Rooney Ranch Wind Repowering Project
Environmental Analysis and CEQA Checklist

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May 2019

City of Santa Clara Planning Division. 2019. *Rooney Ranch Wind Repowering Project Environmental Analysis and CEQA Checklist*. May. (ICF 00066.17.) Santa Clara, CA. With technical assistance from ICF, Sacramento, CA.

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Acronyms and Abbreviations

AB	Assembly Bill
APE	area of potential effects
APLIC	Avian Power Line Interaction Committee
APWRA	Altamont Pass Wind Resource Area
ARB	California Air Resources Board
BAAQMD	Bay Area Air Quality Management District
BMPs	best management practices
CAAQS	California ambient air quality standards
CAP	Climate Action Plan
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
City	City of Santa Clara
CNDDB	California Natural Diversity Database
CO	carbon monoxide
CO_2e	carbon dioxide equivalent
County	Alameda County Community Development Agency
CRHR	California Register of Historic Resources
CUP	conditional use permit
CUPA	Certified Unified Program Agency
dBA	A-weighted decibel
DPM	diesel particulate matter
EACCS	East Alameda County Conservation Strategy
ECAP	East County Area Plan
EIR	environmental impact report
EPA	U.S. Environmental Protection Agency
FAA	Federal Aviation Administration
gen-tie	generation-tie
GHG	greenhouse gas
H&S	health and safety
HCP	habitat conservation plan
HDD	horizontal directional drilling
HMBP	Hazardous Materials Business Plan
I-	Interstate
kV	kilovolt
MW	megawatt
NAAQS	national ambient air quality standards
NAHC	Native American Heritage Commission
NCCP	natural community conservation plan
NO_X	nitrogen oxide
NRHP	National Register of Historic Places
O&M	Operations & Maintenance
PG&E	Pacific Gas and Electric Company
PRD	permit registration document

project or proposed project	Rooney Ranch Wind Repowering Project
QA/QC	quality assurance/quality control
ROG	reactive organic gases
Rooney	Rooney Ranch, LLC
RPS	Renewables Portfolio Standard
SB	Senate Bill
SF_6	sulfur hexafluoride
SJVAPCD	San Joaquin Valley Air Pollution Control District
SMARTS	Stormwater Multiple Application and Report Tracking System
SPCC	Spill Prevention Control and Countermeasures
SWPPP	stormwater pollution prevention plan
WSA	water supply assessment

Chapter 1
Introduction

On November 12, 2014, the Alameda County Community Development Agency (County) published and certified, as CEQA lead agency, the *Altamont Pass Wind Resource Area Repowering Final Program Environmental Impact Report* (PEIR) (Alameda County Community Development Agency 2014). A detailed account of the history and legal activities culminating in preparation of the PEIR is provided in that document. As it explains, subsequent repowering projects in the APWRA would be tiered off the PEIR, provided that they are consistent with the PEIR, and would accordingly be developed to be consistent with the County's goals, objectives, and conditions as set forth therein. This analysis has been prepared by the City of Santa Clara (City) as a responsible agency specifically to address the Rooney Ranch Wind Repowering Project (project or proposed project), in accordance with the PEIR.

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1.1 Project Overview

Rooney Ranch, LLC (Rooney) is proposing the Rooney Ranch Wind Repowering Project (project or proposed project) on two parcels in the Altamont Pass Wind Resource Area (APWRA) (Figure 1-1) . The project area consists of two contiguous parcels, owned by the City of Santa Clara (City), encompassing 578 acres. Rooney Ranch, LLC, a subsidiary of FTP Power LLC (dba sPower), proposed to repower a wind energy facility in the APWRA to replace outdated and inefficient wind turbines with fewer and more efficient turbines. The proposed project would entail replacement of 199 old wind turbines with up to seven new wind turbines and is expected to utilize turbines with generating capacities between 2.3 and 4.0 megawatts (MW), all similar in size and appearance, to develop up to 25.1 MW in output generation. Two conceptual alternative layouts are proposed, each using up to seven wind turbines. The layouts would use identical numbers and types of wind turbines and the turbine locations are nearly identical with small differences in the location of several turbines. The final layout would be selected on the basis of site constraints (i.e., avian siting considerations), data obtained from meteorological monitoring of the wind resources, and turbine availability. Each of these factors would be considered when micrositing turbines, with the final layout reflecting one or some combination of the alternative layouts. Existing roads would be used where possible, and temporary widening and some new roads would be necessary.

1.2 Relationship to the PEIR

The City has prepared this analysis and checklist to validate the project's conformance with the analysis and mitigation presented in the PEIR, and to ensure that the proposed project is in compliance with requirements of the California Environmental Quality Act (CEQA). The summary analysis in the checklist is intended to inform decision makers and the public of the project's conformity with the analysis in the PEIR and to identify the specific impacts and mitigation measures relevant to the project.

This analysis and checklist support the decision not to prepare a subsequent EIR pursuant to Section 15168(c)(2) of the State CEQA Guidelines. The relationship of the checklist (supported by this analysis) to the PEIR is consistent with the intent of a PEIR as established in State CEQA Guidelines Section 15168(d), which calls for use of an initial study to determine whether a later, directly related (or tiered) project would have new or different environmental effects that were not disclosed in the PEIR or that would warrant a new EIR. The environmental checklist prepared for the proposed project constitutes an initial study for the purpose of Section 15063, including its provision for use with a previously prepared EIR (Section 15063(b)(1)(B)). Moreover, any public notice required by City ordinance will state, as required by State CEQA Guidelines Section 15168(e), that the activities associated with the Rooney Ranch project are within the scope of the PEIR and that the PEIR adequately described and assessed these activities.

As shown in Chapter 3, *Environmental Analysis*, despite the changes summarized in Section 1.3, the proposed project would not result in any impacts not addressed in the PEIR, nor would it result in impacts of greater severity than those presented in the PEIR.

