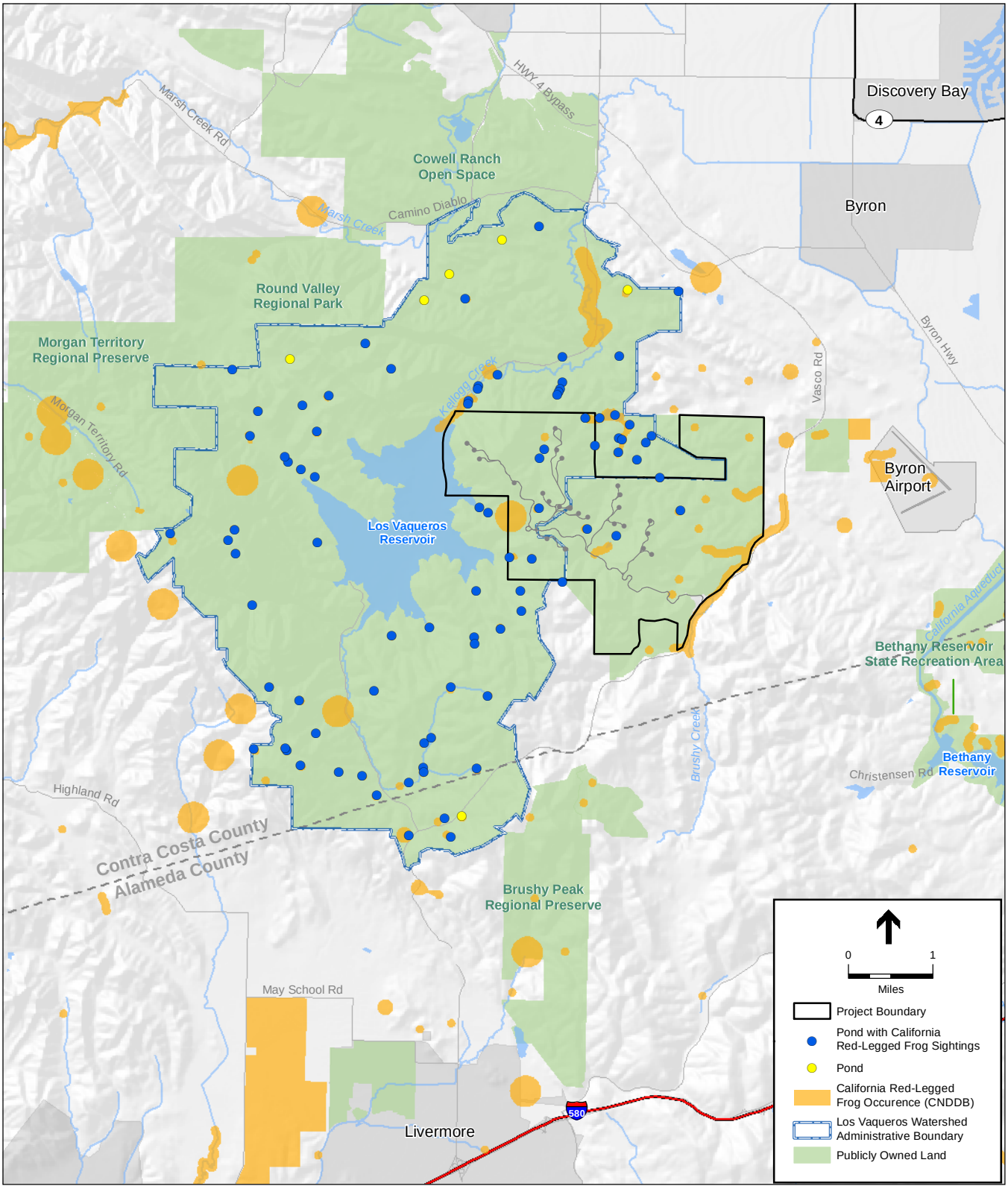
iii. The Applicant shall prepare and implement the same Adaptive Management Plan principles for bats that are being applied to avian species under Mitigation Measure 4.4-1b. Binding instruments of an adaptive management plan for bats could include, for example, increasing the cut-in speed of one or more turbines (curtailment) during times of increased bat activity.

Significance of Impact after Mitigation: Significant and Unavoidable.

Impact 4.4-4: Project construction would result in temporary and permanent impacts on California red-legged frog and California tiger salamander, including loss of upland aestivation habitat for these species. (*Less-than-Significant impact with Mitigation Incorporated*)

Project construction has the potential to directly affect California red-legged frog and California tiger salamander and their habitat. Temporary and permanent impacts to these species and their habitat could occur during Project construction and operation. The Los Vaqueros Reservoir Watershed, which overlaps the Project area, contains large breeding populations of California tiger salamander and California red-legged frog (CCWD and Reclamation, 2010). California tiger salamanders were observed at 12 aquatic breeding sites in the Project area and may occupy a significant portion of upland areas surrounding aquatic breeding habitat, while red-legged frogs were observed at 13 aquatic sites in the Project area (though frog breeding status was not available for these locations) and may occupy a significant portion of upland areas during dry periods (E&E, 2009) and dispersal events. Three large seasonal creeks that traverse the Project area also provide potential aquatic non-breeding habitat for red-legged frogs (E&E, 2009). A GIS analysis of potential and known breeding sites and available annual grassland habitats that occur within an accessible distance to breeding ponds (e.g., within one kilometer [0.62 mile]) (see Figures 4.4-7 and 4.4-8) indicates that all annual grasslands in the Project area may support aestivating California tiger salamanders or California red-legged frogs, and provide upland movement corridors for these species (CCWD and Reclamation, 2010; E&E, 2009). Therefore, these species are presumed present in all Project area grasslands. Approximately 111 acres of California red-legged frog upland habitat would be impacted (93 acres temporarily disturbed; 18 acres permanently disturbed).

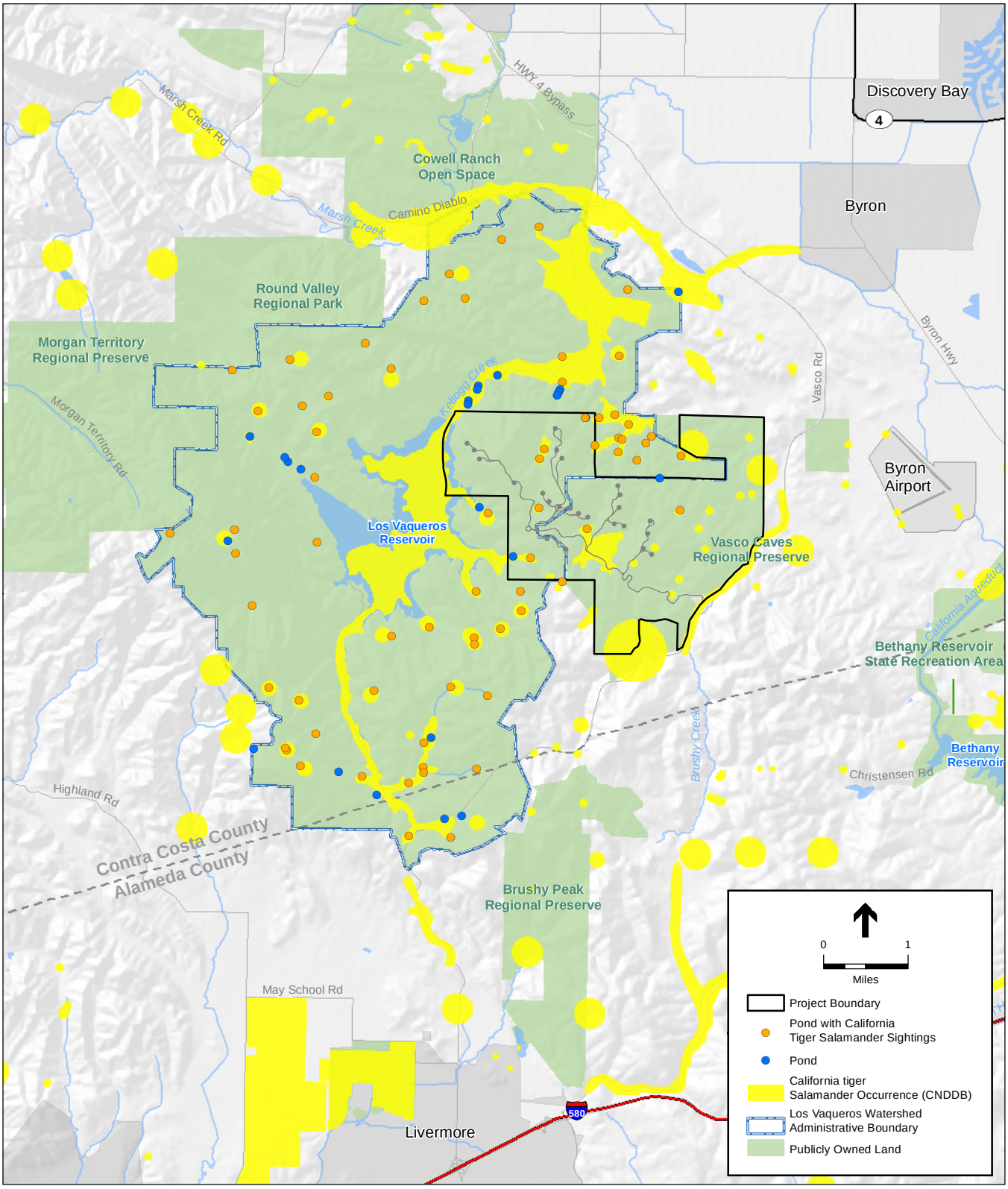
Red-legged frog and California tiger salamander may be harmed during clearing and grubbing activities. Operation of vehicles or heavy equipment could result in direct mortality, injury, or harassment of individuals, as increased human activity and vehicle travel would occur during construction. Frogs and salamanders may take shelter under parked vehicles during Project construction and operation, and be killed, injured, or harassed when the vehicle is moved. Other direct effects could include individual frogs or salamanders being crushed or entombed in their burrows; behavior disruption caused by construction or operation of facilities; disturbance by noise or vibrations from the heavy equipment; injury or mortality from encounters with workers' or visitors' pets; and trash that may attract predators. Individual California red-legged frogs, and California tiger salamanders during their breeding season, may also be attracted to the construction area by application of water to control dust, placing these individuals at higher risk of injury or mortality. Mitigation measures would be effective in reducing or eliminating direct mortality or injury; however, relocation would be a form of harassment.



SOURCES: EBRPD, 2010; 2010; CNDDB, 2010;
ESA, 2008; Ecology and Environment, 2009

Tres Vaqueros Windfarm Repowering Project . 209132

Figure 4.4-7
California Red Legged
Occurrences in the Project Area



SOURCES: EBRPD, 2010; CNDDB, 2010;
ESA, 2008, Ecology and Environment, 2009

Tres Vaqueros Windfarm Repowering Project . 209132.02

Figure 4.4-8
California Tiger Salamander
Occurrences in the Project Area

Installation of exclusionary fencing around work areas could result in direct effects such as mortality, injury, or harassment of California red-legged frog and California tiger salamander due to equipment operation, installation activities, removal of aestivation burrows, and relocation. Frogs and salamanders may die or become injured by capture and relocation if these methods are performed improperly, particularly during extreme temperatures. USFWS-approved biologists would use appropriate protective measures and procedures during capture and relocation of California red-legged frogs and California tiger salamanders.

The reclamation of old turbine pads to a depth of three feet below-grade, in accordance with Contra Costa County's WECS ordinance, could entomb aestivating amphibians and reduce burrow-complex habitat over the short-term. Reclamation of compacted turbine pads with softer fill would not reduce burrow-complex habitat over the long-term.

Indirect effects result from the proposed action and are reasonably certain to occur later in time. Such effects include destruction of small mammal burrows and fewer aestivation/cover sites for California red-legged frog and California tiger salamander, which may increase the mortality of the local population. Road construction and other grading activities may contribute to changes in water quality at aquatic breeding sites through erosion and silt deposition. Amphibian populations within the Los Vaqueros Watershed are closely monitored; undetected Project-related mortality of aestivating adults may affect the local population structure and impact both amphibian populations and their management in the Watershed (E&E, 2009).

The temporary loss of some grasslands represents upland aestivation and migratory habitat potentially occupied by California red-legged frogs and California tiger salamanders. Installation of turbines and associated facilities would cause the permanent loss of 18 acres of undeveloped annual grasslands, resulting from construction of new permanent roads, expansion of the existing substation, construction of new turbine pads, and permanent modifications to existing roads.

Construction would also cause the temporary loss of an additional estimated 93 acres of undeveloped annual grasslands, resulting from construction of new roads (temporarily widened by an extra 16 feet during the construction phase of the Project); modifications to existing roads (temporarily widened by an extra 16 feet during the construction phase of the Project); establishment of turn-around areas, staging and laydown areas; and installation of electrical systems.

Through the reclamation of old roads and turbine pads and their subsequent restoration to grasslands, along with the restoration of temporary disturbance areas, the Project would result in the net increase of 11 acres of upland habitat.

Implementation of General Biological Resources Mitigation Measures 1 to 3, 6 to 11, and 14 to 17, along with the following specific mitigation measure would reduce potential impacts on California red-legged frogs and California tiger salamanders to a less-than-significant level.

> **Mitigation Measure 4.4-4:** The Applicant shall avoid or minimize take of individual California red-legged frogs and California tiger salamanders by implementing temporary

protection measures before and during construction, and by providing habitat compensation and enhancement for permanent impacts.

Construction Measures

Before Construction (i.e., before staging activities)

i. A Sensitive Species Relocation Plan shall be prepared and submitted to Contra Costa County, USFWS, and CDFG for review and approval at least three weeks before the start of groundbreaking. The purpose of the plan is to standardize relocation methods and relocation sites.

ii. The Applicant shall submit the name and credentials of a biologist qualified to act as construction monitor to the County, USFWS, and CDFG for review and approval at least 15 days before construction work begins. General minimum qualifications are a four-year degree in biological sciences or other appropriate training and/or experience in surveying, identifying, and handling California tiger salamanders and California red-legged frogs.

iii. At least 15 days before groundbreaking, the Applicant and its contractors shall install frog-exclusion fencing (i.e., silt fences) around all construction areas that are within 100 feet of potential California red-legged frog or California tiger salamander aquatic breeding habitat.

iv. The County-, USFWS- and CDFG-approved biologist shall survey the work sites no more than two weeks before the onset of construction. If California tiger salamanders or California red-legged frogs are found, the biologist shall inform the County and contact USFWS and CDFG to determine whether moving these individuals is appropriate. If USFWS and CDFG approve moving the animals, then the Applicant shall allow the approved biologist sufficient time to move frogs and/or salamanders from the work sites before work begins. If these species are not identified, construction can proceed at these sites.

v. To-be-reclaimed turbine pad areas shall be reviewed on a case-by-case basis, by a qualified biologist, to determine the presence and extent of burrow complexes. Survey results shall be provided to the County to inform the reclamation of turbine pad areas (further details are provided in “After Construction,” below).

During Construction

vi. Active work areas, including areas where construction equipment and materials are staged, shall be monitored during construction to identify, capture, and relocate sensitive amphibians, if present.

vii. The County-, USFWS- and CDFG-approved biologist shall use professional judgment to determine whether (and if so, when) the California tiger salamanders and/or California red-legged frogs are to be moved. The approved biologist shall have authority to halt construction work, if necessary, to avert avoidable take of listed species.

After Construction

viii. Depending on the pre-construction survey results of to-be-reclaimed turbine pad areas, pads shall be restored in a manner that achieves the benefits of restoration while retaining the benefits of existing burrow-complex habitat.

Other Measures[8]

ix. The Applicant shall provide compensation for permanent impacts on California tiger salamander and California red-legged frog aestivation habitat at a **1:1 ratio** (at least one square foot of compensation for each square foot of net impact) **or a higher ratio if required by USFWS or CDFG** during the permitting process. A "higher ratio" may result in a less than 1 square foot by 1 square foot replacement on the ground if higher quality habitat than that affected by the Project is obtained. Compliance with required mitigation ratios shall be verified by the USFWS and CDFG.

x. The Applicant shall provide compensation for temporary impacts on California tiger salamander and California red-legged frog aestivation habitat at a **1:1 ratio** (at least one square foot of compensation for each square foot of net impact) **or a higher ratio if required by USFWS or CDFG** during the permitting process. A "higher ratio" may result in a less than 1 square foot by 1 square foot replacement on the ground if higher quality habitat than that affected by the Project is obtained. Compliance with required mitigation ratios shall be verified by the USFWS and CDFG.

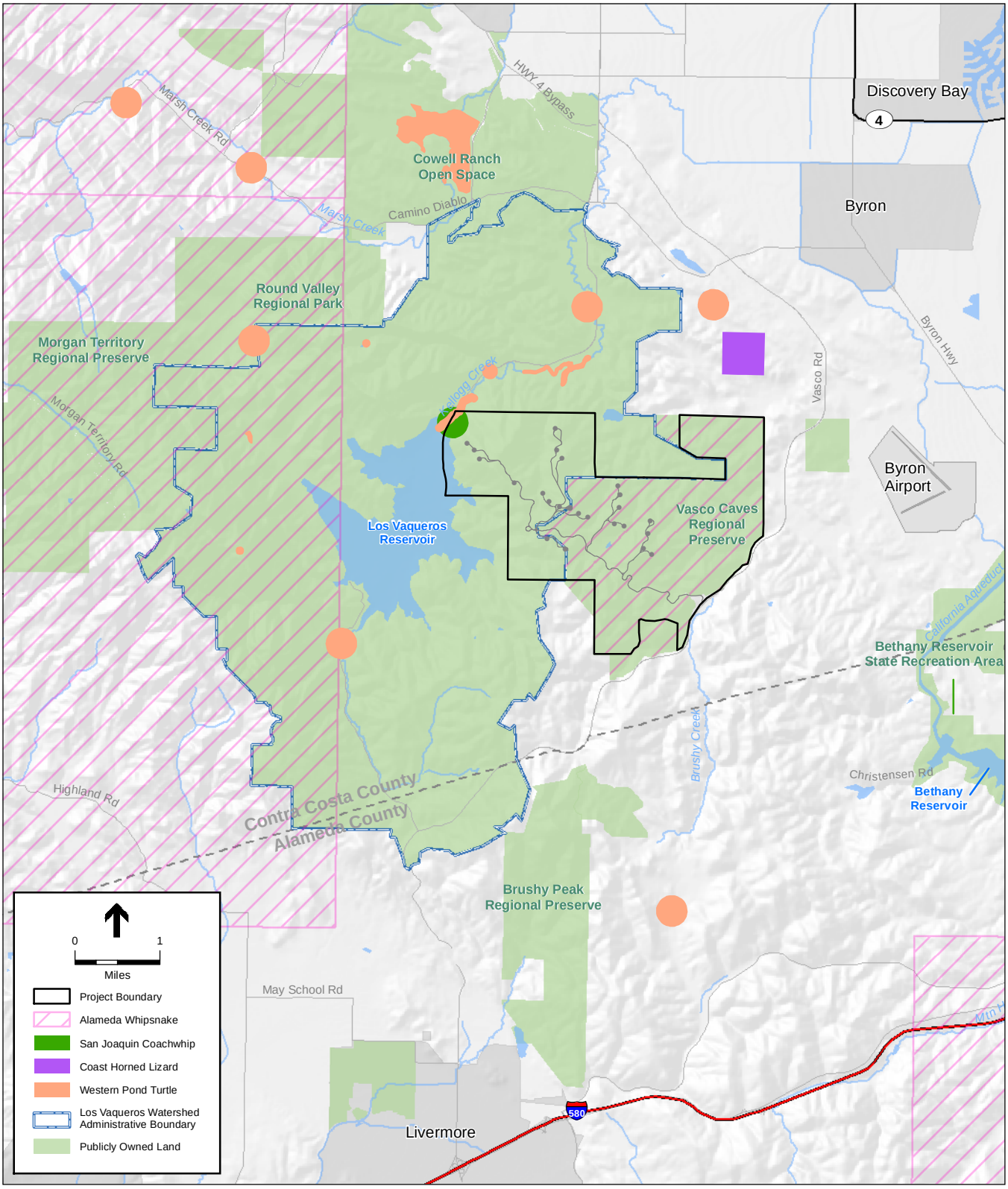
xi. Suitable compensation consists of: (1) purchasing and enhancing suitable habitat, converting it to a conservation easement, and conveying the easement to a managing agency or institution in perpetuity; (2) participating in a resource agency-approved mitigation bank that provides offset mitigation credits for loss of California tiger salamander and California red-legged frog habitat; or (3) a combination of both.

Significance of Impact after Mitigation: Less than Significant.

Impact 4.4-5: Project construction activities could affect listed and special-status reptiles such as Alameda whipsnake, western pond turtle, and San Joaquin coachwhip. (*Less-than-Significant Impact with Mitigation Incorporated*)

Project construction activities could affect listed and special-status reptile species including western pond turtle, Alameda whipsnake, and San Joaquin coachwhip (see Figure 4.4-9). These species are relatively uncommon and when present can be difficult to detect. Direct impacts include the potential for mortality or injury by equipment, and entrapment in open trenches and other excavations. Indirect impacts from grading and other construction activities could include harassment due to noise or vibration. Additionally, as discussed above, Project construction would result in temporary and permanent loss of upland habitat for these species.

[8] Concerning mitigation ratios: this mitigation measure provides for a minimum mitigation ratio of 1:1, however, determination of the final ratio as applied to the Project is expressly under the authority of the resource agencies with jurisdiction over the subject matter (i.e., the USFWS, CDFG) and has not been determined at this time. The County understands that resource agencies like USFWS and CDFG are concerned primarily with the quality of the habitat to be conserved. While mitigation ratios of 1:1 for temporary impacts and 3:1 for permanent impacts commonly are imposed, the actual ratios imposed for this Project will depend on site-specific, project-specific, impact-specific considerations for each of the affected species.



SOURCES: EBRPD, 2010; NextEra, 2010; CNDDB, 2010

Tres Vaqueros Windfarm Repowering Project . 209132.02

Figure 4.4-9

Special Status Reptile Occurrences in the Project Area

Western pond turtle is presumed present within the Project boundary. The species is present in stock ponds and drainages in the watershed and is expected to occur in Project area stock ponds, creeks, and drainages, and upland areas within approximately 0.23 mile (1,200 feet) of these aquatic features.

San Joaquin coachwhip is presumed present within the Project boundary. The Project is proposed within the coachwhip's known range, and the species is expected to occur sporadically throughout the Project area in open, dry areas with little or no tree cover. Suitable grassland habitat is known from the Project area.

Alameda whipsnake is present at Vasco Caves Regional Preserve (EBRPD, 2009a) in the Project area, and is presumed present in low densities within the Project area. This species is primarily associated with scrub vegetation, but will use nearby grassland habitats for foraging and dispersal. Core habitat for Alameda whipsnake habitat would not be affected, but there is a possibility that this species could be encountered in grasslands and crossing roadways during Project construction.

Implementation of General Biological Resources Mitigation Measures 1, 6–11, 15 and 17 along with the following specific mitigation, would reduce impacts on listed and special-status reptiles (i.e., Alameda whipsnake, western pond turtle, and San Joaquin coachwhip) to a less-than-significant level:

> **Mitigation Measure 4.4-5:** The Applicant shall perform pre-construction surveys, perform ongoing relocation of identified animals out of construction areas, and compensate for temporary and permanent habitat impacts as follows:
>
> i. No more than two weeks prior to commencement of surface-disturbing activities, concurrent with other pre-construction wildlife surveys, a County-, CDFG-, and USFWS-approved biologist shall survey for special-status reptile populations. If individuals of these species are found within the work site, they shall be relocated to suitable habitat 0.5 mile or farther from the work site.
>
> ii. Immediately prior to the fill of any aquatic habitat (e.g., during road-widening activities), an approved biologist shall conduct a survey for western pond turtle. If encountered, turtle(s) shall be relocated to suitable habitat 0.5 mile or farther from the work site.

Significance of Impact after Mitigation: Less than Significant.

Impact 4.4-6: Project construction would have temporary and permanent impacts on potential San Joaquin kit fox habitat. (*Less-than-Significant Impact with Mitigation Incorporated*)

Declines in regional San Joaquin kit fox populations have been evident since surveys initially were conducted in the 1960s and 1970s (Jones and Stokes, 1992). While recent distribution data

from CDFG, USFWS (unpublished GIS data), and the CNDDB suggest possible kit fox populations in the Black Diamond Mines area, near Brushy Peak, and along the eastern fringe of the Altamont Hills, the number of breeding foxes is not known from year to year (ESA, 2010). Kit fox are presumed present throughout the Project area.

Grasslands are the principal habitat used by San Joaquin kit foxes for denning, foraging, and dispersal. Grassland habitats would be the primary vegetation community affected by Project construction and operation, which would permanently impact 18 acres of annual grassland habitat and temporarily impact 93 acres of grassland habitat. Of the total acres of impacted grassland habitat, Project construction would result in 6 acres of disturbance within proposed or conveyed San Joaquin kit fox CDFG conservation easement areas (five acres of temporary disturbance and one acre of permanent disturbance). Grassland habitat within this area would be reclaimed/restored during Project implementation. The overall conservation value of this area would not be substantially reduced as a result of Project construction. The remaining acreage of Project disturbance would be outside the existing San Joaquin kit fox CDFG conservation easement, but within a suitable core habitat area (ECCCHC, 2007). In addition, large tracts of land surrounding Los Vaqueros Reservoir have been identified as some of the most important remaining routes for kit fox movement, providing a movement hub among these disperse areas (CCWD and Reclamation, 2010; ECCCHC, 2007, Figure 5-5). Consequently, development of the Project would affect San Joaquin kit fox denning, foraging, and dispersal habitat, including movement corridors.

Project-related construction activities are anticipated to take approximately 12 months and, even though construction would proceed on a rolling basis rather than throughout the entire site at once, such activities are likely to result in localized temporary habitat avoidance by foraging or dispersing kit fox.

Impacts to San Joaquin kit fox could occur during clearing and grubbing activities. Project construction would destroy small mammal burrows that provide a prey base and potential denning opportunities for the species. San Joaquin kit fox may enter the construction site in search of food and cover and as a result may be injured or killed by heavy equipment. Other direct effects could include fox being crushed or entombed in their dens, disruption of kit fox behavior during construction or operation of facilities, disturbance by noise or vibrations from the heavy equipment, injury or mortality from encounters with workers' or visitors' pets, and trash that may attract predators such as coyotes. Mitigation measures would be effective in reducing or eliminating direct mortality or injury to San Joaquin kit fox.

Increased human activity and vehicle travel would occur from the construction, which could disturb, injure, or kill kit fox. Collisions with vehicles could occur along the gravel access roads where vehicle frequency and speed is generally greatest. Additional effects to this species and its habitat could occur from the creation of secondary access routes (e.g., short-cuts) between the Project's approved access roads. Mitigation measures would be effective in reducing or eliminating direct mortality or injury to San Joaquin kit fox that could result from vehicle-related collisions.

Materials and equipment left behind following construction and maintenance activities may entrap or entangle San Joaquin kit that, when removed, could result in displacement or injury of the animal. Timely removal of all construction related equipment and materials from the construction site would eliminate or greatly reduce these adverse effects. Foxes also may take shelter in stored construction materials (e.g., pipes) and be killed, injured, or harassed when the materials are moved. Mitigation measures would be effective in reducing or eliminating direct mortality or injury to San Joaquin kit fox that could result from their entry into the active construction site.

Installation of the exclusionary fencing around the Project work areas could result in direct effects such as mortality, injury, or harassment of San Joaquin kit fox due to equipment operation, installation activities, and removal of suitable denning habitat. However, implementation of the mitigation measures would be effective in reducing or eliminating direct mortality or injury to San Joaquin kit fox.

Destruction of small mammal burrows, such as ground squirrel burrows, by the Project would mean fewer opportunities for kit fox to establish a den. However, these potential indirect effects are considered negligible because the Project is located mostly on hill slopes and ridges that contain a low density of burrows or none at all. Human activities also could cause indirect effects. Workers or site visitors could provide food in the form of trash and litter or water that could attract predators to the area. Mitigation measures would be effective in reducing or eliminating these indirect effects.

With implementation of General Biological Resources Mitigation Measures 1–2, 4–9, 11–13, and 15–17, along with Mitigation Measure 4.4-4 which requires restoring and compensating for annual grassland impacts, and the following species-specific mitigation, this impact would be less than significant. The following measures, which are intended to reduce direct and indirect project impacts on San Joaquin kit foxes, are derived from the *San Joaquin Kit Fox Survey Protocol for the Northern Range* (USFWS, 1999a) and the *Standardized Recommendations for Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance* (USFWS, 1999b).

Mitigation Measure 4.4-6a: To reduce impacts to San Joaquin kit fox and its habitat, the Applicant shall implement the following measures along construction work corridors, work sites, and staging areas:

i. Pre-construction surveys shall be conducted within 200 feet of work areas to identify potential San Joaquin kit fox dens or other refugia in and surrounding work areas. A qualified biologist shall conduct the survey for potential kit fox dens 14 to 30 days before construction begins. All identified potential dens shall be monitored for evidence of kit fox use by placing an inert tracking medium at den entrances and monitoring for at least 3 consecutive nights.

ii. If no activity is detected at these den sites, they shall be closed following guidance established in USFWS documents referenced above.

iii. If kit fox occupancy is determined at a given site, the construction manager shall be immediately informed that work shall be halted within 200 feet of the den and the USFWS and CDFG shall be contacted within 24 hours. Depending on the den type,

reasonable and prudent measures to avoid effects to kit foxes would include seasonal limitations on project construction at the site (i.e., restricting the construction period to avoid spring-summer pupping season), and/or establishing a construction exclusion zone around the identified site, or resurveying the den a week later to determine species presence or absence.

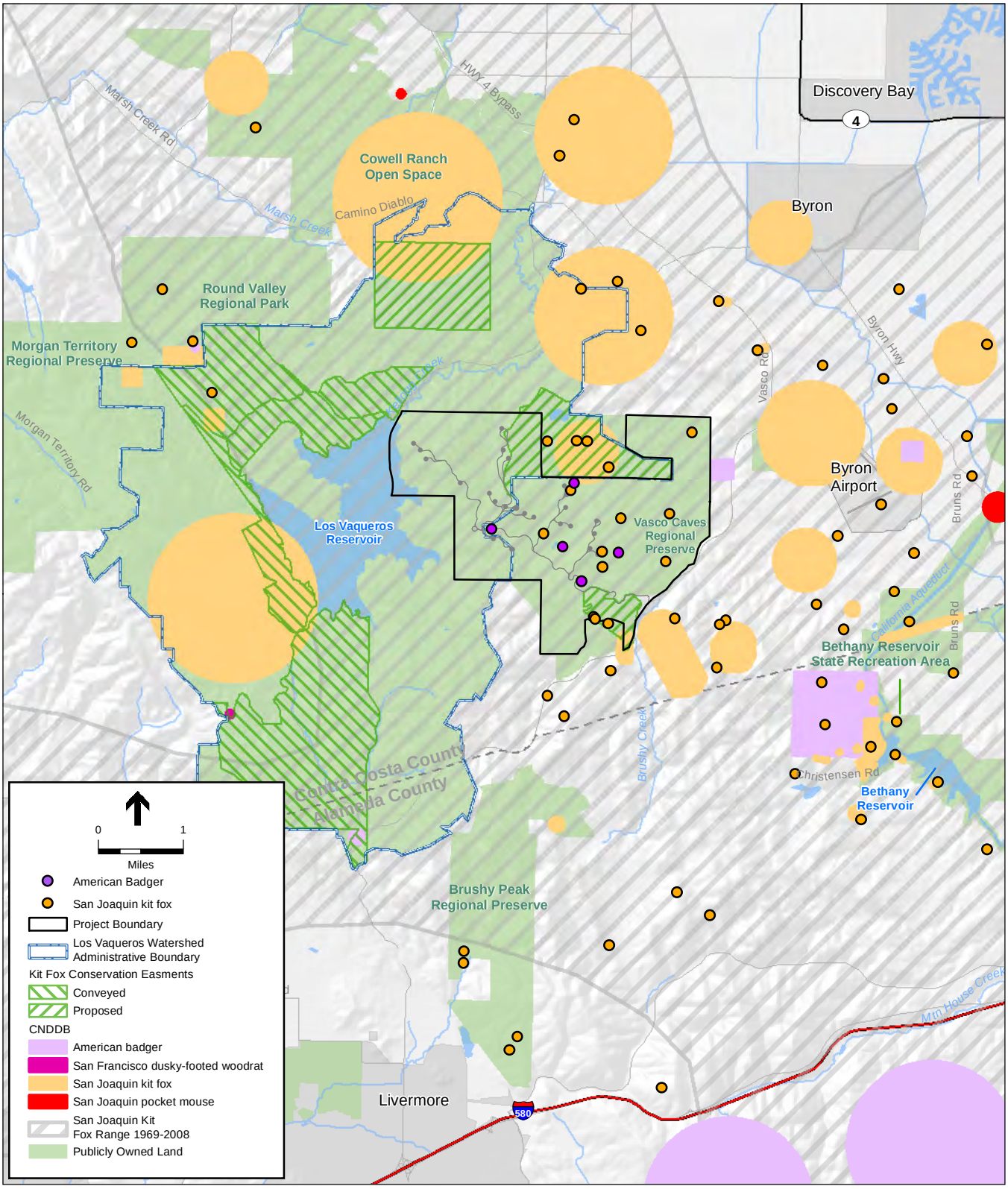
Mitigation Measure 4.4-6b: The Applicant shall compensate for impacts on San Joaquin kit fox grassland habitat by providing mitigation either through acquiring and dedicating lands into conservation easements or purchasing mitigation credits at compensation ratios that have been approved by USFWS and CDFG. The Applicant shall acquire San Joaquin kit fox mitigation lands based on anticipated impacts on up to approximately 111 acres of suitable habitat (18 acres of permanent impacts; 93 acres of temporary impacts). Mitigation ratios applied for impacts on San Joaquin kit fox habitat shall be 1:1 for temporary impacts and 1:1 for permanent impacts (at least one square foot of compensation for each square foot of net impact) **or a higher ratio if required by USFWS or CDFG** during the permitting process. A "higher ratio" may result in a less than 1 square foot by 1 square foot replacement on the ground if higher quality habitat than that affected by the Project is obtained. Compliance with required mitigation ratios shall be verified by the USFWS and CDFG.

Mitigation Measure 4.4-6c: To maintain under conservation easement the full acreage required for the original Los Vaqueros Reservoir Expansion Project, the Applicant shall replace any affected acreage of existing kit fox easement with an equivalent amount of acreage. The Applicant shall provide compensation for permanently affected conservation easement acreage at a 1:1 ratio **or a higher ratio if required by USFWS or CDFG** during the permitting process. Compensation for temporary impacts to lands within conservation easements shall be provided at a ratio of 1:1 **or a higher ratio if required by USFWS or CDFG**. A "higher ratio" may result in a less than 1 square foot by 1 square foot replacement on the ground if higher quality habitat than that affected by the Project is obtained. Compliance with required mitigation ratios shall be verified by the USFWS and CDFG. Temporarily impacted areas shall be reseeded with native species as described in the General Biological Resources Mitigation Measures.

Significance of Impact after Mitigation: Less than Significant.

Impact 4.4-7: Project construction could affect non-listed special-status mammal species (American badger and San Joaquin pocket mouse). (*Less-than-Significant Impact with Mitigation Incorporated*)

American badgers are a California Species of Special Concern that are found throughout the regional Project vicinity and are known to occur in low densities in the Project area (CDFG, 2010a; E&E, 2009) (see Figure 4.4-10). American badgers could be directly affected by vehicle and construction-related mortality at active construction sites anywhere within the Project area. It is anticipated that this species would be affected by construction-related noise, dust, or other disturbances. The Project would result in the permanent loss of 18 acres of grassland habitat and the temporary loss of 93 acres of grassland habitat. A total of 29 acres are planned for



SOURCES: EBRPD, 2010; NextEra, 2010; CNDDB, 2010; Ecology and Environment, 2009; ESA, 2008

Tres Vaqueros Windfarm Repowering Project . 209132.02

Figure 4.4-10

Special Status Mammal Occurrences in the Project Area

reclamation, and would result in a net gain of 11 acres of grassland habitat upon completion of Project construction and restoration.

San Joaquin pocket mouse is typically found in areas with fine-textured soils. This species was recorded in 2002 near Clifton Court Forebay, three miles east of the study area (CDFG, 2010a). Open grasslands within the Project area are thought to provide poor quality habitat, overall, for the San Joaquin pocket mouse because this species is typically found in areas with friable soils (CDFG, 2005). Not all of the grassland habitat that would be lost as a result of the Project would be suitable for or occupied by San Joaquin pocket mouse.

San Francisco dusky-footed woodrat is typically found in wooded or scrubby areas. Oregon Oak Woodland is present in the Project area behind the existing O&M Building, and scrub habitat is sparsely distributed in the Project area (E&E, 2009). Impacts to Oregon Oak Woodland are not anticipated. While grasslands can provide suitable habitat, this usually occurs when grasslands comprise an oak understory. Grasslands in the Project area are not part of an oak woodland understory, and are unlikely to provide habitat for woodrats. Therefore, this species would not be impacted by the Project.

American badger and San Joaquin pocket mouse would benefit from the grassland habitat restoration required for the Project. In addition to habitat restoration activities, implementation of General Biological Resources Mitigation Measures 1, 4–9, 11, 15, and 17, along with the following species-specific mitigation, would reduce impacts on American badger and San Joaquin pocket mouse to a less-than-significant level.

Mitigation Measure 4.4-7: The Applicant shall minimize impacts on American badger and San Joaquin pocket mouse by minimizing the Project footprint, performing pre-construction surveys, and passively or actively relocating animals.

i. Limiting the Project footprint to the smallest possible area shall minimize impacts on San Joaquin pocket mouse.

ii. Concurrent with other required winter/spring month pre-construction surveys (e.g., pre-construction surveys for kit fox and burrowing owl), a qualified biologist shall perform a survey to identify the presence of American badgers. If this species is not found, no further mitigation of potential impacts on American badgers shall be required.

iii. If American badgers are identified in the impact area, they shall be passively relocated using burrow exclusion (e.g., installing one-way doors on burrows) or similar CDFG-approved exclusion methods. Under some situations, it might be necessary to actively relocate American badgers (e.g., using live traps) to protect individuals from potentially harmful situations. Such relocation shall only be performed with advance CDFG coordination and concurrence.

iv. When unoccupied dens are encountered outside of work areas but within 100 feet of proposed activities, vacated dens shall be inspected to ensure they are empty and temporarily covered using plywood sheets or similar materials. Temporary covers shall be removed when Project construction is complete.

v. If, during construction, American badger occupancy is determined at a given site within the work area, the construction manager shall be informed and work halted immediately. Depending on the den type, reasonable and prudent measures to avoid harming American badgers shall be implemented and would include seasonal limitations on Project construction near the site (i.e., restricting the construction period to avoid spring-summer pupping season), and/or establishing a construction exclusion zone around the identified site, or resurveying the den a week later to determine species presence or absence.

Significance of Impact after Mitigation: Less than Significant.

Impact 4.4-8: Project construction activities could result in impacts on longhorn fairy shrimp and vernal pool fairy shrimp and their habitat. (*Less-than-Significant Impact with Mitigation Incorporated*)

Turbine strings and access roads are not sited in areas that support vernal pool habitat, rock outcrops or other features known to support vernal pool fairy shrimp or longhorn fairy shrimp (E&E, 2009); however, the F-string has not been surveyed for potential fairy shrimp habitat.[9] Occupied vernal pools at Vasco Caves Regional Preserve would not be affected by proposed activities, which occur greater than 500 feet from rock outcrops. Potentially occupied habitat along The F-string could be subject to direct or indirect disturbance as a result of Project construction in the vicinity, resulting in habitat destruction or degradation caused by the settling of dust and debris onto the surface of pools. Dust control measures would be implemented as part of standard construction BMPs. In addition to these standard BMPs, implementation of Hydrology and Water Quality Mitigation Measures 4.10-3a, 4.10-3b, and 4.10-5; Air Quality Mitigation Measure 4.3-3a; and the following mitigation would reduce impacts on potential habitat for listed fairy shrimp.

> **Mitigation Measure 4.4-8:** The Applicant shall perform a habitat assessment of the F-string to identify potential fairy shrimp habitat. If potential habitat is identified, then a 250-foot buffer shall be established around the potential habitat.

Significance of Impact after Mitigation: Less than Significant.

Impact 4.4-9: Project construction could affect populations of special-status plant species. (*Less-than-Significant Impact with Mitigation Incorporated*)

Special-status plants are plants that are legally protected under the FESA, CESA or California Native Plant Protection Act, or that otherwise are considered sensitive by federal, State or local

[9] The F-string alignment was identified late in the planning process in response to highlighted concerns over cultural resources and turbine micrositing at other planned locations. Therefore, the area was not identified for inclusion when preliminary surveys were performed.

resource conservation agencies and organizations, such as the CNPS, as indicated in its *Inventory of Rare and Endangered Plants of California.*

The Project could affect special-status plants and special-status plant habitat during construction of new access roads and turbine pads, road-widening efforts, grading activities, and trenching activities associated with installation of the new underground collection system. Demolition of the existing O&M Building and construction of its replacement would occur within the existing O&M Building footprint and graveled parking area, and therefore would not impact vegetation communities or potential special-status plant populations.

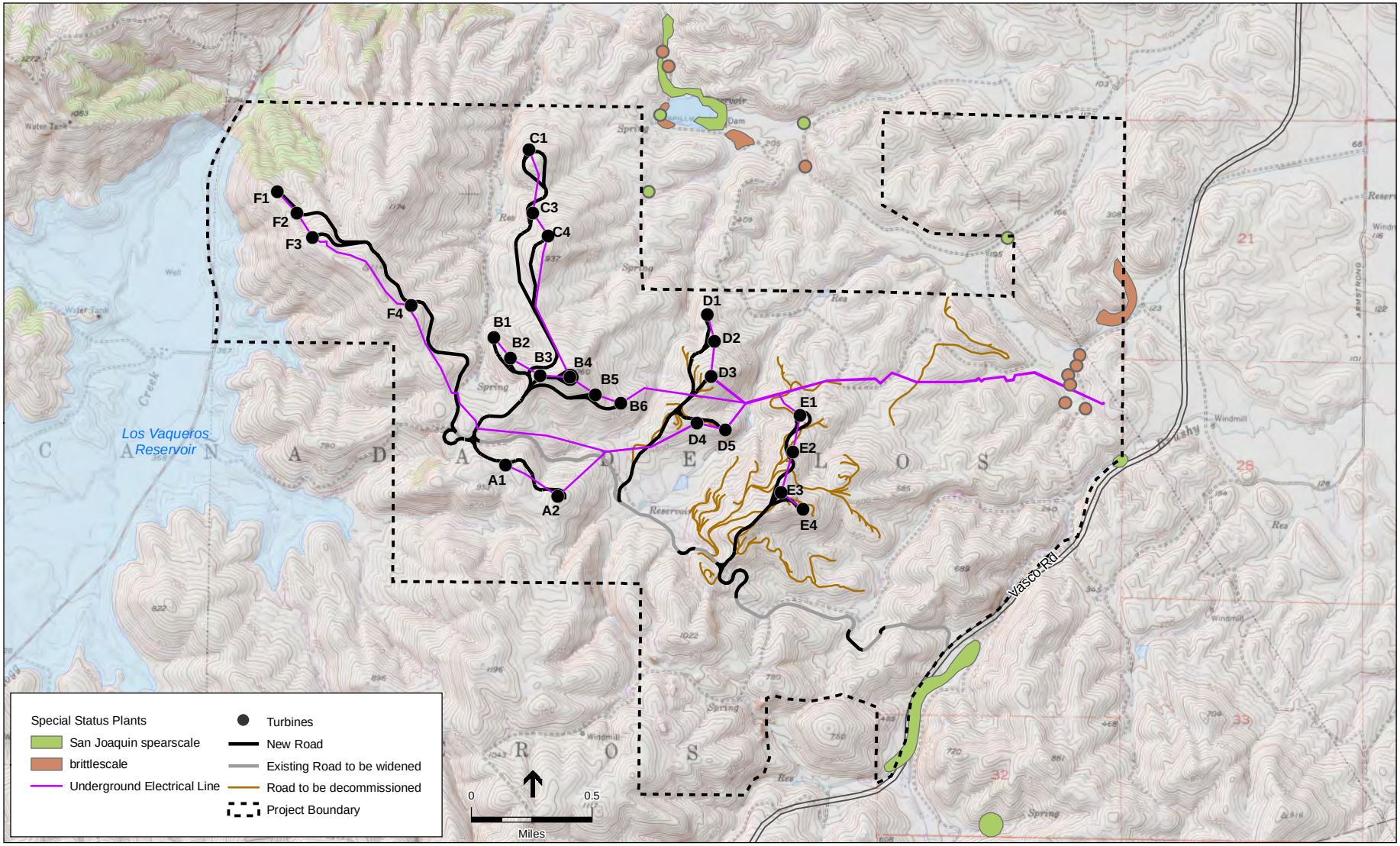
The Project area provides suitable habitat for 34 special-status plant species, including six species identified by CNPS as LU&S (E&E, 2009). Special-status plants known to exist historically or presently in the vicinity include, but are not limited to, large-flowered fiddleneck, alkali milk-vetch, big tarplant, round-leaved filaree, brittlescale, Mount Diablo manzanita, and Contra Costa goldfields (E&E, 2009).

E&E conducted a reconnaissance-level survey on May 26, 2008, to identify general vegetation communities, and botanical surveys were conducted on June 10, 2008, June 19, 2008, and July 12, 2008 (E&E, 2009). No federal or state-listed plants were observed in the study area (see Figure 4.4-11). One CRPR List 4 species (Crownscale (*Atriplex coronata*)), and six CNPS LU&S species (ball saltbush (*Atriplex fruiticulo*sa); fragrant cudweed (*Gnaphalium canescens* spp. *beneolens*); nodding needlegrass (*Nassella cernua*); hop tree (*Ptelea crenulata*); white hedge nettle (*Stachys albens*); and western vervain (*Verbena lasiostachys* var. *scabrida*)) were identified in the study area. Also identified in the study area were three blue elderberry shrubs (E&E, 2009). The Project would avoid the elderberry shrubs and areas where crownscale is identified to occur, as well as a mitigation area previously seeded with crownscale (E&E, 2009).

The Project would avoid impacts to identified occurrences of ball saltbush, fragrant cudweed, and hop tree, and would avoid alkali wetland and seasonal wetland habitat generally associated with remaining LU&S species (E&E, 2009). Therefore, impacts to crownscale and LU&S species are considered less than significant.

Some rare plants were difficult to detect during the survey period, including large-flowered fiddleneck, bent-flowered fiddleneck, round-leaved filaree, Mt. Diablo fairy lantern, recurved larkspur, diablo helianthella, diamond-petaled poppy, showy madia, chaparral ragwort, and caper-fruited tropidocarpum (E&E, 2009). The F-string and associated roadways and infrastructure have not been surveyed[10]; thus, floristic surveys along the F-string would be required prior to construction activities along that string. Additional surveys may be required under CDFG's *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and*

[10] The F-string alignment was identified late in the planning process in response to highlighted concerns over cultural resources and turbine micrositing at other planned locations. Therefore, the area was not identified for inclusion when preliminary surveys were performed.



SOURCES: EBRPD, 2010; NextEra, 2010; CNDDB, 2010; ESA, 2008

Tres Vaqueros Windfarm Repowering Project . 209132.02

Figure Figure 4.4-11

Special Status Plant Occurrences in the Project Area

Natural Communities (CDFG, 2009), which indicates that grassland communities with annual and short-lived perennial plants as major floristic components may require yearly surveys to accurately document baseline conditions for purposes of impact assessment.

Indirect impacts on special-status plants could occur as a result of non-native weeds or invasive plants becoming established within areas disturbed by Project activities and/or transported into the Project area on vehicles and construction equipment, respectively. This would be a significant impact.

With implementation of General Biological Resources Mitigation Measures 1 and 5–9 above, along with the following specific mitigation, impacts on special-status plants would be reduced to a less-than-significant level.

Mitigation Measure 4.4-9: To reduce the potential impact on special-status plant populations, the Applicant shall implement the following:

i. Floristic surveys shall be performed along the F-string in accordance with CDFG and USFWS rare plant survey guidelines, and the results of those surveys shall be made available to CDFG and the USFWS during the Project permitting process.

ii. In areas where floristic surveys have already been completed, surveys shall be supplemented to meet CDFG requirements (CDFG, 2009) which include appropriately timed and numbered survey visits[11].

iii. Construction activities shall avoid identified crownscale, ball saltbush, fragrant cudweed, hop tree, and elderberry shrubs that occur on the Project area and Mitigation Measure 4.4-9.v shall also apply to these species; Mitigation Measure 4.4-9.vi, shall also apply to crownscale and elderberry shrubs.

iv. Exclusion fencing and/or silt fencing shall be installed around special-status plant populations with as large a buffer as possible to minimize the potential for direct and indirect impacts, such as fugitive dust and accidental intrusion into sensitive areas.

v. Where avoidance is not feasible, the Applicant shall compensate for the loss of special-status plants by hiring a qualified ecologist to develop and implement a restoration and mitigation plan according to CDFG guidelines and in coordination with CDFG and USFWS. At a minimum, the plan shall include collection of reproductive structures from affected plants, a full description of microhabitat conditions necessary for each affected species, seed germination requirements, restoration techniques for temporarily disturbed occurrences, assessments of potential transplant and enhancement sites, a timetable for implementation, success and performance criteria, a monitoring program, and measures to ensure long-term sustainability.

[11] Surveys should be conducted at the time of year when species are both evident and identifiable, usually during flowering or fruiting, with visits spaced throughout the growing season. Many times this involves multiple visits to the same site (e.g., in early, mid, and late-season for flowering plants) to capture the floristic diversity at a level necessary to determine if special-status plants are present (CDFG, 2009).

vi. The Applicant shall develop and implement a Noxious Weed and Invasive Plant Control Plan consistent with standard Best Management Practices (see for example: Department of Transportation, State of California (2003); Storm Water Quality Handbooks; and Project Planning and Design Guide Construction Site Best Management Practices Manual). The plan shall be subject to review and approval by Contra Costa County and shall, at a minimum, address any required cleaning of construction vehicles to minimize spread of noxious weeds and invasive plants.

Significance of Impact after Mitigation: Less than Significant.

---

b) Would the Project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

Impact 4.4-10: Project construction activities could result in impacts on Sensitive Natural Communities, including Creeping Rye Grass Turfs. (*Less-than-Significant Impact with Mitigation Incorporated*)

Oregon White Oak Woodland, Purple Needlegrass Grassland, and Creeping Rye Grass Turfs are designated by CDFG as Sensitive Natural Communities (CDFG, 2010ab) and have been identified in the Project area (E&E, 2009). Oregon White Oak Woodland occurs near the existing O&M Building, but impacts are not anticipated during construction and operation activities. Purple Needlegrass Grassland and Creeping Rye Grass Turfs have been identified at 14 locations in the Project area. The Project would avoid impacts on identified Purple Needlegrass Grassland occurrences. Six locations of Creeping Rye Grass Turfs are mapped in existing or proposed roadways (E&E, 2009). The F-string has not been surveyed, and additional occurrences of Purple Needlegrass Grassland and Creeping Rye Grass Turfs may occur in the Project area and would be identified during floristic surveys required as part of Mitigation Measure 4.4-9.i, above.

Creeping Rye Grass Turfs and Purple Needlegrass Grassland have the potential to be impacted during road construction, road-widening, reclamation, grading activities, trenching for new underground collection cables, and increased construction traffic on access roads throughout the Project area.

Implementation of General Biological Resources Mitigation Measures 1 and 5–9, along with the following specific mitigation, would reduce Project impacts on Sensitive Natural Communities to a less-than-significant level.

Mitigation Measure 4.4-10: To reduce impacts on Sensitive Natural Communities, the Applicant shall implement the following:

i. Based on the documented distribution of Sensitive Natural Communities, Project design shall avoid and minimize impacts on these areas to the extent feasible

ii. Where Sensitive Natural Communities cannot be avoided by Project design (e.g., on road alignments that must follow topographic contours or traverse low-lying areas), the Applicant shall provide on-site restoration and enhancement at a 1:1 ratio, **or a higher ratio if required by CDFG**, to redress temporary and permanent impacts. A "higher ratio" may result in a less than 1 square foot by 1 square foot replacement on the ground if higher quality habitat than that affected by the Project is obtained.

iii. Upon project completion, the Applicant shall seed disturbed Creeping Rye Grass Turfs and Purple Needlegrass Grassland areas with native Creeping Rye Grass and Purple Needlegrass Grassland seed collected within or in the vicinity of impacts. Additional seed could be used to supplement seed mixes, but seed shall be from locally collected (within the ecoregion) source material and shall be appropriately selected for site conditions.

Significance of Impact after Mitigation: Less than Significant.

---

c) Would the Project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

Impact 4.4-11: Project construction could affect potentially jurisdictional wetlands or waters, and streambeds and banks. (*Less-than-Significant Impact with Mitigation Incorporated*)

Wetlands in the Project area are generally characterized as cismontane alkali marsh, alkali seeps, seasonal creeks and associated wetlands, seasonal and perennial stock ponds, and a few scattered individual riparian trees (E&E, 2009). A preliminary jurisdictional delineation and a revised preliminary jurisdictional delineation performed by E&E (2010a; 2011), identified two seasonal herbaceous wetlands, eight intermittent streams, 16 ephemeral drainages, and two stock ponds in the wetland survey area (see Table 4.4-3). The F-string was included in the wetland survey area for the revised preliminary jurisdictional delineation (E&E, 2011). Among these areas, two ephemeral drainages would be crossed by Project infrastructure and affected by the Project (E&E, 2011). Seasonal herbaceous wetlands and stock ponds would not be traversed or otherwise impacted.

Potentially jurisdictional and non-jurisdictional waters of the U.S. could be temporarily or permanently affected by Project activities. To accommodate the large turning radii and heavy weight of construction equipment, a portion of the entrance road would be permanently widened to a width of 32 feet while other existing access roads would be temporarily widened to a width of 32 feet. To collect and transmit the energy produced by the turbines, approximately eight miles of underground electrical collection systems would be installed. Table 4.4-3 provides the potential wetland impact acreages associated with Project construction.

Permanent impacts to Project area wetlands would total 0.02 acre. Permanent impacts would result from entrance road improvements, impacting 0.01 acre of intermittent stream and 0.01 acre

TABLE 4.4-3
POTENTIAL IMPACTS ON POTENTIALLY JURISDICTIONAL WATERS

	Total Wetlands in the Project Area (acres)	Wetlands Directly Impacted by the Project (acres)	
		Temporary	Permanent
Potential Jurisdictional Waters			
Ephemeral Drainages	0.7	0.03	0.01
Intermittent Drainages	3.6	0.08	0.01
Seasonal Herbaceous Wetlands	3.7	0	0
Stock Ponds	0.37	0	0
Total	***8.4***	***0.1***	***0.02***

SOURCE: E&E, unpublished GIS data; E&E, 2011, 2010b

of ephemeral drainage. Temporary impacts to Project area wetlands would total 0.1 acre. Temporary impacts would result from entrance road improvements, other road improvements, and installation of electrical collection systems. Entrance road improvements would impact 0.03 acre of intermittent stream and 0.01 acre of ephemeral drainages; other road improvements would impact less than 0.01 acre of intermittent stream; electrical collection systems would impact 0.05 acre of intermittent stream and 0.02 acre of ephemeral drainage.

Additionally, road construction, road widening, reclamation, grading activities, and increased construction traffic on access roads have the potential to result in indirect impacts to any Project area wetlands, resulting from the unplanned and accidental release of soil and other fill material.

Before disturbing any jurisdictional wetland features, the Applicant would obtain all required permit approvals from USACE, CDFG, RWQCB, and all other agencies with permitting responsibilities for construction activities within jurisdictional waters.

Implementation of General Biological Resources Mitigation Measures 1, 3, 5–9, and 14, along with the following specific mitigation, would reduce Project impacts on potentially jurisdictional wetlands or waters, and streambeds and banks, to a less-than-significant level.

Mitigation Measure 4.4-11: To reduce impacts on jurisdictional wetlands or waters, and streambeds and banks, the Applicant shall implement the following:

i. Consistent with USACE, CDFG, and RWQCB, permit requirements, the final Project design shall avoid and minimize the fill of wetlands and other waters to the greatest practicable extent.

ii. Areas that are avoided shall be subject to current Best Management Practices (BMPs) under the County's most recent General National Pollutant Discharge Elimination System Permit (NPDES), including implementation of an effective Stormwater Pollution Prevention Program (SWPPP), presence of an on-site spill kit, and

installation of silt fences along/around construction areas to inhibit soil movement into wetland features.

iii. Where jurisdictional wetlands and other waters cannot be avoided, the following measures shall apply:

a. Construction activities in drainage channel crossings shall be limited to low-flow periods: approximately April 15 to October 15, unless otherwise authorized by CDFG, RWQCB and/or the USACE. Excavation and grading activities performed during the wet season (October 15 to April 30) shall be conducted in accordance with the conditions of Mitigation Measure 4.10-3a and 4.10-3b. For channels or wetlands for which temporary soil removal is necessary, the top layer of the drainage or wetland bottom shall be stockpiled and preserved during construction. After Project construction, the stockpiled material shall be placed back into the drainage or wetland feature to return the beds to approximately their original composition.

iv. To offset temporary and permanent impacts that occur as a result of the Project, restoration and compensatory mitigation shall be provided through the following mechanisms:

a. The square footage of impacted jurisdictional waters shall be determined based on the USACE-approved wetland delineation and during USACE permitting. The Applicant shall then identify lands to provide for wetland preservation, restoration (enhancement) or creation at a 1:1 ratio, **or a ratio acceptable to USACE and/or RWQCB**. On-site mitigation is preferable and shall be implemented if such opportunities are available. Development rights to the on-site mitigation land shall be grant deeded to the County or another acceptable public agency.

b. If the Applicant restores and/or creates wetlands on site, the Applicant shall prepare a wetland mitigation and monitoring plan. The plan, developed by a qualified biologist in coordination with USACE, CDFG, and/or RWQCB, shall detail mitigation and monitoring obligations for temporary and permanent impacts to wetlands and other waters as a result of construction activities. The plan shall quantify the total acreage lost and describe the following: mitigation ratios for lost habitat; annual success criteria; mitigation sites; monitoring and reporting requirements; and site-specific plans to compensate for wetland losses resulting from the Project.

c. The Applicant shall submit the wetland mitigation and monitoring plan to the appropriate regulatory agencies for approval (e.g., USACE, CDFG, and/or RWQCB).

Significance of Impact after Mitigation: Less than Significant.

d) Would the Project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

Impact 4.4-12: Project construction activities could temporarily affect active breeding bird nest sites. (*Less-than-Significant Impact with Mitigation Incorporated*)

Construction activities associated with the Project, including grading and removal of grassland and other potential nesting habitat during the breeding season, could result in direct mortality of nesting birds. Indirect impacts from construction noise, vibrations, and increased human presence could startle or displace adult birds, causing nest abandonment, death of young, or loss of reproductive potential at active nests near the Project area. Generally, more intensive construction activities can impact breeding birds within a larger sphere of influence. Activities that have a short duration can still be loud and potentially disruptive to local nesting birds.

Ground-clearing activities could disturb ground-nesting birds that occur in or near grassland areas, or disrupt surface soils on or in which ground nests are made. Some ground disturbances would be temporary, but permanent habitat loss would occur in other areas.

To reduce impacts on nesting birds to a less-than-significant level, General Biological Resources Mitigation Measures 1, 4–9, and 17, and the following specific mitigation measure shall be implemented:

Mitigation Measure 4.4-12: To reduce the impact on active raptor nests and nests of other special-status birds, the Applicant shall implement the following:

i. To the greatest extent practicable, construction activities shall not take place during the nesting season (February 1 through August 31). If construction activities avoid the nesting season, then no further mitigation is required.

ii. If seasonal avoidance is not possible and active construction work (i.e., ground clearing and grading, including removal of trees or shrubs) is scheduled to take place during the nesting season, then the following measures shall be implemented:

   a. No more than 30 days prior to commencement of construction, a qualified wildlife biologist shall conduct preconstruction surveys of all potential nesting habitat within 500 feet of work areas.

   b. If pre-construction surveys indicate that nests are inactive or potential habitat is unoccupied, no further mitigation shall be required in this regard.

   c. If active nests are found during preconstruction surveys, no-disturbance buffer zones shall be established around active nests. The buffer zones shall not be encroached upon during the breeding season or until it is determined by a qualified wildlife biologist that all young have fledged. Typical buffers include 500 feet for raptors and 250 feet for other nesting birds (e.g., shorebirds, waterfowl, and passerine birds). The size of the buffer zones and types of construction activities allowed in these areas, if any, could be further modified during construction in coordination with CDFG and shall be based on existing noise and human disturbance levels in the Project area.

d. If construction commences during the nonbreeding season and continues into the breeding season, most songbirds that choose to nest next to active construction sites are generally considered to acclimate to construction activities. However, since nest abandonment may occur in some instances, nesting site monitoring shall be conducted by a qualified wildlife biologist and "no-disturbance" buffer zones shall be established in coordination with CDFG around active nests to prevent impacts on nesting birds and their young.

Significance of Impact after Mitigation: Less than Significant.

Impact 4.4-13: Project construction and operation would result in direct and indirect impacts on common wildlife species. (*Less-than-Significant Impact*)

Road Mortality

Construction and operation of the Project would result in temporarily increased traffic and a higher risk of road mortality for wildlife species in the Project area. However, the existing traffic volume on Vasco Road is high and Project-related traffic would be subject to established speed limits. Project traffic would be traveling primarily in daylight hours and may also reduce the general speed of traffic on Vasco Road.

Project traffic may pose a higher risk of road mortality on private, Project area roads. However, Project-related traffic on these roads would also be limited primarily to daylight hours, and would be subject to a maximum 20-mph speed limit. Workers would also receive species awareness training, and be prohibited from off-road travel. Winter rainy weather is a period when amphibians move through the landscape (more frequently at night), but this also commonly postpones construction activities due to concerns about safe vehicular travel on unpaved roads, especially for heavy construction equipment.

Considered together with the implementation of General Biological Resources Mitigation Measure 15 and specific mitigation for the protection of special-status species, increased traffic volumes are not likely to increase the risk of road mortality. Adhering to speed limits, the likelihood for Project traffic to reduce overall traffic speeds on Vasco Road, and the reduced likelihood for traffic on private roads during rainy periods would adequately reduce potential mortality risks to wildlife species. In addition, night construction is not anticipated to occur, which further reduces the potential for road-related mortality.

Noise Disturbance

A search of the scientific literature base found no wildlife studies that evaluate potential noise-related effects of wind energy facility construction or operation on common wildlife species present in the APWRA (e.g., California ground squirrels and Botta's pocket gopher, among others). However, based on Project's overall noise reduction as a result of the decrease in the number of wind turbines present over the Project area, noise impacts to terrestrial wildlife would be reduced during operations, with temporary noise disturbances during construction.

Habitat Impacts

Common wildlife species would experience temporary and permanent losses of upland habitat as a result of Project construction and operation, as previously described. After reclaimed areas are restored to functioning grasslands, the Project would result in a net increase of 11 acres of grassland habitat compared to baseline conditions.

Mitigation: None required.

---

e) Would the Project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

Impact 4.4-14: Project construction may impact trees that are protected under Contra Costa County's Tree Protection and Preservation Ordinance. (*Less-than-Significant Impact*)

Mitigation measures described in this section provide protection for Contra Costa County's biological resources as outlined by the General Plan and described in Section 4.4.2.2 above. One stand of woodlands was identified in the Project area as a riparian canopy of Oregon White Oak Woodland growing in upper portions of a drainage behind the existing O&M building (E&E, 2009). However, the Project would not impact this woodland. Additionally, none of the trees found in the Project area qualify for protection under the Contra Costa County Heritage Tree ordinance due to size and distribution (E&E, 2009). Scattered individual riparian trees may be impacted at crossings during road grading and widening activities, or during trenching for electrical collection systems, but would be protected by Mitigation Measure 4.4-12 and by permits required to construct within jurisdictional wetlands.

Mitigation: None required.

4.5 Cultural Resources

4.5.1 Introduction

This section analyzes the Project's relationship to cultural resources. Discussed herein are the physical and regulatory setting; the baseline for determining environmental impacts; potential impacts associated with construction, operation, maintenance, and decommissioning of the Project; and mitigation measures to reduce or avoid environmental impacts determined to be potentially significant. Cultural resources include historic-period architectural resources, archaeological resources, paleontological resources[1], and human remains.

4.5.2 Setting

4.5.2.1 Regional and Local Setting

Section 3.1.2, *Location*, provides general information about the regional and local setting. This section (4.5.2.1) provides setting information specific to cultural resources in the Project area.

Paleontological Setting

Paleontology is a multidisciplinary science that combines elements of geology, biology, chemistry, and physics in an effort to understand the history of life on earth. Paleontological resources, or fossils, are the remains, imprints, or traces of once-living organisms preserved in rocks and sediments. These include mineralized, partially mineralized, or unmineralized bones and teeth, soft tissues, shells, wood, leaf impressions, footprints, burrows, and microscopic remains. Fossils are considered nonrenewable resources because the organisms they represent no longer exist.

Paleontological Assessment Standards

The Society of Vertebrate Paleontology (SVP) has established guidelines for the identification, assessment, and mitigation of adverse impacts on nonrenewable paleontological resources (SVP, 1995; 1996). Most practicing paleontologists in the nation adhere closely to the SVP's assessment, mitigation, and monitoring requirements as outlined in these guidelines, which were approved through a consensus of professional paleontologists. The SVP (1995) outlines criteria for screening the paleontological potential[2] of rock units and established assessment and mitigation procedures tailored to such potential. Table 4.5-1 lists the criteria for high-potential, undetermined, and low-potential rock units.

1 Paleontology is the science of the forms of life existing in prehistoric times, as represented by fossilized animals and plants.

2 Paleontological potential refers to the likelihood that a rock unit will yield a unique or significant paleontological resource.

TABLE 4.5-1
PALEONTOLOGICAL POTENTIAL CRITERIA

Paleontological Potential Descrip	tion
High	Geologic units from which vertebrate or significant invertebrate or plant fossils have been recovered. Only invertebrate fossils that provide new information on existing flora or fauna or on the age of a rock unit would be considered significant.
Undetermined	Geologic units for which little to no information is available.
Low	Geologic units that are not known to have produced a substantial body of significant paleontological material.

SOURCE: SVP, 1995

Paleontological Resource Potential

On a regional scale, fossilized plants, animals and microorganisms occur primarily in marine and non-marine (fluvial) sedimentary rock. The potential to preserve fossils in a particular rock formation depends on the depositional environment in which it was formed. For example, destructive geologic processes such as landslides and volcanic eruptions are unlikely to preserve the remains of organisms while gently flowing currents that deposit mud and silt may often bury once-living biota without destroying or damaging diagnostic features. Thus, the most valuable geologic units from a paleontological perspective are generally reflective of relic environments such as marine deposits, inland embayments, deltas, basins, floodplains, inland lakes and alluvial fans. The paleontological sensitivity of a particular area is wholly dependent on the nature and origin of the underlying rock-type (or formation).

The Project area is underlain by rocks of the Great Valley Sequence – a thick package of Cretaceous (65 to 144 million years ago) marine and non-marine rocks composed of massive beds of sandstone interbedded with siltstone and shale (USGS, 1994). Over the Project area, the rock type is primarily mapped as sandstone, with shale and siltstone increasing in occurrence in southerly portions of the area. As discussed in the Chapter 4.7, these rocks have been given various nomenclatures including the Panoche Formation, Units B and C of the Great Valley Sequence, the Marliffe Shale of Payne, and the Joaquin Ridge Sandstone Member of Goudkoff. Characteristic of most areas of the Diablo Range, rocks in the Project area have been intensely folded, deformed, and juxtaposed against each other by relict faults and continuing tectonics. Lining the valley floors are narrow deposits of Holocene (less than 10,000 years ago) and late Pleistocene alluvium (125 to 10 thousand years ago), composed of loose gravels, sands, and silts that have been shed off of the surrounding uplands.

Regionally, the University of California Museum of Paleontology (UCMP) database lists 2,395 fossil localities in Contra Costa County, of which 270 are vertebrates. In Alameda County, there are 394 fossil localities, of which 96 are vertebrates. Several fossil localities occur along Vasco Road, Marsh Creek, Byron Creek and numerous other unnamed localities (UCMP, 2010).

However, these localities are within Pleistocene- and Tertiary-age (10,000 to 65 million years ago) sedimentary rocks – not the Cretaceous Great Valley Sequence which underlies the Project disturbance areas. Five vertebrate fossil localities in Alameda and Contra Costa Counties have been found within rock that is similarly early-Cretaceous in age, but does not occur near the Project area (UCMP, 2010). One of those fossils, however, was discovered in the Panoche Formation which is the same rock unit that underlies portions of the Project. The fossil was found in the delta region east of the Project area, yielding the tooth of a Cretaceous-age dinosaur. The Panoche Formation is also known to have yielded numerous invertebrate fossil localities, including one along Marsh Creek.

The Holocene-age deposits (less than 10,000 years old) that line the valley floor are geologically immature and are unlikely to have fossilized the remains of organisms (fossilization processes take place over millions of years). The UCMP database has no record of Holocene-age deposits yielding a vertebrate fossil within Contra Costa County (UCMP, 2010).

Because there is evidence that a vertebrate fossil and numerous invertebrate fossils were recovered from the Panoche Formation, the bedrock underlying the Project area is considered as having *high paleontological potential*, per Table 4.5-1.

Geoarchaeological Review

In many places, the interface between older land surfaces and alluvial fans are marked by a well-developed buried soil profile, or paleosol. Paleosols preserve the composition and character of the earth's surface prior to subsequent sediment deposition; thus, paleosols have the potential to preserve archeological resources if the area was occupied or settled by humans (Meyer and Rosenthal, 2007). Because human populations have grown since the arrival of the area's first inhabitants, younger paleosols (late Holocene) are more likely to yield archeological resources than older paleosols (early Holocene or Pleistocene).

The Project area is mapped as Great Valley Complex sedimentary bedrock with bands of Holocene and Pleistocene Alluvium within low-lying drainages (USGS, 1994). Pleistocene Alluvium has a low potential for containing deeply-buried archaeological deposits (Meyer and Rosenthal, 2007).

Prehistoric Background

Categorizing the prehistoric period into broad cultural stages allows researchers to describe a broad range of archaeological resources with similar cultural patterns and components during a given timeframe, thereby creating a regional chronology. This section provides a brief discussion of the chronology for the Project area.

A framework for the interpretation of the San Francisco Bay Area is provided by Milliken et al. (2007), who have divided human history in the San Francisco Bay Area into four broad periods: the *Paleoindian Period* (11,500 to 8000 B.C.), the *Early Period* (8000 to 500 B.C.), the *Middle Period* (500 B.C. to A.D. 1050), and the *Late Period* (A.D. 1050 to 1550). Economic patterns, stylistic

aspects, and regional phases further subdivide cultural patterns into shorter phases. This scheme uses economic and technological types, socio-politics, trade networks, population density, and variations of artifact types to differentiate between cultural periods.

The *Paleoindian Period* (11,500 to 8000 B.C.) was characterized by big-game hunters occupying broad geographic areas. Evidence of human habitation during *Paleoindian Period* has not yet been discovered in the San Francisco Bay Area. During the *Early Holocene* (*Lower Archaic*; 8000 to 3500 B.C.), geographic mobility continued from the *Paleoindian Period* and is characterized by the millingslab and handstone as well as large wide-stemmed and leaf-shaped projectile points. The first cut shell beads and the mortar and pestle are first documented in burials during the *Early Period* (*Middle Archaic*; 3500 to 500 B.C.), indicating the beginning of a shift to sedentism. During the *Middle Period*, which includes the *Lower Middle Period* (*Initial Upper Archaic*; 500 B.C. to A.D. 430), and *Upper Middle Period* (*Late Upper Archaic*; A.D. 430 to 1050), geographic mobility may have continued, although groups began to establish longer-term base camps in localities from which a more diverse range of resources could be exploited. The first rich black middens are recorded from this period. The addition of milling tools, obsidian and chert concave-base projectile points, and the occurrence of sites in a wider range of environments suggest that the economic base was more diverse. By the *Upper Middle Period*, mobility was being replaced by the development of numerous small villages. Around A.D. 430 a "dramatic cultural disruption" occurred evidenced by the sudden collapse of the *Olivella* saucer bead trade network. During the *Initial Late Period* (*Lower Emergent*; A.D. 1050 to 1550), social complexity developed toward lifeways of large, central villages with resident political leaders and specialized activity sites. Artifacts associated with the period include the bow and arrow, small corner-notched projectile points, and a diversity of beads and ornaments.

Ethnographic and Historic Background

The following background ethnographic and historic information is adapted from *Rancho to Reservoir: History and Archaeology of the Los Vaqueros Watershed, California* (Ziesing, 1997). This comprehensive summary is available at the Contra Costa Water District's website. The report is a synthesis of several years of historical and archaeological research and oral interviews conducted for the Los Vaqueros Reservoir and surrounding area that includes Catherine A. Callaghan's ethnolinguistic study completed for *Los Vaqueros: A Cultural Resource Study* (Fredrickson, 1982), *Native American History of the Los Vaqueros Project Area* (Davis et al., 1994), and *The Los Vaqueros Watershed: A Working History* (Praetzellis et al., 1996).

The Project area is located at the boundary of four different ethnolinguistic groups that lived in the region before European contact: the Bay Miwok, the Northern Valley Yokuts, the Ohlone, and the Plains Miwok. No published ethnographic information pertaining to the Project area is available; however an overview of lifeways can be assembled from information about better-known groups.

Research indicates that *Volvons* – a group of speakers of the Bay Miwok language who had their major villages along Marsh Creek – or *Saoams* – a group of speakers of the Costanoan language

whose villages were in the Brushy Peak area east of Livermore inhabited the Project area by 300 years ago. As ethnohistorian Randall Milliken points out, the precise boundary between these two groups cannot be drawn because of their rapid and total absorption into the mission system; those groups virtually disappeared from the landscape between 1803 and 1810 and none of them or their descendants ever were interviewed by historians. While individual Native Americans lived in the region after that time – with immediate family or as part of a ranch workforce – traditional group living in the area ended nearly 200 years ago.

Because there are no ethnographic accounts of people from the Project area, only general descriptions can be made regarding their lifeways. People lived in multi-family tribelets (also known as village communities) of about 200 people each, and made their living hunting and gathering food and other resources from their lands. They also kept in regular contact with neighbors, trading for items not available in their home territory, and exchanging marriage partners and ideas as well as goods. Although the climate would have been roughly similar to that of today, the area was probably more wooded before Spanish, Mexican, and American cattle-grazing and woodcutting.

Following several explorations into the region beginning in 1771, local Native American tribes of the Bay Area "were conquered and brought to Mission San Francisco" (Milliken, 1986). *Saoams* from eastern Livermore Valley and possibly the headwaters of Kellogg Creek to the west of the Project area arrived at Mission San Jose in 1803. Although the first *Volvon* individual was also baptized at Mission San Jose in 1803, it was not until 1805 that groups of *Volvon* first appeared at both Mission San Francisco and Mission San Jose; all but two *Volvon* baptisms occurred before 1807. It was also reported that between 1803 and 1806 the *Volvon* were one of the East Bay tribes that actively resisted the Spanish, prompting retaliatory military forays that ended the resistance by forcefully rounding up the *Volvons* and bringing them to the missions.

When the missions closed, the Project area became part of Francisco Alviso, Antonio Hiquera, and Manuel Miranda's Rancho Canada de los Vaqueros. In 1847, Alviso and Miranda sold their interests in the land to Jose Noriega and Robert Livermore, who also owned Rancho Los Positas to the south. Following years of claims, suits, and sales the property was divided into numerous ranches that were leased to tenants for stock raising. Most ranchers were immigrants from France, Italy, and Portugal (Bright, 1998; Hoover et al., 2002).

Summary of Background Research

A cultural resources study was completed for the Project that included background research, contact with Native Americans, and a surface survey (Koenig, 2010). A records search was conducted at the Northwest Information Center (NWIC) of the California Historical Resources Information System at Sonoma State University on May 14, 2009 (File No. 08-1383). The purpose of the records search was to: (1) determine whether known cultural resources have been recorded within or adjacent to the Project area; (2) assess the likelihood for unrecorded cultural resources to be present based on historical references and the distribution of nearby sites; and

(3) develop a context for the identification and preliminary evaluation of cultural resources. The records search consisted of an examination of the following documents:

- **NWIC base maps** (USGS Byron Hot Springs 7.5-minute topographic maps), to identify recorded archaeological sites and studies within a ½-mile radius of the Project.
- **NWIC base maps** (USGS Byron Hot Springs 7.5-minute topographic maps), to identify recorded historic-period resources of the built environment (building, structures, and objects) within a ¼-mile radius of the Project.
- **Resource Inventories**: *California Inventory of Historical Resources, California Historical Landmarks, Historic Properties Directory Listing by City* (through August 2008).
- **Prehistoric Archaeology:** T.L. Jones and K.A. Klar (2007) *Prehistoric California: Colonization, Culture, and Complexity.* AltaMira Press.
- **Ethnographic Sources:** Levy, Richard (1978), Eastern Miwok, Costanoan; Wallace, William, (1978), Northern Valley Yokut. In *California, Handbook of North American Indians, Vol. 8*, edited by Robert F. Heizer, William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.; Kroeber, A.L. (1925). *Handbook of the Indians of California.* Bureau of American Ethnology Bulletin 78. Smithsonian Institution, Washington, D.C.
- **Historic Maps:** An extensive online historic map collection with over 300 maps and views of California and Contra Costa County is available online at http://davidrumsey.com; General Land Office Plat Rancho Canada de los Vaqueros; USGS topographic quadrangles.

Results of Records Search

The Los Vaqueros region, including the Project area, has been the subject of numerous cultural resource studies, surveys, and excavations over the past several decades, primarily due to construction of Los Vaqueros Reservoir. For a comprehensive review of archaeological studies and results in the Los Vaqueros Watershed see *Rancho to Reservoir: History and Archaeology of the Los Vaqueros Watershed, California*.

The 1985 study conducted by Holman, Clark, and Wiberg (S-8909), and reviewed by Fredrickson (1986), included all of the Project area. The survey strategy was mixed including both general field reconnaissance and intensive field reconnaissance (Holman, Clark, and Wiberg, 1985). General field reconnaissance was conducted in areas of lower archaeological sensitivity such as ridge tops, windward slopes, and steep slopes where use and habitation were less likely. Areas were spot checked or walked in 100-foot transects. Intensive field reconnaissance, consisting of a detailed and completed ground inspection walked in narrow transects, was conducted in drainage bottoms, near springs, and any ground level enough to have been used for habitation sites or temporary camps. All exposed bedrock was inspected.

Six prehistoric sites and three historic-period sites are recorded within the records search radius, including extensive prehistoric rock shelter sites and historic-period ranch sites (Table 4.5-2). National Register-eligibility is summarized from *Evaluation, Request for Determination of*

TABLE 4.5-2
ARCHAEOLOGICAL SITES WITHIN A HALF-MILE RADIUS OF THE PROJECT AREA

Trinomial	Primary #	Site Type	National Register-eligibility Potential
CA-CCO-310	P-07-000187	Rock shelter	District/Individual
CA-CCO-417	P-07-000212	Rock shelter	District/Individual
CA-CCO-434/H	P-07-000219	Rock shelter	District/Individual
CA-CCO-443H	P-07-000443	Ancillary ranch complex	Ineligible
CA-CCO-444H	P-07-000224	Cabral tenant ranch	District
CA-CCO-454H	P-07-000234	Tony Rose tenant ranch	District
CA-CCO-456	P-07-000236	Rock shelter	District
CA-CCO-466	P-07-000743	Bedrock mortar	Not evaluated
CA-CCO-703	P-07-000483	Rock feature	Not evaluated

SOURCE: NWIC, 2009

Eligibility, and Effect for the Los Vaqueros Project, Alameda and Contra Costa Counties, California (SSUAF, 1992). Three prehistoric rock shelters and one historic-period ranch site are located adjacent to the proposed A-string turbines and the O&M building.