1.3 Changes Relevant to the PEIR Analysis

Since preparation of the PEIR, four factors relevant to the PEIR analysis have emerged. First, some of the turbines under consideration for the proposed project, while mostly within the overall dimensional specifications of the turbines analyzed in the PEIR, exceed the individual nameplate capacity of the turbines analyzed. The consequences of this change are two-fold: fewer turbines would be required to achieve the same project-level generation capacity, and the larger turbines would have a larger rotor-swept area.

The second factor involves additional information on avian and bat mortality rates and effects, available since the PEIR was prepared. This information includes recent fatality monitoring reports from the Golden Hills project, additional information on micrositing, and additional information on golden eagle populations. This issue is addressed briefly below and in detail in Section 3.4.2, *Environmental Impacts and Mitigation Measures*.

Third, the foreseeable future wind projects have changed from those contemplated in the PEIR. Consequently, depending on the development of other projects in the program area, the size of the proposed project could contribute to an exceedance of the maximum capacity of the aggregate repowering projects contemplated in the PEIR.

Finally, Alameda County has informed the City that information regarding nighttime lighting during operation of the turbines, as well as FAA requirements, may in fact be different from the information presented in the PEIR. These four issues are described and evaluated in detail in the following subsections and in Chapter 3, *Environmental Analysis*, of this document.

1.3.1 Turbine Size

Rooney proposes to use two types of turbines: a 2.3 MW model and a 3.6 or 3.8 MW model. Because Rooney has not yet selected the specific turbine models, it retains the option of using turbines up to 4.0 MW, depending on product availability at time of construction. However, regardless of the turbine model selected, the project would not exceed the proposed Rooney Ranch 25.1 MW aggregate capacity, and the overall dimensions of individual turbines would not exceed those currently proposed.

The PEIR analyzed projects with a range of turbine sizes. Table 1-1 shows the maximum dimensions of this range for comparison with the largest of three turbine types under consideration for the proposed project.

Table 1-1. Turbine Specifications Contemplated in the PEIR and for the Proposed Project

Turbine Model	PEIR Maximum—3.0 MW	General Electric 3.6 MW
Rotor type	3-blade/horizontal axis	3-blade/horizontal axis
Blade length	62.5 m (205 ft)	67.2 m (220 ft)
Rotor diameter	125 m (410 ft)	137 m (449 ft)
Rotor-swept area	12,259 m^2 (131,955 ft^2)	14,741 m^2 (158,671 ft^2)
Tower type	Tubular	Tubular
Tower (hub) height	96 m (315 ft)	81.5 m (267 ft)
Total height (from ground to top of blade)[a]	153 m (502 ft)	150 m (492 ft)

[a] Depending on the type of turbine and tower height used for the proposed project, total height would be up to but would not exceed 152 m (499 ft).

As shown in the table, the proposed Rooney turbines would be within the specifications established in the PEIR for rotor type, tower type, tower (hub) height, and total height. However, blade lengths would be up to 15 feet (approximately 7%) longer, rotor diameters up to 39 feet (approximately 9%) greater, and rotor-swept area up to 2,482 m^2 (approximately 17%) larger.

Because some of the proposed project specifications exceed those described in the PEIR, additional review of potentially affected environmental resources is provided in this document. Larger turbines could affect three resources: aesthetics (Section 3.1), hazards (i.e., setbacks) (Section 3.8), and biological resources (i.e., birds and bats) (Section 3.4). At the same time, it should be borne in mind that while a 3 MW turbine was the largest considered in the PEIR, for purposes of the analysis of avian mortality, the turbine used as the basis for developing estimates of future or typical project impacts was the Vasco Winds 2.3 MW turbine. The consequence of the increased nameplate capacity would be lower impacts per MW for certain environmental topic areas, because a 25.1 MW project would require 10 turbines the Vasco Winds-sized turbines, whereas the same 25.1 MW capacity can be achieved with the 7 turbines proposed for the Rooney Ranch Project. This decreased density of turbines would result in proportionally lesser impacts associated with air quality emissions, traffic, and ground disturbance.

1.3.2 Additional Avian and Bat Information

1.3.2.1 Golden Hills Fatality Monitoring Reports

The PEIR considered fatality monitoring results from three projects: Diablo Winds, Buena Vista, and Vasco Wind. Since the PEIR was prepared in 2014, an additional 2 years of monitoring for birds and bats at Vasco Wind were completed. The results were reported in Brown et al. (2016) and are incorporated into this analysis. Additionally, the Golden Hills project was constructed and 2 years of avian and bat monitoring have been completed.

In early 2018, H. T. Harvey & Associates prepared the *Golden Hills Wind Energy Center Postconstruction Fatality Monitoring Report: Year 1*, presenting the results of the first year's monitoring effort and analysis of those results (H. T. Harvey & Associates 2018a). The monitoring effort indicated potentially higher mortality rates than those estimated in the PEIR, particularly for golden eagles and red-tailed hawks. The PEIR analyzed effects on avian and bat species using information on multiple repowered projects collected over multiple years, noting that "… fatality rates in the APWRA are highly variable (that is because they differ across years, turbine types, geographies, and topographies…)."

The first year of Golden Hills data (H. T. Harvey & Associates 2018a) reflected monitoring during northern California's wettest year on record, using search methods (e.g., search dogs and shorter, 7-day search intervals) that were not used for most of the baseline (and repower) mortality estimates presented in the PEIR. The monitoring duration during unusually high rainfall conditions and the use of different search methods make comparison with the PEIR's baseline data difficult (H. T. Harvey & Associates 2018a:51). Results for the second year of monitoring at Golden Hills were mixed. Some substantial reductions of the mortality rate for some species were observed (e.g., red-tailed hawk), while the mortality rate for some species increased, sometimes inexplicably (e.g., burrowing owl).

The Golden Hills estimated mortality rate (averaged over the 2 years of monitoring) for all raptors combined (the primary criterion for APWRA avian impact measurement) was significantly lower than the pre-repowering average from the APWRA-wide avian monitoring study (which already reflected significant mortality reductions resulting from seasonal shutdown and the removal of high-risk turbines in accordance with the 2007 settlement agreement) (H. T. Harvey & Associates 2018b). APWRA-wide nonrepowered average mortality rates for all raptors combined was 2.43/MW/year. The all-raptors combined average mortality rate for Golden Hills in its first 2 years of operation was 1.74/MW/year, 28% less than the average APWRA-wide rate—even though the latter included seasonal shutdowns and high-risk turbine removals.

The primary estimation model used in the first year H. T. Harvey report estimated higher golden eagle mortality rates (0.13/MW/year) than baseline, nonrepowered conditions (H. T. Harvey & Associates 2018a:50). However, the authors explained that the model "inflate[d] the estimate by incorporating searcher efficiency and carcass persistence parameters that represent medium/large birds as a group rather than eagles specifically" (i.e., the use of medium bird persistence parameters introduced an assumption that more golden eagle carcasses were missed during searches than was in fact the case because the large size of golden eagles makes them hard to miss). Other models used in the first-year H. T. Harvey report that did not incorporate these parameters yielded results that, in the words of the study, were "closer to reality." Those models estimated golden eagle mortality rates nearly matching (0.09/MW/year) or slightly below (0.07/MW/year) baseline conditions

(0.08/MW/year) (H. T. Harvey & Associates 2018a:50). These rates are still higher than the rates of the three repowered projects used to generate estimates in the PEIR. The report observed that all of its golden eagle mortality rates may be overstated as a consequence of bias attributable to the presence of old turbines near the Golden Hills site that provided perching and nesting opportunities for raptors, including golden eagles, which were seen perching on them on several occasions (H. T. Harvey & Associates 2018a:46, 50). By the second year, the primary mortality model used was consistent with the method used in the final Vasco Winds monitoring report. The second-year golden eagle mortality rates were reported as being slightly higher than the first-year rates (0.17/MW/year) (H. T. Harvey & Associates 2018b:xiii). The authors further noted that "Higher fatality rates in this study compared to other APWRA repowering studies may partly reflect the influence of differing estimation methods, but probably reflect substantial inter-annual variation in climate and landscape conditions and the attendant influence on wildlife populations, as well as the consequences of evaluating project impacts based on short-term studies that may inadvertently represent atypical conditions." (H. T. Harvey & Associates 2018b:xii). In general, the authors of the second-year Golden Hills report noted that the primary conclusions from the first 2 monitoring years were that the golden eagle mortality rate was higher during both years compared to other recent APWRA studies. Additionally, they further noted that climactic conditions (a return to wetter conditions) may have contributed to the increase in golden eagle fatalities in year 2 (H. T. Harvey & Associates 2018b:63). As additional evidence of this interannual variability, the authors point to annual reproductive monitoring of golden eagles across central California, which they note dropped markedly during the 4-year drought, began to resurge in 2016, declined again during the very wet 2017 breeding season, and then surged again in 2018 (H. T. Harvey & Associates 2018b:63). For the purposes of this analysis, estimates of golden eagle fatalities were calculated in two ways. The first way considered the estimates from year one, referred to by H. T. Harvey (2018a) as "closer to reality." The second way considered the alternative (and higher) estimates derived from the Huso DS729 estimation method.

Red-tailed hawk mortality rates observed in the first-year H. T. Harvey study also exceeded both the rates of the three repowering projects used to generate the PEIR's estimates for Golden Hills and the APWRA-wide estimates, but the H. T. Harvey report observed that additional years of study would be needed to determine whether this was an anomaly or a standard pattern (H. T. Harvey & Associates 2018a:50). As stated in the first-year H. T. Harvey report, red-tailed hawk results may also have been skewed by perching and nesting opportunities created by nearby old turbines, the removal of which would likely reduce mortality rates. The red-tailed hawk mortality rate dropped by approximately 41% in the second year of the Golden Hills study—from 0.91/MW/year to 0.37/MW/year, nearly in line with the pre-repowering PEIR rate of 0.44/MW/year. The other raptor species analyzed in the H. T. Harvey reports, American kestrel and burrowing owl, revealed significantly lower averaged mortality rates than were estimated in the PEIR (H. T. Harvey & Associates 2018a, 2018b). The recently available information also indicates fatalities of tricolored blackbird and white-tailed kite are possible, as they have been observed at Vasco Wind and Golden Hills (although in very low numbers—one tricolored blackbird individual found during monitoring at each project and two white-tailed kites at Golden Hills).

With regard to bats, it is worth noting that the first-year monitoring report for the Vasco Winds project (Brown et al. 2013), erroneously reported overall bat mortality rates. Table 10 in Brown et al. (2013) reported adjusted mortality rates for bats in several ways, including using "national means" or "national averages" and several onsite trials with different size classes. As reported in that first-year monitoring report, the highest mortality rate was reported as 1.679 bats/MW/year considering the overall detection, otherwise known as the "big D" adjustment method. The PEIR used this mortality rate and an additional mortality rate from a nearby wind resource area to calculate the range of estimated bat fatalities for the Program alternatives and the specific projects. By the time the final report was prepared addressing all 3 monitoring years (Brown et al. 2016), a mortality rate of 1.679 bats/MW/year was reported in Table 30 for year one considering national averages. However, the average mortality rate for 3 years using the "D" adjustment was actually 3.207 bats/MW/year. Consequently, the estimates of bat fatalities described in the PEIR used the incorrect mortality rates for the estimates. For this analysis, the corrected mortality rates from the final Vasco Winds report were used (a 3-year average of 3.207 bats/MW/year).