Vasco Caves (CA-CCO-434/H) and related rock shelters (CA-CCO-310, CA-CCO-417, and CA-CCO-456) are located immediately south and adjacent to the Project area. These sites have been determined eligible for listing in the National Register of Historic Places (National Register) both individually and as a part of the Upper Kellogg Creek Historic District (SSUAF, 1992; OHP, 2009). Site constituents include lithic materials, midden soils with floral and faunal remains, bedrock mortars, rock art, and human skeletal remains. The impressive and culturally-significant sites are only accessible via guided tours offered through the East Bay Regional Park District (EBRPD).

The Upper Kellogg Creek Historic District has been determined eligible for listing in the National Register by consensus of the State Historic Preservation Officer (SSUAF, 1992; OHP, 2009). The National Register defines a “district” as:

> [A] geographically definable area, urban or rural, possessing a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united by past events or aesthetically by plan or physical development. A district may also comprise individual elements separated geographically but linked by association or history (36CFR60).

The district encompasses both archaeological and historic architectural properties from the prehistoric, ethnohistoric, and historic periods within the entire Los Vaqueros Reservoir watershed, including a number of resources within the Project area. The Sonoma State University Academic Foundation (SSUAF) stated that “these resources appear to be linked because they illustrate settlement and subsistence patterns through time within an intermediate zone situated between the

Delta/Sacramento Valley, San Francisco Bay Area, and the Coast Ranges" (SSUAF, 1992). In addition to discussing continuous occupation, the SSUAF based its assessment on physiographic features, historic land-holding boundaries, and establishment of a district as a management tool (SSUAF, 1992), and recommended the inclusion of 68 historic properties comprising 69 cultural components within the district, which "represent thousands of individual features created during human occupation and use of the area spanning at least 3,500 years" (SSUAF, 1992). The prehistoric period is represented by 12 open sites, 16 milling stations, eight rock shelters, and one rock art site. A ranch site represents the ethnohistoric period, and the historic period includes one ancillary farm or ranch complex, one water management feature, five stone fences and corrals, 23 farm or ranch headquarters, and one site of unknown characteristics (SSUAF, 1992). In addition to these, two prehistoric milling stations and five water management features recorded by Ziesing in 2000 are considered eligible for National Register-district status, bringing the total of historic properties within the district to 75.

The district is eligible for listing on the National Register because contributing elements meet the established criteria for significance, have the ability to address research potential within a developed historical context, and retain integrity of location and setting.

In 1995, archaeological testing within the proposed alignment of an underground natural gas pipeline was undertaken in the area between two rock shelter sites (CA-CCO-310 and CA-CCO-417) and a historic-period tenant ranch (CA-CCO-454H) (Stewart and Villemaire, 1995). Forty surface transect units[3] and two vertical units[4] were excavated, for a total excavated volume of 9.4 cubic meters of soil. The majority of cultural materials uncovered were historic-period artifacts associated with the late 19th- and early 20th-century tenant ranch camp (CA-CCO-454H). Prehistoric cultural materials consisted of 30 lithic fragments and a few modified flakes. Hydration analysis of eight obsidian flakes indicated use of the area for more than 4,000 years. Despite the valuable data obtained from the excavated materials, the paucity of materials and lack of concentrations were evaluated as not a significant contributor to the National Register-eligibility of CA-CCO-310, CA-CCO-417, and CA-CCO-454H.

Summary of Native American Contact

A sacred lands file (SLF) search request was submitted to the Native American Heritage Commission (NAHC) on July 8, 2009, and a response was received on July 22, 2009. A records search of the SLF did not indicate the presence of Native American cultural resources in the Project area. A list of Native American individuals/organization that might have additional information or concerns was provided. Each person on the list was contacted by letter on July 22, 2009. No responses were received. Additional correspondence has been sent on behalf of Contra Costa County and no response has been received as of the publishing of this EIR.

[3] Shallow (20 cm deep) excavation units, measuring 50 x 200 cm.
[4] Deeper (70 cm deep) excavation units, measuring 1 x 1 meter.

Field Methods and Results

A Registered Professional Archaeologist conducted a reconnaissance cultural resources survey of the Project area on June 22 and 23, 2009 and January 27, 2011. Because of the extensive previous research completed in and within the immediate vicinity of the Project, including 100 percent surface coverage, a mixed strategy survey was completed for the current analysis. All proposed turbine areas were inspected. Ridgelines and steep slopes were spot checked and less-intensively walked. Ridgelines containing currently operating turbines have been heavily disturbed due to road construction and turbine pad installation. Existing roads were driven to inspect current turbine locations. All rock outcrops were inspected. Drainages and level areas were intensively inspected in 10–20-meter transects. Visibility was generally good. Soils varied depending upon the slope; drainages and lower lying areas tended to have a darker brown silty soil, while ridgelines and slopes tended to have a light to medium brown more gravelly soil. Areas with more limited visibility due to vegetation were periodically scraped with a trowel and rodent holes were inspected. The String A turbines are proposed in the vicinity of three prehistoric rock shelters (CA-CCO-310, CA-CCO-456, and CA-CCO-434) and one historic-period tenant farm location (CA-CCO-454H). The nearest rock shelters to String A turbines (CA-CCO-310 and CA-CCO-456) were visited to assess the nearness of Project activities to those sites.

Rock shelter CA-CCO-310 is located adjacent to the road alignment to access turbine A-4. The existing maintained dirt road skirts the rock shelter on the east. No cultural materials were visible on the road bed; however the road is constructed with imported fill. On February 25, 2010, an extended archaeological survey consisting of a series of hand-held auger borings was conducted along the unpaved road adjacent to CA-CCO-310 in order to determine whether cultural materials extend into the current Project area. Five auger holes were excavated along a 100 foot length spaced 20 feet apart. The depth of the auger holes varied from 10 cm to 50 cm below ground surface (bgs). All excavated soils were run through a ¼-inch screen and returned to the auger hole. The subsurface investigation did not reveal any cultural materials. The road was partially constructed in a cut bulldozer push and the upper 10 cm consisted of artificially-deposited decomposed granite road fill. The native soils below the road consisted of a medium to dark brown clayey loam with no intrusions.

No cultural resources were located within the Project area of the A, B, C, D, and E-strings; the access road; or the utilities alignments. A human-made rock pile feature was located along the proposed F-string access road (see below).

ESA-TV-01

A human-made rock pile feature (temporarily designated ESA-TV-01) was located along the proposed access road for the F-string. The feature is located on the top of a low-rising ridge between two higher ridgelines. In comparison to the surrounding rock outcrops the feature is obviously of human construction. Approximately 50 medium- (30 cm) to large- (100 cm) sized sandstone rocks are stacked in a semi circle 4 x 1 meter x .75 meter high. No other cultural materials were located in the vicinity and there are no cultural indicators on the rocks themselves

(heat or fire affects). The age of the feature is unknown, however lichen growth on the top of the rocks indicates the rock were not piled in the very recent past.

The age of the feature is unknown and no other cultural constituents that could illuminate the age or purpose of the rock pile are located in the surrounding area. The feature does not appear to be associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage (criterion 1) nor does it appear to be associated with the lives of persons important in the past (criterion 2). The feature does not embody the distinctive characteristics of a type, period, region, or method of construction (criterion 3) nor could it yield information important in prehistory or history (criterion 4). It therefore is recommended that ESA-TV-01 is not eligible for listing in the California Register and should therefore not be considered a legally-significant historical resource. No additional consideration is necessary regarding this resource.

4.5.2.2 Regulatory Setting

Federal Statutes and Regulations

Archaeological and architectural resources (buildings and structures) are protected through the National Historic Preservation Act (NHPA) of 1966, as amended (16 USC 470f) and its implementing regulations: Protection of Historic Properties (36 CFR Part 800), the Archaeological and Historic Preservation Act of 1974, and the Archaeological Resources Protection Act of 1979.

Prior to implementing an "undertaking" (e.g., issuing a federal permit), Section 106 of the NHPA requires federal agencies (e.g., U.S. Army Corps of Engineers, National Park Service) to consider the effects of the undertaking on historic properties and to afford the Advisory Council on Historic Preservation (ACHP) and the State Historic Preservation Officer (SHPO) a reasonable opportunity to comment on any undertaking that would adversely affect properties eligible for listing on the National Register. NHPA Section 101(d)(6)(A) allows properties of traditional religious and cultural importance to a tribe to be determined eligible for inclusion in the National Register. Under the NHPA, a find is significant if it meets the National Register listing criteria at 36 CFR 60.4, as stated below:

> The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and:
>
> a) That are associated with events that have made a significant contribution to the broad patterns of our history, or
>
> b) That are associated with the lives of persons significant in our past, or
>
> c) That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction, or

d) That have yielded, or may be likely to yield, information important in prehistory or history.

Federal review of projects is normally referred to as the Section 106 process. The Section 106 process normally involves step-by-step procedures that are described in detail in the implementing regulations (36 CFR Part 800) and summarized here:

- Establish a federal undertaking;
- Delineate the Area of Potential Effects;
- Identify and evaluate historic properties in consultation with the SHPO and interested parties;
- Assess the effects of the undertaking on properties that are eligible for inclusion in the National Register;
- Consult with the SHPO, other agencies, and interested parties to develop an agreement that addresses the treatment of historic properties and notify the Advisory Council on Historic Preservation; and
- Proceed with the project according to the conditions of the agreement.

State Statutes and Regulations

The State of California implements the NHPA through its statewide comprehensive cultural resource preservation programs. The California Office of Historic Preservation (OHP), an office of the California Department of Parks and Recreation, implements the policies of the NHPA on a statewide level. The OHP also maintains the California Historical Resources Inventory. The State Historic Preservation Officer is an appointed official who implements historic preservation programs within the State's jurisdiction.

California Environmental Quality Act (CEQA)

CEQA, as codified in Public Resources Code (PRC) Sections 21000 et seq. and implemented via the CEQA Guidelines (14 Cal. Code Regs. § 15000 et seq.), is the principal statute governing the environmental review of projects in the State. The CEQA Guidelines define a historical resource as: (1) a resource in the California Register; (2) a resource included in a local register of historical resources, as defined in PRC Section 5020.1(k) or identified as significant in a historical resource survey meeting the requirements of PRC Section 5024.1(g); or (3) any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California, provided the lead agency's determination is supported by substantial evidence in light of the whole record.

The California Register is "an authoritative listing and guide to be used by state and local agencies, private groups, and citizens in identifying the existing historical resources of the state and to indicate which resources deserve to be protected, to the extent prudent and feasible, from

substantial adverse change" (PRC Section 5024.1[a]). The criteria for eligibility to the California Register are based on National Register criteria (PRC Section 5024.1[b]). Certain resources are determined by the statute to be automatically included in the California Register, including California properties formally eligible for or listed in the National Register.

To be eligible for the California Register as a historical resource, a prehistoric or historic-period resource must be significant at the local, state, and/or federal level under one or more of the following criteria:

1) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

2) Is associated with the lives of persons important in our past;

3) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or,

4) Has yielded, or may be likely to yield, information important in prehistory or history [14 CCR Section 4852(b)].

For a resource to be eligible for the California Register, it must also retain enough integrity to be recognizable as a historical resource and to convey its significance. A resource that does not retain sufficient integrity to meet the National Register criteria may still be eligible for listing in the California Register.

CEQA requires lead agencies to determine if a proposed project would have a significant effect on important historical resources or unique archaeological resources. If a lead agency determines that an archaeological site is a historical resource, the provisions of PRC Section 21084.1 and CEQA Guidelines Section 15064.5 would apply. If an archaeological site does not meet the CEQA Guidelines criteria for a historical resource, then the site may meet the threshold of PRC Section 21083.2 regarding unique archaeological resources. A unique archaeological resource is an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

- Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
- Has a special and particular quality such as being the oldest of its type or the best available example of its type.
- Is directly associated with a scientifically recognized important prehistoric or historic event or person [PRC Section 21083.2 (g)].

The CEQA Guidelines note that if a resource is neither a unique archaeological resource nor a historical resource, the effects of the project on that resource shall not be considered a significant effect on the environment (CEQA Guidelines Section 15064[c][4]).

Local

Contra Costa County General Plan

The Contra Costa County General Plan contains goals and policies that are applicable to all development projects in the unincorporated areas of the County. The overarching goal for cultural resources is to identify and preserve important archaeological and historic resources within the County. Policies include preserving areas that have identifiable and important archaeological or historic significance, preferably in public ownership, and creating compatible and high quality design in developments surrounding areas of historic significance in order to protect and enhance the historic quality of the area (Contra Costa County, 2010).

4.5.3 Project Baseline

The environmental setting described above constitutes the baseline for determining the significance of potential impacts of the Project on cultural resources. In summary, while no legally-significant cultural resource were located during the background research, surface survey, or extended subsurface investigation, the general area is considered very sensitive for cultural resources.

Due to the nearness of several significant prehistoric sites, the Project area should be considered sensitive for prehistoric resources. The L1–L5 turbines near Vasco Caves (CA-CCO-434/H) are proposed for removal. While no direct impacts to the caves are expected, the general vicinity should be considered a sensitive area. Rock shelters CA-CCO-417 and CA-CCO-456 are also in the nearby vicinity of Project activities. Similarly, no direct impacts to these resources are expected from Project construction; however, the area is sensitive for prehistoric archaeological resources.

4.5.4 Significance Criteria

Based on CEQA Guidelines Section 15064.5 and CEQA Guidelines Appendix G, a project would cause adverse impacts to cultural resources if it would:

a) Cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines Section 15064.5;

b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines Section 15064.5;

c) Directly or indirectly destroy a unique paleontological resource or site or unique geological feature; or

d) Disturb any human remains, including those interred outside of formal cemeteries.

4.5.5 Discussion of No Impacts

As discussed in Section 4.5.6, analysis of the setting and Project characteristics relative to the significance criteria stated above shows that the Project would have impacts with respect to each of the criteria.

4.5.6 Discussion of Impacts and Mitigation Measures

a) Would the Project cause a substantial adverse change in the significance of a historical resource as defined in § 15064.5?

Impact 4.5-1: The Project would cause a substantial adverse change in the setting of a historical resource. (*Less-than-Significant Impact*)

The Project would cause no direct impact on known historical resources because it would not directly demolish or materially alter them. However, the Project would cause indirect impacts related to decommissioning and construction activities. The Project is immediately adjacent to a series of archaeological sites including prehistoric rock shelters and other archaeological features that are eligible for listing on the National Register, and are contributing elements to the Upper Kellogg Creek Historic District. The rock shelters are part of Vasco Caves Regional Preserve, owned and operated by EBRPD, which offers guided tours. Visual impacts to the historical resources are addressed in Section 4.1, *Aesthetics*. The Project involves installation of fewer but larger wind turbines and indirect impacts would occur to the historic setting as the Project would be partially visible from these archaeological sites. However, removal of turbines L1-L5 would improve the setting of the main Vasco Caves complex. Additionally the distance of proposed turbine A-3 from the rock shelters is great enough[5] as to not significantly impact the surroundings of this resource. Thus, implementation of the Project would have a less-than-significant impact on the setting of known historical resources.

Mitigation: None required.

Impact 4.5-2: The Project could cause an intentional and/or inadvertent impact to the significance of a historical resource. (*Less-than-Significant Impact with Mitigation Incorporated*)

Secondary impacts to cultural resources are of primary concern for the Project. Construction personnel would be working in the vicinity of legally-significant cultural resources and could cause accidental damage or vandalism of these resources. The following protective measures would reduce potential impacts to these historical resources, as defined in Section 15064.5, to a less-than-significant level.

> **Mitigation Measure 4.5-2a:** Prior to commencing construction, a qualified archaeologist and a Native American representative shall assess the current site condition of CA-CCO-310, CA-CCO-417, CA-CCO-456, and CA-CCO-434/H (for comparative purposes following construction activity). Three sites have not been formally recorded by an archaeologist within the last 10 years (1996 [CA-CCO-310; CA-CCO-456] and 1987 [CA-CCO-434/H]). Site record updates on a Department of Parks and Recreation Form 523 shall be completed, that include thorough photo documentation, description, GIS location

[5] The site is approximately 800 feet from the turbine. Additionally the site is downslope and the turbine is upslope.

information, and detailed sketch maps and plan drawings. The site records shall be provided to EBRPD for inventory and interpretive potential.

Mitigation Measure 4.5-2b: Following construction activities, a qualified archaeologist and a Native American representative shall reassess the site condition of CA-CCO-310, CA-CCO-417, CA-CCO-456, and CA-CCO-434/H.

Mitigation Measure 4.5-2c: Construction contracts shall require avoidance of cultural sites.

Mitigation Measure 4.5-2d: Temporary fencing shall be installed around the boundaries of CA-CCO-310 and the northernmost extent of CA-CCO-434/H during Project construction to prevent inadvertent or intentional damage to the site by construction personnel. Visitors to cultural sites shall only include those with professional or scientific interests or Native American representatives.

Mitigation Measure 4.5-2e: Project personnel, including construction crews, shall be alerted to the archaeological sensitivity of the Project area and the importance of protecting cultural resources. Project personnel shall be required to attend a mandatory on-site instruction led by a qualified archaeologist and a Native American representative that discusses what types of cultural materials are and could be present in the Project area. The instruction shall include appropriate training to identify and protect cultural resources in the event that they are inadvertently unearthed. All Project personnel shall be informed that they are prohibited from entering the adjacent Vasco Caves Regional Preserve property owned by the East Bay Regional Park District and that entry onto said property constitutes trespassing punishable by law. Information about the specific locations of cultural resources on the Project site and in the surrounding area shall be kept confidential and provided only on a need-to-know basis.

Mitigation Measure 4.5-2f: All ground-disturbing activity in String A, removal of the L1-L5 turbines, and construction of the new O&M building shall be monitored by a qualified archaeologist and a Native American representative. An Archaeological Monitoring Plan shall be prepared prior to commencement of any ground-disturbing activities that includes:

- Person(s) responsible for conducting monitoring activities, including Native American monitors;
- How the monitoring shall be conducted and the required format and content of monitoring reports;
- Person(s) responsible for overseeing and directing the monitors;
- Schedule for submittal of monitoring reports and person(s) responsible for review and approval of monitoring reports;
- Physical monitoring boundaries;
- Protocol for notifications in case of encountering of cultural resources, as well as methods of dealing with the encountered resources (e.g., collection, identification, curation);

- Methods to ensure security of cultural resources sites; and
- Protocol for notifying local authorities (i.e. County Sheriff, EBRPD Police) should site looting and other illegal activities occur during construction.

Significance of Impact after Mitigation: Less than Significant.

---

b) Would the Project cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?

Impact 4.5-3: The Project could cause a substantial adverse change in the significance of unique archaeological resources that are within the Project area, but have not yet been discovered. (*Less-than-Significant Impact with Mitigation Incorporated*)

The Project area's history suggests, and previous cultural studies have indicated, that there is a possibility of accidentally uncovering and damaging or destroying undocumented archaeological sites. Damaging or destroying previously undocumented archaeological resources would be a potentially significant impact. Should archaeological materials be discovered during construction activities, **Mitigation Measure 4.5-3** shall be implemented to ensure that work ceases in the immediate area and a qualified archaeologist is provided the opportunity to document the find, assess its significance, and recommend further treatment. Implementation of this mitigation measure will reduce potential impacts to a less-than-significant level.

> **Mitigation Measure 4.5-3:** The Applicant and its contractors shall take a proactive role in protecting archaeological resources encountered during implementation of the Project. Prehistoric archaeological materials that might be present in the area include obsidian and chert flaked-stone tools (e.g., projectile points, knives, scrapers) or toolmaking debris; culturally darkened soil ("midden") containing heat-affected rocks, artifacts, or shellfish remains; stone milling equipment (e.g., mortars, pestles, handstones, or milling slabs); and battered stone tools, such as hammerstones and pitted stones. Historic-period materials might include stone, concrete, or adobe footings and walls; filled wells or privies; and deposits of metal, glass, and/or ceramic refuse. If archaeological resources are encountered, the applicant shall immediately halt all activity within 100 feet of the find and notify the Contra Costa County Department of Conservation & Development (DCD).
>
> The find shall be evaluated by an archaeologist who meets the Secretary of the Interior's Professional Qualification Standards and if necessary, an appropriate Native American representative. If the archaeologist or Native American representative determines that the resources may be significant, then they shall consult with the DCD to formulate an appropriate treatment plan for the resources. Avoidance shall be considered the default mitigation, though the DCD will ultimately determine whether avoidance is necessary and feasible in light of factors such as the nature of the find, Project design, costs, and other considerations. If avoidance is infeasible, other appropriate measures (e.g., data recovery) will be instituted. Work may proceed in other parts of the Project area while mitigation for archaeological resources is being carried out, but work within 100 feet of the find shall remain halted until the DCD explicitly gives authority to proceed.

Significance of Impact after Mitigation: Less than Significant.

---

c) Would the Project directly or indirectly destroy a unique paleontological resource or site or unique geological feature?

Impact 4.5-4: The Project could directly or indirectly destroy a unique paleontological resource or site or a unique geological feature. (*Less-than-Significant Impact with Mitigation Incorporated*)

Unique Geological Features. The Project would not damage or destroy a unique geological feature. Vasco Caves may be considered a unique geological feature because the outcrops of gently dipping, elongated sandstone strata represent a visual feature which is distinctive and visually appealing in the general context of the landscape. The Project is proposed in an area to the north and would not physically impair or destroy these features (directly or indirectly). Thus, the Project would have no impact with respect to unique geological features.

Paleontological Resources. As discussed in the setting, one vertebrate fossil was previously recovered from the Panoche Formation (outside the Project area), and the formation is known to have yielded numerous invertebrate fossils. While this qualifies the rock unit as having a high paleontological potential under SVP criteria (see Table 4.5-1), the probability that earthwork would uncover additional vertebrate fossils is very low for several reasons. First, there has only been one vertebrate fossil discovery within the unit, even though the unit is widely-occurring in the Coast Ranges, and numerous construction projects have excavated substantial volumes from the Panoche Formation. Second, most of the excavation would consist of road cuts and foundation excavation within surface soils or the zone of highly weathered bedrock where fractures, fissures and chemical processes have damaged the integrity of the original, *in-situ* rock formation.

Activities of highest concern for impacts to paleontological resources typically consist of projects that involve large-scale mining, tunneling, or deep trenching that excavate large volumes of sensitive, unweathered rock units rather than the relatively shallow excavations for road grading and foundation excavation that typify the Project. Nevertheless, Project-related grading and excavation for access roads, turnarounds, staging areas, work areas, and foundations would disturb substantial quantities of soil, some of which may consist of “fresh” bedrock. As such, inadvertent disturbance of ancient biota and unique or significant fossils cannot be ruled out. For this reason, and because the significance of fossil resources cannot be known until assessed by a professional paleontologist, any unanticipated discovery or disturbance of a fossil of unknown importance would be a potentially significant impact. Implementation of **Mitigation Measure 4.5-4** would reduce the potential impact to a less-than-significant level.

> **Mitigation Measure 4.5-4:** The Applicant and its contractors shall take a proactive role in protecting paleontological resources encountered during implementation of the Project. Paleontological resources that might be present in the area include fossilized bone, teeth,

shell, tracks, trails, casts, molds, and impressions. If paleontological resources are encountered, the applicant shall immediately halt all activity within 100 feet of the find and notify the DCD.

The find shall be evaluated by a qualified paleontologist. If the paleontologist determines that the resources may be significant, then they shall consult with the DCD to formulate an appropriate treatment plan for the resources. Avoidance shall be considered the default mitigation, though the DCD will ultimately determine whether avoidance is necessary and feasible in light of factors such as the nature of the find, Project design, costs, and other considerations. If avoidance is infeasible, other appropriate measures (e.g., data recovery) will be instituted in conformance with Society of Vertebrate Paleontology Guidelines (SVP, 1995; SVP, 1996). Work may proceed in other parts of the Project area while mitigation for paleontological resources is being carried out, but work within 100 feet of the find shall remain halted until the DCD explicitly gives authority to proceed.

Significance of Impact after Mitigation: Less than Significant.

---

d) Would the Project disturb any human remains, including those interred outside of formal cemeteries?

Impact 4.5-5: The Project could disturb human remains that are located within the Project area, but have not yet been discovered. (*Less-than-Significant Impact with Mitigation Incorporated*)

While there is no indication that the immediate Project area has been used for human burials, the possibility cannot be discounted entirely. Although unlikely, the unearthing of human remains during construction would be a significant impact. Implementation of **Mitigation Measure 4.5-5** would reduce this impact to a less-than-significant level.

Mitigation Measure 4.5-5: The Applicant and its contractors shall take a proactive role in protecting human remains encountered during implementation of the Project. If potential human remains are encountered, the applicant shall halt work within 100 feet of the find and immediately contact the Contra Costa County coroner in accordance with Public Resources Code Section 5097.98 and Health and Safety Code Section 7050.5. The DCD shall then be contacted. If the coroner determines that the remains are Native American, the coroner will contact the Native American Heritage Commission (NAHC) within 24 hours. As provided in Public Resources Code Section 5097.98, the NAHC will identify the person or persons believed to be most likely descended from the deceased Native American. The most likely descendent makes recommendations for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods as provided in Public Resources Code Section 5097.98.

Significance of Impact after Mitigation: Less than Significant.

4.6 Energy Conservation

4.6.1 Introduction

This section analyzes the Project's relationship to energy conservation. Discussed are the physical and regulatory setting; the baseline for determining environmental impacts; the criteria used for determining the significance of environmental impacts; potential impacts associated with decommissioning the existing windfarm and construction, operation, maintenance, and decommissioning of the repowering Project; and mitigation measures to reduce or avoid environmental impacts determined to be potentially significant.

4.6.2 Setting

4.6.2.1 Regional and Local Setting

Section 3.1.2 (*Location*) provides general information about the regional and local setting. This section provides setting information specific to energy conservation.

California's energy system includes electricity, natural gas, hydroelectric, nuclear, and petroleum resources. California's energy system provides 73.2 percent of the electricity, 12.9 percent of the natural gas, and 38.12 percent of the petroleum consumed in or used for the State. The rest of the State's energy is imported and includes: natural gas purchases from Canada (22.1 percent), the Rocky Mountain States (24.2 percent), and the Southwest (40.8 percent); electricity from the Pacific Northwest (8.4 percent, primarily hydroelectric) and the Southwest (18.4 percent, primarily coal and nuclear); and crude oil imported from Alaska (13.41 percent) and foreign sources (48.5 percent) (CEC, 2010).

The production of electricity requires the consumption or conversion of energy resources including water, wind, oil, gas, coal, solar, geothermal, and nuclear sources. Of the electricity generated in-State, 59 percent is generated by natural gas-fired power plants, two percent is generated by coal-fired power plants, 10 percent comes from large hydroelectric dams, and 16 percent comes from nuclear power plants. The remaining 13 percent of the in-State total electricity production is supplied by renewable sources, including small hydroelectric generation (1.8 percent), biomass (2.7 percent), geothermal (6.2 percent), solar (0.3 percent) and wind (2.7 percent) (CEC, 2010). The electricity generated is distributed via a network of transmission and distribution lines commonly called the power grid.

The existing windfarm consists of 91 wind turbines with a combined nameplate capacity of 29.1 MW and is located east of Los Vaqueros Reservoir and west of Vasco Road in eastern Contra Costa County. Tres Vaqueros shut down operations in 2009 and currently no turbines are operating. The wind farm is located in the northwestern portion of the Altamont Pass Wind Resource Area (APWRA), which is one of the most significant resource areas for wind energy development in California. The APWRA consists of about 50,000 acres and includes property within Contra Costa and Alameda Counties. There are numerous other wind farms located within

the APWRA, including several in close proximity to the Tres Vaqueros Windfarm. These include: Vasco Winds Windfarm to the south-southwest, Northwind Energy to the northeast, Buena Vista Windfarm to the east, and Diablo Winds to the south.

4.6.2.2 Regulatory Setting

Federal Regulations

Energy Policy and Conservation Act

The Energy Policy Act of 1975 was established in response to the oil crisis of 1973, which increased oil prices due to a shortage of reserves. The Act required that all vehicles sold in the U.S. to meet certain fuel economy goals. Since 1990, the fuel economy standard for new passenger cars has been 27.5 miles per gallon. Since 1996, the fuel economy standard for new light trucks (gross vehicle weight of 8,500 pounds or less) has been 20.7 miles per gallon. Heavy-duty vehicles (i.e., vehicles and trucks over 8,500 pounds gross vehicle weight) are not subject to fuel economy standards. This Act indirectly applies to the Project due to its requirements for increased fuel economy standards particularly for the construction equipment to be used.

Energy Policy Act of 2005

The Energy Policy Act of 2005 seeks to reduce reliance on non-renewable energy resources and provide incentives to reduce current demand on these resources. For example, under the Act, consumers and businesses can attain federal tax credits for purchasing fuel-efficient appliances and products, buying hybrid vehicles, building energy efficient buildings, and improving the energy efficiency of residential and commercial buildings. Additionally, tax credits are available for the installation of qualified fuel cells, stationary microturbine power plants, and solar power equipment.

State of California

State of California Integrated Energy Policy

In 2002, the Legislature passed Senate Bill 1389 which required the California Energy Commission (CEC) to develop an integrated energy plan biannually for electricity, natural gas, and transportation fuels, for the California Energy Report. The plan calls for the State to assist in the transformation of the transportation system to improve air quality, reduce congestion, and increase the efficient use of fuel supplies with the least environmental and energy costs. To further this policy, the plan identifies a number of strategies, including assistance to public agencies and fleet operators in implementing incentive programs for Zero Emission Vehicles and their infrastructure needs, and encouragement of urban designs that reduce vehicle miles traveled and accommodate pedestrian and bicycle access.

The latest update – the 2009 Integrated Energy Policy Report - was adopted by the CEC on December 16, 2009. The update focuses on anticipated operational and physical changes to California’s electric system through 2020; how the State’s energy efficiency goals interact with electrical and natural gas demand forecasting methods; recommended changes to electricity

procurement; vulnerability of the State's nuclear plants to major seismic events; and other energy issues. The CEC is currently in the process of preparing the 2011 Integrated Energy Policy Report.

SB 1078 - California Renewables Portfolio Standard Program

This bill requires retail sellers of electricity to increase procurement of electricity from renewable energy sources by at least one percent of retail sales per year until their portfolio of renewable energy increases to 20 percent. The deadline for reaching the threshold is 2017. Municipal utilities are required to implement and enforce their own such program.

Executive Order #S-14-08

On November 17, 2008, Governor Arnold Schwarzenegger signed Executive Order # S-14-08 which raised California's renewable energy goals to 33 percent by 2020 and improved processes for licensing renewable projects. The Executive Order is intended to advance California's transition into a clean energy economy and directs state agencies to create comprehensive plans to prioritize regional renewable projects based on an area's renewable resource potential and the level of protection for plant and animal habitat. To implement and track the progress of the Executive Order, the CEC and California Department of Fish and Game signed a Memorandum of Understanding formalizing a Renewable Energy Action Team which will concurrently review permit applications filed at the state level to streamline the application process for renewable energy development. Recently, on April 12, 2011 Governor Brown, signed SBX1-2 which essentially puts S-14-08 in to the state code and established the 33 percent renewable portfolio as the state target by December 31, 2020.

Title 24 Building Energy Efficiency Standards

Title 24, Part 6, of the California Code of Regulations is the California Building Code governing all aspects of building construction. Included in Part 6 of the Code are standards mandating energy efficiency measures in new construction. Since its establishment in 1977, the building efficiency standards (along with standards for energy efficiency in appliances) have contributed to a reduction in electricity and natural gas usage and costs in California. The standards are updated every three years to incorporate new energy efficiency technologies. The latest updates to the Title 24 standards became effective on August 1, 2009, and reflect the California Building Standards Commission-approved 2008 Building Energy Efficiency Standards. The standards regulate energy consumed in buildings for heating, cooling, ventilation, water heating, and lighting. Title 24 is implemented through the local planning and permit process.

Local

Contra Costa County General Plan

The Contra Costa County General Plan contains goals and policies that apply to all development projects in the unincorporated County, including the Project. The goals and policies relating to energy and renewable energy resources are summarized as follows:

- Achieve a balance of uses of the County's natural and developed resources to meet social and economic needs of the County's residents.
- Reduce energy use in the County to avoid risks of air pollution and energy shortages which prevent orderly development.
- Achieve utilization of oil and gas resources in a manner beneficial to all County residents.
- Encourage use of renewable resources where they are compatible with the environment.

(Contra Costa County, 2010)

4.6.3 Project Baseline

The baseline for the Energy Conservation analysis is the year 2008, the last full year that the existing turbines operated. During 2008, when 60 of the 91 turbines were in production, approximately 13,906 megawatt hours of electricity were generated (Greiner, 2010). Baseline conditions for consumption of fuel are only for operations, which consist of periodic site visits for maintenance activities, and are relatively small quantities. There were no construction-related energy usages during 2008.

4.6.4 Significance Criteria

Appendix F of the CEQA Guidelines provides guidance for assessing energy impacts of projects. The appendix provides three goals:

- Decreasing overall per capita energy consumption
- Decreasing reliance on natural gas and oil
- Increasing reliance on renewable energy sources

Consistent with Appendix F, environmental impacts evaluated in this analysis include:

a) The Project's energy requirements by amount and fuel type for each stage of the Project including construction, operation, maintenance and/or removal;

b) The effects of the Project on local and regional energy supplies and on requirements for additional capacity;

c) The effects of the Project on peak and base period demands for electricity and other forms of energy;

d) The degree to which the Project complies with existing energy standards;

e) The effects of the Project on energy resources; and

f) The Project's projected transportation energy use requirements and its overall use of efficient transportation alternatives.

4.6.5 Discussion of No Energy Conservation Impacts

As discussed below, development of the Project would have no energy conservation impacts for criteria b), c), d) or e).

b) The Project would cause no adverse effect on local and regional energy supplies or requirements for additional capacity.

Wind is a local energy resource. The Project would be located within PG&E's service territory and would transmit energy from the site to the regional power grid through a Power Purchase Agreement with PG&E that likely would have a 20- or 30-year duration. By replacing older model turbines with new, more efficient ones, the Project would contribute approximately 12 more MW of power to the grid than the existing facility, an increase of 38 percent. In addition, when the wind blows and electricity is generated by a windfarm, the real-time output required from fossil fuel plants is reduced by the amount of renewable generation going into the electrical grid to maintain the balance between the supply and demand for electricity. Consequently, the Project would have a beneficial impact on local and regional energy supplies, and would not require additional capacity; therefore, no adverse impact on local or regional energy supplies or capacity would result.

c) Generally, the effects of the Project on peak and base period demands for electricity and other forms of energy would be neutral or beneficial.

The Project would generate and provide electrical energy to the grid whenever the wind blows, regardless of whether it is a peak or base period. Whenever wind energy was being generated, the Project would be reducing the real-time output required from fossil fuel plants and other sources of energy, regardless of the level of demand. This would be a beneficial impact. When the wind turbine generators are not operating, the Project would be drawing only such load to maintain aircraft warning lighting, O&M building power, and communications equipment. This maintenance load would not have a significant draw on the existing electrical supply or demand. Consequently, the Project would cause no adverse impact on demands for electricity or other forms of energy.

d) The Project complies with existing energy standards by directly supporting and furthering efforts toward achieving those standards.

The Project would use wind energy technology, an Eligible Renewable Energy Resource, which meets criteria set forth in Public Utilities Code Section 399.12, Public Resources Code Section 25741, the California Energy Commission's *New Renewable Facilities Program Guidebook* (CEC, 2006a) and *Renewable Portfolio Standard: Eligibility Guidebook* (CEC, 2006b). Electricity from the Project would be sold in the competitive market, most likely under the terms of a 20- to 30-year Power Purchase Agreement with PG&E. Consequently, the Project would contribute toward meeting the California Renewable Portfolio Standard and the goals of legislation aimed at reducing greenhouse gas emissions, and would help satisfy increased demand for electricity. By proposing to increase the efficiency of existing wind energy generation in one of the most significant wind resource areas in the State, the Project would support PG&E's efforts

to meet its California Renewable Portfolio Standard requirements cost effectively and resource-efficiently (i.e., with a smaller number of projects). Thus, the Project complies with, directly supports and furthers efforts toward achieving existing energy standards. No adverse impact on efforts to achieve existing energy standards would result.

e) The Project would have no adverse effect on energy resources.

As discussed above, the Project would increase the efficiency of the site's existing renewable energy capacity to the grid by approximately 38 percent. Consequently, the Project would provide a beneficial impact to energy resources. However, this beneficial impact comes via the use and exploitation of an energy resource, the APWRA. The Project is sited on the northern portion of the APWRA and is near the western (leading) edge of the typical sea breeze wind flow coming from a general southwesterly direction (from the Pacific Ocean to the Central Valley of California). As such, both the existing facility and the proposed repowered turbines use the energy resource that is the APWRA before the wind reaches an adjacent wind farm. Downwind from the Project area is at least one other existing wind energy producer - Northwind Energy. As the existing Northwind Energy turbines are downwind of the Project[1], the potential for the Project to degrade or deplete the APWRA energy resource via disturbance of the wind flow is considered to be a potential impact.

The APWRA energy resource is understood to be a fairly unique resource and exhibit unique wake effects[2]. It is it shallow layer of air approximately 100-300 feet in depth and because of this, disturbances to the wind flow tend to extend longer distances than traditional micrometeorological theory of 10 times the height of the disturbing object would predict (Nierenberg, 2010). Consequently, it is entirely likely that the Project, when in operation, would typically produce wake effects that would have the potential to degrade the APWRA, thereby periodically reducing the potential output of the Northwind Energy facility. The degree of this degradation is beyond the scope of this environmental analysis as substantial wind energy modeling studies are required to quantitatively determine this, and it is also understood that current models are generally poor at predicting the behavior of the unique aspects of the APWRA (Nierenberg, 2010). Consequently, in order to determine the approximate magnitude of this impact, a comparison (see Table 4.6-1) was made between the approximate windswept area[3] of the existing Tres Vaqueros Windfarm versus the windswept area of the Project.

As shown in Table 4.6-1, the repowered turbine configuration of the Project would significantly increase the amount of windswept area over the existing Tres Vaqueros Windfarm's baseline configuration. However, while the Project does have a larger amount of wind swept area, many of its new turbine pads are located northwest of the existing wind farm. Assuming a predominate

1 The nearest Project turbine (E4) is approximately one half mile from the nearest existing Northwind Energy turbine. The furthermost Project (F1) turbine is approximately 3.25 miles to the nearest existing Northwind Energy turbine.

2 Wake effects include disturbances in wind direction and wind speed downwind from the disturbing object. These effects persist for some distance from the disturbing object until the wind flow is restored to its original wind direction and flow.

3 Cross-sectional area of the turbine rotor blade.

TABLE 4.6-1
COMPARISON OF TURBINE SWEPT AREA

Turbines	Swept Area square feet	Percent change from 2008 Baseline
Existing Tres Vaqueros Wind Farm (60 operating turbines in 2008)	472,702	N/A
New Turbines 2-2.3 MW (21 turbines)	1,810,357	283%
New Turbines Upwind of Northwind (4 turbines)	344,830	-27%

SOURCE: ESA, 2010.

wind flow from the southwest wind, this new turbine pad layout would result in a decrease of the number of turbines that could affect the Northwind Energy windfarm (by being directly upwind of the predominate wind direction between the Project and the Northwind turbines) to approximately four turbines. The result of the repowered Project is reduction of wind swept area possibly affecting the Northwind Energy windfarm by about 27 percent less than the 2008 baseline conditions. As a result the Project would have a potential beneficial impact on this energy resource.

4.6.6 Discussion of Impacts and Mitigation Measures

a) Would the Project's energy requirements by amount and fuel type for each stage of the Project, including construction, operation, maintenance and/or removal, be significant?

Impact 4.6-1: Construction and operation of the Project would result in consumption of energy. (*Less-than-Significant Impact*)

Although construction-related energy consumption would occur only during the construction period (which includes decommissioning of the existing turbines, construction of the new turbines, and future decommissioning of the Project), it would represent irreversible consumption of finite natural energy resources. Construction-related energy expenditures would include both direct and indirect uses of energy in the form of fuel (typically diesel fuel) and electricity. Indirect energy use typically represents about three-quarters of total construction-related energy consumption, while direct energy represents about one-quarter of total construction-related consumption (Hannon et al., 1978). Direct energy use would include the consumption of petroleum for operation of construction vehicles and the use of electricity for construction equipment, such as welding machines and power tools. Energy consumed by power equipment used during construction would be relatively minimal, as would be the energy required for lighting and heating trailers and operation of ancillary electrical equipment. Indirect energy use includes the energy required to make the materials and components used in construction of the Project. This includes energy used for extraction of raw materials, manufacturing, and transportation associated with manufacturing.

The precise amount of construction-related energy that would be required is uncertain. Regardless, the energy consumption for construction would represent a less-than-significant impact as construction activities would not result in long-term depletion of non-renewable energy resources and would not permanently increase reliance on energy resources that are not renewable. Construction activities would not reduce or interrupt PG&E's existing electrical or natural gas services due to insufficient supply. Because construction would not interrupt existing local PG&E service and because Project-specific construction-related energy demands are not expected to have a significant adverse effect on energy resources, energy consumption by construction activities would be less than significant. Nonetheless, implementation of Mitigation Measures 4.3-2a and 4.3-2b, which are described and analyzed in Section 4.3, *Air Quality*, would ensure that fuel energy consumed in the construction phase would not be wasted through unnecessary idling or through operation of poorly maintained equipment.

Energy consumption required for operations and maintenance of the Project would be minimal and substantially the same as baseline conditions (i.e., occasional use of electricity from the PG&E grid for start up and maintenance activities and fuel usage for periodic visits by inspection and maintenance vehicles onsite would be required). Impacts from operations and maintenance of the Project on the consumption of energy would be less than significant.

Mitigation: None required.

---

f) Would the Project's projected transportation energy use requirements be significant, and would the Project's overall use of transportation alternatives be efficient?

Impact 4.6-2: Construction and operation of the Project would require use of transportation energy. (*Less-than-Significant Impact*)

As discussed in Impact 4.6-1 above, Project construction and operation would consume energy (primarily though fuel usage) during transportation of labor and materials to and from the Project. This transportation-related energy usage would be the greatest during construction activities; during Project operations and maintenance, transportation-related energy usage is expected to be essentially the same as baseline conditions. For the reasons discussed above, construction-related transportation energy use would be less than significant.

Mitigation: None required.

Impact 4.6-3: The Project's overall use of efficient transportation alternatives would be limited. (*Less-than-Significant Impact)*

The Project is in a rural area that is not supported by alternative means of transportation, such as public transit. Because of the Project's location and the specific needs during construction to

transport labor, materials, and large pieces of equipment to and from the site, use of transportation alternatives would be limited to labor force car pooling and minimizing unnecessary trips. While opportunities for utilizing efficient transportation alternatives would be limited, the Project also would not impede use of efficient transportation alternatives. When the relatively short duration of the construction period (12 months) and the relatively small size of the construction workforce (30-40 persons per day) are considered, the impact would be less than significant.

Mitigation: None required.

4.7 Geology and Soils

4.7.1 Introduction

This section analyzes the Project's relationship to local geology, existing soil conditions, and seismicity. Discussed herein are the physical and regulatory setting, the baseline for determining environmental impacts, the significance criteria used for determining environmental impacts, and potential impacts associated with decommissioning the existing windfarm and construction, operation, maintenance, and decommissioning of the repowering Project. Mitigation measures are provided where potentially significant impacts have been identified.

4.7.2 Setting

4.7.2.1 Regional and Local Setting

Section 3.1.2, *Location*, provides general information about the regional and local setting. This section (4.7.2.1) provides setting information specific to geology and soils in the Project area.

Regional Geology

The Project site is located within the Coast Ranges geomorphic province and the Byron Hills region of California (CGS, 2002a; CGS, 2006). The Coast Ranges province lies between the Pacific Ocean and the Great Valley (Sacramento and San Joaquin Valleys) provinces and stretches from the Oregon border to the Santa Ynez Mountains near Santa Barbara. Much of the Coast Ranges province is composed of marine sedimentary deposits and volcanic rocks that form northwest-trending mountain ridges and valleys, running subparallel to the San Andreas Fault Zone. The geology in this part of the Coast Ranges reflects a long history of mountain building, weathering, erosion, and sediment deposition in terrestrial, shallow marine and deeper ocean environments. These processes have been driven by the interaction of the Pacific and North American Plates, which created several active faults, including the San Andreas, Hayward, and Greenville.

Local Geology

The Project area is underlain by rocks of the Great Valley Sequence – a thick package of Cretaceous (65 to 144 million years ago) marine and non-marine rocks composed of massive beds of sandstone interbedded with siltstone and shale (CGS, 2002a). In the Project area, the rock type is primarily mapped as shale and siltstone, with sandstone occurring in narrow south-to-north oriented belts. These rocks have been given various nomenclatures including the Panoche Formation (USGS, 1980), Units B and C of the Great Valley Sequence (USGS, 1994), and the Marliffe Shale of Payne (USGS, 1997a). Characteristic of most areas of the Diablo Range, rocks in the Project area have been intensely folded, deformed, and juxtaposed against each other by relict faults and continuing tectonics. Lining the valley floors are narrow deposits of Holocene (less than 10,000 years ago) alluvium, composed of loose gravels, sands, and silts that have been eroded off of the surrounding uplands. The bedrock underlying the ridges and valleys in the

Project area is composed of a series of sedimentary rock formations (sandstone, siltstone, claystone) of varying thicknesses. These sedimentary layers dip to the northeast; their more erosion-resistant sandstone beds tend to form the area's topographic ridges (or uplands), while more erodible siltstones or claystones dominate in the valleys.

Topography

The Project area is located in eastern Contra Costa County, southeast of Mount Diablo. The topography of the Project area is dominated by northwest-southeast-trending ridge lines that reach elevations of approximately 1,000 to 1,200 feet above mean sea level (msl). Over the Project area, these ridges are separated by valleys of varying width. The ridges decline in elevation to the east and become relatively flat as the San Joaquin Valley is approached; the elevations of intervening valley bottoms are approximately 400 feet above msl.

Soils

The U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) has characterized soils beneath the Project area as well as slopes associated with the soil types (for a discussion on slope and slope stability, see Slope Stability, below) as part of their Soil Survey programs (NRCS, 2010; SSURGO, 2010). The Project area coincides with a variety of different soil types and associations. The following soil types are present within the Project area:

- Altamont Series
  - Altamont clay (9–15 percent and 15–30 percent slopes)
  - Altamont-Fontana complex (30–50 percent and 50–75 percent slopes)
- Capay Series
  - Capay clay (0–2 percent slopes)
- Millsholm Series
  - Millsholm loam (30–50 percent slopes)
- Pescadero Series
  - Pescadero clay loam (0–2 percent slopes)
  - Pescadero clay loam, strongly alkali (0–2 percent slopes)

The Project area soils are grouped into soil series that reflect the bedrock and various alluvial parent materials from which they are derived. The upland and bedrock soils belong to one soil series; the alluvial soils belong to four soil series. Generally, the soils in the Project area tend to be slightly acidic to highly alkaline. The upland soils developed in sandstone and finer-grained bedrock belong to the Altamont series. These soils are associated with areas that are strongly sloping to very steep with well-drained clay and silty clay loam textures and have slight to high erodibility. These soils often have resistant shale outcroppings on ridges and slopes. In the Project area, these outcroppings are frequently exposed at or near the tops of ridgelines (NRCS, 1977).

The alluvial soils belong to three soil series. The Capay series forms on the lower-gradient, more fine-grained stream deposits or in organic materials derived from decaying plants; these soils occur downstream on progressively finer-grained and more poorly drained deposits. The Capay series ranges from moderately well-drained to poorly drained clays, silty clay loams, and clay loams on valley fill and floodplains. The Millsholm series consists of well drained clay, silty and gravelly loams formed in material weathered from sandstone, mudstone and shale. Millsholm soils are well drained with moderate permeability. The Millsholm loams are localized in the southwestern portion of the Project area on upland areas (NRCS, 1977). The Pescadero Series is localized to the northwestern portion of the Project area and consists of poorly drained clays, clay loams, and silty loams. Pescadero clay loams have very low to moderate permeability.

Soil characteristics vary based on the proportion of clay, silt, sand and gravel within the soil type, as well as the soil acidity. Table 4.7-1 summarizes the key characteristics for the soil types within the Project area.

TABLE 4.7-1
SOIL TYPES IDENTIFIED WITHIN THE PROJECT CONSTRUCTION DISTURBANCE AREAS

Soil Unit	Percent of Project area	Depth to Bedrock (inches) [a]	Shrink/ Swell Potential[b]	Risk of Corrosion[c]		Erosion and Runoff	
				Uncoated Steel	Concrete	Hydrologic Soil Group[d]	Erosion Factor (Kf)[e]
Altamont Clay	20	20 - 60	High	High	Low	D	0.20
Altamont-Fontana Complex	72	12 – 60	Moderate	High	Low	B/D	0.20 – 0.37
Millsholm Loam	4	12	Low	High	Moderate	D	0.32
Capay Clay	1	--	High	High	Moderate	D	0.20
Pescadero Clay Loam	2	--	High	High	Low	D	0.28
Pescadero Clay Loam, strongly alkali	1	--	High	High	Low	D	0.32

[a] Depth to bedrock is deeper than the depth explored and is not known (--) where soils are derived from unconsolidated alluvium on valley floors.
[b] Soils characterized by their ability to undergo significant volume change (i.e., to shrink and swell) due to variations in soil moisture content.
[c] "Risk of corrosion" pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete.
[d] Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups (A through D) according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms. Soils in Group A have low runoff rates and water is transmitted freely through the soil. Soils in Group B have a moderate infiltration rate and a moderate rate of water transmission. Soils in Group C have slow infiltration and transmission rates and consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. Soils in Group D have high runoff potential when thoroughly wet. Water movement through the soil is restricted or very restricted.
[e] Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

SOURCE: SSURGO, 2010

Faulting and Seismic Hazards

The Project area is located in a region of high seismic activity with numerous active and potentially active faults[1] (Figure 4.7-1). The Project area is influenced by the faults of the San Andreas System including the San Andreas, Hayward, Calaveras, Concord - Green Valley, and Greenville faults. Major earthquakes have affected the region in the past and can be expected to occur again in the near future on one of the principal active faults in the San Andreas Fault System.

Richter magnitude (M) is a measure of the size of an earthquake as recorded by a seismograph, the standard instrument that records ground shaking. The reported Richter magnitude for an earthquake represents the highest amplitude measured by the seismograph at a distance of 100 kilometers from the epicenter. Richter magnitudes vary logarithmically, with each whole number step representing a tenfold increase in the amplitude of the recorded seismic waves. Earthquake magnitudes are also measured by their moment magnitude (Mw), which is related to the physical characteristics of a fault, including the rigidity of the rock, the size of fault rupture, and the movement or displacement across a fault (CGS, 2002b).

Table 4.7-2 lists the location of regionally active faults significant to the Project area due to proximity, activity status, and Maximum Credible Earthquake (MCE). The MCE is an estimated Mw for the largest earthquake capable of occurring on a fault. The six regional active faults in closest proximity to the site include: the Mount Diablo thrust, Greenville, Calaveras, Hayward, Concord - Green Valley, and San Andreas faults.

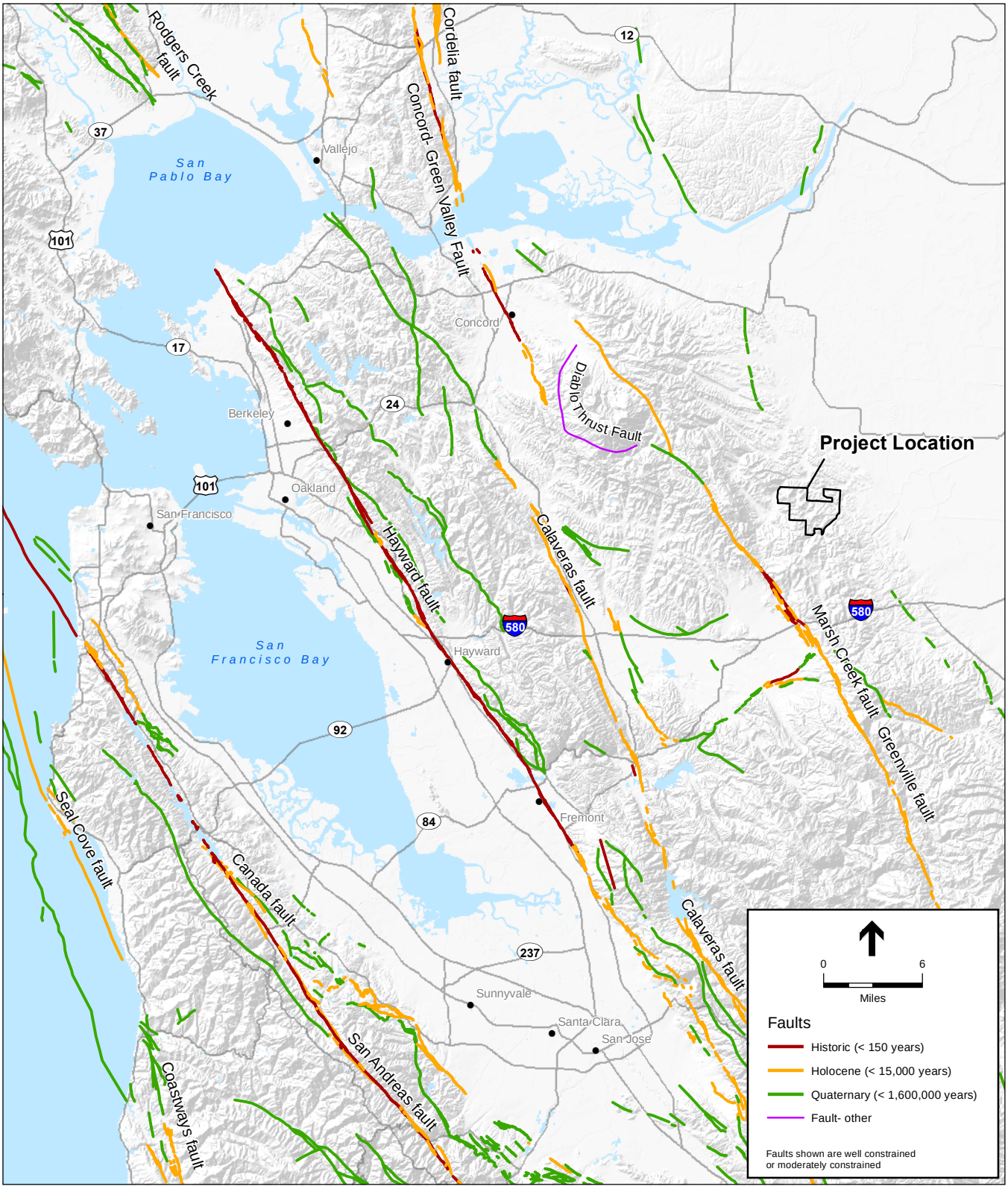
TABLE 4.7-2
ACTIVE REGIONAL FAULTS

Fault A	pproximate Distance[a] Fault	Classification	Maximum Credible Earthquake[b]
Greenville	3.7 miles west	Active	7.0
San Andreas	41 miles west	Active	8.0
Mount Diablo blind thrust	10 miles northwest	Active	6.8
Calaveras	14 miles west	Active	7.0
Hayward	22.5 miles west	Active	7.1
Concord - Green Valley	16 miles northwest	Active	7.1

[a] Distance from Tres Vaqueros Project.
[b] The maximum credible earthquake is an estimated moment magnitude (Mw) for the largest earthquake capable of occurring on a fault.

SOURCES: Jennings, 1994; Petersen et al., 1996; Hart,1997

[1] An *active* fault is defined by the CGS as a fault that has had surface displacement within Holocene time (approximately the last 11,000 years). A *potentially active* fault is a fault that has shown evidence of surface displacement during the last 1.6 million years, unless direct geologic evidence demonstrates inactivity for the last 11,000 years or longer. This definition does not mean that faults lacking evidence of surface displacement are necessarily inactive. *Sufficiently active* is also used to describe a fault if there is some evidence that Holocene surface displacement occurred on one or more of its segments or branches (Hart, 1997).



SOURCE: DOC, 2001; USGS and California Geological Survey, 2006
Microsoft Virtual Earth, 2009

Tres Vaqueros Windfarm Repowering Project . 209132.02

Figure 4.7-1
Regional Fault Map

The Greenville fault is approximately 3.7 miles from the Project area and has a calculated MCE of magnitude M 7.0. Although the San Andreas fault is 41 miles west of the Project, it has a calculated MCE of M 8.0 and could induce seismic deformations in the Project area comparable to those on the Greenville fault (Woodward Clyde Consultants, 1995). In addition, the Mount Diablo blind thrust is located about 10 miles northwest of the Project area. Blind thrust faults do not reach the earth's surface and therefore are not as easily recognized as other faults. The MCE for the Mount Diablo blind thrust is M 6.8; therefore, the Greenville and San Andreas faults remain the most likely to affect the Project area. Inactive geologic faults are present throughout the Project area. Additionally, three portions of the Project area are identified as potential sites for inactive, concealed faults (Contra Costa County, 2010).

Greenville Fault

The Greenville fault is located along the base of the hills that form the eastern margin of the Livermore Valley. The fault is recognized as a major structural feature and has demonstrated Holocene (recent) activity. An M 5.6 earthquake in 1980 produced a small amount of surface rupture on the fault south of the Project area near Vasco Road. The fault is located west of, and not within, the Project area.

San Andreas Fault

The San Andreas Fault Zone, located about 41 miles west of the Project area, is a major structural feature that forms at the boundary between the North American and Pacific tectonic plates. It is a strike-slip[2] fault, extending from the Salton Sea in Southern California near the border with Mexico to north of Point Arena, where the fault trace continues out into the Pacific Ocean. The main trace of the San Andreas fault through the San Francisco Bay Area trends northwest from the Santa Cruz Mountains to the eastern side of the San Francisco Peninsula.

The San Andreas Fault Zone was the source of the two major earthquakes in recent history that affected the San Francisco Bay region. The 1906 San Francisco earthquake was estimated at M 7.9 and resulted in approximately 290 miles of surface fault rupture, the longest of any known continental strike-slip fault. Horizontal displacement along the fault approached 17 feet near the epicenter. The 1989 Loma Prieta earthquake, with a magnitude of M 6.9, was centered in the Santa Cruz Mountains and resulted in widespread damage throughout the Bay Area. The USGS Working Group on California Earthquake Probabilities (USGS, 2008) identifies the San Andreas fault as having a 21 percent chance of generating one or more earthquakes of magnitude 6.7 or greater in the next 30 years.

Mount Diablo Blind Thrust Fault

The Mount Diablo thrust, located 10 miles northwest of the Project area, is considered a "blind" thrust fault because it ends below the earth's surface. The Mount Diablo blind thrust is a newly recognized earthquake source for the San Francisco Bay Area (USGS, 1999). Based on studies conducted by USGS it is possible that the Mount Diablo thrust fault is divided into at least two

[2] Refers to relative motion on either side of a fault which is primarily horizontal (as opposed to vertical).

structural segments. The two segments are informally referred to as the “northwest segment” and “southeast segment”. The structural boundary between the two segments is interpreted to be near the town of Alamo (USGS, 2006a). The USGS Working Group on California Earthquake Probabilities identifies the Mount Diablo thrust as having a 3 percent chance of generating one or more earthquakes of M 6.7 or greater in the next 30 years (USGS, 2008).

Calaveras Fault

The Calaveras fault, located 14 miles west of the Project area, is a major right-lateral strike-slip fault that has been active during the last 11,000 years. The Calaveras fault is located in the eastern San Francisco Bay region and generally trends from north to south along the eastern side of the Oakland Hills into the western Diablo Range, eventually joining the San Andreas Fault Zone south of Hollister. The northern extent of the fault zone is somewhat speculative and could be linked with the Concord fault.

The Calaveras fault has been the source of several moderate magnitude earthquakes, and the probability of a large earthquake (greater than M 6.7) is much lower than on the San Andreas or Hayward faults. The USGS Working Group on California Earthquake Probabilities (USGS, 2008) identifies the Calaveras fault as having a 7 percent chance of generating one or more earthquakes of M 6.7 or greater in the next 30 years.

Hayward Fault

The Hayward Fault Zone, located 22.5 miles southwest of the Project area, extends for 60 miles from San Pablo Bay in Richmond south to the San Jose area. In 1868, the Hayward Fault generated a Richter magnitude 7 earthquake on its southern segment and ruptured the ground for a distance of about 30 miles. Lateral ground surface displacement during this event was at least 3 feet.

A characteristic feature of the Hayward fault is its well-expressed and relatively consistent fault creep. Although large earthquakes on the Hayward fault have been rare since 1868, slow fault creep has continued to occur and has caused measurable offset. Fault creep on the East Bay segment of the Hayward fault is estimated at 9 millimeters per year (mm/yr) (Peterson, et al., 1996). However, a large earthquake could occur on the Hayward fault with an estimated moment magnitude of about Mw 7.1 (Table 4.7-2). The USGS Working Group on California Earthquake Probabilities (2008) identifies the Hayward–Rodgers Creek Fault Systems as having a 31 percent chance of generating one or more earthquakes of M 6.7 or greater in the next 30 years.

Concord - Green Valley Fault

The Concord - Green Valley fault, located 16 miles northwest of the Project area, extends from Walnut Creek north to Wooden Valley (east of Napa Valley). Historical record indicates that no large earthquakes have occurred on the Concord or Green Valley faults. However, a moderate earthquake of magnitude M 5.4 occurred on the Concord fault segment in 1955. The Concord and Green Valley faults exhibit active fault creep and are considered to have a small probability of causing a significant earthquake. The USGS Working Group on California Earthquake Probabilities (USGS, 2008) identifies the Concord - Green Valley fault as having a 3 percent chance of generating one or more earthquakes of magnitude 6.7 or greater in the next 30 years.

Regional Seismicity

Although no active faults have been mapped through the Project area, a seismically-active blind thrust belt underlies the Coast Range B Great Valley geomorphic boundary and passes through the eastern portion of Contra Costa County. Its location is not well established (but can be inferred to pass three to four miles east of the Project area). Earthquakes associated with the Great Valley fault system include the 1983 Coalinga earthquake and 1985 Kettleman Hills earthquake, of magnitudes 6.7 and 6.1, respectively. Additionally, two greater than 6.0 magnitude earthquakes are believed to have occurred on this fault system in 1892, with epicenters near Winters and Dixon. Similar magnitude (or larger) seismic events could originate on the segment of this fault system that passes through eastern Contra Costa County.

The precise location of the Great Valley Fault System and associated blind-thrust faults are not accurately mapped because the earthquakes on this fault system do not result in fault rupture at the ground surface. Wakabayashi and Smith (1994) have proposed preliminary segmentation of the Great Valley Fault System. In the Alameda - Contra Costa County area, a 30-kilometer-long segment with a characteristic earthquake magnitude of 6.7 is indicated. Overall, Wakabayashi and Smith state the recurrence interval for the average Great Valley Fault segment, as estimated from historical seismicity, is 360 to 440 years.

Seismic Hazards

The following discussion identifies the seismic hazards for the vicinity of the Project area and provides the initial context for further evaluation in the impact analysis.

Surface Fault Rupture

Seismically-induced ground rupture is defined as the physical displacement of surface deposits in response to an earthquake’s seismic waves. The magnitude and nature of fault rupture can vary for different faults, or even along different strands of the same fault. Ground rupture is considered most likely along active faults.

Alquist-Priolo Earthquake Fault Zones indicate areas where surface fault rupture is possible during a seismic event along a particular fault (CDMG, 2001). While the likelihood of fault rupture would be considered higher along active faults, there is potential for fault rupture to occur on faults considered to be inactive. In some cases, seismic events on active faults can trigger responses on nearby inactive faults. The Project area is not located within an Alquist-Priolo Earthquake Fault Zone, as designated by the Alquist-Priolo Earthquake Fault Zoning Act.

Ground Shaking

The USGS along with the California Geological Survey and the Southern California Earthquake Center formed the 2007 Working Group on California Earthquake Probabilities to summarize the probability of one or more earthquakes of M 6.7 or higher occurring in the State of California over the next 30 years. Due to the wide range of possible earthquake sources, it is estimated that the Bay Area has a 63 percent chance of experiencing such an earthquake (Working Group on

California Earthquake Probabilities, 2008). According to the working group, the individual faults posing the greatest threat to the Bay Area are the Hayward, San Andreas, and Calaveras faults.

As a rule, the greater the earthquake magnitude and the closer the fault rupture to a site, the greater the intensity of ground shaking. The amplitude and frequency of ground shaking is related to the size of an earthquake, the distance from the causative fault, the type of fault (e.g., strike-slip), and the response of the geologic materials at the site. Ground shaking can be described in terms of acceleration, velocity, and displacement of the ground. A common measure of ground motion during an earthquake is the peak ground acceleration (PGA). The PGA for a given component of motion is the largest value of horizontal acceleration obtained from a seismograph. PGA is expressed as the percentage of the acceleration due to gravity (g), which is approximately 980 centimeters per second squared. For comparison purposes, the maximum peak acceleration value recorded during the Loma Prieta earthquake was in the vicinity of the epicenter, near Santa Cruz, at 0.64g (ABAG, 2010c). Unlike measures of magnitude, which provide a single measure of earthquake energy, PGA varies from place to place, and is dependent on the distance from the epicenter and the character of the underlying geology (e.g., hard bedrock, soft sediments or artificial fills).

The Modified Mercalli (MM) Intensity Scale (Table 4.7-3) assigns an intensity value based on the observed effects of ground-shaking produced by an earthquake. Unlike measures of earthquake magnitude, the MM Intensity Scale is qualitative in nature (i.e. it is based on actual observed effects rather than measured values). MM intensity values for an earthquake at any one place can vary depending on its magnitude, the distance from its epicenter, and the type of geologic material. The MM values for intensity range from I (earthquake not felt) to XII (damage nearly total), and intensities ranging from IV to X could cause moderate to significant structural damage. Because the MM is a measure of ground-shaking effects, intensity values can be related to a range of PGA values, also shown in Table 4.7-3.

As discussed above, a major earthquake is likely to affect the Project area within the next 30 years, and would produce strong ground-shaking effects throughout the region. Earthquakes on active or potentially active faults, depending on magnitude and distance from the Project area, could produce a range of ground-shaking intensities. Historically, earthquakes have caused strong ground-shaking and damage in the San Francisco Bay Area, the most recent being the M 6.9 Loma Prieta earthquake in October 1989. The epicenter was approximately 50 miles southwest of the Project area, but this earthquake is estimated to have caused light (MMI V) to moderate (MMI VI) shaking intensities at the Project area (ABAG, 2010a). The largest earthquake in Bay Area history was the San Francisco Earthquake of 1906, with an estimated M 7.9, this produced moderate (MMI VI) to strong (MMI VII) shaking intensities at the Project area (ABAG, 2010a).

The highest ground motions at the Project area would be generated from an M 7.0 earthquake on the Greenville Fault. Given the relatively close distance to the fault (3.7 miles), the potential ground shaking is expected to be strong to very strong within the vicinity of the Project area (ABAG, 2010b). Additionally strong to very strong ground shaking (MMI VIII – MMI IX) would be generated at the Project area from an M 6.8 earthquake along the Mt. Diablo Thrust.

TABLE 4.7-3
MODIFIED MERCALLI INTENSITY SCALE

Intensity Value	Intensity Description	Average Peak Ground Acceleration[a]
I	Not felt except by a very few persons under especially favorable circumstances.	< 0.0017 g
II	Felt only by a few persons at rest, especially on upper floors on buildings. Delicately suspended objects may swing.	0.0017-0.014 g
III	Felt noticeably indoors, especially on upper floors of buildings, but many people do not recognize it as an earthquake. Standing motor cars may rock slightly, vibration similar to a passing truck. Duration estimated.	0.0017-0.014 g
IV	During the day felt indoors by many, outdoors by few. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.	0.014–0.039g
V	Felt by nearly everyone, many awakened. Some dishes and windows broken; a few instances of cracked plaster; unstable objects overturned. Disturbances of trees, poles may be noticed. Pendulum clocks may stop.	0.035 – 0.092 g
VI	Felt by all, many frightened and run outdoors. Some heavy furniture moved; and fallen plaster or damaged chimneys. Damage slight.	0.092 – 0.18 g
VII	Everybody runs outdoors. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving motor cars.	0.18 – 0.34 g
VIII	Damage slight in specially designed structures; considerable in ordinary substantial buildings, with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. Sand and mud ejected in small amounts. Changes in well water. Persons driving motor cars disturbed.	0.34 – 0.65 g
IX	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb; great in substantial buildings, with partial collapse. Buildings shifted off foundations. Ground cracked conspicuously. Underground pipes broken.	0.65 – 1.24 g
X	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations; ground badly cracked. Rails bent. Landslides considerable from riverbanks and steep slopes. Shifted sand and mud. Water splashed (slopped) over banks.	> 1.24 g
XI	Few, if any, (masonry) structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly.	> 1.24 g
XII	Damage total. Practically all works of construction are damaged greatly or destroyed. Waves seen on ground surface. Lines of sight and level are distorted. Objects are thrown upward into the air.	> 1.24 g

[a] Value is expressed as a fraction of the acceleration due to gravity (g). Gravity (g) is 9.8 meters per second squared. 1.0 g of acceleration is a rate of increase in speed equivalent to a car traveling 328 feet from rest in 4.5 seconds.

SOURCE: ABAG, 2010a

One useful tool that seismologists use to describe ground-shaking hazard is a probabilistic seismic hazard assessment (PSHA). The PSHA for the State of California takes into consideration the range of possible earthquake sources (including such worse-case scenarios as described above) and estimates their characteristic magnitudes in order to generate a probability map for ground-shaking. The PSHA maps depict values of peak ground acceleration (PGA) that have a 10 percent probability of being exceeded in 50 years. This probability level allows engineers to design buildings for ground motions that have a 90 percent chance of not occurring in the next 50-years, making buildings and structures safer than if they were simply designed for the most likely events (Peterson et al.1996). The PSHA indicates that at the Project area, there is a 10 percent chance of exceeding PGA values of 0.445g over the next 50 years (CGS, 2010). As indicated in Table 4.7-3, these PGAs could result in damage even in specially designed structures, causing partial collapse of some buildings.

Secondary Earthquake Hazards

Secondary earthquake hazards at the Project area include earthquake-induced land sliding, settlement, and liquefaction. Strong ground motions that occur during earthquakes are capable of inducing landslides and related forms of ground failure. The rate of rock and soil movements can vary from a slow creep over many years to sudden mass movements. Settlement is the gradual downward movement of an engineered structure (such as a building) due to the compaction of unconsolidated material below the foundation. Settlement accelerated by earthquakes can result in vertical or horizontal separations of structures or portions of one structure; cracked foundations, roads, sidewalks, and walls; and (in severe situations) building collapse and bending or breaking of underground utility lines. Soil liquefaction, a phenomenon in which soils lose strength, can result in ground failure. The soils most susceptible to liquefaction are clean, loose, uniformly graded, saturated, sands and silts. In general, upland areas have a lower liquefaction potential, except where significant alluvium is present in creek bottoms or swales. The majority of soils on the Project area are mature soils over bedrock with a low potential for liquefaction rather than loose, unstable alluvial soils (USGS, 2006b).

Other Geologic Hazards

The artificial fills and natural geology underlying the Project area present potential hazards related to slope stability, soil erosion, corrosivity, and expansive soil materials. These hazards are discussed briefly below and provide the initial context for further evaluation in the impact analysis.

Slope Failure and Slope Stability

Slope failures, commonly referred to as landslides; include many phenomena that involve the downslope displacement and movement of material, either triggered by static (i.e., gravity) or dynamic (i.e., earthquake) forces. Exposed rock slopes undergo rockfalls, rockslides, or rock avalanches, while soil slopes experience soil slumps, rapid debris flows, and deep-seated rotational slides. Slope stability can depend on several complex variables, including the geology, structure, and amount of groundwater present, as well as external processes such as climate, topography, slope geometry, and human activity. The factors that contribute to slope movements

include those that decrease the resistance in the slope materials and those that increase the stresses on the slope.

Landslides can occur on slopes of 15 percent or less, but the probability is greater on steeper slopes that exhibit old landslide features such as scarps, slanted vegetation, and transverse ridges. Landslides typically occur within slide-prone geologic units that contain excessive amounts of water or are located on steep slopes, or where planes of weakness are parallel to the slope angle.

The best available predictor of where slides and earth flows might occur is the distribution of past movements. In 1997, the USGS released a preliminary map and geographic information system (GIS) database that provides a summary of the distribution of landslides evident in the landscape of the San Francisco Bay region (USGS, 1997c). The map is a digitized nine-county compilation of existing landslides that has been used to divide the area into four landslide zones. These four zones are designated as follows:

- *Mostly Landslide*. Consists of mapped landslides, intervening areas typically narrower than 1,500 feet, and narrow borders around landslides; defined by drawing envelopes around groups of mapped landslides.
- *Many Landslides*. Consists of mapped landslides and more extensive intervening areas than in "mostly landslide;" defined by excluding areas free of mapped landslides; the outer boundaries are quadrangle and county limits to the areas in which this unit was defined.
- *Few Landslides*. Contains few, if any, large mapped landslides, but locally contains scattered small landslides and questionably identified larger landslides; defined in most of the region by excluding groups of mapped landslides, but defined directly in areas containing the "many landslides" unit by drawing envelopes around areas free of mapped landslides.
- *Flatland*. Areas of gentle slope at low elevations that have little or no potential for the formation of slumps, landslides, or earth flows, except along stream banks and terrace margins; defined by the distribution of surficial deposits.

Due to the geologic material and proximity to major regional faults, landslides are a common geomorphic feature in the upland landscape of Contra Costa County, and many hilly areas are inherently unstable. There is evidence of small, localized landslides throughout the Project area, providing evidence that this area is susceptible to earthflows during heavy winter rains (USGS, 1997c) as well as earthquake-induced landslides. Steep slopes exist throughout the Project area, with some slopes exceeding a 50 percent gradient and the Project area has been mapped as containing areas of "Mostly Landslides" with intervening areas of "Few Landslides" as designated by USGS mapping (USGS, 1997b; USGS, 1997c). Some areas of high landslide potential coincide with proposed sites for new wind turbines.

Expansive Soils

Expansion and contraction of expansive soils in response to changes in moisture content can cause differential and cyclical movements that can cause damage and/or distress to shallow founded structures and equipment. Issues with expansive soils typically occur near the ground surface where changes in moisture content typically occur. Often times, grading, site

preparations, and backfill operations associated with subsurface structures can eliminate the potential for expansion. Soils with expansive properties on the Project area are summarized in Table 4.7-1.

Soil Erosion

Erosion is the wearing away of soil and rock by processes such as mechanical or chemical weathering, mass wasting, and the action of waves, wind and underground water. Excessive soil erosion can eventually lead to damage of building foundations and roadways. Areas that are susceptible to erosion are those that would be exposed during the construction phase, especially those occurring along steep slopes. Soils with a high erosion potential in the Project area are summarized in Table 4.7-1. Typically, the soil erosion potential is reduced once the soil is graded and covered with concrete, structures, asphalt, or slope protection features.

Corrosivity

Corrosivity refers to potential soil-induced electrochemical or chemical action that could corrode or deteriorate concrete, reinforcing steel in concrete structures, and bare-metal structures exposed to these soils. The rate of corrosion is related to factors such as soil moisture, particle-size distribution, and the chemical composition and electrical conductivity of the soil. The relative, potential corrosivity of Project area soils is summarized generally in Table 4.7-1.

4.7.2.2 Regulatory Setting

Federal

There are no federal regulations related to geology, soils, and seismicity that apply to the Project.

State of California

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act was passed in 1972 to mitigate the hazard of surface faulting to structures for human occupancy. In accordance with this act, the state geologist established regulatory zones, called “earthquake fault zones,” around the surface traces of active faults and published maps showing these zones. Within these zones, buildings for human occupancy cannot be constructed across the surface trace of active faults. Each earthquake fault zone extends approximately 200 to 500 feet on either side of the mapped fault trace, because many active faults are complex and consist of more than one branch. There is the potential for ground surface rupture along any of the branches.

Title 14 of the California Code of Regulations, Section 3601(e), defines buildings intended for human occupancy as those that would be inhabited for more than 2,000 hours per year. While the Project proposes to construct habitable structures, this Act would not apply to the Project because the Project area is not within an earthquake fault zone as defined by the Act (CDMG, 2001).

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act of 1990 was developed to protect the public from the effects of strong ground-shaking, liquefaction, landslides, or other ground failure, and from other hazards caused by earthquakes. This act requires the State Geologist to delineate various seismic hazard zones and requires cities, counties, and other local permitting agencies to regulate certain development projects within these zones. Before a development permit may be granted for a site within a Seismic Hazard Zone, a geotechnical investigation of the site must be conducted and appropriate mitigation measures incorporated into the Project design.

California Building Code

The California Building Code (CBC) has been codified in the California Code of Regulations (CCR) as Title 24, Part 2. Title 24 is administered by the California Building Standards Commission, which, by law, is responsible for coordinating all building standards. Under State law, all building standards must be centralized in Title 24 or they are not enforceable. The purpose of the CBC is to establish minimum standards to safeguard the public health, safety and general welfare through structural strength, means of egress facilities, and general stability by regulating and controlling the design, construction, quality of materials, use and occupancy, location, and maintenance of all building and structures within its jurisdiction. The CBC is based on the International Building Code. The 2007 CBC is based on the 2006 International Building Code (IBC) published by the International Code Conference. In addition, the CBC contains necessary California amendments which are based on the American Society of Civil Engineers (ASCE) Minimum Design Standards 7-05. ASCE 7-05 provides requirements for general structural design and includes means for determining earthquake loads as well as other loads (flood, snow, wind, etc.) for inclusion into building codes. The provisions of the CBC apply to the construction, alteration, movement, replacement, and demolition of every building or structure or any appurtenances connected or attached to such buildings or structures throughout California.

Local

Contra Costa County General Plan

The Contra Costa County General Plan Safety Element contains goals and policies related to geology, soils, and seismicity that apply to development projects throughout the unincorporated County, including Project. These goals and policies are summarized as follows: reduce injuries and health risks resulting from the effects of earthquake-induced ground shaking on structures, facilities, and utilities; modify the location and/or design of proposed facilities or buildings in areas near active or inactive earthquake faults; establish and enforce erosion control procedures for all construction and grading projects; apply special erosion control and construction techniques to lands with slope greater than 26 percent; significant, very steep hillsides shall be considered unsuitable for types of development which require extensive grading or other land disturbance; preclude development in areas when landslides cannot be adequately repaired; structures permitted in areas of high liquefaction potential shall be sited, designed, and constructed to minimize dangers due to liquefaction; slope stability shall be a primary

consideration in the ability of land to be developed or designated for urban uses; carefully consider slope stability in the design and development of structures and in the adoption of conditions of approval and required mitigation measures; implement a soil conservation program in order to reduce soil erosion for projects which have the potential to increase waterway or hillside erosion; conduct seismic hazards studies prior to development of any significant structures; approvals of public and private development projects in areas subject to slope failures or liquefaction shall be contingent on geologic and engineering studies which define and delineate potentially hazardous conditions and recommend adequate mitigation; and require review of soil and geological reports by the County Planning Geologist (Contra Costa County, 2010).

Liquefaction Potential. The Safety Element contains a map, "Estimated Liquefaction Potential," that divides Contra Costa County into three categories: "generally high," "generally moderate to low," and "generally low." This map is used as screening criteria by the County during the processing of land development applications. The County requires rigorous evaluation of liquefaction potential in areas of "high potential," and less comprehensive investigations are demanded in areas falling within the "moderate" or "low" category. The classification "generally high" liquefaction does not guarantee the presence of liquefiable sands on a parcel. The map attempts to be conservative on the side of safety, and where geologically-recent alluvial and esturine deposits are shown on soils maps of the County, the map depicts such properties within the "generally high" category. Site specific investigations are needed to determine if liquefiable sands are present and to provide stabilization measures where liquefiable sands are confirmed.