The recent monitoring reports for Golden Hills (H. T. Harvey & Associates 2018a, 2018b) provide additional information regarding bat mortality rates following repowering. The monitoring results documented the majority of fatalities as Mexican free-tailed bats and hoary bats; however, several other species were affected to a much lesser degree. It is also worth noting that the Golden Hills fatality monitoring results for the first 2 years represent the first use of scent-detection dogs for an extended period to conduct fatality searches in the APWRA (H. T. Harvey & Associates 2018a:xii; Smallwood et al. 2018[1]). The authors of the studies note that the use of scent detection dogs, as well as shorter search intervals, "clearly resulted in our detecting far greater numbers of bat fatalities than previously reported in the APWRA; however, similar estimates of per MW fatality rates in this study and the post-repowering Vasco Winds study suggest that repowering with larger, taller turbines also may have contributed to a higher fatality rate for bats" (H. T. Harvey & Associates 2018a:xiii). Additional discussion of potential biases resulting from comparisons of this and other studies are presented later in this analysis.

1.3.2.2 Micrositing Studies

The PEIR outlined a mitigation strategy that, among other measures, recognized the potential benefits of careful micrositing of turbines in minimizing effects on avian species. Since preparation of the PEIR, this mitigation strategy has been initiated for several proposed projects in the APWRA. Several studies, undertaken both before and after issuance of the PEIR, used a generally similar approach involving map-based collision hazard models to site turbines (Smallwood and Neher 2009, 2016a, 2017). However, many of these projects were never constructed. Additional studies, such as Bell (2017), which tracked golden eagles using satellite telemetry, have also supported map-based collision hazard models. Smallwood and Neher (2010a, 2010b, 2011) used micrositing analysis for the Vasco Winds and Tres Vaqueros projects in Contra Costa County; however, because the Tres Vaqueros project was never constructed, no results are available for interpretation. Smallwood and Neher (2015a) later conducted micrositing for the proposed Patterson Pass Repowering Project. Patterson Pass was authorized by the County with completion of the PEIR in 2014, but has not yet been constructed. Additionally, Smallwood and Neher (2016b) conducted micrositing at the Sand Hill repowering project (a project that had the same name in 2016 but is different from the currently proposed Project and under different ownership); this project was also never constructed. Finally, Smallwood and Neher (2016c) completed micrositing studies for the Summit Winds project, but like Tres Vaqueros, Patterson Pass, and the original Sand Hill project, Summit Winds has not yet been constructed. Smallwood and Neher (2015b, 2015c) conducted a micrositing study for the Golden Hills Repowering Project (following publication of the PEIR) for which fatality monitoring results

[1] Smallwood et al. 2018 conducted surveys using detection dogs at the Golden Hills and Buena Vista sites for a limited period (compared to the overall Golden Hills study described in H. T. Harvey & Associates 2018a, 2018b).

are available. In summary, of multiple micrositing studies undertaken in the APWRA, only two—Vasco Winds and Golden Hills—have been associated with projects that were subsequently completed and for which monitoring results are available.

The Golden Hills study used collision hazard models to site turbines, as did the other studies, with the intent of minimizing avian collision risk. The Golden Hills project was subsequently built, beginning operation in December 2015, and the first- and second-year monitoring results have been published (H. T. Harvey & Associates 2018a, 2018b). Smallwood and Neher (2017) and Smallwood (2018) reviewed a draft and final of the first-year monitoring results and prepared a report and addendum, discussing the effectiveness of the micrositing effort and whether the collision hazard models used to guide micrositing were effective. The report states that the collision hazard models have improved over time, and that continued adjustments may improve the model performance. The report also highlighted that prioritizing fatality minimization for one species—golden eagle, for example—can result in putting other species at greater collision risk. Additionally, the addendum to the 2017 report stated that "the collision hazard models were likely effective at minimizing golden eagle fatalities in the absence of grading …" and noted that "… grading for wind turbine pads and access roads was extensive." Thus, Smallwood (2018) effectively cited topographic changes due to new access road and turbine pad construction as a potential cause for an increase in golden eagle mortality at Golden Hills. However, the extent to which these factors actually influence potential mortality remains speculative.

Smallwood and Neher (2017) noted that "Map-based collision hazard models of each successive repowering project benefitted from lessons learned from past efforts on repowering projects …" In general, this statement is speculative: although a number of micrositing studies have been prepared, definitive conclusions regarding the effectiveness of micrositing efforts are limited by the small sample size of projects completed for which fatality monitoring results are available (only Vasco Winds and Golden Hills have fatality monitoring results available). However, in general, the approach among all repowered projects, regardless of whether they were constructed, has been similar. Overall, the micrositing approach—and the studies completed to date—are consistent with and support the approach used in the PEIR (Mitigation Measure BIO-11b) that requires micrositing for each subsequent project to "… use the results of previous siting efforts to inform the analysis and siting methods as appropriate such that the science of siting continues to be advanced." Recent results and new information, such as the influence that grading may have on micrositing, may be useful in subsequent micrositing efforts and will be addressed in future studies consistent with the direction of the PEIR. However, in general, the efficacy and benefits of micrositing currently remain speculative.

1.3.2.3 Additional Golden Eagle Studies

Since preparation of the PEIR, USFWS proposed and finalized a rule revising the regulations for permits for incidental take of eagles and eagle nests. In support of that process, USFWS prepared a report summarizing the status, trends, and sustainable take rates in the United States for bald and golden eagles (U.S. Fish and Wildlife Service 2016). In Bird Conservation Region (BCR) 32, a region covering most of California and that includes the APWRA, the median golden eagle population was estimated to be 718 individuals, a reduction from previous estimates (U.S. Fish and Wildlife Service 2016).

Additionally, and under similar timing to the USFWS study, USGS recently conducted a survey and implemented a sampling design to estimate the occupancy, breeding success, and abundance of territorial pairs of golden eagles in the Diablo Range (Wiens et al. 2015); an additional study focused on the APWRA and surrounding region (Kolar and Wiens 2017). A total of 138 territorial pairs of golden eagles were observed during surveys completed in the 2014 breeding season, representing about one-half of the 280 pairs (560 individuals) that the authors estimated to occur in the 1,996-square-mile region sampled. The results from Wiens et al. (2015) were further described specifically for the region surrounding the APWRA in Kolar and Wiens (2017). This recent work supports the current USFWS management guidelines for golden eagles, which considers surveys for occupied eagle territories when the territories may overlap with wind energy projects. The findings of the study indicated that the average nearest-neighbor distance of simultaneously occupied territories was approximately 3.2 km (approximately 2 miles) Bell (2017). This information is consistent with the approach to nesting eagle surveys in the PEIR (Mitigation Measure BIO-8a), which requires "Surveys to locate eagle nests within 2 miles of construction.…"

Considering the information currently available, it is likely that the current estimate of 718 individuals in BCR 32, currently used by USFWS to estimate cumulative effects on golden eagles, is an underestimate. The USGS study estimates that there are 560 individuals (280 territorial pairs) within the Diablo Range (Wiens et al. 2015:13). The Diablo Range encompasses approximately 2% of the total size of BCR 32. While eagle density is likely to vary dramatically over the landscape within BCR 32, it is unlikely that variability is so high that 78% of the population occupies just 2% of BCR 32, with only 22% of the population scattered throughout the remaining 98% of the BCR. It is much more likely that BCR 32 carries more than 718 individuals. USFWS requires that analysis of cumulative effects on golden eagle populations consider the "local area population" (LAP). The LAP is calculated for golden eagles based on the number of eagles within 109 miles (the golden eagle natal dispersal distance) of a project site (U.S. Fish and Wildlife Service 2013). For the proposed Project, the LAP encompasses approximately 29,600 square miles (excluding the Pacific Ocean and San Francisco Bay). The entire Diablo Range subject to study by USGS is within the Rooney Ranch LAP for golden eagles, occupying approximately 7% of the Rooney Ranch LAP. Therefore, 7% of the LAP includes all 560 individuals. The remaining 93% of the Rooney Ranch LAP supports significant areas with suitable habitat (generally oak or pine woodlands in a grasslands matrix) in the Coast Ranges north of San Francisco Bay and significant areas of suitable habitat south of the Diablo Range that USGS did not survey. Considering the available information, it is likely that the Rooney Ranch LAP comprises substantially more than 560 individuals. Conservatively assuming that the remaining 93% of the Rooney Ranch LAP supports only 50% of the density of eagles on average that the Diablo Range supports, then another 280 eagles may reside within the LAP, outside the Diablo Range. Thus, at least 840 individuals are likely to make up the Rooney Ranch LAP.

USFWS has identified authorized take rates of between 1 and 5% of the total estimated LAP as benchmarks, with authorized take of up to 5 percent being at the upper end of what might be appropriate under the Bald and Golden Eagle Act's preservation standard absent compensatory mitigation. Hunt et al. (2017) recently examined demographic data for the region surrounding the APWRA and estimated that the annual reproductive output of 216–255 breeding pairs would have been necessary to support published estimates of 55–65 turbine blade-strike fatalities per year. Additional demographic modeling research related to golden eagle populations is ongoing and was recently described in Wiens et al. (2017). USFWS recently determined in an environmental assessment for the Shiloh IV Wind Project, approximately 30 miles north of the Rooney Ranch project, that the current mortality rate for the LAP was approximately 12% annually (U.S. Fish and Wildlife Service 2014). However, this estimate was based on an LAP estimate of 526 individuals and a total estimated take (within the LAP from all sources) of 64.5 individuals (47.5 of those estimated within the APWRA) (U.S. Fish and Wildlife Service 2014:36–38). Considering the recently available information from USGS indicating that the LAP is likely substantially larger than previously estimated, cumulative impacts on the APWRA LAP are likely to be substantially lower than previously estimated by USFWS.

1.3.3 Megawatt Cap

The PEIR identified two alternatives for repowering the APWRA, analyzing both at an equal level of detail. Because the County adopted and certified the PEIR without identifying a preferred alternative, the County may authorize either alternative. Alternative 2 was the larger alternative, assuming a maximum capacity of 450 MW for the APWRA at full repowering. The PEIR also analyzed two projects, Golden Hills and Patterson Pass, and considered four other future projects (Table 1-2). While the PEIR did not contemplate the sequencing of projects considered in the future, County staff consider that the future projects identified in the PEIR should be considered first in allocating the total nameplate capacity. Subsequent projects would be reviewed on a first-come, first-served basis. As outlined in Table 1-2, the total capacity of approved, operational, or foreseeable future projects considered in the PEIR, or as authorized and constructed under the PEIR is 316.5 MW. The proposed project would increase that total to 341.6 MW. Because this is less than the 450 MW cap established by program Alternative 2, the proposed project would not conflict with the PEIR. The proposed project, with a 25.1 MW nameplate capacity, in concert with the Sand Hill project, would increase the total capacity of the program area to 450.1 MW, a 0.02% exceedance of the 450 MW capacity contemplated in Alternative 2 in the PEIR. For all resources, this minor difference cannot realistically be measured and is within the rounding already used in the PEIR; it would not result in new significant effects or a substantial increase in the severity of effects already described in the PEIR.

Table 1-2. Operational, Approved, or Foreseeable Projects in the APWRA

Project	Owner/Operator	Status	Total MW
Patterson Pass[a]	EDF	Approved (PEIR)	19.8
Golden Hills[b]	NextEra	Operational (PEIR)	85.9
Golden Hills North	NextEra	Operational	40.8
Sand Hill[c]	Ogin (now sPower)	Approved	36
Mulqueeny Ranch	Brookfield	Foreseeable (PEIR)	80
Summit Wind[d]	AWI (now Salka, LLC)	Approved	54
		Subtotal	316.5
Sand Hill (additional)[c]	sPower	CUP Application Submitted	108.5
Rooney Ranch[e]	sPower	Foreseeable	25.1
		Total	450.1

[a] County planning staff has indicated that the Patterson Pass project is under new ownership and is no longer owned by EDF.

[b] Golden Hills was identified in the PEIR as up to 88.4 MW but the complete project was 85.9 MW.