The Safety Element includes a number of policies, some of which are summarized above, indicating that at-risk areas require evaluation of liquefaction potential and effective mitigation of the hazard posed to new development. Where improvements are proposed in even the "generally moderate to low" category, investigation of the hazard is routinely required. Where liquefiable sands are confirmed to be present, effective measures to avoid/control damage are a prerequisite to obtaining project approvals. Because the windswept ridge crests within the Project area are in the "generally low" category, quantitative evaluation of liquefaction potential is not required.

Ground Failure and Landslides. In 1975 the USGS issued photo-interpretation maps of landslides and other surficial deposits of Contra Costa County (scale: 1 inch = 2000 feet; Nilsen, 1975). That mapping is presented on Page 10-24 of the Safety Element (Contra Costa County, 2010). According to the map, there are landslides within the Project area.

It should be recognized that the USGS slides are mapped solely on the basis of photo-interpretation, without the benefit of a site visit or any subsurface data. The landslides are not classified on the basis of the activity status (i.e., active or dormant), depth of slide plane (shallow or deep seated), or type of landslide deposit. Nevertheless, the map fulfills its function, which is to red flag sites that may be at risk of landslide damage, where detailed geologic and geotechnical investigations are required to evaluate risks and develop measures to reduce risks to a practical minimum. The Safety Element includes a number of policies, some of which are summarized above, that require

evaluation of geologic hazards for land development projects proposed in areas of potential hazards. The Safety Element states that *geologic conditions should be a primary determinant of land use*.

4.7.3 Project Baseline

The environmental setting, discussed above, provides the baseline for purposes of analyzing potential impacts of the Project on geology, soils and seismicity. Within this context, approximately four of the existing wind turbines are located in areas mapped as susceptible to landslides. Additionally, the existing facilities have been subject to on-site soil conditions, including soils that are slightly erodible, have expansive characteristics, and are mildly to moderately corrosive.

4.7.4 Significance Criteria

Based on CEQA Guidelines Appendix G, a project would cause adverse impacts to geology and soils if it would:

a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

   1. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault. Refer to Division of Mines and Geology Special Publication 42;
   2. Strong seismic ground shaking;
   3. Seismic-related ground failure, including liquefaction;
   4. Landslides;

b) Result in substantial soil erosion or the loss of topsoil;

c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on-or off-site landslide, lateral spreading, subsidence, liquefaction or collapse;

d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property; or

e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste disposal systems where sewers are not available for the disposal of wastewater.

4.7.5 Discussion of No Geology and Soils Impacts

Comparison of the baseline circumstances and Project characteristics with each of the significance criteria stated above shows that there would be an impact for each of the criteria.

4.7.6 Discussion of Impacts and Mitigation Measures

a) Would the Project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

1. **Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault. Refer to Division of Mines and Geology Special Publication 42;**
2. **Strong seismic ground shaking;**
3. **Seismic-related ground failure, including liquefaction;**
4. **Landslides ?**

Impact 4.7-1: Project implementation would expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault. *(Less-than-Significant Impact)*

No Alquist-Priolo Earthquake Fault Zones have been mapped in the Project area. The closest active fault to the Project is approximately 3.7 miles away. Although seismic activity is not limited to active faults, ground rupture is typically associated with active faults. Based on the location of the Project components and the active faults in the region, the potential for surface fault rupture to affect the Project and pose a hazard to nearby structures or people would be minimal. Therefore, the potential impact of the Project to expose persons or structures to risk of ground rupture along a fault line is considered less than significant.

Mitigation: None required.

Impact 4.7-2: Project implementation would expose people or structures to potential substantial adverse effects as a result of strong seismic ground shaking. *(Less-than-Significant Impact with Mitigation Incorporated)*

The Project is likely to experience at least one major earthquake (M 6.7 or higher) within the next 30 years. The intensity of such an event would depend on the causative fault and the distance to the epicenter, the moment magnitude, and the duration of shaking. As discussed above in the description of the setting, in an unlikely event, ground-shaking could exceed PGA values of 0.445g (depending on soil characteristics) in the next 50 years. This range of values correspond to MM Shaking Intensity VIII (strong to very-strong), which could cause considerable damage to older, poorly built structures, and slight damage to structures built according to modern building codes. Substantial cracks could appear in the ground, and the shaking could cause other secondary damaging effects, such as the failure of underground utilities. This level of ground-shaking may possibly induce soil liquefaction and other secondary ground-shaking effects, which

are discussed under Impact 4.7-3, below. Because the Project would potentially expose people to harm or structures to damage from strong ground shaking, this impact is considered potentially significant.

Several laws and policies impose stringent seismic safety requirements on the design and construction of new structures. Structures in California that require compliance with the California Building Code are subject to seismic design requirements. Specifically, the design must be based on seismic design criteria that reflect the nature and magnitude of maximum ground motions that can be reasonably expected. These seismic design criteria allow engineers to apply appropriate building codes and design structures to withstand the effects of earthquakes. In addition, County General Plan policies regarding mitigation of seismic and geologic hazards are applicable to the Project and would require the applicant to reduce injuries and health risks resulting from the effects of earthquake ground shaking on structures, facilities, and utilities as well as conduct seismic hazards studies prior to development of any significant structures.

Predicting seismic events is not possible, nor is providing mitigation that can entirely reduce the potential for injury and damage that can occur during a seismic event. As described above in the discussion on Setting, the entire Project area is likely to encounter seismic groundshaking and secondary seismic hazards. Many of these hazards are already present for the existing facilities and would not be significantly increased as a result of implementation of the Project. However, following current building codes, using accepted geotechnical evaluation techniques, and standard, accepted engineering remedies can substantially reduce the potential for injury and damage, thereby exposing fewer people and less property to the effects of a major damaging earthquake. Geotechnical characterization of Project areas and incorporation of seismic design criteria into final project designs is standard practice in California and required by the CBC. As described in the Chapter 3, *Project Description*, a geotechnical report would be prepared to identify the appropriate turbine foundation design and building design. Use of standard seismic engineering design criteria and accepted construction methods will help to mitigate potential damage from an earthquake. However, these practices would not completely address the potential for damage to the Project, and additional studies are required to adequately characterize the potential for substantial adverse effects to people or structures as a result of strong seismic ground shaking. Implementation of the following mitigation measure would further ensure that strong seismic ground shaking would have a less-than-significant impact on the Project.

Mitigation Measure 4.7-2: The Applicant shall comply with and implement all of the following measures designed to reduce potential substantial adverse effects resulting from strong seismic ground shaking:

(A) A California licensed geotechnical engineer and engineering geologist shall perform a comprehensive geotechnical investigation of all Project facilities based on adequate subsurface exploration, laboratory testing of selected samples, and engineering/ geologic analysis of the data gathered. The information shall be compiled and presented as a geotechnical report that provides an evaluation of potential seismic and geologic hazards, and provides 2007 CBC seismic design parameters, along with providing specific standards and criteria for site grading, drainage and foundation design.

(B) The Project geotechnical engineer or engineering geologist shall prepare an Original Geologic Map of the Project area based on subsurface exploration, field geologic mapping and interpretation of historic aerial photographs. The map shall show the details of site geologic conditions, including lithologic units (i.e., bedrock units/stratigraphy), geologic structure, and the distribution of surficial deposits (e.g. colluvium, landslides and artificial fill).

(C) The information shall be compiled and presented as a geotechnical report that provides an evaluation of potential seismic hazards, including secondary seismic ground failures such as liquefaction and collapse, lateral spread and earthquake induced settlement, and other geologic hazards, and provides 2007 CBC seismic design parameters, along with providing specific standards and criteria for site grading, drainage and foundation design.

(D) The geotechnical report shall be subject to technical review by the County Peer Review Geologist and review and approval by the County Zoning Administrator prior to issuance of grading permits or building permits. The recommendations in the approved geotechnical report shall be incorporated into the design and construction specifications and shall be implemented during build-out of the Project. Also prior to issuance of grading or building permits, the Project geotechnical engineer or engineering geologist shall review grading and improvement plans to verify their consistency with the recommendations in the approved geotechnical report.

(E) The Project geotechnical engineer shall provide observation and testing services during grading and foundation-related work, and shall submit a grading completion report to the County prior to requesting the final inspection. This report shall provide full documentation of the geotechnical monitoring services provided during construction, including the results of ASTM testing as well as geologic mapping of all cut slopes that are constructed. The Final Grading Report shall also certify compliance of the as-built Project with the recommendations in the approved geotechnical report.

Significance of Impact after Mitigation: Less than Significant.

Impact 4.7-3: In the event of a major earthquake in the region, people and property could be exposed to seismically-induced ground failure, including liquefaction, lateral spreading and earthquake-induced settlement. *(Less-than-Significant Impact with Mitigation Incorporated)*

Several locations within the Project area may be subject to secondary ground shaking effects that occur primarily as a result of soils with poor strength characteristics and shallow groundwater. As indicated above in the discussion of the Project's setting, these effects include liquefaction and secondary ground failures associated with liquefaction, including lateral spreading and post-liquefaction settlement. The soils most susceptible to liquefaction are clean, loose, uniformly graded, saturated, sands, and silts. The majority of soils in the Project area are mature soils over bedrock with a low potential for liquefaction. A small area in southeastern portion of the Project area is designated as having moderate liquefaction susceptibility (ABAG, 2010b). However, no

structures are proposed for these areas. There is a potential for lay down areas and access roads to be damaged from seismically-induced liquefaction, but these would be repaired or replaced following emergency inspection and repair.

Based on existing geologic conditions, the Project facilities would not be expected to be adversely impacted by seismic-related ground failure. Regardless, soils may exist in the Project area that could liquefy even at relatively low ground accelerations. Specific estimates of liquefaction, lateral spread and post-liquefaction settlement have not been developed for the Project area. Without proper soil engineering and structural design, liquefaction, lateral spread and settlement could damage proposed buildings and foundations. In a major regional earthquake, liquefaction, lateral spread or rapid settlement could damage proposed structures or harm people. Consequently, this impact is considered potentially significant. However, seismically-induced ground failure hazards are evaluated as a standard practice in design-level geotechnical investigations such as would be conducted as part of Mitigation Measure 4.7-2. Incorporation of measures recommended by the consulting geotechnical engineer into the Project design specifications would ensure that the potential impacts to people and property due to seismic-related ground failure would be reduced to less-than-significant levels.

Significance of Impact after Mitigation: Less than Significant.

---

b) Would the Project result in substantial soil erosion or the loss of topsoil?

Impact 4.7-4: Project implementation would result in substantial erosion or loss of topsoil. (*Less-than-Significant Impact)*

The preliminary stages of construction, especially site grading, stripping, and soil stockpiling would leave loose soil exposed to the erosive forces of rainfall and high winds. Erosion and loss of topsoil could be problematic in areas underlain by soils with a high runoff and erosion potential. In particular, soil erosion would be a concern on the Project area where the terrain is steeply sloped and where new and improved access roads and staging/laydown areas are proposed. Intense rain or wind events in such areas could result in substantial soil erosion into adjacent waterways, and possible propagation of small rills or gullies. Increased surface water runoff, and entrainment of sediment in runoff, is just as much a concern as soil erosion. It is both processes (surface runoff and disturbed soils) that must be managed, and the principal concern for the Project relates more to water quality impacts (see Section 4.10, *Hydrology and Water Quality*) than loss of topsoil resources or impacts from the formation of rills, channels or gullies. In the event that rills or gullies form, the features would not significantly undermine the wind turbine footings and any degradation of access roads would be minimized from design and installation of culverts, which would be designed in accordance with County standards and other proposed drainage improvements. Soil erosion and associated rilling or gullying that could pose a threat to the proposed facilities would be detected and repaired through the routine inspection and maintenance procedures discussed in the Chapter 3, *Project Description*.

As discussed in Chapter 3, *Project Description*, a Storm Water Pollution Prevention Plan (SWPPP) would be developed with the civil design of the Project. The SWPPP would include erosion control measures and design features that utilize Construction Water Quality Best Management Practices (BMPs) to avoid or minimize soil erosion and off-site sediment transport. Because soil surface disturbance for the Project would be greater than one acre, specific erosion control measures would be identified as part of the National Pollutant Discharge Elimination System (NPDES) permit and SWPPP required for construction. Examples of typical construction BMPs include scheduling or limiting activities to certain times of the year; installing sediment barriers such as silt fence and fiber rolls along the perimeter of the construction area; maintaining equipment and vehicles used for construction in good working order; soil-track-out controls, such as stabilizing entrances to the construction-site; and developing and implementing a spill prevention and cleanup plan. The SWPPP (and associated BMPs) would be prepared and implemented prior to commencing construction, and BMP effectiveness would be ensured through the sampling, monitoring, reporting, and record keeping requirements contained in the construction general permit. In addition, the general construction permit required under the NPDES program would require that the topsoil be preserved in areas requiring grading in order to ensure proper implementation of post-construction BMPs for site restoration.

Additional post-construction BMPs that would be required under the SWPPP would restore the work sites to their original condition (such as reseeding of disturbed areas), thereby preventing or minimizing long-term erosion problems. As discussed in more detail in Section 4.10, *Hydrology and Water Quality*, additional and/or more specific measures in the SWPPP (i.e., measures that are not explicitly required as part of the General Construction Permit or the SWPPP) have been specified in Mitigation Measures 4.10-3 in order to adequately address local conditions that present an erosion risk. Therefore, impacts related to substantial or accelerated soil erosion or loss of topsoil during and following construction of the Project would be less than significant.

Mitigation: None required.

---

c) Would the Project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on-or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

Impact 4.7-5: Project implementation would expose people or structures to potential substantial adverse effects as a result of landslides. (*Less-than-Significant Impact with Mitigation Incorporated)*

Landslides have been identified and mapped by the USGS as part of different Bay Area-wide studies of debris flows and landslides (USGS, 1997c). Due to the geologic material and proximity to major regional faults, landslides are a common geomorphic feature in the upland landscape of Contra Costa County, and many hilly areas are inherently unstable. As indicated above in the discussion of the Project's setting, there is evidence of small, localized landslides throughout the Project area, providing evidence that this area is susceptible to earthflows during heavy winter

rains (USGS, 1997c) as well as earthquake-induced landslides. Steep slopes exist throughout the Project area, with many slopes exceeding a 50 percent gradient. The staging and laydown areas are located in areas where slopes range between 9 to 30 percent gradients. However, areas of proposed new wind turbines, access roads, and road improvements are located in or immediately adjacent to areas of steep slopes where gradients exceed 30 percent. Road construction, site grading operations, and site drainage must be carefully planned and managed in order to avoid causing or increasing the potential for landslides.

Grading and excavations associated with new or improved access roads, staging areas, and wind turbine foundations could create unstable conditions, or exacerbate existing landslide risks. Therefore, the potential for continuing small-scale slope failures (consisting mainly of earth-flows and soil-slumps) to affect Project development is considered a potentially significant impact. If improperly performed, cuts into hillsides could remove material that is needed to support the upland material, and road or staging area fills could slough or slump if they result in over-steepened slopes. The Contra Costa General Plan requires project applicants to consider slope stability in the design and development of buildings and other project elements (Contra Costa County, 2010). As a result, construction activities in the County generally do not create new areas of instability.

However, because landslides and other types of slope failure have the potential to undermine foundations, cause distortion and distress to structures, and displace or destroy Project components, Project activities involving significant cuts into sloped terrain could result in a significant impact. Implementation of Mitigation Measures 4.7-5a and 4.7-5b would ensure that site-specific conditions are understood and that construction and grading plans are designed to minimize the risk of slope instabilities. With implementation of this mitigation measure, these effects would be less than significant.

Mitigation Measure 4.7-5: Perform Site-Specific Slope Stability Evaluation. The Applicant shall perform a site-specific slope stability evaluation for Project improvements that require grading or excavation in areas where slopes exceed 30 percent. The slope stability evaluation shall assess the localized potential for slope instability in these areas, and shall identify appropriate design and construction measures to incorporate into final Project plans. The site-specific slope stability evaluation shall include, but not be limited to, the following measures:

(A) Where landslides are confirmed within or immediately adjacent to planned improvements, provide a slope stability evaluation (report) for static and pseudo-static conditions. The approach utilized shall be consistent with the California Geological Survey, 2008, *Guidelines for Evaluating and Mitigating Seismic Hazards in California* (CGS Special Publication 117A) or other generally accepted methodology. The Project geologic consultant shall explain the methodology used and justify the assumptions that are made regarding the engineering properties of soil, rock and saturation.

(B) The slope stability evaluation report shall provide specific geotechnical design measures to achieve long-term stability. These shall include, but will not necessarily be limited to, corrective grading of landslides or colluvial wedges that present the

potential to effect improvements. Additionally, standard practices such as minimizing the amount of grading required in areas that are deemed to be stable in their existing condition; installing adequate drainage; avoiding grading activities and excavations during and immediately following periods of heavy rainfall; geotechnical monitoring of slopes for stability during construction; minimizing the gradient of engineered slope; following natural topography; and, salvaging topsoil for use during final grading to facilitate revegetation, shall be implemented during construction.

(C) For construction requiring excavations, such as foundations, appropriate support and protection measures shall be implemented to maintain the stability of excavations and to protect construction worker safety. Where excavations are adjacent to existing structures, utilities, or other features that may be adversely affected by potential ground movements, bracing, underpinning, or other methods of support for the affected facilities shall be implemented.

Mitigation Measure 4.7-4b: The slope stability evaluation shall be subject to technical review by the County Peer Review Geologist and review and approval by the County Zoning Administrator prior to issuance of grading permits or building permits. The recommendations in the approved slope stability evaluation shall be incorporated into the design and construction specifications and shall be implemented during build-out of the Project. Also prior to issuance of grading or building permits, the Project geotechnical engineer or engineering geologist shall review grading and improvement plans to verify their consistency with the recommendations in the approved slope stability evaluation.

Significance of Impact after Mitigation: Less than Significant.

---

d) Would the Project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code, creating substantial risks to life or property?

Impact 4.7-6: Project implementation would occur on expansive soils, creating risks to life and property. (*Less-than-Significant Impact)*

Portions of the Project are situated on soils with moderate to high expansion potential. Expansive soils may cause structural damage over a long period of time, usually as the result of inadequate soil and foundation engineering or placement of structures directly on expansive soils. The Project area may also contain soils that possess corrosive properties. If improperly designed or installed, foundations constructed in areas with expansive or corrosive soils could be damaged over a long period of time. However, the soil conditions present in the Project area are not particularly unique in comparison to other areas nor do they represent a significant impediment to the Project.

The Project would be required to adhere to all applicable standards of the California Building Code and would employ standard engineering and building practices common to construction projects throughout California. Structural foundations and utilities would be designed to accommodate expected soil movements or would be placed within imported sand or gravel or other backfill material. Depending on the nature of the facilities and the characteristics of the soils at each specific work site, the standards and recommendations could require a variety of

mitigation approaches, including specialized foundation design; over-excavation and placement of clean, non-expansive engineered fill prior to construction; and/or other measures to reduce concerns related to expansive and corrosive soils, consistent with the prevailing engineering standard of care. Because soil conditions are not unique or particularly hazardous, and methods to address expansive and corrosive soils are common engineering practices, this impact is considered less than significant.

Mitigation: None required.

---

e) Would the Project have soils incapable of adequately supporting the use of septic tanks or alternative waste disposal systems where sewers are not available for the disposal of wastewater?

Impact 4.7-7: Project implementation could require installation of septic tanks or alternative waste disposal systems in an area containing unsuitable soils. (*Less-than-Significant Impact*)

Wastewater generated at the operations and maintenance building would be collected by a septic system. Demolition of the existing building would require installation of a new septic system. Installation of the septic system would require a permit issued by the Contra Costa County Health Services Department. As a result, the soils present at the location of the operations and maintenance building would have to be suitable to support such a system. In order obtain the permit, the applicant would have to demonstrate that soil conditions would be adequate to support proposed septic systems by conducting a percolation test. Soils can have a maximum percolation rate of 40 minutes per inch (CCCHS, 2010). Additionally the system could not be placed on a slope greater than 20 percent. If soil and site conditions are inadequate to support a standard septic system, special designs would be required or the system would not be permitted. Through adherence to the described regulations, this impact would be less than significant.

Mitigation: None required.

4.8 Greenhouse Gas Emissions

4.8.1 Introduction

This section analyzes the Project's relationship to greenhouse gas (GHG) emissions. Discussed are the physical and regulatory setting; the baseline for determining environmental impacts; the criteria used for determining the significance of environmental impacts; potential impacts associated with decommissioning the existing windfarm and construction, operation, maintenance, and decommissioning of the repowering Project; and mitigation measures to reduce or avoid environmental impacts determined to be potentially significant.

4.8.2 Setting

4.8.2.1 Background on Greenhouse Gases and Climate Change

Section 3.1.2, *Location*, provides general information about the regional and local setting. This section (4.8.2.1) provides setting information specific to GHG emissions.

Gases that trap heat in the atmosphere are called GHGs. What GHGs have in common is that they allow sunlight to enter the atmosphere, but trap a portion of the outward-bound infrared radiation, which warms the air. The process is similar to the effect greenhouses have in raising the internal temperature, hence the name GHGs. Both natural processes and human activities emit GHGs. The accumulation of GHGs in the atmosphere regulates the Earth's temperature; however, emissions from human activities such as fossil fuel-based electricity production and the use of motor vehicles have elevated the concentration of GHGs in the atmosphere. This accumulation of GHGs has contributed to an increase in the temperature of the Earth's atmosphere and has contributed to global climate change. Global climate change is a change in the average weather on earth that can be measured by wind patterns, storms, precipitation, and temperature. Although there is disagreement as to the rate of global climate change and the extent of the impacts attributable to human activities, most in the scientific community agree that there is a direct link between increased emissions of GHGs and long term global temperature increases.

The principal GHGs are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulfur hexafluoride (SF_6), perfluorocarbons (PFCs), and hydrofluorocarbons (HFCs). CO_2 is the most common reference gas for climate change. To account for the warming potential of GHGs, GHG emissions are often quantified and reported as CO_2 equivalents (CO_2e). For example, SF_6 is a GHG commonly used in the utility industry as an insulating gas in circuit breakers and other electronic equipment. SF_6, while comprising a small fraction of the total GHGs emitted annually world-wide, is a much more potent GHG with 23,900 times the global warming potential as CO_2. Large emission sources are reported in million metric tons of CO_2e.[1]

[1] A metric ton is 1,000 kilograms; it is equal to approximately 1.1 U.S. tons and approximately 2,204.6 pounds.

Some of the potential effects in California of global warming may include loss in snow pack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years (CARB, 2009a). Globally, climate change has the potential to impact numerous environmental resources through potential, though uncertain, impacts related to future air temperatures and precipitation patterns. The projected effects of global warming on weather and climate are likely to vary regionally, but are expected to include the following direct effects (IPCC, 2001):

- Higher maximum temperatures and more hot days over nearly all land areas;
- Higher minimum temperatures, fewer cold days and frost days over nearly all land areas;
- Reduced diurnal temperature range over most land areas;
- Increase of heat index over land areas; and
- More intense precipitation events.

Also, there are many secondary effects that are projected to result from global warming, including global rise in sea level, impacts to agriculture, changes in disease vectors, and changes in habitat and biodiversity. While the possible outcomes and the feedback mechanisms involved are not fully understood and much research remains to be done, the potential for substantial environmental, social, and economic consequences over the long term may be great.

The California Air Resources Board (CARB) estimated that, in 2008, California produced 478 million gross metric tons of CO_2e emissions (CARB, 2010). CARB found that transportation was the source of 37 percent of the State's GHG emissions; followed by electricity generation at 24 percent, and industrial sources at 19 percent.

4.8.2.2 Regulatory Setting

Federal

The federal Clean Air Act (CAA) requires the U.S. Environmental Protection Agency (USEPA) to define national standards to protect U.S. public health and welfare. The federal CAA does not specifically regulate GHG emissions; however, the U.S. Supreme Court has determined that GHGs are pollutants that can be regulated under the federal CAA. There are currently no federal regulations that set ambient air quality standards for GHGs.

State of California

Executive Order S-3-05

In 2005, in recognition of California's vulnerability to the effects of climate change, Governor Schwarzenegger established Executive Order S-3-05, which set forth a series of target dates by which statewide emissions of GHGs would be progressively reduced, as follows:

- By 2010, reduce GHG emissions to 2000 levels;
- By 2020, reduce GHG emissions to 1990 levels; and
- By 2050, reduce GHG emissions to 80 percent below 1990 levels.

Recently, on April 12, 2011 Governor Brown, signed SBX1-2 which essentially puts S-14-08 in to the state code and established the 33 percent renewable portfolio as the State target by December 31, 2020.

Assembly Bill 32 – California Global Warming Solutions Act

California Assembly Bill 32 (AB 32), the Global Warming Solutions Act of 2006, requires CARB to establish a statewide GHG emissions cap for 2020 based on 1990 emission levels. AB 32 required CARB to adopt regulations by January 1, 2008, that identify and require selected sectors or categories of emitters of GHGs to report and verify their statewide GHG emissions, and CARB is authorized to enforce compliance with the program. Under AB 32, CARB was also required to adopt, by January 1, 2008, a statewide GHG emissions limit equivalent to the statewide GHG emissions levels in 1990, which must be achieved by 2020. CARB established this limit, in December 2007, at 427 million metric tons of CO_2e. This is approximately 30 percent below forecasted "business-as-usual" emissions of 596 million metric tons of CO_2e, and about 10 percent below average annual GHG emissions during the period of 2002 through 2004 (CARB, 2009a).

On December 16, 2010 CARB adopted rules and regulations (which are to become operative January 1, 2012), to achieve the maximum technologically feasible and cost-effective GHG emission reductions. AB 32 permits the use of market-based compliance mechanisms to achieve those reductions. AB 32 also requires CARB to monitor compliance with and enforce any rule, regulation, order, emission limitation, emissions reduction measure, or market-based compliance mechanism that it adopts.

In June 2007, CARB directed staff to pursue 37 early strategies for reducing GHG emissions under AB 32. The broad spectrum of strategies that were developed, including a Low Carbon Fuel Standard, regulations for refrigerants with high global warming potentials, guidance and protocols for local governments to facilitate GHG reductions, and green ports, reflects that the serious threat of climate change requires action as soon as possible.

In addition to approving the 37 GHG reduction strategies, CARB directed staff to further evaluate early action recommendations made at its June 2007 meeting, and to report back to CARB within six months. The general sentiment of CARB suggested a desire to try to pursue greater GHG emissions reductions in California in the near-term. Since the June 2007 CARB hearing, CARB staff has evaluated all 48 recommendations submitted by stakeholders and several internally-generated staff ideas and published the *Expanded List of Early Action Measures To Reduce Greenhouse Gas Emissions In California Recommended For Board Consideration* in September 2007 (CARB, 2007). CARB adopted nine Early Action Measures for implementation, including Ship Electrification at Ports, Reduction of High Global-Warming-Potential Gases in Consumer Products, Heavy-Duty Vehicle Greenhouse Gas Emission Reduction (Aerodynamic Efficiency), Reduction of Perfluorocarbons from Semiconductor Manufacturing, Improved Landfill Gas Capture, Reduction of Hydroflourocarbon-134a from Do-It-Yourself Motor Vehicle Servicing, Sulfur Hexaflouride Reductions from the Non-Electric Sector, a Tire Inflation Program, and a Low Carbon Fuel Standard.

Climate Change Scoping Plan

In December 2008, CARB approved the AB 32 Scoping Plan outlining the State's strategy to achieve the 2020 GHG emissions limit (CARB, 2009a). This Scoping Plan, developed by CARB in coordination with the Climate Action Team (CAT), proposes a comprehensive set of actions designed to reduce overall GHG emissions in California, improve the environment, reduce dependence on oil, diversify California's energy sources, save energy, create new jobs, and enhance public health. The measures in the Scoping Plan will be developed over the next one to two years and be in place by 2012.

The Scoping Plan expands the list of the nine Early Action Measures into a list of 39 Recommended Actions contained in Appendices C and E of the Scoping Plan. These measures are presented in Table 4.8-1.

In addition, the Scoping Plan identifies challenges to meeting future electrical demand, including building transmission lines for renewables and modernizing electricity infrastructure. The Plan states:

> "Population growth in hot areas and the need to reach remote renewable generation regions both require adding electricity transmission capability. Without new transmission lines, a 33 percent target for the Renewable Portfolio Standard (RPS) is unlikely to be met. Equally important to building transmission is modernizing the transmission and electricity distribution system. Advanced control, communications, and metering technologies, as well as improvements in control of both conventional and renewable generation, can create a more reliable, resilient grid." (CARB, 2009a)

CEQA Guidelines Revisions

In 2007, the State Legislature passed Senate Bill 97, which required amendment of the State CEQA Guidelines to incorporate analysis of, and mitigation for, GHG emissions from projects subject to CEQA. The California Natural Resources Agency adopted these amendments on December 30, 2009, and they took effect March 18, 2010, after review by the Office of Administrative Law and filing with the Secretary of State for inclusion in the California Code of Regulations.

The Guidelines revisions include a new section (Sec. 15064.4) that specifically addresses the potential significance of GHG emissions. Section 15064.4 calls for a "good-faith effort" to "describe, calculate or estimate" GHG emissions; Section 15064.4 further states that the analysis of the significance of any GHG impacts should include consideration of the extent to which the project would increase or reduce GHG emissions; exceed a locally applicable threshold of significance; and comply with "regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions." The new Guidelines also state that a project may be found to have a less-than-significant impact on GHG emissions if it complies with an adopted plan that includes specific measures to sufficiently reduce GHG emissions (Sec. 15064(h)(3)). Importantly, however, the Guidelines do not require or recommend a specific analytical methodology or provide quantitative criteria for determining the significance of GHG emissions.

TABLE 4.8-1
RECOMMENDED ACTIONS OF CLIMATE CHANGE SCOPING PLAN

ID #	Sector	Strategy Name
T-1	Transportation	Pavley I and II – Light-Duty Vehicle GHG Standards
T-2	Transportation	Low Carbon Fuel Standard (Discrete Earl Action)
T-3	Transportation	Regional Transportation-Related GHG Targets
T-4	Transportation	Vehicle Efficiency Measures
T-5	Transportation	Ship Electrification at Ports (Discrete Early Action)
T-6	Transportation	Goods-movement Efficiency Measures
T-7	Transportation	Heavy Duty Vehicle Greenhouse Gas Emission Reduction Measure – Aerodynamic Efficiency (Discrete Early Action)
T-8	Transportation	Medium and Heavy-Duty Vehicle Hybridization
T-9	Transportation	High Speed Rail
E-1	Electricity and Natural Gas	Increased Utility Energy efficiency programs; More stringent Building and Appliance Standards
E-2	Electricity and Natural Gas	Increase Combined Heat and Power Use by 30,000 Gigawatt hours
E-3	Electricity and Natural Gas	Renewables Portfolio Standard
E-4	Electricity and Natural Gas	Million Solar Roofs
CR-1	Electricity and Natural Gas	Energy Efficiency
CR-2	Electricity and Natural Gas	Solar Water Heating
GB-1	Green Buildings	Green Buildings
W-1	Water	Water Use Efficiency
W-2	Water	Water Recycling
W-3	Water	Water System Energy Efficiency
W-4	Water	Reuse Urban Runoff
W-5	Water	Increase Renewable Energy Production
W-6	Water	Public Goods Charge (Water)
I-1	Industry	Energy Efficiency and Co-benefits Audits for Large Industrial Sources
I-2	Industry	Oil and Gas Extraction GHG Emission Reduction
I-3	Industry	GHG Leak Reduction from Oil and Gas Transmission
I-4	Industry	Refinery Flare Recovery Process Improvements
I-5	Industry	Removal of Methane Exemption from Existing Refinery Regulations
RW-1	Recycling and Waste Management	Landfill Methane Control (Discrete Early Action)
RW-2	Recycling and Waste Management	Additional Reductions in Landfill Methane – Capture Improvements
RW-3	Recycling and Waste Management	High Recycling/Zero Waste
F-1	Forestry	Sustainable Forest Target
H-1	High Global Warming Potential (GWP) Gases	Motor Vehicle Air Conditioning Systems (Discrete Early Action)
H-2	High GWP Gases	SF_6 Limits in Non-Utility and Non-Semiconductor Applications (Discrete Early Action)
H-3	High GWP Gases	Reduction in Perfluorocarbons in Semiconductor Manufacturing (Discrete Early Action)
H-4	High GWP Gases	Limit High GWP Use in Consumer Products (Discrete Early Action, Adopted June 2008)
H-5	High GWP Gases	High GWP Reductions from Mobile Sources
H-6	High GWP Gases	High GWP Reductions from Stationary Sources
H-7	High GWP Gases	Mitigation Fee on High GWP Gases
A-1	Agriculture	Methane Capture at Large Dairies

SOURCE: CARB, 2009a.

Bay Area Air Quality Management District

On September 15, 2010, the Bay Area Air Quality Management District (BAAQMD) Board of Directors adopted the final *Bay Area 2010 Clean Air Plan* (2010, CAP). The 2010 CAP control strategies include revised, updated, and new measures in the three traditional control measure categories, including stationary sources measures, mobile source measures, and transportation control measures. In addition, the Bay Area 2010 CAP indentifies two new categories of control measures, including land use and local impact measures and energy and climate measures (BAAQMD, 2010), which includes specific significance thresholds for GHG emissions. Separate GHG thresholds are established for operational emissions from stationary sources and non-stationary sources. The stationary source threshold is 10,000 metric tons per year. For non-stationary sources, three separate thresholds are established:

- Compliance with Qualified GHG Reduction Strategy (i.e., if a project is found to be out of compliance with a Qualified GHG Reduction Strategy, its GHG emissions may be considered significant); or
- 1,100 metric tons of CO_2e per year; or
- 4.6 metric tons CO_2e per service population per year (service population is the sum of residents plus employees expected for a development project).

Contra Costa County

Contra Costa County General Plan

The Contra Costa County General Plan Conservation Element contains a discussion on renewable energy resources (Section 8.8) that identifies general goals and policies designed to encourage the use of renewable resources, such as wind-generated energy, where such resources are compatible with the maintenance of the environment (Contra Costa County, 2010). The Conservation Element also contains an air quality resources discussion (Section 8.14) that identifies general goals and policies designed to address air pollution. The goals and policies tend to focus on improvements to the transportation system, reducing long distance commuting, encouraging and supporting non-auto transportation, and reducing future land use conflicts related to air pollution (Contra Costa County, 2010). Although Section 8.14 is geared toward criteria pollutants, such as ozone and particulate matter, implementation of the stated goals and policies also benefit efforts to reduce GHG emissions. The Project would not conflict with the goals or policies identified in the Contra Costa County General Plan Conservation Element.

Contra Costa County Climate Change Working Group

In May 2005, the Board of Supervisors convened department heads in a Climate Change Working Group (CCWG) to identify existing County activities and policies that could potentially reduce GHG emissions. The CCWG is comprised of the Agricultural Commissioner, the Deputy Director of Building Inspection, and the Directors of Conservation and Development, General Services, Health Services, and Public Works. In November 2005, the CCWG presented a climate protection report to the Board of Supervisors, which included a list of existing and potential GHG reduction

measures. To quantify Contra Costa County's current GHG emissions and to evaluate the impact of these GHG reduction measures, the Board of Supervisors approved a resolution in February 2007 to join Local Governments for Sustainability (formerly known as the International Council for Local Environmental Initiatives (ICLEI)) and to conduct a GHG emissions inventory of Contra Costa County's countywide and municipal emissions. Upon completion of the inventory and associated report, the Board of Supervisors approved a resolution in October 2007 to complete a climate action plan for the County's municipal facilities and operations, funded by a grant from the BAAQMD (Contra Costa County, 2008). In December 2008, the Contra Costa County Municipal Climate Action Plan was adopted; however, the plan is geared toward the County's municipal operations and is not directly applicable to the Project.

4.8.3 Project Baseline

Baseline conditions reflect the operation of the site as a windfarm, including operations and maintenance-related vehicle trips and maintenance activities. Although the existing turbines were not operating in Spring 2009 when the Notice of Preparation (NOP) was issued for this EIR, the baseline conditions for this analysis are the conditions of the operating wind farm, just prior to the 2009 shutdown, when 60 of the existing turbines were operating. For the purposes of this analysis, a three-year average of annual power production data for the wind farm from 2006 to 2008 of approximately 25,000 megawatt-hours per year (MWh/year) was used to serve as baseline wind farm power generation for the Project.

4.8.4 Significance Criteria

Based on CEQA Guidelines Sections 15064.4 and 15064.7(c), as well as Appendix G, a project would cause adverse impacts associated with greenhouse gas emissions if it would:

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

b) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

Approach to Analysis

As mentioned above, the BAAQMD recently adopted an approach for assessing GHG-related impacts in CEQA review documents. The BAAQMD's *CEQA Air Quality Guidelines* identify qualitative and quantitative operations-related thresholds of significance that can be applied to the significance criteria listed above. With the exception of minor GHG emissions that would be associated with the substation, the Project would primarily consist of non-stationary sources, such as those that would be generated during construction activities. For projects other than stationary sources, the proposed threshold is noncompliance with a qualified climate action plan or if it would result in annual operational emissions of more than 1,100 metric tons CO_2e per year. This threshold is more conservative than that for stationary sources (i.e., 10,000 metric tons CO_2e per year). Therefore, for the purposes of this analysis, Project-related direct and indirect GHG emissions

would be considered to result in a significant cumulative impact on the environment if the emissions would be more than 1,100 metric tons CO_2e per year.

The BAAQMD Guidelines do not identify an approach to assessing the significance of construction-related GHG emissions. However, the South Coast Air Quality Management District (SCAQMD) has adopted an approach for assessing construction emissions that includes amortizing construction emissions over the life span of the project, defined as 30 years, then adding those emissions to the operational emissions, and then comparing the combined emissions to the applicable GHG significance threshold (SCAQMD, 2008). Therefore, in the absence of a BAAQMD-recommended approach for assessing construction GHG emissions, this analysis adopts the SCAQMD's recommended approach of amortizing construction emissions over a 30 year period and comparing combined construction and operational emissions to the applicable GHG significance threshold, which in this case is the BAAQMD non-stationary source threshold of 1,100 metric tons CO_2e per year.

There is no qualified climate action plan for Contra Costa County that would be applicable to the Project. However, the Project's potential to conflict with applicable plan, policy, or regulation adopted for the purpose of reducing emission of GHG is assessed by examining any conflicts with the GHG reduction goals set forth in AB 32, including the potential for the project to conflict with the 39 Recommended Actions identified by CARB in its Climate Change Scoping Plan, which includes nine Early Action Measures.

4.8.5 Discussion of No Impacts on GHG Emissions

As discussed in Section 4.8.6, analysis of the Project characteristics relative to the baseline and significance criteria shows that the Project would have impacts with respect to each of the criteria.

4.8.6 Discussion of Impacts and Mitigation Measures

a) Would the Project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Impact 4.8-1: The Project would result in emissions of greenhouse gases that would contribute to global climate change. (*Less-than-Significant Impact*)

Construction of the Project would occur over a period of approximately 12 months. During that period it is estimated that there would be approximately 135 workdays that would include the use of heavy construction equipment. Construction activities over the Project area would be associated with existing turbine removal and installation of the new turbines and associated infrastructure, including access roads, power collection systems, communication lines, and upgrades to the existing substation. It is estimated that approximately 24 pieces of off-road construction equipment, including cranes, excavators, water trucks, graders, rough terrain

forklifts, dozers, etc., would be required between four and 10 hours per day, depending on the specific equipment type and construction activity, to construct the Project.

In addition to the off-road equipment, on-road vehicle trips would be required to deliver materials and equipment to the construction site and to transport workers to and from the construction site. It is estimated that an average of approximately 100 round trips per day, including truck trips and commuting worker trips, would be required during the construction period. The truck trips that would be required to deliver the turbine components are anticipated to originate from the Port of Oakland and it is anticipated that the trips required to deliver the other materials, including concrete, road gravel, etc., and the trips that would be required to remove the existing turbine debris, would occur locally within Contra Costa and Alameda counties and that the construction worker-related commute trips would occur entirely within the Bay Area.

Total GHG emissions associated with construction of the Project have been estimated and are presented in Table 4.8-2. Construction GHG exhaust emissions were estimated using CARB's Offroad 2007 and EMFAC 2007 emission models to develop GHG emission factors for off-road and on-road sources, respectively. In addition, indirect GHG emissions associated with water use for dust control were estimated for the Project employing emission factors and assumptions from the California Energy Commission (CEC), the California Climate Action Registry (CCAR), and Pacific Gas and Electric Company (PG&E) (CEC, 2005; CCAR, 2009; and PG&E, 2010). Refer to Appendix C for additional information on the assumptions, emission factors, and methodologies used to estimate construction GHG emissions that would be associated with the Project.

Operational GHG emissions would consist of SF_6 leakage, maintenance activities, and employee vehicle emissions. The two new circuit breakers (230 kV and 34.5 kV) at the Tres Vaqueros Substation would require the use of SF_6, which could leak during operation. The exact amount of SF_6 that would be required for the Project has not been determined, but based on other electric substation projects of similar voltage, each new circuit breaker could have a capacity for up to 150 pounds of SF_6 (CPUC, 2010). The USEPA estimates that leaking circuit breakers manufactured in 1999 and later emit less than one percent of the SF_6 nameplate capacity (USEPA, 2006). Considering this information, the Project could emit up to approximately three pounds of SF_6 per year, which is equal to approximately 33 metric tons CO_2e per year. With respect to emissions from maintenance activities, the baseline includes maintenance activities at the active wind farm; daily emissions associated with maintenance of the Project would be similar, and thus the potential increase or decrease in maintenance-related emissions would be negligible. In addition, operation of the Project would require up to eight new workers to be employed. Assuming that each new employee would generate an average of 1.5 40-mile round trips per day, annual emissions of CO_2e would be approximately 62 metric tons CO_2e per year. Therefore, the total operational emissions that would be generated by the Project would be approximately 95 metric tons CO_2e per year (see Table 4.8-2 for summary of operational impacts).

As shown in Table 4.8-2, total GHG construction emissions in the form of CO_2e would be approximately 840 metric tons. These emissions amortized over a 30-year period equal approximately 28 metric tons per year. Adding to that the operation emissions of 95 metric tons

TABLE 4.8-2
PROJECT GHG EMISSION ESTIMATES

Source or Activity	Metric Tons			
	CO2	CH4	N2O	CO2e
Construction				
Existing Turbine Removal	58.32	0.01	0.00	58.91
New Turbine and Infrastructure Installation	452.27	0.04	0.01	456.67
Off-site Vehicle Trips	319.59	0.01	0.01	321.46
Water Use – Indirect Emissions	3.00	0.00	0.00	3.02
Total Emissions - Construction	833.18	0.05	0.02	840.07
Amortized (per year for 30 Years) - Construction				28.00
Operation (per year)				
Circuit Breaker Leakage				33
Employee Vehicle Travel				62
Total Emissions – Operation				95
Total Construction and Operation Emissions				**123**
BAAQMD Significance Threshold				1,100
Significant Impact?				No

NOTES: Emissions from operations do not include daily emissions associated with maintenance of the Project. Maintenance emissions would be similar to baseline emissions, and thus the potential increase or decrease in maintenance-related emissions would be negligible.

Project construction exhaust emissions estimates were made using CARB's Offroad 2007 and EMFAC 2007 emission models. Equipment numbers and types are based on information provided by the Applicant and experience of the consultant. Water usage (indirect) is based on CEC, 2005; and CCAR, 2009. See Appendix C for details.

CO_2e per year, total Project GHG emissions would be approximately 123 metric tons CO_2e per year, which would be substantially less than the BAAQMD's significance threshold of 1,100 metric tons CO_2e per year for non-stationary sources.

It should also be noted that total Project GHG emissions would be immaterial compared to the GHG emissions that would be avoided by the increased wind energy output that would occur under the Project. The Project would produce approximately 110,000 megawatt hours (MWh) of electricity per year, which would be approximately 38 percent more energy than the existing facility generated prior to being shut down in 2009. Therefore, the Project would contribute approximately 30,000 MWh of additional wind-generated energy per year to PG&E's power grid compared to baseline conditions, and would therefore displace the same amount of energy from the grid, which includes "conventional" (carbon-based) energy. Using an emission factor of 524 pounds of CO_2e per MWh developed by PG&E for its current energy production portfolio (PG&E, 2010), it can be estimated that the Project would result in an annual GHG emissions reduction of more than 7,000 metric tons CO_2e. Therefore, operation of the Project would result in a net reduction of approximately 6,877 metric tons CO_2e per year and there would be no long-term impacts associated with Project-generated GHG emissions.

Mitigation: None required.

---

b) Would the Project conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Impact 4.8-2: The Project could conflict with CARB's Climate Change Scoping Plan. (*Less-than-Significant Impact with Mitigation Incorporated*)

The Project could conflict with certain GHG reduction goals set forth in AB 32, including the 39 Recommended Actions identified by CARB in its Climate Change Scoping Plan. Table 4.8-1 presents the 39 Recommended Actions identified to date by CARB in its Climate Change Scoping Plan. Of the 39 measures identified, those that would be considered to be applicable to the Project would primarily be those actions related to transportation, renewables portfolio standard, and high global warming potential gases. Consistency of the Project with these measures has been evaluated by each source-type measure below:

Scoping Plan Measure T-7: Heavy-Duty Vehicle GHG Emission Reduction (Aerodynamic Efficiency)—Discrete Early Action

This measure will require existing trucks/trailers to be retrofitted with the best available technology and/or CARB approved technology. This measure has been identified as a Discrete Early Action, which means that it began to be enforceable starting in 2010. Technologies that reduce GHG emissions and improve the fuel efficiency of trucks may include devices that reduce aerodynamic drag and rolling resistance. The requirements would apply to California and out-of-State registered trucks that travel to California. This measure would require in-use trucks and trailers to comply through a phase-in schedule starting in 2010 and achieve 100 percent compliance by 2014. Construction of the Project and the associated use of heavy-duty vehicles for hauling would be expected to be complete by approximately the end of 2011; therefore, the potential for the Project to conflict with compliance of this recommended action would be negligible.

Scoping Plan Measure E-3: Renewables Portfolio Standard (RPS)

The RPS promotes multiple objectives, including diversifying the electricity supply. Increasing the RPS to 33 percent is designed to accelerate the transformation of the electricity sector, including investment in the transmission infrastructure and system changes to allow integration of large quantities of intermittent wind and solar generation. The Project would add renewable wind-generated energy to the electricity supply; therefore, the Project would be consistent with this recommended action.

Scoping Plan Measure H-6: High Global Warming Potential Gas Reductions from Stationary Sources – SF_6 Leak Reduction and Recycling in Electrical Applications

This measure will reduce emissions of SF_6 within the electric utility sector and at particle accelerators by requiring the use of best achievable control technology for the detection and repair of leaks and the recycling of SF_6. This measure would establish a regulation mandating a

performance standard. Utilities and other affected entities would comply by using leak detection and repair (LDAR) abatement equipment to reduce system leakage. The proposed performance standard would mandate and enhance current voluntary federal SF_6 recycling standards. The Project would include installation of two new circuit breakers at Tres Vaqueros Substation that would contain SF_6. Pursuant to Mitigation Measure 4.8-2 (see below), the Applicant would be required to install circuit breakers with low SF_6 leak rates and monitor SF_6-containing circuit breakers consistent with Scoping Plan Measure H-6. Implementation of Mitigation Measure 4.8-2 would ensure that the Project would not conflict with implementation of Measure H-6.

> **Mitigation Measure 4.8-2: Low SF_6 Leak Rate Circuit Breakers and Monitoring.** Prior to issuance of building permits for the substation, the Applicant shall ensure that the new circuit breakers installed at Tres Vaqueros Substation have a guaranteed SF_6 leak rate of 0.5 percent per volume or less. The Applicant shall provide Contra Costa County with documentation of compliance, such as specification sheets. In addition, the Applicant shall monitor SF_6-containing circuit breakers at Tres Vaqueros Substation consistent with Scoping Plan Measure H-6 for the detection and repair of leaks.

Significance of Impact after Mitigation: Less than Significant.

4.9 Hazards and Hazardous Materials

4.9.1 Introduction

This section analyzes hazardous materials and other hazard issues associated with decommissioning the existing windfarm and constructing, operating, maintaining, and decommissioning the Project. As used in the EIR, the term “hazardous materials” refers to both hazardous substances and hazardous wastes. The term “hazardous material” is defined by law as any material that, because of quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment (Health & Safety Code § 25501(o)).The issues evaluated in this section include the potential to encounter hazardous materials in soil and groundwater resulting from past use, spills, or leaks of hazardous materials in proposed construction areas; the Project’s potential to generate and discharge hazardous materials during decommissioning the existing windfarm and construction, operation, maintenance, and decommissioning of the repowering Project; risks associated with the Project’s proximity to Byron Airport; potential impairment of emergency response and evacuation plans; risks associated with wildland fires; risks associated with interference with microwave, radar, and communications signals; and risks associated with turbine blade throw.

The physical and regulatory setting, baseline for determining environmental impacts, and criteria used for determining the significance of such impacts are discussed below. For potential impacts determined to be significant, mitigation measures are identified.

4.9.2 Setting

4.9.2.1 Regional and Local Setting

Section 3.1.2 (*Location*) provides general information about the regional and local setting. This section (4.9.2.1) provides setting information specific to hazards and hazardous materials in the Project area. The Project area’s current primary land uses are wind energy generation, agriculture (predominantly livestock grazing), parks, and water supply reservoir watershed. There is one airport (Byron Airport) and no schools within the Project vicinity.

Based on land use in the Project vicinity, existing hazardous materials use could include those hazardous materials common to agriculture, such as pesticides, fertilizers, and fuels for farming equipment; however, these materials would be less common in areas used for livestock grazing and are to be avoided in the watershed areas of the Project area to safeguard the water supply (Contra Costa County, 2010).In addition, subsurface soil or groundwater contamination related to hazardous material use is present in isolated commercial and light industrial properties throughout the region, and is discussed in the following paragraphs.

In April 2010, Environmental Data Resources (EDR), Inc. conducted a review of regulatory agency databases for the Project area and its vicinity to inventory sites of past hazardous materials releases (EDR, 2010). The database search included over 50 federal, State and local agency lists of

hazardous waste cleanup sites, leaking underground storage tank sites, landfills, hazardous waste generators, sites registered to use or store hazardous materials, etc.

The EDR database review was supplemented with a review of the online database, Geotracker, which is maintained by the State Water Resources Control Board (SWRCB, 2010), the Envirostor database maintained by the State Department of Toxic Substances Control (DTSC), and the Contra Costa County Hazardous Materials Incident Search database (DTSC, 2010; CCCHS, 2010). The regulatory agency database review did not identify any known hazardous materials sites within the Project area. The EDR database search identified six sites; of these six, three were listed as having a known release to soil or groundwater. The other three were unidentified as to the hazard; however, these sites are located more than three miles from the Project area and would be unlikely to affect soil and groundwater conditions at the Project area.

Naturally Occurring Asbestos

Asbestos is a naturally occurring fibrous group of minerals. Chrysotile, which is found in the serpentine group[1], is the most common asbestos mineral in California. Small amounts of chrysotile asbestos fibers are common in serpentinite. When disturbed, the asbestos fibers can become airborne and present a public health risk when inhaled. The California Department of Conservation, Division of Mines and Geology has mapped California for the occurrence of ultramafic rocks, which have the highest potential for serpentine. A review of the map shows that the Project area is not near these mapped locations; therefore, the potential for encountering naturally occurring asbestos during construction is considered very low (CDC, 2000).

Wildland Fire

Based upon the California Department of Forestry and Fire Protection (CalFire) Fire Hazard Severity Zoning map, the Project area lies within areas mapped as “Moderate” and “High” Fire Hazard Severity Zones within the State Responsibility Area (CalFire, 2007). The Project area is not within areas mapped as a “Very High” Fire Hazard Severity Zone. Due to the fire hazard zoning and the Project’s location within an area where fire protection is under State jurisdiction, the public safety requirements to minimize the risk of wildland fire would apply within the Project area.

Airports and Air Hazards

The Project is located approximately two miles west of the Byron Airport. As shown on Figure 4.11-1, Land Use Designation, in Section 4.11, *Land Use and Planning*, the eastern portion of the Project lies within the Byron Airport Compatibility Zone. Windfarm facilities could be considered hazardous to air navigation depending upon the height and location of structures relative to the airport and flight paths (Contra Costa County, 2000).

[1] Serpentine is a naturally occurring group of minerals that can be formed when ultramafic rocks are metamorphosed during uplift to the earth’s surface. Serpentinite is a rock consisting of one or more serpentine minerals. This rock type is commonly associated with ultramafic rock along earthquake faults.

4.9.2.2 Regulatory Setting

Federal and State

Hazardous Materials and Waste Handling

The federal Resource Conservation and Recovery Act of 1976 (RCRA) established a "cradle-to-grave" regulatory program governing the generation, transportation, treatment, storage, and disposal of hazardous waste. Under RCRA, individual states may implement their own hazardous waste programs in lieu of RCRA as long as the state program is at least as stringent as federal RCRA requirements. In California, the DTSC regulates the generation, transportation, treatment, storage, and disposal of hazardous material waste. The hazardous waste regulations establish criteria for identifying, packaging, and labeling hazardous wastes; dictate the management of hazardous waste; establish permit requirements for hazardous waste treatment, storage, disposal, and transportation; and identify hazardous wastes that cannot be disposed of in landfills. These regulations also require hazardous materials users to prepare written plans, such as a Hazardous Materials Business Plan, that describe hazardous materials inventory information, storage and secondary containment facilities, emergency response and evacuation procedures, and employee hazardous materials training programs. A number of agencies participate in enforcing hazardous materials management requirements, including DTSC, the Regional Water Quality Control Board (RWQCB) and the Contra Costa County Health Services Department's Hazardous Materials Division.

Hazardous Materials Transportation

The U.S. Department of Transportation regulates hazardous materials transportation on all interstate roads. Within California, the State agencies with primary responsibility for enforcing federal and State regulations and for responding to transportation emergencies are the California Highway Patrol (CHP) and the California Department of Transportation (Caltrans). Together, federal and State agencies determine driver-training requirements, load-labeling procedures, and container specifications. Although special requirements apply to transporting hazardous materials, requirements for transporting hazardous waste are more stringent, and hazardous waste haulers must be licensed to transport hazardous waste on public roads.

Aviation Hazards

Federal Aviation Administration (FAA) Regulations Part 77 (14 CFR 77) establish standards for what constitutes an obstruction to navigable airspace. Obstructions include any object if it is: (1) 500 feet above ground level; (2) 200 feet above ground level or above the established airport elevation, whichever is higher, within 3 nautical miles of an airport and (3) above a height within a terminal obstacle clearance area or en route obstacle clearance area. In addition, California Public Utilities Code section 21659 prohibits hazards near airports (as defined by 14 CFR 77) unless a permit allowing the construction is issued by the Caltrans Division of Aeronautics.

The FAA requires a developer to file a Notice of Proposed Construction (Form 7460) for any structure greater than 200 feet above ground level. The form requires a proposal for marking and lighting of the wind turbines and towers. The FAA would determine whether the proposed project

would create a hazard to navigable airspace and issue either a Determination of No Hazard or a Notice of Presumed Hazard.

State of California

Emergency Response

California has developed an emergency response plan to coordinate emergency services provided by federal, State, and local government and private agencies. Responding to hazardous materials incidents is one part of this plan, as is responding to intentional acts of destruction. Another part involves development of a downstream evacuation plan for areas within the potential inundation area. For Contra Costa County, the plan is administered by the California Office of Emergency Services (OES), which coordinates the responses of other agencies, including the California Environmental Protection Agency, CHP, California Department of Fish and Game, RWQCB, and local fire departments.

Fire Protection

The California Public Resources Code includes fire safety regulations that apply to State responsibility areas during the time of year designated as having hazardous fire conditions. During the fire hazard season, these regulations restrict the use of equipment that may produce a spark, flame, or fire; require the use of spark arrestors[2] on equipment that has an internal combustion engine; specify requirements for the safe use of gasoline-powered tools in fire hazard areas; and specify fire-suppression equipment that must be provided on-site for various types of work in fire-prone areas.

Utility Notification Requirements

Title 8, Section 1541 of the California Code of Regulations requires excavators to determine the approximate locations of subsurface installations such as sewer, telephone, fuel, electric, and water lines (or any other subsurface installations that may reasonably be encountered during excavation work) prior to opening an excavation. The California Government Code (Section 4216 et seq.) requires owners and operators of underground utilities to become members of and participate in a regional notification center. According to Section 4216.1, operators of subsurface installations who are members of, participate in, and share in the costs of a regional notification center are in compliance with this section of the code. Underground Service Alert North (USA North) receives planned excavation reports from public and private excavators and transmits those reports to all participating members of USA North that may have underground facilities at the location of excavation. At this point, members of the regional notification center will mark or stake their facilities, provide information, or give clearance to dig (USA North, 2009).

[2] A spark arrestor is a device that prohibits exhaust gases from an internal combustion engine from passing through the impeller blades where they could cause a spark. A carbon trap commonly is used to retain carbon particles from the exhaust.

Worker Safety

Occupational safety standards exist in federal and State laws to minimize worker safety risks from both physical and chemical hazards in the work place. The California Division of Occupational Safety and Health (Cal-OSHA) and the federal Occupational Safety and Health Administration are the agencies responsible for assuring worker safety in the workplace.

Cal-OSHA assumes primary responsibility for developing and enforcing standards for safe workplaces and work practices within the State. At sites known to be contaminated, a site safety plan must be prepared to protect workers. The site safety plan establishes policies and procedures to protect workers and the public from exposure to potential hazards at the contaminated site.

Local

Contra Costa County General Plan

The Safety Element of the Contra Costa County General Plan contains relevant goals and policies regarding hazardous materials and fire protection. The hazardous materials goal (10-I) is to provide public protection from hazards associated with the use, transport, treatment and disposal of hazardous substances and is supported by policies that include the following: identification and elimination of hazardous waste releases; regulation of hazardous materials and waste storage; construction and operation of industrial facilities in accordance with up-to-date safety and environmental protection standards; notification of the County OES of emergencies related to the transportation of hazardous materials.

Fire protection goals (10-N) are intended to provide public protection services in a disaster. Implementation Measure 10-as requires that projects that encroach into high fire hazard areas be reviewed by the appropriate fire district to determine if special fire prevention measures are advisable. Additional fire protection policies are described in the Public Facilities/Services Element (Chapter 7) of the General Plan and encourage wildland fire prevention activities such as control burning, fuel removal, establishment of fire roads, fuel breaks and water supply in wildland areas. This section also prohibits siting hazardous waste facilities within the watershed (Contra Costa County, 2010).

Contra Costa County Code – Title 8, Zoning Ordinance

Contra Costa County Code Section 88-3.602 establishes setback requirements for Commercial Wind Energy Conversion Systems (WECS), i.e., wind turbines. These regulations require a minimum setback of three times the overall machine height or 500 feet (whichever is greater) from each line of the exterior project boundary and from each public right-of-way. A proposed Commercial WECS that does not meet these minimum setback requirements may only be approved if it will not pose a significant danger to adjacent land uses and public or private rights-of-way due to toppling or blade throw *and* a reduced setback is necessary in order to avoid or reduce the severity of an environmental impact or to significantly increase the ability to utilize the kinetic energy of the wind resource. Notwithstanding these provisions, Commercial WECS must be set back at least 1,000 feet from all existing legal off-site residences and from all general plan-designated residential areas.

Contra Costa County Airport Land Use Compatibility Plan

The Contra Costa County *Airport Land Use Compatibility Plan* describes the authority of the Contra Costa County Airport Land Use Commission (ALUC), the types of land use actions that require its review, both within and outside the airport influence areas, the review process and compatibility criteria. Section 4.3 includes policies for airspace protection. As described in Countywide Policy 4.3.5, the FAA requires review and approval of any structure over 200 feet in height and all such proposals must be submitted to the ALUC so that it may review the proposal and provide advisory comments to the FAA and the local land use jurisdiction. Countywide Policy 4.3.6 prohibits visual, electronic or bird strike hazards within any airport influence area, including glare or distracting lights which could be mistaken for airport lights and sources of electrical interference with aircraft communications and navigation (Contra Costa County, 2010).

Contra Costa County Health Services Department

The Contra Costa County Health Services Department (CCCHSD) is the Certified Unified Program Agency (CUPA)– the agency certified by the California Secretary of Environmental Protection to implement the Unified Hazardous Waste and Hazardous Materials Management Regulatory Program specified in Health and Safety Code Chapter 6.11 – for Contra Costa County. As such, CCCHSD oversees the regulatory programs for Hazardous Materials Business Plans, underground storage tanks, hazardous waste generators, and California Accidental Release Prevention, including facility inspections and permitting.

Contra Costa County has adopted the *Contra Costa County Hazardous Materials Area Plan*, which outlines the procedures that County regulatory and response agencies will use to coordinate management, monitoring, containment, and removal of hazardous materials in the event of an accidental release (Contra Costa County, 2009).

4.9.3 Project Baseline

Baseline conditions reflect the operation of the Project as a wind energy facility, including hazardous materials utilized in operation and maintenance of the windfarm when it ceased operation in 2009. Existing wind turbines range from approximately 90 to 174feet (27.5 to 53 meters) in height. Hazardous materials used in connection with the facility's existing baseline wind turbines primarily consist of gear oil, coolants and hydraulic fluids, which must be replaced periodically. Transformers at the substation and smaller pad-mounted or grounding transformers within the area contain mineral oils. In addition, the towers and blades are occasionally cleaned and repainted. Although the existing windfarm was not identified on any regulatory agency list of known hazardous materials releases, the potential exists that minor spills during routine maintenance or leaks from transformers or other equipment may have occurred during the past and may affect local soil conditions. Construction impacts, however, are evaluated relative to the environmental conditions at the site as of the date of the Notice of Preparation for this Project.

Reporting of wind turbine failures are scarce in the literature, but available data from Alameda County and Europe show rotor failure probability in the 1 in 1,000 per turbine per year range (CEC, 2006).The Alameda County data is derived from an operator of smaller Kenetech

machines manufactured in the 1980s for the period 2000-2003, while the European studies encompassed a wide range of turbine types over a longer period.

A portion of the existing windfarm site lies within the Byron Airport Compatibility Zone (see Figure 4.11-1 in Section 4.11, *Land Use and Planning*). Ten existing turbines are located within the Compatibility Zone.

The Project area is predominantly grassland and used for grazing.

4.9.4 Significance Criteria

Based on CEQA Guidelines Appendix G, a project would cause adverse impacts on hazards and hazardous materials if it would:

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

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

c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances or waste within one-quarter mile of an existing or proposed school;

d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment;

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would result in a safety hazard for people residing or working in the project area;

f) For a project within the vicinity of a private airstrip, would result in a safety hazard for people residing or working in the project area;

g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; or

h) 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.

4.9.5 Discussion of No Hazards and Hazardous Materials Impacts

Comparison of the baseline conditions and Project characteristics with each of the eight significance criteria stated above clearly shows that no hazards and hazardous materials impacts would result related to criteria c), d), f), and g). The following discusses the reasoning supporting this conclusion:

c) The Project would not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances or waste within one-quarter mile of an existing or proposed school.

There are no existing or proposed schools within one-quarter mile of the Project area. Therefore, the Project would have no impact with regard to criterion c).

d) The Project would not be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would not create a significant hazard to the public or the environment.

Based upon review of a database search of regulatory agency lists, the Project area is not located on a listed hazardous materials site (EDR, 2010). Therefore, the Project would have no impact with regard to criterion d). In addition, 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 area is not near these mapped locations and, therefore, the potential for encountering naturally occurring asbestos during construction is considered very low (CDC, 2000).

f) The Project would not be located within the vicinity of a private airstrip, would not result in a safety hazard for people residing or working in the project area.

There are no existing private airstrips in the vicinity of the Project area. Therefore, the Project would have no impact with regard to criterion f).

g) Project construction or operation would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.

No emergency response plan has been adopted for the Project area. According to Mr. Chris Boyer, Contra Costa County Emergency Services Manager, the Countywide Emergency Operation Plan (currently under revision) does not identify evacuation routes. The County has drafted a Mass Care and Evacuation Plan; however, this document has not yet been formally adopted (Boyer, 2010).

4.9.6 Discussion of Impacts and Mitigation Measures

a) Would the Project create a significant hazard to the public or the environment through the routine transport, use or disposal of hazardous materials?

Impact 4.9-1: Project construction, operation and maintenance could, through routine transport, use or disposal, accidentally release hazardous materials, thereby exposing construction workers, Project personnel and the public to hazardous materials or releasing hazardous materials into the environment. (*Less-than-Significant Impact with Mitigation Incorporated*)

Baseline hazardous materials used on the Project primarily consist of lubricants and hydraulic fluids in the turbines that must be replaced periodically. Transformers at the existing substation contain mineral oils. In addition, the towers and blades occasionally are cleaned and repainted. Although the existing wind energy facility was not identified on any regulatory agency list of

sites known to contain hazardous materials releases, minor spills during routine maintenance or leaks from transformers or other equipment may have occurred during the past and affected local soil conditions.

Decommissioning of the existing wind turbines in advance of Project construction could also result in accidental spills or releases of hazardous materials, thereby exposing workers and the environment. Construction, operation, and future decommissioning of the Project would require use of limited quantities of hazardous materials such as gasoline, diesel fuel, motor oil, hydraulic fluid, solvents, cleaners, sealants, welding flux, various lubricants, paints, and paint thinners. The improper use, storage or disposal of hazardous materials could result in accidental spills or hazardous releases during Project construction or operation activities, thereby exposing construction workers, facility operators, and the environment.

Hazardous materials used during Project construction would be stored at the construction staging area and transported to individual wind turbine sites as needed. All hazardous materials would be contained and stored according to the manufacturers' recommendations and all hazardous material storage regulations. The types and quantities of hazardous materials would vary throughout construction of the Project and may include above-ground fuel tanks at the staging area to provide fuel for construction vehicles and equipment. All tanks and hazardous materials storage areas would be equipped with appropriate secondary containment for spill prevention. Heavy equipment, such as cranes, would be refueled at the point-of-use by a fuel delivery truck. In order to minimize the potential for leaks and spills during construction and provide for prompt cleanup in the event of an inadvertent release, all construction would be performed in compliance with the best management practices set forth in the Stormwater Pollution Prevention Plan (SWPPP) (see Section 4.10, *Hydrology and Water Quality* for further discussion of construction storm water regulations) to be prepared for the Project.

Operations and maintenance activities for the Project would be similar to baseline windfarm operations. The Project would continue to handle and store limited quantities of hazardous materials such as paints, solvents, fuels, and oil, but in far smaller quantities than during construction. Hazardous materials that would be used for routine maintenance, such as gear oil, coolant, and hydraulic fluid would be stored at the new O&M facility, which would be constructed at the location of the existing O&M facility.

For facility operations after construction is completed, the Applicant would be required to update its existing hazardous materials permits and to continue to comply with all applicable regulations. The Applicant would update its existing *Emergency Response Plan and Hazardous Materials Business Plan*, which would state quantities stored and provide handling procedures to ensure the safety of workers and the public.

Due to the extent and the approximately 12-month duration of construction and the common use of hazardous materials during construction and operation, the Project could expose people and the environment to accidental releases of hazardous substances, resulting in a potentially significant impact. Similarly, during future decommissioning of the Project, trucks and equipment would

likely pose similar potential impacts. These impacts would be reduced with the implementation of Mitigation Measure 4.10-3a, discussed in Section 4.10, *Hydrology and Water Quality*. This measure requires preparation of a spill prevention and control plan specifying appropriate storage and handling procedures for fuels, oils, lubricants, transformer oil, and other fluids that minimize fluid release; use of secondary containment surrounding transformers and any on-site hazardous materials storage areas; and spill prevention measures including staff training for the recognition and proper handling of potentially hazardous materials.

Significance of Impact after Mitigation: Less than Significant.

---

b) Would the Project 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?

Impact 4.9-2: Grading and excavation for Project construction could cause a release of hazardous materials into the environment or expose construction workers to these substances, if hazardous materials are present in the subsurface. (*Less-than-Significant Impact*)

Review of database reports of known hazardous materials sites in the Project vicinity identified no known releases of hazardous materials at the Project or adjacent areas. Therefore, the potential to encounter hazardous materials during project construction is considered to be low. Existing wind energy facility operations include the use of small quantities of hazardous materials such as paints, lubricants, transformer oils, and fuels. If leaks or spills have occurred during existing operations and unanticipated areas of contamination were encountered, construction workers would be exposed to contaminated soil and, potentially, to chemical vapors.

Existing federal, State and local worker safety and emergency response regulations (see subsection 4.9.2.3) require that if any unforeseen hazardous conditions are discovered during construction, the contractor coordinate with the appropriate agencies for the safe handling, sampling, transportation, and disposal of encountered materials. Contra Costa County has adopted a *Hazardous Materials Area Plan* that outlines the procedures that County regulatory and response agencies will use to coordinate management, monitoring, containment, and removal of hazardous materials in the event unanticipated contamination is encountered during construction (Contra Costa County, 2009). The Applicant also would be required to comply with Cal-OSHA worker health and safety standards that ensure safe workplaces and work practices. Compliance with applicable regulations, requirements and standards is presumed as part of the Project and would ensure that the impacts of encountering hazardous materials in soil or groundwater would be less than significant.

Mitigation: None required.

Impact 4.9-3: Project construction could cause a significant hazard related to accidental rupture of the natural gas pipeline that crosses the Project area. (*Less-than-Significant Impact with Mitigation Incorporated*)

Construction activities such as excavation and grading for wind turbine foundations and roadways could inadvertently damage the underground PG&E high pressure natural gas pipeline that crosses the Project area (Figure 3.3) in close proximity to a number of proposed wind turbine locations. The potential consequences of a pipeline rupture include jet flame, radiant heat, flammable vapor cloud flash fire, and unconfined vapor cloud explosion, which could fatally injure construction workers, damage equipment, and initiate a wildland fire.

As described above under *Regulatory Setting*, the construction contractor is required by State law to contact USA North at least two working days prior to initiation of ground-disturbing construction activities. USA North would notify the utility providers in the vicinity of the planned excavations. Each provider would be responsible for marking the location of its underground utilities and coordinating with the contractor to avoid damage. Although this requirement would provide notification to PG&E of Project excavation activities, given the Project size, it may not provide sufficient time for PG&E to locate and mark the gas pipeline or for the Applicant to develop and incorporate appropriate design changes, if needed, to avoid damage to the utility. If construction affected the underground gas pipeline, it would be a significant impact.

Implementation of Mitigation Measure 4.9-3 would reduce this impact to a less-than-significant level by requiring advance notification and coordination with PG&E for protection of the gas pipeline.

> **Mitigation Measure 4.9-3:** At least 30 days prior to commencement of construction activities, the Applicant shall provide PG&E with the Project construction plans, notify the County that it has done so, and make arrangements with PG&E to identify underground utilities potentially affected by the Project so that the Applicant can modify its construction plans to avoid utility conflicts. Prior to beginning construction, the Applicant shall make further arrangements with PG&E regarding protection of the existing gas pipeline, possibly to include having a PG&E monitor present during excavation near the pipelines to ensure that the facilities are not damaged.

Significance of Impact after Mitigation: Less than Significant.

---

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?

Impact 4.9-4: The Project could cause a safety hazard through interference with air navigation. (*Less-than-Significant Impact with Mitigation Incorporated)*

The Project area is located approximately two miles west of Byron Airport. As shown on Figure 4.11-1, the eastern portion of the Project area lies within a Byron Airport Compatibility

Zone. According to the Airport Land Use Compatibility Plan (Contra Costa County, 2000) this portion of the Project is within Byron Airport Safety Compatibility Zones C1 and D and the Height Exception Overlay Zone. A portion of the site is also within the Byron Airport Airspace Protection Surfaces. Objects taller than 50 feet within the Compatibility Zone D-Height Overlay Zone require approval of the Contra Costa County ALUC and are limited in accordance with Airspace Protection Surfaces Figure 4A of the Airport Land Use Compatibility Plan. Contra Costa County ALUC staff has reviewed the Project and determined that because the turbines are proposed outside the boundaries of Compatibility Zone D, the Height Exception Overlay Zone, the Airspace Protection Surfaces, and the projected Byron Airport noise contours, the Project is compatible with the Airport Land Use Compatibility Plan (CCC ALUC, 2010).

Although the wind turbine towers would be constructed outside of the airport influence area, the construction of structures over 200 feet above ground level may still cause an obstruction or hazard to air navigation. Further analysis of the Project would be necessary when the Applicant files an FAA Notice of Proposed Construction (FAA Form 7460). The FAA must review and approve any structure over 200 feet. For any structure that would cause a potential obstruction, a permit must also be obtained from Caltrans Division of Aeronautics. The FAA analysis of the Project would include nighttime lighting and marking (paint color) requirements so that aircraft can readily identify and avoid the wind turbines. The FAA conducted an aeronautical study for an earlier proposed configuration of approximately 28 wind turbines at the site with machine heights of 368 feet above ground level (equivalent to the height of Gamesa G90 wind turbines) and issued a Determination of No Hazard to Air Navigation for each of the proposed turbines (FAA, 2010). However, due to changes in the proposed configuration, a new aeronautical study would be conducted for the Project. Compliance with FAA requirements and the issuance of a Determination of No Hazard to Air Navigation from the FAA, as required by Mitigation Measure 4.9-4, would reduce the potential impacts of the Project on aviation safety to a less-than-significant level.

> **Mitigation Measure 4.9-4:** The Applicant shall submit the FAA Determination of No Hazard on the final turbine design and layout to the County Zoning Administrator prior to issuance of building permits.

Significance of Impact after Mitigation: Less than Significant.

---

h) Would the Project 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?

Impact 4.9-5: Improper handling or use of flammable or combustible materials such as internal combustion equipment could result in wildland fires, exposing people or structures to a significant risk of loss, injury, or death. *(Less-than-Significant Impact with Mitigation Incorporated*)

The rural area of Contra Costa County in which the Project would be constructed is dominated by grasslands, shrublands, and woodlands. The relatively dry climate conditions make the fire regime

rich with fuels, although areas with active grazing, agricultural irrigation, and landscape irrigation provide some fuel reduction. Wildland fires in this region are largely caused by human activities as opposed to natural ones, such as lightning strikes. The most likely source of an ignition from the Project would be from construction and construction-related activities, such as welding, refueling, and general use of vehicles and equipment powered by internal combustion engines.

As discussed in Section 4.9.2.1, *Regional and Local Setting*, the Project is located within "Moderate" and "High" fire hazard severity zones (CalFire, 2007). Regulations require fire safety measures during the high fire season. Project construction and decommissioning of the existing wind energy facility would occur over approximately 12 months and could occur during the high fire season. Because Project construction activities would include welding, refueling, and use of fuel-motorized equipment in a predominantly grassland environment, Project construction could expose people and structures to wildland fires. This is a significant impact that would be reduced to a less-than-significant level through implementation of Mitigation Measure 4.9-5.

> **Mitigation Measure 4.9-5:** Prior to commencement of construction activities, the Applicant shall submit a Fire Safety Plan to, and obtain approval from, CalFire and the Contra Costa County Fire Protection District. The Applicant shall submit the approved plan to the County Zoning Administrator. The measures contained in the approved plan shall be strictly enforced. The Fire Safety Plan shall describe on-site BMPs to reduce the potential for accidental fires which shall include, but not necessarily be limited to, the following (unless deemed unnecessary or modified by CalFire or the Fire Protection District):
>
> 1) All equipment used during construction must have an approved spark arrestor.
>
> 2) Fire-suppression equipment and tools shall be readily available at all work locations and workers shall be trained in their use.
>
> 3) Construction workers will receive fire hazard training to identify actions that will reduce the risk of ignition and facilitate immediate control of an incipient fire. The training shall also include emergency communication protocols.
>
> 4) Adequate water supplies for fire prevention shall be maintained at all times.

Significance of Impact after Mitigation: Less than Significant.

Impact 4.9-6: 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 Impact)*

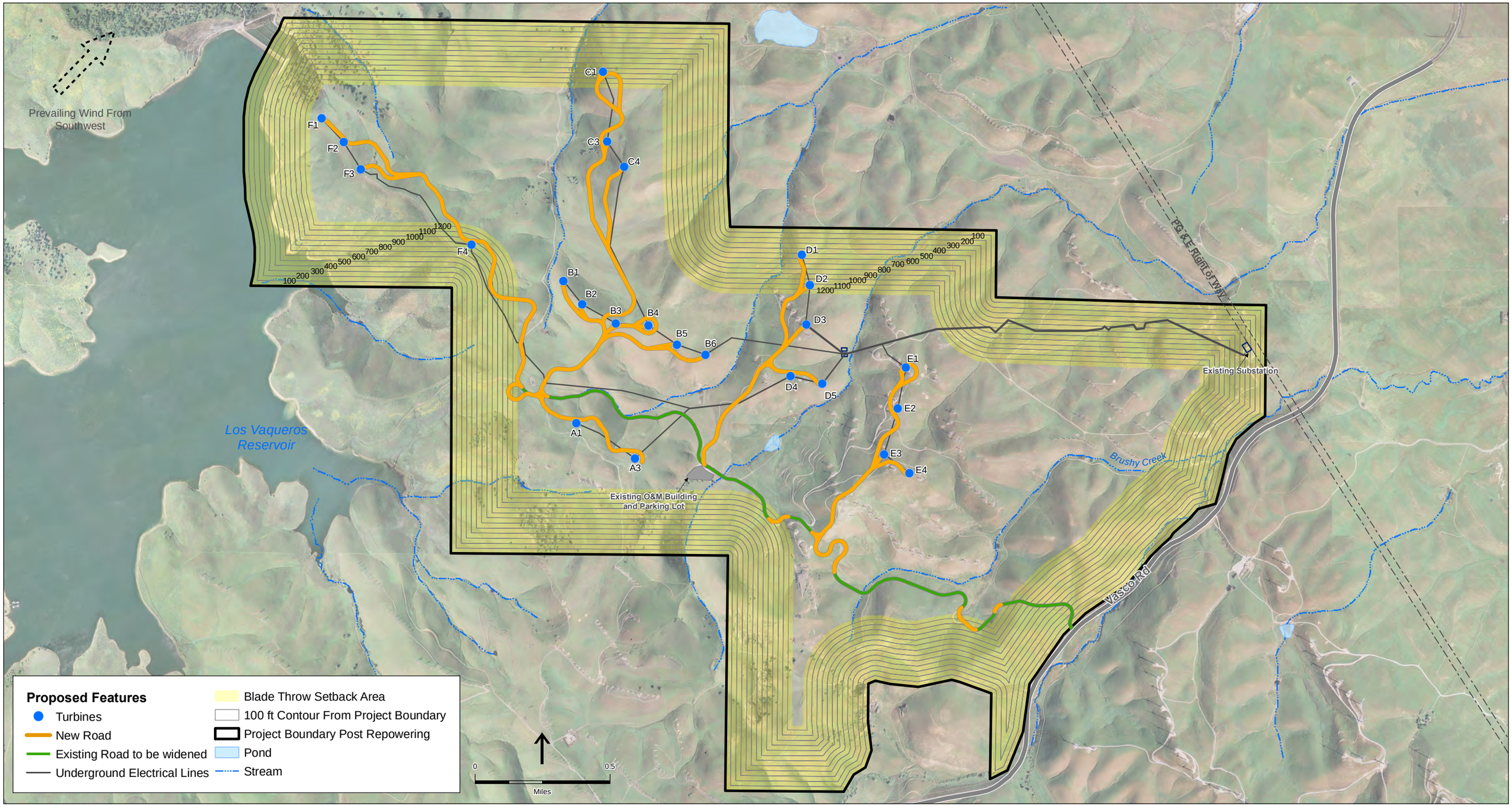
During normal operation, wind turbine rotor blades are subject to a combination of axial, bending and torsional stress at each part of the blade due to centripetal, gravitational and aerodynamic forces (AWEA, 2008). One potential hazard of wind turbine operation is blade throw, which could occur if all or part of a rotor blade detaches from the turbine, typically due to equipment failure or an extreme event such as a lightning strike. Persons and facilities within the blade throw

hazard zone could be at risk of damage, injury or death if struck by a falling blade. If a blade detaches from the hub, the distance it travels is dependent upon a number of factors including tower height, topographic setting, blade or blade fragment length, rotor speed, wind speed, and departure angle. Because blade throw distances are predominantly in the plane of rotation, not down wind, the potential hazard zone is considered as a circle surrounding each tower with a radius defined by the potential blade throw distance.