[c] The Sand Hill project was identified in the PEIR as up to 34MW. Under additional review, it was ultimately approved in 2016 for 36 MW. sPower, the current project owner, has applied to expand the project to a total of 144.5 MW (36 MW +108.5 MW= 144.5MW).

[d] The Summit Wind project was identified in the PEIR as up to 95 MW but was approved in 2016 for 54 MW.

[e] The Rooney Ranch project proposed by sPower would be subject to approval by the City of Santa Clara.

1.3.4 Turbine Lighting

The PEIR assumed that lighting for repowered turbines would be similar to lighting of previously existing turbines. Alameda County has since informed the City that the new turbines may require more lighting than the previously existing, smaller turbines, most of which were not tall enough to require FAA lighting. This issue does not constitute a change in the project or its circumstances; it is rather a change in information. In this case, CEQA prohibits a supplemental review of the issue because the correct information about the relative lighting impacts of new versus old turbines was readily available during preparation of the PEIR. For example, the Vasco Winds project, which has nighttime lighting, could have been observed at the time the PEIR was prepared. Thus, CEQA prohibits the County from preparing a supplemental EIR under Public Resources Code Section 21166(c) and 14 California Code of Regulations Section 15162(a)(3) on the basis of the lighting issue because it constitutes information that could have been known with the exercise of reasonable diligence at the time the PEIR was certified as complete.

As discussed in Section 2.4.1, *Proposed Project Features*, Rooney Ranch will implement lighting management techniques as part of the project to minimize the need for turbine lighting. The exact lighting minimization methods would be determined through consultation with the FAA.. Finally, although the larger turbines may require more lighting, there will be significantly fewer turbines (7 instead of 199), and any required lighting will be consistent with current conditions that include multiple repowered sites in the APWRA with larger, new turbines that have already installed lights per FAA requirements. Consequently, considering the analysis above and with FAA coordination, this analysis confirms that the project would not result in a new source of substantial light or glare beyond what is described in the PEIR.

1.4 Organization of this Document

This analysis has been structured to parallel the PEIR; accordingly, all resource topics are addressed—even those that clearly would fall within the analysis and conclusions in the PEIR. Following this introductory chapter, the analysis comprises the chapters and appendices listed below.

Chapter 2, *Project Description*, describes the project features, sequence of construction, and details of operations and maintenance.

Chapter 3, *Environmental Analysis*, provides the analysis of each resource topic considered in the PEIR, with a conclusion regarding any divergence from the conclusions presented in the PEIR.

Chapter 4, *List of Preparers*, identifies the persons involved in the preparation of this document.

Appendix A, *Air Quality Technical Memorandum*, provides the assumptions and modeling results used to support the air quality analysis for the proposed project.

Appendix B, *Biological Resources Evaluation Report*, is the project-specific report detailing biological conditions in the project area.

Appendix C, *Cultural Resources Survey Report*, is the report prepared by ICF cultural resources staff for the proposed project.

Appendix D, *Sound Technical Report*, is the report detailing the noise analysis prepared for the proposed project.

1.5 References Cited

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

Bell, A. B., 2017. GPS Satellite Tracking of Golden Eagles (*Aquila chrysaetos*) in the Altamont Pass Wind Resource Area (APWRA) and the Diablo Range: Final Report for Phases 1 and 2 of the NextEra Energy Settlement Agreement. East Bay Regional Park District, Oakland, California.

Brown, K., K. S. Smallwood, and B. Karas. 2013. *Vasco Avian and Bat Monitoring Project 2012–2013 Annual Report*. Final. September. Prepared by Ventus Environmental Solutions, Portland, OR. Prepared for NextEra Energy Resources, Livermore, CA.

Brown, K., K. S. Smallwood, and B. Karas, and Szewczak. J.M. 2016. *Vasco Avian and Bat Monitoring Project 2012–2015 Final Report*. June. Prepared by Ventus Environmental Solutions, Portland, OR. Prepared for NextEra Energy Resources, Livermore, CA.

H. T. Harvey & Associates. 2018a. *Golden Hills Wind Energy Center Postconstruction Fatality Monitoring Report: Year 1*. February 28. Prepared for Golden Hills Wind, LLC, Livermore, CA.

H. T. Harvey & Associates. 2018b. *Golden Hills Wind Energy Center Postconstruction Fatality Monitoring Report: Year 2*. December 17. Draft Report. Prepared for Golden Hills Wind, LLC, Livermore, CA.

Hunt, G.W., D.J., Wiens, P.R. Law, M.R. Fuller, T.L. Hunt, D.E. Driscoll. 2017. Quantifying the demographic cost of human-related mortality to a raptor population. PLos ONE 12(2): e0172232. Doi:10.1371/journal.pone.0172232.

ICF International 2016. *Final Report Altamont Pass Wind Resource Area Bird Fatality Study*. *Monitoring Years 2005-2013.* April. (ICF J&S 00904.08.) Sacramento, CA. Prepared for Alameda County Community Development Agency, Hayward, CA.

Insignia Environmental. 2009. *2008/2009 Annual Report for the Buena Vista Avian and Bat Monitoring Project*. September 4. Martinez, CA. Prepared for Contra Costa County.

Kolar, P.S., and Wiens, J.D., 2017. Distribution, nesting activities, and age-class of territorial pairs of golden eagles at the Altamont Pass Wind Resource Area, California, 2014-2016: U.S. Geological Survey Open-File Report 2017-1035, 18 p., https://doi.org/10.3133/ofr20171035.

Smallwood, K.S, 2018. Addendum to Comparison of Wind Turbine Collision Hazard Model Performance: One-year Post-construction Assessment of Golden Eagle Fatalities at Golden Hills.

Smallwood, K.S. and L. Neher. 2017. Comparison of Wind Turbine Collision Hazard Model Performance Prepared for Repowering Projects in the Altamont Pass Wind Resource Area. (Updated April 5, 2018).