Multiple factors determine the distance that a blade or blade fragment can travel. Studies, including the California Energy Commission's *Permitting Setback Requirements for Wind Turbines in California* (CEC, 2006), suggest a relationship between turbine height and potential blade throw distances. Calculations of example turbines to evaluate the maximum attainable throw distance for failure at nominal operating conditions, and normalized by overall turbine height (machine height from grade at base of turbine to the highest extension of any blades), show a drop in the maximum throw distance with increasing turbine size. This is primarily because the maximum range is dependent on turbine tip speed. For large turbines (for example, over 100 meters in height) such as those proposed for the Project, the maximum throw range is estimated to be approximately equal to the overall machine height for a full blade thrown and 2.5 times the machine height for a blade fragment. Blade fragments fly farther than full blades because the initial velocity at failure for a fragment tends to be higher than for a full blade. For smaller wind turbines (overall height of 30 meters), the blade throw distances are estimated to be approximately 2.8 and 5.5 times the turbine height for full blade and blade fragments, respectively (CEC, 2006). These distances could be further, depending upon topography of the area.

Using the general relationship between turbine height and blade throw distance described in the Energy Commission Report, calculations show the approximate blade throw hazard distance from each Project turbine would be approximately 429 feet (131 meters) for a full blade and 1,073 feet (328 meters) for a blade fragment. In comparison, because the existing wind turbines are smaller (average 130 feet [40 meters]), the blade throw distance is considered to be 2.8 times the turbine height is 364 feet (111 meters) and the fragment throw distance, considered to be 5.5 times the turbine height, is 715 foot (220 meter) blade fragment throw distance. As 60 turbines were operational when the Tres Vaqueros Windfarm was shut down in Spring 2009 and up to 21 are proposed, although the size of the hazard zone would increase for each repowered turbine due to the taller turbine size, the total area of all combined the hazard zones for the up to 21 repowered turbines would decrease by about 20 percent when compared to the existing 60 turbine combined hazard zone area.

Article 88-3.6 of the Contra Costa County Code establishes public safety-based setbacks that require wind turbines to be located at least 1,000 feet from existing residences and at least three times the total machine height from exterior property boundaries and public rights-of-way, unless additional conditions are met. There are no residences within 1,000 feet of the proposed turbine locations. Using a turbine height of approximately 429 feet (131 meters) to provide a conservative assessment, the setback distance from the property boundary would be 1,287 feet (392 meters). This setback encompasses the hazard zone of 1,073 feet (328 meters) that is estimated for the maximum throw of a blade fragment (see Figure 4.9-1). For the Project layout, 4 of the 24 proposed turbines



SOURCE: PERMCO, 2010

Notes: 1. Locations are approximate.
2. While 24 turbine site locations are shown, only 21 turbines will be installed

Tres Vaqueros Windfarm Repowering Project . 209132

Figure 4.9-1
Blade Throw Setback Area

THIS PAGE INTENTIONALLY LEFT BLANK

locations would be within the setback area[3]. Turbine C1 would be located approximately 930 feet from the northern Project boundary, D1 and D2 would be located about 550 and 1,120 feet from the northern boundary, respectively, and F4 would be 940 feet from a corner on the western side boundary.

The hazard zone for the bulk of the proposed turbines would be predominantly within the Project boundary and, therefore, exposure to related risks would be within the control of the Applicant. The Applicant strictly controls access to the existing wind energy facility and would similarly restrict access to the Project: site access is limited to persons approved for entry by the Applicant or by the underlying land owners. This strict control of public access would reduce the risk of potential blade strike within the Project area.

For the four turbines identified as within the setback area, only a small blade throw hazard zone extends outside the Project boundary onto adjacent properties (a maximum of about 525 feet for D1 and a minimum of about 100-200 feet for the other three turbines). Access to the potential hazard area would be subject to similar access restrictions than those in place on the Project area and all four turbines (C1, D1, D2, and F4) would be located within the setback area of the Project boundary shared with the Contra Costa Water District (CCWD) (see Section 4.11, *Land Use and Planning*). CCWD manages this portion of the Los Vaqueros Watershed as a protected area where public access is prohibited (CCWD, 2010). Further, the type of failure that could lead to a blade or blade fragment hitting an individual or structure within the hazard zone is low, i.e., within the range of 1-in-1,000 per turbine per year (CEC, 2006), and the probability of mechanical failure also is low. Consequently, potential impacts related to blade throw would be less than significant.

Mitigation: None required.

Impact 4.9-7: Because of their large size and proposed location, the proposed turbines have the potential to interfere with microwave, radar, and communications signals and be a hazard to public safety. *(Less-than-Significant Impact with Mitigation Incorporated*)

Wind projects may affect communications signals, such as microwave systems, radar and land mobile radio (LMR) systems, by creating physical obstructions that distort communications signals or through electromagnetic noise that can interfere with telecommunications services (AWEA, 2008). Federal agencies whose operations could be affected by interference with radar or microwave telecommunications systems include the FAA, the Department of Defense, the Department of Justice and the Department of Homeland Security. The operations of local public

[3] The blade through setback area shown on Figure 4.9-1, represents the outside boundary of all parcels which would contain new wind turbines and related project infrastructure (roads, substation, transmission lines, O&M building, etc.). This is different than the overall project boundary shown in Figure 3-2d, which shows the outside boundary of all parcels which have some change as a result of the Project and include the decommissioning and reclamation of the existing turbines.

safety providers such as police departments, fire departments and medical responders could be impacted because they often use LMR systems for communication.

As discussed under Impact 4.9-4, the FAA will analyze air safety issues, including potential degradation of communication, navigation and radar operations, upon receipt of the Form 7460 Notice of Proposed Construction. However, the FAA has created a Long Range Radar Tool for preliminary radar clearance analyses to determine whether a site is in a no problem area (green zone), possible problem area (yellow zone) or definite problem area (red zone) with respect to air defense and Homeland Security long range radar systems (AWEA, 2008). An initial evaluation of aviation and radar hazards indicates that the Project is located in a yellow zone. The Oakland (Sacramento) Long Range Joint Use Radar site is located within approximately 60 nautical miles from the Project area; the Project could impact air defense and Homeland Security radars. In addition, weather radar operations would likely be affected (Aviation Systems, 2009). Interference with radar systems and communications signals would be a potentially significant impact on public safety.

Consultation with federal agencies is necessary to identify federal government microwave communication systems. Upon request, the National Telecommunications Information Administration (NTIA) would notify federal agencies operating telecommunication systems to identify whether potential impacts associated with proposed wind turbines would occur. Upon receipt of Form 7460 (see Impact 4.9-4), the FAA would evaluate aviation hazards including potential impacts to communication and radar systems. If identified, potential impacts would have to be addressed in coordination with the FAA or other relevant federal agency to determine appropriate measures to accommodate their radar and communications requirements.

> **Mitigation Measure 4.9-7a:** The Applicant shall notify the NTIA of the Project and request review of the Project's potential impacts to microwave and radar communications systems. Should potential impacts to microwave and/or radar systems be identified, the Applicant shall coordinate with the relevant agency or agencies to resolve concerns. These actions shall be completed prior to issuance of building permits.
>
> **Mitigation Measure 4.9-b:** Prior to issuance of building permits, the Applicant shall consult with local public safety providers, such as the California Highway Patrol, CalFire, the Contra Costa County Fire Protection District, the Contra Costa County Sheriff's Office, and private ambulance service providers, regarding their use of LMR systems and the Project's potential to impact those systems. If it is determined through consultation that the Project will or is likely to impact LMR systems, then the Applicant shall take the necessary steps to ensure that LMR communications will not be disrupted during Project construction and operation, possibly by repositioning LMR repeaters or adding repeaters at appropriate locations. If at any time local public safety providers inform the Applicant that the Project is interfering with LMR communications, then the Applicant shall implement any additional measures necessary to restore LMR communications to no less than their pre-Project levels.

Significance of Impact after Mitigation: Less than Significant.

4.10 Hydrology and Water Quality

4.10.1 Introduction

This section analyzes the Project's relationship to hydrology and water quality. Discussed herein are the physical and regulatory setting; the baseline for determining environmental impacts; the criteria used for determining the significance of environmental impacts; potential impacts associated with decommissioning the existing windfarm and construction, operation, maintenance, and decommissioning of the repowering Project; and mitigation measures to reduce or avoid environmental impacts determined to be potentially significant.

4.10.2 Setting

4.10.2.1 Regional and Local Setting

Section 3.1.2 (*Location*) provides general information about the regional and local setting. This section (4.10.2.1) provides setting information specific to hydrology and water quality in the Project area, including an overview of the surface water hydrology, known groundwater hydrology, water quality, and potential flooding associated with the Project area.

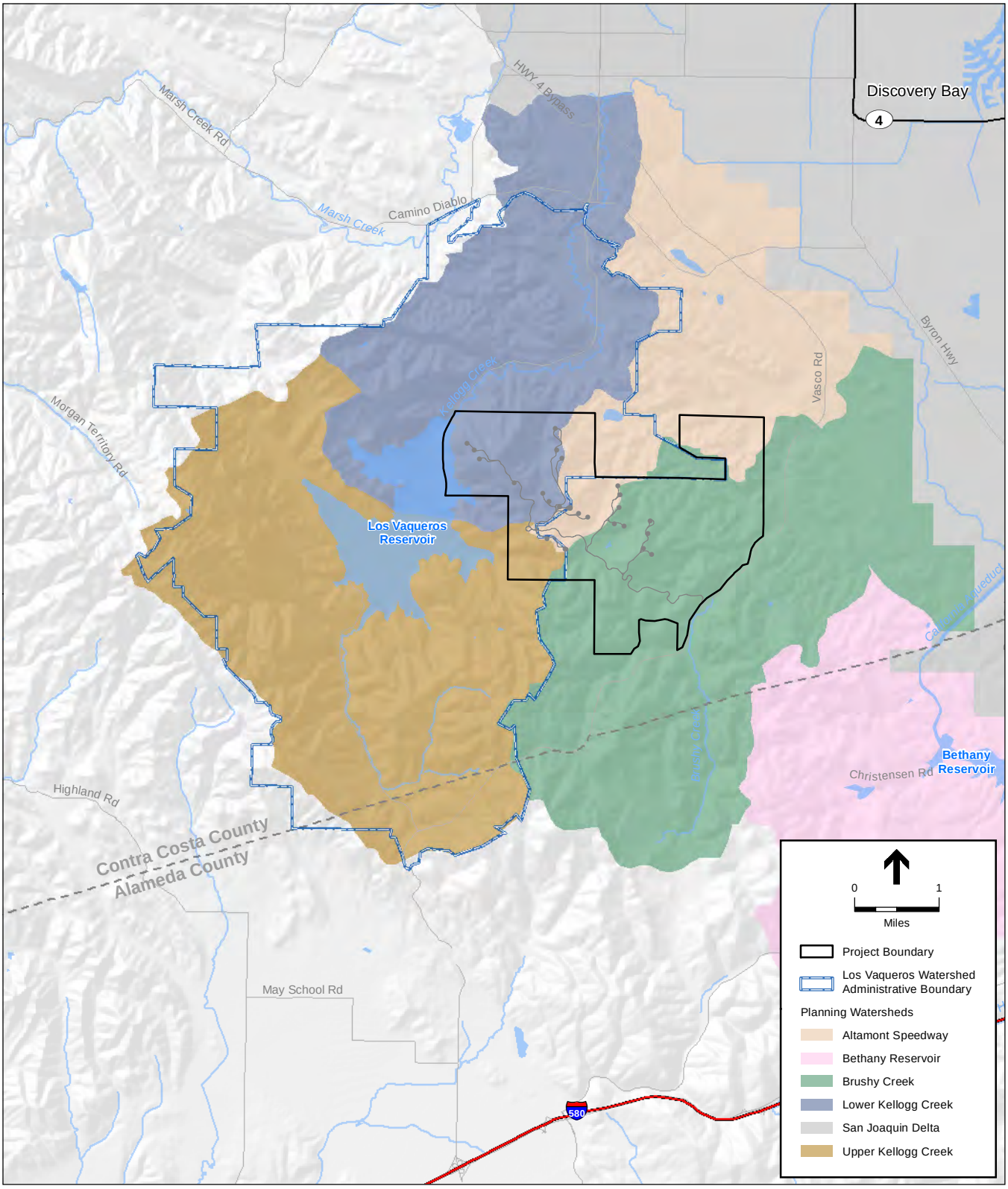
Surface Water Hydrology

Surface Hydrology

The Project area is located within the North Diablo Range Hydrologic Area (U.S. Geological Survey Cataloging Unit No. 187040003), which drains into the larger Sacramento–San Joaquin Delta near Old River. The Project area lies in part, within the Upper Kellogg Creek Watershed, the Lower Kellog Creek Watershed, the Altamont Speedway Watershed, and the Brushy Creek Watershed (Figure 4.10-1). Within these watersheds, hydraulic conditions exist which support sensitive seasonal wetlands. A brief description of each planning watershed area is provided below.

Upper and Lower Kellogg Creek Watersheds. Kellogg Creek is the primary surface waterways in the Project area. Kellogg Creek and its minor tributaries drain much of the western and northern area of the Project area, wherein runoff generally flows northward toward Kellogg Creek and westward toward the Los Vaqueros Reservoir. The main stem of Kellogg Creek flows west to east along the northwestern edge of the Project area, and then turns northward, away from the Project area.

Kellogg Creek drains both the Upper and Lower Kellogg Creek Watersheds, including an area of approximately 18,220 acres, of which about 10,528 acres are located upstream of the existing Los Vaqueros Dam. Water features that drain into Kellogg Creek upstream of Los Vaqueros Dam include Mallory, Adobe, Savanna, Silva, and Horseshoe Creeks. Below the dam, Mariposa, Kit Fox, Eagle, and Buckeye Canyon Creeks converge with Kellogg Creek. Downstream of the reservoir, Kellogg Creek parallels Vasco Road. East of Vasco Road, Kellogg Creek becomes channelized, and eventually enters Discovery Bay and Indian Slough.



SOURCES: EBRPD, 2010; NRCS, 2002; Contra Costa County, 2009

Tres Vaqueros Windfarm Repowering Project . 209132.02

Figure 4.10-1
Planning Watersheds

Kellogg Creek, along with its tributaries, is intermittent upstream of Los Vaqueros Reservoir, although isolated pools may remain in creek beds during drier periods. A number of stock ponds replenished by springs or runoff can be found within the watershed, and a single, relatively larger pond is located near the northern boundary of the site. This pond is typically flooded during the rainy season, but may dry out almost completely during the dry season.

Below the Los Vaqueros Reservoir, Kellogg Creek flow is largely controlled by releases from the reservoir; reservoir releases are governed by existing State Water Resources Control Board (SWRCB) decisions and permits. In the downstream reaches of the watershed, the creek traverses an alluvial fan prior to entering the Sacramento-San Joaquin Delta, near Discovery Bay. This reach of Kellogg Creek was realigned and channelized as agricultural and urban development progressed through the area. In order to meet downstream water rights on Kellogg Creek, flow is maintained in the creek downstream of the dam to match the flow entering the reservoir at the south end, up to a maximum release of five cubic feet per second or approximately 0.01 thousand acre feet per day (CH2M Hill, 2002).

Altamont Speedway Watershed. The Altamont Speedway Watershed is located between the Brushy Creek Watershed and the Lower Kellogg Creek Watershed. As a subregion to the Kellogg Creek Watershed, all ephemeral and perennial streams or drainages eventually enter Kellogg Creek. However, these drainages generally have very little or no flow outside of the rainy season. Most of these drainages are unnamed. The Altamont Speedway Watershed also contains geothermal springs known as the Byron Hot Springs. Frisk Creek leads to the Byron Hot Springs from the Project area through the Altamont Speedway Watershed.

Brushy Creek Watershed. Brushy Creek is an intermittent stream that flows to a slow trickle or subsurface flow during the late summer and early fall seasons, and drains an area of approximately 16,346 acres. The headwaters of Brushy Creek start in Alameda County near the eastern flank of Brushy Peak and flow to the north. Several unnamed spring-fed streams converge with Brushy Creek north of the Contra Costa/Alameda County line. The lower reach of Brushy Creek enters an alluvial plain near the Byron Airport. East of the airport, Brushy Creek enters Italian Slough, which meanders north along the western perimeter of Clifton Court Forebay, towards Old River. Directly west of Armstrong Road, approximately three berms have been constructed that capture a portion of the upgradient surface water before crossing Armstrong Road. Brushy Creek crosses along the southeastern edge of the Project area, and several ephemeral streams located on-site are tributary to Brushy Creek.

Los Vaqueros Reservoir. Los Vaqueros Reservoir is located immediately west of the Project area, and is located within both the Upper and Lower Kellogg Creek Watersheds. The reservoir dams Kellogg Creek, however, only a small portion of the water stored in the Reservoir is derived from Kellogg Creek. Most of its water is pumped from the Sacramento-San Joaquin Delta, and the reservoir is used to supply water to customers of the Contra Costa Water District. The reservoir is managed in coordination with the State Water Project and the Central Valley Project, which collectively provide urban water supply to over two thirds of Californians, and support agriculture across the southern half of California's Central Valley.

Investigations prepared in support of an expansion study for the reservoir included a simulated hydrologic study spanning 70 years (1920 to 1990), which found that Kellogg Creek provides an average inflow of 1,290 acre-feet per year into the reservoir, equivalent to 1.3 percent of the volume of the existing reservoir. Maximum annual inflow from the creek was 8,500 acre-feet, while minimum annual inflow was 100-acre feet (CH2M Hill, 2002). Los Vaqueros Reservoir is scheduled for expansion with construction starting in Spring 2011 and fully filled by 2014. This expansion will increase its total storage volume and would result in inundation of minor low-lying areas located along the western edge of the Project area, where the Project area intersects with the existing reservoir. However, this increase in water level is not expected to interfere with Project construction or operations.

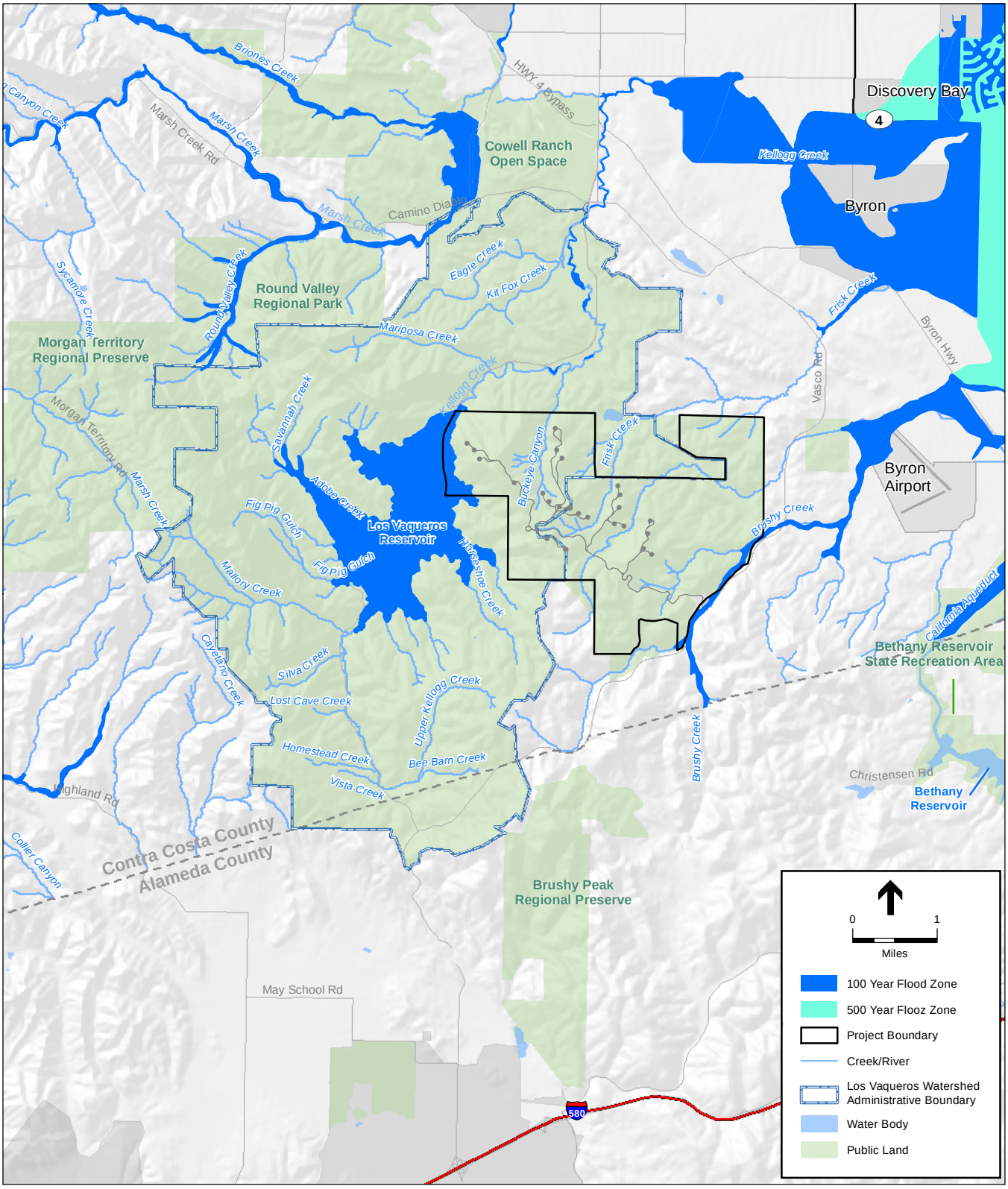
Flood Potential and Drainage

Stormwater drainage on the western half of the Project area flows either into Kellogg Creek or into Los Vaqueros Reservoir via a combination of smaller drainages and sheet flow. Drainage flows along most of the eastern half of the Project area discharge into Brushy Creek and its minor tributaries. Stormwater drainage in the central portion of the Project area flows into Frisk Creek and its tributaries within Altamont Speedway Watershed. Small scale drainage on-site is provided by existing natural and manmade drainages, including roadside drainages and culverts. These facilities discharge into on-site waterways and creeks.

The Federal Emergency Management Agency (FEMA) provides information on flood hazard and frequency for cities and counties on its Flood Insurance Rate Maps. FEMA identifies designated zones to indicate flood hazard potential, wherein the 100-year flood zone is defined as the area in which flooding would be expected to occur for a storm having a one percent annual chance of recurrence. The 100-year floodplain is shown for the Project area and vicinity in Figure 4.10-2. As indicated, the 100-year flood zone extends along the segments of Brushy Creek and Kellogg Creek that are located on-site. No FEMA flood zones have been identified along on-site tributaries to Kellogg Creek and Brushy Creek. However, this is due to lack of FEMA survey data, and does not necessarily indicate that flooding would not occur along these tributary creeks and drainages. To the contrary, in the event of a100-year flood, the streambeds of on-site drainages and creeks, and likely limited low-lying adjacent areas, could be subject to flooding. Due to the relatively high topographic relief on-site, it is generally expected that flooding would be limited to existing stream channels and their vicinity.

Along Kellogg Creek, flood flows would be expected to be contained by Los Vaqueros Reservoir. Although the primary purpose of this reservoir is for the supply of water, sufficient freeboard would be maintained in the reservoir in order to accommodate flooding events along Kellogg Creek. This is possible because Los Vaqueros Reservoir stores water pumped from the Delta and is very large in comparison to the maximum anticipated flood flow within Kellogg Creek (CCWD, 2009).

Drainages within the existing wind energy facility have been affected by long-term runoff from existing facilities. In particular, existing roadways have been subject to erosion during large storm events. Also, runoff from these roadways has in some cases been channeled into areas in a



SOURCES: FEMA; 2009; EBRPD, 2010; Contra Costa County, 2009; ESRI, 2009

Tres Vaqueros Windfarm Repowering Project . 209132.02

Figure 4.10.2

Creeks and Drainages with FEMA Flood Zones

manner that results in localized scouring, combined with additional erosion and sedimentation downstream. In some cases, sediment from on-site may reach the downstream waterways discussed above.

Surface Water Quality

Perhaps due to the ephemeral nature of the waterways located on-site, very limited surface water quality data are available for the Project area and its vicinity. However, neither Kellogg Creek, Frisk Creek, nor Brushy Creek are included in the 303(d) list of water quality impaired segments for California (USEPA, 2006). Substantial water quality data are available for the Sacramento-San Joaquin Delta, to which both watersheds are tributary. Delta waters are included on the 303(d) list for the following constituents: Chlordane (nonpoint source), DDT (nonpoint source), Dieldrin (nonpoint source), dioxins (atmospheric deposition), exotic species (ballast water), furan compounds (atmospheric deposition), mercury (various sources), nickel (unknown source), polychlorinated biphenyls (PCBs; nonpoint source), and selenium (industrial, agricultural and other sources) (USEPA, 2006).

Groundwater

The entire Project area is located outside of any defined groundwater basins, as defined by the California Department of Water Resources (DWR, 2003). Therefore, limited information is available regarding groundwater levels and quality in the Project area. Generally speaking, limited groundwater is expected to occur in alluvial sediments along valleys in the Project area, including the streambeds of Kellogg Creek, Brushy Creek, Frisk Creek, and associated waterways and tributaries. Very limited groundwater level measurements are available for the vicinity of the Project area, with a total of six data points for 1981 through 1982, which indicate that groundwater levels range from approximately four to 12 feet below ground surface (bgs) for valley areas (USGS, 2010). Groundwater recharge areas likely occur beneath the ephemeral creeks that cross the Project area, although groundwater recharge from Los Vaqueros Reservoir appears to be limited.

Tsunamis and Seiches

Tsunamis are earthquake-generated displacements of water resulting in a rise or mounding at the ocean surface that moves away from the center as a sea wave. All portions of the Project area are located at least several hundred feet above sea level, within land-locked areas that are not adjacent to ocean or other water bodies that would support the propagation of a tsunami.

Seiches are large-scale waves of long wave length in a closed body of water such as a lake or reservoir. Depending on the location of the water body, seiches might be generated by fault rupture that displaces one side of the water body relative to the other and sets up oscillatory waves, or by a landslide or other sudden mass movement that temporarily displaces a portion of a large water body. Such waves may be up to several feet in height under appropriate conditions. Only small, shallow water bodies (ponds) are located on-site.

4.10.2.2 Regulatory Setting

Federal

Executive Order 11988

Under Executive Order 11988, FEMA is responsible for managing floodplain areas, which are defined as the lowland and relatively flat areas adjoining inland and coastal waters subject to a one percent or greater chance of flooding in any given year (the 100-year floodplain). FEMA requires that local governments whose jurisdictions include land that is covered by federal flood insurance (including Contra Costa County) pass and enforce a floodplain management ordinance that specifies minimum requirements for any construction within the 100-year floodplain.

Clean Water Act

The Clean Water Act (CWA) established the basic structure for regulating discharges of pollutants into "waters of the United States." The act specifies a variety of regulatory and nonregulatory tools to sharply reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff.

Section 404 of the CWA establishes a program to regulate the discharge of dredged and fill material into waters of the U.S., including some wetlands. Activities in waters of the U.S. that are regulated under this program include fills for development, water resource projects (e.g., dams and levees), infrastructure development (e.g., highways and airports), and conversion of wetlands to uplands for farming and forestry.

Section 401 requires every applicant for a federal permit or license for any activity that may result in a discharge to a water body to obtain a water quality certification that the proposed activity will comply with applicable water quality standards.

Section 402 regulates point- and nonpoint-source discharges to surface waters through the National Pollutant Discharge Elimination System (NPDES) program. In California, the State Water Resources Control Board (SWRCB) oversees the NPDES program, which is administered by the Regional Water Quality Control Boards (RWQCBs). The NPDES program provides for both general permits (those that cover a number of similar or related activities) and individual permits.

National Pollutant Discharge Elimination System Permit Program

The NPDES permit program was established by the CWA to regulate municipal and industrial discharges to surface waters of the United States. Federal NPDES permit regulations have been established for broad categories of discharges, including point-source municipal waste discharges and nonpoint-source stormwater runoff. NPDES permits generally identify the following:

- Effluent and receiving-water limits on allowable concentrations and/or mass emissions of pollutants contained in the discharge;
- Prohibitions on discharges not specifically allowed under the permit; and

- Provisions that describe required actions by the discharger, including industrial pre-treatment, pollution prevention, self-monitoring, and other activities.

In November 1990, the USEPA published regulations establishing NPDES permit requirements for municipal and industrial stormwater discharges. Phase 1 of the permitting program applied to municipal discharges of stormwater in urban areas where the population exceeded 100,000 persons. Phase 1 also applied to stormwater discharges from a large variety of industrial activities, including general construction activity, if the project would disturb more than five acres. Phase 2 of the NPDES stormwater permit regulations, which became effective in March 2003, required that NPDES permits be issued for construction activity for projects that disturb between one and five acres. The USEPA has delegated its NPDES permitting function relevant to the Project area to the SWRCB, and the RWQCBs. Within this framework, the SWRCB provides coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity, as described in greater detail later in this section.

Safe Drinking Water Act

Under the Safe Drinking Water Act (SDWA) (Public Law 93-523), passed in 1974, the USEPA regulates contaminants of concern to the domestic water supply. Contaminants of concern relevant to the domestic water supply are defined as those that pose a public health threat or that alter the aesthetic acceptability of the water. These types of contaminants are regulated by the USEPA primary and secondary Maximum Contaminant Levels (MCLs) that are applicable to treated water supplies delivered to the distribution system. MCLs and the process for setting these standards are reviewed triennially. Amendments to the SDWA enacted in 1986 established an accelerated schedule for setting MCLs for drinking water. The USEPA has delegated to the California Department of Public Health (CDPH) the responsibility for administering California's drinking-water program. CDPH is accountable to the USEPA for program implementation and for adopting standards and regulations that are at least as stringent as those developed by the USEPA. The applicable state primary and secondary MCLs are set forth in Title 22, Division 4, Chapter 15, Article 4 of the California Code of Regulations.

State of California

Porter-Cologne Water Quality Control Act

Under the Porter-Cologne Water Quality Control Act, water quality objectives are limits or levels of water quality constituents or characteristics established for the purpose of protecting beneficial uses. The Act requires the RWQCBs to establish water quality objectives while acknowledging that water quality may be changed to some degree without unreasonably affecting beneficial uses. Designated beneficial uses, together with the corresponding water quality objectives, also constitute water quality standards under the federal CWA. Therefore, the water quality objectives form the regulatory references for meeting State and federal requirements for water quality control. A change in water quality is only allowed if the change is consistent with the maximum beneficial use of the waters of the State, would not unreasonably affect the present or anticipated beneficial uses, and would not result in water quality lower than that specified in applicable water quality control

plans (CVRWQCB, 2009). All aspects of the Project would be subject to the Porter-Cologne Water Quality Control Act.

State Water Resources Control Board

Created by the California State Legislature in 1967, the SWRCB holds authority over water resources allocation and water quality protection within the State. The five-member SWRCB develops statewide water protection plans, establishes water quality standards, and guides the nine RWQCBs. The mission of SWRCB is to, "preserve, enhance, and restore the quality of California's water resources, and ensure their proper allocation and efficient use for the benefit of present and future generations" (CVRWQCB, 2009).

Central Valley Regional Water Quality Control Board

As authorized by the Porter-Cologne Water Quality Control Act, the Central Valley Regional Water Quality Control Board's (CVRWQCB) primary function is to protect the quality of the waters within its jurisdiction for all beneficial uses. State law defines beneficial uses of California's waters that may be protected against quality degradation to include, but not be limited to: domestic; municipal; agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves.

The CVRWQCB implements water quality protection measures by formulating and adopting water quality control plans (referred to as basin plans, as discussed below) for specific groundwater and surface water basins, and by prescribing and enforcing requirements on all agricultural, domestic, and industrial waste discharges. The CVRWQCB oversees many programs to support and provide benefit to water quality, including the following major programs: Agricultural Regulatory; Above-Ground Tanks; Basin Planning; CALFED; Confined Animal Facilities; Landfills and Mining; Non-Point Source; Spills, Leaks, Investigations, and Cleanups (SLIC); Storm Water; Total Maximum Daily Load (TMDL); Underground Storage Tanks (UST); Wastewater Discharges (including those subject to the NPDES program); Water Quality Certification; and Watershed Management.

Basin Plans and Water Quality Objectives

The Porter-Cologne Water Quality Control Act provides for the development and periodic review of water quality control plans (basin plans) that are prepared by the RWQCBs. Basin plans designate beneficial uses of California's major rivers and groundwater basins, and establish narrative and numerical water quality objectives for those waters. Beneficial uses represent the services and qualities of a water body (i.e., the reasons why the water body is considered valuable), while water quality objectives represent the standards necessary to protect and support those beneficial uses. Basin plans provide the technical basis for determining waste discharge requirements and taking regulatory enforcement actions if deemed necessary. Basin plans are primarily implemented through the NPDES permit program and by issuing waste discharge regulations to ensure that water quality objectives are met.

The Central Valley RWQCB has adopted the *Water Quality Control Plan for the Sacramento and San Joaquin River Basins* (Basin Plan) (CVRWQCB, 2009), which covers the entire Project area. Neither Kellogg Creek, Frisk Creek, Brushy Creek, nor any of their tributaries, is discussed specifically and no beneficial uses have been delineated for either waterway, but the following beneficial uses have been identified for the Delta, into which both creeks drain: municipal and domestic water supply; irrigation; stock watering; industrial/service supply; contact recreation; noncontact recreation; warmwater habitat; coldwater habitat; warmwater migration; coldwater migration; warmwater spawning; wildlife habitat; and navigation (CVRWQCB, 2009).

The Basin Plan sets water quality objectives for the surface waters within its coverage area and addresses the following substances and parameters: ammonia, bacteria, biostimulatory substances, chemical constituents, color, dissolved oxygen, floating material, oil and grease, pesticides, pH, radioactivity, salinity, sediment, settleable material, suspended material, taste and odor, temperature, toxicity, and turbidity. For groundwater, water quality objectives applicable to all groundwater have been set for bacteria, chemical constituents, radioactivity, taste, odors, and toxicity (CVRWQCB, 2009). Specific objectives for concentrations of chemical constituents are also applied to bodies of water based on their designated beneficial uses.

NPDES General Permit for Discharges of Stormwater Associated with Construction Activities

Construction activities disturbing one acre or more of land are subject to the permitting requirements of the NPDES General Construction Activity Permit for Discharges of Storm Water Runoff Associated with Construction Activity (General Construction Permit). A project applicant must submit a Notice of Intent to the RWQCB to be covered by the General Construction Permit prior to the beginning of construction.

On September 2, 2009, the SWRCB adopted a new General Construction Permit for Discharges of Storm Water Associated with Construction Activities, effective on July 1, 2010, replacing the existing permit. The new permit requires a risk-based permitting approach, dependent upon the likely level of risk imparted by a project. The new permit also contains several additional compliance items, including (1) additional mandatory Best Management Practices (BMPs) to reduce erosion and sedimentation, which may include incorporation of vegetated swales, setbacks and buffers, rooftop and impervious surface disconnection, bioretention cells, rain gardens, rain cisterns, implementation of pollution/sediment/spill control plans, training, and other structural and non-structural actions; (2) sampling and monitoring for non-visible pollutants; (3) effluent monitoring and annual compliance reports; (4) development and adherence to a Rain Event Action Plan; (5) requirements for permanent BMPs to match predevelopment hydrology in the post-construction period (for projects in areas with no approved Hydrograph Modification Management Plan); (6) numeric action levels and effluent limits for pH and turbidity; (7) monitoring of soil characteristics on-site; and (8) mandatory training under a specific curriculum. Under the revised permit, BMPs will be incorporated into the action and monitoring requirements for each Project area, including implementation of a Stormwater Pollution Prevention Plan (SWPPP). Under the updated permit, additional and more stringent monitoring, reporting, and training requirements for management of stormwater pollutants will be implemented.

Lake and Streambed Alteration Agreement Program

Under Sections 1600–1616 of the California Fish and Game Code, any person, business, State or local government agency, or public utility that proposes an activity that would (1) substantially divert or obstruct the natural flow of any river, stream or lake, (2) substantially modify the bed or bank of any river, stream or lake, or (3) deposit or dispose debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into any river, stream, or lake, is required to notify the California Department of Fish and Game (CDFG). The Lake and Streambed Alteration Agreement that the notifying entity and CDFG execute after such notification identifies potential impacts of construction and mitigation measures required to minimize and avoid impacts. All portions of the Project that would alter a waterway as summarized above would be subject to the Lake and Streambed Alteration Agreement Program.

Contra Costa County

Contra Costa County General Plan

The Contra Costa County General Plan contains goals and policies applicable to all development projects within the County's unincorporated areas. The General Plan's Public Facilities/Services and Conservation elements identify goals and policies related to drainage, flood control, and water quality that include but are not limited to watershed management, protection of surface water supplies, requirements for drainage facilities, risk management in relation to flood control, and the control of nonpoint sources of water pollution (Contra Costa County, 2010).

Contra Costa County Code Section 1014 - Stormwater Management and Discharge Control

The purpose of County Code section 1014 is to eliminate, to the maximum extent practicable, the discharge of pollutants into local watercourses and municipal storm drain systems. Section 1014 requires that all projects creating and/or redeveloping at least 10,000 square feet of impervious surface provide treatment of stormwater runoff generated by the project. Projects creating and/or redeveloping impervious surface in excess of one acre are required to not only treat stormwater runoff, but also to provide hydrograph modification management (wherein resulting in post-project stormwater runoff flow rates and durations effectively matching the estimated pre-project levels). This section of the County Code is intended to achieve compliance with Provision C.3 of the County's Municipal Separate Storm Sewer System (MS4) NPDES Permit issued by the San Francisco Bay RWQCB, which has jurisdiction over the western and central portions of Contra Costa County (NPDES Permit No. CAS612008). Although the current MS4 NPDES Permit issued to the County by the Central Valley RWQCB (Permit No. CAS083313) contains no such requirements, it is expected that the upcoming reissuance of that NPDES Permit would formally impose similar requirements. Although there currently is no MS4 NPDES Permit requiring treatment and/or hydrograph modification management in the eastern portions of Contra Costa County, Section 1014 of the County Code is applied throughout the County in a uniform manner. Since there is an approved Hydrograph Modification Management Plan related to the San Francisco Bay RWQCB NPDES Permit, and projects within the Central Valley RWQCB are required to comply with Section 1014 of the County Code, the Project must provide for post construction

hydrograph modification management, which may suffice for purposes of compliance with the General Construction Permit requirement to implement permanent post-construction BMPs.

The Project must comply with the County's Stormwater Management and Discharge Control Ordinance (§1014) and the County's MS4 NPDES Permit. Prior to issuance of permits associated with the Project, the Applicant must prepare and submit a Final Development Plan that would be analyzed by the County Public Works Department to determine the scope of new and/or redeveloped impervious surfaces proposed with the Project. If the total impervious surfaces proposed exceeded 10,000 square feet, then the Applicant could be required to prepare and implement treatment features presented in a Storm Water Control Plan, which must be reviewed and given final approval by the Contra Costa County Public Works Department.

Contra Costa County Code Chapter 82-28 - Floodplain Management Ordinance

The Floodplain Management Ordinance applies to all FEMA-designated special flood hazard areas within the County's jurisdiction. The purpose of the ordinance is to promote public health and safety and minimize public and private losses due to flood conditions. This is accomplished through provisions designed to protect human life and property; minimize damage to public facilities and utilities such as water and gas mains, electric, telephone, sewer lines and streets and bridges located in areas of special flood hazard; minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public; minimize public expenditure on flood projects; and provide information to the public regarding special flood hazard areas. The ordinance establishes the requirement for a floodplain permit, which must be obtained prior to issuance of a grading permit or building permit, or commencement of development, on any property within any area of special flood hazards, and also establishes construction standards pertaining to structure anchoring, construction materials and methods, elevation above the base flood height, and flood proofing.

Contra Costa County Flood Control Ordinance Number 94-75

The western portion of the Project is located within Drainage Area 109, for which a drainage fee is due in accordance with Contra Costa County Flood Control Ordinance Number 94-75. This ordinance finds that new developments, with the associated increases in impervious surface, can have adverse effects on regional drainage systems, requiring those systems to be upgraded and maintained. To address these effects, the ordinance requires collection of fees based on square footage of newly created impervious area. All building permits issued in this area are subject to the provisions of the drainage fee ordinance. The current fee in this drainage area is $0.35 per square foot of newly created impervious surface. Therefore, the Project would be conditioned to pay the drainage area fee for net increases in impervious surface area prior to issuance of building permits.

Contra Costa County Drainage Ordinance 1010

A drainage permit under Drainage Ordinance 1010 would be required for installation of culverts proposed along Upper and Lower Kellogg Creek, and within existing drainage ditches and tributaries to Brushy, Frisk, and Kellogg Creeks.

4.10.3 Project Baseline

The environmental setting described above generally constitutes the baseline for issues related to waterways and other natural features relevant to hydrologic resources on-site and in the Project area, and for regulatory issues.

Wind turbines currently are spread across most of the Project area. The wind turbines typically are arranged in rows, usually along ridgelines, with service/access roads extending to each turbine. The access roads cross creeks/drainages at several locations, primarily within the Kellogg Creek Watershed, as shown on Figure 3-3 (Chapter 3, *Project Description*), and Figure 4.10-2. The roads are not paved, but are hard-compacted in order to permit the passage of maintenance trucks as well as larger equipment such as cranes, and are maintained without vegetation. The roads are subject to erosion, which may cause downstream sedimentation. It is likely that the roads contain contaminants, such as fuel, lubricants, brake dust, etc., deposited by the maintenance vehicles.

The Project area contains basic drainage infrastructure. The drainage system primarily consists of approximately 15 culverts whose principal purpose is to direct stormwater away from the access roads. In some places, these culverts are responsible for erosion and scouring of hillsides.

4.10.4 Significance Criteria

Based on CEQA Guidelines Appendix G, a project would cause adverse impacts to hydrology and water quality if it would:

a) Violate any water quality standards or waste discharge requirements;

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

c) 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 which would result in substantial erosion or siltation on- or off-site;

d) 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 run-off in a manner which would result in flooding on-or off-site;

e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;

f) Otherwise substantially degrade water quality;

g) 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;

h) Place within a 100-year flood hazard area structures that would impede or redirect flood flows;

i) 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; or

j) Result in or cause inundation by seiche, tsunami, or mudflow.

4.10.5 Discussion of No Hydrology and Water Quality Impacts

Comparison of baseline conditions and Project characteristics with respect to each of the 10 significance criteria stated above shows that no impacts would result for the following criteria:

f) Would the Project otherwise substantially degrade water quality?

As discussed previously, the Project area is currently used for ranching operations, particularly cattle grazing, in addition to the existing wind energy facility. This is the only on-site activity aside from wind energy production that has potential to degrade water quality. Such degradation may include heightened erosion and sedimentation resulting from direct physical disturbance of waterways, as well as increased microbial and nutrient loading. However, on-site ranching is conducted by an entity separate from the Applicant and implementation of the Project would not result in long-term alteration or interference with ranching operations. Therefore, the Project would not otherwise degrade water quality.

g) The Project would not place housing within a 100-year flood hazard area.

The Project would not result in the construction of housing, as none is proposed. Therefore, no housing would be located within a mapped flood hazard area and no impact would occur with respect to this criterion.

i) The Project would not expose people to a significant risk of loss, injury, or death due to flooding, including flooding as a result of levee or dam failure.

The Project would not interfere with any dam or levee. Although Los Vaqueros Reservoir is located along the western edge of the Project area, the Project would not result in any alteration of Los Vaqueros Reservoir facilities or operations and would not alter any other flood control facilities downstream of the Project area. The Project would include channel crossings along roads used for Project construction, operations and maintenance that, under high flow circumstances, could become inundated. However, this condition already exists on-site for the existing wind farm. Therefore, the Project would result in no change in any risk associated with flooding and no impact would occur.

j) The Project would not result in or cause inundation by seiche, tsunami, or mudflow.

The Project is located, at its lowest point in the northwest corner of the Project area, about 300 feet above sea level, in a land-locked area that is distant from the Pacific Ocean and the San Francisco Bay. Therefore, inundation of the Project area as a result of a tsunami would not occur.

Mudflows can occur within areas of high topographic relief and unstable soils, or areas immediately downstream of such areas. The Project area contains stable soils (see Section 4.7, *Geology and Soils*) that would not be anticipated to result in mudflow. Therefore, no mudflow-related impact is anticipated.

Seiche, defined as long-period wave movement of an enclosed water body, results from seismic movement, or from a major landslide or other mass movement that falls into a lake, creating a substantial wave. A seiche can result in runup of several feet on shore, temporarily inundating adjacent areas. Seiche could potentially occur at Los Vaqueros Reservoir. However, the wind turbines, roads, and other facilities proposed for the Project would be located on high ground and away from the reservoir, and in the event of a seiche, would not be affected. Therefore, no seiche-related impact is anticipated.

4.10.6 Discussion of Impacts and Mitigation Measures

a) Would the Project violate any water quality standards or waste discharge requirements?

Impact 4.10-1: The Project could violate a water quality standard during operations, or result in other water quality degradation during operations. *((Less-than-Significant Impact with Mitigation Incorporated)*

Construction, operation and decommissioning of the Project would not violate any waste discharge requirements because no facility-specific NPDES permit is likely to be required. Potential construction- and decommissioning-related water quality impacts are analyzed under Impact 4.10-3. However, as analyzed below, operation of the Project could violate water quality standards.

In support of Project operations, fuels, oils, lubricants, and other hazardous chemicals and potential water quality pollutants would be stored off-site. Small amounts of these and other operational chemicals would, however, be brought on-site in order to support maintenance of the wind turbines, substation, and other equipment. Chemicals used for these purposes include transformer oils, which typically include fluorinated hydrocarbons, silicone-based oils, and/or biodegradable esters. Similarly, wind turbines require various lubricants and greases in order to function properly, and the use of maintenance equipment, including cranes, trucks, and transport vehicles requires on-site usage of fuels, oils, greases, and other fluids.

Accidental spill or release of these or other equipment–related water quality pollutants could result in a reduction of water quality on-site. Specifically, these chemicals could leach into soils and affect groundwater, or into water bodies on-site (ponds, streams) during rain storms, causing degradation of receiving water quality. This impact is considered potentially significant, however, implementation of Mitigation Measure 4.10-1 would reduce this effect to a less-than-significant level.

Potential impacts to water quality as a result of construction-related stormwater pollutants, including during the construction period, are discussed in Impact 4.10-3. Potential changes in water quality related to drainage on-site are discussed in Impact 4.10-4.

Mitigation Measure 4.10-1: In order to ensure that accidental spills of fuels, oils, greases, coolant, transformer oil, and other chemicals used on-site do not result in water quality degradation, the Applicant shall prepare a spill prevention and control plan for Project operations. The Applicant shall implement the recommendations of this plan prior to commencement of Project operations. The plan shall provide for compliance with local, State, and federal regulations regarding on-site storage and use of fluids and compounds, including:

- Storage and handling criteria for fuels, oils, lubricants, antifreeze, and other fluids that minimize fluid release;
- Storage and handling criteria for waste oils, lubricants, transformer oil, and other fluids that minimize fluid release;
- Use of secondary containment surrounding transformers and any on-site transformer oil storage areas, as relevant;
- Use of secondary containment for temporary storage of waste/spent oils, lubricants, transformer oil, or other fluids on-site;
- Operational spill prevention measures including staff training for the recognition and proper handling of potentially hazardous fluids; and
- Cleanup procedures that, in the event of a spill, provide for identification and response procedures to contain spills, and properly dispose of contaminated soils or other materials, so as to minimize potential water quality effects.

Significance of Impact after Mitigation: Less than Significant.

---

b) Would the Project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?

Impact 4.10-2: The Project could interfere with groundwater recharge or deplete groundwater supplies. ***(Less-than-Significant Impact)***

The Project would not result in the installation of any new groundwater wells, and would not result in the extraction of groundwater on the Project area. Water for Project construction activities would be supplied via an agreement with municipal or private entities, as discussed in Chapter 3, *Project Description*. Water supplied by local private entities or municipal water, that could include groundwater, would be trucked on-site to support Project construction, including

dust suppression and concrete production. As shown in Table 3-7, construction of the proposed Project would require the use of a total of approximately 8.4 million gallons of water. This water would be provided by the Byron Bethany Irrigation District and taken at the intersection of Canal 45 and Camino Diablo Road near Bryon (see Figure 3-2d), and could include groundwater. Although the source of water for construction has not been identified, this volume of water is minor and would represent only a minimal and temporary increase in use in comparison to typical agricultural or municipal water sources. Construction water demand would be limited to the construction period. Therefore, use of water, including groundwater, for construction is not anticipated to result in a substantial reduction in groundwater levels.

Implementation of the Project would result in the construction of approximately 44.4 acres of new gravel access roads on-site in order to support construction, operation, and maintenance. The Project would also involve improvements to 2.2 miles of existing roads. These roads would be engineered and compacted to support use by large trucks and other equipment, but would not be paved, and therefore are not considered impervious surfaces.

Areas immediately surrounding the wind turbines, as well as paths, spaces between equipment, and setbacks within the expanded substation, would not be paved. The turbine pads, as well as some portion of the total roadway, would be located at or near the peak of several hills on-site. Hilltop areas on the Project area are not expected to support substantial groundwater recharge, and the construction of proposed facilities at or near hilltops would not interfere with groundwater recharge. Given the minimal and relatively dispersed nature of proposed impervious surfaces across the Project area, as well as the extensive pervious surfaces that would be maintained on-site, any potential reduction in groundwater infiltration would be minimal to negligible. Therefore, this impact would be less than significant.

Mitigation: None required.

---

c/d) Would the Project 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 would result in substantial erosion or sedimentation on or off site, or substantially increase the rate or amount of surface run-off in a manner which would result in flooding on or off site?

Impact 4.10-3: Project construction and operation could alter drainage patterns on-site in a manner which could result in erosion, sedimentation, or flooding on-site or off site. (*Less-than-Significant Impact with Mitigation Incorporated)*

Erosion and Sedimentation

Construction of the Project would include the use of heavy machinery, including but not limited to transport trucks, bulldozers, graders, backhoes, and cranes. Use of these and similar types of heavy machinery would cause disturbance to surface sediments, loosen soils, remove existing

vegetation, and potentially result in increased erosion on-site. During large storm events, eroded soils could become entrained in stormwater, and could cause sedimentation on-site or downstream, including along Project area waterways. A staging areas (approximately 3 acres) and laydown areas (the existing O&M building would be razed and the area of the building and the parking lot would be used as the laydown area) also could generate substantial sediment loads during storm events, if improperly managed. During Project operations, if improperly managed, stormwater control measures along the proposed roadways, substation, and other proposed facilities could result in the discharge of stormwater into inadequately sized drainages, or in a manner that would result in additional erosion and sedimentation. The Project would include removal of some existing roadways which, as discussed, currently create various erosion-related problems in some areas. If reclaimed roadways are not properly managed, additional erosion could occur. Installation the proposed new roads, stream crossings/culverts, wind turbines, upgraded power substation, temporary trenches for on-site power lines, the new O&M building, and other proposed facilities, as well as temporary facilities such as crane pad and laydown areas, would involve digging, grading, and earth-moving. If improperly managed, these activities could result in changes in drainage patterns on-site, which could lead to increased incidence of erosion, sedimentation, and flooding on-site or downstream. For instance, unless properly managed, stormwater runoff along new roadways could cut erosional channels, resulting in erosion along the roadways, and sedimentation downstream.

For the construction period, the Project would be required to acquire coverage under the County's General Construction NPDES Permit issued by the CVRWQCB. As discussed previously, conditions of this permit would require adherence to a series of Best Management Practices, as well as other measures, to control potential erosion and sedimentation and address water quality issues associated with Project construction. To ensure that stormwater control facilities were designed to minimize erosion and sedimentation, implementation of Mitigation Measures 4.10-3a and 4.10-3b also would be required.

Drainage and Flooding

As discussed above, installation of the proposed roads, stream crossings/culverts, wind turbines, upgraded substation, new O&M building, temporary trenches for power lines, removal of existing culverts, and other proposed actions and facilities would involve digging, grading, and earth-moving activities, including within existing streambeds. If improperly managed, these activities could result in changes in drainage patterns on-site, which could lead to increased incidence of erosion, sedimentation, and flooding on-site or downstream. For instance, the Project includes installation of new culverts[1]. Unless adequately designed, the installation of proposed culverts could result in the back-up of storm flows on-site, potentially resulting in increased flooding. Therefore, implementation of Mitigation Measures 4.10-3a and 4.10-3b would be required in order to ensure that installation of Project facilities would not result in substantial changes in on-site drainage patterns, such that additional flooding would occur.

[1] The exact number of new culverts is unknown as they will be dependent on the final road design from the final layout.

Mitigation Measure 4.10-3a: To control and manage stormwater runoff during construction and decommissioning, the Applicant shall prepare and implement a Stormwater Pollution Prevention Plan (SWPPP) as required under the General Construction Permit for Discharges of Storm Water Associated with Construction Activities, for all construction and decommissioning phases of the Project. The SWPPP shall identify pollutant sources that may affect the quality of stormwater discharge and shall require implementation of Best Management Practices (BMPs) to reduce pollutants in stormwater discharges.

BMPs shall include, but would not be limited to:

1. Excavation and grading activities in areas with slopes greater than 30 percent or directly adjacent to open water shall, to the extent possible, be conducted during the dry season (April 30 to October 15). If Excavation and grading activities must performed during the wet season (October 15 to April 30), they shall be conducted in accordance with County requirements and the requirements of the General Construction Permit for Discharges of Storm Water Associated with Construction Activities.

2. If excavation occurs during the rainy season, storm runoff from the construction area shall be regulated through a storm water management/erosion control plan that shall include temporary on-site silt traps and/or basins with multiple discharge points to natural drainages and energy dissipaters. Stockpiles of loose material shall be covered and runoff diverted away from exposed soil material. If work stops due to rain, a positive grading away from slopes shall be provided to carry the surface runoff to areas where flow would be controlled, such as the temporary silt basins. Sediment basins/traps shall be located and operated to minimize the amount of off-site sediment transport. Any trapped sediment shall be removed from the basin or trap and placed at a suitable location on-site, away from concentrated flows, or removed to an approved disposal site.

3. Temporary erosion control measures (such as fiber rolls, staked straw bales, detention basins, check dams, geofabric, sandbag dikes, and temporary revegetation or other ground cover) shall be provided until perennial revegetation or landscaping is established and can minimize discharge of sediment into nearby waterways. For construction within 500 feet of a water body, appropriate erosion control measures shall be placed between the potential source of sediment and the water body.

4. Sediment shall be retained on-site by a system of sediment basins, traps, or other appropriate measures.

5. No disturbed surfaces will be left without erosion control measures in place during the rainy season, from October 15th through April 30th.

6. Erosion protection shall be provided on all cut-and-fill slopes. Revegetation shall be facilitated by mulching, hydroseeding, or other methods and shall be initiated as soon as possible after completion of grading and, to the extent feasible, prior to the onset of the rainy season (by October 15).

7. A vegetation and/or engineered buffer shall be maintained, to the extent feasible, between the construction zone and all surface water drainages including riparian zones.

8. Vegetative cover shall be established on the construction site as soon as possible after disturbance.

9. BMPs selected and implemented for the Project shall be in place and operational prior to the onset of major earthwork on the site. The construction phase facilities shall be maintained regularly and cleared of accumulated sediment as necessary. Effective mechanical and structural BMPs that shall be implemented at the Project area include the following:

    a. Mechanical storm water filtration measures, including oil and sediment separators or absorbent filter systems such as the Stormceptor® system, shall be installed as appropriate within the storm drainage system to provide filtration of stormwater prior to discharge;

    b. Vegetative strips, high infiltration substrates, and grassy swales shall be used where appropriate throughout the Project area to reduce runoff and provide initial stormwater treatment;

    c. Permanent energy dissipaters shall be included for all permanent drainage outlets;

    d. The water quality detention basins and their maintenance procedures shall be designed to provide effective water quality control measures including the following:

        i. Maximize detention time for settling of fine particles;

        ii. Establish maintenance schedules for periodic removal of sedimentation, excessive vegetation, and debris that may clog basin inlets and outlets;

        iii. Maximize the detention basin elevation to allow the highest amount of infiltration and settling prior to discharge.

10. Hazardous materials such as fuels and solvents used on the construction sites shall be stored in covered containers and protected from rainfall, runoff, vandalism, and accidental release to the environment. All stored fuels and solvents will be contained in an area of impervious surface with containment capacity equal to the volume of materials stored. A stockpile of spill cleanup materials shall be readily available at all construction sites. Employees shall be trained in spill prevention and cleanup, and individuals shall be designated as responsible for prevention and cleanup activities.

11. Equipment shall be properly maintained in designated areas with runoff and erosion control measures to minimize accidental release of pollutants.

Mitigation Measure 4.10-3b: Prior to issuance of grading or building permits and initiation of construction activities for the Project, the Applicant shall prepare a Drainage Management Plan. The plan shall be submitted to the Contra Costa County Flood Control and Water Conservation District for review and approval as part of the Flood Control District's issuance of a Drainage Permit, as required by the County's 1010 Drainage

Ordinance. The Applicant shall be required to implement and adhere to the plan approved by the reviewing agency. The plan shall include measures necessary to ensure that stormwater drainage from the proposed roadways, new substation, and other facilities is channeled into appropriately-sized drainage ditches, channels, culverts, stormwater retention ponds, and/or stormwater infiltration facilities. The plan shall require that all new or modified facilities are designed so as to ensure no net increase in stormwater discharge rates, flow velocities, or sediment transport would result from Project implementation, and that discharges from these facilities are designed so as to avoid concentrating of flow and subsequent downstream scouring or sedimentation. Proposed roadways shall be designed so as to ensure that potential for slope failure and erosion is minimized. The Drainage Management Plan shall be incorporated into all design drawings and specifications as appropriate.

Significance of Impact after Mitigation: Less than Significant.

---

e) Would the Project create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

Impact 4.10-4: The Project could create or contribute additional runoff water, which could exceed the capacity of drainage systems, and could create additional sources of polluted runoff. (*Less-than-Significant Impact with Mitigation Incorporated)*

Approximate disturbance and restoration acreage associated with Project components is presented in Project Description Table 3-4. Project implementation would result in the permanent disturbance of 11 acres, temporary disturbance of 93.1 acres, and restoration of 29.1 acres. Overall, there would be no net increase of impervious surfaces. Impervious surfaces include paved roadways, concrete transformer and turbine pads/foundations, and other areas that do not permit the infiltration of stormwater. During a storm event, impervious surfaces generate additional stormwater runoff, as compared to pervious surfaces. If improperly managed, this additional stormwater runoff could be channeled into existing drainages and natural waterways, contributing to or exacerbating flooding on-site and downstream of the impervious surfaces.

These roadways are to be composed of gravel and, as such, are not considered impervious surfaces. However, the proposed unpaved roadways would be hard-compacted; while not classified as impervious, would still result in reduced permeability for stormwater infiltration, as compared to existing conditions. Therefore, during a storm event these surfaces could generate additional stormwater runoff, as compared to existing surfaces. If improperly managed, this additional stormwater runoff could be channeled into existing drainages and natural waterways, contributing to or exacerbating flooding on-site and downstream. Additionally, the proposed roadways could collect oil, grease, brake dust, sediment, and other potential pollutants deposited by maintenance vehicles. During a storm, especially during the first major storm of the season, these potential pollutants can become entrained in stormwater, migrate into natural waters, and result in water quality degradation on-site or downstream. These impacts, including potential

increases in the volume of stormwater discharged from the Project area, and potential increases in pollutants emanating from the proposed roadways, are potentially significant. However, implementation of Mitigation Measures 4.10-3a and 4.10-3b would reduce these impacts to less-than-significant levels.

The influx of vehicles and equipment at the Project area during construction, along with the construction processes themselves, would increase the likelihood of accidental releases of fuels, oils, lubricants, antifreeze, and other hazardous fluids and compounds into the environment. During storm events, these pollutants could become entrained in stormwater flows and degrade water quality downstream. Discharges from the temporary cement plant identified in Chapter 3, *Project Description*, including truck washout and other concrete washout, would be channeled into an on-site, aboveground settling pond. If improperly managed, pollutant-containing water accidentally could be released from this pond. Such releases could become entrained in natural waterways, resulting in degradation of downstream water quality. The construction-related impacts to water quality are potentially significant, but would be mitigated to less-than-significant levels through implementation of Mitigation Measures 4.10-3a and 4.10-3b. For a discussion of potential releases of hazardous materials during construction, and the potential for exposure of Project workers, personnel, and the public at large to such chemicals, please refer to Section 4.9, Hazards and Hazardous Materials, Impact 4.9-1.

Significance of Impact after Mitigation: Less than Significant.

---

h) Would the Project place within a 100-year flood hazard area structures that would impede or redirect flood flows?

Impact 4.10-5: The Project could place structures in a 100-year flood hazard area, which could impede or redirect flood flows. *(Less-than-Significant Impact with Mitigation Incorporated)*

Implementation of the Project would involve construction of new roads and stream crossings within FEMA-defined 100-year hazard areas, and other areas that would be subject to flooding (e.g., stream crossings along tributaries to Kellogg Creek, Brushy Creek, and Los Vaqueros Reservoir, where FEMA flood zones have not been delineated). Stream crossings may include the installation of engineered crossings with culverts in the streambed, in order to enable construction and maintenance of wind turbines during periods when waterways on-site are flowing. The installation of these features could result in the retention of floodwaters behind the crossing, resulting in impeded or redirected flood flows, and potential backing up of floodwaters on-site. While this impact would be potentially significant, implementation of Mitigation Measure 4.10-5 would reduce the impact to a less-than-significant level.

> **Mitigation Measure 4.10-5:** The Applicant shall ensure that the proposed stream crossings are designed so as to not substantially interfere with flood flows within the Project area. Specifically, the Applicant shall ensure that all stream crossings are sized to allow a

100-year flood to pass without backing up or ponding of water upstream of the crossing. For areas where 100-year flood flows have not been evaluated by FEMA, the Applicant shall complete a study that quantifies the 100-year flood flows along the stream reach where the crossing would be installed, and design the crossings as indicated previously. This study, where necessary, shall be incorporated into the Drainage Management Plan (see Mitigation Measure 4.10-3b).

Significance of Impact after Mitigation: Less than Significant.

4.11 Land Use and Planning

4.11.1 Introduction

This section analyzes the Project's relationship to land use and planning. Discussed herein are the physical and regulatory setting; the baseline for determining environmental impacts; the criteria used for determining the significance of environmental impacts; and potential impacts associated with decommissioning the existing windfarm and construction, operation, maintenance, and decommissioning of the Project.

4.11.2 Setting

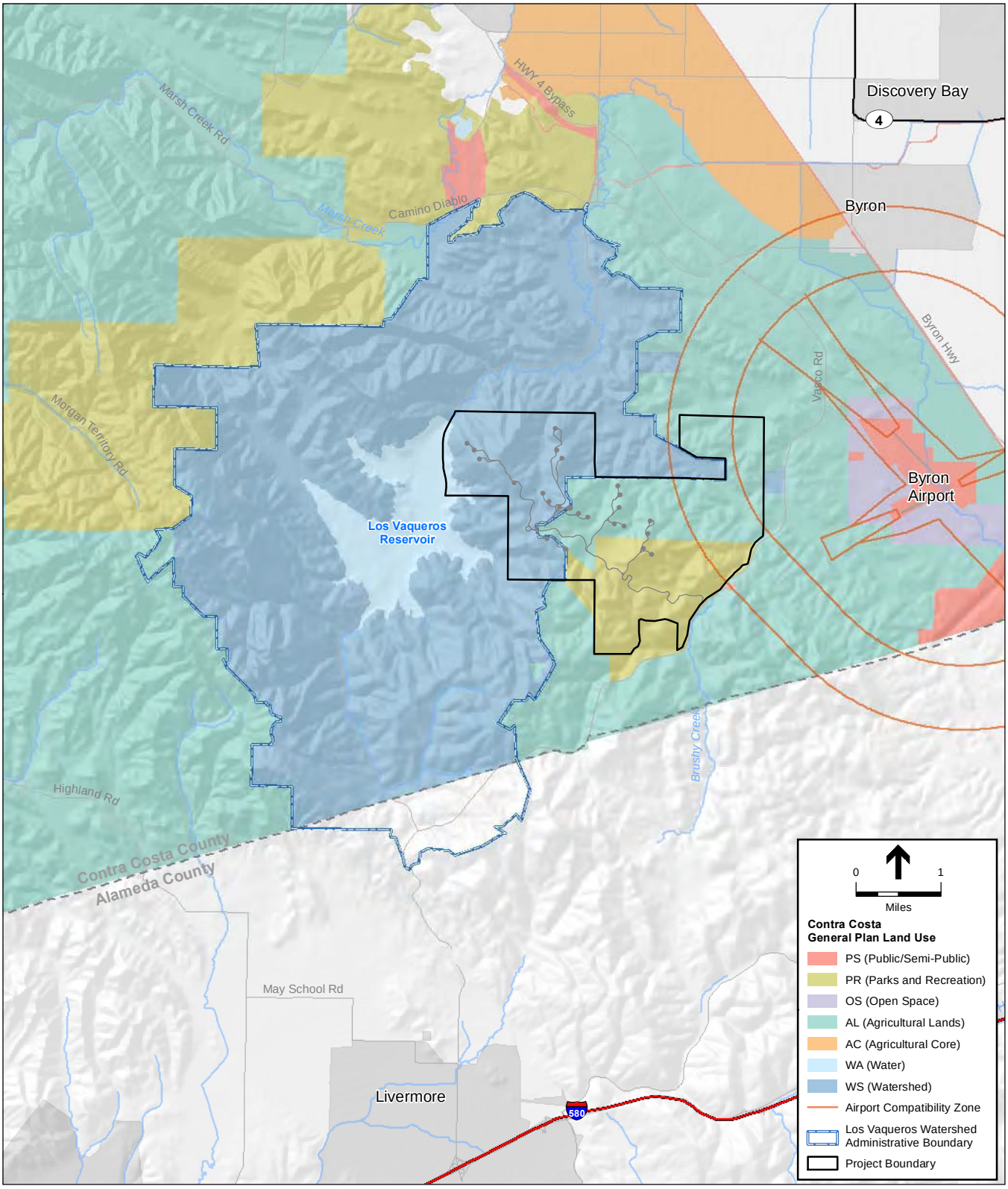
4.11.2.1 Regional and Local Setting

Section 3.1.2 (*Location*) provides general information about the regional and local setting. This section (4.11.2.1) provides setting information specific to land uses and planning. The Project is located within the Altamont Pass Wind Resource Area (APWRA), which is one of the most significant resource areas for wind energy development in California. The Project area is characterized by mostly treeless, rolling hills of annual grassland. Primary land uses are agriculture, parks and recreation, and water supply reservoir watershed.

4.11.2.2 Regulatory Setting

Contra Costa County General Plan

The Contra Costa County General Plan designates land within the Project area as Watershed (WS), Agricultural Land (AL), and Parks and Recreation (PR), as shown in Figure 4.11-1 (Contra Costa County, 2010). The purpose of the Watershed designation is to protect public water supplies. The primary use allowed within designated Watershed areas include public water supplies stored in reservoirs, such as the Los Vaqueros Reservoir. To safeguard such reservoirs, uses in Watershed areas are limited to livestock grazing; intensive agriculture that does not rely on pesticides or other chemical fertilizers; passive, low-intensity recreational uses such as hiking and biking; and small-scale commercial uses that support picnicking, boating, and fishing activities on the adjacent reservoirs. The purpose of the Agricultural Lands designation is to preserve and protect lands capable of and generally used for the production of food, fiber, and plant materials. This land use designation is not intended to exclude or limit other types of agricultural, open space, or non-urban uses. The General Plan recognizes that the State Energy Resources Conservation and Development Commission has identified the APWRA, including the Byron Hills area of the County, as an area with high wind potential and that the private sector responded by moving into wind energy production as a "secondary use to agricultural pursuits" (Contra Costa County, 2010). Allowable uses in the Parks and Recreation land use designation are passive and active recreation-oriented activities and associated commercial uses such as snack bars and restaurants.



SOURCE: Contra Costa County, 2006; ESRI, 2009

Tres Vaqueros Windfarm Repowering Project . 209132.02

Figure 4.11-1

Contra Costa County General Plan Land Use

Contra Costa County General Plan goals, policies, and implementation measures apply to all unincorporated areas of the County, including the Project area. These may be summarized as follows: those that recognize the value of the Project area "as an area with high wind energy potential" (e.g. Land Use Policy 3-71, Renewable Energy Resources Policy 8-49 and Renewable Energy Implementation Measure 8-bo); those that foster wind energy uses in appropriate areas by discouraging development that would be incompatible with wind energy generation (e.g. Land Use Goal 3-G, Land Use Policy 3-71, and Renewable Energy Resources Policy 8-50); those that expressly find wind energy uses to be compatible with agricultural and watershed uses (e.g. Land Use Policies 3-68 and 3-69); and those that establish what must occur in the event that a windfarm becomes obsolete or abandoned (e.g. Renewable Energy Implementation Measures 8-bp and 8-bq) (Contra Costa County, 2010).

Zoning Ordinance

The Project area contains parcels zoned as A-2 (General Agriculture, 5-acre minimum parcel) and A-3 (Heavy Agriculture, 10-acre minimum parcel). Surrounding areas are also zoned for agricultural use. Wind turbines are a permitted use in both of these zoning districts, subject to approval of a Land Use Permit. The County's Land Use Permit approval process is discussed in Section 4.2, *Agriculture and Forestry.*

Wind Energy Conversion System (WECS) Ordinance

The County regulates wind energy projects through the Wind Energy Conversion System (WECS) ordinance, codified in Chapter 88-3 of the County Code. Specific requirements of the ordinance are summarized below.

- A minimum setback of three times overall wind turbine height (measured from grade to the top of the structure, including the uppermost extension of any blades) or 500 feet, whichever is greater, shall be maintained from exterior project boundaries.
- Turbines must be set back a minimum distance of 1,000 feet from any existing legal off-site residence(s) or general plan designated residential areas.
- Turbines may not generate noise which exceeds a maximum of 65 dBA as measured at the exterior project boundary.
- Turbines must be of a nonreflective, unobtrusive color. All buildings and structures related to turbines must be sited to minimize visual impact to residences within one mile, adjacent roadways, and County scenic routes.
- A reclamation plan shall indicate removal of all turbines, buildings, structures, and foundations to three feet below finish grade; road repair costs; and all re-grading and re-vegetation necessary to return the subject property to the condition existing prior to establishment or expansion of the turbines.

Contra Costa County Airport Land Use Compatibility Plan

The Contra Costa County Airport Land Use Compatibility Plan (ALUCP) serves as a planning tool to promote compatibility between airports in Contra Costa County and the surrounding land uses. The Contra Costa County Airport Land Use Commission adopted the ALUCP in December 2000.

The Contra Costa County ALUCP presents land use policies that pertain to the Airport Influence Area (AIA) associated with Byron Airport. The AIA includes the area that could be affected by aircraft noise, safety concerns, overflight impacts, or potential hazards to aircraft. The AIA extends about two to three miles from the airport runways. ALUCP policies identify potential limitations associated with land uses, building designs, structure heights, and population densities and intensities for areas near the Byron Airport, and typically require the Airport Land Use Commission to review proposed objects within the AIA.

Height limitations range from 35 feet for areas closest to the runways (Zone B1) to 70 feet (Zone B2) to 100 feet (Zones C1, C2, and D). Additional limitations are set with regard to noise exposure (see Section 4.13, *Noise*) (ALUC, 2000).

East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan

The East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan (East County HCP/NCCP), approved in July 2007, provides a comprehensive framework for species and ecosystem conservation, short- and long-term local land use decision-making in a rapidly urbanizing region, and environmental permitting processes. The East County HCP/NCCP was developed by the East Contra Costa County Habitat Conservation Plan Association (East County HCPA), which was formed in 2000. The East County HCPA was a Joint Powers Authority consisting of seven entities: Contra Costa County, Contra Costa Water District, East Bay Regional Park District, and the cities of Brentwood, Clayton, Oakley, and Pittsburg. Upon approval of the HCP/NCCP and issuance of the permits, the HCPA ceased to exist, and implementation of the plan is now managed by the East Contra Costa County Habitat Conservancy, which is composed of Contra Costa County and the cities of Brentwood, Clayton, Oakley, and Pittsburg. The Project area is located entirely within the East County HCP/NCCP (ECCCHC, 2007).

Altamont Pass Wind Resources Area Natural Community Conservation Plan/ Habitat Conservation Plan (APWRA NCCP/HCP)

The APWRA NCCP/HCP is currently being developed to minimize impacts to birds caused by wind turbine operations, and to conserve birds and other terrestrial species while allowing wind energy development and operations in the APWRA. When completed, the plan will outline how wind energy projects within APWRA can occur while reducing impacts to specific species and their habitats. The plan's conservation strategy will specify how the impacts to these covered species will be mitigated and also how covered and select non-covered species will be conserved and managed. The Draft APWRA NCCP/HCP and related environmental review documents were anticipated to be released for public review in March 2011, but no information has been updated

on the NCCP/HCCP website. The Final APWRA NCCP/HCP is scheduled to be completed in late 2011 (APWRA, 2010). Because Contra Costa County is not a participant, the APWRA NCCP/HCP would not apply in the Contra Costa County portion of the APRWA or to the Project.

4.11.3 Project Baseline

The regional, local, and regulatory settings described above constitute the baseline for purposes of analyzing potential impacts related to land use and planning. Established communities located nearest to the Project area include the unincorporated community of Byron (approximately 4 miles northeast of the Project), City of Livermore (approximately 6 miles to the south), City of Brentwood (approximately 5-6 miles to the north), and the unincorporated community of Blackhawk (about 9-10 miles to the west).

4.11.4 Significance Criteria

Based on CEQA Guidelines Appendix G, a project would have significant adverse impacts to land use and planning if it would:

a) Physically divide an established community;

b) Conflict with any applicable land use plan, policy, or the regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect; or

c) Conflict with any applicable habitat conservation plan or natural community conservation plan.

4.11.5 Discussion of No Land Use and Planning Impacts

As discussed below, development of the Project would have no impact on land use and planning with respect to criteria a) and c).

a) The Project would not physically divide an established community.

The Project area is located in a rural portion of southeastern Contra Costa County, approximately 4 miles southwest of the unincorporated community of Byron. No established communities are present within the Project area. The Project area and vicinity are primarily used for wind energy generation, agriculture (mostly cattle grazing), and parks and recreation (Vasco Caves Regional Preserve, Los Vaqueros Watershed). Therefore, the Project would not divide an established community and there would be no impact.

c) The Project would not conflict with an applicable habitat conservation plan or natural community conservation plan.

The Project area is located within the East County HCP/NCCP Inventory Area Zone 5, (ECCCHC, 2007, Figure 5-2). Zone 5 acreage comprises “all the unprotected lands dominated by annual

grassland and alkali grassland between the Los Vaqueros Watershed lands and the Alameda/Contra Costa County line. This Zone incorporates all uncultivated areas in the southern portion of the inventory area that have potential conservation value to the HCP/NCCP" (ECCCHC, 2007, p. 5-18). Zone 5 does not include the conservation easements surrounding the Byron Airport or the developed portions of the Byron Airport.

The East County HCP/NCCP's primary goal is to obtain incidental take authorization for 28 listed and non-listed species ("covered species") under the Endangered Species Act (ESA) and the California Natural Community Conservation Planning Act (NCCPA). As discussed in Section 4.4, *Biological Resources*, many of these species are found in the Project area. The 28 covered species are:

- *Mammals*: San Joaquin kit fox, and Townsend's western big-eared bat.
- *Birds*: Golden Eagle, Western Burrowing Owl, Swainson's Hawk, and Tricolored Blackbird.
- *Reptiles*: Alameda whipsnake, Silvery legless lizard, Giant garter snake, and Western pond turtle.
- *Amphibians*: California red-legged frog, California tiger salamander and Foothill yellow-legged frog.
- *Invertebrates*: Longhorn fairy shrimp, Vernal pool fairy shrimp, Midvalley fairy shrimp, and Vernal pool tadpole shrimp.
- *Plants*: San Joaquin spearscale, Round-leaved filaree, Brittlescale, Mount Diablo Manzanita, Big tarplant, Mount Diablo fairy lantern, Recurved larkspur, Diablo helianthella, Brewer's dwarf flax, Showy madia, and Adobe navarretia.

To be covered under the permits issued in connection with East County HCP/NCCP, the authorized take must be incidental to the otherwise lawful activities identified as "covered activities" in the plan. Such activities broadly include all ground-disturbing activities controlled by permit holders via their land use planning process, as well as specific rural infrastructure projects and preserve management activities. The East County HCP/NCCP's definition of covered activities expressly excludes wind turbine expansion and operation (ECCCHC, 2007).

Table 4.11-1 compares the anticipated results of Project implementation with the results that are expected to occur from the implementation of the landscape-level, natural community-level and species-level conservation measures set forth in the East County HCP/NCCP and shows that the Project is consistent with the plan. Because the Project would be consistent with the East County HCP/NCCP, the Project would have no impact on an applicable HCP or NCCP.

TABLE 4.11-1
PROJECT CONSISTENCY WITH THE EAST COUNTY HCP/NCCP

Conservation Measure	Analysis of Consistency
1. Landscape-Level Conservation Measures	
Conservation Measure 1.1, Acquire Lands for Preserve System	The East County HCP/NCCP anticipates that a "combination of acquisition in fee title and conservation easements" would be used in Zone 5 (ECCCHC, 2007, p. 5-24), where existing wind turbines are "abundant" (ECCCHC, 2007, p. 5-37). "Land acquisition in wind turbine areas can contribute to the goals and objectives of this HCP/NCCP. However, the Implementing Entity is encouraged to consider retiring wind turbine leases on land it acquires when these leases come up for renewal, or require turbine reconfiguring (e.g., replace many old turbines with fewer turbines of new design in locations better for wildlife). Either action could significantly reduce wind turbine impacts on covered species and other native wildlife." (ECCCHC, 2007, p. 5-38). The construction, operation and ultimate decommissioning of the Project would not preclude the acquisition of fee title to the Project area or entry into a conservation agreement with the underlying landowner(s), should the owners elect to participate, during the life of the Project. Should site control be obtained under the plan, no aspect of the Project would preclude the consideration of retiring the existing wind leases when they expire. Further, as described in Section 3, *Project Description*, and discussed in Section 4.4, *Biological Resources*, the Project proposes to combine repowering with micrositing and thereby reduce the number of turbines on the site by up to 70 turbines and to install new, taller, more efficient ones in locations that have been selected to avoid avian and other environmental impacts to the extent practicable. Accordingly, the Project would be consistent with results to be obtained under Conservation Measure 1.1.
Conservation Measure 1.2. Prepare and Implement Preserve Management Plans for Natural Habitat Lands	Although the Project area is located in East County HCP/NCCP Inventory Area Subzone 5, it is not a part of the Preserve system. Nonetheless, implementation of the Project is expected to restore at least 29 acres, including upland grassland habitat (see Section 3.4.2, *Construction)* as a result of the removal and restoration of existing roads, turbine pads and other existing infrastructure that would no longer be needed. In addition, mitigation measures that would be imposed if the Project were approved would avoid or reduce Project impacts to on-site habitat. These habitat benefits would be in addition to, and would support, benefits resulting from implementation of the East County HCP/NCCP. Accordingly, the Project would be consistent with results to be obtained under Conservation Measure 1.2.
Conservation Measure 1.3. Prepare and Implement Management Plans for Cultivated Agricultural Lands	There are no cultivated agricultural lands on the Project area. Therefore, implementation of the Project would have no effect, much less any adverse effect, on such lands. Accordingly, Project implementation would be consistent with results to be obtained under Conservation Measure 1.3.
Conservation Measure 1.4. Prepare and Implement an Exotic Plant Control Program for the Preserve System	As discussed in Section 4.4, *Biological Resources*, grasslands on the Project area support nonnative invasive plant species including yellow star-thistle and medusahead. The Project would result in the restoration of at least 29 acres (see Section 3.4.2, *Construction*), including approximately 180 acres of upland grassland habitat. The restoration areas would be reseeded with an approved mixture of grasses (see Chapter 3, *Project Description*), that would not likely include exotic plants. Accordingly, Project implementation would be consistent with results of exotic plant control efforts expected to be obtained under Conservation Measure 1.4.
Conservation Measure 1.5. Prepare and Implement a System-wide Recreation Plan for the Preserve System	The Project area consists exclusively of private property and public property with restricted public access. Only authorized access to the existing wind energy facility is allowed; access would be similarly managed under the Project in accordance with public safety and site security needs. However, implementation of the Project would not preclude use of site lands for recreational purposes at the conclusion of the useful life of the Project. Accordingly, Project implementation would be consistent with recreation planning efforts in accordance with Conservation Measure 1.5.

TABLE 4.11-1 (Continued)
PROJECT CONSISTENCY WITH THE EAST COUNTY HCP/NCCP

Conservation Measure	Analysis of Consistency
2. Natural Community–Level Conservation Measures	
Conservation Measure 2.1. Enhance, Restore, and Create Land Cover Types and Species Habitat	After Project approval, at least 29 acres would be restored (see Section 3.4.2, *Construction*), including upland grassland habitat. At the end of the Project's useful life, decommissioning would include removing the turbines, transformers, substation, foundations and related infrastructure to a depth of at least 3 feet below grade. On-site roads also would be reclaimed. The land then would be restored to pre-Project conditions, including regrading, spot replacement of topsoil if and where needed, and revegetation of disturbed areas with an approved seed mix. As a result, Project implementation would be consistent with the results of enhancement, restoration, and habitat work that would occur under Conservation Measure 2.1.
Conservation Measure 2.2. Manage Wetlands and Ponds	Wetland resources were catalogued within a 400 food-wide corridor along proposed turbine strings, the associated road and collector layout, and the staging area (see Section 4.4, *Biological Resources*). Table 4.4-3 provides potential wetland impact acreages associated with potentially jurisdictional and non-jurisdictional wetlands and waters identified on the Project area. Implementation of General Biological Resources Mitigation Measures 1, 3, 5–9, and 14 and Mitigation Measure 4.4-11 would reduce Project impacts on potentially jurisdictional wetlands or waters, and streambeds and banks, to a less-than-significant level. Accordingly, Project implementation would be consistent with the results of wetlands and pond management efforts expected to occur under Conservation Measure 2.2.
Conservation Measure 2.3. Restore Wetlands and Create Ponds	Among other things, implementation of Mitigation Measure 4.4-11 would require the final Project design to avoid and minimize the fill of wetlands and other waters to the greatest practicable extent and, if such areas cannot be avoided, would require the Applicant to purchase or dedicate land to provide for wetland preservation, restoration or creation. Consequently, implementation of the Project would be consistent with the results of wetland restoration and pond creation efforts expected under Conservation Measure 2.3.
Conservation Measure 2.4. Manage Grassland	Project implementation would result in the near-term restoration of at least 29 acres, including upland grassland habitat. Disturbed areas would be revegetated with an approved mixture of grasses. As a result, Project implementation would be consistent with the results of grassland management efforts expected under Conservation Measure 2.4.
Conservation Measure 2.5. Manage Natural Burrow Availability and Prey Base in Grasslands	Project development would include implementation of Mitigation Measures 4.4-1, 4.4-2 and 4.4-4, among others. These measures would require burrow enhancement or creation in grassland habitat areas under certain circumstances for the benefit of burrowing owls; case-by-case review by a qualified biologist of turbine pads proposed for removal to determine the presence and extent of burrow complexes that are or could be used by California red-legged frogs and California tiger salamanders; and preclusion of the use of rodenticides in the Project area. The results of these efforts, among others, would be consistent with the results expected to occur under Conservation Measure 2.5.
Conservation Measure 2.6. Manage Oak Woodland and Oak Savanna	No oak woodland or oak savannah would be affected by the Project. Accordingly, Project implementation would not hinder the success of efforts made in connection with Conservation Measure 2.6.
Conservation Measure 2.7. Compensate for Loss of Oak Savanna	No oak savannah would be lost as a result of the Project. Accordingly, Project implementation would be consistent with compensation expectations made with respect to Conservation Measure 2.7.
Conservation Measure 2.8. Manage Chaparral/Scrub	No chapparal/scrub would be affected by the Project. Accordingly, Project implementation would be consistent with efforts made under Conservation Measure 2.8.
Conservation Measure 2.9. Manage Streams and Riparian Woodland/Scrub	Potential Project impacts on riparian woodland and scrub are discussed in Section 4.4, *Biological Resources* (see, Impact 4.4-10). With the implementation of General Biological Resources Mitigation Measures 1 and 6–9, and Mitigation Measure 4.4-11, Project impacts on riparian woodland would be less than significant. Accordingly, Project implementation would be consistent with results of efforts associated with Conservation Measure 2.6.

TABLE 4.11-1 (Continued)
PROJECT CONSISTENCY WITH THE EAST COUNTY HCP/NCCP

Conservation Measure	Analysis of Consistency
2. Natural Community–Level Conservation Measures (cont.)	
Conservation Measure 2.10. Restore Streams and Riparian Woodland/Scrub to Compensate for Habitat Loss and to Increase Biodiversity	Mitigation Measure 4.4-10 would require the Project design to avoid and minimize impacts on these areas to the extent feasible. Where avoidance of riparian woodland and scrub habitat is not possible, the Applicant would have to provide on-site compensation through habitat creation, enhancement, and preservation for temporary and permanent impacts. Mitigation for the permanent loss of riparian habitat would be provided by on-site preservation and enhancement of riparian areas at a minimum 1:1 ratio or a higher ratio if required by USFWS or CDFG during the permitting process. With the implementation of this mitigation measure, the Project would be consistent with Conservation Measure 2.10.
Conservation Measure 2.11. Enhance Cultivated Agricultural Lands to Benefit Covered Species	Because no cultivated agricultural lands are present on the Project area, Project implementation would have no adverse effect on efforts made in connection with Conservation Measure 2.11.
3. Species-Level Conservation Measures	
Conservation Measure 3.1. Protect and Enhance Roosting Habitat for Townsend's Western Big-Eared Bat	As indicated in Table 4.4-1 and Appendix D, *Biological Resources*, suitable roosting habitat for Townsend's Western Big-Eared Bat is present at the neighboring Vasco Caves Regional Preserve, but not at the Project area. Accordingly, Project implementation would not hinder efforts made under Conservation Measure 3.1.
Conservation Measure 3.2. Minimize Predation on Tricolored Blackbird Colonies	Potential predators for this species include Common Ravens (*Coryus corax*), Cooper's hawks (*Accipiter cooperii*), and Northern Harriers (*Circus cyaneus*) (USFWS, 2007). As stated in Appendix D, *Biological Resources*, tricolored blackbird nesting has not been documented in the Project area (CH2M HILL, 2010a; CDFG, 2010; ESA, 2010). The nearest documented record occurs 1.7 miles northeast of the Project area. Therefore, Project implementation would not hinder efforts made under Conservation Measure 3.2 to minimize predation on tricolored blackbird colonies. (See also General Biological Resources Mitigation Measure 13, the implementation of which would avoid the attraction of predators during Project construction activities).
Conservation Measure 3.3. Protect Golden Eagle Nest Sites within Preserve System	The East County HCP/NCCP's biological goals and objectives for golden eagle include retiring wind turbine leases within the Preserve System, when feasible (ECCCHC, 2007, p. 5-106). In discussing the acquisition of lands for the Preserve System, the plan states, "the abundant wind turbines in the Zone (mostly in Subzones 5d and 5b) are serious hazards to many species, especially...golden eagle [citations omitted]. Wind turbines are abundant and somewhat evenly distributed within Zone 5, so they will inevitably occur in some lands acquired under the HCP/NCCP preserves." (ECCCHC, 2007, pp. 5-37, 5-38). As indicated in Appendix D1, Biological Resources, three golden eagle nesting locations are identified in the Project area (Figure 4.4-5). Approximately 35 nest locations are recorded within five miles of the Project area. Golden eagles nest in open areas on cliffs and in large trees; they prefer open habitats such as rolling grasslands with cliffs or large trees for nesting and cover. The Project's proposed removal of existing turbines, foundations and roads that would no longer be needed and restoration of the affected areas to pre-wind energy facility conditions would result in an approximately 11-acre increase in annual grassland habitat. Because the Project would restore more acres of potential habitat than it would permanently disturb, the Project would not conflict with Conservation Measure 3.3.
Conservation Measure 3.4. Temporarily Create Artificial Burrows in Grasslands to Attract and Retain Burrowing Owls	Potential impacts on burrowing owl are discussed in Biological Resources Impact 4.4-2. The implementation of Mitigation Measure 4.4-2 would require the enhancement or creation of burrows under certain circumstances, and monitoring to confirm owl use of new burrows before formerly-occupied burrows may be excavated. With Mitigation Measure 4.4 2, Project implementation would be consistent with results expected under Conservation Measure 3.4.

TABLE 4.11-1 (Continued)
PROJECT CONSISTENCY WITH THE EAST COUNTY HCP/NCCP

Conservation Measure	Analysis of Consistency
3. Species-Level Conservation Measures (cont.)	
Conservation Measure 3.5. Install Temporary Artificial Perches to Attract and Retain Burrowing Owls	The implementation of Mitigation Measure 4.4-2 would avoid or minimize potential impacts to burrowing owls. Anticipated results would be consistent with the expected results of efforts made under Conservation Measure 3.5.
Conservation Measure 3.6. Compensate for Loss of Giant Garter Snake Habitat	The Project would not affect Giant Garter Snake habitat. Consequently, Project implementation would not conflict with the achievement of compensation expectations under Conservation Measure 3.6.
Conservation Measure 3.7. Enhance Habitat for Western Pond Turtle	As discussed in Appendix D, *Biological Resources*, a variety of habitats such as creeks, ponds, and drainages, as well as semi-permanent marsh, riparian woodland, and some grasslands, provide pond turtle habitat in the Project area. Implementation of Mitigation Measure 4.4-5 would result in the mitigation of potential impacts to western pond turtle by requiring pre-construction surveys and ongoing relocation of identified animals out of active construction areas. Implementation of General Biological Resources Mitigation Measures 1, 6–11, 15 and 17 also would benefit this species. Because Project impacts on western pond turtle would be less than significant with the imposition of mitigation measures, Project implementation would be consistent with the results expected to be achieved by efforts made under Conservation Measure 3.7.
Conservation Measure 3.8. Compensate for Loss of Occupied Covered Shrimp Habitat	As indicted in Table 4.4-1, suitable longhorn fairy shrimp or vernal pool fairy shrimp habitat was detected in the Project area. Dust control measures would be implemented as part of standard construction BMPs. In addition to these the standard BMPs, Mitigation Measure 4.4-8 would be implemented to make impacts to longhorn fairy shrimp or vernal pool fairy shrimp habitat less-than-significant.
Conservation Measure 3.9. Conduct Experimental Management to Maintain or Enhance Covered Plant Populations	Potential impacts of Project construction to populations of special-status plant species, including round-leaved filaree, are analyzed in connection with Biological Resources Impact 4.4-9. Such impacts would be avoided or minimized to a less-than-significant level by the implementation of General Biological Resources Mitigation Measures 1 and 5–9, and Mitigation Measure 4.4-9. With the implementation of these measures, Project implementation would be consistent with the expected results of efforts made under Conservation Measure 3.9.

4.11.6 Discussion of Impacts and Mitigation Measures

b) Would the Project conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the Project, adopted for the purpose of avoiding or mitigating an environmental effect?

Impact 4.11-1: The Project could conflict with an applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect. (*Less-than-Significant Impact*)

The Project would be subject to all of the requirements of the County Code. The Project would neither add a new land use nor change existing uses of the Project area, would be consistent with the area's General Plan and zoning designations, and would be generally consistent with the WECS Ordinance. However, installation of the new turbines would not comply in every respect with the ordinance's setback provisions. Based on the proposed turbines' maximum height of 429 feet above ground level, the required setback from the exterior project boundary for these

turbines would be 1,287 feet (see discussion of Impact 4.9-6, in Section 4.9, *Hazards and Hazardous Materials*). Although the site plan generally conforms to the setback requirements, 4 turbines are proposed within the setback area. The final approval for the Project would either require compliance with the WECS setback requirements or permit setback reductions and state the findings necessary for granting such reductions. General conformance with the intent and purpose of the WECS Ordinance, as opposed to strict compliance with the requirements, conservatively is determined to be a less-than-significant impact on consistency with applicable plans, policies and regulations.

The eastern portion of the Project would be located within Hazard Zones C1 and D of the Byron Airport Land Use Compatibility Plan and the Height Exception Overlay Zone. A portion of the Project area is also within the Byron Airport Airspace Protection Surfaces. As discussed in Impact 4.9-4, in Section 4.9, *Hazards and Hazardous Materials*, Contra Costa County ALUC staff has reviewed the Project and determined that because the turbines are proposed outside the boundaries of Compatibility Zone D, the Height Exception Overlay Zone, the Airspace Protection Surfaces, and the projected Byron Airport noise contours, the Project is compatible with the Airport Land Use Compatibility Plan (ALUC, 2010).

Mitigation: None required.

4.12 Mineral Resources

4.12.1 Introduction

This section analyzes the Project's relationship to mineral resources. Discussed herein are the physical and regulatory setting; the baseline for determining environmental impacts; the criteria used for determining the significance of environmental impacts; and potential impacts associated with decommissioning the existing windfarm and construction, operation, maintenance, and decommissioning of the Project. More specifically, this section evaluates the potential loss of availability of known mineral resources resulting from implementation of the Project.

4.12.2 Setting

4.12.2.1 Regional and Local Setting

Section 3.1.2, *Location*, provides general information about the regional and local setting. This section (4.12.2.1) provides setting information specific to mineral resources in the Project area. Noteworthy mineral resource areas are located in Contra Costa County near the communities of Port Costa, Concord, Clayton, and Byron. The mineral resource area closest to the Project area lies north of the area, near the intersection of Camino Diablo and Vasco Road. This area contains a deposit of Domengine sandstone, which is a resource of national importance because it is an ingredient in heat-resistant glass used by NASA. As this is the only known deposit of Domengine sandstone in California, it is considered a valuable commodity.

Contra Costa County is one of the leading counties in the State in terms of natural gas production. The County also has a small volume of oil production. The most productive gas and oil fields are concentrated in the eastern portion of the County, north of Brentwood and east of Antioch, several miles from the Project area. No significant gas or oil concentrations are known to exist in the immediate vicinity of the Project (Contra Costa County, 2010).

4.12.2.2 Regulatory Setting

State of California

Surface Mining and Reclamation Act of 1975

Pursuant to the Surface Mining and Reclamation Act of 1975 (Pub Res. Code § 2710, et seq., SMARA), the California Geological Survey (CGS) has evaluated areas of California and classified the land into Mineral Resources Zones (MRZs) according to its known or inferred mineral potential. Protected mineral resources include construction materials, industrial and chemical mineral materials, metallic and rare minerals, and non-fuel mineral resources. Non-fuel mineral resources include metals such as gold, silver, iron, and copper; industrial minerals such as boron compounds, rare-earth elements, clays, limestone, gypsum, salt, and dimension stone; and construction aggregate, which includes sand, gravel, and crushed stone. One of the objectives of the MRZ classification process is to ensure that the mineral potential of the land is recognized by

local government decision-makers and considered before making land use decisions that could preclude mining. There are four general MRZ categories:

- *MRZ-1* for areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that little likelihood exists for their presence;
- *MRZ-2* for areas where adequate information indicates that significant mineral deposits are present, or where it is judged that a high likelihood exists for their presence;
- *MRZ-3* for areas containing mineral deposits, the significance of which cannot be evaluated due to inadequate data; and
- *MRZ-4* for areas where no known minerals occur, and where available information is inadequate to make a definite determination as to the area's mineral potential.

The closest mineral resources to the Project pursuant to SMARA were classified as MRZ-2 and are over 2.5 miles northeast of the Project area (CDMG, 1987).

Local

Contra Costa County General Plan

The Conservation Element of the Contra Costa County General Plan identifies mineral resource areas within the County and contains mineral resource-related goals, policies and implementation measures that are applicable to all development projects in the unincorporated areas of the County. Examples are Mineral Resource Goals 8-M and 8-N, Policy 8-58, and Implementation Measure 8-bu, which ensure the following: viability of mineral extraction operations that are important to the County's economy; protection of identified valuable mineral resource areas from incompatible land uses; and planning of future development in the vicinity of valuable mineral resource areas in a way that would minimize incompatibility among uses (Contra Costa County, 2010).

The Conservation Element also contains oil and gas production-related goals, policies and implementation measures that are applicable throughout the unincorporated areas of the County. Examples are Oil and Gas Resources Goals 8-R and 8-S, Policy 8-69, and Implementation Measure 8-cj, which ensure the following: beneficial utilization of oil and gas resources, minimization of impacts on surrounding uses and the environment, protection of the agricultural viability of rural areas (Contra Costa County, 2010).

4.12.3 Project Baseline

The environmental setting provides the baseline for the County's evaluation of Project impacts on mineral resources. Sandstone is considered to be the mineral resource of primary concern for the Project. The availability of other mineral deposits (e.g., gold, silver, crude oil, and natural gas) is not considered for the Project area because the geologic conditions are not suitable for such deposits.

As stated above, no mineral resource areas are known to exist within the Project area; the nearest mineral resource area is approximately 2.5 miles northeast of the Project area.

4.12.4 Significance Criteria

Based on CEQA Guidelines Appendix G, a project would cause adverse impacts to mineral resources if it would:

a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state; or

b) Result in the loss or availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan.

4.12.5 Discussion of No Mineral Resources Impacts

As explained below, development of the Project would have no impact on mineral resources.

a) The Project would not result in the loss of availability of a mineral resource of value to the region or the State.

The Project would not be located within a significant mineral, oil, or gas resource producing area. No Domengine sandstone has been identified within the Project boundary (see Section 4.7, *Geology and Soils*) and the Brentwood oil and gas field and Rio Vista gas field are miles away from the area. No expansion of the area boundary is proposed. Therefore, the Project would cause no adverse impact to the availability of a mineral resource.

b) The Project would not result in the loss of availability of a locally important mineral resource recovery site.

No mineral resource recovery site is located within or near the Project area and the area boundary would not be expanded to include one. Therefore, the Project would not result in the loss of availability of a locally important mineral resource recovery site, and no impact would occur.

4.12.6 Discussion of Impacts and Mitigation Measures

Because implementation of the Project would cause no impact on mineral resources, there are no impacts and no mitigation measures to be analyzed in this section.

4.13 Noise

4.13.1 Introduction

This section analyzes the Project's relationship to noise. Discussed herein are the physical and regulatory setting, the baseline for determining environmental impacts, the significance criteria used for determining environmental impacts, and potential impacts of Project-related noise resulting from decommissioning of the existing windfarm and construction, operation and maintenance, and end-of-life decommissioning of the proposed turbines and related infrastructure. Mitigation measures are identified to reduce potentially significant impacts. Background information on environmental acoustics, including definitions of terms commonly used in noise analyses, also is provided.

4.13.2 Setting

4.13.2.1 Regional and Local Setting

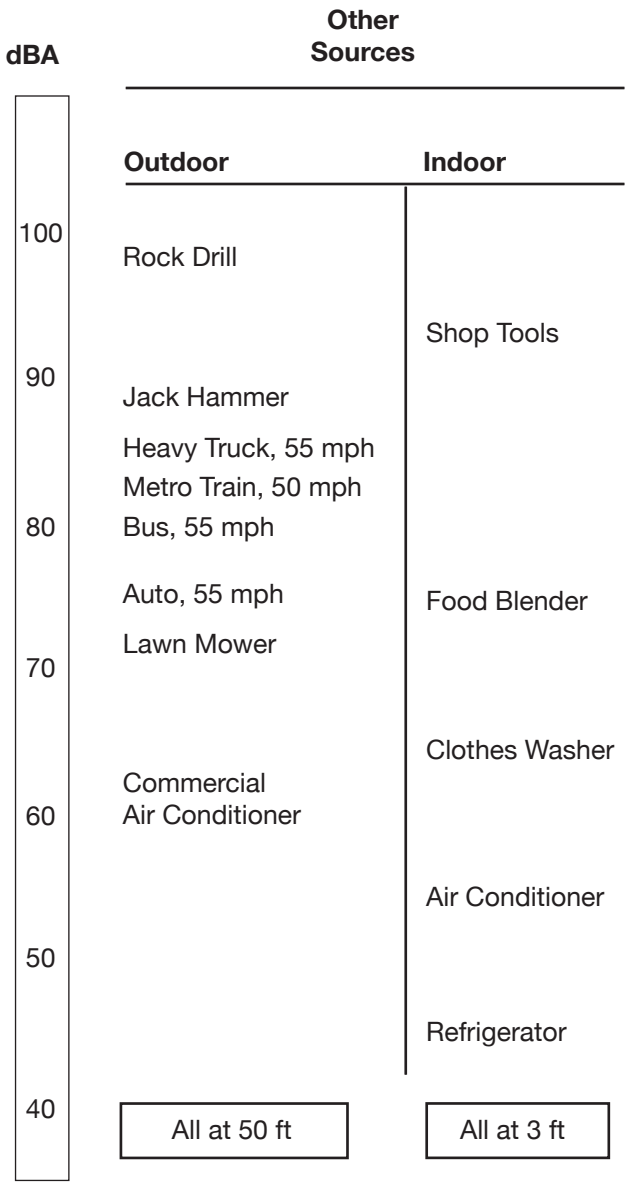
Section 3.1.2, *Location*, provides general information about the regional and local setting. This section (4.13.2.1) provides setting information specific to noise in the Project area.

Noise Background

Sound is mechanical energy transmitted by pressure waves through a medium such as air. Noise can be defined as unwanted sound. Sound is characterized by various parameters that include the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). In particular, the sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound level. Sound pressure level is measured in decibels (dB), with zero dB corresponding roughly to the threshold of human hearing and 120 to 140 dB corresponding to the threshold of pain.

Sound pressure fluctuations can be measured in units of hertz (Hz), which correspond to the frequency of a particular sound. Typically, sound does not consist of a single frequency, but rather a broad band of frequencies varying in levels of magnitude (sound power). When all the audible frequencies of a sound are measured, a sound spectrum is plotted consisting of a range of frequency spanning 20 to 20,000 Hz. The sound pressure level, therefore, constitutes the additive force exerted by a sound corresponding to the sound frequency/sound power level spectrum.

The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum. As a consequence, when assessing potential noise impacts, sound is measured using an electronic filter that de-emphasizes the frequencies below 1,000 Hz and above 5,000 Hz in a manner corresponding to the human ear's decreased sensitivity to low and extremely high frequencies instead of the frequency mid-range. This method of frequency weighting is referred to as A-weighting and is expressed in units of A-weighted decibels (dBA). Some typical A-weighted sound levels are presented in Figure 4.13-1.



SOURCE: Federal Transit Administration, 2006

Tres Vaqueros Windfarm Repowering Project . 209132.02

Figure 4.13-1

Typical A - Weighted Sound Levels

Noise Exposure and Community Noise

An individual's noise exposure is a measure of the noise experienced by the individual over a period of time. A noise level is a measure of noise at a given instant in time. However, noise levels rarely persist consistently over a long period of time. In fact, community noise varies continuously with time with respect to the contributing sound sources of the community noise environment. Community noise is primarily the product of many distant noise sources, which constitute a relatively stable background noise exposure, with the individual contributors unidentifiable. Background noise levels change throughout a typical day, but do so gradually, corresponding with the addition and subtraction of distant noise sources and atmospheric conditions. The addition of short duration single event noise sources (e.g., aircraft flyovers, motor vehicles, sirens) makes community noise constantly variable throughout a day.

These successive additions of sound to the community noise environment vary the community noise level from instant to instant requiring the measurement of noise exposure over a period of time to legitimately characterize a community noise environment and evaluate cumulative noise impacts. This time-varying characteristic of environmental noise is described using statistical noise descriptors. The most frequently used noise descriptors are summarized below:

L_{eq}: The equivalent sound level is used to describe noise over a specified period of time, in terms of a single numerical value. The L_{eq} is the constant sound level which would contain the same acoustic energy as the varying sound level, during the same time period (i.e., the average noise exposure level for the given time period).

L_{max}: The instantaneous maximum noise level measured during the measurement period of interest.

DNL: The day-night noise level (DNL; also referred to as L_{dn}) or the energy average of the A-weighted sound levels occurring during a 24-hour period and which accounts for the greater sensitivity of most people to nighttime noise by weighting noise levels at night ("penalizing" nighttime noises). Noise between 10:00 PM and 7:00 AM is weighted (penalized) by adding 10 dBA to take into account the greater annoyance of nighttime noises.

CNEL: Similar to the DNL, the Community Noise Equivalent Level (CNEL) adds a 5-dBA "penalty" for the evening hours between 7:00 PM and 10:00 PM in addition to a 10-dBA penalty between the hours of 10:00 PM and 7:00 AM.

Effects of Noise on People

The effects of noise on people can be placed into three categories:

- *Interference with activities such as speech, sleep, and learning* – The thresholds for speech interference indoors are about 45 dBA if the noise is steady and above 55 dBA if the noise is fluctuating. Outdoors, the thresholds are about 15 dBA higher. Interior residential standards for multi-family dwellings are set by the State of California at 45 DNL. The standard is designed for sleep and speech protection and most jurisdictions apply the same criterion for all residential uses.

- *Subjective effects of annoyance, nuisance, and dissatisfaction* – Based on attitude surveys used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas, the main causes for annoyance are interference with speech, radio and television, house vibrations, and interference with sleep and rest. The DNL as a measure has been found to provide a valid correlation of noise level and the percentage of people annoyed. Three aspects of community noise are most important in determining subjective response – the level of sound, the frequency composition or spectrum of the sound, and the variation of sound level with time.

- *Physiological effects such as hearing loss or sudden startling* – While physical damage to the ear from an intense noise impulse is rare, a degradation of auditory acuity can occur even within a community noise environment. Hearing loss occurs mainly due to chronic exposure to excessive noise, but may be due to a single event such as an explosion. Natural hearing loss associated with aging may also be accelerated from chronic exposure to loud noise.

Environmental noise typically produces effects in the first two categories. Workers at industrial plants often experience noise in the last category. There is no completely satisfactory way to measure the subjective effects of noise, or the corresponding reactions of annoyance and dissatisfaction. A wide variation exists in the individual thresholds of annoyance and different tolerances to noise tend to develop based on an individual's past experiences with noise.

Thus, an important way of predicting a human reaction to a new noise environment is the way the new noise compares to the existing noise levels to which one has adapted: the so called "ambient noise" level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it. With regard to increases in A-weighted noise level, the following relationships occur:

- Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived;

- Outside of the laboratory, a 3-dBA change is considered a just-perceivable difference when the change in noise is perceived, but does not cause a human response;

- A change in level of at least 5 dBA is required before any noticeable change in human response would be expected; and

- A 10-dBA change is subjectively heard as approximately a doubling in loudness and can cause an adverse response.

These relationships occur in part because of the logarithmic nature of sound and the decibel system. A ruler is a *linear* scale: it has marks on it corresponding to equal quantities of distance. One way of expressing this is to say that the ratio of successive intervals is equal to one. A *logarithmic* scale is different in that the ratio of successive intervals is not equal to one. Each interval on a logarithmic scale is some common factor larger than the previous interval. A typical ratio is 10, so that the marks on the scale read: 1, 10, 100, 1,000, 10,000, etc., doubling the variable plotted on the X-axis. The human ear perceives sound in a non-linear fashion; hence the decibel scale was developed. Because the decibel scale is based on logarithms, two noise sources do not combine in a simple additive fashion; instead they combine logarithmically. For example, if two identical noise sources produce noise levels of 50 dBA, the combined sound level would be 53 dBA, not 100 dBA.

Noise Attenuation

Sound level naturally decreases with more distance from the source. This basic attenuation rate is referred to as the *geometric spreading loss*. The basic rate of geometric spreading loss depends on whether a given noise source can be characterized as a point source or a line source. Point sources of noise, including stationary mobile sources such as idling vehicles or on-site construction equipment, attenuate (lessen) at a rate of 6.0 dBA per doubling of distance from the source. In many cases, noise attenuation from a point source increases by 1.5 dB from 6.0 dB to 7.5 dB for each doubling of distance due to ground absorption and reflective wave canceling. These factors are collectively referred to as *excess ground attenuation*. The basic geometric spreading loss rate is used where the ground surface between a noise source and a receiver is reflective, such as parking lots or a smooth body of water. The excess ground attenuation rate (7.5 dB per doubling of distance) is used where the ground surface is absorptive, such as soft dirt, grass, or scattered bushes and trees. For example, if a point source produces 80 dBA at 50 feet, the same source in an area with an absorptive ground surface would be expected to generate approximately 72.5 dBA at 100 feet, 65.0 dBA at 200 feet, 57.5 dBA at 400 feet, etc.

Widely distributed noises such as a street with moving vehicles (a “line” source) would typically attenuate at a lower rate of approximately 3.0 dB for each doubling of distance between the source and the receiver. If the ground surface between source and receiver is absorptive rather than reflective, the nominal rate increases by 1.5 dB to 4.5 dB for each doubling of distance. Atmospheric effects, such as wind and temperature gradients, can also influence noise attenuation rates from both line and point sources of noise. However, unlike ground attenuation, atmospheric effects are constantly changing and difficult to predict.

Trees and vegetation, buildings, and barriers reduce the noise level that would otherwise occur at a given receptor distance. However, for a vegetative strip to have a noticeable effect on noise levels, it must be dense and wide. For example, a stand of trees must be at least 100 feet wide and dense enough to completely obstruct a visual path to the roadway to attenuate traffic noise by 5 dB (Caltrans, 1998). A row of structures can shield more distant receivers depending upon the size and spacing of the intervening structures and site geometry. Generally, for an at-grade highway in an average residential area where the first row of houses cover at least 40 percent of the total area, the reduction provided by the first row of houses is approximately 3.0 dB and 1.5 dB for each additional row (Caltrans, 1998). Similar to vegetative strips discussed above, noise barriers, which include natural topography and soundwalls, reduce noise by blocking the line of sight between the source and receiver. Generally, a noise barrier that breaks the line of sight between source and receiver will provide at least a 5-dB reduction in noise.

Vibration

Vibration is an oscillatory motion through a solid medium in which the motion’s amplitude can be described in terms of displacement, velocity, or acceleration. There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe vibration impacts to buildings. The root mean square (RMS) amplitude is most frequently used to

describe the affect of vibration on the human body. The RMS amplitude is the average of the squared amplitude of the signal. Decibel notation (VdB) is commonly used to measure RMS. The decibel notation acts to compress the range of numbers required to describe vibration (FTA, 2006). Typically, ground-borne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration.

4.13.2.2 Project Setting

Existing Ambient Noise Environment Near the Project

The noise environment in the Project area is influenced primarily by agricultural operations, traffic on Vasco Road and other local roadways, noise from adjacent operating wind farms, and occasional aircraft overflights associated with Byron Airport. Portions of the Project, including the existing substation and underground electrical lines, would be within two miles of Byron Airport. As shown on Figure 4.11-1, Contra Costa County General Plan Land Use (see Section 4.11, *Land Use and Planning)*, a portion of the Project, including the existing substation, 10 existing turbines to be removed, and segments of the underground power line, would be within the Byron Airport Compatibility Zone[1]. Maximum noise levels associated with aircraft overflights in the Project area are anticipated to range between 55 and 65 dBA; however, the Project area is not within any of the noise contours identified for the airport in the Contra Costa County General Plan (Contra Costa County, 2010a).

Environmental Science Associates (ESA) collected noise measurements for another project in an area directly adjacent to the Project area – noise measurements for the Los Vaqueros Reservoir Expansion Project were collected in late March and early April of 2007. Two short-term five-minute measurements were collected in the vicinity of the Project area along Vasco Road, approximately 50 feet from the road centerline. Those measurements revealed ambient L_{eq} levels of 66 dBA at a location approximately one mile west-northwest of Bryon Airport and 75 dBA at a location several miles to the north of the Project area, at the intersection of Vasco Road and Camino Diablo. In addition, a short-term noise measurement was collected near the Los Vaqueros Dam, which indicated a much lower L_{eq} level of 46 dBA.

Based on the measured noise levels, it is assumed that the average daytime noise levels in the Project area range from the mid-40-dBA range away from Vasco Road to the mid 60-dBA range in the immediate vicinity of Vasco Road. It should be noted that the three measurements were not collected in the vicinity of any of the existing Tres Vaqueros Wind Farm turbines proposed to be removed; therefore, the measured noise levels are considered representative of the Project baseline conditions as defined for this noise analysis (see Section 4.13.3 below).

[1] Although Figure 4.11-1shows the location of the proposed new turbines and does not indicate the location of the existing turbines. The 10 existing turbines and substation are located in the intersected by the project boundary (heavy black line) and the orange oval denoting the Byron Airport Compatibility Zone.

Sensitive Receptors

Human response to noise varies considerably from one individual to another. Effects of noise at various levels can include interference with sleep, concentration, and communication and can cause physiological and psychological stress and hearing loss. Given these effects, some land uses are considered more sensitive to ambient noise levels than others. In general, residences, schools, hotels, hospitals, and nursing homes are considered to be the most sensitive to noise. Facilities such as churches, libraries, and cemeteries, where people tend to pray, study, and/or contemplate are also sensitive to noise. Recreational areas can also be considered sensitive to noise due to the potential for noise to disturb the recreational experience. Commercial and industrial uses are considered the least noise-sensitive.

The Vasco Caves Regional Preserve, which is jointly owned by the East Bay Regional Park District (EBRPD) and the Contra Costa Water District (CCWD) and operated by the EBRPD, is located in the southern portion of the Project area. Public access is limited to guided tours. The preserve includes a caretaker residence, which is located approximately 1,000 feet south of one of the existing access roads to be widened, approximately 2,000 feet southeast of one of the turbines to be removed, and approximately 3,500 feet south-southwest of a proposed location for a new turbine. For the purposes of this analysis, this area is also considered a recreational area because the Vasco Caves guided tour starts at the caretaker residence.

The closest off-site sensitive receptors to a location of a proposed permanent feature of the Project are residences along Armstrong Road. These residences are located east of Vasco Road, and are approximately 0.9 mile (approximately 4,750 feet) to the east of the existing substation site. There are also two residences off the west side of Vasco Road, the closest of which is located approximately 1.8 miles (approximately 9,500 feet) northeast of the closest proposed new turbine site and approximately 1.1 miles (approximately 5,800 feet) north-northeast of the closest existing turbine to be removed. The closest sensitive receptor to the proposed construction water extraction point off Camino Diablo Road is located on the south side of the road, at a distance of approximately 100 feet.

In addition, the Project area is located adjacent to and within the CCWD Los Vaqueros Watershed property, which includes recreational opportunities such as hiking, biking, boating, fishing, and horseback riding. The closest watershed recreational area is in the vicinity of Los Vaqueros Interpretative Center, which is approximately 0.47 miles (2,500 feet) northwest from the closest proposed turbine location.

4.13.2.3 Regulatory Setting

Federal, State, and local agencies regulate different aspects of environmental noise. Federal and State agencies generally set noise standards for mobile sources such as aircraft and motor vehicles, while regulation of stationary sources is left to local agencies. Local regulation of noise involves implementation of general plan policies and noise ordinance standards. Noise issues relevant to the Project are addressed in Contra Costa County General Plan (General Plan) policies and the Contra Costa County Code.

Federal

Federal regulations establish noise limits for medium and heavy trucks (i.e., more than 4.5 tons, gross vehicle weight rating) under the Code of Federal Regulations, Title 40, Part 205, Subpart B. The federal truck pass-by noise standard is 80 dBA at 15 meters (approximately 50 feet) from the vehicle pathway centerline. These standards are implemented through regulatory controls on truck manufacturers.

State of California

The State of California establishes noise limits for vehicles licensed to operate on public roads. For heavy trucks, the State pass-by standard is consistent with the federal limit of 80 dBA. The State pass-by standard for light trucks and passenger cars (i.e., less than 4.5 tons, gross vehicle rating) is also 80 dBA at 15 meters from the vehicle pathway centerline. These standards are implemented through controls on vehicle manufacturers and by legal sanction of vehicle operators by State and local law enforcement officials.

Local

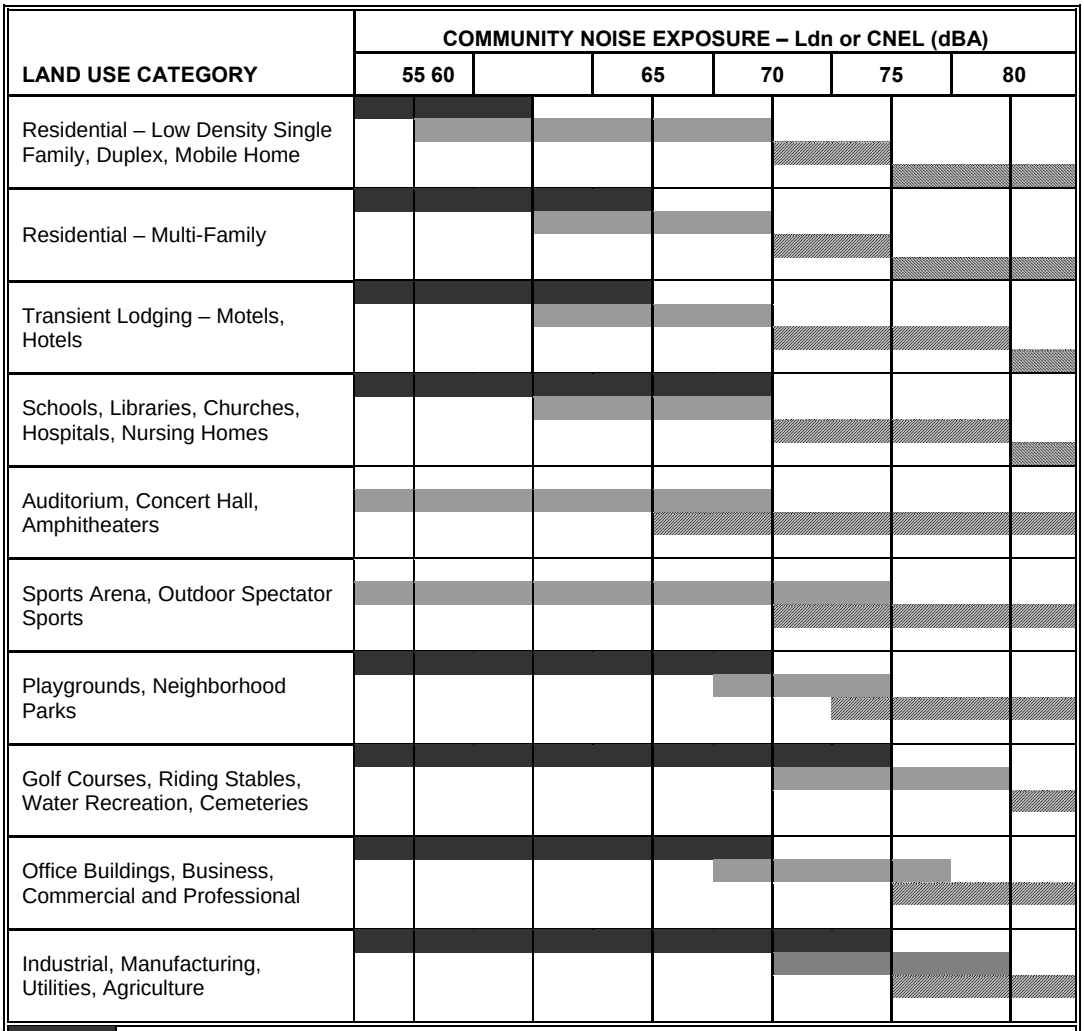
In California, local regulation of noise involves implementation of general plan policies and noise ordinance standards or codes. Local general plans identify general principles intended to guide and influence development plans, and noise ordinances and codes tend to set forth the specific standards and procedures for addressing particular noise sources and activities. General plans recognize that different types of land uses have different sensitivities toward their noise environment. Residential areas are considered to be the most sensitive type of land use to noise and industrial/commercial areas are considered to be the least sensitive.

Contra Costa County General Plan

The Noise Element of the Contra Costa County General Plan (Contra Costa County, 2010a) sets various goals and policies that apply to all development projects in the County. Most of these policies address land use compatibility and are not directly applicable to the Project. Noise from construction activities in Contra Costa County is considered exempt from applicable standards during daytime hours, although the County has not defined “daytime” or “normal work hours” for construction noise. Instead, the County uses project-specific conditions of approval to regulate construction noise levels for projects that require County approval.

The General Plan requires that new projects meet acceptable exterior noise level standards as established in the Noise and Land Use Compatibility Guidelines shown in Table 4.13-1. These standards, along with existing and future noise contour maps contained in the General Plan, are used by the County to evaluate the compatibility of “noise-sensitive” projects in potentially noisy areas and of noisy projects in noise-sensitive areas. If an area is currently below the maximum “normally acceptable” noise level, an increase in noise up to the maximum level is not necessarily allowed. Implementation of Noise Element Measure 11-b requires the County to evaluate the noise impacts of a proposed project upon existing land uses in terms of the applicable federal, State, and local codes, and the potential of adverse community response, based on a significant increase in existing noise levels.

TABLE 4.13-1
LAND USE COMPATIBILITY FOR COMMUNITY NOISE ENVIRONMENTS (DBA)



SOURCE: Contra Costa County General Plan Noise Element – Figure 11-6, Contra Costa County, 2010a.

The General Plan Noise Element also establishes a DNL standard of 60 dB for outdoor noise levels in residential areas. However, the County recognizes that a DNL of 60 dB or less may not be achievable in all residential areas due to economic or aesthetic constraints.

Contra Costa County Code

Chapter 88-3 of the Contra Costa County Code, the *Wind Energy Conversion Systems* ordinance, includes noise level limits for wind energy conversion systems (WECS, or wind turbines) that apply to the Project (Contra Costa County, 2010b). Specifically, Section 88-3.612 indicates that WECS shall not be allowed to create noise that exceeds a maximum of 65 dBA as measured at the exterior project boundary. The code states that in the event that noise exceeds this standard, the WECS operator shall take all measures necessary to meet this standard, which may include discontinued operation of one or more WECS. A site-specific noise study may be required to confirm compliance with the 65-dBA noise standard. An exception from this standard may be granted for projects adjacent to existing or approved WECS where existing residences or General Plan designated residential areas would not be adversely affected.

4.13.3 Project Baseline

Baseline conditions for the noise analysis reflect the conditions at the existing wind farm in Spring 2009, when the NOP was issued for the EIR. At that time, the wind farm had been completely shut down, and none of the existing 91 turbines were operational. As stated above, the Project baseline includes ambient noise levels in the mid-40-dBA to mid-60-dBA range and the closest on-site and off-site sensitive receptors are residences approximately 1,000 feet and 4,750 feet to any proposed component of the Project, respectively.

For purposes of this analysis, noise measurements taken in the vicinity of the existing wind farm in 2007 have been determined to be comparable to conditions in the Project area in Spring 2009 because the 2007 measurements were not taken near the turbines and in Spring 2009 the turbines were no longer operational.

4.13.4 Significance Criteria

Based on CEQA Guidelines Appendix G, a project would cause adverse noise impacts if it would result in:

a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;

b) Exposure of persons to or generation of, excessive ground borne vibration or ground borne noise levels;

c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the Project;

d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the Project area to excessive noise levels; or

f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the Project area to excessive noise levels.

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines and on the guidance provided by the Contra Costa County General Plan and County Code. The significance of Project-related noise impacts were determined based on the following specific significance thresholds.

Short-Term Decommissioning and Construction Noise Impacts. Short-term noise level increases from decommissioning and construction activities would be considered substantial and would cause significant impacts if on-site construction activities would be conducted outside of normal working hours and within 4,000 feet of a residence.[2] Contra Costa County does not have noise-related performance standards or definitions of "daytime" or "normal" working hours; however, for purposes of this impact analysis, normal working hours are considered to be 7:00 a.m. to 7:00 p.m. Monday through Friday, and 8:00 a.m. to 6:00 p.m. on Saturday and Sunday.

Long-term Operational Noise Impacts. Long-term operational noise impacts would be significant if Project-related operation and maintenance activities would increase the ambient L_{dn} noise level at a noise-sensitive land use by more than three dBA, or cause the overall level to exceed the "normally acceptable" standard for land use compatibility established by the Contra Costa County General Plan (60 dBA L_{dn} for the most noise-sensitive land uses).

Vibration Impacts. A numerical threshold to identify the point at which a vibration impact occurs has not been identified by County standards or codes. Therefore, a peak particle velocity (PPV) threshold identified by the California Department of Transportation (Caltrans) is used in this analysis to determine the significance of vibration impacts related to adverse human reaction and risk of architectural damage to normal buildings.[3] The PPV threshold is 0.20 in/sec (Caltrans, 2004). This PPV level has been found to be annoying to people in buildings and can pose a risk of architectural damage to buildings.

4.13.5 Discussion of No Noise Impacts

Comparison of the baseline and Project characteristics with each of the six significance criteria stated above shows that no noise impacts would result for the a), b), and f) criteria. The following discussion provides the reasoning to support this conclusion.

2 Construction noise levels at 4,000 feet would be up to approximately 40 dBA. Nighttime construction noise levels that would exceed 40 dBA at a residence would be considered significant.

3 Architectural damage could be structural damage, such as cracking of floor slabs, foundations, columns, beams, or wells, or cosmetic architectural damage, such as cracked plaster, stucco, or tile (Caltrans, 2004).

a) The Project would not result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

As explained in more detail under Section 4.13.5 below, there would be no impact in this regard because the Project's operational noise levels would be within the acceptable noise levels for residential, agricultural, and water recreation uses as identified by the County General Plan's land use compatibility standards and would not exceed the turbine noise limits identified in Chapter 88-3 of the Contra Costa County Code.

b) The Project would not result in exposure of persons to or generation of excessive ground borne vibration or groundborne noise levels.

Construction and decommissioning of the Project would employ conventional activities and the equipment/techniques to be used would not cause excessive groundborne vibration. The use of heavy construction equipment, such as a large bulldozer, would generate vibration levels of up to 0.089 PPV at a distance of 25 feet. At this short distance, construction equipment PPV levels would be less than the 0.20 in/sec significance threshold considered "annoying," (Caltrans, 2004). On-site Project construction equipment would operate at a distance of at least 1,000 feet from the closest sensitive receptor resulting in 0.0015 PPV. Construction, operations and maintenance-related vibration levels at the closest sensitive receptor locations would be, under the threshold of perception of 0.006 PPV (Caltrans, 2004). There would be no vibration-related impact associated with the Project.

Operation and maintenance of the Project would not introduce any new sources of perceivable groundborne vibration to the Project area. Operation and maintenance activities with and without the Project could include checking torque on various components of turbines, looking for cracks, and evaluating grease loss. Servicing and repair occasionally could require the use of a crane or equipment transport vehicles to clean, repair, adjust, or replace the rotors or other components of the turbines. As described in Section 3.5.2, such cranes would not be as large as those needed during the construction phase to erect the turbine towers. O&M staff would travel via pickup or other light-duty trucks. These activities would be similar to existing operation and maintenance activities. Consequently, operation and maintenance of the Project would cause no impact relating to ground borne vibration.

Ground borne noise is the rumbling sound of structure surfaces caused by high vibration levels. Because implementation of the Project would not result in exposure of persons to or generation of excessive groundborne vibration, it also would not expose them to or generate excessive groundborne noise levels. Consequently, there would be no groundborne noise-related impact associated with the Project.

f) The Project would not expose people residing or working in the Project area to excessive noise levels within the vicinity of a private airstrip.

The Project area is not located within the vicinity of a private airstrip. Consequently, no noise impact associated with private airstrips would occur.

4.13.6 Discussion of Impacts and Mitigation Measures

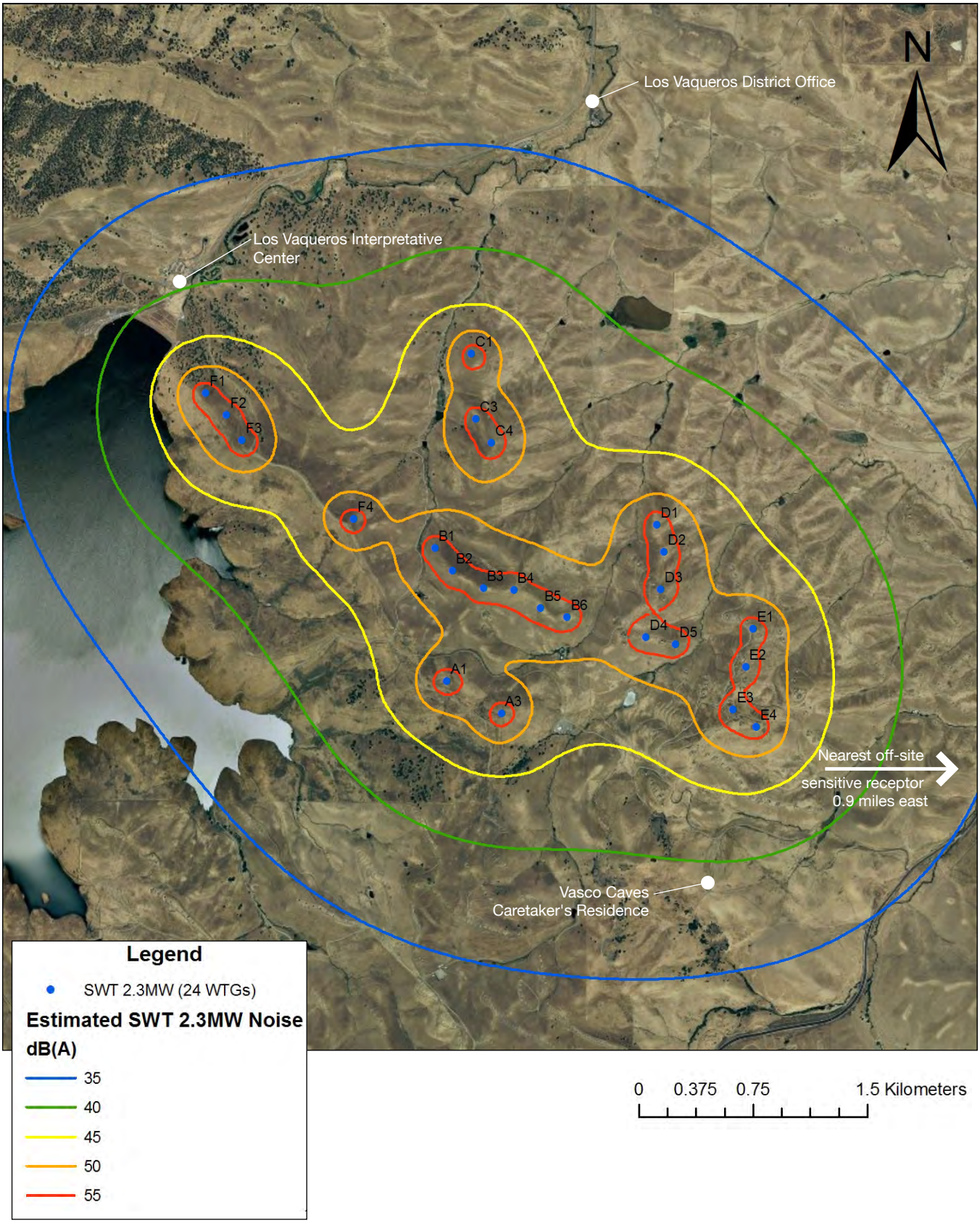
c) Would the Project result in a substantial permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project?

Impact 4.13-1: Operation of the Project would increase local ambient noise levels. (*Less-than-Significant Impact)*

Implementation of the Project would replace the 91 existing non-operational wind turbines with up to 21 Gamesa G90 2.0 MW, Siemens 2.3-MW, or comparable 3-blade turbines with a nameplate capacity of at least 2 MW. This analysis includes consideration of 24 location options for the proposed 21 new turbines. At the request of the County, the applicant has generated a noise contour map for the 24 potential locations of the Siemens 2.3-MW turbines using the WindPRO model, which is a modular-based software suite for the design and planning of single turbines and wind farms. Figure 4.13-2 presents the WindPRO noise contour results in terms of 5-dBA contours from 55 dBA to 35 dBA.

As indicated in the figure, noise levels associated with the proposed turbines would average approximately 55 dBA at a distance of approximately 200 feet. At the Vasco Caves caretaker residence and in the vicinity of the Vasco Caves guided tour area, the modeled noise contours indicate that turbine noise levels would be conservatively not more than 40 dBA, which over a 24-hour period would equate to an L_{dn} level of approximately 46 dBA. This noise level would represent approximately the same level of ambient conditions in the area; therefore, impacts to the residence and Vasco Caves guided tour area would be less than significant.

Because of the scale of the aerial photo in Figure 4.13-2, the nearest off-site sensitive receptors to the proposed turbine sites are not located within the geographic area of the photo. However, through the use of additional aerial photos that include the nearest sensitive receptor locations and interpretation of the patterns of the contours, it is apparent that the off-site residential receptors in the Project vicinity would be located outside of the 35-dBA contour, indicating that the noise associated with the combined operation of the proposed new turbines would result in noise levels that would be less than 35 dBA at the nearest off-site residences. The western portion of the Los Vaqueros Dam recreational area would be within the 35 dBA contour, with the area in the vicinity of the dam having a turbine noise level in the 40 to 45-dBA range. For reference, average hourly noise levels of 35 dBA and 40 dBA for 24 continuous hours equates to L_{dn} levels of approximately 41 dBA and 46 dBA. Table 4.13-1 shows that water recreational and agricultural land uses are compatible with noise levels of up to 75 L_{dn}/CNEL, and residential land uses are compatible with noise levels up to 60 L_{dn}/CNEL. The Project noise levels would be well within acceptable noise levels for residential, agricultural, and water recreation uses as identified by the County's land use compatibility standards and would not conflict with the turbine noise limits identified in Chapter 88-3 of the Contra Costa County Code (i.e., 65 dBA at the exterior project boundary). Therefore, impacts related to operation of the proposed turbines would be less than significant.



SOURCE: Pattern

Tres Vaqueros Windfarm Repowering Project . 209132.02

Figure 4.13-2

Estimated Project Noise (dbA)

The Project would also require upgrades to the existing substation, including a proposed new transformer. Based on data available for other electric transmission projects of similar voltage (220/115 kV), the proposed new transformer at the existing substation could generate noise levels between 39 and 64 dBA at 400 feet (CPUC, 2010). Therefore, for the purposes of a conservative analysis, it is assumed that the proposed transformer could generate a maximum noise level of up to 64 dBA at 400 feet, which would result in a noise level of up to 37 dBA at the nearest residence, approximately 4,750 feet from the existing substation. Given the ambient conditions in the vicinity of the nearest receptors, noise levels associated with the upgraded substation would not be audible. In addition, assuming 24 continuous hourly averages of 37 dBA, the corresponding L_{dn} level would be approximately 43 dBA, which is well within the regulatory limits of the County. Therefore impacts related to operations of the upgraded substation would be less than significant.

Implementation of the Project would also require four new full time employees. Drive-by inspections and scheduled wind turbine maintenance would occur on a daily, weekly, or monthly basis. These activities would be performed per the requirements of the equipment specifications and standard industry practice. Some amount of unscheduled maintenance and repair are expected to be necessary. However, because maintenance-related activities would tend to be low intensity infrequent events, not involving large noise-producing construction equipment, and would be expected to occur during daytime hours they would not be expected to significantly impact on the nearest sensitive receptor locations. Therefore, impacts related to maintenance of the Project would be less than significant.

Mitigation: None required.

---

d) Would the Project result in a substantial temporary or periodic increase in ambient noise levels in the Project vicinity above levels existing without the Project?

Impact 4.13-2: Project construction and decommissioning activities would temporarily increase local ambient noise levels. (*Less-than-Significant Impact with Mitigation Incorporated*)

Noise levels related to construction activities within and adjacent to the Project area and along haul routes would fluctuate depending on the particular type, number, duration of uses of various pieces of construction equipment, and number of daily haul trips. Construction activities would involve decommissioning of existing turbines and associated hardware and foundations, development of new access roads, construction of new turbines and related infrastructure, and vehicle travel to and from the Project area. Construction activities would result in a substantial increase in noise levels at the Project area. In addition, it is anticipated that during the peak period of construction approximately 200 daily trips related to material hauling and commuting workers would raise ambient noise levels along Vasco Road and Camino Diablo road (for water hauling). These Project-related trips would represent an approximately one percent increase to existing average daily traffic volume on Vasco Road and would likely result in a short-term L_{dn} increase

along the road of less than one dBA. Table 4.13-2 provides typical noise levels produced by various types of construction equipment and vehicles that would be required to construct the Project.

TABLE 4.13-2
TYPICAL NOISE LEVELS FROM CONSTRUCTION EQUIPMENT AND VECHILES

Construction Equipment	Noise Level (dBA, Leq at 50 feet)
Dump, Concrete, and Water Trucks	88
Concrete Mixer (Truck)	85
Bulldozers	87
Graders	85
Backhoes	85
Cranes	83
Compactor	82
Generator	81

SOURCE: FTA, 2006.

As indicated in the table, the majority of the construction equipment that would be used to construct the Project would generate noise measuring between 82 dBA and 98 dBA. The loudest pieces of equipment that would be associated with existing turbine removal, road construction activity, and substation upgrades would be heavy off-road trucks, such as water trucks, which emit noise levels of up to 88 dBA at 50 feet.

On-site construction activities associated with widening of an existing access road would occur approximately 1,000 feet from the Vasco Caves caretaker residence. At this residence, maximum peak construction noise levels associated with road widening activities would be up to 55 dBA. Although the road widening construction activities in the area would likely be limited to less than a week, this noise level would be higher than the ambient conditions for the area and may result in a short-term nuisance to anyone staying at the residence and/or any recreationalists on the Vasco Caves guided tour. Implementation of Mitigation Measure 4.13-2a would ensure that the construction contractor provided advanced notice of construction activities to EBRPD to reduce nuisance-related impacts to any persons staying at the residence and to recreationalists on the guided tour.

Because construction activities associated with substation upgrades and removal of the existing turbines would occur no closer than 4,750 feet from the nearest off-site residences, maximum peak noise levels at those residences would be less than 40 dBA. Construction activities associated with installation of new turbines would occur no closer than about 2,500 feet from the Los Vaqueros Interpretative Center area; therefore, maximum peak construction noise levels at the dam recreation area would be up to 55 dBA and maximum construction noise levels at the closest residences would be up to approximately 41 dBA. Depending on the ambient noise levels at the receptor locations, noise levels associated with Project-related construction activities may be perceivable in the area of the dam and would likely not be perceivable at the nearest off-site residence.

In addition to Project construction activities, once the operating life of the Project would be complete, the turbines and related infrastructure would be dismantled, and the Project area would be reclaimed. Project decommissioning activities would use similar equipment and would result in similar noise levels as those described in Table 4.13-2; however, there would be less truck trips required because there would be no need for concrete, gravel, or other material deliveries, and drilling would not be required. Therefore, decommissioning of the Project at the end of its life would result in noise levels at sensitive receptor locations that would be less than those described above related to construction of the Project.

> **Mitigation Measure 4.13-2a:** The Applicant shall provide at least 30 days advance notice to the East Bay Regional Park District of all construction and decommissioning activities that would occur within 1,000 feet of either the Vasco Caves caretaker residence or the Vasco Caves guided tour route in order to limit disturbance to any persons that may be staying at the caretaker residence or participating in the guided tour. The notice shall include the construction time-of-day restrictions, the anticipated date of commencement, and the anticipated duration of construction activities that would occur within 1,000 feet of the residence or guided tour route. The Applicant shall simultaneously transmit a copy of the notice to the County Zoning Administrator.

Significance of Impact after Mitigation: Less than Significant.

Although, Section 3.4.3, *Construction Labor Force, Equipment, and Traffic* indicates that construction activities would occur during the daytime hours from 8:00 a.m. to 5:00 p.m. Monday through Friday; and adherence to this schedule would ensure that nighttime construction related noise impacts would be avoided; as is discussed in Section 4.17, *Transportation and Traffic*, it is possible that the Project would be required to deliver large turbine components during nighttime hours. Truck noise during nighttime hours could pose a significant impact at the Vasco Caves caretakers residence.

> **Mitigation Measure 4.13-2b:** The Applicant construction contractor(s) shall schedule all nighttime deliveries to ensure a free flow of truck traffic. Trucks making nighttime deliveries shall proceed directly into the Project area without stopping, idling, or queuing on any portion of on-site access roads within 4,000 feet of the Vasco Caves caretaker residence. Use of compression release engine brakes (also known as “Jake brakes”) shall be prohibited within 4,000 feet of the Vasco Caves caretaker residence. In addition, all on-site nighttime delivery routes shall be planned in a fashion that would eliminates the need for delivery trucks to drive in reverse thereby eliminating after hours back-up alarm soundings. For example, the nighttime delivery drop-off staging area shall include an access road loop and all drivers shall be instructed to use the loop as opposed to driving in reverse at the staging area.

Significance of Impact after Mitigation: Less than Significant.

With regard to noise that would occur at the construction water extraction site (shown on Figure 3-2d), the water pump and passing water tanker trucks would generate noise levels up to 70 dBA and 82 dBA at 100 feet, respectively. These noise sources would likely increase ambient daytime noise level conditions in the area and would represent a potential nuisance to nearby

residences. However, implementation of Mitigation Measure 4.13-2c would ensure that short-term pump and truck noise impacts in the vicinity of the water extraction site would be reduced to a less-than-significant level.

> **Mitigation Measure 4.13-2c:** The Applicant shall install a noise shield that would block the line of sight between the water extraction pump at Camino Diablo Road and the nearest residences, all water extraction activities shall be limited to approved daytime hours, and water tanker trucks shall not idle at the water extraction and delivery sites.

Significance of Impact after Mitigation: Less than Significant.

---

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

Impact 4.13-3: Construction, operation, and decommissioning of the Project would expose workers to aircraft overflight noise. (*Less-than-Significant Impact*)

The existing substation and existing and proposed locations of some of the underground collection cables are approximately 1.6 miles west of Byron Airport. All other Project components and activities, including construction, maintenance, operation and end-of-life decommissioning, would occur more than 2 miles from the airport. Workers that would construct the Project would be exposed to periodic short-term aircraft overflight noise; however, the average construction activity noise levels that the workers would be exposed to would be far greater than the average overflight noise levels that they would be exposed to. The Project would not involve development of noise-sensitive land uses that would be exposed to excessive aircraft noise. As the Project area is well outside of Byron Airport's 55-60 CNEL contour line, airport-related impacts would be less than significant.

Mitigation: None required.

4.14 Population and Housing

4.14.1 Introduction

This section analyzes the Project's relationship to population and housing. Discussed herein are the physical and regulatory setting; the baseline for determining environmental impacts; the criteria used for determining the significance of environmental impacts; and potential impacts associated with decommissioning the existing windfarm and construction, operation, maintenance, and decommissioning of the Project.

4.14.2 Setting

4.14.2.1 Regional and Local Setting

Section 3.1.2, *Location*, provides general information about the regional and local setting. This section (4.14.2.1) provides setting information specific to population and housing in the Project area.

Contra Costa County is divided into three distinct regions – West County, Central County, and East County – the boundaries of which are delineated by hills and protected open space. Most of the County's residential and employment opportunities are located in the West County and Central County areas. The East County area, where the Project area is located, contains four of the County's 19 incorporated cities and is home to approximately 25 percent of the County's population. The majority of the land area of East County is unincorporated and, with the exception of the community of Discovery Bay, the unincorporated area is generally characterized as rural. Most housing units in East County are medium- to high-density single-family residences located within the four incorporated cities and Discovery Bay. Lower-density single-family development is found in unincorporated communities such as Byron and Knightsen, and small farms and ranches are common in the most rural parts of East County. Multiple-family housing is present within the cities and Discovery Bay, though it is not abundant. Job opportunities in East County are generally in the agriculture, service and construction sectors.

The Project area is more specifically located in the southeastern part of the County. The area is rural, with development occurring at extremely low densities. Housing is typically found on small farms and ranches and employment opportunities are generally in the agriculture sector. There are no residences located within the Project area itself, though there is one within the Vasco Caves Regional Preserve to the immediate south.

4.14.2.2 Regulatory Setting

Contra Costa County General Plan

The Contra Costa County General Plan contains goals, policies and implementation measures that apply to all development projects in the unincorporated areas of the County. However, the

General Plan contains no goals, policies or implementation measures that are applicable to the Project in the context of population and housing (Contra Costa County, 2010).

4.14.3 Project Baseline

Baseline conditions reflect the ongoing operation of the Project as a wind farm, including necessary staffing levels and operations and maintenance activities relating to wind turbines and related infrastructure, electrical collection systems, the Tres Vaqueros substation, and on-site roadways. At the time of shut down in 2009, the wind farm employed four full-time employees and, depending upon the time of year, two part-time employees. As stated above, there are no residences located within the Project area.

4.14.4 Significance Criteria

Based on CEQA Guidelines Appendix G, a project would cause significant adverse impacts to population and housing if it would:

a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure);

b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere; or

c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere.

4.14.5 Discussion of No Population and Housing Impacts

As explained below, development of the Project would result in no impact on population and housing.

a) The Project would not induce substantial population growth in an area, either directly or indirectly.

The Project proposes no new homes and no new businesses. The Project area currently is developed and operated as a wind farm with no housing and would continue to be developed and operated as a wind farm with no housing. Thus, there would be no direct inducement of population growth.

The Project could indirectly induce population growth if it encourages people to move to the area for temporary or permanent employment opportunities. The construction period would last approximately 12 months and would likely employ 30 to 40 workers per day during peak construction periods. It is anticipated that with the exception of the construction foreman position, all temporary and permanent construction related positions would be filled from the local labor pool. After construction, the Project would employ approximately eight full-time workers for operation and maintenance, whereas the existing wind farm employs four full-time and two part-

time workers. As the decommissioning phase of the Project would be similar to the construction phase in terms of its workforce requirements, it is anticipated that the positions, again with the possible exception of the construction foreman, would be filled by the local labor pool. Therefore, implementation of the Project would not require a substantial number of workers to relocate into the area. Accordingly, there would be no substantial indirect impact associated with the temporary and permanent workforce.

The Project could indirectly induce population growth if it extends infrastructure that, in turn, encourages new development. The Project involves construction of new service roads and electrical infrastructure. The service roads would provide access to various Project facilities, including the wind turbines and substation. The electrical infrastructure would transfer power generated by the turbines to the state's electrical grid. The roads and electrical infrastructure would be privately owned and would neither extend off-site nor provide convenient connection points for potential off-site development. Therefore, their construction would not encourage new development or induce population growth.

The Project involves generation of additional electricity for distribution to the electrical grid. This increased generation from wind energy is necessary to meet both projected future demand, and the Governor of California's State-wide goal of achieving a 33 percent renewable energy share by 2020, and therefore is not considered growth-inducing.

b) The Project would not displace substantial numbers of existing housing necessitating the construction of replacement housing elsewhere.

There are no housing units in the Project area. The proposed repowering of turbines within the boundary of the existing wind farm would not result in the displacement of existing housing, and so would not necessitate the construction of replacement housing elsewhere. Consequently, the Project would have no impact related to the displacement of existing housing.

c) The Project would not displace substantial numbers of people necessitating the construction of replacement housing elsewhere.

No people live within the Project area. Therefore, no one would be displaced by the Project and it would not be necessary to construct replacement housing elsewhere. Consequently, the Project would have no impact related to the displacement of people.

4.14.6 Discussion of Impacts and Mitigation Measures

Because implementation of the Project would cause no impact on population or housing, there are no impacts and no mitigation measures to be analyzed in this section.

4.15 Public Services

4.15.1 Introduction

This section analyzes the Project's relationship to public services. Discussed herein are the physical and regulatory setting; the baseline for determining environmental impacts; the criteria used for determining the significance of environmental impacts; and potential impacts associated with decommissioning the existing windfarm and construction, operation, maintenance, and decommissioning of the Project.

4.15.2 Setting

4.15.2.1 Regional and Local Setting

Section 3.1.2, *Location*, provides general information about the regional and local setting. This section (4.15.2.1) provides setting information specific to the provision of public services, including fire protection, law enforcement, schools, parks, and other public services in the Project area.

Fire Protection

The East Contra Costa Fire Protection District (ECCFPD) provides fire protection services to the Project area, in coordination with the California Department of Forestry and Fire Protection (CalFire). CalFire has responsibility for fire protection and suppression activities with State-designated high fire hazard severity zones known as State Responsibility Areas. The Project area lies within the area mapped as "Moderate" and "High" Fire Hazard Severity Zones by CalFire (CalFire, 2007). The nearest ECCFPD fire station to the Project area is Station No. 57 in the community of Byron. The nearest CalFire facility is the Sunshine Station, No. 16, at 11851 Marsh Creek Road in Clayton. During 2008-2009, CalFire responded to approximately 16 fires in the general vicinity of the portion of the APWRA located within Contra Costa County. Of those fires, an estimated 13 to 14 were related to wind turbines. In 2009-2011, CalFire responded to only one fire in the general vicinity of the APWRA located within Contra Costa County, related to a wind turbine. The causes of those fires involved such issues as mechanical failure, inherent design/engineering flaws, electrical failure, and bird collisions (Van Wormer, 2010; Marcucci, 2011).

Law Enforcement

The Contra Costa County Sheriff's Office provides law enforcement services to unincorporated areas of the County. The station with responsibility for the Project area is the Delta Station in the City of Oakley. In addition, East Bay Regional Park District (EBRPD) Police provide law enforcement services on East Bay Regional Park District property. The Contra Loma Regional Park sub-station office in Antioch serves the Project area.

Schools

The Project is located within the Byron Elementary and Liberty High school districts. However, no school facilities are located in the Project area. The closest school to the Project area is located approximately 3 miles to the south, in Alameda County.

Parks

Contra Costa Water District's Los Vaqueros Reservoir and Watershed about the Project site to the east. Round Valley Regional Preserve and Morgan Territory Regional Preserve, owned by the EBRPD, are located approximately four miles northwest of the Project area. Brushy Peak Regional Preserve is located approximately three miles south of the Project area in Alameda County. A portion of the Project area is located on land owned by the EBRPD and is within the boundaries of the Vasco Caves Regional Preserve. No local (community or neighborhood) parks are proximate to the Project area. Park and recreation facilities are discussed in depth in Section 4.16, *Recreation*.

Other Public Facilities

No other public facilities, such as libraries or hospitals, are located in the Project area. The nearest library facilities are the Springtown Branch of the Livermore Public Library, located about eight miles southwest in the City of Livermore, and the Contra Costa County Library-Discovery Bay Library-a-Go-Go (an automated book dispensing machine) located approximately seven miles northeast. The nearest public hospital is the Valley Memorial Hospital in the City of Livermore, approximately 10 miles southwest of the Project.

4.15.2.2 Regulatory Setting

Contra Costa County General Plan

The Public Services and Facilities and Growth Management elements of the Contra Costa County General Plan contain goals, policies, and implementation measures that apply County-wide. These provisions may be summarized as follows: those that relate to fire protection in open space areas, wildland fire prevention, standards of service, and minimization of fire-related losses (e.g., Fire Protection Goals 7-Y, 7-Z, and Policies 7-73, 7-79 and 7-80); those that relate to police services, including standards of service (e.g., Public Protection Goals 7-V and 7-W, and Policies 7-57, 7-58 and 7-59); those that relate to schools and other public facilities, including the provision of high-quality civic, medical and community facilities (e.g., Other Public Facilities Goal 7-AW) (Contra Costa County, 2010).

4.15.3 Project Baseline

The environmental setting constitutes the baseline for purposes of analyzing potential impacts on public services. The Project area does not have any residents, and is fenced and gated to prevent unauthorized public access.

4.15.4 Significance Criteria

Based on CEQA Guidelines Appendix G, a project would cause adverse impacts to public services if it would:

a) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

1. Fire Protection
2. Police Protection
3. Schools
4. Parks
5. Other public facilities

4.15.5 Discussion of No Public Services Impacts

As explained below, the Project would have no impact on fire or police protection, schools, parks, or other public facilities. Impacts related to regional parks are discussed in Section 4.16, *Recreation*.

a.1) The Project would not result in a substantial adverse physical impact associated with the provision of new or physically altered fire protection facilities.

The ECCFPD and CalFire provide fire protection services to the Project area. The fire protection facilities and infrastructure required to protect the proposed facilities and the four full-time and two part-time employees of the existing Tres Vaqueros Wind Farm are already in place. The Project would reduce the number of wind turbines from 91 to 21; therefore, fewer wind energy facility components could be threatened by fire or cause a fire. CalFire has indicated that the newer generation wind turbines are safer, and that no wind turbine-caused fires during 2008-2009 appeared to have been caused by the latest generation of turbines (Van Wormer, 2010).

As discussed in Section 4.14, *Population and Housing*, it is anticipated that workers required for construction, operations, maintenance, and decommissioning activities would be filled from the local labor pool, with the exception of the construction foreman; therefore, they are part of the existing demand on fire protection services. Moreover, implementation of the Project would not result in new residents at the site or a substantial increase in employees accessing the site on a permanent basis.

During the Project's anticipated 12-month construction period and future decommissioning activities there would be an increased risk of fire within the Project area. Approximately 30 to 40 workers would be at the site per day during construction and flammable materials would be in use. Additionally, a significant portion of the work would be electrical. Due to the increased number of people, the inherent fire dangers associated with construction activities and the Project area's rural grassland location, there would be a greater risk of exposure of people, structures, and equipment to fires caused by construction and wildland fires (see Section 4.9, *Hazards and*

Hazardous Materials, for a full discussion of wildland fire impacts). However, because of their temporary nature, construction and decommissioning activities would not result in the need for new or altered fire protection facilities. Accordingly, no impact would occur.

a.2) The Project would not result in a substantial adverse physical impact associated with the provision of new or physically altered police protection facilities.

The Contra Costa County Sheriff's Office and EBRPD Police provide law enforcement services to the Project area. The Sheriff's Office, which keeps six months' statistics online, has not responded to any incidents in the Project area during the six-month period from December 13, 2010 to May 13, 2011 (CCCSD, 2011). The police protection facilities and infrastructure required to protect the facilities and employees of the existing Tres Vaqueros Wind Farm are already in place. Moreover, the existing site is secured with perimeter fencing and locked gates. As explained above, the Project would significantly reduce the number of wind turbines and would employ up to an additional four full time workers who are likely to be current residents of the area. As fewer facilities would be present that could be tampered with or vandalized, and there would be no increase in permanent employees, operation of the Project would not increase demand on police services so as to require new or physically altered police protection facilities.

Similarly, the temporary increase in employment required for initial decommissioning, construction, and ultimate decommissioning (30 to 40 workers per day during peak construction) also would not necessitate the provision of new or physically altered police protection facilities. All of these workers are presumed to be local and, therefore, part of the existing demand on police services. Therefore, the Project would not require construction of a new or expanded Sheriff's Office facility. Accordingly, no impact would occur.

a.3) The Project would not result in a substantial adverse physical impact associated with the provision of new or physically altered school facilities.

No schools are present on-site or in the vicinity of the Project. No residential uses are proposed as part of the Project and thus, no new students would be generated by the Project. Temporary and permanent employees are assumed to reside locally and their school-aged children are assumed to be part of the existing or anticipated student population. Therefore, implementation of the Project would not require construction or expansion of school facilities and no impact would occur.

a.4) The Project would not result in a substantial adverse physical impact associated with the provision of new or physically altered park facilities.

There are several regional parks and other open space areas within the vicinity of the Project. These facilities are intended to serve a large segment of the population. Residential uses are not proposed as part of the Project; thus no direct increase in the number of park users is expected to result from Project. It is presumed that the construction workers and permanent employees and their families would already reside locally, and so would be part of the existing demand on park facilities. Therefore, the Project would not require the provision of new or physically altered park facilities and no impact would occur.

a.5) The Project would not result in substantial adverse physical impact associated with the provision of any other public facilities.

No other public facilities, such as meeting halls, libraries, hospitals, etc., are present on-site. No residential uses or public facilities are proposed as part of the Project. Therefore, construction and operation of the Project would neither increase the demand on existing public facilities nor require the construction or expansion of any other public facilities. Accordingly, no impact would occur.

4.15.6 Discussion of Impacts and Mitigation Measures

Because implementation of the Project would result in no impacts related to public services, there are no impacts and no mitigation measures to be analyzed in this section.

4.16 Recreation

4.16.1 Introduction

This section analyzes the Project's relationship to recreation. Discussed herein are the physical and regulatory setting; the baseline for determining environmental impacts; the criteria used for determining the significance of environmental impacts; and potential impacts associated with decommissioning the existing windfarm and construction, operation, maintenance, and decommissioning of the Project.

4.16.2 Setting

4.16.2.1 Regional and Local Setting

Section 3.1.2, *Location*, provides general information about the regional and local setting. This section (4.16.2.1) provides setting information specific to recreation-related resources in the Project area. Contra Costa County contains numerous recreational facilities, including major parks and open space areas, local parks, and private recreational facilities. Several such areas provide recreational opportunities in the vicinity of the Project, although there are no local (community or neighborhood) parks in the Project area.

Several major parks and open space areas provide recreational opportunities in the vicinity of the Project. Two regional preserves owned by the East Bay Regional Park District (EBRPD) are located approximately four miles northwest of the Project area. Round Valley Regional Preserve consists of approximately 1,911 acres, and, adjacent to it, Morgan Territory Regional Preserve consists of 4,708 acres. Park activities available in these preserves include hiking, horseback riding, bicycling, picnicking and camping. The 1,833-acre Brushy Peak Regional Preserve is located approximately three miles south of the Project in Alameda County. Brushy Peak offers opportunities for hiking, biking, running, nature study, and dog walking (EBRPD, 2010a).

All of the existing 91 turbines are located on land owned by the EBRPD. Approximately 48 of the turbines are within the boundaries of the 1,339-acre Vasco Caves Regional Preserve, which is jointly owned by the EBRPD and the CCWD and operated by the EBRPD. All access to the preserve is by advance reservation guided hiking tours only. Visitors depart on EBRPD-provided buses from either Round Valley Regional Preserve or Brushy Peak Regional Preserve, and travel through the Project area on Howden Road to reach the tour staging area (EBRPD, 2010b).

The Project is also located on portions of the CCWD's Los Vaqueros Watershed property. Recreational opportunities on watershed lands include hiking, biking, boating, fishing, and horseback riding. To protect the public water supply, activities involving body or clothing contact with the water are not allowed at the reservoir. Public vehicle access to the watershed is limited to 1) the Marina, concession, and picnic area on the southern shore of the reservoir, with access provided via a 3.75-mile-long public road that connects to North Vasco Road; and 2) the Interpretive Center, Watershed Office, and day use facilities near the existing Los Vaqueros Dam

on the north end of the watershed. These facilities are accessed via Walnut Boulevard, which connects to Camino Diablo near the intersection with Vasco Road. No public access to CCWD recreational areas is provided from within the Project area.