Smallwood, K.S. and L. Neher. 2016a. Comparing Bird and Bat Use Data for Siting New Wind Power Generation. California Energy Commission. Publication number: CEC-500-2017-019

Smallwood, K.S., and L. Neher. 2016b. Siting Wind Turbines to Minimize Raptor Collisions at Sand Hill Repowering Project, Altamont Pass Wind Resource Area. Report to Ogin, Inc., Waltham, Massachusetts.Smallwood, K.S., and L. Neher. 2016c. Siting Wind Turbines to Minimize Raptor Collisions at Summit Winds Repowering Project, Altamont Pass Wind Resource Area. Report to Salka, Inc., Washington, D.C.

Smallwood, K.S., and L. Neher. 2016d. Bird and Bat Impacts and Behaviors at Old Wind Turbines at Forebay, Altamont Pass Wind Resource Area. California Energy Commission. CEC-500-2016-066.Smallwood, K.S., and L. Neher. 2015a. Siting Wind Turbines to Minimize Raptor Collisions at the Patterson Pass Repowering Project, Altamont Pass Wind Resource Area. Report to EDF Renewable Energy, Oakland, California.

Smallwood, K.S., and L. Neher. 2015b. Siting Wind Turbines to Minimize Raptor Collisions at Golden Hills North Repowering Project, Altamont Pass Wind Resource Area. Report to NextEra Energy Resources, Livermore, California.

Smallwood, K.S., and L. Neher. 2015c. Siting Wind Turbines to Minimize Raptor Collisions at Golden Hills North Repowering Project, Altamont Pass Wind Resource Area. Report to NextEra Energy Resources, Livermore, California.

Smallwood, K.S., and L. Neher. 2011. Siting Wind Turbines to Minimize Raptor Collisions at Tres Vaqueros Repowering Project, Contra Costa County, California. Report to Pattern Energy.

Smallwood, K.S., and L. Neher. 2010a. Siting Wind Turbines to Minimize Raptor Collisions at Tres Vaqueros Repowering Project, Contra Costa County, California. Report to the East Bay Regional Park District, Oakland, California

Smallwood, K.S., and L. Neher. 2010b. Siting Wind Turbines to Minimize Raptor Collisions at Vasco Winds, Contra Costa County, California. Report to NextEra Energy.

Smallwood, K.S., and L. Neher. 2009. Map-based repowering of the Altamont Pass Wind Resource Area based on burrowing owl burrows, raptor flights, and collisions with wind turbines. Final Report to the California Energy Commission, Public Interest Energy Research—Environmental Area, Contract No. CEC-500-2009-065. Sacramento, California. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2009-065

U.S. Fish and Wildlife Service (USFWS). 2016. Bald and Golden Eagles: Population demographics and estimation of sustainable take in the United States, 2016 update. Division of Migratory Bird Management, Washington, D.C., USA.

U.S. Fish and Wildlife Service (USFWS). 2014. Final Environmental Assessment, Shiloh IV Wind Project Eagle Conservation Plan, California. Prepared by Division of Migratory Bird Management, Sacramento, CA.

U.S. Fish and Wildlife Service (USFWS). 2012. Land-Based Wind Energy Guidelines, OMB Control No, 1018-0148. https://www.fws.gov/ecological-services/es-library/pdfs/weg_final.pdf

Wiens, J.D. Schumaker N.H., Inman, R.D., Esque T.C., Longshore, K.M. Nussear, K.E. 2017. Spatial Demographic Models to Inform Conservation Planning of Golden Eagles in Renewable Energy Landscapes. Journal of Raptor Research 51 (3):234-257

Wiens, J.D. Kolar, P.S., Fuller, M.R. Hunt, W.G. and Hunt, T. 2015. Estimation of occupancy, breeding success, and predicted abundance of Golden Eagles (Aquila chrysaetos) in the Diablo Range, California, 2014: U.S. Geological Survey Open-File Report 2015-1039, 23p., http://dx.doi.org/10.3133/ofr20151039 .