4.16.2.2 Regulatory Setting

Contra Costa County General Plan

The Open Space Element of the Contra Costa County General Plan contains park and recreation-related goals, policies and implementation measures that apply County-wide. Such goals and policies establish standards for park and recreational opportunities and facilities (e.g., Goals 9-36, 9-37 and 9-39), promote the use of such areas (e.g., Goal 9-38), manage conflicts between park and recreation and other, potentially competing, uses (e.g., Policies 9-47 and 9-48), and protect regional-scale public access to scenic areas on County waterfronts (e.g., Policy 9-43) (Contra Costa County, 2010).

East Bay Regional Park District Master Plan

The current Master Plan for the EBRPD, the 1997 District Master Plan, is a policy document that guides the EPRPD in future expansion of parks, trails, and services for its regional parks in Contra Costa and Alameda Counties. The Master Plan includes policies for conserving natural and cultural resources, providing for recreational opportunities, and providing for the balanced distribution, acquisition, protection, restoration, management, and development of the regional parks. The EBRPD is currently updating the policy portion of the Master Plan and anticipates the revised plan to be released in 2011. The Master Plan also includes a map, which was updated and adopted by the EBRPD in 2007. The 2007 Master Plan Map identifies gaps in the current system of regional parks, open spaces, and trails. One existing trail that connects Morgan Territory and Brushy Peak Regional Preserves is located outside the Project boundary along the western side of the access road to the Los Vaqueros Marina. The map also identifies a potential trail connecting Vasco Caves and Brushy Peak Regional Preserves along Vasco Road (EBRPD, 1996, 2007, 2010a).

4.16.3 Project Baseline

The environmental setting constitutes the baseline for this analysis of potential impacts on recreation. There is no direct access from the Project area to the parks and recreation resources described above.

4.16.4 Significance Criteria

Based CEQA Guidelines Appendix G, a project would cause adverse impacts to recreation if it would:

a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.

b) Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment.

4.16.5 Discussion of No Recreation Impacts

As explained below, development of the Project would have no impact on recreational resources.

a) The Project would not increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.

There are no existing neighborhood parks in the vicinity of the Project; however, the Project is partially located on EBRPD property, with a portion of it being within Vasco Caves Regional Preserve. Upon completion of the Project, the number of turbines located on EBRPD property would be reduced from the existing 91 turbines to a maximum of 13. Turbines located on the Vasco Caves portion would be reduced from 48 to a maximum of two. Both of these potential turbine locations within the preserve would be sited along an existing string of turbines.

Primary access to the Project is by Howden Road, via Vasco Road, and through the Vasco Caves Regional Preserve. Public access to the preserve is limited to guided tours. During decommissioning of the existing turbines, removal would occur on existing roads within the preserve and on other EPRPD property north of the preserve. Construction of the Project would require widening and/or improving some existing roads as well as new permanent roads. Access to the preserve for guided tours may therefore be temporarily interrupted during the decommissioning and construction periods for public safety purposes. However, few people visit Vasco Caves annually, so any increase in use at other area facilities as a result of visitation by recreationists temporarily displaced by Project-related roadwork would be minimal.

Approximately 30-40 workers would be on-site during construction, and operation of the Project would employ up to eight people. However, most if not all of these workers are presumed to be local and, therefore, to be existing users of the area's parks and recreational facilities. As no new residences or uses are proposed, the Project is not expected to induce population growth that could result in increased use of parks and recreational facilities.

For the reasons explained above, implementation of the Project would not increase the use of existing parks or other recreational facilities such that substantial physical deterioration would occur or be accelerated. Therefore, no impact would result.

b) The Project does not include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment.

The Project would not construct any recreational facilities. For reasons discussed in a), development of the Project also would not include or require the construction of new, or expansion of existing, recreational facilities, the construction of which could have an adverse physical effect on the environment. Therefore, no impact would occur.

4.16.6 Discussion of Impacts and Mitigation Measures

Because implementation of the Project would result in no impact on recreation, there are no impacts or mitigation measures to be analyzed in this section.

4.17 Transportation/Traffic

4.17.1 Introduction

This section analyzes the Project's relationship to transportation and traffic. Discussed are the physical setting; the regulatory setting; the baseline for determining environmental impacts; the significance criteria used for determining environmental impacts; and potential impacts related to construction, maintenance, operation and decommissioning of the Project. When impacts are determined to be significant or potentially significant, mitigation measures are identified to avoid or reduce the significance. Because the construction and decommissioning phases are more traffic-intensive than other phases, this section focuses on impacts related to construction and decommissioning, including potential impacts to roadways that are adjacent to or within the Project area and could therefore be affected by construction, and roadways that are potential access routes for construction workers, materials delivery, and other equipment trucks.

4.17.2 Setting

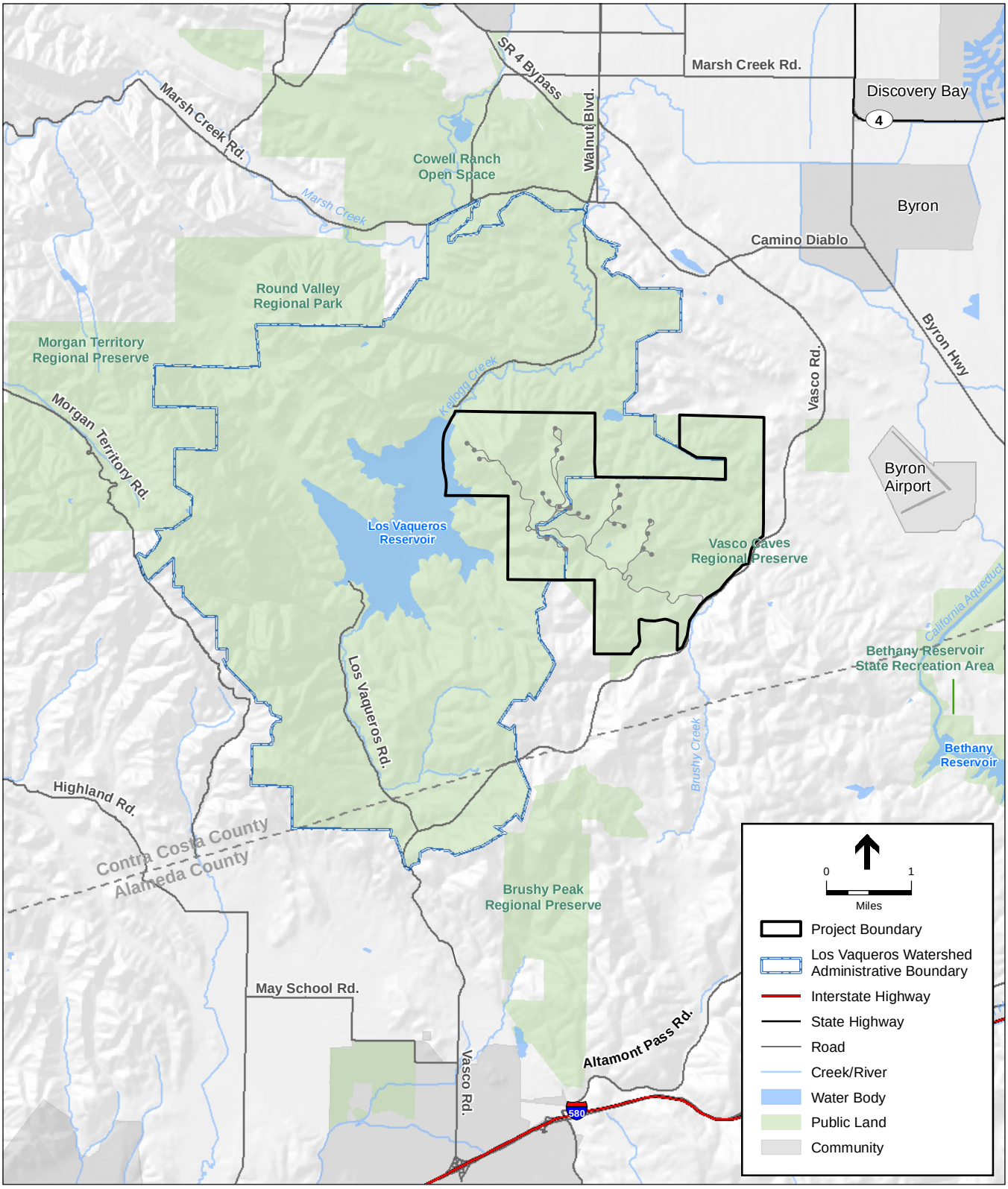
4.17.2.1 Regional and Local Setting

Section 3.1.2, *Location*, provides general information about the regional and local setting. This section (4.17.2.1) provides setting information specific to traffic and transportation in the Project area, including descriptions of the existing transportation facilities (local and regional roadways, transit service, and bicycle routes) and existing traffic conditions.

The Project area lies east of Los Vaqueros Reservoir and west of Vasco Road, in Contra Costa County. Vasco Road, which runs north-south through the area, is the only major public road that provides direct local access, and as such is the focus herein of assessment of potential impacts on local traffic conditions. Figure 4.17-1 shows the local and regional roadway network that could be affected by construction and operation of the Project. Specific roadways in the Project vicinity are described below. Table 4.17-1 presents average daily traffic estimates for relevant segments of regional roadways.

State Route 4

State Route 4 (SR 4) is a regional highway that begins at Interstate 80 in the City of Hercules in western Contra Costa County and generally runs in an east-west orientation across the entire county. East of the City of Martinez, SR 4 becomes the California Delta Highway and passes through the Central and East County cities of Concord, Pittsburg, and Antioch. The freeway character of SR 4 changes at the Main Street interchange in the City of Oakley, east of which SR 4 continues as a two-lane arterial roadway that passes through Oakley and then continues southward and eastward through the City of Brentwood and past the unincorporated community of Discovery Bay. SR 4 then crosses Old River and continues into San Joaquin County toward Stockton, where it intersects Interstate 5.



SOURCES: EBRPD, 2010; Contra Costa County, 2010

Tres Vaqueros Windfarm Repowering Project . 209132.02

Figure 4.17-1

Project Area Roadways

TABLE 4.17-1
EXISTING AVERAGE DAILY TRAFFIC VOLUMES ON HIGHWAYS IN THE PROJECT AREA

Highway	Segment	Vehicles (% Trucks)[a]
State Route 4		
Contra Costa County	Willow Pass Road (Concord) to Railroad Avenue (Pittsburg)	122,000 to 152,000 (4.6% to 5.2%)
	Railroad Avenue to Contra Loma Boulevard (Antioch)	103,000 to 122,000 (4.6% to 5.2%)
	Contra Loma Boulevard to SR 4 Bypass (Antioch)	76,000 to 100,000 (4.6% to 5.4%)
State Route 4 Bypass		
Contra Costa County	North of Laurel Road (Antioch)	53,200 (n/a)
	South of Sand Creek Road (Brentwood)	27,400 (n/a)
Interstate 580		
Alameda County	I-205 to Vasco Road	137,000 to 139,000 (4.6% to 12.5%)
	Vasco Road to North Livermore Avenue	161,000 to 164,000 (4.6% to 12.2%)

[a] Daily truck traffic volume as percent of total traffic volume.

SOURCES: Caltrans, 2009a; Caltrans, 2009b; Mark Thomas & Company (Consultant for the SR 4 Bypass Authority), 2008.

The SR 4 Bypass was constructed as a 14.5-mile-long segment of new freeway and conventional highway through eastern Contra Costa County to ease traffic congestion through the Brentwood and Oakley areas. The bypass replaced the existing SR 4 from just south of the Main Street Interchange to Marsh Creek Road, with a Vasco Road extension from Marsh Creek Road to Vasco Road at Walnut Boulevard. The construction was a cooperative effort between Contra Costa County and the cities of Antioch, Oakley, and Brentwood.

Interstate 580

Interstate 580 (I-580) is the major east-west truck travel route and main throughway in eastern Alameda County that connects to the Sacramento and San Joaquin valleys. The main freeway interchange that provides access to the Project area road network is I-580 at Vasco Road. The eastbound to northbound loop ramp at the Vasco Road interchange has a tight turning radius, and drivers of long trucks can opt to travel farther east on I-580 to the North Greenville Road interchange, then use Northfront Road westbound to reach Vasco Road.

Vasco Road

Vasco Road is a major thoroughfare for travelers heading to the eastern and southern San Francisco Bay Area from the cities of Stockton, Brentwood, and Oakley and the community of Discovery Bay. Locally, Vasco Road heads south from Walnut Boulevard near Brentwood and crosses into

Alameda County as it extends to I-580. Vasco Road is primarily a two-lane arterial (with some four-lane segments, and some three lane segments for truck climbing and passing in the southbound direction) that has heavy use during morning and evening commute hours. Vasco Road has 12-foot travel lanes, 6- to 8-foot outside shoulders, and a posted speed limit of 55 miles per hour (mph). As described above, the last segment of the SR 4 bypass, including an extension of Vasco Road from Walnut Boulevard to Marsh Creek Road has been completed and is now open for use. The average daily traffic volume on Vasco Road in the Project area is about 19,300 vehicles (Marks Traffic Data, 2010).

Collision History

Three full years of collision records (2006-2008) were obtained from the California Highway Patrol for Vasco Road.[1] As shown in Table 4.17-2, there was an average of 50 recorded collisions per year over the 16.5-mile stretch of road (about four of which involved a truck). Taking into account the average daily traffic volume on Vasco Road, those collisions translate to an accident rate of about 0.43 accidents per million vehicle miles traveled (MVMT). As shown in the table, the latest published accident rate for two-lane rural roads in Contra Costa County was 0.94 accidents per MVMT. The predominant cause and type of accident over the three-year period was Unsafe Speed and Rear End, respectively.

TABLE 4.17-2
COLLISION HISTORY ON VASCO ROAD IN PROJECT AREA (WALNUT BOULEVARD TO I-580)[a]

Roadway Segment	Distance (miles)	2006	2007	2008	2006-2008 Average	Accident Rate (per MVMT)[b]
Vasco Road (Walnut Boulevard to I-580)	16.5	58 (1)	43 (5)	48 (5)	49.7 (3.7)	0.43
	Contra Costa County Average (rural areas): 2-lane roads					0.94

a The total number of accidents, for each year, are shown, with accidents involving trucks shown in parenthesis.
b MVMT = Million Vehicle Miles Traveled

SOURCES: ESA, 2010, using data from California Highway Patrol 2009; Caltrans, 2007.

While the accident rate for the 16.5-mile segment is lower than the average for two-lane roads in rural areas of Contra Costa County, in response to a number of collisions involving injuries and multiple fatalities, the County is implementing Phase 1 of the Vasco Road Safety Improvements Project; construction started in May 2010 (Lai, 2010). This Phase 1 project includes the construction of a concrete median barrier and addition of a second southbound lane in a one-mile segment through the Brushy Creek Area, to eliminate the need to merge.

1 At the time the collision data were provided by the CHP, about half of 2009 records were available. The County decided to present only full-year data.

Public Transit

The Project area is served by one transit agency that provides bus service to areas in eastern Contra Costa County: the Eastern Contra Costa Transit Authority (Tri-Delta). Tri-Delta Transit operates 14 local bus routes and serves the cities of Brentwood, Antioch, Oakley, Pittsburg, and the community of Bay Point. Bus Route 384 operates on a portion of the SR 4 Bypass (between Sand Creek Road and Balfour Road), but does not extend south through the Project area.

Bikeways/Pedestrian Circulation

The regional network of bicycle facilities includes a variety of Class I (bicycle paths), Class II (bicycle lanes, striped in roads), and Class III (bicycle routes without striping) bikeways within the cities and communities of Contra Costa County. The closest Class I, II, and III bikeways to the Project area are in Brentwood, over four miles north of the Project area; it is anticipated that construction traffic would not use local Brentwood streets.

Existing Site Access

The Project area is accessed from Vasco Road via Howden Road. The configuration of this intersection fully accommodates vehicles that need access to the area (i.e., operations and maintenance personnel and emergency vehicles as needed).

4.17.2.2 Regulatory Setting

Federal and State

The California Department of Transportation (Caltrans) is responsible for planning, designing, constructing, operating, and maintaining all State-owned roadways in Contra Costa and Alameda counties. Federal highway standards for interstates (e.g., I-580) are implemented in California by Caltrans. Caltrans has the discretionary authority to issue special permits for the movement of vehicles/loads exceeding statutory limitations on the size, weight, and loading of vehicles contained in Division 15 of the California Vehicle Code. Requests for such special permits require the completion of an application for a Transportation Permit. The California Highway Patrol is notified about transportation of oversize/overweight loads.

Local

Contra Costa County

The Transportation and Circulation Element and Conservation Element of the Contra Costa County General Plan (Contra Costa County, 2010) contain goals and policies related to establishing and maintaining an efficient transportation and circulation network, right-of-way requirements, emergency response efficiency, and roadway development. The General Plan also outlines level of service (LOS) standards and routes of regional significance. Additional goals and policies in the above-cited elements of the General Plan pertain to alternative transportation, public transit, and the relationship of transportation to air quality goals. Contra Costa County has not designated local truck routes nor adopted specific policies regarding management of construction activities.

The Contra Costa Transportation Authority (CCTA) is responsible for ensuring local government conformance with the Congestion Management Program (CMP). The CCTA has review responsibility for proposed development actions expected to generate 100 or more new a.m. or p.m. peak-hour trips, and reviews the adequacy of California Environmental Quality Act (CEQA) transportation impact analyses and measures proposed to mitigate significant impacts.

The Contra Costa County Public Works Department is responsible for the design, construction, operation, and maintenance of County rights-of-way. Right-of-way improvements must be constructed to meet County standards, and an encroachment permit must be obtained from the Public Works Department prior to performing any work within a County right-of-way (e.g., to construct new or wider access roads that would connect the Project to Vasco Road).

Alameda County

The Alameda County East County Area Plan (Alameda County, 2000) contains goals and policies to inform agencies of the county-approved ways to maintain an efficient circulation network in the eastern portion of the county. Such goals include creating and maintaining a balanced multimodal transportation system, cooperating with other regional transportation plans, integrating pedestrian use into the transportation system, and mitigating exceedances of LOS standards. Alameda County has not designated local truck routes nor adopted specific policies regarding management of construction activities. Chapter 12.08 of the Alameda County Code regulates roadway use, including the issuance of encroachment permits for work within an Alameda County right-of-way.

4.17.3 Project Baseline

The environmental setting generally constitutes the baseline for purposes of analyzing potential impacts on Transportation/Traffic. The existing facility road system primarily consists of gravel access roads, which are maintained for ongoing access and maintenance activities. Existing roads are maintained at a width of up to 16 feet for ongoing operations and maintenance activities.

4.17.4 Significance Criteria

Based on CEQA Guidelines Appendix G, a project would cause adverse impacts related to transportation/traffic if it would:

a) 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;

b) 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;

c) 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;

d) Substantially increase hazards due to a design feature (e.g. sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment);

e) Result in inadequate emergency access; or

f) Conflict with adopted policies, plans or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

4.17.5 Discussion of No Transportation/Traffic Impacts

Comparison of the baseline circumstances and Project characteristics with each of the six significance criteria stated above indicates that no transportation/traffic impacts would result for the b), c), and f) criteria. The following discusses the reasoning supporting this conclusion:

b) The Project would not 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.

Level of service standards and travel demand measures, established by county agencies (e.g., the Contra Costa Transportation Authority or Alameda County Congestion Management Agency), are intended to regulate long-term traffic impacts due to future development, and do not apply to temporary construction projects whose short-term traffic increases end when construction activities end. The workforce for the Project's operations and maintenance activities would not change from the existing workforce levels, and as such would not increase the traffic volumes on area roads. (The construction-phase analysis, presented herein, evaluates whether construction traffic would cause traffic levels to substantially increase congestion on roadways; see Impact 4.17-1).

c) The Project would not change air traffic patterns that would result in substantial safety risks.

The Project would not affect air traffic patterns of the Byron Airport, located east of the Project area. The Project would also not result in substantial safety risks associated with airport operations (see airport impact discussion in Section 4.11, *Land Use*, under impact 4.11-1, Section 4.9, *Hazards and Hazardous Materials*, under Impact 4.9-4, and Federal Aviation Administration lighting requirements discussion in Section 4.1, *Aesthetics*, under impact 4.1-7).

f) The Project would not conflict with adopted policies, plans or programs supporting alternative transportation.

The Project would neither directly nor indirectly eliminate existing or planned alternative transportation corridors or facilities (e.g., bike paths, lanes, bus turnouts, etc.). In addition, the Project would not include changes in policies or programs that support alternative transportation, and it would not construct facilities in locations in which future alternative transportation facilities are planned. The potential effect of Project construction on existing bus transit service in the Project area is discussed in Impact 4.17-1.

4.17.6 Discussion of Impacts and Mitigation Measures

Methodology

Project Construction

The Project would use standard construction and operation procedures typical for wind power projects in California. These procedures, with minor modification to allow for site-specific circumstances and differences between turbine manufacturers, are summarized below. The Applicant would consult and coordinate with County staff as Project designs are finalized and specific details on construction are available.

To the greatest extent possible, the Project would use the existing access road network, which includes one access point (Howden Road) off Vasco Road and the various internal roads that access the existing turbines. Howden Road and some internal access roads would be widened to a 32-foot width (plus up to two feet of temporary shoulder on each side of the road), to accommodate the mobilization of heavy equipment and turbine equipment transport trucks and provide enough room for trucks and equipment to pass areas where turbines are being erected. Some new roads would be necessary and they too would be constructed to the 32-foot width. To allow safe passage of the large transport equipment used in construction, roads would be constructed with all-weather gravel surfaces. Improved roads and new roads would be designed and constructed to minimize cuts and fills. Roads retained after construction for use during Project operation would be reduced to a width of approximately 16 feet. Vasco Road improvements at the access point to the Project would be designed and constructed in coordination with the County Public Works Department. Following construction, roads no longer needed to support Project operations would be reclaimed in conformance with County standards.

Project construction would result in short-term traffic and circulation impacts resulting from temporary increases in traffic from construction workers and transport of equipment and materials. The analysis of Project-construction effects on traffic, circulation and access is based on the description of Project construction activities presented in Chapter 3, *Project Description*.

Key construction scenario assumptions used in the analysis of potential Project effects on traffic and circulation during construction includes the following:

- Earthwork (cut and fill) would be balanced on-site (i.e., any excavated material cut would be used as fill on-site during the construction process), resulting in no off-hauling of cut material.

- The existing on-site O&M building would be razed, and the area of the building and the parking lot would be used as the staging/equipment laydown area for temporary storage of turbine components, construction equipment, and other supplies, as well as for parking of construction worker vehicles.

- The Applicant would prepare a Construction Traffic Management Plan to ensure that no hazards would result from the increased truck traffic, and that traffic flow would not be significantly affected on local public roads and highways. This plan would incorporate

measures such as informational signs, traffic cones, and flashing lights to identify any necessary temporary changes in lane configuration (e.g., during times when the Project's access intersection on Vasco Road is being reconstructed to accommodate large Project-generated trucks). Flaggers with two-way radios would be used to control construction traffic and reduce the potential for accidents. Speed limits on on-site roads would be set commensurate with road type, traffic volume, vehicle type, and site-specific conditions as necessary to ensure safe and efficient traffic flow, but would not exceed 20 mph. On-site construction traffic would be restricted to the roads developed for the Project. Use of existing unimproved roads (i.e., roads not widened for the Project) would be for emergency situations only. There would be a turnout for vehicle stacking and a locked gate for authorized personnel. Authorized users, such as grazing permits holders, and Contra Costa Water District (CCWD) and East Bay Regional Park District (EBRPD) personnel would continue to have access during the construction period.

This analysis relies on available information, a field inventory of the Project area, and estimates of daily vehicle trips generated by Project-related activities, augmented by professional traffic engineering judgment. Field reconnaissance was undertaken to determine characteristics of roads that are proposed to accommodate construction-generated vehicle trips, including the number of travel lanes and land uses served by the affected roadways. Estimates of increased roadway traffic volumes generated by the Project were compared to existing traffic volumes, and the effect of that percent increase on traffic flow was judged by a qualified expert in traffic analysis based upon experience and knowledge of the relevant roadway facilities and conditions.

Activity associated with decommissioning of existing wind farm components and delivery of construction materials and equipment would require a total of approximately 1,151 fully loaded one-way truck trips (see Table 4.17-3), for a total of about 2,302 one-way truck trips (half loaded and half empty) over the 12-month construction period (four to five months for decommissioning and seven to eight months for construction).

TABLE 4.17-3
ESTIMATED TOTAL TRUCK TRIPS FOR PROJECT CONSTRUCTION

Purpose for Truck Load	Truck Loads
Remove Decommissioned Turbine Components (Assumes 91 Turbines)	546 [a]
Deliver Turbine Components (Assumes 21 Turbines)	200
Road and Turbine Foundation Construction	350
Crane Delivery and Removal	20
Deliver Substation and Interconnection Components	25
Deliver Operations and Maintenance Building Materials	10
Total Truck Loads	**1,151**
Total One-Way Truck Trips (one inbound and one outbound, to and from the area)	**2,302**

[a] Dismantling of existing turbines would require approximately six truck loads per turbine.

SOURCE: Pattern Energy, 2010

Construction of Project roads, facilities, communication lines, and electrical infrastructure would occur at about the same time, using individual vehicles for multiple tasks. Assuming that construction material deliveries from external sources would occur over a 5-month construction period at 20 workdays per month, an average of about 12 one-way truck trips per day (i.e., six trucks generating one trip to the Project area and one trip away from the Project area) would be added to background traffic volumes on area roadways. For purposes of this analysis, it is assumed that the peak number of daily truck trips could be twice the average number (i.e., up to about 24 one-way truck trips per day). (Using the same 20 workdays per month assumption, during the 4- to 5-month period for decommissioning the existing turbine components, a similar average of about 12 one-way truck trips (i.e., six trucks making one inbound and one outbound trip) would be added to area roadways per day.)

In addition to the currently proposed activity described above, there would be construction activity associated with decommissioning (in about 30 years) of the turbines and other components proposed for installation under the Project (including new roads constructed for the Project). It is expected that truck trip generation for the future decommissioning efforts would be similar to the current efforts. Dismantling/removal of the 21 turbines would require up to six truck loads per turbine, and would take about two to three months to complete. Using the same 20 workdays per month assumption, during a two-month period for dismantling and removing the turbines at the end of their useful life (30 years hence), an average of about six one-way truck trips (i.e., three trucks making one inbound and one outbound trip) would be added to area roadways per day.[2] Decommissioning would also involve removal of turbine-related infrastructure (e.g., concrete pads on which the turbines are located) and reclamation of areas where Project roads were constructed. Removal of roads and infrastructure would take about two to three months to complete, starting one month after removal of the turbines begins. The number of daily truck trips during the overlapping period (when turbines, their infrastructure, and roads were all being removed) would not be expected to exceed the above-described truck trip generation during Project construction (i.e., an average of about 12 one-way truck trips, and a peak of about 24 one-way trips).

Project Operation

The analysis for long-term increases in traffic associated with Project operation considers the extent of additional employees required to operate the Project and the need for additional maintenance activities. All existing turbines were shut down in 2009. At that time, the Project employed four people full time and, depending on the time of year, two people part-time. The repowered Project would employ approximately four people full time. It is not known at this time if the new staff would include members of the previous staff. In a worst-case scenario the Project would generate four additional daily round-trip commuter trips.

[2] If the removal of turbines were to take three months, then the truck trips would be spread over a longer period of time, and fewer truck trips per day would occur.

Through the process of performing the operations and maintenance (O&M) activities, O&M personnel would drive through the entire Project at least once every few days. Various inspections would be performed on a daily, weekly, or monthly basis. Regularly scheduled preventive maintenance activities would also be performed on a daily, weekly, or monthly basis. After construction, O&M of the Project would require three round trips per day using pickups or other light-duty trucks.

a) Would the Project 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?

Impact 4.17-1: Project construction activities would intermittently and temporarily increase traffic congestion on area roadways due to vehicle trips generated by construction workers and construction vehicles. (*Less-than-Significant Impact with Mitigation Incorporated*))

As described in Chapter 3, *Project Description*, construction activities would involve about 30 to 40 workers per day. The beginning and end of the construction period would involve a slightly lower number of workers when compared to the middle months. Assuming all workers commuted in their own vehicle, there would be up to about 80 daily one-way trips (i.e., 40 inbound trips in the morning and 40 outbound trips in the evening). An additional 16 one-way trips per day are assumed to occur, reflecting the expectation that some construction workers would make another trip to and from a construction-site during the day (e.g., for lunch). Thus, over the course of the construction period, it is assumed that construction workers would contribute an average of up to about 96 one-way trips per day to roads within the Project area. The construction workforce would commute to the Project area from various directions, using I-580, SR 4, the SR 4 Bypass, and various County arterials to access Vasco Road.

As described in the impact methodology section above for construction (including the two periods of decommissioning activity), on average, daily truck trips would total approximately six round trips (12 one-way trips, with peak generation of about 24 one-way trips). Hours of construction would be between 7:00 a.m. and 7:00 p.m. Monday through Friday and from 8:00 a.m. to 6:00 p.m. on Saturdays and Sundays. It is expected that materials and equipment would likely be delivered within a 10-hour, day-time period per day. Under this assumption, truck trips scheduled throughout the day to deliver and remove materials from the Project area would average approximately one trip per hour (with a peak of about two trips per hour). It is probable that Contra Costa County Public Works Department (in cooperation with other agencies, such as the California Highway Patrol) would require that delivery of large turbine components occur during nighttime hours (due to the need for temporary closure of Vasco Road during those deliveries, and the impact on traffic flow conditions if the road were closed during daytime hours). The specifics of the road closure (e.g., maximum number of deliveries per night, duration of the road closure, and specific hour(s) of the day) would be set by the cooperating agencies, but by way of an example of potential impacts, the average number of vehicles on Vasco Road in the

Project area between Midnight and 3:00 a.m. on weekdays is about 75 vehicles per hour, and about 150 vehicles per hour between 11:00 p.m. and Midnight, and between 3:00 and 4:00 a.m. (Marks Data Service, 2010).

Project-generated construction truck traffic could travel to the Project area from various locations. Based on preliminary analysis provided by the Applicant, turbines and associated equipment would be transported to the Project area from the Port of Oakland, south along I-880, and east along SR 238 and I-580 to the Project area. Trucks traveling eastbound on I-580 would not be able to use the Vasco Road exit because of the tight radius of the loop ramp, and would have to exit at the next interchange to the east (North Greenville Road), and double-back to Vasco Road traveling north along North Greenville Road and west along Northfront Road to Vasco Road. They would go north on Vasco Road and turn left onto Howden Road. SR 4 is not expected to be used for any oversized or overweight trucks. Other truck trips (e.g., dump trucks, concrete trucks, water trucks, cranes) could travel from locations whereby I-580, SR 4, and the SR 4 Bypass could be used to reach Vasco Road. As described above, Caltrans has the discretionary authority to issue special permits for the movement of vehicles/loads exceeding statutory limitations on the size, weight, and loading of vehicles contained in the California Vehicle Code. The California Highway Patrol is notified about transportation of oversize/overweight loads.

Assessment of the short-term effect that Project construction traffic could have on local and regional roads includes review of existing traffic volume information and consideration of both the percentage increase the Project construction traffic would contribute over existing conditions and the capacity of the road to handle the additional traffic. Because the numbers of vehicles on roads vary from day-to-day and over the course of a day, and routinely range plus or minus five percent, a change in traffic volume of five percent or less is generally not perceptible to the average motorist. Traffic volume on Project area roads is typically highest during morning and evening peak commute hours (generally between 7:00 am to 9:00 am, and 4:00 pm to 6:00 pm); traffic increases that occur during these peak periods may exacerbate short-term congestion.

The existing volume of traffic on I-580 is shown on Table 4.17-1. In the stretch of highway on either side of the Vasco Road exit, the average daily traffic volume is about 162,500 vehicles to the west and 138,000 vehicles to the east. Even if all 120 daily Project construction trips were to use I-580, this level of short-term traffic increase would represent no more than about one-tenth of one percent of the existing traffic volume; as such this would not be a substantial traffic increase on I-580.

The main roads providing access from the highway system to the Project area and access to the Project area include: Vasco Road, SR 4 and the SR 4 Bypass (see Figure 4.17-1). Compared to the existing average daily traffic of about 19,300 vehicles on Vasco Road (see page 4.17-4), the average level of Project-generated traffic would represent no more than a one percent increase in daily traffic. On an hourly basis, this would represent up to an additional 40 trips per hour (by commuting construction workers), and up to an added two trips per hour by large trucks. In the off-peak commute hours, this additional traffic would not represent a substantial increase in traffic volume that would appreciably affect traffic congestion; however, if this project

construction traffic increase were to occur during the peak commute hours (typically 7:00 am to 9:00 am, and 4:00 pm to 6:00 pm), then this could result in a noticeable increase in traffic congestion.

It is not possible to accurately predict background traffic conditions on area roadways 30 years in the future, but it is reasonable to expect that the less-than-substantial traffic generation associated with decommissioning the 21 turbines at the end of their useful lives would result in impacts similar to those described above.

With respect to Project construction effects on existing bus transit services, Eastern Contra Costa Transit Authority operates 14 local bus routes and serves the cities of Brentwood, Antioch, Oakley, and Pittsburg, as well as the unincorporated communities of Discovery Bay, Byron, and Bay Point. Bus Route 384 operates on a portion of the SR 4 Bypass (between Sand Creek Road and Balfour Road), but does not extend south through the Project area. The short-term traffic increases that would occur on the SR 4 Bypass during Project construction would not disrupt transit service but, as noted, above, traffic increases during morning and evening peak commute hours could increase traffic congestion and add to transit delays. Implementation of Mitigation Measure 4.17-1 would mitigate the impacts of Project-related construction traffic to a less-than-significant level.

> **Mitigation Measure 4.17-1:** Prior to the start of construction-related activities, the Applicant shall prepare and implement a Traffic Management and Safety Plan that will reduce or eliminate impacts associated with the Project. The plan shall adhere to Contra Costa County and Caltrans requirements, and must be submitted for the review and approval of the Contra Costa County Public Works Department prior to implementation. In preparing this plan, the Applicant shall take into account the cumulative traffic impacts of the overlapping construction schedules of the Contra Costa County's Vasco Road Safety Improvements Project, the Vasco Winds Repowering Project, and any other projects in the area that could combine with the Project to create cumulative traffic impacts. The traffic management plan shall include, at a minimum, the following elements:
>
> > ***Part A - Scheduling and Delivery Requirements.*** To the maximum extent feasible, schedule Project-related construction truck trips on Vasco Road, State Route 4, and State Route 4 Bypass outside the peak morning and evening commute hours. Restrict slow-moving trucks to nighttime deliveries if required by the Contra Costa County Public Works Department or other agency, such as Caltrans, the California Highway Patrol, the State Route 4 Bypass Authority or the Alameda County Public Works Department, that has jurisdiction over a portion of the haul route. Implement road closures during delivery of oversized loads as directed by any agency with jurisdiction over the haul route.
> >
> > ***Part B - Permits.*** Comply with transportation permit requirements of the Contra Costa County Public Works Department, Caltrans, the California Highway Patrol, the State Route 4 Bypass Authority, and the Alameda County Public Works Department for Project-related construction truck trips carrying oversized loads. Implement a road closure in Contra Costa County by submitting a road closure approval request to the Contra Costa County Public Works Department at least two months prior to the

planned closure. Contact the other agencies listed above regarding authorization for road closures within their jurisdictions and submit copies of road closure requests within those jurisdictions to the Contra Costa County Public Works Department.

***Part C - Coordination with County Projects*.** Coordinate Project-related construction activities with activities related to Contra Costa County projects on Vasco Road. Contra Costa County projects, such as the Vasco Road Safety Improvements Project, shall have priority access at all times, and the delivery of oversized equipment and other heavy equipment shall be scheduled around Contra Costa County projects, which might limit the delivery hours.

***Part D - Emergency Services Notification*.** Provide a minimum of five days advance notification to local police, fire, and emergency service providers of the timing, location, and duration of construction activities that could affect the movement of emergency vehicles on area roadways. The names and 24-hour contact numbers of the Project superintendent and foreman shall be included as part of the advance notification. The County Public Works Department's resident engineer(s) for Vasco Road projects shall also be provided with the advance notification.

***Part E - Signage*.** Place signs along appropriate roads throughout the duration of the construction period to notify drivers of the presence of construction traffic. At a minimum, signs shall be placed along Vasco Road, SR 4, SR 4 Bypass, and Camino Diablo.

Significance of Impact after Mitigation: Less than Significant.

---

d) Would the Project substantially increase hazards due to a design feature (e.g. sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment)?

Impact 4.17-2: Project construction activities could substantially increase traffic hazards due to construction in or adjacent to roads or due to possible road wear. (*Less-than-Significant Impact with Mitigation Incorporated*)

Project-generated traffic (including large trucks) would interact with other vehicles on the roads used to access the Project, which could create traffic safety hazards. The slower-moving Project trucks could cause other drivers to act impatiently, especially during the morning and evening commute hours when expectations of higher speeds are more prevalent among drivers. During the 12-month construction period (and during the end-of-life decommissioning period), trucks delivering materials and equipment would be entering and exiting the Project area along Vasco Road. Those turning movements could create a traffic safety hazard requiring the need for traffic control. At times the presence of slow-moving trucks entering or exiting construction areas along roadways could pose a traffic hazard to other vehicles. The creation of potential traffic safety hazards as a result of Project construction would be a significant impact.

Several pieces of equipment that exceed roadway load or size limits would need to be transported to the Project area during construction. This equipment includes the wind turbines. To transport this equipment, the Applicant must obtain special permits from Caltrans District 4 and other relevant jurisdictions including Contra Costa County to move oversized or overweight materials. In addition, the Applicant must ensure proper routes are followed; proper time is scheduled for the delivery; and proper escorts, including advanced warning and trailing vehicles as well as law enforcement control are available, if necessary.

The Project would construct access roadways and intersections with Vasco Road (to County standards) required to accommodate widths and turning radii of trucks needed to transport large equipment. Construction of the requisite access intersections at two locations along Vasco Road would require encroachment permits from Contra Costa County and Alameda County. Construction plans must be submitted for the review and approval of the County, and encroachment permits must be obtained.

In addition, heavy truck traffic delivering equipment and materials to the Project area could result in road wear and damage that result in a driving safety hazard. The degree to which this latter impact would occur depends on the existing roadway design (pavement type and thickness) and existing condition of the road. Freeways, major arterials and collectors (e.g., I-580, SR 4, SR 4 Bypass, and Vasco Road) are designed to accommodate a mix of vehicle types, including heavy trucks. The Project's impacts are expected to be negligible on those roads. However, roads such as Northfront Road are not designed and constructed to the same standards as freeways and could be damaged by construction traffic.

Mitigation Measure 4.17-2a: Where needed to maintain safe driving conditions, traffic control devices and procedures shall be installed/implemented as specified in Caltrans' *California Manual on Uniform Traffic Control Devices, Part 6: Temporary Traffic Control*. The Applicant shall submit a plan for temporary traffic control to the Contra Costa County Public Works Department for review and approval prior to implementation. This plan may be part of the Traffic Management and Safety Plan required by Mitigation Measure 4.17-1. If directed to do so by any agency that has jurisdiction over a right-of-way that would be impacted by the Project, the Applicant shall submit a temporary traffic control plan or its equivalent to that agency for review and approval.

Mitigation Measure 4.17-2b: The Applicant shall be responsible for repairing all damage to County roads resulting from construction activities. Prior to issuance of grading, building, or encroachment permits, the Applicant shall prepare a plan for mitigating construction-related damage to County roads. The plan shall be submitted for the review and approval of the Contra Costa County Public Works Department and shall include, at minimum, the following elements:

Part A - Haul Routes. Indicate County roads to be used as haul routes. An exhibit shall be provided that shows haul routes and county lines.

Part B - Road Survey and Monitoring. Perform pre- and post-construction surveys of the approved haul routes in order to document their condition before and after

Project construction. Monitor roads during Project construction to identify any damage that requires immediate repair.

Part C - Financial Security. Provide a security, such as a bond or other acceptable instrument, to ensure that funding is available to undertake any necessary road repairs. The Applicant shall calculate the amount of the required security and submit the calculation to the Contra Costa County Public Works department for review and approval.

Mitigation Measure 4.17-2c: If any severe road damage results from construction activities, especially damage that would make the impacted road unsafe to the public, then the Applicant shall complete necessary repairs immediately, per the direction either the Contra Costa County or Alameda County Public Works Department depending on the agency having jurisdiction over the damaged road segment. Emergency road repairs shall be completed at the Applicant's expense. Any potentially hazardous road segment must be flagged until the road is repaired.

Significance of Impact after Mitigation: Less than Significant.

---

e) Would the Project result in inadequate emergency access?

Impact 4.17-3: Project construction activities would intermittently and temporarily interfere with response times for emergency service providers using area roadways. (*Less-than-Significant Impact with Mitigation Incorporated*)

As stated in Part A (Scheduling and Delivery Requirements) of Mitigation Measure 4.17-1, the Applicant would be required to implement road closures during delivery of oversized loads (during hours of the day deemed appropriate by the agency with jurisdiction over the haul route), which could impede access to any emergency services related land use accessed via Vasco Road, (e.g., hospitals, fire stations, police stations), and to Vasco Caves Regional Preserve, during road closures. At other times, as described above, Project construction-generated traffic would not represent a substantial increase in traffic volume that would appreciably affect traffic congestion on area roadways (such as Vasco Road, SR 4 and the SR 4 Bypass). However, if Project construction traffic increases were to occur during the peak commute hours (typically 7:00 am to 9:00 am and 4:00 pm to 6:00 pm), particularly the construction truck traffic, then this could result in a noticeable increase in traffic congestion, and might delay emergency service providers traveling through this area.

Mitigation Measure 4.17-3a: Comply with stipulations of Mitigation Measure 4.17-1 – Part A pertaining to the scheduling of Project-related construction truck trips on Vasco Road, State Route 4, and State Route 4 Bypass outside the peak morning and evening commute hours, and restricting delivery of oversized loads (and related road closure) to nighttime hours if directed by any agency with jurisdiction over the haul route.

Mitigation Measure 4.17-3b: Comply with Mitigation Measure 4.17-1 – Part D to ensure that the East Bay Regional Park District, local police, fire, and emergency services providers receive adequate advance notice of road closures.

Mitigation Measure 4.17-3c: To ensure access for emergency vehicles to the Project area (including Vasco Caves Regional Preserve), and through the Project area, shall be maintained open at all times.

Significance of Impact after Mitigation: Less than Significant.

4.18 Utilities and Service Systems

4.18.1 Introduction

This section analyzes the Project's relationship to utilities and service systems. Discussed are the physical and regulatory setting; the baseline for determining environmental impacts; the criteria used for determining the significance of environmental impacts; and potential impacts associated with decommissioning the existing windfarm and construction, operation, maintenance, and decommissioning of the repowering Project.

4.18.2 Setting

4.18.2.1 Regional and Local Setting

Section 3.1.2, *Location*, provides general information about the regional and local setting. This section (4.18.2.1) provides setting information specific to the provision of water service, wastewater service, stormwater drainage and wastewater disposal in the Project area.

Water Service

The Contra Costa Water District (CCWD) provides water service to developed areas of eastern and central Contra Costa County. Rural residences located in southeastern Contra Costa County, including the Project area, obtain their water from local private wells. Potable water needs of public-serving areas of the Los Vaqueros Reservoir watershed are served by packaged membrane treatment plants. There is no existing water service at the existing facility.

Wastewater Service

Several municipalities and service districts provide sewer service within the County. Privately-owned and maintained septic tanks and leachfields are used in rural areas, such as the Project area, where no public sewer service is available. The one restroom facility in the O&M building at the Project area is linked to a septic tank and leachfield.

Stormwater Drainage

Construction and maintenance of the public drainage facilities in the Project vicinity generally fall under the jurisdiction of the Contra Costa County Public Works Department/Flood Control and Water Conservation District. Construction and maintenance of drainage facilities within the Project area are the responsibility of Tres Vaqueros. The site is located entirely in a rural setting; stormwater runoff drains primarily through natural drainage swales, ditches and watercourses. See Section 4.10, *Hydrology and Water Quality*, for further discussion of drainage in the Project area.

Solid Waste Disposal

The Contra Costa County Health Services Department, Environmental Health Division is certified by the California Department of Resources Recycling and Recovery (CalRecycle) as the Local Enforcement Agency for Solid Waste in Contra Costa County. Two permitted, large-volume landfills are active in Contra Costa County: Keller Canyon Landfill and West Contra Costa Sanitary Landfill. The Keller Canyon Landfill is located northwest of the Project area in Pittsburg, at 901 Bailey Road near State Route 4. It serves the eastern and central portions of Contra Costa County and is a Class II facility with a projected remaining life span of 40 years. Due to the proximity of the Project to the Vasco Road and Altamont Landfills in Alameda County, these two facilities may also serve as the destination of solid waste generated by the Project (Fong, 2010). The Vasco Road Landfill is estimated to have sufficient capacity through 2019 and Altamont through 2029 (CalRecycle, 2010). These facilities, separately or in combination, provide comprehensive materials recovery operations and efficient waste transfer operations for the Project area. Waste Management Inc. provides garbage disposal services at the Tres Vaqueros site (Pattern Energy, 2010).

Energy Service

Pacific Gas & Electric Company (PG&E) provides electricity and natural gas service to the Project area. The existing facility transmits energy from the site to the regional power grid through a power purchase agreement with PG&E via the existing Tres Vaqueros Substation.

4.18.2.2 Regulatory Setting

State of California

California Integrated Waste Management Act (AB 939)

The Integrated Waste Management Act of 1989, known as AB 939, created the Integrated Waste Management Board, required local jurisdictions to submit detailed solid waste planning documents for Board approval, and set diversion requirements of 25 percent in 1995 and 50 percent in 2000, among other actions. In priority order, local agencies were to implement source reduction, recycling and composting, and environmentally safe transformation and land disposal activities. By year 2000, the waste diversion rate in unincorporated portions of Contra Costa County was at 46 percent—below the mandated 50 percent reduction (CalRecycle, 2010). Consequently, Contra Costa County adopted the Construction and Demolition Debris Recovery Ordinance described below.

Contra Costa County

General Plan

The Public Facilities and Services Element of the Contra Costa County General Plan contains goals, policies, and implementation measures that apply County-wide and could be applicable to the Project. These are summarized as follows:

- Water service-related goals and policies relate to the protection and enhancement of water resources, conservation, drinking water supply, and the allocation of costs necessitated by increases in water system capacity (e.g., Water Service Goals 7-F, 7-H, 7-I and 7-J; and Water Service Policies 7-21, 7-23, and 7-25).

- Wastewater goals and policies relate to the adequacy of service to meet current and projected demands and the allocation of costs of increased sewer system capacity that are necessitated by new development (e.g., Sewer Service Goals 7-K and 7-N; and Sewer System Policy 7-33).

- Stormwater goals, policies, and implementation measures relate to the retention of natural watercourse characteristics, the allocation of costs associated with drainage improvements necessitated by existing and new development, erosion control, floodplain management, culverts, and on-site water control (e.g., Drainage and Flood Control Goal 7-S, 7-T and 7-U; Drainage and Flood Control Policies 7-38, 7-39, 7-40, 7-45, and 7-55; and Drainage and Flood Control Implementation Measure 7-ac).

- Solid waste goals, policies, and implementation measures relate to the adequacy of disposal capacity and waste reduction through recycling, diversion and other methods, (e.g., Solid Waste Management Goals 7-AF, 7-AG, and 7-AH; and Solid Waste Management Policies 7-88, 7-90, 7-91, and 7-92).

(Contra Costa County, 2010)

Construction and Demolition Debris Recovery Ordinance

Chapter 418-14 of the County Code requires owners of construction or demolition projects that are 5,000 square feet in size or greater to demonstrate that at least 50 percent of construction and demolition debris generated on a jobsite is reused, recycled or otherwise diverted (unless a diversion adjustment is granted). Submittal of a Debris Recovery Plan would be required before the issuance of a building or demolition permit and, thereafter, contractors hauling waste to County transfer stations or landfills typically would be required to demonstrate reuse, recycling and diversion of construction debris prior to loads being accepted at those facilities.

Countywide Integrated Waste Management Plan

As required by the California Integrated Waste Management Act, Contra Costa County adopted a Countywide Integrated Waste Management Plan and Source Reduction and Recycling Element (SRRE). The SRRE is composed of five volumes including the Source Reduction and Recycling Element, the Household Hazardous Waste Element, and the Nondisposal Facility Element that are specific to the unincorporated regions of Contra Costa County, and two volumes that describe the objectives, goals, and policies of the Countywide plan and types of programs to support them. Every year, Contra Costa County must submit a progress report to California Department of Resources Recycling and Recovery (CalRecycle) detailing the SRRE's effectiveness for solid waste reduction and diversion. The most recent CalRecycle-approved diversion rate (2006) for unincorporated Contra Costa County was 54 percent (CalRecycle, 2010).

Contra Costa Clean Water Program

The Contra Costa Clean Water Program (CCCWP) is a consortium of the Contra Costa County, its 19 incorporated cities, and the Contra Costa County Flood Control and Water Conservation District. Endeavoring to eliminate stormwater pollution, the consortium has the authority to regulate and oversee stormwater plans and permits for projects within Contra Costa County pursuant to a National Pollutant Discharge Elimination System (NPDES) permit (CCCWP, 2010).

4.18.3 Project Baseline

The environmental setting constitutes the baseline for purposes of analyzing potential impacts on utilities. The Project area is not connected to a water, wastewater or public sewer system. Water is currently available on-site only at the existing O&M building through a groundwater well. The O&M building also contains one functioning restroom facility that discharges to a sewer/septic system. Stormwater management occurs via natural drainage swales, ditches and watercourses. Solid waste is collected on-site and trucked off the Project area on a regular basis by a Waste Management Inc. Solid waste is disposed of at landfills in Contra Costa and Alameda counties. There are existing drainages within the Project area as discussed in more detail in Section *4.10, Hydrology and Water Quality* section.

4.18.4 Significance Criteria

Based on CEQA Guidelines Appendix G, a project would cause adverse impacts to utilities and service systems if it would:

a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board;

b) 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;

c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects;

d) Not have sufficient water supplies available to serve the project from existing entitlements and resources, or if new or expanded entitlements are needed;

e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to the provider's existing commitments;

f) Be served by a landfill without sufficient permitted capacity to accommodate the project's waste disposal needs; or

g) Not comply with federal, State and local statutes and regulations related to solid waste.

4.18.5 Discussion of No Utilities and Service Systems Impacts

Review and comparison of baseline conditions and Project characteristics in the context of the significance criteria stated above demonstrates that no utilities and service systems impacts would result for criteria a), b), d), e) or g).

a) The Project would not exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board.

The Project would not exceed wastewater treatment requirements because the Project would not be connected to a public sewer system. During construction a local sanitation company would provide and maintain sanitation facilities to be located at each of the crane assembly areas, the concrete batch plant, the substation, and the trailer pad area. The waste would be removed from site and processes to meet Regional Water Quality Control Board (RWQCB) requirements. To support the existing wind energy facility, there is one restroom facility in the O&M Building linked to a septic tank and leachfield. Under the Project, the existing restroom would be replaced with a new restroom also linked to a septic tank and leachfield at the new O&M Building. Accordingly, there would be no impact with regard to criterion a).

b) The Project would not 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.

The Project would not require or result in the construction of new water or wastewater treatment facilities or the expansion of existing facilities because the Project would not be connected to either type of system. Water for use during construction would be acquired from Byron Bethany Irrigation District and trucked in (the demand for construction-related water would be temporary). Drinking water would be bottled. The O&M Building would be served by a groundwater well for non-potable water and the restroom would be linked to a septic tank and leachfield. A local sanitation company would provide and maintain appropriate construction sanitation facilities. The sanitation facilities would be located at each of the crane assembly areas, the substation, and the trailer pad area. If necessary, additional facilities would be placed at specific construction locations. Therefore, there would be no impact with regard to criterion b).

d) The Project would have sufficient water supplies available to serve the project from existing entitlements and resources, and new or expanded entitlements would not be needed.

The Project area does not have water service. Water used during the temporary construction and decommissioning phases would be provided by Byron Bethany Irrigation District. The District has indicated that the approximately 8 million gallons needed for construction would be available from its sources (Pattern Energy, 2011). There is one groundwater well that serves the existing windfarm and would serve the non-potable water needs of the four anticipated permanent employees during operation of the Project. All drinking water would be bottled. Existing water supplies are sufficient and new or expanded water service entitlements are not required (Docs

Water, Inc., 2010; Pattern Energy, 2011). Therefore, there would be no impact with regard to criterion d).

e) The Project would not result in a determination by the wastewater treatment provider which serves or may serve the Project that it does not have adequate capacity to serve the Project's projected demand in addition to the provider's existing commitments.

The Project area is not served by a wastewater treatment provider. For the Project's temporary construction and decommissioning phases, portable toilets would be installed on-site. The wastewater contained in the toilets would be disposed of off-site at an appropriate facility with adequate capacity. Wastewater generated by the existing windfarm's permanent employees is handled by a septic system at the O&M Building and the four anticipated permanent employees of the Project would use the same system. Because the Project is not connected to an off-site wastewater system, it would not require installation of additional wastewater treatment capacity or affect a wastewater treatment provider's ability to serve its existing commitments. There would be no impact with regard to criterion e).

g. The Project would comply with federal, State, and local statutes and regulations related to solid waste.

The Project would dispose of unsalvageable materials at authorized sites in accordance with all applicable federal, state, and local statutes and regulations (see also the discussion under criterion f), below). Contractors hauling waste to Contra Costa County transfer stations or landfills would be required to comply with Contra Costa County Ordinance 2004-16 regarding construction and demolition debris. The Project would have no impact regarding compliance with solid waste regulations.

4.18.6 Discussion of Impacts and Mitigation Measures

c. Would the Project require or result in the construction of new storm water drainage facilities, the construction of which could cause significant environmental effects?

Impact 4.18-1: The Project would require or result in the construction of new storm water drainage facilities, the construction of which could cause significant environmental effects. (*Less-than-Significant Impact*)

During decommissioning, the Project would remove all above-ground portions of the turbines. The foundations to be removed are approximately the same diameter as the existing towers (i.e., approximately 13.05 feet each). Consequently, decommissioning of the existing turbines would convert approximately 12,166 square feet (or 0.28 acres) of existing impervious surface area to pervious surface area.

New impervious surfaces would be constructed at the concrete tower foundations at the bases of the new turbines, and at the expanded portion of the Tres Vaqueros Substation. The above-ground portions of the tower foundations are approximately the same diameter as the tower poles. The

diameter of the tower, and thus the concrete stem onto which it will be attached, is approximately 12.8 feet. The Project would construct up to 21 turbines, which represents an area of approximately 2,701 square feet (or less than 0.1 acres) of impervious surface. Stormwater falling on the tower poles would run off onto adjacent turbine pads which would be gravel (i.e. not impervious), and would be absorbed or directed to natural drainage swales, ditches and watercourses. New impervious surface would also be constructed at the expanded portion of the substation. Although the substation would not be paved, new impervious surface would occur under the proposed electrical system upgrades, including the circuit breakers, generation step-up transformer, bus work, capacitors, and a 250 square foot control house.

When the repowering Project is decommissioned, structures would be removed to a depth of at least three feet below grade, and the impervious area associated with the new turbines, turbine foundations and substation would be restored to pervious area.

New impervious surfaces on-site would be limited to the very small areas associated with the exposed portion of the wind turbine foundation, wind turbine towers, transformers, and individual pieces of equipment within the expanded substation. The Project would also include installation of new roadways. These roadways would be composed of gravel and as such, are not considered impervious surfaces. Furthermore, the new O&M Building would replace an existing building within the same footprint, and consequently would not represent an increase in impervious surface above baseline conditions.

In sum, the new impervious surface at the substation and at each of the turbines would be comparatively small, would be distributed throughout the approximately 2,608-acre Project area, and would be removed upon Project decommissioning. Further, during the operations and maintenance period when the impervious surface would be in place, the existing natural drainage swales, ditches, and watercourses would manage stormwater drainage, and drainage components, such as culverts, may be installed. Therefore, impacts would be less than significant.

Mitigation: None required.

---

f) Would the Project be served by a landfill without sufficient permitted capacity to accommodate the Project's waste disposal needs?

Impact 4.18-2: Project construction would temporarily increase the flow of solid waste to area landfills. (*Less-than-Significant Impact*)

The Project would increase solid waste generation during the approximate 12-month decommissioning and construction periods. All existing turbines and related infrastructure would be removed. As discussed in Chapter 3, *Project Description*, clearing and disposing of trash, debris, and scrub on those portions of the site where construction would occur would be performed at the end of each work day through all stages of construction. Solid waste would be separated on-site by construction crews into salvageable, recyclable, and non-reusable items.

Waste materials would be removed from the area and recycled or disposed of at approved facilities. All construction-related waste would be properly handled in accordance with State and federal regulations and permit requirements. This waste may include trash and litter, garbage, other solid waste, petroleum products, and other potentially hazardous materials (such as, lubricants, solvents, paints, etc.). Upon Project completion, materials including old turbine pieces (e.g., housing components, broken turbine blades) and construction equipment would be removed from the Project area to the Laydown Area or offsite within 90 days. Under the Construction and Demolition Debris Recovery Ordinance, the Project would be required to prepare and submit a Debris Recovery Plan before the issuance of a building or demolition permit. Contractors hauling waste to disposal sites would be required to demonstrate reuse, recycling, and diversion of construction debris in accordance with Contra Costa County Ordinance 2004-16 prior to loads being accepted at those facilities.

During operations, the Project would generate an insignificant amount of solid waste because there would only be four employees and any industrial waste generated during maintenance would be minimal. As was done when the existing wind farm was operational, solid waste would be collected and hauled to either Keller Canyon Landfill located near Pittsburg or the Contra Costa Transfer and Recovery Station, which is a materials recovery facility/transfer station located near Martinez, which serve the Project area. Either of these facilities would be able to accommodate the small amount of solid waste that the Project operations would generate. Due to the proximity of the Project to the Vasco Road and Altamont Landfills in Alameda County, these two facilities may also serve as the destination of solid waste generated by the Project.

Accordingly, the Project would have a less-than-significant impact on solid waste generation that would be limited to the construction phase.

Mitigation: None required.

CHAPTER 5
Other CEQA Considerations

CEQA requires an EIR to consider the significant environmental effects of a proposed project (CEQA Guidelines §15126.2). Direct and indirect, short- and long-term effects of the Project are analyzed in Chapter 4, *Environmental Setting, Impacts, and Mitigation Measures* of this document. Chapter 4 concludes that the Project would have no impact relating to Agriculture and Forestry Resources, Mineral Resources, Population and Housing, Public Services, and Recreation. There would be some degree of impact in all other resource areas. This chapter considers significant and unavoidable impacts in Section 5.1, significant irreversible environmental effects in Section 5.2, growth-inducing impacts in Section 5.3, cumulative impacts in Section 5.4, and effects found not to be significant in Section 5.5.

5.1 Significant Unavoidable Impacts

Section 21100(b)(2)(A) of CEQA requires an EIR to identify significant environmental effects that cannot be avoided if a project is implemented. Most of the impacts of the Project either would be less than significant or would be mitigated to a less-than-significant level. The impacts below are those that would remain significant and unavoidable after mitigation.

- **Aesthetics:** During operation, Project turbines would have a significant and unavoidable direct impact on views (Section 4.1.6, Impact 4.1-2) from the Los Vaqueros Watershed, specifically from the Vista Grande Trail, the Los Vaqueros Trail, the Los Vaqueros Watershed marina, and the Los Vaqueros Watershed Office, and the Los Vaqueros Interpretive Center. Despite being fewer in number than the existing turbines number (up to 21 new turbines compared with 91 turbines at the existing wind energy facility), the proposed turbines would be significantly taller than the existing turbines.

- **Air Quality:** Construction of the Project would result in a short-term direct impact on air quality related to the emission of the nitrogen oxides (NOx, a criteria pollutant) that would contribute to existing air quality violations (Section 4.3.6, Impact 4.3-2).

- **Biological Resources:** Operation of the Project would result in impacts to avian (Section 4.4.6, Impact 4.4-1) and bat (Section 4.4.6, Impact 4.4-3) species. Although repowering with micro-sited, newer generation turbines would result in a reduction in the estimated total number of avian fatalities and the overall mortality rate per MW of capacity for all species groups and for all individual species, avian and bat deaths are still expected to occur at the Project area. Despite expected reductions in mortality, a significant and unavoidable finding has been made based on uncertainties in the number of reductions in mortality.

The Project is being proposed notwithstanding these effects because the site is an ideal location for generating electrical power from wind because of the strong predictable wind resource at the site. In addition to the site's attributes for wind energy generation, the Project would repower an existing site currently zoned and used for wind energy production (and not develop a new facility on undeveloped land). Repowering at the Project site would replace existing aging infrastructure with newer, more efficient turbines that are expected to reduce impacts to avian species; contribute positively to achieving Statewide renewable energy and GHG emissions-reduction goals and objectives; and achieve a net increase in the quality and acreage of habitat.

5.2 Significant Irreversible Environmental Effects

Section 21100(b)(2)(B) of CEQA requires that an EIR identify any significant effect on the environment that would be irreversible if the project were implemented. Section 15126.2(c) of the CEQA Guidelines describes irreversible environmental changes as follows:

> Uses of nonrenewable resources during the initial and continued phases of the project may be irreversible since a large commitment of such resources makes removal or nonuse thereafter unlikely. Primary impacts and, particularly, secondary impacts (such as highway improvement which provides access to a previously inaccessible area) generally commit future generations to similar uses. Also irreversible damage can result from environmental accidents associated with the project.

Construction of the Project would use some non-renewable resources, such as fuel for construction vehicles and equipment. However, such use would be limited to the approximate 12-month initial decommissioning and construction period and the end-of-life decommissioning period, which is expected to be four to five months. Operation and maintenance of the Project would not increase such use relative to existing conditions. The temporary, construction-related increase would not result in significant use of non-renewable resources and would not commit future generations to similar uses. Moreover, the Project's primary objective is to provide an economically viable source of clean, renewable electricity generation that meets California's growing demand for power and fulfills numerous state and national renewable energy policies. The Project would produce approximately 38 percent more wind-generated energy than the existing facility. To the extent that this additional renewable source could offset the demand for fossil fuel-generated electricity for the next approximately 30 years, the Project would reduce the use of non-renewable resources and their associated impacts. Consequently, the temporary and limited increase in consumption of non-renewable resources that would be caused by the Project relative to existing conditions is justified.

Accidents, such as the release of hazardous materials, could trigger irreversible environmental damage. During initial decommissioning and construction, the Project would result in a temporary increase in the use, handling, and storage of hazardous materials over existing levels (see Section 4.9, *Hazards and Hazardous Materials*, for a discussion of hazardous materials that could be handled on-site). Environmental damage from an accidental release of the limited quantities of hazardous materials that could be present on the Project and affect the surrounding environment is unlikely to be irreversible, given the types of hazardous materials used on-site, the

small amounts involved, and existing emergency response plans and procedures. State and federal regulations and safety requirements, as described in the regulatory setting in Section 4.9, would ensure that public health and safety risks are maintained at acceptable levels, so that significant irreversible changes from accidental releases are not expected.

5.3 Growth-Inducing Impacts

Section 15126.2(d) of the CEQA Guidelines states that an EIR must discuss "the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment." Growth can be induced in a number of ways, including directly through implementation of projects that create new housing and employment opportunities, and indirectly through elimination of obstacles to growth and stimulation of economic activity within a region. CEQA requires a discussion of how a project could increase population, employment, or housing in the areas surrounding the project as well as an analysis of the infrastructure and planning changes that would be necessary to implement the project.

Section 4.14, *Population and Housing*, analyzes the Project's overall effect on population and housing, including growth-inducing considerations. The Project would result in the presence over a 12-month period of approximately 30 to 40 workers per day. The temporary addition of a construction workforce is not considered a significant impact because it is anticipated that all temporary positions would be filled from the local labor pool available in Contra Costa and Alameda counties, the greater Bay Area, and the Central Valley. Workers would be expected to commute to the Project rather than move. The Applicant estimates that four permanent employees would be needed to operate and maintain the Project. The Project would not increase employees above the Applicant's existing workforce[1], so operation and maintenance of the Project would not be growth-inducing. Because the ultimate decommissioning phase of the Project would also create temporary jobs that would be filled from the local labor pool, it too would not be growth-inducing.

The Project involves construction of new service roads and electrical infrastructure. The service roads would provide access to various facilities within the Project area, including the turbines and existing Tres Vaqueros substation. The new electrical infrastructure would transfer power generated by the turbine generators to the state's electrical grid. The roads and electrical infrastructure would be privately-owned and would neither extend off-site nor provide convenient connection points for potential off-site development. Therefore, their construction would not encourage new development or induce population growth. Furthermore, the zoning for the Project vicinity is agriculture (see Section 4.11, *Land Use and Planning*). In sum, the Project would not directly or indirectly induce short-term or long-term population growth.

The Project involves generation of additional electricity for distribution to the electrical grid. This increased generation is necessary to meet California's projected future demand for electricity as well as the State-wide requirement of achieving a 33 percent renewable energy share by 2020. As

[1] The current workforce is four permanent employees and two part time employees.

the Project would occur in response to future demand and State requirements, it is not considered to be growth-inducing.

5.4 Cumulative Impacts

Section 21083(b)(2) of CEQA states that a significant effect on the environment includes the possible effects of a project "that are individually limited but cumulatively considerable." As defined by CEQA, "'cumulatively considerable' means that the incremental effects of an individual project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects." (*Id.*) Stated another way, "a cumulative impact is created as a result of a combination of the project evaluated in the EIR together with other projects causing related impacts" (CEQA Guidelines § 15130(a)(1)). The CEQA Guidelines require that:

- Cumulative impacts shall be discussed when they may be significant;
- The discussion may be more general than that for the individual project impacts, but that the discussion should reflect the potential extent, severity, and probability of the impact;
- The cumulative impact analysis may be based on either a list of past, present, and probable future projects or a summary of projections from an adopted General Plan or other adopted planning document; and
- Reasonable options for mitigating or avoiding the project's contribution to significant cumulative impacts shall be discussed, noting that for some cumulative impacts the only feasible mitigation may involve the adoption of ordinances or regulations rather than the imposition of conditions on a project-by-project basis.

This EIR uses a combination of a plan-based approach and a list-based approach to determine whether significant cumulative impacts would occur. For a plan-based approach, the EIR analysis considers the Contra Costa County General Plan and other applicable planning documents identified in Section 5.4.1. For the list-based approach, Project impacts were analyzed in combination with the impacts of the other wind energy facilities and repowering projects identified in Section 5.4.2.1 and with the impacts of the past, present and reasonably foreseeable projects identified in Section 5.4.2.2. In reaching a conclusion for each resource area (i.e., the topics analyzed in Sections 4.1 through 4.18 of Chapter 4, *Environmental Setting, Impacts, and Mitigation Measures*), five considerations were made: (i) the geographic scope of the cumulative impact area for that resource, (ii) the timeframe within which Project-specific impacts could interact with the impacts of other projects, (iii) whether a significant adverse cumulative condition presently exists to which Project impacts could contribute, (iv) the significance of the incremental Project-specific contribution to cumulative conditions, and (v) whether any cumulative impact is significant. For the purposes of this EIR, significant cumulative impacts would occur if impacts related to the implementation of the Project, added to the environmental impacts of other past, present and reasonably foreseeable future projects, resulting in an adverse significant effect. For an impact to be considered cumulative, these incremental impacts and

potential incremental impacts must be related to the types of impacts caused by the Project (i.e., the types of impacts caused by repowering existing wind energy facilities and evaluated in Chapter 4, *Environmental Setting, Impacts, and Mitigation Measures*). The analysis of cumulative impacts for each resource area analyzed in Sections 4.1 through 4.18 of this document is set forth in Section 5.4.3.

5.4.1 General and Regional Plans Considered in the Cumulative Analysis

The following adopted plans are those considered in combination with the Project for assessing cumulative impacts. In most cases these plans have been prepared by local agencies to meet the requirements of State law (certain plans, such as the habitat conservation/natural community conservation plans, have been prepared voluntarily), and comprise the preparing agencies' comprehensive, long-term visions for physical development or resources conservation within the region. For example, the Contra Costa County General Plan, adopted in 2005 and updated in 2010, includes specific goals and policies to preserve and enhance existing development within the County and to provide for orderly and appropriate new development until 2020.

- Contra Costa County General Plan
- Contra Costa County Airport Land Use Compatibility Plan
- Contra Costa Clean Water Program
- Contra Costa County Integrated Waste Management Plan
- East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan
- Alameda County East County Area Plan
- Altamont Pass Wind Resource Area Natural Community Conservation Plan/Habitat Conservation Plan
- East Bay Regional Park District 1997 Master Plan and 2007 Master Plan Map
- State of California Integrated Energy Policy
- Regional Planning Documents from Association of Bay Area Governments, Bay Area Air Quality Management District, Metropolitan Transportation Commission, and the Central Valley Regional Water Quality Control Board

5.4.2 Specific Projects Considered in the Cumulative Analysis

The following projects are those considered in combination with the Project for assessing cumulative impacts. Incremental impacts of the Project have the potential to interact with the continuing impacts of past projects, the impacts of other current projects, and the anticipated impacts of reasonably foreseeable future projects. These projects include other existing wind energy facilities and proposed wind repowering projects in the Altamont Pass Wind Resource Area (APWRA), and other non-wind energy projects that have potentially overlapping impacts with those of the Project.

5.4.2.1 Other Windfarm Repowering Projects in the Altamont Pass Wind Resource Area

Contra Costa County

Contra Costa County recently approved a Land Use Permit application for the Vasco Winds Repowering Project. This project is located immediately south-southwest of the Project area and also is accessible via Vasco Road. The Vasco Winds Repowering Project will repower the existing Altamont Power facility by replacing 438 existing turbines and civil/electrical infrastructure with up to 34 new turbines. The approved turbines are the Siemens 2.3-101 models, which have a total tower height of 80 meters (262 feet) and a rotor diameter of 101 meters (331 feet). The Draft EIR for the Vasco Winds Repowering Project was published in December 2010 and the Final EIR was certified in April 2011.

One previously-approved repowered wind farm exists in the Contra Costa County portion of the APWRA. The Buena Vista Wind Energy Project was completed in 2006 and removed obsolete turbines, restored former turbine sites and unused access roads to their natural condition, replaced overhead power collection lines with underground lines, and installed 38 Mitsubishi 1000A 1.0 MW turbines. The Mitsubishi turbines have tower heights of 55 meters (181.5 feet) and 60 meters (198 feet), and rotor diameters of 62 meters (201.5 feet).

Alameda County

Seven companies currently are operating turbines in the Alameda County portion of the APWRA. Existing permits authorize wind energy projects that range in size from four turbines with an installed capacity of 1 MW to 697 turbines with an installed capacity of 70 MW (Alameda County, 2010). The Alameda County Community Development Agency intends to prepare a Program Environmental Impact Report (PEIR) to assess the impacts of repowering the existing wind energy facilities subject to existing Alameda County conditional use permits (Alameda County, 2010a).

Two permittees have proposed individual repowering projects for consideration in the PEIR – the Summit Wind Project and the NextEra Wind Repowering Project. In the Summit project area, there are about 1,394 existing turbines of varying types on lattice and tubular towers 60 feet to 140 feet in height that would be replaced with modern turbines, though the specifications of the new turbines are not yet known. NextEra Energy Resources, LLC[2], would repower existing turbines on about 8,950 acres that are in the vicinity of the Project area. NextEra would install up to 59 new turbines, each of which would be approximately 429 feet in height. Construction of both projects would be phased, with a typical duration of 8 to 12 months. The Summit project is expected to begin interim construction periods as early as the fall of 2012, and continue periodically into 2018. The NextEra project's start date is not yet known, but all phases of construction are expected to be complete no later than 2015.

[2] The applicant for the Vasco Winds Repowering Project (Vasco Winds, LLC) is a wholly owned indirect subsidiary of NextEra Energy Resources.

The Diablo Winds Energy Project, which repowered on existing wind farm in the central portion of the APWRA, was completed in February 2005. As repowered, it consists of 31 Vestas V47 turbines (AWEA, 2010). Of these, 24 are on 50 meter towers and seven are on 55 meter towers; the maximum height to the rotor tip is 73.5 meters (241 feet) for the taller towers and 78.5 meters (258 feet) for the shorter towers (WEST, 2006).

5.4.2.2 Other Projects in the Project Area

Other development projects, the impacts of which could interact with those of the Project, are listed in Table 5-1. The location of these projects is shown in Figure 5-1. The list of projects considered in this cumulative analysis is a summary of existing and potential projects that spans a broad geographical area. Upon further consideration, most of the other projects were determined not to contribute to potential cumulative effects. This was based on the lack of potential to interact with the incremental effects of the Project, either as a result of the lack of potential for the impacts to combine in time and space, or because the other projects were speculative relative to funding and permitting feasibility. The list of projects in Table 5-1 is provided to demonstrate extended and extensive consideration of the area in which cumulative impacts could occur. The categories of other in Table 5-1 are:

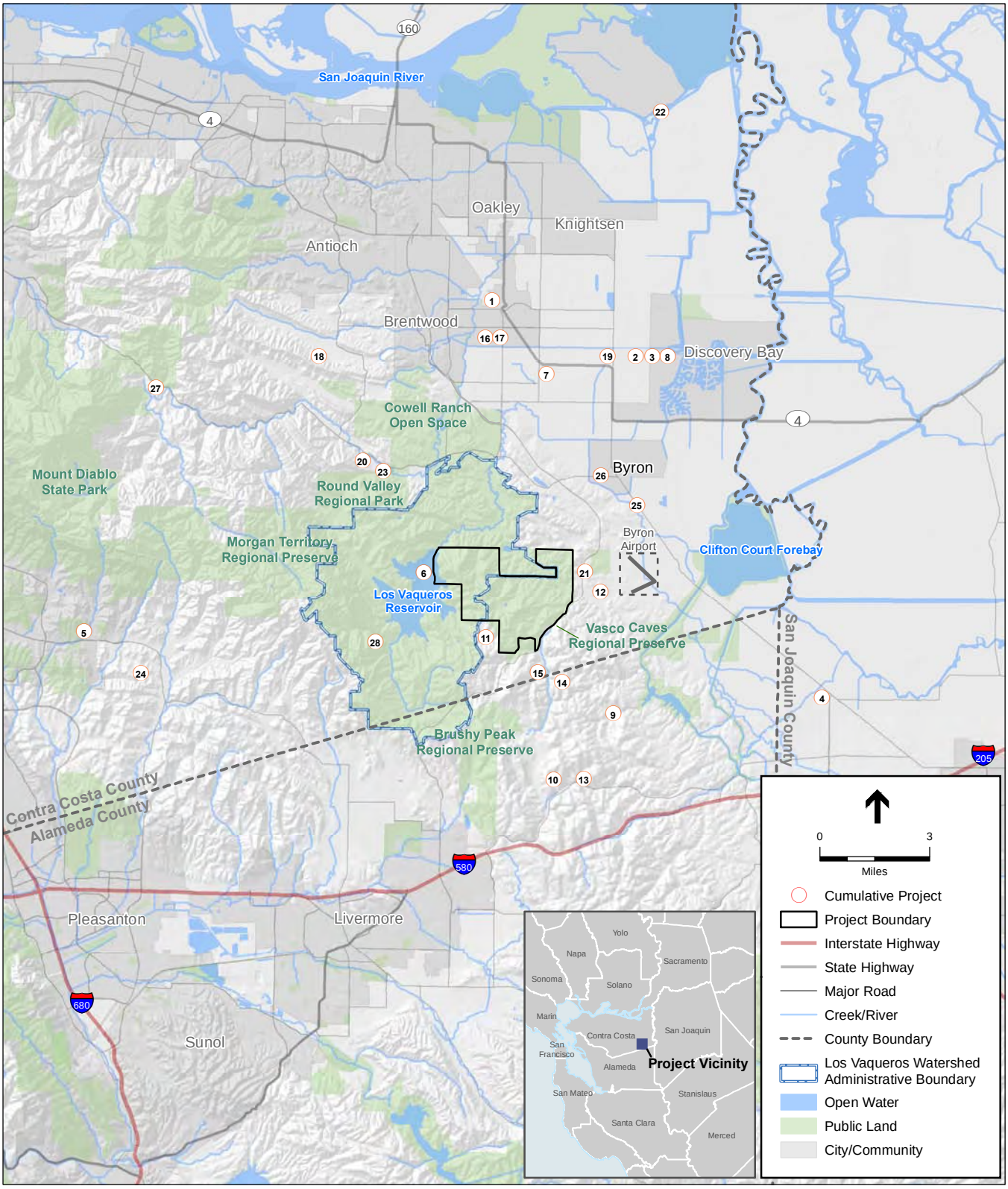
- Residential/Commercial Development
- Public Roadway
- Public Infrastructure
- Recreational Trails

5.4.3 Discussion of Potential Cumulative Impacts

5.4.3.1 Aesthetics

Impact 5-1: The Project would make a cumulatively considerable contribution to adverse effects on scenic vistas in the Project area.

The geographic scope considered for potential cumulative impacts to visual/aesthetic resources is the viewshed of the public and recreational users common to the vicinity of the Project. Within the viewshed of the Project, the Vasco Winds Repowering Project, in combination with the Project, could contribute to cumulative impacts to the visual/aesthetic resources. Specifically, repowering of the Vasco Windfarm on land adjacent to the south of the Project area would increase the total area covered by larger modernized wind turbine facilities on the eastern and southern sides of the Los Vaqueros Reservoir. Although fewer turbines would be installed at both the Tres Vaqueros (up to 21 new turbines compared with 91 turbines at the existing wind energy facility) and the Vasco Winds projects, the proposed turbines would be significantly taller than the existing turbines. While clutter within both project areas would be reduced, the new turbines would be far more prominent within the landscape due to their height.



SOURCE: EBRPD, 2010; ESRI, 2009; APWRA, 2010;
City of Brentwood, 2010; Contra Costa County, 2010;
CCWD,2010; EBRPD, 2007; Zone 7, 2008/2009; and ESA, 2010

Tres Vaqueros Windfarm Repowering Project . 209132.02

Figure 5-1

Cumulative Projects in the
Tres Vaqueros Project Vicinity

TABLE 5-1
CUMULATIVE PROJECTS SCENARIO

Map Key	Project Name	Location	Description	Status/Schedule	Distance From Project
1	Brentwood – various development projects	City of Brentwood	4,532 residential units and 1,203,757 square feet of commercial development.	Some units are under construction with project approval up until 2018.	7 miles north
2	Bixler Road Business Park	Community of Discovery Bay	The community of Discovery Bay is planning to change the land use designation from Office (OF) to Business Park (BP) to establish a 62,500 sq. ft. business park.	Applications are under review.	6 miles north
3	Pantages at Discovery Bay	Community of Discovery Bay	Change the General Plan land use designation from Agricultural Lands (AL) to Single Family Residential-High Density (SH) to allow for a 292-unit water-oriented residential project. Approximately 172 acres in size.	Preparation of draft EIR underway. Project has not been approved and construction schedule is unknown.	6 miles north
4	Mountain House Specific Plan I, II, and III	Western San Joaquin County	Future phases of multi-year build out of new community on 4,784 acres including 2,500 acres for residential, 700 acres commercial, and 750 acres open space and parks. Total ultimate population projected to be 44,000. First phase consisting of 14 neighborhoods has been completed.	2004 – 2024/2044.	7 miles southeast
5	New Farm	Tassajara Valley (Unincorporated Contra Costa County)	Proposal for development of 185 new residential units on 771 acres located along Camino Tassajara. The project would develop a mix of rural uses, including agricultural uses, reserve portions of open space and protected wetlands, and provide public facilities such as community gardens, community center, staging area for related trails, cemetery, farm stand, an agricultural learning annex, religious worship facility, fire training facility, and site improvements at the westerly edge of the northern site.	Application submitted; first stages of planning process; no permits have been issued and anticipated construction dates have not been set.	Approximately 8.5 miles west
6	Los Vaqueros Reservoir Expansion	Southeastern Contra Costa County	Contra Costa Water District (CCWD) proposes to expand the Los Vaqueros Reservoir to 160,000 acre feet.	Final EIR certified in 2010; construction planned to begin Spring 2011. Final reservoir filling by 2014.	Borders the western side of the Project area.
7	City of Brentwood Solid Waste Transfer Station Expansion	City of Brentwood	Expand the existing Brentwood solid waste transfer facility into an adjacent area, install a transfer facility building, and related improvements including vehicle weigh scales, a scale house, and on-site roadways. The facility is estimated to be 4.8 acres in size.	Approved in February 2009. Currently in the design phase.	5.5 miles north
8	Cell Tower	Community of Discovery Bay	135-foot cell tower on the southern edge of CCWD's Old River Pump Station.	Currently in the preliminary phase; land use permit process underway; construction could occur by late 2010.	7 miles northeast
9	Department of Water Resources (DWR) South Bay Aqueduct (SBA) Enlargement	Northeastern Alameda County	DWR is currently enlarging the capacity of the SBA canal system from Bethany Reservoir west of and through Alameda County.	Currently under construction; estimated to be complete by late 2011.	3 miles southeast

TABLE 5-1 (Continued)
CUMULATIVE PROJECTS SCENARIO

Map Key	Project Name	Location	Description	Status/Schedule	Distance From Project
10	Altamont Pipeline Project	Northeastern Alameda County	An 11-mile buried potable water pipeline that would convey water to portions of Alameda County by connecting the future Altamont Water Treatment Plant to Zone 7 Water Agency's existing Cross Valley Pipeline.	Construction of a 5-mile segment of pipeline within the City of Livermore, from Kitty Hawk Road to the vicinity of Vasco Road, was completed in October 2009. Zone 7 is currently evaluating the timing of treatment plant itself and the remaining 6-mile stretch of pipeline through unincorporated Alameda County west to Livermore.	4 miles south
11	Vasco Winds Repowering Project	Eastern Contra Costa County	Vasco Winds, LLC proposes to repower the Vasco Winds Windfarm (located just southeast of the Los Vaqueros Reservoir) by replacing all 438 existing turbines and civil/electrical infrastructure with up to 34 new wind turbines.	Approved, demolition and construction to occur in 2011.	Adjacent to the southern portion of the Project area.
12	Buena Vista Wind Energy Project	Southeastern Contra Costa County	Buena Vista Wind Energy, LLC removed and replaced existing wind turbines and restored former turbine sites and maintenance roads.	New turbines are operating.	1 mile east
13	Diablo Winds Repowering Project	Alameda County	Diablo Winds constructed 31 turbines in the central portion of the Altamont Pass Wind Resource Area.	Construction completed in February 2005.	4 miles south
14	Various wind energy repowering projects	Alameda County	An "Avian Wildlife Protection Program & Schedule" prepared pursuant to a settlement agreement that resolved a lawsuit concerning Alameda County windfarms establishes deadlines for when certain existing turbines permitted in accordance with 31 individual permits must be shut down in advance of repowering.	Years 4-18 of the schedule include shut-down and related deadlines. According to this schedule, Alameda County is nearing the end of Year 5.	The Alameda County border is approximately 1 mile south of the Project boundary. Further, the affected Alameda County windfarm projects and the Project all would be located within the APWRA.
15	Altamont Pass Wind Resource Area Conservation Plan	Contra Costa and Alameda Counties	Alameda County is the local sponsor of the APWRA Conservation Plan. The purpose of this conservation plan is to minimize impacts to birds caused by wind turbine operations and to conserve birds and other terrestrial species while allowing wind energy development and operations in the APWRA. The plan is a joint Natural Community Conservation Plan and Habitat Conservation Plan and will outline how energy projects within the APWRA can occur while reducing impacts to specific species and their habitats.	Under development.	The APWRA Conservation Plan covers both the Project area (including the Project) and other land within the APWRA.
16	John Muir Parkway Project	City of Brentwood	The City of Brentwood plans to construct 2,000 feet of road from Ventura Drive to the Foothill Drive extension to provide north-south traffic circulation and access to surrounding properties.	CEQA review was completed in 2007; to obtain federal funding, project is currently under NEPA review.	Approximately 6.5 miles north of the Project area.

TABLE 5-1 (Continued)
CUMULATIVE PROJECTS SCENARIO

Map Key	Project Name	Location	Description	Status/Schedule	Distance From Project
17	Balfour Road Widening	Eastern Contra Costa County	Contra Costa County plans to widen shoulders and roadway along both sides of Balfour Road from an 18 foot pavement width to an interim 36 foot pavement width between Sellers Avenue and Bixler Road.	Construction begins Summer 2013.	7 miles north
18	Deer Valley Road Shoulder Widening and Safety Improvements	Eastern Contra Costa County	Widen and realign road and shoulders for vehicular safety; increase curve radius and super elevation; improve sight distance by lowering the roadway and grading slopes on the inside of specific curves; re-establish drainage ditches and install new ditches; and install traffic striping.	Construction scheduled to begin Spring 2013.	8 miles northwest
19	State Route 4	Eastern and Southeastern Contra Costa County	Construct approximately 4 miles of new two-lane expressway between Balfour Road (in Brentwood) and Walnut Boulevard and widen approximately 4.5 miles of Marsh Creek Road between SR4 Bypass and SR4/Byron Highway. Install a left turn lane and intersection improvements at Byron Highway intersection.	Construction of some projects complete, while others are awaiting funding.	6 miles northeast
20	Marsh Creek Road Shoulder Widening	Eastern Contra Costa County	Widen roadway and shoulders, install guardrail, eliminate roadway obstacles, and install roadway signs and pavement markers.	Construction estimated to be complete by Summer 2011.	4 miles northwest
21	Vasco Road Safety Improvements – Phase 2	Contra Costa County	Contra Costa County plans to construct approximately one mile of concrete median barrier on Vasco Road with widening of approximately 6,900 feet of roadway, widening of one single span bridge; constructing drainage, stormwater and erosion control facilities; constructing wildlife crossing systems, directional fencing and kit fox and tiger salamander jumpouts, and retaining walls.	Construction estimated to start Spring 2011 (pending funding approval).	Adjacent to the eastern portion of the Project area (along Vasco Road beginning approximately 4 miles north of the Alameda/Contra Costa County line to approximately 5.5 miles north of the County line).
22	Bethel Island Road Bridge Replacement	Northeastern Contra Costa County	Replace Bethel Island Road Bridge with a new nine-span structure. Work includes construction of new roadways on embankments, storm drains, concrete curbs/sidewalk/ditches, rock slope protection, sewer installation, signage and striping.	Construction started June 2009; estimated to be complete by Summer 2011.	13 miles north.
23	Marsh Creek Road Safety Improvements	Eastern Contra Costa County	Widen paved shoulders and travel lanes along a segment of Marsh Creek Road, realigning horizontal and vertical curves to improve roadway safety, installing a temporary detour road to main two-way traffic and clear the existing roadway pavement for construction, relocating utility poles and fence, modifying drainage ditch and pavement striping.	Construction estimated to occur in 2012.	4 miles north
24	Camino Tassajara Shoulder Widening	Eastern Contra Costa County	Add 5-foot wide paved shoulders and 3 feet of shoulder backing and also realign a portion of Camino Tassajara to avoid impacting Tassajara Creek.	Construction Summer/Fall 2011.	8.5 miles west

TABLE 5-1 (Continued)
CUMULATIVE PROJECTS SCENARIO

Map Key	Project Name	Location	Description	Status/Schedule	Distance From Project
25	Byron Highway Shoulder Widening	Southeastern Contra Costa County	Install an asphalt concrete overlay on existing pavement surface; construct 6-foot wide paved shoulders and 2-foot shoulder backing along Byron Highway from Byron Hot Springs Road to 550 feet south of Rankin Road.	Construction estimated to occur in Summer 2011.	5 miles northeast
26	Vasco Road at Camino Diablo Intersection Improvements	Southeastern Contra Costa County	Add a right-turn pocket from northbound Vasco Road to Camino Diablo and from westbound Camino Diablo to Vasco Road. Construction would entail excavation into the hillsides, relocation of drainage ditches, relocation of utility poles, and right-of-way acquisition may be necessary for road widening. Traffic signal modification, installation and relocation of advance warning signals, and additional signage will also be necessary.	Construction estimated to begin 2011.	4 miles northeast
27	Marsh Creek Detention Facility Bridge Replacement	Contra Costa County	Contra Costa County plans to replace and widen an existing bridge, reconstruct roadway approaches and creek bank improvement.	Construction estimated to begin 2012.	9 miles northwest
28	Morgan Territory to Brushy Peak Trail	Southeastern Contra Costa County and Northeastern Alameda County	Construct 5.5-mile trail connecting Morgan Territory Regional Preserve to Brushy Peak Regional Preserve.	Trail should be complete in 2011-2012 timeframe.	2.5 miles west

SOURCES: APWRA, 2010;City of Brentwood, 2010; Contra Costa County, 2010; CCWD, 2010; EBRPD, 2007; Kohne, 2010; Oborne, 2010; Salam, 2010; Townsend, 2010; Young, 2010; Zone 7 Water Agency, 2009; Zone 7 Water Agency, 2008

As discussed under Impact 4.1-1, views from recreational areas including the Los Vaqueros Watershed (Vista Grande Trail, Los Vaqueros Shoreline Trail, marina, Los Vaqueros Watershed Office, and Los Vaqueros Interpretive Center) and the Upper Whipsnake Trail east of Morgan Territory Regional Preserve would be affected by the Project, primarily because of the increased area covered by turbines, and the fact that new turbines would be more visually prominent than existing turbines. Even with implementation of Mitigation Measure 4.1-2, impacts to all of these views would remain significant and unavoidable.

The Vasco Winds Repowering Project would install fewer, taller turbines than exist under current conditions immediately south of the Project, increasing the span of visibility of turbines along the eastern side of the reservoir (see Figures 5-2 and 5-3). The cumulative impact of expanding the presence of turbines to both the north and west of where turbines are currently visible would alter the character of several views, and the two wind energy facilities would demand viewer attention creating a strong visual contrast. Although the turbines from the Tres Vaqueros and Vasco Winds projects would not block scenic features from these vista points, the cumulative effect of substantially increasing the landscape in which turbines are visible would perceptibly increase the dominance of industrial features in the viewshed, even with implementation of Mitigation Measure 4.1-2. Overall visual change from watershed vista points including the marina and the Los Vaqueros Shoreline Trail, as well as the scenic vistas from the Whipsnake Loop Trail, would be moderate to moderate-high. In conjunction with the moderate-to-high visual sensiti7vity of these locations, the Project's contribution to cumulative impacts to visual/aesthetic resources would be considerable.

Visitors to Vasco Caves Regional Preserve and motorists on Vasco Road also would be exposed to changes from both the Project and the Vasco Winds project. However, impacts of the Project for Vasco Caves visitors would not be significant; Project turbines would be further from the vista points than the existing turbines, partially obstructed by intervening hills, and substantially reduced in number. Despite the increased height of the turbines, the Project would not cause an increase in visitors' perception of structure prominence or industrial character. The overall visual change would be moderate but positive, as the Project would represent an improvement from baseline conditions (see Section 4.1, *Aesthetics*, Figure 4.1-4). Therefore, the Project would not contribute to potential cumulative impacts to views from Vasco Caves Regional Preserve. For motorists on Vasco Road, the height of turbines visible from the road would increase under the Project (see Figures 4.1-5 and 4.1-6) and the Vasco Winds Repowering Project, but the amount of time that turbines would be visible would not increase above baseline conditions. The increased height of Project turbines would be offset by the fact that they would be farther from the road and more spread out, and as such, impacts would be adverse but not significant. The combined impacts of the Project and the Vasco Winds Repowering Project would not substantially increase view blockage of scenic resources along Vasco Road; however, the two projects would cumulatively increase the visual dominance of turbines in the viewshed. Given the high visual sensitivity of Vasco Road and the cumulatively moderate visual change, cumulative impacts to motorists' views would occur.

Cumulative impacts to daytime and nighttime views resulting from light and glare would be mitigated to less than significant for both the Project and the Vasco Winds Repowering Project. The effect of constructing both projects would not result in a cumulatively considerable impact because the combined impacts of the two projects would still not create a new source of light or glare of sufficient magnitude that day or nighttime views in the area would be substantially degraded.

> **Mitigation:** The combined impact of the Project and the Vasco Winds Repowering Project on aesthetics/visual resources would be significant and unavoidable. No additional mitigation is feasible.

Significance of Cumulative Impact: Significant and Unavoidable.

5.4.3.2 Agriculture and Forest Resources

Implementation of the Project would result in no incremental impact related to Agriculture and Forestry Resources, and so would not contribute to any cumulative impact to such resources.

5.4.3.3 Air Quality

Impact 5-2: Construction associated with the Project would result in short-term emissions of criteria pollutants that would be cumulatively considerable.

The geographic scope considered for potential cumulative impacts to Air Quality is the San Francisco Bay Area Air Basin, which is governed by the Bay Area Air Quality Management District (BAAQMD). Based on BAAQMD guidance, if a project would result in an increase in ROG, NO_x, PM10, or PM2.5 of more than its respective average daily mass thresholds, then it would also be considered to contribute considerably to a significant cumulative impact. In developing thresholds of significance for air pollutants, BAAQMD considered the emission levels for which a project's individual emissions would be cumulatively considerable. Therefore, if a project would exceed the identified significance thresholds, its emissions would be cumulatively considerable, and if a project would not exceed the significance thresholds, its emissions would not be cumulatively considerable.

Long-term operations of the Project would result in negligible emissions that would not exceed the BAAQMD significance thresholds. Therefore, long-term emissions that would be associated with the Project would not be cumulatively considerable.

Project-related construction activities, as described in the Impact 4.3-2 discussion, would result in short-term emissions of NO_x that would exceed the BAAQMD threshold. Therefore, short-term construction-related NO_x emissions would be cumulatively considerable and associated cumulative impacts would be significant when combined with other projects described in Section 5.4.2 that would be constructed concurrently. Mitigation Measures 4.3-2a and 4.3-2b would reduce emissions of criteria pollutants during construction activities, but the short-term impacts associated with NO_x emissions would remain significant and unavoidable, and would therefore be considered cumulatively considerable.

Existing view from Whipsnake Loop Trail / Morgan Territory (VP 18)

Cumulative visual simulation - proposed project and Vasco Winds Repowering Project

SOURCE: Environmental Vision

Tres Vaqueros Windfarm Repowering Project . 209132

Figure 5-2
Visual Simulation

Existing panoramic view from Los Vaqueros Marina (VP 11)

Cumulative visual simulation - proposed project and Vasco Winds Repowering Project

SOURCE: Environmental Vision

Tres Vaqueros Windfarm Repowering Project . 209132

Figure 5-3
Visual Simulation

Implementation of Mitigation Measures 4.3-2a and 4.3-2b would reduce emissions of criteria pollutants to the maximum extent feasible; however, the Project's construction-related NO_x emissions would not be mitigated to a less-than-significant level. Therefore, when considered with the NO_x-emission related impacts of other projects, including the Vasco Winds project, the Project-specific impact could be cumulatively considerable and remain significant and unavoidable.

> **Mitigation:** The Project-specific construction impact related to NO_x emissions, when combined with NO_x emissions of other projects would be significant and unavoidable. No additional mitigation is feasible.

Significance after Mitigation: Significant and Unavoidable.

5.4.3.4 Biological Resources

Decommissioning activities would occur at both the beginning and the end of the Project. Through initial decommissioning, the repowered Project would moderately reduce the amount of lands occupied by wind turbines, access roads and related infrastructure. Initial decommissioning would remove 91 existing turbines and their foundations, existing roads, and other infrastructure that would not be used for the Project. These areas that would not be used for the Project would be reclaimed and restored to pre-development conditions in accordance with County Code Section 88-3.804. Thus, initial decommissioning would reclaim and restore approximately 29.1 acres of grassland (see Chapter 3, *Project Description*, Table 3-4),resulting in a net increase in grassland habitat compared with existing conditions. Construction of the new facilities would result in permanent disturbance to approximately 18 acres and temporary disturbance to approximately 93 acres of undeveloped lands that potentially support the life functions of San Joaquin kit fox, California tiger salamander, California red-legged frog, Alameda whipsnake, and burrowing owl, among others. Final decommissioning (presumably in about 30 years) would return the entire site to pre-development conditions and restore the about 11 acres of grassland occupied by the Project.

Impact 5-3: The Project would cause a cumulatively considerable contribution to a significant adverse cumulative impact on avian and bat species.

As analyzed in Section 4.4, *Biological Resources*, the Project would have significant unavoidable impacts on avian and bat species. It is anticipated that Project implementation would reduce avian mortality during the term of the Project, and final decommissioning would eliminate wind energy facility-related impacts on these species when the Project area is returned to pre-wind farm conditions at the end of the facility's useful life.

As analyzed in Section 4.4, evidence indicates that repowering could be the most effective approach to reducing turbine-related avian mortality in the APWRA because it appears that fewer, taller, and larger-output turbines offer lower risk than do many, shorter, lower-output turbines. Preliminary study results of repowered sites in the APWRA indicate that repowering has reduced the estimated total number of avian fatalities, and the overall mortality rate per MW of

capacity for all avian species groups and for all individual avian species. Despite anticipated reductions in avian mortality after Project implementation, some amount of avian deaths would continue to occur at the Project area. In the absence of the site-specific monitoring data that would be collected following repowering, it cannot be ascertained whether the anticipated reductions would be below the estimated baseline fatalities per MW/year as determined by Shawn Smallwood, Ph.D. and presented in Table 4.4-2 (Smallwood, 2010a). In the absence of local population data for species affected by Project facilities, it cannot be ascertained whether reductions would be sufficient to avoid adverse impacts on the sustainability of local populations. Based on this uncertainty and to exercise a conservative approach to impact assessment, Project-specific impacts to avian species are considered cumulatively considerable.

Implementation of the mitigation measures recommended in Section 4.4 would reduce Project impacts on bats; however, in the absence of site-specific monitoring data following repowering, it cannot be ascertained whether the expected reductions would reduce the impact to a less-than-significant level. In the absence of local population data for species affected by Project facilities, it cannot be ascertained whether reductions would be sufficient to avoid adverse impacts on the sustainability of local populations. Based on this uncertainty and to exercise a conservative approach to impact assessment, Project-specific impacts to bat species are considered significant and unavoidable. Data are insufficient to ascertain the extent to which impacts from the Project and other related projects would combine to result in cumulative impacts to bat species. Similar to avian impacts, it is anticipated for bat species that the fewer turbines that would be installed to replace more numerous and outdated turbines would not adversely affect bat migration; however, because of their increased height, the fewer but taller turbines may adversely impact migrating bats. Based on this uncertainty and to exercise a conservative approach to impact assessment, the Project-specific impact to bat species is considered cumulatively considerable.

Turbines constructed as part of the Vasco Winds Repowering Project and as part of anticipated Alameda County APWRA repowering projects included in the cumulative scenario would be micro-sited, as was done with the Project. Additional research results may be available to inform future wind energy facility projects by the time their environmental impacts are analyzed. Although it is expected that these other projects would also reduce avian mortality relative to baseline conditions, no such reduction has yet affirmatively been established. Bat mortality may not be reduced relative to baseline conditions due to the potential relationship between increased tower heights and increased bat fatalities. Consequently, it conservatively is assumed that the incremental impacts of these other projects to cumulative conditions relating to birds and bats also would be significant and cumulatively considerable.

The Project would make a significant and unavoidable contribution to avian and bat impacts that, when considered with the incremental impacts of other projects in the cumulative scenario, would be cumulatively considerable. Together, the cumulative projects would cause or contribute to a significant cumulative impact related to avian and bat mortality.

Mitigation: No additional mitigation is feasible.

Significance of Impact: Significant and Unavoidable.

With proposed mitigation measures incorporated, the Project would have a less-than-significant impact on burrowing owl habitat; California red-legged frogs and California tiger salamander, including temporary loss of aestivation habitat; special-status reptile species (western pond turtle, San Joaquin coachwhip and Alameda whipsnake); potential San Joaquin kit fox habitat; non-listed special-status mammals (American badger and San Joaquin pocket mouse); vernal pool fairy shrimp and longhorn fairy shrimp habitat; special-status plants (crownscale, ball saltbush, fragrant cudweed, hop tree, and elderberry shrubs); and sensitive natural communities (purple needlegrass grassland and creeping rye grass turfs). With proposed mitigation measures incorporated, the Project would have a less-than-significant impact on breeding bird nest sites and common wildlife species.

Cumulative impacts on burrowing owls can be divided into two types: (1) turbine collisions; and (2) loss of grassland habitat. Avian collisions are discussed above and would remain significant and unavoidable for burrowing owl. Regarding the loss of grassland habitat, surveys discussed in Section 4.4 identified 10 nesting pairs in the Project area and additional owls in proximity to the Project area. Project construction would result in the temporary loss of 93 acres of foraging habitat. The Project would restore more acres of potential habitat than it would permanently disturb (18 acres permanently disturbed versus 29 acres reclaimed and restored); the Project's proposed removal and restoration of areas currently occupied by existing turbines, foundations and roads not used for the repowered project would result in an 11-acre net increase in grassland habitat potentially available to burrowing owls. In addition, implementation of General Biological Resources Mitigation Measures 1, 5–10, 13, and 16, (see Section 4.4.6.1, *General Biological Resources Mitigation Measures*) and measures specific to burrowing owl would further reduce the potential for site-specific impacts. In conjunction with other plans and projects in the cumulative scenario, the Project would not have a cumulatively considerable contribution to adverse impacts on burrowing owls resulting from loss of grassland habitat.

The Project's area of initial decommissioning is covered with a highly compacted gravel surface and is routinely used and maintained by the Applicant during O&M of the existing wind energy facility. This level of disturbance generally would preclude San Joaquin kit fox from denning on-site or in the vicinity, but other more prolific small mammals, such as ground squirrels and pocket gophers, could create burrows in less compacted areas or under foundations that would provide potentially suitable aestivation habitat for California tiger salamander and California red-legged frog. Based on the net acreage creation of grassland habitat as a result of decommissioning the existing wind energy facility, the Project would not contribute to a cumulative condition in relation to other development, including the wind repowering and other projects identified in Table 5-1, relative to San Joaquin kit fox, California tiger salamander, and California red-legged frog. The Project is not located within designated critical habitat for these species. The Project area is within suitable aestivation and migration habitat for California tiger salamander and California red-legged frog, and multiple breeding locations occur outside the Project's construction footprint but in the immediate Project vicinity. Potential effects are considered negligible because the Project is located mostly on hill slopes and ridges that contain a very low density of burrows or none at all.

Potential effects on vernal pool fairy shrimp and longhorn fairy shrimp species are considered negligible because construction activities would occur at a distance greater than 500 feet from known occurrences and thus would be unlikely to contribute to any cumulatively considerable effect.

Each of these species also is covered by the East County HCP/NCCP in the vicinity of the Project area. For the cumulative projects and activities that would be covered by the East County HCP/NCCP, incremental impacts would have at least a net-zero impact on the species, and could benefit them. For activities such as wind energy projects (e.g., Vasco Winds and Alameda County APWRA repowering projects) that are not covered activities under the East County HCP/NCCP, each activity/project would be subject to individual permitting by U.S. Fish and Wildlife Service and CDFG to avoid or reduce potential impacts. As a result, the Project's incremental, less-than-significant impact on each of these species or habitats would not be cumulatively considerable.

The Project's less-than-significant impact on the following CRPR and LU&S species – crownscale, ball saltbush, fragrant cudweed, nodding needlegrass, hop tree, white hedge nettle, and western vervain, and elderberry shrubs that are host species to the federally-listed Valley elderberry longhorn beetle – would not be cumulatively considerable because implementation of mitigation measures recommended for the Project would protect such species, and because of the Project's small construction footprint relative to the amount of remaining suitable grassland habitat in the vicinity.

If mitigated as recommended, the Project would have a less-than-significant impact on breeding bird nest sites and common wildlife species. The Project-specific less-than-significant impact on common wildlife species would not be cumulatively considerable because the increase in on-site permanent habitat and implementation of mitigation measures recommended for the Project would benefit such species.

The only adopted habitat conservation plan/natural community conservation plan that is relevant to the Project is the East County HCP/NCCP and the Project would not conflict with it. Accordingly, the Project would neither cause a cumulative impact nor contribute any existing cumulative condition with respect to compliance with this plan. The Project-specific less-than-significant impact in this regard would not be cumulatively considerable.

With proposed mitigation measures, the Project would have a less-than-significant impact on creeping rye grass turfs, riparian habitat, potential jurisdictional waters, and trees protected by County Ordinance. Road-widening and resurfacing activities could result in impacts to riparian woodland and scrub habitat at several locations in the Project area. Implementation of General Biological Resources Mitigation Measures 1, 3, 5–9, and 14, and Mitigation Measures 4.4-10 and 4.4-11 would reduce Project impacts on creeping rye grass turfs, riparian woodland, scrub habitat, and potential jurisdictional waters to a negligible and less-than-cumulatively-considerable level. The Project's incremental impacts to potentially jurisdictional wetlands or waters of the U.S., and streambeds and banks would not be cumulatively considerable because the Project would permanently impact only 0.02 acres of wetlands and would mitigate for impacts to a less-than-

significant level. As analyzed in Section 4.4, the potential Project-specific impact on protected trees would be negligible; this would not be cumulatively considerable.

5.4.3.5 Cultural Resources

The geographic scope of potential cumulative effects with respect to cultural resources usually is limited to areas within the physical footprint of a proposed project. As analyzed in Section 4.5, *Cultural Resources*, with the implementation of the recommended mitigation measures, the Project could have a less-than-significant impact on unrecorded archaeological resources, paleontological resources, and human remains due to unanticipated discovery and damage during construction.

Of the projects and plans considered in this cumulative analysis, those closest to the Project site are the Los Vaqueros Reservoir Expansion Project (CCWD and Reclamation, 2010), the Vasco Winds Repowering Project (Contra Costa County, 2010), and Alameda County's proposed APWRA Program Environmental Impact Report (PEIR) for wind energy project CUPs. Each of these projects borders the Project site. However, because none of these projects would be developed on the Project site, the incremental, Project-specific less-than-significant impacts could not combine with the impacts of these other projects to cause a cumulative impact on cultural resources. Project impacts to cultural resources would not be cumulatively considerable.

5.4.3.6 Energy Conservation

The geographic scope of potential cumulative effects with respect to energy conservation includes the electric grid to which Project power would contribute and areas from which transportation fuels would be provided (for this EIR, publicly-available fuel sources in the vicinity of the Project area). The Project's less-than-significant incremental demand on operational energy requirements (electricity drawn from the PG&E power grid) is assumed to be only a small percentage of the electrical energy produced by the Project. Several of the other local cumulative projects are also wind farms and clearly provide more power to the grid than they consume. Consequently, the incremental impacts of other projects in the cumulative scenario that are or would be located in eastern Contra Costa County and the northern end of the APWRA would not result in any known adverse cumulative impacts to energy conservation. Further, because the long-term incremental Project-specific impact would be beneficial, it would not cause a cumulatively considerable contribution to any significant cumulative impact on energy conservation.

The Project's less-than-significant incremental impact relating to the use of transportation energy and efficient use of transportation alternatives is not expected to combine with the incremental impacts of other projects to cause an adverse cumulative impact on energy conservation. Project-related transportation impacts would be limited to the construction phase, which could overlap with the transportation needs (including fuel needs) of previously-approved past projects, as well as other present or future projects that come online during the Project decommissioning and construction. Given the rural nature of the Project area, the Project's less-than-significant demand on/efficient use of transportation alternatives would be independent of other projects' use of such alternatives and, consequently, would not be cumulatively considerable. Similarly, given that the energy used by the construction labor force and energy used in transporting materials to the work

sites would be likely to be used elsewhere should either the Project and/or cumulative projects not be constructed, the Project's less-than-significant incremental usage of transportation energy would not be cumulatively considerable.

5.4.3.7 Geology, Soils and Seismicity

The entire Bay Area lies within a seismically-active region with a wide range of geologic and soil conditions that can vary widely within a short distance. Thus the cumulative context for potential impacts to people and structures related to geologic and seismic hazards is more localized or site-specific. As analyzed in Section 4.7, *Geology and Soils*, the Project (mitigated at recommended) could cause less-than-significant impacts related to earthquake faults, strong seismic groundshaking, seismically-induced ground failure, landslides, erosion, or loss of topsoil and expansive soils. However the projects in the cumulative scenario, including those on adjacent sites, would be required to adhere to all applicable building codes and ordinances as well as all federal, State, and local programs, requirements and policies pertaining to building safety and construction permitting. Further, none of the potential impacts of any of these projects would interact with impacts of the Project on the Project area. Therefore, the Project's incremental contribution to any cumulative impact related to geology and soils would not be considerable.

5.4.3.8 Greenhouse Gas Emissions

GHG emissions is inherently a cumulative concern in that the significance of GHG emissions is determined based on whether such emissions would have a cumulatively considerable impact on global climate change. Although the geographic scope of cumulative impacts related to GHG emissions is global, this analysis focuses on the State, the region, and the Project's direct and/or indirect generation or offset of GHG emissions. The Project would generate a long-term net reduction of approximately 6,877 metric tons of CO_2e per year and implementation of Mitigation Measure 4.8-2 would ensure that the Project would not conflict with the State's GHG reduction goals. Therefore, Project-specific incremental impacts on GHG emissions would not be cumulatively considerable.

5.4.3.9 Hazards and Hazardous Materials

The geographic scope of potential cumulative hazards and hazardous materials impacts encompasses the Project area only. These types of impacts are generally site-specific and depend on past, present, and future uses and existing soil, sediment, and groundwater conditions. The geographic scope of potential cumulative impacts relating to wildland fires includes the high fire hazard areas in which access and haul roads would be shared among this Project and other projects being constructed at the same time. The Project would contribute less-than-significant impacts related to accidental releases of hazardous materials; accidental rupture of a natural gas line; interference with air navigation; flammable or combustible materials; blade throw; and interference with microwave, radar and communications signals. There is no evidence of existing subsurface conditions that would potentially contribute to cumulative impacts relating to hazards and hazardous materials. No records exist indicating that contaminated sites or hazardous substances are located within areas to be disturbed. The Project and all cumulative projects would be required to

adhere to the robust body of regulations that govern hazardous materials storage and handling, water quality best management practices, construction work in the vicinity of gas lines, and fire prevention and management. Together, these measures would ensure that impacts related to exposure to hazardous materials would be minimized and/or avoided. Therefore, the Project's incremental, less-than-significant impacts in these areas would not be cumulatively considerable.

Other wind energy facility projects in the cumulative scenario could cause a hazard related to blade throw. However, like the Project, the Vasco Winds Repowering Project adjacent to the Project area to the south and other repowering projects in Alameda County are expected to reduce any existing blade throw hazard. No other projects in the cumulative scenario could cause an impact that would interact geographically with that of the Project to cause a cumulative impact. The Project's incremental, less-than-significant impact relating to blade throw hazard would not be cumulatively considerable.

With respect to any aviation hazard, all projects' compliance with FAA regulations would ensure that no aviation hazard would result, whether individual or cumulative, including with respect to communications signals. In any event, there is no known existing adverse condition relating to communications signals in the Project area.

In sum, the Project would make no cumulatively considerable contribution to any significant cumulative impact related to hazards and hazardous materials.

5.4.3.10 Hydrology and Water Quality

The geographic scope considered for potential cumulative impacts to Hydrology and Water Quality includes the Upper Kellogg Creek, Lower Kellogg Creek, Altamont, and Brushy Creek watersheds. Implementation of the Project could result in a less-than-significant incremental impact (after mitigation) related to: water quality during operation of the Project; groundwater recharge or depletion; drainage patterns; runoff; and flood hazard areas as a result of installation of facilities along Brushy Creek, Kellogg Creek, Frisk Creek, and their tributaries on-site.

Projects in the cumulative scenario that could cause impacts that might combine with those of the Project to compound or increase any existing hydrology- or water quality-related cumulative impacts might include the Los Vaqueros Reservoir Expansion, the Vasco Winds Repowering Project, the Buena Vista Wind Energy Project, Contra Costa's Vasco Road Improvements projects, and EBRPD's proposed Morgan Territory to Brushy Peak trail. However, existing water quality in the potentially affected water bodies is not impaired and the implementation of the Project is expected to improve on-site conditions. Consequently, the less-than-significant Project-specific incremental impact on hydrology and water quality would not be cumulatively considerable.

5.4.3.11 Land Use and Planning

Implementation of the Project would result in a less-than-significant impact related to Land Use and Planning. The Project would not add a new land use or change existing uses of the Project area, and would be consistent with General Plan and zoning requirements. The Project would not

physically divide an established community, would not contribute to the potential impacts of the residential and commercial development in Table 5-1, and would be consistent with the East County HCP/NCCP. Although the Project would not strictly comply in every respect with the property boundary setback requirement of the WECS Ordinance, it would be generally consistent with this Ordinance. Consequently, the less-than-significant Project-specific incremental impact on Land Use and Planning would not be cumulatively considerable.

5.4.3.12 Mineral Resources

Implementation of the Project would result in no incremental impact related to Mineral Resources, and so would not contribute to any cumulative impact.

5.4.3.13 Noise

The geographic scope of potential cumulative noise impacts is the area within which the Project would be audible. Two other wind energy projects are proposed within one mile of the Project area. First, the Vasco Winds Repowering Project could be constructed, operated, or decommissioned simultaneously with the Project. The simultaneous construction of the Vasco Winds Repowering Project could increase the potential for impacts to nearby sensitive receptors from construction noise. However, the Project's incremental impact is positive: a reduction in noise levels at the existing sites and, therefore, would not contribute to any cumulative impact to noise. Second, Alameda County's proposed APWRA PEIR includes a repowering project in Alameda County that would be in close proximity to the southern portion of the Project. While the design layout and construction schedule for this second project is not known, it is distant enough as to not be likely to overlap combine with construction noise during the 12-month decommissioning and construction period for the Project. Because construction noise would not combine, and operation-related noise would be reduced relative to existing conditions, no cumulatively considerable impact would result.

Other projects constructed simultaneously with the Project that could affect ambient conditions at the closest sensitive receptor locations to the Project (which include the Vasco Caves caretaker residence, the Los Vaqueros Interpretative Center, residences off Vasco and Armstrong Road, the water extraction point at Camino Diablo Road, and the marina at Los Vaqueros Reservoir) would be subject to applicable county noise standards, the imposition of which would reduce each project's incremental contribution during construction to a less-than-significant level. There is no existing cumulative noise impact in the cumulative impacts assessment area (geographic scope) for Noise, and none of the cumulative projects would cause a cumulative impact to which the Project's incremental less-than-significant, short-term impact on noise could contribute. Therefore, when considered in combination with cumulative development, the Project's incremental contribution to temporary noise impacts from construction would not be cumulatively considerable.

Workers' on-site exposure to overflight noise could not combine with such impacts on other workers on other sites. The Project's incremental less-than-significant impact would not be cumulatively considerable.

5.4.3.14 Population and Housing

Implementation of the Project would result in no incremental impact related to Population and Housing, and so would not contribute to any cumulative impact.

5.4.3.15 Public Services

Implementation of the Project would result in no incremental impact related to Public Services, and so would not contribute to any cumulative impact on such services.

5.4.3.16 Recreation

Implementation of the Project would result in no incremental impact related to Recreation, and so would not contribute to any cumulative impact.

5.4.3.17 Transportation and Traffic

Impact 5-4: Construction of the Project, when combined with construction of other projects, could contribute to short-term cumulative impacts to traffic and transportation (traffic congestion, traffic safety, and pavement wear-and-tear).

The geographic scope of potential cumulative traffic impacts includes access routes to area freeways, and arterial and collector roadways used for haul routes and construction equipment/vehicle and worker access to the Project area. Constructing and operating the facilities associated with the Project would not result in long-term traffic-related impacts. However, Impact 4.17-1 identifies short-term increases in traffic volumes associated with construction of the Project. Additional construction-related traffic impacts include temporary increases in traffic congestion, temporary and intermittent impedances to access and increased potential for traffic safety hazards. These impacts would be temporary, occurring during the estimated 12-month decommissioning and construction period.

The Project could contribute incrementally to cumulative construction-related impacts as a result of (1) the cumulative projects, such as land development projects, that generate increased traffic at the same time on the same roads as would the Project, causing increased congestion and delays; and (2) infrastructure projects in roads that would be used by Project construction workers and trucks, which could affect detour routes around Project work zones or could delay Project-generated vehicles past the work zones of those other projects.

A review of planned development and infrastructure improvement projects in the Project area indicates a few projects that could generate construction-related traffic impacts at the time that the Project is under construction. For example, construction of the Vasco Winds Repowering Project and the Los Vaqueros Reservoir Expansion Project are expected to overlap with Project construction in both time and the use of Vasco Road to access their respective sites. The Vasco Winds Repowering Project is estimated to generate up to about 492 one-way vehicle trips (trucks plus construction worker autos) per day over an 8-month construction period, and the Los Vaqueros project is estimated to generate up to about 2,000 vehicle trips per day on Vasco Road

(assuming a concentration of work being completed at facility sites accessed by Vasco Road). In addition, construction traffic generated by other current or reasonable foreseeable projects (e.g., Vasco Road Safety Improvement Project and Vasco Road at Camino Diablo Intersection Improvement Project) would use Vasco Road at the same time as the Project. Implementation of circulation and detour plans, installing traffic control devices, and scheduling (to the extent feasible) truck trips outside of peak morning and evening commute hours (as identified for the Project in Mitigation Measure 4.17-1) would reduce the Project's contribution to any cumulative impacts. However, some traffic disruption and increased delays would still occur during Project construction, even with mitigation. Given the lack of certainty about the timing (and identification) of other projects, specifically what projects would be constructed during construction of the Project, it is reasonable to conclude that significant cumulative traffic and circulation impacts could occur.

> **Mitigation Measure 5-4:** Prior to construction, the Applicant shall coordinate with the appropriate local government departments in the cities of Brentwood and Livermore, Contra Costa County, Alameda County, and Caltrans, and with appropriate utility districts and agencies regarding the timing of construction projects that would occur near the Project area. Specific measures to mitigate potential significant impacts would be determined as part of the interagency coordination, and could include measures such as employing flaggers during key construction periods, designating alternate haul routes, coordinating equipment and material deliveries for the Project and concurrent projects (e.g., possibly scheduling deliveries of oversized loads to the Project area and the Vasco Winds Repowering Project area during the same time period when Vasco Road would be closed [as specified in Part B, Scheduling and Delivery Requirements, of Mitigation Measure 4.17-1]), and providing more outreach and community noticing.

Significance of Impact after Mitigation: The Project-specific less-than-significant contribution to transportation and traffic impacts would not be cumulatively considerable.

5.4.3.18 Utilities and Service Systems

No cumulative impact or incremental contribution to a cumulative impact would result from implementation of the Project regarding water, wastewater, or storm water because the Project would have no impact on these systems. The Project would have a less-than-significant impact on drainage facilities because the existing system would have minor components such as culverts added to the system. Because these components are specifically related to the Project and would be located within the Project area, this impact would not contribute to the cumulative scenario.

The Project's less than significant impact on solid waste generation would be limited to the construction phase. Generation of solid waste by other development projects would not combine with the Project's contribution to create a cumulatively considerable impact because the landfills serving the Project have sufficient capacity to accommodate the regional waste needs for several decades; i.e., there is no existing significant cumulative impact to which the Project's incremental impact could contribute. Therefore, no cumulative impact or incremental contribution to a cumulative impact would result from implementation of the Project.

5.5 Effects Found Not to be Significant

The environmental effects of the Project are identified and discussed in detail in Chapter 4, *Environmental Setting, Impacts, and Mitigation Measures*. Except for those impacts discussed in Section 5.1 above, which would be significant and unavoidable, all identified significant environmental effects of the Project can be mitigated to less-than-significant levels with the implementation of the mitigation measures identified in this EIR. The EIR further concludes that the Project would not have any significant effects in the following environmental areas:

- Agricultural Resources
- Mineral Resources
- Population and Housing
- Public Services
- Recreation

CHAPTER 6
Alternatives Analysis

6.1 General Consideration of Alternatives

CEQA requires a lead agency to analyze alternatives to a proposed project that could feasibly attain the basic objectives of the project while substantially reducing or eliminating significant environmental effects. The lead agency must identify an environmentally superior alternative from among the alternatives, including the Project.

CEQA requires that the lead agency adopt mitigation measures or alternatives, where feasible, to substantially lessen or avoid significant environmental impacts that would otherwise occur. Where a lead agency has determined that, even after adoption of all feasible mitigation measures, a project as proposed still would cause significant environmental effects that cannot be substantially lessened or avoided, the agency, prior to approving the project as mitigated, first must determine whether, with respect to such impacts, there remain any project alternatives that are both environmentally superior and feasible within the meaning of CEQA.

CEQA provides the following guidance for discussing project alternatives:

- An EIR need not consider every conceivable alternative to a project. Rather, it must consider a reasonable range of potentially feasible alternatives that will foster informed decision-making and public participation (CEQA Guidelines § 15126.6(a)).
- An EIR is not required to consider alternatives that are infeasible (§ 15126.6(a)).
- The discussion shall focus on alternatives to the project or its location that are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly (§ 15126.6(b)).
- The range of alternatives shall include those that could feasibly accomplish most of the basic objectives of the project and could avoid or substantially lessen one or more of the significant effects (§ 15126.6(c)).
- The EIR shall include sufficient information about each alternative to allow meaningful evaluation, analysis and comparison with the proposed project (§ 15126.6(d)).

For the Project, factors considered when addressing the feasibility of an alternative included, among others, site suitability, ability to support infrastructure, general plan consistency, APWRA Conservation Plan consistency, consistency with other plans or regulatory limitations,

jurisdictional boundaries, economic viability, and whether the Applicant reasonably can acquire, control or otherwise have access to an alternative site. “Reduced project” alternatives often are developed to reduce significant adverse project impacts that are proportional to the size of the project. Given the nature of this Project, which consists of producing wind-generated power within a limited lease area footprint, this analysis is focused on significant project impacts related to project footprint and design, rather than alternative project sites. Thus, the alternatives analysis identifies and evaluates scenarios under which various project designs and footprints are formulated to minimize specific impacts that otherwise would occur with the Project.

CEQA requires an EIR to evaluate a “no project” alternative to allow decision-makers to compare the impacts of approving the project with the impacts of not approving it (CEQA Guidelines § 15126.6(e)). The “no project” analysis evaluates the existing conditions at the time the Notice of Preparation was published as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans, permits and available infrastructure and services. The “no project” alternative includes changes and on-going activities needed to keep the existing wind farm in operation, such as regular major and minor scheduled and unscheduled maintenance activities and the expiration of existing facility permits at the expiration of their terms followed by decommissioning of the facilities in accordance with existing permit conditions. The “no project” alternative is analyzed in Section 6.5.1.

6.2 Project Objectives

The California Renewable Portfolio Standard legislation enacted in 2002 (Senate Bill 1078) and accelerated in 2005 requires retail sellers of electricity to obtain 20 percent of their supply of electricity from renewable energy sources, such as wind, by 2010. The Governor of California has also set a statewide goal of achieving a 33 percent renewable energy share by 2020. Recently, on April 12, 2011 Governor Brown, signed SBX1-2 which essentially puts S-14-08 in to the state code and established the 33 percent renewable portfolio as the state target by December 31, 2020. Consequently, the Applicant’s primary objective for the Project is to provide an economically viable source of clean, renewable electricity generation that meets California’s growing demand for power and fulfills numerous state and national renewable energy policies. Additional objectives for the Project are as follows:

- Achieve increased performance, lower cost, higher reliability, and longer service life that will produce up to 42 MW of electricity in an area with proven wind resources.
- Develop an economically viable wind energy project that will support commercially available financing.
- Maximize renewable energy production and economic viability by replacing aging assets with newer and more efficient wind turbines in the APWRA.
- Minimize avian and bat impacts, to the maximum extent feasible.
- Support Renewable Energy Portfolio requirements by substantially contributing to its portfolio of wind-generated power, which is no longer subject to curtailment restrictions.

- Contribute positively to economic activity during construction and operation.
- Increase local short-term and long-term employment opportunities for communities within 90 miles of the Project (which is an acceptable commuting distance for construction and skilled labor resources).
- 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.
- Produce electricity without the need for large amounts of water; conventional power plants consume more water than wind energy.

6.3 Potentially Significant Impacts of the Project

As mentioned above, CEQA project alternatives must avoid or substantially lessen any of the significant environmental impacts of a proposed project. Pub. Res. Code § 21002; CEQA Guidelines § 15126.6. Even with implementation of the mitigation measures proposed in this EIR, the Project would cause the significant and unavoidable environmental impacts identified in Chapter 4 and Section 5.1, *Significant and Unavoidable Impacts*. Briefly, these impacts relate to: views of the Project area from the Vista Grande Trail, the Los Vaqueros Trail, the Los Vaqueros Watershed marina, the Los Vaqueros Reservoir Office, and the Los Vaqueros Interpretive Center; construction-related emissions of NO_x; and biological resources, including avian and bat species. The alternatives discussed in the following sections, in addition to considering and addressing significant and unavoidable Project impacts, at times also potentially result in reductions of the impacts that are capable of being mitigated to a less-than-significant level.

6.4 Alternatives Considered but Dismissed from Consideration in this EIR

In addition to the Project analyzed in this EIR, the Applicant considered a number of other turbine layouts and size configurations ranging from more than approximately 40 1-MW turbines to less than 30 2-MW turbines. These different configurations were considered and rejected based on engineering efficiency and cost considerations as well as preliminary environmental concerns such as avian mortality, potential impacts to jurisdictional waters (including wetlands), avoidance of highly erosive areas, etc. As is discussed in Section 4.4, *Biological Resources*, once the proposed turbine design and site layout was established, the Applicant, together with a consultant for the East Bay Regional Park District, participated in a micro-siting process designed to reduce potential raptor mortality. Because of this micro-siting process already conducted by the Applicant, alternatives involving other turbine layouts or size configurations are dismissed from further consideration.

Contra Costa County also considered alternate locations for the Project, but dismissed them from further consideration due to inappropriateness and infeasibility. Being a wind energy project, the Project is proposed within the Altamont Pass Wind Resource Area (APWRA). The APWRA is designated by the State of California and recognized by the County as a Wind Resource Area

because it maintains winds at a level that supports economically viable wind energy projects. No other area of the County is recognized as such. If the Project were to be located outside of the APWRA, then it is highly unlikely that the Project's primary objective, which is to increase production of wind-generated energy, would be met. Also, because the Project area is already disturbed and developed as a windfarm, with an existing connection to the State's power grid, it is reasonable to conclude that development of the Project at an alternate site that is less suited for wind energy production would result in new impacts that are more severe than those associated with repowering the current site.

6.5 Alternatives to the Project

6.5.1 No Project Alternative

Description of the No Project Alternative

Under the No Project Alternative, the existing windfarm would continue operating using the existing facilities. For purposes of this alternative, continued operation is assumed to include all existing 91 turbines, not just the 60 existing operating turbines shut down in 2009. Furthermore, the Applicant holds the lease for the windfarm through December 19, 2014, at which point, again for the purposes of this alternative, the Applicant would have the option to extend for an additional 30 years and would exercise that option. At that point in approximately 2044, the Applicant would potentially have to decommission the site and restore it to its initial conditions. It is assumed that as part of this continued operation, the Applicant would continue maintenance of their turbines and generation/transmission infrastructure as well as site access roads. Furthermore, some replacement of existing equipment would be likely to occur although the extent and timing of this are not foreseeable. The following analysis considers the effects of the No Project Alternative.

Impacts and Relationship to Project Objectives

Compared to the Project, the No Project Alternative would avoid all potential construction-related impacts to air quality, noise, traffic, aesthetics, geology and soils, hazards and hazardous materials, water quality, and cultural resources, because no new facilities would be constructed and the use of construction equipment, site grading, earth work, paving or faculties construction would be avoided. Operationally, the No Project Alternative would avoid any new impacts associated with aesthetics, biology, noise, and water quality because no changes in current facilities operations or location would occur.

If the Project is not implemented, the existing windfarm would continue to operate using equipment that is not as energy efficient or capable of the increased energy production as that of the Project. Implementation of the No Project Alternative is technically feasible, but would fail to meet many of the Project objectives. The No Project Alternative would not address specific goals to minimize avian and bat impacts nor would it contribute much to economic activity. It would partially meet the renewable energy objective but would fall short of the objective specifically related to the increase in generation capacity (from about 29 to 42MW) proposed by the Project.

Aesthetics

Under the No Project Alternative, there would be no impacts to aesthetic resources resulting from construction, operation, or maintenance; the existing windfarm would continue operating using its existing facilities, and no visual changes would occur. Nevertheless, whereas the Project would improve views of the Project area from vantage points along the Vasco Caves tour trail by reducing the number of visible turbines and locating turbines further from public vantage points, under the No Project Alternative, this beneficial impact would not occur. However, the No Project Alternative would still result in no impact, as views would not change from baseline conditions. Therefore, overall, impacts to scenic vistas, scenic and major roadways, and the Project area would be less than those associated with the Project.

Agriculture and Forestry Resources

Under the No Project Alternative, the existing windfarm would continue operating using the existing facilities until the existing Land Use Permits from Contra Costa County expire after a 30-year extension. After the permits expire, the wind farm would be restored to pre-permit conditions. The existing wind farm is not located within any farmland classified as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. Consequently, like the Project Alternative, the No Project Alternative would have no impact to any agricultural use of farmland classified as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. Similarly the No Project Alternative would have no impact in converting any farmland classified as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to non-agricultural use.

Since no change to the property's current approved uses would occur under the No Project Alternative there would be no conflict with zoning for agricultural use or any Williamson Act contracts at the site.

Since the existing wind farm is not located within any land that is zoned as a Timberland Protection Zone (TPZ) pursuant to the Government Code there would be no impact on timberland nor would the No Project Alternative convert any forest land to non-forest use.

Air Quality

Under the No Project Alternative, maintenance activities associated with the existing turbines and related infrastructure would result in substantially less criteria pollutant emissions compared to the construction emissions that would result under the Project. Similar to the Project, the No Project Alternative would not conflict with the Bay Area Air Quality Management District 2010 Clean Air Plan; however, compared to the Project, the No Project Alternative would result in a decrease in renewable wind-generated energy in lieu of other forms of energy generation that could have greater impacts on air resources i.e., through the potential use of fossil fuels in the worst case scenario.

Biological Resources

The No Project Alternative would continue to impact avian and bat species. The continued operation of up to 91 older-generation turbines would result in a significant and unavoidable impact on avian and bat species until decommissioning is completed in 2044. Compared to the Project, this alternative is likely to result in a greater number of bird deaths over the next 34 years because the existing, older generation turbines are generally more dangerous to birds, but could result in fewer bat deaths because smaller turbines are thought to be safer for bats. In either case, the fatality rates would remain notable, and, similar to the Project, the impacts would continue to be significant and unavoidable until decommissioning in 2044, after which there would be no impact.

The No Project Alternative would have a lesser impact than the Project on special-status and common species and their habitats, but these impacts would continue to be characterized as less than significant with mitigation. Unlike the Project, there would be no temporary or permanent loss of grassland habitat. Under the No Project Alternative, the Project area would be restored to native grassland after decommissioning. The decommissioning process may result in direct and indirect impacts on special-status and common species, similar to the construction-related impacts that would be experienced during Project construction. Grasslands, wetlands, refugia burrows, and individuals within the impact area of decommissioning activities could be disturbed by heavy equipment, grading activities, and the presence of construction personnel in the area, and individuals would be subject to direct mortality by moving equipment. Implementation of the Project's temporary, construction-related mitigation measures would protect special-status and common species during the decommissioning process.

The No Project Alternative would have a lesser impact than the Project on riparian habitat and potentially jurisdictional wetlands or waters, and streambeds and banks, but these impacts would continue to be characterized as less than significant with mitigation. Potentially jurisdictional wetlands or waters, and riparian habitat including protected trees, could be impacted during the decommissioning process. Wetlands or waters in the decommissioning impact area could be exposed to accidental sediment release or fill, especially when reclaiming roads at existing culvert or stream crossing locations, and excavating and burying foundations to a depth of three feet below-grade. Implementation of the Project's riparian and wetland mitigation measures would protect wetlands and riparian habitat during decommissioning.

Cultural Resources

Under the No Project Alternative, the current baseline conditions would be maintained. The Upper Kellogg Creek Historic District and its contributing features were nominated as eligible to the National Register while in the setting of the current operating windfarm. Therefore, the No Project Alternative would not have an impact on cultural resources.

Energy Conservation

Under the No Project Alternative, impacts on energy conservation would be similar to the existing baseline conditions. However, assuming that all 91 existing turbines could be returned to operation, the windfarm output would tend to rise above the 2008 pre-shutdown levels. There

would be no significant energy impacts from decommission of the existing turbines. However, increasing the amount of renewable generating capacity by returning the 91 existing turbines to operation would not provide as great a benefit as that provided by the repowered project (a net increase of 12 MW). Therefore, the No Project Alternative would not be as beneficial as the Project.

Geology and Soils

After the termination or expiration of the land lease assumed to be in 2044, the windfarm would be decommissioned and the site would be restored to original conditions. Construction activities required for decommissioning could leave loose soil exposed to the erosive forces of rainfall and high winds. However, temporary erosion control measures would be implemented as part of the NPDES permit and a SWPPP would be required in connection with the demolition permit that would have to be obtained from the County pursuant to the decommissioning work. The NPDES permit and SWPPP would ensure that risks relating to erosion and sedimentation would be minimized. Additionally, the areas subject to turbine, foundation and roadway removal would be restored to follow the natural topography in order to maintain slope stability. The potential impacts of the No Project Alternative on erosion and loss of top soil would be relatively similar to the Project and the potential impacts with respect to other seismic and geologic hazards would be less than those of the Project.

Greenhouse Gas Emissions

Under the No Project Alternative, maintenance activities that would be associated with the existing turbines and related infrastructure would result in substantially less greenhouse gas (GHG) exhaust emissions compared to the construction and maintenance emissions that would result under the Project. However, because the No Project alternative would result in no new renewable generating capacity to the electricity grid under the GHG baseline scenario, it would result in a long-term adverse impact associated with annual GHG emissions reductions compared to implementation of the Project. The No Project Alternative would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHG.

Hazards and Hazardous Materials

The No Project alternative would have less impact regarding the routine use and accidental upset of hazardous materials, potential damage to natural gas pipeline, and wildfire hazards as no construction activities would occur. Potential hazards related to aviation hazards and disruption of communication signals that might result from new, taller turbines would not occur. Currently, the Project area subject to blade throw hazards is larger than would occur under the Project.

Hydrology and Water Quality

Implementation of the No Project Alternative would result in continued operation of the existing windfarm. Because no changes would occur on-site, as compared to existing conditions, the No Project Alternative would avoid all potential impacts associated with implementation of the Project, including potential impacts to water quality, increased erosion, sedimentation, runoff,

drainage, and flooding. However, no remedial action would necessarily occur at the eroded areas currently within the Project area.

Land Use and Planning

Under the No Project Alternative, the 91existing turbines would continue to operate as currently permitted under the terms of the existing lease through 2044 with the presumed granting of a 30-years extension. The existing wind farm would therefore be anticipated to remain in compliance with the zoning ordinance and other County regulations regarding wind farm operations, including reclamation requirements. As with the Project, land use and planning impacts would be less than significant.

Mineral Resources

As with the Project, under the No Project Alternative there would be no impacts related to mineral resources. Since the existing windfarm is not located within a significant mineral, oil, or gas resource producing area, or within the vicinity of a mineral resource recovery site, the No Project Alternative would cause no adverse impact to the availability of a mineral resource.

Noise

Under the No Project Alternative, the windfarm would continue operations using its existing facilities. No construction related impacts would occur. Maintenance and repairs would occur as necessary, but no new operational noise impacts would be incurred. The No Project Alternative would result in less impact than the Project.

Population and Housing

The No Project Alternative would maintain employment at existing levels. The Tres Vaqueros windfarm would continue to operate with four full-time and two part-time workers and no additional workers would be retained. With the presumed 30-year extension of its operating permit, there would be an increase in temporary workers associated with replacement activities as equipment and infrastructure wears down and is replaced. The number of additional temporary workers would be negligible because equipment and infrastructure would likely be replaced as needed, rather than requiring a large contingent of workers to replace several of the turbines at the same period of time. Similar to the Project, and because of the small number of workers required, these workers would be hired from the local labor pool. Compared to the Project, the No Project Alternative would generate less employment opportunities, but similar to the Project, this alternative would not induce substantial population growth by bringing in new workers to the Project area.

There are currently no residences or residents within the Project area. Under the current conditions, and presuming that the Tres Vaqueros wind farm extends operations for an additional 30 years after 2014, no new residences or residents would need to be added because of the nature of the operations. Similar to the Project, the No Project Alternative would not displace housing or substantial numbers of people.

Public Services

Under the No Project Alternative the existing 91 turbines would continue operations with four full-time and two part-time employees as it did before the windfarm was shut down. This would be expected to continue with the existing lease extended for 30-years until about 2044.

The fire protection facilities to support these existing operations are already in place. No new Fire Department facilities or resources would be needed to serve the windfarm operations. The No Project Alternative would not have the 30 to 40 additional temporary construction workers, or the danger of fire from construction activities as under the Project. Therefore, there would be less demand for fire protection services than with the Project, but similar to the Project, there would not be a substantial adverse physical impact associated with the provision of new or physically altered fire protection services.

Likewise, the police protection facilities and infrastructure to protect the existing 91 turbines and the four full-time and two part-time employees are already in place. Compared to the Project, there would be more turbines to protect, but fewer temporary and full-time employees to serve. Similar to the Project, there would not be a substantial adverse physical impact associated with the provision of new or physically altered police protection facilities.

The No Project Alternative would not include any residential development and there are no existing residences in the Project area. As with the Project, it is presumed that the employees would reside locally and their school-age children would be part of the existing or anticipated student population. Therefore, these employees and their families would be part of the existing demand on schools, parks, and other public facilities, such as libraries and hospitals. Similar to the Project, the No Project Alternative would not require the provision of new or physically altered schools, parks, or other public facilities.

Recreation

Under the No Project Alternative, the existing turbines would continue to operate on land owned by the EBRPD, including some within the boundaries of the Vasco Caves Regional Preserve. Although temporary construction impacts would not occur under the No Project Alternative, decommissioning impacts would potentially occur either in 2014 when the current lease expires or with presuming a 30-year lease extension at that point in about 2044. Temporary disruption of guided tours of the preserve could still occur during decommissioning but no recreation impacts would result.

Transportation and Traffic

In the near-term, transportation and traffic conditions under the No Project Alternative would be the same as existing conditions, and in the long-term, the number of daily vehicle trips (trucks and worker vehicles) generated would be fewer than the number of trips per day associated with facility decommissioning for the Project (see Section 6.5.2, *Alternative 1*), and far fewer than the number of trips that would be associated with Project construction. The No Project Alternative

would have a less-than-significant impact on traffic congestion, emergency access and traffic safety, and less of an impact than the Project.

Utilities and Service Systems

Under the No Project Alternative, the existing wind farm would continue to operate as it did before it was shut down in 2009 and all existing 91 turbines would be returned to service. Since the utilities that served the former operations are still in place, no new services would be required.

The No Project Alternative would not exceed wastewater treatment requirements because the Project area is not connected to a public sewer system. The existing septic system that serves the O&M building would continue to be used. The No Project Alternative would not be connected to water or wastewater treatment facilities. As was done previously, drinking water would be bottled. The O&M building would be served by a groundwater well for non-potable water. Therefore, the No Project Alternative would not require or result in the construction of new water supply entitlements or wastewater treatment facilities or expansion of existing facilities.

The existing wind farm has a drainage system in place for the existing wind turbines. Therefore, the No Project Alternative would not require or result in the construction of new storm water drainage facilities, the construction of which could cause significant environmental effects.

The No Project Alternative would generate an insignificant amount of solid waste because there will only be four employees and any industrial waste generated during maintenance would be minimal. As was done when the existing wind farm was last operational in 2009, solid waste would be collected and hauled to either Keller Canyon Landfill or the Contra Costa Transfer and Recovery Station, which serve the Project area. Either of these facilities would be able to accommodate the small amount of solid waste that operations under this alternative would generate. Therefore, the No Project Alternative would not generate solid waste that would exceed the permitted capacity of a landfill serving the Project area.

Compared to the Project, the No Project Alternative would have no impacts on utilities and service systems because this alternative would not require new drainage components such as culverts.

6.5.2 Alternative 1 – Complete Decommissioning of Windfarm

Description of Alternative 1

Under Alternative 1, the Project would not be built and the Applicant would decommission and remove all 91 existing turbines, roads, and related infrastructure per existing permits. The process would be similar to the activities described in Section 3.4.1, of the Project Description. Decommissioning of the turbines and roads would require approximately four to five months, and would proceed after required approvals have been issued by the County and responsible agencies. Construction activities would occur consistent with County requirements for work days and hours. Local construction contractors and suppliers would be used to the extent possible. The timing of this decommissioning is unknown but it is reasonable to assume that implementation of this alternative

would be completed on or before the renewal date of the existing lease in 2014. Turbine pads would be reclaimed to follow natural topography and native vegetation. All above-ground facilities, foundations, and related systems would be removed to a depth of at least three feet below grade. Concrete foundations would be decommissioned in place so that no part of the foundation is located within three feet of grade or would be removed from the site for appropriate disposal. Roads and other disturbed areas no longer desired for use by the land owner would be decommissioned as appropriate to maintain slope stability and topographic recontouring. Following recontouring, surface soils would be prepared for planting and spread with native vegetation seeds, and temporary erosion control measures would be implemented to maintain topsoil and revegetation.

Impacts and Relationship to Project Objectives

This alternative would fail to meet all but three Project objectives – minimizing avian and bat impacts; positive contribution to economic activity during construction; and creation of short-term employment opportunities – and would result in a loss of the renewable energy currently produced by the existing windfarm.

For the following environmental topic areas discussed in Chapter 4, *Environmental Setting, Impacts, and Mitigation Measures*, Alternative 1 would result in impacts identical to or less than those that would occur during the initial and/or final decommissioning phases of the Project: Aesthetics, Cultural Resources; Geology and Soils; Hazards and Hazardous Materials; Hydrology and Water Quality; Noise; Public Services; Recreation; Transportation/Traffic; and Utilities and Service Systems. For these topic areas, none of the impacts related to construction, operation, and maintenance of the Project would occur. For the following topic areas, implementation of Alternative 1 would result in purely beneficial impacts because the wind turbines and related infrastructure would be removed, thereby returning the site to its natural state: Agriculture and Forestry Resources; Land Use and Planning; and Mineral Resources.

Air Quality

Alternative 1 would result in the same air quality impacts as the Project during decommissioning of the existing turbines and related infrastructure. However, no emissions would result from construction activities. Unlike the Project, Alternative 1 would not result in increased production of renewable wind-generated energy. If this lost production was made up by increasing production at fossil fuel burning power plants, which emit criteria pollutants, then Alternative 1 would result in long-term air quality impacts that would not occur under the Project.

Biological Resources

Alternative 1 would eliminate impacts on avian and bat species, compared to the Project's significant and unavoidable impacts. The process of decommissioning the existing windfarm under Alternative 1 would result in impacts identical to or less than those that would occur during the decommissioning phase of the Project.

Energy Conservation

Alternative 1 would have the same impacts as the Project during decommissioning. Construction-phase energy usage would not occur, which would be a beneficial impact. However, because all existing turbines would be removed, Alternative 1 would have an adverse effect on long-term energy conservation efforts because the lost renewable generation capacity would have to be made up by some other source or combination of sources that would have to be constructed elsewhere in the California energy grid.

Greenhouse Gas Emissions

Alternative 1 would result in substantially less short-term GHG exhaust emissions compared to the Project because the construction phase would not occur. However, unlike the Project, Alternative 1 would not result in increased production of renewable wind-generated energy. If this lost production was made up by increasing production at fossil fuel burning power plants, which emit GHGs, then Alternative 1 would result in long-term GHG impacts. This would conflict with applicable plans, policies, and regulations adopted for the purpose of reducing emissions of GHGs.

Population and Housing

Alternative 1 would create short-term job opportunities in the construction sector during decommissioning of the existing windfarm. However, because there would be no new windfarm to operate or maintain, then unlike with the Project, no new permanent jobs of any type would be created under this alternative.

6.5.3 Alternative 2 – Partial Repowering to Existing Capacity

Description of Alternative 2

Under Alternative 2, the Project would be constructed, but it would only replace the existing windfarm's 29.1-MW capacity. Decommissioning of the 91 existing turbines and related infrastructure would take place as with the Project. Assuming that turbines with nameplate capacities of 2 MW[1] were used for this alternative, 14 or 15 turbines would be required to provide approximately 28 or 30 MW. Given the sensitivity of turbine siting, it is assumed that the layout presented in Figure 3-3 would be used, with the principal difference being that no more than 15 of the 24 potential turbine locations[2]would be developed. Which of the sites would be developed is unknown. It is assumed as a worst-case scenario for this alternative that all six strings (A-F) would be built, but with less turbines per string. This reduction of installed turbines would reduce the total amount of affected area for pad sites and roads, and would have a shorter construction schedule compared to the Project.

---

1 As discussed in Chapter 3, *Project Description*, the Applicant has not yet determined the exact make and model of turbine. For the purposes of this CEQA analysis, a turbine similar to a Gamesa G90 2.0 MW, Siemens 2.3 MW, or a comparable 3-blade turbine has been contemplated.

2 Note that as is discussed in Section 3, *Project Description*, only 21 the 24 turbine locations shown on Figure 3-3 would be used for the Project.

Impacts and Relationship to Project Objectives

This alternative would meet most of the Project objectives, although in many respects it would not meet them to the same degree as the Project. This alternative would specifically fail to meet the objective of increasing the capacity of the windfarm, but the increased efficiency of modern turbines would be likely to produce more energy per year than the existing windfarm. Operation of a reduced number of turbines would also be likely to further reduce avian and bat impacts. Impacts related to Cultural Resources; Mineral Resources; Pubic Services; and Recreation would be identical to those identified for the Project and are not evaluated further.

Aesthetics

The construction-related impacts of Alternative 2 would be similar to or less than the Project. Like the Project, this alternative would result in construction activities near recreational areas, though implementation of Mitigation Measure 4.1-1 would reduce visual impacts at Vasco Caves to a less-than-significant level, and construction impacts to scenic roadways would remain less than significant. Operation and maintenance related impacts to scenic vistas and roadways would be proportionately less than the Project with as many as eight fewer[3] turbines in operation. Like the Project, impacts to scenic roadways would be less than significant, and impacts to the Watershed Office at Los Vaqueros Reservoir likely would be significant and unavoidable. Like the Project, Alternative 2 would not substantially degrade the existing visual character or quality of the Project area and its surroundings (less-than-significant impact). This alternative would result in fewer lighted turbines and implementation of Mitigation Measure 4.1-4 would reduce night lighting and glare impacts to a less-than-significant level.

Agriculture and Forestry Resources

Because Alternative 2 would be constructed at the same location as the Project, the impacts to agricultural and forestry resources would be the same – no impacts would occur. Because Alternative 2 would involve less site disturbance and development, it would have the beneficial impact of opening up more land to potential agricultural use, such as grazing.

Air Quality

Under Alternative 2, the air quality impacts associated with initial decommissioning would be the same as would occur with the Project. Construction activities could result in lower criteria pollutant emissions compared to the construction emissions that would result under the Project, depending on the amount of daily construction activities that would occur. However, construction activities under Alternative 2 would likely also result in significant and unavoidable impacts associated with short-term generation of criteria pollutants. Unlike the Project, Alternative 2 would not result in increased production of renewable wind-generated energy. If this lost production was made up by increasing production at fossil fuel burning power plants, which emit criteria pollutants, then Alternative 2 would result in additional long-term air quality impacts.

[3] Assuming 21 turbines for the Project, use of 13 2.3-MW turbines results in a reduction of 8 turbines compared with the Project.

Biological Resources

Similar to the Project, Alternative 2's impacts on avian and bat species would be significant and unavoidable. However, constructing six to eight fewer turbines is anticipated to reduce total fatalities compared to the Project. Alternative 2 would reduce the amount and duration of habitat disturbance in comparison to the Project, so impacts to terrestrial species and their habitat, avian foraging habitat, Sensitive Natural Communities, and wetlands would likely be reduced. Implementation of the Project's mitigation measures would protect these biological resources, and maintain the significance of the impact at less than significant with mitigation. All other impacts and significance findings would remain the same as the Project.

Energy Conservation

Alternative 2 would have the same impacts as the Project during the decommissioning and removal of the existing turbines but would also tend to a have reduced impact on construction energy usage due simply to the reduced number of turbines to be installed, potentially shorter construction schedule, and reduced infrastructure. Because fewer turbines would be installed than the Project, Alternative 2 would have a negative effect on energy conservation because of the lesser amount of wind-generated energy.

Geology and Soils

Alternative 2 would cause impacts related to geology, soils, and seismicity that would be similar to those of the Project. However, these impacts would occur over a reduced area and some impacts, such as soil erosion and landslide susceptibility, would be less than those of the Project if areas susceptible to these hazards were avoided. The impacts of Alternative 2 would be reduced to a less-than-significant level with incorporation of the mitigation measures detailed in Section 4.7.6.

Greenhouse Gas Emissions

Under Alternative 2, construction activities would result in less GHG emissions compared to the emissions that would result under the Project. However, because Alternative 2 would result in less renewable generating capacity compared to the Project, it would result in a long-term adverse impact associated with annual GHG emissions reductions compared to implementation of the Project. Alternative 2 would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHG.

Hazards and Hazardous Materials

Alternative 2 would result in the same hazards and hazardous materials impacts as the Project, although the impacts would be somewhat reduced because six to eight fewer turbines would be constructed, shortening the construction duration and therefore reducing the use of hazardous materials and the wildfire hazard during construction. Fewer turbines may not, however, reduce aviation and communication hazards of the Project or the risk of damage to the natural gas pipeline. The blade throw hazard would be less because of the reduced number of turbines.

Hydrology and Water Quality

Alternative 2 would include fewer wind turbines and reduced support infrastructure (roads, transformers, etc.). Implementation of Alternative 2 would result in impacts similar in type to those that would occur under the Project, but the impacts would be on a smaller scale and would occur over a smaller geographic area. All hydrology and water quality mitigations required for the Project would also be required for Alternative 2.

Land Use and Planning

The Project includes four potential turbine locations that do not comply with the minimum setback requirements established by the Contra Costa County Code. Because six to eight turbines would be eliminated under Alternative 2, all of the non-complaint turbine locations could be eliminated from the layout. Thus, there would be no impact where a less-than-significant impact would occur under the Project.

Noise

In this alternative, construction would occur to the extent that it would replace the existing windfarm's generation of 29.1 MW. With fewer sites to construct, the construction schedule would be somewhat shorter. Therefore, construction noise under Alternative 2 would be similar to the Project but for a shorter duration. Subsequent to construction, fewer turbines would be in operation which would result in slightly lower noise levels than the Project. Alternative 2 would therefore result in slightly less noise impacts than the Project.

Population and Housing

Because Alternative 2 involves operation of fewer turbines, it is possible that there would be fewer than four new permanent employment opportunities.

Transportation/Traffic

Under Alternative 2, the number of daily vehicle trips (trucks and worker vehicles) during decommissioning of the existing turbines would be the same as for the Project. However, Alternative 2 would generate fewer vehicle trips than would the Project during construction, resulting in reduced impacts compared to the Project on traffic congestion, emergency access, and traffic safety. Mitigation Measures 4.17-1, 4.17-2, and 4.17-3 would still be required to reduce Alternative 2 impacts to a less-than-significant level.

Utilities and Service Systems

Implementation of Alternative 2 would result in development of fewer turbines and associated access roads. Thus, less construction-related waste would be generated. Because fewer turbines and access roads would be constructed, less water would be required for foundation construction and dust suppression. All other impacts related to utilities and services systems would be the same as would occur under the Project.

6.5.4 Alternative 3 – Alternative Site Layouts

Description of Alternative 3A – Project without A-string

Under Alternative 3A, the two potential turbine sites shown as A1 and A3 in Figure 3-3 would be eliminated for the purpose of reducing impacts to cultural resources. Eliminating these potential turbine sites would not reduce the number of turbines. Instead, the Applicant's options for siting turbines would be reduced from 24 locations to 22; up to 21 turbines would still be constructed. Decommissioning of the 91 existing turbines would take place as proposed under the Project.

Impacts and Relationship to Project Objectives

This alternative would be expected to meet all Project objectives. Without extensive simulation it is unknown if this more limited layout would affect the efficiency of the Project, but for this analysis, it is assumed to be substantially equal to the Project. Therefore, impacts related to Agriculture and Forestry Resources; Air Quality; Energy Conservation; Geology and Soils; Greenhouse Gas Emissions; Hazards and Hazardous Materials; Hydrology and Water Quality; Land Use and Planning; Mineral Resources; Noise; Population and Housing; Public Services; Recreation; Transportation/Traffic; and Utilities and Service Systems would be identical to those identified for the Project and are not evaluated further.

Aesthetics

Construction-related impacts of Alternative 3A would be similar to the Project. Like the Project, this alternative would result in construction activities near recreational areas and scenic roadways, though implementation of Mitigation Measure 4.1-1 would reduce construction-related visual impacts from scenic vistas to a less-than-significant level, and construction impacts to scenic roadways would remain less than significant. Operation and maintenance-related impacts to scenic vistas would be slightly less than with the Project. Alternative 3A would result in two fewer turbines on the western side of the Project area, lessening the visual perception of increased turbine presence from several scenic vistas, including the Los Vaqueros Reservoir Vista Grande Trail, the Upper Whipsnake Trail east of Morgan Territory Regional Preserve, and the marina at Los Vaqueros Reservoir. Visual impacts from these locations would be slightly less than with the Project, but like the Project, impacts would be significant. Also like the Project, impacts to the Watershed Office and the Interpretive Center at Los Vaqueros Reservoir would remain significant and unavoidable because the A-string is not visible from these locations (i.e., there would be no difference). Like the Project, Alternative 3A would not substantially degrade the existing visual character or quality of the Project area and its surroundings and impacts to scenic roads would be less than significant. This alternative would result in similar impacts related to light and glare, and implementation of Mitigation Measures 4.1-4 would reduce nighttime lighting and glare impacts to a less-than-significant level.

Biological Resources

Similar to the Project, Alternative 3a's impacts on avian and bat species would continue to be significant and unavoidable. Not constructing turbines on the A-string is not anticipated to greatly

reduce fatalities, especially considering that APWRA-wide data has not revealed a substantial decrease in avian and bat fatality rates after repowering. All other impacts and significance findings would remain the same as the Project.

Cultural Resources

Alternative 3a would have the same impacts as the Project during the decommissioning and removal of the existing turbines. Alternative 3a would not include the A-string, and therefore would have a reduced impact on the setting of three prehistoric rock shelters (CA-CCO-310, CA-CCO-456, and CA-CCO-434) and one historic-period tenant farm location (CA-CCO-454H). The absence of turbines in the vicinity of these historical resources would maintain the existing conditions and the mitigation required under the Project to protect those resources would not be necessary.

Description of Alternative 3B – Project without full F-string

Under Alternative 3B, the three potential turbine sites shown as F1, F2, and F3 in Figure 3-3 would be eliminated for the purposes of reducing a significant and unavoidable impact to aesthetic/visual resources. Eliminating these potential turbine sites would not reduce the number of turbines. Instead, the Applicant's options for siting turbines would be reduced from 24 locations to 21; up to 21 turbines would still be constructed. Decommissioning of the 91 existing turbines would take place as proposed under the Project.

Impacts and Relationship to Project Objectives

This alternative would be expected to meet all Project objectives. Without extensive simulation it is unknown if this more limited layout would affect the efficiency of the Project, but for this analysis it is assumed to be substantially equal to the Project. Therefore, impacts related to Agriculture and Forestry Resources; Air Quality; Cultural Resources; Energy Conservation; Geology and Soils; Greenhouse Gas Emissions; Hazards and Hazardous Materials; Hydrology and Water Quality; Land Use and Planning; Mineral Resources; Population and Housing; Public Services; Recreation; Transportation/Traffic; and Utilities and Service Systems would be identical to those identified for the Project and are not evaluated further.

Aesthetics

Construction-related impacts of Alternative 3B would be similar to the Project. Like the Project, this alternative would result in construction activities near recreational areas and scenic roadways, though implementation of Mitigation Measure 4.1-1 would reduce construction-related visual impacts from scenic vistas to a less-than-significant level, and construction impacts to scenic roadways would remain less than significant. Operation and maintenance-related impacts to scenic vistas would be less than the Project. Alternative 3B would result in three fewer turbines located adjacent to the eastern edge of Los Vaqueros Reservoir, lessening the visual perception of increased turbine presence from several scenic vistas, including the Los Vaqueros Reservoir Vista Grande Trail, the Upper Whipsnake Trail east of Morgan Territory Regional Preserve, and the

marina at Los Vaqueros Reservoir. Visual impacts at these locations would be less than with the Project, but like the Project, impacts would be significant and unavoidable. Like the Project, impacts to the Watershed Office at Los Vaqueros Reservoir would remain significant and unavoidable. However, from the Los Vaqueros Interpretative Center, removal of the three northernmost F-string turbines would reduce the significant and unavoidable impact to adverse but less than significant. Like the Project, Alternative 3B would not substantially degrade the existing visual character or quality of the Project area and its surroundings and impacts to scenic roads would be less than significant. This alternative would result in similar impacts related to light and glare, and implementation of Mitigation Measures 4.1-4 would reduce nighttime lighting and glare impacts to a less-than-significant level.

Biological Resources

Similar to the Project, Alternative 3B's impacts on avian and bat species would continue to be significant and unavoidable. Not constructing turbines on the F-string is not anticipated to greatly reduce fatalities, especially considering that APWRA-wide data has not revealed a substantial decrease in avian and bat fatality rates after repowering. All other impacts and significance findings would remain the same as the Project.

Noise

This alternative would not result in any significant reduction in the amount of noise produced by the Project because the same number of turbines would be installed and operated. However, removal of the three F-string turbines would reduce all construction and operational noise in the vicinity of the area of the Los Vaqueros Dam and Interpretive Center.

6.5.5 Alternative 4 – Reduction of Daily Construction Emissions

Description of Alternative 4

Alternative 4 would be identical to the Project in every respect except that the construction schedule would be adjusted to reduce the daily amount of NO_x emitted by construction equipment on-site and vehicles used in transportation of materials to and from the Project. This adjustment to the construction schedule would be done either by drawing out the construction duration or by requiring that only a fixed amount of construction equipment and transportation vehicles could be used on a daily basis, such that the amount of NO_x potentially emitted by these sources would be at or below the BAAQMD significant level (54 pounds of NO_x per day).

Impacts and Relationship to Project Objectives

Alternative 4 would meet most if not all Project objectives, with the primary downside being that the construction period would be extended and the fully repowered windfarm would come online later than would occur under the Project. Because Alternative 4 involves performing the same type and amount of construction work over a longer period, impacts related to Agriculture and Forestry Resources; Biological Resources; Cultural Resources; Energy Conservation; Geology

and Soils; Greenhouse Gas Emissions; Land Use and Planning; Mineral Resources; Population and Housing; Public Services; Recreation; and Utilities and Service Systems would be identical to those that would occur under the Project and are not evaluated further.

Aesthetics

Under Alternative 4, impacts from construction would be greater than those that would occur with the Project because construction activities would be visible for a longer period of time. However, the severity of the construction-related impacts would not change and with implementation of Mitigation Measure 4.1-1, impacts to scenic resources would be reduced to a less-than-significant level. All operations and maintenance-related aesthetic impacts and mitigations would be identical to those of the Project.

Air Quality

Under Alternative 4, decommissioning and construction activities would result in less criteria-pollutant emissions per day compared to the emissions that would result under the Project. Total emissions for the decommissioning/construction period would not change. However, because criteria pollutants would be emitted over an extended period, the significant and unavoidable impact related to NO_x emissions would be reduced to a less-than-significant level.

Hazards and Hazardous Materials

In terms of overall hazards and hazardous materials impacts, Alternative 4 would be nearly identical to the Project. The difference is that the potential for wildfire hazards may be slightly increased if the construction duration is extended.

Hydrology and Water Quality

Potential impacts and required mitigations associated with implementation of Alternative 4 would be very similar to those discussed for the Project. Extending the construction period could result in additional exposure of construction sites to storm events, which could result in increased erosion, sedimentation, and water quality impacts. However, implementation of the mitigations prescribed for the Project would reduce these potential impacts to less-than-significant levels.

Noise

Alternative 4 would be identical to the Project except that it would lengthen the construction schedule, meaning that temporary, construction-related noise impacts would occur over a longer period. The severity of the impacts would not change. All other impacts and mitigations would be identical to the Project.

Transportation/Traffic

The number of daily vehicle trips (trucks and worker vehicles) under Alternative 4 would be the same as, or less than, the Project. Fewer daily trips would be generated compared to the Project if the construction duration were drawn out (because the total number of trips would be spread over

a greater number of days). Impacts resulting from Alternative 4 would be no more than, and possibly less than, Project impacts on traffic congestion, emergency access, and traffic safety. Mitigation Measures 4.17-1, 4.17-2, and 4.17-3 would still be required to reduce Alternative 4 impacts to a less-than-significant level.

6.5.6 Alternative 5 – Increased Tip-to-Ground Clearance

Description of Alternative 5

This alternative would be identical to the Project in every respect except that the heights of the nacelles would be raised such that the turbine blade tip ground clearance would be 90 feet (27.4 meters), an increase of 18 feet from the proposed turbine design. Some studies in the APWRA have indicated that a tip-to-ground clearance height of 90 feet or more may be beneficial in lowering raptor strike deaths in wind farms. The intent of this alternative is to explore the consequences of this Project design change. Again, all other aspects of this alternative would be identical to the Project.

Impacts and Relationship to Project Objectives

Alternative 5 would likely meet most Project objectives. The primary negative of this alternative would be a reduction in energy production efficiency in the windfarm because the greater height of the turbines would not be optimal for exploitation of the Altamont wind flow. Because Alternative 5 only involves increasing the height of the new turbine towers, impacts related to Agriculture and Forestry Resources; Air Quality; Cultural Resources; Geology and Soils; Greenhouse Gas Emissions; Hydrology and Water Quality; Mineral Resources; Noise; Population and Housing; Public Services; Recreation; Transportation/Traffic; and Utilities and Service Systems would be identical to those that would occur under the Project and are not evaluated further.

Aesthetics

Alternative 5 would result in similar to greater impacts to visual resources than the Project because the heights of the nacelles would be approximately 18 feet greater than under the Project. This would slightly increase the visual prominence of turbines.

Construction-related impacts of Alternative 5 would be similar to the Project. Like the Project, this alternative would result in construction activities near recreational areas and scenic roadways, though implementation of Mitigation Measure 4.1-1 would reduce construction-related visual impacts from scenic vistas to a less-than-significant level, and impacts to views from scenic roadways would remain less than significant. Operation and maintenance related impacts to scenic vistas and roadways would be similar to or greater than the Project (less than significant to significant and unavoidable). An increase in turbine height would result in increased visual prominence of visible turbines. All significant and unavoidable impacts would remain significant and unavoidable, and all other impacts and mitigation measures would be identical to the Project.

Biological Resources

Similar to the Project, Alternative 5's impacts on avian and bat species would continue to be significant and unavoidable, despite increasing the tip-to-ground clearance[4] to the minimum distance recommended for golden eagles. The evidence supports that a minimum 90-foot tip-to-ground clearance is likely to reduce golden eagle fatalities, but while the measure may also reduce fatality rates for all or some other birds, this has not been demonstrated conclusively. The overall significance finding of the avian impact is related to many avian species and many contributing factors, not just to golden eagles and tip ground clearance. All other impacts and significance findings would remain the same as the Project.

Energy Conservation

Alternative 5 would be very similar to the Project's impacts to energy conservation in most respects. However, because the turbines blades would be partially out of the APWRA wind flow layer, some loss in energy generation efficiency would be expected. The Applicant estimates that this difference in height would result in a two to three percent drop in energy generation efficiency (Greiner, 2010a). In addition, because the blades would protrude out of the wind flow layer, this is likely to cause uneven loading on the blades and turbine resulting in shorter turbine life and increased energy usage due to the increased need of maintenance during operations (Greiner, 2010a). In summary Alternative 5, while being very similar to the Project, would tend to be less beneficial than the Project because less renewable energy would be produced.

Hazard and Hazardous Materials

Alternative 5 would have the same general hazards and hazardous materials impacts as the Project; however, raising the total height of the turbines by 18 feet would slightly increase the blade throw hazard zone surrounding each turbine.

Land Use and Planning

Similar to the Project, Alternative 5 would result in four turbines being located within the required WECS setback area. However, even with the increased turbine height, no additional turbines would be located within the required setback area.

6.6 Environmentally Superior Alternative

CEQA requires an EIR to identify an environmentally superior alternative. CEQA Guidelines § 15126.6(e)(2). Further, if the environmentally superior alternative is the No Project Alternative, then the EIR also shall identify an environmentally superior alternative from among the other alternatives. CEQA Guidelines § 15126.6(e)(2). In general, the environmentally superior alternative is defined as that alternative with the least adverse impacts to the project area and its surrounding environment. Under CEQA, the goal of identifying the environmentally superior alternative is to assist decision-makers in considering project approval.

[4] Referred to in Section 4.4, Biological Resources, as ground-to-bladetip clearance.

The Environmentally Superior Alternative

Impacts from the Project and the alternatives considered to reduce these impacts are summarized and presented in Table 6.6-1. Alternative 1 (Complete Decommissioning of the Windfarm) would reduce all significant and unavoidable impacts of the Project in Aesthetics, Air Quality, and Biological Resource to less-than-significant levels. However, this alternative would achieve this reduction in significance at the cost of failing to meet almost all Project objectives. It would result in a loss of renewable generating capacity to the electrical grid and potentially result in an increase in greenhouse gas emissions if the equivalent power produced by the Project would have to be generated by the use of fossil fuels elsewhere in the grid. The full effects of this potential loss of renewable generating capacity cannot be determined, and potential increases in greenhouse gas emissions cannot be quantified, without considerable speculative assumptions. Therefore, the significance of this potential impact is unknown. It is reasonably certain, however, that Alternative 1 would have greater adverse impacts to Energy Conservation and GHG Emissions compared to the Project. Nevertheless, as Alternative 1 would reduce all identified significant and unavoidable impacts to less-than-significant levels, Alternative 1 is the Environmentally Superior Alternative.

TABLE 6.6-1
PROJECT VS. ALTERNATIVES
SUMMARY OF ENVIRONMENTAL IMPACT CONCLUSIONS

Resource Area	Proposed Project	No Project Alternative	Alternative 1	Alternative 2	Alternative 3a	Alternative 3b	Alternative 4	Alternative 5
Aesthetics	Construction of the Project, decommissioning of the existing turbines, and the process of decommissioning the Project at the end of its life, would have a substantial adverse effect on views from various viewpoint. With the implementation of recommended mitigation measures, the Project would have less-than-significant impacts for these Project phases. Operation and maintenance of the Project would have a substantial adverse effect on scenic vistas including the Vista Grande Trail, the Los Vaqueros Trail, the Los Vaqueros Watershed marina, the Los Vaqueros Reservoir Office, and the Los Vaqueros Interpretive Center. With the implementation of recommended mitigation measures, this impact would remain significant and unavoidable. The Project would not substantially damage scenic resources within a State scenic highway, but would substantially damage scenic resources within a County-designated scenic route (i.e., Vasco Road). With the implementation of the recommended mitigation measure, the significance of the impact would remain significant and unavoidable.	With no real change over baseline condition s this alternative would have reduced visual impacts over that of the Project in the A-string and F-string areas. The No Project Alternative will not improve views in the vicinity of the Vasco Caves Tour trail. In sum though the more compact layout of the existing turbines would tend to have reduced visual impacts over the Project. **Lesser impact than Project**	While there would be similar visual impacts during decommissioning to those of the Project. Complete removal of the turbines would reduce all future visual impacts to *no impact*. **Lesser impact than Project**	Although, there would be a reduction of turbines with this alternative, and some proportional reduction of impacts, with turbines installed over the Project layout would still led to comparable impacts to the Project. The same mitigation measures would apply but the overall impact would still remain significant and unavoidable. **Lesser impact than Project**	Impacts would be comparable to the Project; the same mitigation measures would apply but the overall impact would still remain significant and unavoidable. **No preference**	With the exception of the elimination of the significant and unavoidable impact at the Los Vaqueros Interpretative Center, all other impacts would be comparable to the Project; the same mitigation measures would apply but the overall impact would still remain significant and unavoidable. **Lesser impact than Project**	Impacts would be comparable to the Project. The same mitigation measures would apply but the overall impact would still remain significant and unavoidable. **No preference**	Impacts would be comparable to the Project. The same mitigation measures would apply but the overall impact would still remain significant and unavoidable. **No preference**
Agriculture Resources	Impacts would be less than significant.	Impacts would be comparable to the Project. **No preference**	No new impacts would occur. Because less area would be disturbed Alternative 2 would tend to be beneficial due to the potential opening of land to grazing. **Lesser impact than Project**	No new impacts would occur. Because less area would be disturbed Alternative 2 would tend to be beneficial due to the potential opening of land to grazing. **Lesser impact than Project**	Impacts would be comparable to the Project **No preference**	Impacts would be comparable to the Project **No preference**	Impacts would be comparable to the Project **No preference**	Impacts would be comparable to the Project **No preference**
Air Quality	The Project would result in a significant and unavoidable impact related to construction-related emission of NO_x, a criteria pollutant, which would contribute to existing air quality violations. With the implementation of recommended mitigation measures, the impact would remain significant and unavoidable.	Initial decommissioning would have the same impacts as the Project. There would be no near-term construction impacts or impacts associated with decommissioning a wind energy facility. **Lesser impact than Project**	Initial decommissioning and construction activities would be the same as the Project. However, lack of any further construction / operational activities under Alternative 1 would result no further emissions or impacts to criteria pollutants. Mitigation measures recommended for the Project would apply. **Lesser impacts than Project**	Initial decommissioning and construction activities would be the same as the Project. Impacts would be comparable to the Project; the same mitigation measures would apply but the impact would still remain significant and unavoidable. **No Preference**	Impacts would be comparable to the Project **No preference**	Impacts would be comparable to the Project **No preference**	Initial decommissioning and construction activities would be the similar to the Project but the schedule would be lengthened to reduce daily air quality impacts. Impacts would be comparable to the Project; the same mitigation measures would apply but the impact would be reduced to less than significant. **Lesser impacts than Project**	Impacts would be comparable to the Project **No preference**
Biological Resources	Project operation would result in direct and indirect impacts on birds, including species listed under Federal and State Endangered Species Acts, eagles protected under the BGEPA, Fully Protected species, State Species of Special Concern, and birds protected under the Migratory Bird Treaty Act. With the implementation of recommended mitigation measures, the significance of the impact would remain significant and unavoidable. Project construction would result in potentially significant direct and indirect impacts on burrowing owls, including temporary and permanent loss of potential habitat. With the implementation of recommended mitigation measures, the	Under the No Project Alternative, the continued operation of the existing turbines is likely to result in a great number of avian deaths than that of the Project; however, it would tend to result in fewer bat deaths due to the smaller turbines of the existing facility. Under this alternative avian deaths would continue to be significant and unavoidable. With no new construction of new turbines, impacts to habitat would be reduced over that of the Project. **Greater impact than Project**	Alternative 1 would result in reduced impacts to biological resources relative to the Project because the existing turbines would be removed and no new construction / operation would be done. The same mitigation measures would be applied to the decommissioning of the existing turbines and would be less than significant. **Lesser impact than Project**	Although Alternative 2 would reduce habitat disturbance, it is not anticipated to greatly reduce avian and bat fatalities. Impacts would therefore be comparable to the Project; the same mitigation measures would apply but the overall impact would still remain significant and unavoidable. **Lesser impact than Project**	Although Alternative 3a would slightly reduce habitat disturbance, impacts would be comparable to the Project; the same mitigation measures would apply but the overall impact would still remain significant and unavoidable. **No preference**	Although Alternative 3b would slightly reduce habitat disturbance, impacts would be comparable to the Project; the same mitigation measures would apply but the overall impact would still remain significant and unavoidable. **No preference**	I Impacts would be comparable to the Project **No preference**	Impacts would be comparable to the Project; the same mitigation measures would apply but the overall impact would still remain significant and unavoidable. **No preference**

TABLE 6.6-1 (Continued)
PROJECT VS. ALTERNATIVES
SUMMARY OF ENVIRONMENTAL IMPACT CONCLUSIONS

Resource Area	Proposed Project	No Project Alternative	Alternative 1	Alternative 2	Alternative 3a	Alternative 3b	Alternative 4	Alternative 5
Biological Resources (cont.)	significance of the impact would be reduced to less than significant. Project operation would result in significant and unavoidable direct impacts on special-status and common bats. With the implementation of recommended mitigation measures, the significance of the impact would remain significant and unavoidable. Project construction and operation would result in significant temporary and permanent impacts on California red-legged frog and California tiger salamander, including loss of upland aestivation habitat for these species. With the implementation of recommended mitigation measures, the significance of the impact would be reduced to less than significant. Project construction and operation could have a significant impact on listed and special-status reptile species (western pond turtle, San Joaquin coachwhip and Alameda whipsnake). With the implementation of recommended mitigation measures, the significance of the impact would be reduced to less than significant. Project construction would have significant temporary and permanent impacts on potential San Joaquin kit fox habitat. With the implementation of recommended mitigation measures, the significance of the impact would be reduced to less than significant. Project construction and operation could have a significant impact on non-listed special-status mammal species (American badger and San Joaquin pocket mouse). With the implementation of recommended mitigation measures, the significance of the impact would be reduced to less than significant. Project construction and operation could have a significant impact on non-listed special-status mammal species (American badger and San Joaquin pocket mouse). With the implementation of recommended mitigation measures, the significance of the impact would be reduced to less than significant. Project construction and operation could have a significant impact on longhorn fairy shrimp and vernal pools. With the implementation of recommended mitigation measures, the significance of the impact would be reduced to less than significant. Project construction could have a significant impact on populations of special-status plant species, including round-leaved filaree. With the implementation of recommended mitigation measures, the significance of the impact would be reduced to less than significant. Project construction activities could result in a significant impact on riparian habitat. With the implementation of recommended mitigation							

TABLE 6.6-1 (Continued)
PROJECT VS. ALTERNATIVES
SUMMARY OF ENVIRONMENTAL IMPACT CONCLUSIONS

Resource Area	Proposed Project	No Project Alternative	Alternative 1	Alternative 2	Alternative 3a	Alternative 3b	Alternative 4	Alternative 5
Biological Resources (cont.)	measures, the significance of the impact would be reduced to less than significant level. Project construction and operation could have a significant impact on Sensitive Natural Communities (Creeping Rye Grass Turfs). With the implementation of recommended mitigation measures, the significance of the impact would be reduced to less than significant. Project construction could have a significant impact on potentially jurisdictional wetlands or waters, and streambeds and banks. With the implementation of recommended mitigation measures, the significance of the impact would be reduced to less than significant. Project construction activities could temporarily affect active breeding bird nest sites. With the implementation of recommended mitigation measures, the significance of the impact would be reduced to less than significant.							
Cultural Resources	Impacts would be less than significant.	No impact. **No preference**	Impacts would be comparable to the Project. **No preference**	Impacts would be comparable to the Project. **No preference**	Elimination of the A-string would further lessen the localized impacts near existing cultural resources. **Lesser impact than Project**	Impacts would be comparable to the Project **No preference**	Impacts would be comparable to the Project **No preference**	Impacts would be comparable to the Project **No preference**
Energy Conservation	Impacts would be less than significant.	Impacts would be comparable to the Project. However, reduced generation would not be as beneficial as Project. **Greater impact than Project**	Impacts would be reduced or comparable to the Project. However, reduced generation would not be as beneficial as Project. **Greater impact than Project**	Alternative 2 would have the same impacts as the Project during the decommissioning and removal of the existing facilities. It would have reduced impacts during construction on energy conservation as the Project. However, reduced generation would not be as beneficial as Project. **Greater impact than Project**	Impacts would be comparable to the Project. **No preference**	Impacts would be comparable to the Project. **No preference**	Impacts would be comparable to the Project. **No preference**	The increased height of the turbines would tend to slightly reduce the generation efficiency of the Project and correspondingly be less beneficial. **Greater impact than Project**
Geology, Soils, Seismicity and Mineral Resources	Impacts would be less than significant.	Impacts would be comparable to the Project. **No preference**	With only decommissioning of the existing turbines to be performed impacts would be reduced over that of the Project. **Lesser impact than Project**	Impacts would be somewhat reduced over those of the Project due to the reduced amount of disturbed area and construction. **Lesser impact than Project**	Impacts would be comparable to the Project. **No preference**	Impacts would be comparable to the Project. **No preference**	Impacts would be comparable to the Project. **No preference**	Impacts would be comparable to the Project **No preference**
Greenhouse Gas Emissions	Impacts would be less than significant.	While operational impacts would be reduced to those of the Project, the reduction in alternative generating capacity would be not as beneficial as the Project. **Greater impact than Project**	Decommissioning impacts would be the same. Operational impacts would be eliminated. The reduction in alternative generating capacity would be not as beneficial as the Project. **Greater impact than Project**	Impacts would be somewhat reduced over those of the Project. The reduction in alternative generating capacity would be not as beneficial as the Project. **Greater impact than Project**	Impacts would be comparable to the Project. **No preference**	Impacts would be comparable to the Project. **No preference**	Impacts would be comparable to the Project. **No preference**	Impacts would be comparable to the Project **No preference**
Hazards and Hazardous Materials	Impacts would be less than significant.	Impacts would be comparable to the Project although the blade through area is larger than the Project. **Greater impact than Project**	The shorter construction period for decommissioning would result in reduced impacts over that of the Project. **Lesser impact than Project**	Impacts would be comparable to the Project. **No preference**	Impacts would be comparable to the Project. **No preference**	Impacts would be comparable to the Project. **No preference**	Impacts would be mostly comparable to the Project, except for a slight increased risk of wildland fires. **Greater impact than Project**	The increased height of the turbines would tend to slightly increase the blade throw distance beyond that of the Project. **Greater impact than Project**

TABLE 6.6-1 (Continued)
PROJECT VS. ALTERNATIVES
SUMMARY OF ENVIRONMENTAL IMPACT CONCLUSIONS

Resource Area	Proposed Project	No Project Alternative	Alternative 1	Alternative 2	Alternative 3a	Alternative 3b	Alternative 4	Alternative 5
Hydrology and Water Quality	Impacts would be less than significant.	Impacts would be comparable to the Project. **No preference**	Potential impacts to hydrologic resources would be comparable to the Project for decommissioning. But with no new construction or operation, the alternative would have a reduced impact. **Lesser impact than Project**	Impacts would be comparable to the Project **No preference**	Impacts would be comparable to the Project **No preference**	Impacts would be comparable to the Project **No preference**	Impacts would be comparable to the Project **No preference**	Impacts would be comparable to the Project **No preference**
Land Use and Planning	Impacts would be less than significant.	No impact. **No preference**	Because less area would be disturbed than the Project and all the Project Area would be opened to other uses, Alternative 1 would tend to be a beneficial impact. **Lesser impact than Project**	Impacts would be comparable to the Project. However, depending on the layout, all non-compliant potential turbine sites could be eliminated. **Lesser impact than Project**	Impacts would be comparable to the Project **No preference**	Impacts would be comparable to the Project **No preference**	Impacts would be comparable to the Project **No preference**	Impacts would be comparable to the Project **No preference**
Mineral Resources	No impact.	No impact. **No preference**	No impact. **No preference**	No impact. **No preference**	No impact. **No preference**	No impact. **No preference**	No impact. **No preference**	No impact. **No preference**
Noise	Impacts would be less than significant.	Because no new construction would occur and the area of impacts would remain the same as baseline the no project alternative would tend to have a reduced impact over the Project. **Lesser impact than Project**	Decommissioning of the existing facility would result in comparable noise impacts as the Project; construction, operation and end-of-life decommissioning would cause less of an impact than the Project, **Lesser impact than Project**	With fewer turbines operating, impacts would be somewhat reduced over those of the Project. **Lesser impact than Project**	Impacts would be comparable to the Project **No preference**	With fewer turbines operating near the Los Vaqueros Dam area, impacts would be somewhat reduced over those of the Project. **Lesser impact than Project**	Impacts would be comparable to the Project **No preference**	Impacts would be comparable to the Project **No preference**
Population and Housing	No impact.	No impact. **No preference**	No impact. **No preference**	Impacts would be comparable to the Project **No preference**	No impact. **No Preference**	No impact. **No Preference**	No impact. **No Preference**	No impact. **No Preference**
Public Services	No impact.	No impact. **No preference**	No impact. **No preference**	No impact. **No Preference**	No impact. **No Preference**	No impact. **No Preference**	No impact. **No Preference**	No impact. **No Preference**
Recreation	No impact.	No impact. **No preference**	No impact. **No preference**	No impact. **No Preference**	No impact. **No Preference**	No impact. **No Preference**	No impact. **No Preference**	No impact. **No Preference**
Transportation and Traffic	Impacts would be less than significant.	Because no new construction would occur and the area of impacts would remain the same as baseline the no project alternative would tend to have a reduced impact over the Project. **Lesser impact than Project**	Decommissioning of the existing facility would result in comparable impacts as the Project; however elimination of new construction, operation and end-of-life decommissioning would cause less of an impact than the Project, **Lesser impact than Project**	Decommissioning of the existing facility would result in comparable impacts as the Project; however the reduction in the amount of construction and schedule would result in reduced impacts. **Lesser impact than Project**	Impacts would be comparable to the Project **No preference**	Impacts would be comparable to the Project **No preference**	Impacts would be comparable to the Project **No preference**	Impacts would be comparable to the Project **No preference**
Utilities and Service Systems	Impacts would be less than significant.	No impact. **No preference**	Impacts would be comparable to the Project. **No preference**	Impacts would be comparable to the Project. **No preference**	Impacts would be comparable to the Project **No preference**	Impacts would be comparable to the Project **No preference**	Impacts would be comparable to the Project **No preference**	Impacts would be comparable to the Project **No preference**

CHAPTER 7
Report Preparation

7.1 Report Authors

7.1.1 Lead Agency

Contra Costa County

William R. Nelson, Principal Planner
Department of Conservation & Development
Community Development Division

7.1.2 Consultants

Environmental Science Associates

Jennifer Johnson, Project Director	QA/QC
Tim Morgan, Project Manager	Project Description, Alternatives, Energy Conservation
Claire Myers, Deputy Project Manager	Aesthetics, Cumulative Scenario
Cory Barringhaus	Land Use and Planning, Recreation
Nik Carlson	Agriculture and Forestry Resources
Allison Chan	Mineral Resources, Cumulative Scenario
Kirstin Conti	Geology and Soils
Dylan Duverge	Paleontological Resources
Natasha Dvorak	Biological Resources
Robert Eckard	Hydrology and Water Quality
Matt Fagundes	Air Quality, Greenhouse Gas Emissions, Noise
Ben Freese	Noise
Jack Hutchison	Traffic and Transportation
Heidi Koenig	Cultural Resources
Julie Moore	Hazards and Hazardous Materials
Reema Mahamood	Population and Housing, Public Services, Utilities
Brian Pittman	Biological Resources
Ron Teitel	Graphics
Wes McCullough	GIS
Lisa Bautista	Word Processing and Report Production

Environmental Vision (Sub-consultant)

Marsha Gale	Visual Simulations
Chuck Cornwall	Visual Simulations

7.2 Consultation

The Department of Conservation & Development consulted with staff from the following agencies and organizations on the dates listed:

California Department of Fish and Game	February 25, 2010
Contra Costa Water District	February 3, 2010
East Bay Regional Parks District	February 4, 2010
U.S. Fish and Wildlife Service	February 25, 2010

7.3 Agencies and Organizations Contacted

To solicit comments and inform the scope of this EIR, the Department of Conservation & Development submitted a copy of the Notice of Preparation to the following agencies and organizations:

- Air Resources Board
- Alameda County Community Development Agency
- Audubon California
- Bay Area Air Quality Management District
- California Department of Forestry and Fire Protection
- California Energy Commission, Environmental Protection Office
- California Highway Patrol Headquarters
- California Native Plant Society
- California Native Plant Society, East Bay Chapter
- Central Valley Regional Water Quality Control Board (5S)
- City of Brentwood, Community Development Department
- City of Livermore, Community Development Department
- Contra Costa Water District
- Department of Justice, Attorney General's Office
- Department of Fish and Game, Region 3
- Department of Parks and Recreation, Resources Management Division
- Department of Transportation (CALTRANS), District 4
- Department of Water Resources
- East Bay Regional Park District
- East Contra Costa Fire Protection District
- Federal Aviation Administration, Western-Pacific Region
- Mount Diablo Audubon Society
- Native American Heritage Commission
- Northwind Energy, Inc.
- Public Utilities Commission
- Save Mount Diablo
- The Resources Agency of California
- US Army Corps of Engineers, Sacramento District, Regulatory Section

CHAPTER 8
Glossary and Acronyms

8.1 Glossary

A number of technical terms are used in the wind energy industry and at the Tres Vaqueros Windfarm to describe the operations and equipment that are in use there, as well as some other general technical terms used in various analytical sections. This glossary includes selected definitions and in some cases expanded descriptions of these terms that allow the reader of this document who is unfamiliar with the wind energy industry to understand the basic operations within a wind farm.

Active Fault — An active fault is defined by the California Geological Survey as a fault that has had surface displacement within Holocene time (approximately the last 11,000 years). A potentially active fault is a fault that has shown evidence of surface displacement during the last 1.6 million years, unless direct geologic evidence demonstrates inactivity for the last 11,000 years or longer. This definition does not mean that faults lacking evidence of surface displacement are necessarily inactive. Sufficiently active is also used to describe a fault if there is some evidence that Holocene surface displacement occurred on one or more of its segments or branches.

Aestivation — A state of dormancy similar to hibernation that occurs during summer and fall.

CO — Carbon monoxide (CO), a toxic gas generated by incomplete combustion. CO is a criteria air pollutant.

Criteria Air Pollutant — An air pollutant for which acceptable levels of exposure can be determined and for which an ambient air quality standard has been set. Examples include: ozone (O3), carbon monoxide (CO), nitrogen dioxide (NO2), sulfur dioxide (SO2), and PM10 and PM2.5.

Nacelle — A nacelle is the a housing located at the top of a wind turbine tower inside of which will typically be found the gearbox, generator, and various control equipment for the wind turbine generator. The nacelle protects the turbine generator and electronics from environmental exposure. A wind vane and anemometer are mounted at the rear of the nacelle to provide the controller with wind speed and direction information.

Nitrogen Oxides NO_X A general term pertaining to compounds of nitric oxide (NO), nitrogen dioxide (NO_2), and other oxides of nitrogen. Nitrogen oxides are typically created during combustion processes, and are major contributors to smog formation and acid deposition. NO2 is a criteria air pollutant and may result in numerous adverse health effects.

Rotor Blades Wind turbines are powered by three composite or fiberglass blades connected to a central rotor hub. Wind creates lift on the blades, causing the rotor hub to spin. This rotation is transferred to a gearbox where the speed of rotation is increased to the speed required for the attached electric generator that is housed in the nacelle. The rotor blades turn slowly, typically less than 20 revolutions per minute. The rotor blades are typically made from glass-reinforced polyester composite. The blades are non-metallic, but equipped with a sophisticated lightning suppression system.

Take The federal Endangered Species Act defines “take” as harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, collecting, or attempting to engage in any such conduct.

Tower A tower is a free-standing, painted steel, conical- type (tubular) structure that is manufactured in multiple sections depending on the required height.

Turbine A turbine is a rotary engine that extracts energy from a fluid or air flow and converts it into useful work. As specifically used for this Project, wind is used by a turbine to convert the energy of wind into mechanical energy. This mechanical energy is then converted to electricity through a generator connected to the turbine. Wind turbines can also be called a wind generator, wind power unit, wind energy converter, or aerogenerator.

8.2 Acronyms and Abbreviations Used in This EIR

AB	Assembly Bill
ABAG	Association of Bay Area Governments
AIA	Airport Influence Area
ALUC	Airport Land Use Commission
AMP	Adaptive Management Plan
APWRA	Altamont Pass Wind Resource Area
ASCE	American Society of Civil Engineers
BAAQMD	Bay Area Air Quality Management District
BGEPA	Bald and Golden Eagle Protection Act

BMP	Best Management Practice
BO	Biological Opinion
CAAQS	California Ambient Air Quality Standard
CalFire	California Department of Forestry and Fire Protection
CalRecycle	California Department of Resources Recycling and Recovery
Caltrans	California Department of Transportation
CAA	Clean Air Act
CARB	California Air Resources Board
CAT	Climate Action Plan
CBC	California Building Code
CCAR	California Climate Action Registry
CCR	California Code of Regulations
CCWD	Contra Costa Water District
CCWG	Climate Change Working Group
CCCHSD	Contra Costa County Health Services Department
CCCWP	Contra Costa Clean Water Program
CDC	California Department of Conservation
CDFG	California Department of Fish and Game
CDMG	California Division of Mines and Geology
CDPH	California Department of Public Health
CEC	California Energy Commission
CFR	Code of Federal Regulations
CGS	California Geological Survey
CHP	California Highway Patrol
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CNDDB	California National Diversity Data Base
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CO	Carbon Monoxide
CO_2e	CO2 equivalent

CORPS	U.S. Army Corps of Engineers
CRPR	California Rare Plant Rank
CVRWQCB	Central Valley Regional Water Quality Control Board
CWA	Clean Water Act
dB	decibels
dBA	A-weighted decibels
DNL	Day-Night Noise Level
DPM	Diesel Particulate Matter
DTSC	Department of Toxic Substances Control
EBRPD	East Bay Regional Park District
ECCFPD	East Contra Costa Fire Protection District
EDR	Environmental Data Resources
EIR	Environmental Impact Report
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FHWA	Federal Highway Administration
g	Acceleration due to gravity
GHG	Greenhouse gas(es)
GIS	Geographic Information System
GSU	Generation Step-Up Transformer
GW	Gigawatt, a thousand million Watts
GWh	Gigawatt hour
GWP	Global Warming Potential
g/bhp-hr	Grams per brake horsepower-hour
HAPs	Hazardous Air Pollutants
HCP	Habitat Conservation Plan
hp	Horsepower
Hz	Hertz
H_2S	Hydrogen Sulfide
ICLEI	International Council for Local Environmental Initiatives

kV	Kilovolt
kW	Kilowatt
kWh	Kilowatt hour
LDAR	Leak Detection and Repair
Leq	Equivalent sound level
Lmax	Instantaneous maximum noise level
LMR	Land Mobile Radio
LOS	Level of Service
LU&S	Locally Unusual and Significant
M	Richter Magnitude
MBTA	Migratory Bird Treaty Act
MCE	Maximum Credible Earthquake
MCLs	Maximum Contaminant Levels
MGD	Million Gallons per Day
MMI	Modified Mercalli Intensity
mm/y	Millimeter per Year
MOU	Memorandum of Understanding
mph	Miles per Hour
MRZ	Mineral Resources Zone
MSDS	Material Safety Data Sheets
msl	Mean Sea Level
MUTCD	Manual on Uniform Traffic Control Devices
Mw	Moment Magnitude
MW	Megawatt, a million Watts
MWh	Megawatt hour
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NCCP	Natural Community Conservation Plan
NCCPA	California Natural Community Conservation Planning Act
NESC	National Electrical Safety Code
NESHAPs	National Emission Standards for Hazardous Air Pollutants

NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NO_x	Nitrogen Oxides
NO_2	Nitrogen Dioxide
NOP	Notice of Preparation
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resource Conservation Service
NWIC	Northwest Information Center
OEHHA	California Office of Environmental Health Hazards Assessment
OES	Office of Emergency Services
OSHA	Occupational Safety and Health Administration (Federal)
O&M	Operations and Maintenance
PG&E	Pacific Gas & Electric Company
PGA	Peak Ground Acceleration
PSHA	Probabilistic Seismic Hazard Assessment
PM10	PM less than 10 microns in size
PM2.5	PM less than 2.5 microns in size
ppm	Parts per million
PRC	Public Resources Code
PSHA	Probabilistic Seismic Hazard Assessment
RCRA	Resource Conservation and Recovery Act
RCRIS	Resource Conservation and Recovery Information System
ROG	Reactive Organic Gases
ROW	Right-of-way
RPS	Renewable Portfolio Standard
RWQCB	Regional Water Quality Control Board
SCADA	Supervisory Control and Data Acquisition
SCAQMD	South Coast Air Quality Management District
SDWA	Safe Drinking Water Act
SF6	Sulfur Hexafluoride
SIP	State Implementation Plan

SLIC	Spills, Leaks, Investigations, and Cleanups
SMARA	California Surface Mining and Reclamation Act
SO_2	Sulfur Dioxide
SPCC	Spill Prevention and Countermeasure Control Plan
SR	State Route, for example SR-4 is State Route number 4
SRC	Scientific Review Committee
SRRE	Source Reduction and Recycling Element
SSUAF	Sonoma State University Academic Foundation
SVP	Society of Vertebrate Paleontology
SWRCB	State Water Resources Control Board (State Board)
SWPPP	Storm Water Pollution Prevention Plan
TMDL	Total Maximum Daily Load
VAC	Volts Alternating Current
UBC	Uniform Building Code
UCMP	University of California, Museum of Paleontology
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Service
UST	Underground Storage Tank
WECS	Wind Energy Conversion Systems
WHR	California Wildlife Habitat Relations System

CHAPTER 9
References

Project Description

American Wind Energy Association (AWEA), 2009. Wind Energy FAQ: How Much Water Do Wind Turbines Use Compared with Conventional Power Plants? Available at: http://www.awea.org/faq/water.html.

Pattern Energy, 2009. *Project Description: Tres Vaqueros Windfarms LLC, A Wind Energy Repowering Project*. September 23, 2009.

Pattern Energy, 2010. Responses to ESA Data Requests 1, 2, & 3. Dated February 2, 2010, March 4, 2010, and March 1, 2010 respectively.

Pattern Energy 2011. Personal Communication Rick Greiner, Pattern Energy with Tim Morgan of ESA, March 22, 2011.

Aesthetics

California Department of Transportation (Caltrans), 2010. Caltrans, California Scenic Highway mapping system. Available at: http://www.dot.ca.gov/hq/LandArch/scenic_highways/index.htm. Accessed April 2, 2010.

Caufield, 2010. Rex Caulfield, East Bay Regional Park District. Personal Communication June 20, 2010.

Colby, 2010. Peter Colby, Contra Costa Water District. Personal Communication April 13, 2010.

Contra Costa County, 2010a. Contra Costa County General Plan 2005-2020. Published January 18, 2005; reprinted July 2010.

Contra Costa County, 2010b. Contra Costa County, California Ordinance Code, Chapter 88.3, Wind Energy Conversion Systems (WECS). Accessed May 11, 2010.

Contra Costa County Traffic Engineering Division, 2005. Personal Communication, 2005. Cited in the Los Vaqueros Reservoir Expansion Project, Draft EIS/EIR, Chapter 4.9 Transportation and Circulation. Published February, 2009.

Contra Costa Water District (CCWD), 2010. Los Vaqueros Watershed Recreational Trails. Available at: http://www.ccwater.com/losvaqueros/images/LVMAP.jpg. Accessed June 17, 2010.

East Bay Regional Park District (EBRPD), 2010. Morgan Territory Regional Preserve map. Available at: http://www.ebparks.org/parks/maps#M. Accessed June 17, 2010.

Kenny, 2010. Jack Kenny, Chief of Parks, East Bay Regional Parks District. Personal Communication April 7, 2010.

Los Vaqueros Draft EIR, 2009. Los Vaqueros Reservoir Expansion Project, Draft EIS/EIR, Chapter 4.9 Transportation and Circulation. Published February, 2009.

Mark Thomas & Company (consultant for the SR 4 Bypass Authority), 2008. Traffic Volumes on SR 4 Bypass, September 2008.

Mark Thomas & Company, 2011. Traffic Data Service Vehicle Counts. Marsh Creek Road East of Walnut Blvd. Data collected April 2009; provided to ESA May 2011.

Marks Traffic Data, 2010. Traffic Volumes collected on Vasco Road, February 4-10, 2010.

National Research Council (NRC), 2007. Environmental Impacts of Wind Energy Projects, Washington, D.C.: The National Academies Press, 2007.

Wrightman, 2010. Harvey Wrightman letter: Regarding Wind Turbines and Road Safety. Dated January 13, 2010.

Agriculture and Forestry Resources

California Department of Conservation, Division of Land Resource Protection, 2010. *Farmland Mapping and Monitoring Program, Contra Costa County, Table A-5: 2006-2008 Land Use Conversion, available at http://redirect.conservation.ca.gov/DLRP/fmmp/product_page.asp*, accessed April 2, 2010.

Contra Costa County, 2010a. Contra Costa County General Plan 2005-2020. Published January 18, 2005; reprinted July 2010.

Contra Costa County, 2010b. Contra Costa County Codes and Ordinances. Available at *http://www.co.contra-costa.ca.us/index.aspx?NID=178. A*ccessed April 2, 2010.

Farmland Mapping and Monitoring Program (FMMP), 2010. California Department of Conservation – Division of Land Resource Protection, GIS data available at *http://www.conservation.ca.gov/DLRP/fmmp/Pages/Index.aspx*. Accessed April 2, 2010.

Air Quality

Bay Area Air Quality Management District (BAAQMD), 2010a. Bay Area Climatology website. Available at: http://www.baaqmd.gov/Divisions/Communications-and-Outreach/Air-Quality-in-the-Bay-Area/Bay-Area-Climatology.aspx. Accessed April 7, 2010.

BAAQMD, 2010b. *Annual Bay Area Air Quality Summaries* website. Available at: http://www.baaqmd.gov/Divisions/Communications-and-Outreach/Air-Quality-in-the-Bay-Area/Air-Quality-Summaries.aspx. Accessed April 3, 2010.

BAAQMD, 2010c. *BAAQMD Air Quality Data Display System* website. Available at: http://gate1.baaqmd.gov/aqmet/AQYearly.aspx. Accessed May 14, 2010.

BAAQMD, 2010d. *Air Quality Standards and Attainment Status*, website. Available at: http://hank.baaqmd.gov/pln/air_quality/ambient_air_quality.htm. Accessed April 5, 2010.

BAAQMD, 2010e *CEQA Air Quality Guidelines Update*, June 2010.

BAAQMD, 2010f. Personal communication with Greg Tholen of the BAAQMD on May 14, 2010.

BAAQMD, 2010g. *The Bay Area 2010 Clean Air Plan*. Adopted September 15, 2010.

California Air Resources Board (CARB), 2009. *Methodology for Estimating Premature Deaths Associated with Long-Term Exposure to Fine Airborne Particulate Matter in California*, Draft Staff Report, December 7, 2009. Available online at: http://www.arb.ca.gov/Research/Health/pm-mort/pm-mortdraft.pdf.

Contra Costa County, 2010. Contra Costa County General Plan 2005-2020. Published January 18, 2005; reprinted July 2010.

Western Regional Climate Center (WRCC), 2010. *Period of Record Monthly Climate Summaries for Livermore, California*. Available at: http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca4997. Accessed April 6, 2010.

Biological Resources

Altamont County, 2010. APWRA Conservation Plan website. Available online at http://www.apwraconservationplan.org. Accessed May 19, 2010.

Arnett, E. B., K. Brown, W. P. Erickson, J. Fiedler, T. H. Henry, G. D. Johnson, J. Kerns, R. R. Kolford, C. P. Nicholson, T. O'Connell, M. Piorkowski, and R. Tankersley, Jr., 2008. Patterns of Fatality of Bats at Wind Energy Facilities in North America. Journal of Wildlife Management 72: 61–78.

Arnett, E. B., M. Schirmacher, M. M. P. Huso, and J. P. Hayes, 2009. Effectiveness of changing wind turbine cut-in speed to reduce bat fatalities at wind facilities. An annual report submitted to the Bats and Wind Energy Cooperative. Bat Conservation International. Austin, Texas, USA.

Audobon, 2010. Letter from Audobon to Alameda County Planning Department regarding Audubon/CARE Adaptive Management Plan Pursuant to Settling Parties Avian Wildlife Protection Program and Schedule (Condition 7) as modified by Planning Director's Amendment on February 3, 2010. Letter dated March 15, 2010.

California Bat Working Group (CBWG), 2006. Guidelines for Assessing and Minimizing Impacts to Bats at Wind Energy Development Sites in California. September, 2006.

California Burrowing Owl Consortium (CBOC), 1993. Burrowing Owl Survey Protocol and Mitigation Guidelines. April 1993.

California Department of Fish and Game (CDFG), 1995. Staff Report on Burrowing Owl Mitigation. October 17, 1995.

CDFG, 2005. California Interagency Wildlife Task Group, California Wildlife Habitat Relationships (CWHR) Version 8.1. (modeling software), California Department of Fish and Game, Sacramento, CA, 2005.

CDFG, 2009. Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities. November 24, 2009.

CDFG, 2010a. Rarefind 3. California Natural Diversity Database. California Department of Fish and Game, Biogeographic Data Branch, Sacramento, CA. April 2010.

CDFG, 2010b. List of Vegetation Alliances and Associations. September, 2010. Available online at http://www.dfg.ca.gov/biogeodata/vegcamp/natural_comm_list.asp.

California Energy Commission (CEC), 2002. Golden Eagles in a Perilous Landscape: Predicting the Effects of Mitigation for Wind Turbine Blade Strike Mortality. Prepared by Grainger Hunt for the California Energy Commission. July, 2002.

CEC, 2006. The Trend of Golden Eagle Territory Occupancy in the Vicinity of the Altamont Pass Wind Resource Area: 2005 Survey. Consultant Report prepared by Grainger Hunt and Teresa Hunt for the California Energy Commission. June, 2006.

CEC, 2007. "California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development. Commission Final Report. October, 2007.

CEC, 2009. "Range Management Practices to Reduce Wind Turbine Impacts on Burrowing Owls and Other Raptors in the Altamont Pass Wind Resource Area. Prepared for California Energy Commission by East Bay Regional Park District. October, 2009.

California Native Plant Society (CNPS), 2010. Electronic Inventory of Rare and Endangered Plants (online edition, v7-08c). California Native Plant Society, Sacramento, CA, 2010.

CH2M Hill, 2010a. Wildlife Habitat Characterization Report for the Vasco Winds Repowering Project. Prepared for Vasco Winds, LLC. April 2010.

CH2M Hill, 2010b. USACE Delineation of Wetlands and Other Waters for the Vasco Winds Repowering Project. Prepared for Vasco Winds, LLC. May 2010.

CH2M Hill, 2010c. Final Burrowing Owl Survey Report. Vasco Winds Repowering Project. Prepared for Vasco Winds, LLC. July 2010.

CH2M Hill, 2010d. "Vasco Winds Nextera: Status Update on Botanical Surveys." Email. April 6, 2010.

CH2M Hill, 2010e. "Vasco Winds Repowering Project Acoustical Analysis." Prepared for Vasco Winds, LLC by CH2M Hill. August, 2010.

Contra Costa County, 2010. Contra Costa County General Plan 2005-2020. Published January 18, 2005; reprinted July 2008.

Contra Costa Water District and Bureau of Reclamation (CCWD and Reclamation), 2010. Environmental Impact Report for the Los Vaqueros Reservoir Expansion Project, Volumes I through IV. Prepared by Environmental Science Associates. Final published March 2010.

Drewitt, Allan L., and Rowena H.W. Langston, 2008. Collision Effects of Wind-power Generators and other Obstacles on Birds. Ann. N.Y. Acad. Sci. 1134: 233–266 (2008).

East Bay Regional Parks District (EBRPD), 2009a. Range Management Practices to Reduce Wind Turbine Impacts on Burrowing Owls and Other Raptors in the Altamont Pass Wind Resource Area, California. Prepared for California Energy Commission, Public Interest Energy Research Program. October 2009.

EBRPD, 2009b. Scoping Comments for Tres Vaqueros Windfarm Repowering Project. Letter dated April 16, 2009.

East County HCP (ECCCHC), 2007. Final East Contra Costa County Habitat Conservation Plan/Natural Communities Conservation Plan, East Contra Costa County Habitat Conservation Plan Association, October, 2007.

Eckert, H. G., 1982. Ecological aspects of bat activity rhythms. Pages 201–242 in T. H. Kunz, editor. Ecology of bats. Plenum Press, New York, New York, USA.

Ecology and Environment, Inc, 2010a. Final Wetland Delineation Report for the Tres Vaqueros Wind Re-Power Project. Prepared for Pattern Renewables Development Company LLC, Houston, Texas. June 15, 2010.

Ecology and Environment, Inc, 2009. Final Biological Resources Report for the Tres Vaqueros Wind Repower Project. Prepared for Contra Costa County, California. February 19, 2009.

Ecology and Environment, Inc, 2010b. Tres Vaqueros Disturbance Calculations Summary. Unpublished Document. Fall, 2010.

Ecology and Environment, Inc, 2011. Revised Wetland Delineation Report for the Tres Vaqueros Wind Re-Power Project. Prepared for Pattern Renewables Development Company LLC, Houston, Texas. February 11, 2011.

Erickson, W. P., G. D. Johnson, M. D. Strickland, D. P. Young Jr, K. J. Sernka, and R. E. Good, M. Bourassa, K. Bay, and K. Sernka, 2002. Synthesis and comparison of baseline avian and bat use, raptor nesting and mortality information from proposed and existing wind developments. Bonneville Power Administration, Portland, Oregon, USA.

ICF International, 2010. History, Assessment, and Implications of Avian Studies for the Vasco Winds LLC Repowering Project. Prepared for NextEra Energy Resources, LLC. June 2010.

Insignia Environmental, 2009. 2008/2009 Annual Report for the Buena Vista Avian and Bat Monitoring Project. Prepared for Contra Costa County. September 4, 2009.

Johnson, G.D., M. K. Perlik, W. P. Erickson, and M. D. Strickland, 2004. Bat activity, composition, and collision mortality at a large wind plant in Minnesota. Wildlife Society Bulletin 32: 1278–1288.

Kerlinger, P., R. Curry, L. Culp, A. Jain, C. Wilkerson, B. Fischer, A. Hasch, 2006. Post-Construction Avian and Bat Fatality Monitoring Study for the High Winds Wind Repower Project Solano County, California: Two Year Report. Prepared for High Winds, LLC, FPL Energy.

Kunz, Thomas H., Edward B. Arnett, Wallace P. Erickson, Alexander R. Hoar, Gregory D. Johnson, Ronald P. Larkin, M. Dale Strickland, Robert W. Thresher, and Merlin D. Tuttle, 2007. "Ecological impacts of wind energy development on bats: questions, research needs, and hypotheses," Front Ecol Environ 2007; 5(6): 315-324.

Leddy, K. L, 1996. Effects of wind turbines on non-game birds in Conservation Reserve Program grasslands in southwestern Minnesota. M. S. thesis. South Dakota State University,Brookings, SD, USA.

National Academy of Sciences, 2007. Environmental Impacts of Wind-Energy Projects.

Orloff and Flannery, 1992. "Wind Turbine Effects on Avian Activity, Habitat Use, and Mortality in Altamont Pass and Solano County Sind Resource Areas 1998-1991. Prepared for California Energy Commission. March, 1992.

Pandion, 2010. "Altamont Vasco Repower – Acoustic Bat Monitoring Preliminary Findings." Prepared for NextEra Energy Resources by Pandion Systems, Inc. October 8, 2010.

Skinner and Pavlik (eds.), 1994. California Native Plant Society's Inventory of Rare and Endangered Vascular Plants of California, California Native Plant Society, 1994.

Smallwood, K.S, 2010. Personal communications regarding turbine bladetip-to-ground clearance and other micrositing factors. Spring, 2010.

Smallwood, Shawn, 2010a. Baseline Avian and Bat Fatality Rates at the Tres Vaqueros Wind Project, Contra Costa County, California. March 21, 2010.

Smallwood, Shawn, 2010b. Assessment of Three Proposed Adaptive Management Plans for Reducing Raptor Fatalities in the Altamont Pass Wind Resource Area. June 1, 2010.

Smallwood, Shawn, 2010c. Follow-up Wind Turbine Siting Suggestions for Tres Vaqueros Wind Energy Project. June 23, 2010.

Smallwood, Shawn, 2010d. Second Follow-up Wind Turbine Siting Suggestions for Tres Vaqueros Wind Energy Project. September 3, 2010.

Smallwood, K. S., and B. Karas, 2009. Avian and bat fatality rates at old-generation and repowered wind turbines in California. Journal of Wildlife Management. Vol. 73, No. 7. pp. 1062-1071. September 2009.

Smallwood, K. S., and L. Neher, 2010. Siting Repowered Wind Turbines to Minimize Raptor Collisions at the Tres Vaqueros Wind Project, Contra Costa County, California. March 19, 2010.

Smallwood, K.S. and L. Spiegel, 2005. Assessment to Support An Adaptive Management Plan for the APWRA. Unpublished CEC staff report. 19 pp.

Smallwood, Shawn, and Carl Thelander, 2004. "Developing Methods to Reduce Bird Mortality in the Altamont Pass Wind Resource Area." Prepared by BioResource Consultants for the California Energy Commission Public Interest Energy Research (PIER) Program, Report #500-04-052. August 2004.

Sycamore Environmental Consultants, 2010. "Botanical Inventory Report for the Vasco Winds Repowering Project." Prepared by Sycamore Environmental Consultants, Inc. for CH2M Hill, Inc. August 20, 2010.

TetraTech, 2008. Draft Affected Environment Report for the Vasco Winds LLC Project. Prepared for FPL. October 2008.

United States Department of Energy (USDOE), 2009. Sage-Grouse and Wind Energy: Biology, Habits, and Potential Effects from Development. Prepared by Pacific Northwest National Laboratory. July, 2009.

United States Fish and Wildlife Service (USFWS), 1999a. San Joaquin Kit Fox Survey Protocol for the Northern Range. Prepared by the Sacramento Fish and Wildlife Office. June 1999.

USFWS, 1999b. Standardized Recommendations for Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance. Prepared by the Sacramento Fish and Wildlife Office. June 1999.

USFWS, 2010a. Eagle Take Permitting under the Bald and Golden Eagle Protection Act. U.S. Fish and Wildlife Service Interim Guidance. May 2010.

USFWS, 2010b. USFWS Wind Turbine Guidelines Advisory Committee Recommendations. March 4, 2010.

Usgaard, R.E., D.E. Naugle, R.G. Osborn, and K.F. Higgins, 1997. Effects of wind turbines on nesting raptors at Buffalo Ridge in southwestern Minnesota. Proceedings of the South Dakota Academy of Science 76: 113-117.

WEST, Inc., 2006. Diablo Winds Wildlife Monitoring Progress Report: March 2005 – February 2006. Unpubl. report to unnamed recipient. Available at County of Alameda, Alameda County Community Development Agency, Planning Department, 224 W. Winton Avenue, Rm. 111, Hayward, California. 26 pp. + 2 app.

Cultural Resources

Bright, 1998. William Bright. 1500 California Place Names: Their Origin and Meaning. Revised 1000 California Place Names by Erwin G. Gudde. Berkeley, University of California Press.

California Office of Historic Preservation (OHP), 2009. Archaeological Determinations of Eligibility, Contra Costa County, Updated September 17, 2009. On file, NWIC. [CONFIDENTIAL]

Contra Costa County, 2010. Contra Costa County General Plan 2005-2020. Published January 18, 2005; reprinted July 2010.

Davis, Lee, Richard Hitchcock, Lisa Mertz, Randall Milliken, Beverly Ortiz, Suzanne Stewart, Lauren Teixeira, and David Fredrickson, 1994. *Native American History of the Los Vaqueros Project Area, Alameda and Contra Costa Counties California.* Prepared for Contra Costa Water District.

Fredrickson, David, 1982. *Los Vaqueros: A Cultural Resource Study*. Prepared for Contra Costa Water District.

Fredrickson, David A., 1986. *A Review of the Cultural Resources Evaluation of Sections 25 and 30, Howden Wind Parks, Inc., Vasco road Area, Contra Costa County, California (County File # 2025-85).* Prepared for Darwin Myers Associates, Pleasant Hill, California. On file (S-8757), Northwest Information Center of the California Historical Resources Information System, Sonoma State University, Rohnert Park, California, 1986. [CONFIDENTIAL]

Holman, Miley Paul, Matthew Clark, and Randy Wiberg, 1985. *A Preliminary Report of Findings for the Proposed Howden Windpark, Sections 25, 30, and 31, Altamont Pass, Contra Costa County, California.* Prepared for Howden Wind Parks, Inc. On file, NWIC (S-8909).

Hoover, M. B., H. E. Rensch, E. G. Rensch, W. N. Abeloe. 2002. *Historic Spots in California.* Revised by Douglas E. Kyle. Palo Alto, CA: Stanford University Press.

Jones, T.L., and K.A. Klar, 2007. *Prehistoric California: Colonization, Culture, and Complexity.* AltaMira Press.

Koenig, Heidi, 2010. *Cultural Resources Survey Report, Tres Vaqueros Windfarm Project, Contra Costa County, California.* Prepared for Contra Costa County. On file, Department of Conservation and Development Community Development Division and NWIC.[CONFIDENTIAL]

Kroeber, Alfred L., 1925. *Handbook of the Indians of California.* Bureau of American Ethnology Bulletin 78. Smithsonian Institution, Washington, D.C.

Levy, Richard, 1978. Eastern Miwok. Costanoan. In *California, Handbook of North American Indians, Vol. 8*, edited by Robert F. Heizer, pp. 398–413, 485–495, William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Meyer, Jack, and Jeffrey Rosenthal, 2007. *Geoarchaeological Overview of the Nine Bay Area Counties in Caltrans District 4.* Prepared for Caltrans District 4.

Milliken, Randall, 1986. Historic Overview. In *Archaeological Survey of the Kellogg Reservoir Contra Costa County, California*, edited by Janet P. Eidsness, pp. 27–34. Prepared for Jones & Stokes Associates, Inc., Sacramento.[CONFIDENTIAL]

Milliken, Randall, Richard T. Fitzgerald, Mark G. Hylkema, Randy Groza, Tom Origer, David G. Bieling, Alan Leventhal, Randy S. Wiberg, Andrew Gottfield, Donna Gillette, Vaviana Bellifemine, Eric Strother, Robert Cartier, and David A. Fredrickson, 2007. Punctuated Culture Change in the San Francisco Bay Area, In *Prehistoric California: Colonization, Culture, and Complexity.* Edited by T.L. Jones and K.A. Klar, pp. 99–124, AltaMira Press.

Northwest Information Center (NWIC), 2009. Records Search May 14, 2009 (File No. 08-1383). [CONFIDENTIAL]

Praetzellis, Mary, Suzanne B. Stewart, and Grace H. Ziesing, 1996. *The Los Vaqueros Watershed: A Working History*. SSUAF Rohnert Park. Report prepared for the Contra Costa Water District.

Sonoma State University Academic Foundation, Inc. (SSUAF), 1992. *Evaluation, Request for Determination of Eligibility, and Effect for the Los Vaqueros Project, Alameda and Contra Costa Counties, California.* Prepared for Contra Costa Water District.

Society of Vertebrate Paleontology (SVP), 1995. *Assessment and mitigation of adverse impacts to nonrenewable paleontologic resources: standard guidelines*, Society of Vertebrate Paleontology News Bulletin, Vol. 163, pp. 22–27, 1995.

Society of Vertebrate Paleontology (SVP), 1996. *Conditions of Receivership for Paleontologic Salvage Collections, Society of Vertebrate Paleontology* News *Bulletin, Vol. 166*, pp. 31–323, February 1996.

Stewart, Suzanne, and Albert Villemaire, 1995. *Archaeological Investigations within the Natural Gas Pipeline Area of Direct Impact near CA-CCO-310 and CA-CCO-417, Los Vaqueros Project, Alameda and Contra Costa Counties, California.* Prepared for Contra Costa Water District.

University of California Museum of Paleontology (UCMP), 2010. *Collections Database*. Accessed Online April 12, 2010 at: http://www.ucmp.berkeley.edu/science/collections.php.

U.S. Geological Survey (USGS), 1994. *Preliminary geologic map emphasizing bedrock formations in Contra Costa County, California: A digital database*, compiled by R.W Graymer, D.L. Jones, and E.E. Brabb, USGS Open-file Report 94-622, 1994.

Wallace, William, 1978. Northern Valley Yokuts. In *California*, edited by Robert F. Heizer, pp. 274–288. Handbook of North American Indians, vol. 8, William C. Sturtevant, general editor. Smithsonian Institution, Washington D.C.

Ziesing, Grace (editor), 1997. *Rancho to Reservoir: History and Archaeology of the Los Vaqueros Watershed, California.* Prepared for Contra Costa Water District, 1997.

Energy Conservation

California Energy Commission (CEC), 2010. *California's Major Sources of Energy*. http://energyalmanac.ca.gov/overview/energy_sources.html, updated April 7, 2009. Site accessed April 26, 2010.

CEC, 2006a, *New Renewable Facilities Program Guidebook* Publication No. CEC-300-2006-006-F (April 2006) < http://www.energy.ca.gov/2006publications/CEC-300-2006-006/CEC-300-2006-006-F.PDF>.

CEC, 2006b, *Renewable Portfolio Standard: Eligibility Guidebook*, Publication No. CEC-300-2006-007-F (April 2006) <http://www.energy.ca.gov/2006publications/CEC-300-2006-007/CEC-300-2006-007-F.PDF>.

Contra Costa County, 2010. Contra Costa County General Plan 2005-2020. Published January 18, 2005; reprinted July 2010.

ESA, 2010. Calculations by Tim Morgan, Technical Associate, Environmental Associates. December 2010.

Greiner, 2010. Rick Greiner, Pattern Energy. Personal Communication with Tim Morgan of ESA, January and August 2010.

Hannon et al., 1978. Energy and Labor in the Construction Sector. Article in Science Magazine. November 24, 1978.

Nierenberg, 2010. Ron Nierenberg, Independent Consultant. Personal Communication with Tim Morgan of ESA, April 2010.

Geology and Soils

Association of Bay Area Government (ABAG), 2003, *Modified Mercalli Intensity Scale*, http://www.abag.ca.gov/bayarea/eqmaps/doc/mmi.html, accessed on Apri1 26, 2010a.

Association of Bay Area Government (ABAG), ABAG Shaking Intensity Maps and Information, http://www.abag.ca.gov/bayarea/eqmaps/mapsba.html, accessed on April 26, 2010b.

Association of Bay Area Government (ABAG), ABAG *Modeled Shaking Intensity for Bay Area: 1989 Loma Prieta Earthquake*, http://www.abag.ca.gov/cgi-bin/pickmapx.pl. Accessed on April 26, 2010c.

California Department of Mines and Geology (CDMG), *GIS Files of Official Alquist-Priolo Earthquake Fault Zones, Central Coastal Region*, Developed by William A. Bryant, Ross Martin, Perry Wong, Dinah Maldonado, Jerry Wampole, and David Dixon, DMG CD 2001-04, 2001.

California Geologic Survey (CGS), 2002a. *California Geomorphic Provinces*, Note 36, 2002.

California Geologic Survey (CGS), 2002b. *How Earthquakes Are Measured*, CGS Note 32, 2002b.

California Geologic Survey (CGS), 2006. *Simplified Geologic Map of California*, 2006.

California Geologic Survey (CGS), 2010. Probabilistic Seismic Hazards Mapping Ground Motion Page. http://redirect.conservation.ca.gov/cgs/rghm/pshamap/pshamap.asp Accessed on April 23, 2010.

Contra Costa County, 2010. Contra Costa County General Plan 2005-2020. Published January 18, 2005; reprinted July 2010.

CCCHS (Contra Costa County Health Services), available online at http://www.cchealth.org/eh/land_use/pdf/septic_system_cococo.pdf, accessed April 27, 2010.

Hart, E.W. Revised and updated 1997. Fault-Rupture Hazard Zones in California: Alquist-Priolo Special Studies Zones Act of 1972 with Index to Special Studies Zones Maps, California Division of Mines and Geology, Special Publication 42, 1990.

Jennings, C. W., 1994, *Fault Activity Map of California and Adjacent Areas*, California Division of Mines and Geology Data Map No. 6, 1:750,000, 1994.

National Resource Conservation Service (NRCS), United States Department of Agriculture, 1977. *Soil Survey, Contra Costa County*, 1977.

Natural Resources Conservation Service (NRCS), Web Soil Survey. Available online at http://websoilsurvey.nrcs.usda.gov accessed on April 26, 2010.

Nilsen, T.H., 1975. Preliminary Photointerpretation Map of Landslide and Other Surficial Deposits of the (Various) 7.5-Minute Quadrangles, Contra Costa County. U.S. Geological Survey, Open File Maps 75-277.

Peterson, M.D., Bryant, W.A., Cramer, C.H., Probabilistic Seismic Hazard Assessment for the State of California, California Division of Mines and Geology Open-File Report issued jointly with U.S. Geological Survey, CDMG OFR 96-08 and USGS OFR 96-706, 1996.

SSURGO, 2010. Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. *Soil Survey Geographic (SSURGO) Database for Contra Costa County, CA*, Available at http://soildatamart.nrcs.usda.gov, accessed April 23, 2010. 2010.

U.S. Geological Survey (USGS), 1980. *Preliminary Geologic Map of the Byron Hot Springs Quadrangle, Alameda and Contra Costa Counties, California*, compiled and mapped by Thomas W. Dibblee, Jr, USGS Open-file Report 80-534, 1980.

U.S. Geological Survey (USGS), 1994. *Preliminary geologic map emphasizing bedrock formations in Contra Costa County, California: A digital database*, compiled by R.W Graymer, D.L. Jones, and E.E. Brabb, USGS Open-file Report 94-622, 1994.

U.S. Geological Survey (USGS), 1997a. *General Distribution of Geologic Materials in the San Francisco Bay Region, California, a Digital Database*, compiled by Carl M. Wentworth, USGS Open-file Report 97-744, 1997a.

U.S. Geological Survey (USGS), 1997b., *Slope Map of Contra Costa County, California: A Digital Database*, part of OFR 98−766, 1997b.

U.S. Geological Survey (USGS), 1997c. *Introduction to the San Francisco Bay Region, California, Landslide Folio*, USGS Open-file Report 97-745 A, 1997c.

U.S. Geological Survey (USGS), 1999. Earthquake Probabilities in the San Francisco Bay Region: 2000 to 2030—A Summary of Findings. Working Group on California Earthquake Probabilities. USGS Open-File Report 99-517, 1999.

U.S. Geological Survey (USGS), 2006a. Digital Compilation of Thrust and Reverse Fault Data for the Northern California Map Database: Collaborative Research with William Lettis & Associates, Inc., and the U.S. Geological Survey, 2006.

U.S. Geological Survey (USGS), 2006b. Maps of Quaternary Deposits and Liquefaction Susceptibility in the Central San Francisco Bay Region, California. Liquefaction Susceptibility. Geology by Robert C. Witter, Keith L. Knudsen, Janet M. Sowers, Carl M. Wentworth, Richard D. Koehler, and Carolyn E. Randolph. Digital Database by Carl M. Wentworth, Suzanna K. Brooks, and Kathleen D. Gans, Open File Report 06-1037, 2006b.

U.S. Geological Survey (USGS), 2008. *Earthquake Probabilities in the San Francisco Bay Region*, by Working Group on California Earthquake Probabilities: 2007–2037, USGS Open-File Report 2008-3027, 2008.

Wakabayashy, J., and Smith, D.L., 1994. *Evaluation of Recurrence Intervals, Characteristic Earthquakes, and Slip Rates Associated with Thrusting along the Coast Range-Central Valley Geomorphic Boundary, California*, Bulletin of the Seismological Society of America, Vol. 84, No. 6.

Woodward-Clyde, 1995. *Los Vaqueros Dam Final Technical Memorandum*, Volume II, 1995.

Working Group on California Earthquake Probabilities, *The Uniform California Earthquake Rupture Forecast, Version 2 (UCERF 2)*, U.S. Geological Survey Open-File Report 2007-1437 and California Geological Survey Special Report 203, http://pubs.usgs.gov/of/2007/1437/, 2008.

Greenhouse Gas Emissions

Bay Area Air Quality Management District (BAAQMD), 2010. *CEQA Air Quality Guidelines*, June 2010.

California Air Resources Board (CARB), 2007. *Expanded List of Early Action Measures To Reduce Greenhouse Gas Emissions In California Recommended For Board Consideration*, September 2007.

CARB, 2009a. *Climate Change Scoping Plan: A Framework for Change*, available online: http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf; published December 2008, amended version included errata and Board requested modifications posted May 11, 2009.

CARB, 2010. *California Greenhouse Gas Inventory for 2000-2008 – by Category as Defined in the Scoping Plan*, http://www.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_scopingplan_00-08_2010-05-12.pdf, accessed February 7, 2011, last updated Wednesday May 12, 2010.

California Climate Action Registry (CCAR), 2009. General Reporting Protocol, Reporting Entity-Wide Greenhouse Gas Emissions, Version 3.1, January 2009.Tables C.4 and C.7.

California Energy Commission (CEC), 2005. California's Water – Energy Relationship Prepared in Support of the 2005 Integrated Energy Policy Report Proceeding, Final Staff Report, November 2005 (CEC-700-2005-011-SF) Table C-6, page 118.

California Public Utilities Commission (CPUC). 2010. Southern California Edison's Devers-Mirage 115 kV Subtransmission System Split Project, Draft Environmental Impact Report, January 2010.

Contra Costa County, 2010. Contra Costa County General Plan 2005-2020. Published January 18, 2005; reprinted July 2010.

Contra Costa County, 2008. *Contra Costa County Municipal Climate Action Plan, Measures to Reduce Municipal Greenhouse Gas Emissions*, December 2008.

Intergovernmental Panel on Climate Change (IPCC), 2001. Climate Change 2001: Working Group I: The Scientific Basis, Section F.5, Table 4; http://www.grida.no/climate/ipcc%5Ftar/wg1/032.htm#f5, accessed April 8, 2010.

Pacific Gas and Electric (PG&E). 2010. Carbon Footprint Calculator website (http://www.pge.com/myhome/environment/calculator/) accessed April 16, 2010.

SCAQMD, 2008. *Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans*, accessed online (http://www.aqmd.gov/hb/2008/December/081231a.htm), last updated November 26, 2008.

U.S. Environmental Protection Agency (USEPA), 2006. SF6 Leak Rates from High Voltage Circuit Breakers – U.S. EPA Investigates Potential Greenhouse Gas Emissions Source. IEEE Power Engineering Society General Meeting, Montreal, Quebec, Canada, June 2006.

Hazards and Hazardous Materials

American Wind Energy Association (AWEA) 2008. *Wind Energy Siting Handbook*, February 2008.

Aviation Systems, 2009. *Re: Tres Vaqueros Project 09-N-0447-HOU.001*, Letter Report to Ms. Natalie McCue, Babcock & Brown Renewable Holdings, from Jerry Chavkin, Vice President, Airspace Operation, dated January 21, 2009.

Boyer, 2010. Mr. Chris Boyer, Emergency Services Manager, personal communication, April 8, 2010.

California Department of Conservation (CDC) 2000. Division of Mines and Geology. *A General Location Guide for Ultramafic Rocks in California – Areas More Likely to Contain Naturally Occurring Asbestos.* August 2000.

California Department of Forestry and Fire Protection (CalFire) 2007. *Adopted Fire Hazard Severity Zone Maps for State Responsibility Areas.* November 7, 2007.

California Department of Toxic Substances Control (DTSC) 2010. Envirostor database, http://www.envirostor.dtsc.ca.gov/public/, accessed March 31, 2010.

California Energy Commission (CEC) 2006. Public Interest Energy Research Program. Permitting Setback Requirements for Wind Turbines in California, PIER Interim Project Report, CEC-500-2005-184, November 2006.

California State Water Resources Control Board (SWRCB) 2010. Geotracker database, http://geotracker.swrcb.ca.gov/, accessed March 31, 2010.

Contra Costa County (CCC) 2000. *Contra Costa County Airport Land Use Compatibility Plan*, Contra Costa County, California, Adopted by Contra Costa County Airport Land Use Commission, December 13, 2000.

Contra Costa County 2009. *Contra Costa County Hazardous Materials Area Plan*. Revised September 29, 2009.

Contra Costa County, 2010. Contra Costa County General Plan 2005-2020. Published January 18, 2005; reprinted July 2010.

Contra Costa County Airport Land Use Commission, 2010. Letter to Department of Conservation and Development, Attn: Will Nelson Senior Planner, RE: Tres Vaqueros Replacement of Wind Turbines Project, July 23, 2010.

Contra Costa County Health Services (CCCHS) 2010. Hazardous Materials Programs, *Hazardous Materials Incident Search Database*, http://cchealth.org/z/app/incident_search/incident.php, accessed April 1, 2010.

Contra Costa Water District (CCWD), 2010, Los Vaqueros Watershed: New Topo Map of LV, with All the Hiking Trails, http://www.ccwater.com/losvaqueros/hikebike.asp, website accessed November 11, 2010.

Environmental Data Resources (EDR), 2010, *Radius Atlas Report, Vasco Wind*, April 2, 2010.

Underground Service Alert North (USA North), "About USA North" http://www.usanorth.org/about.php?user=excavators; website accessed February 5, 2009.

Hydrology and Water Quality

Central Valley Regional Water Quality Control Board (CVRWQCB), 2009. *Fourth Edition of the Water Quality Control Plan (Basin Plan) for the Sacramento River and San Joaquin River Basins.* Updated September 4, 2009.

CH2MHill, 2002. Contra Costa Water District Sanitary Survey Update, prepared for Contra Costa Water District, May 2002.

Contra Costa County, 2010. *Contra Costa County General Plan 2005-2020*. Published January 18, 2005; reprinted July 2010.

Contra Costa Water District (CCWD), 2009. *Los Vaqueros Reservoir Expansion Project, Environmental Impact Statement, Environmental Impact Report.* State Clearinghouse No. 2006012037, February, 2009. Available at: http://www.lvstudies.com/documents.asp Accessed on April 12, 2010.

California Department of Water Resources (DWR), 2003. *California's Groundwater, Bulletin 118, Update 2003* California Department of Water Resources.

US Environmental Protection Agency (USEPA), 2006. 2006 Clean Water Act List of Water Quality Limited Segments Requiring TMDLs. Available at: http://www.swrcb.ca.gov/water_issues/programs/tmdl/docs/303dlists2006/epa/state_06_303d_reqtmdls.pdf Accessed on April 12, 2010.

US Geological Survey (USGS), 2010.*Groundwater Levels for the Nation.* Online Database. Available at: http://nwis.waterdata.usgs.gov/nwis Accessed on April 12, 2010; Well numbers: USGS 374708121460101 002S002E04M001M; USGS 374816121443601 001S002E34F001M; USGS 374817121442501 001S002E34G001M; USGS 374827121442101 001S002E34B001M

Land Use and Planning

Altamont Pass Wind Resource Area (APWRA), 2010. Natural Community Conservation Plan/ Habitat Conservation Plan, www.apwraconservationplan.org, site accessed April 27, 2010.

Contra Costa County, 2010. Contra Costa County General Plan 2005-2020. Published January 18, 2005; reprinted July 2010.

Contra Costa County, Zoning Code, Chapter 88-3, Wind Energy Conversion Systems.

Contra Costa County Airport Land Use Commission (ALUC), 2010. Letter to Department of Conservation and Development, Attn: Will Nelson Senior Planner, RE: Tres Vaqueros Replacement of Wind Turbines Project, July 23, 2010.

Contra Costa County Airport Land Use Commission (ALUC), 2000. *Contra Costa County Airport Land Use Compatibility Plan.* December 13, 2000.

East Contra Costa County Habitat Conservancy (ECCCHC), 2007. *East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan (East County HCP/NCCP).* July 2007.

Mineral Resources

California Division of Mines and Geology (CDMG), 1987. Mineral Land Classification: Aggregate Materials in the San Francisco-Monterey Bay Area, Special Report 145, Part II, 1987.

Contra Costa County, 2010. Contra Costa County General Plan 2005-2020. Published January 18, 2005; reprinted July 2010.

Noise

California Department of Transportation (Caltrans), 1998. *Traffic Noise Analysis Protocol for New Highway Construction and Reconstruction Projects*, October 1998.

Caltrans, 2004. Transportation- and Construction-Induced Vibration Guidance Manual, June, 2004.

California Public Utilities Commissions (CPUC), 2010. Section 4.11, Noise, of the Draft Environmental Impact Report for the Devers-Mirage 115 kV Subtransmission System Split Project, January, 2010.

Contra Costa County, 2010a. *Contra Costa County General Plan 2005-2020*. Published January 18, 2005; reprinted July 2010.

Contra Costa County, 2010b. Contra Costa County Code Chapter 88-3. Accessed County Codes and Ordinances webpage (http://www.co.contra-costa.ca.us/index.aspx?NID=178) on May 13, 2010.

Federal Transit Authority (FTA), 2006. *Transit Noise and Vibration Impact Assessment*, May 2006.

Population and Housing

Contra Costa County, 2010. *Contra Costa County General Plan 2005-2020*. Published January 18, 2005; reprinted July 2010.

Public Services

California Department of Forestry and Fire Protection (CalFire) 2007. *Fire Hazard Severity Zones in State Responsibility Areas* Map, Adopted November 7, 2007.

Contra Costa County, 2010. Contra Costa County General Plan 2005-2020. Published January 18, 2005; reprinted July 2010.

Contra Costa County Sheriff's Department (CCCSD), 2011. Crime statistics from CrimeReports.com provided by the CCCSD; www.co.contra-costa.ca.us/index.aspx?nid=1870. Accessed May 13, 2011.

Van Wormer, Rob, 2010. Battalion Chief, CalFire. Personal communication, September 13, 2010.

Recreation

Contra Costa County, 2010. Contra Costa County General Plan 2005-2020. Published January 18, 2005; reprinted July 2010.

East Bay Regional Park District (EBRPD), 1996. *Master Plan 1997*, adopted December 16, 1996.

EBRPD, 2007. *2007 Master Plan Map*, adopted November 6, 2007.

EBRPD, 2010a. Website available at: www.ebparks.org, accessed April 27, 2010.

EBRPD, 2010b. Personal communication with Brad Olsen, Environmental Programs Manager, July 1, 2010.

Transportation and Traffic

Alameda County 2002. *East County Area Plan*. Adopted May 5, 1994. Amended May 2002.

California Department of Transportation (Caltrans) 2007. *2006 Collision Data on California State Highways*. Published 2007.

California Department of Transportation (Caltrans) 2009a. *2008 Traffic Volumes on California State Highways*. Published 2009.

California Department of Transportation (Caltrans) 2009b. *2008 Annual Average Daily Truck Traffic on the California State Highway System*. September 2009.

California Department of Transportation (Caltrans), 2010. *California Manual on Traffic Control Devices, Part 6: Temporary Traffic Control*. January 2010.

Contra Costa County, 2010. Contra Costa County General Plan 2005-2020. Published January 18, 2005; reprinted July 2010.

ESA, 2010. Data Summary of Collision Data obtained from the California Highway Patrol, February 2010.

Lai, Warren (Resident Engineer, Contra Costa County Public Works), 2010. Vasco Safety Improvements – Phase 1 Blog (http://vascosafety.blogspot.com/search?updated-max=2010-06-19T20%3A48%3A00-07%3A00&max-results=10).

Mark Thomas & Company (consultant for the SR 4 Bypass Authority), 2008. Traffic Volumes on SR 4 Bypass, September 2008.

Marks Traffic Data 2010. Traffic Volumes collected on Vasco Road, February 4-10, 2010.

Pattern Energy, 2010. Responses to ESA Data Requests 1, 2, & 3. Dated February 2, 2010, March 4, 2010, and March 1, 2010 respectively.

Utilities and Service Systems

CalRecycle 2010. Countywide, Region wide, and Statewide Jurisdiction Diversion/Disposal Progress Report, Report Year 2000 for Contra Costa County, http://www.calrecycle.ca.gov/LGCentral/Tools/mars/JurDrSta.asp?VW=In. Accessed April 16, 2010 and May 10, 2010.

Contra Costa County Clean Water Program (CCCWP) 2010. *Stormwater C.3 Update*, March 2010.

Contra Costa County, 2010. *Contra Costa County General Plan 2005-2020*. Published January 18, 2005; reprinted July 2010.

Docs Water, Inc., 2010. Personal communication with Nathan Dunham regarding capacity to supply water during construction, September 13, 2010.

Fong, Eric, 2010. Contra Costa Health Services, Environmental Health Division, 2010. Personal communication, April 19, 2010.

Pattern Energy, 2010. Personal communication between Rick Greiner and Claire Myers, September 13, 2010.

Pattern Energy, 2011. Personal communication between Rick Greiner and Tim Morgan, March 23, 2011.

Other CEQA Considerations

Alameda County Community Development Agency (Alameda), 2010. *Current Development Projects.* Available online at http://www.acgov.org/cda/planning/landuseprojects/windturbineproject.htm. Accessed September 4, 2010.

Alameda 2010a. *Notice of Preparation (Notice) of a Program Environmental Impact Report for the Altamont Pass Wind Resource Area (APWRA) revisions to Conditional Use Permits (CUPs) for repowering and continued maintenance and operation of wind turbines in Alameda County*. Available online at http://www.acgov.org/cda/planning/landuseprojects/documents/CUP-NOP_final-ltrhd_combined.pdf.

Altamont Pass Wind Resource Area (APWRA), 2010. Plan website, About the APWRA Conservation Plan, available online at http://www.apwraconservationplan.org/about.html, accessed on May 4, 2010.

American Wind Energy Association (AWEA), 2010. *U.S. Wind Energy Projects – California*. Available online at http://www.awea.org/projects/Projects.aspx?s=California, accessed July 20, 2010.

City of Brentwood, 2010. Project Status Report, February 12, 2010.

Contra Costa County, 2010. Advertised and Upcoming Construction Projects, last updated March 23, 2010, available online at http://www.cccounty.us/index.aspx?NID=261, accessed on April 1, 2010.

Contra Costa Water District (CCWD), 2010. Alternative Intake Project website, available online at http://www.ccwater.com/aip.asp, accessed on April 1, 2010.

East Bay Regional Park District (EBRPD), 2007. Master Plan Map, Existing and Potential Parklands and Trails, November 7, 2007.

Kohne, 2010. Personal communication via telephone with Virgil Kohne, General Manager of Discovery Bay, April 19, 2010.

Oborne, 2010. Personal communication via telephone with John Oborne, Planner for Contra Costa County, April 6, 2010.

Salam, 2010. Personal communication via telephone with Anthony Salam, CIP General Manager, April 1, 2010.

Smallwood, Shawn, 2010a. Baseline Avian and Bat Fatality Rates at the Tres Vaqueros Wind Project, Contra Costa County, California. March 21, 2010.

Townsend, 2010. Personal communication via telephone with Jim Townsend, Trails Development Program Manager with East Bay Regional Park District, April 6, 2010.

Western EcoSystems Technology (WEST), Inc., 2006. Diablo Winds Wildlife Monitoring Progress Report, March 2005 – February 2006 (April 2006).

Young, 2010. Personal communication via e-mail with Andrew Young, Planner for Alameda County, April 27, 2010.

Zone 7 Water Agency, 2009. Altamont Water Treatment Plant and Pipeline website, available online at http://www.zone7water.com/index.php?Itemid=414&id=97&option=com_content&task=view, accessed April 1, 2010.

Zone 7 Water Agency, 2008. SBA Improvement & Enlargement Project schedule, available online at http://www.zone7water.com/images/pdf_docs/sba_projects/sba-sked_12-4-08.pdf, accessed April 1, 2010.