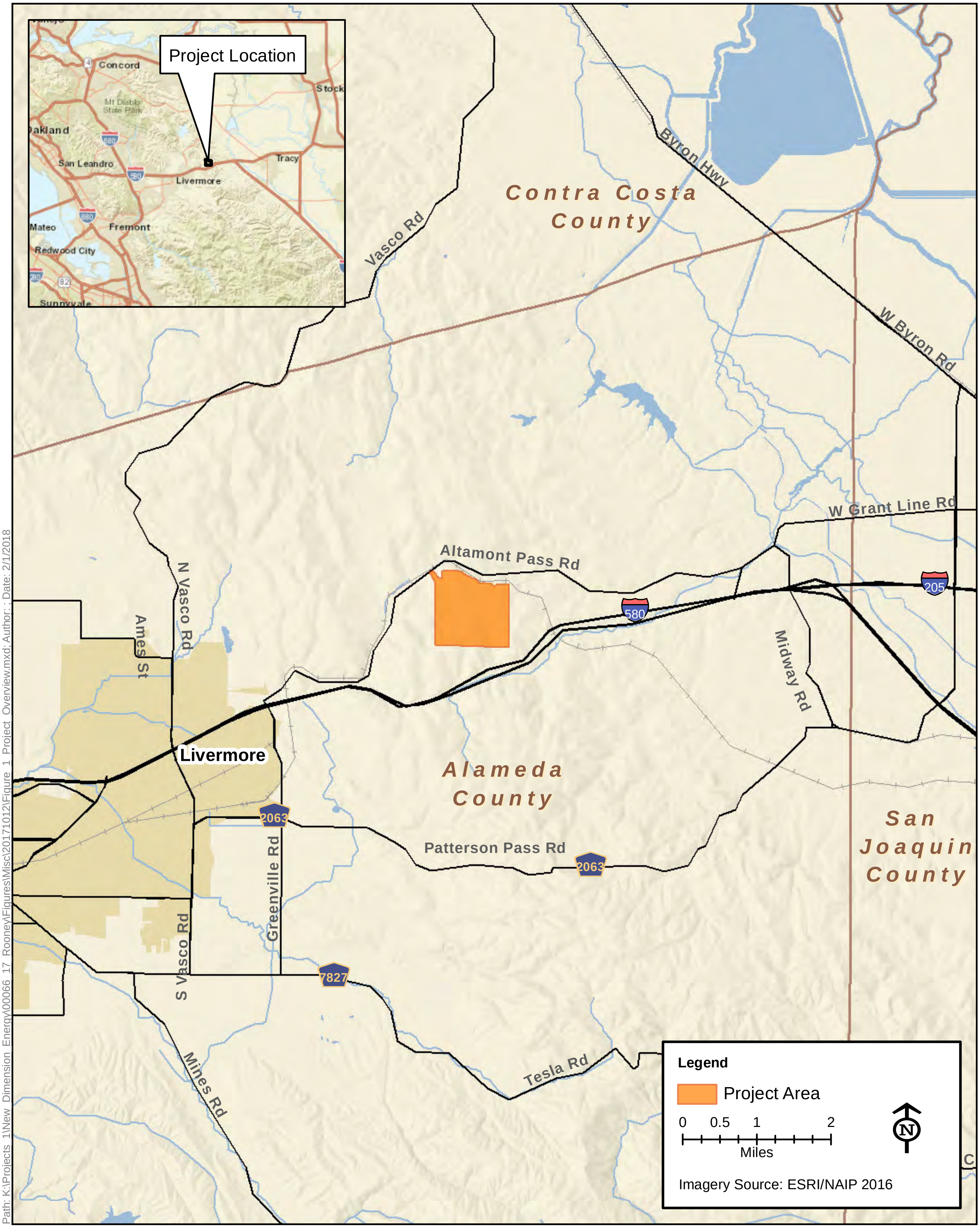

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Figure 1-1
Project Location

Chapter 2
Project Description

2.1 Project Location and Land Ownership

The 578-acre project area—an existing wind project in the Alameda County portion of the APWRA—comprises two parcels, owned by the City, south of Altamont Pass Road (Figure 2-1). Land use in the project area and the surrounding APWRA consists largely of cattle-grazed land supporting operating wind turbines and ancillary facilities.

Generally characterized by rolling foothills of annual grassland, the mostly treeless region is steeper on the west and gradually flatter to the east where it slopes toward the floor of the Central Valley. Elevations in the area range from approximately 600 to 1,200 feet above sea level.

The project area—parcels 99B-6275-2-5 and 99B-6500-1—is located in Township 2, Range 3 East, Sections 28 of the Mount Diablo Base Meridian. Rooney has lease agreements with the City to install, operate, and maintain the repowered wind turbines while permitting ongoing agricultural activities to continue.

2.2 Project Need, Goals, and Objectives

The underlying purpose of the Project is to repower an existing wind project on two parcels owned by the City, within the Program Area, to develop a 25.1MW commercially viable wind energy facility that would deliver renewable energy to the grid and would be subject to a single, uniform avian monitoring protocol and help meet the state's RPS, GHG reduction, and carbon neutrality goals.

The fundamental objectives of the Project are:

- To satisfy existing Power Purchase Agreements by siting up to seven fourth-generation wind turbines on lands within the Program Area; and
- To maintain commercial viability.

The secondary objectives of the Project are:

- To minimize environmental impacts by:
    - Limiting ground disturbance through the re-use of existing infrastructure (e.g., roads, transmission lines) where feasible; and
    - Improving current understanding of the effects of new generation turbines on birds and bats by applying the same avian mortality monitoring protocol applied in-the Program Area to the project area, rather than introducing a separate protocol.
- To increase local short-term and long-term employment opportunities;
- To provide economic benefits to Alameda County and the City; and
- To assist California and the City of Santa Clara/Silicon Valley Power in meeting its RPS, GHG reduction, and carbon neutrality goals.

2.3 Existing Facilities

2.3.1 Wind Turbines and Foundations

The proposed project may include the removal of old turbine foundations where they conflict with the location of repowered project components.

2.3.2 Access Roads

Primary access to the project area is through a locked gate from Altamont Pass Road. Additional access to the project area may be available through a private road connecting to Carroll Road to the south. Onsite roads are graveled and vary in width from 8 to 16 feet.

2.3.3 Meteorological Towers

Two meteorological towers, 18–60 meters (60–197 feet) tall are present onsite. These towers monitor and record meteorological data such as wind speed, wind direction, and atmospheric pressure.

2.3.4 Power Collection System

Electricity generated by the existing project consisting of 199 old first-generation wind turbines was collected from each wind turbine and transmitted to the Santa Clara substation, where its voltage was increased for interconnection with the Pacific Gas and Electric Company's (PG&E's) transmission lines. The collection system includes pad-mounted transformers, underground cables, overhead cables on wooden poles, assorted circuit breakers and switches, electrical metering/protection devices, and the Santa Clara substation, which encompasses 0.2 acre in the northwest corner of the project area.

2.3.5 Cattle Handling and Staging Areas

A cattle handling and staging area with several abandoned buildings are also located near the substation and encompass 0.3 acre in the northwest corner of the project area.

2.4 Proposed Project Features

The actual layout may differ from the two primary proposed layouts illustrated in Figures 2a and 2b because the exact turbine locations are subject to micrositing (i.e., small moves to accommodate setback constraints, avian siting requirements, and other local considerations). Either layout is expected to have the same extent of impact. Temporarily disturbed areas would be restored within 1 year. The proposed project features are listed below and discussed in greater detail in the following subsections.

- A total nameplate generation capacity of up to 25.1 MW.
- Removal of wind turbine foundations that are in conflict with new project components.

- Installation of up to seven new wind turbine generators, towers, foundations, and pad-mounted transformers.
- Development of project roads and installation of a power collection system.
- Use of existing roads to the extent possible.
- Use of existing substation (with upgrades to the equipment within the footprint of the existing facility).
- Installation of one permanent meteorological tower.

2.4.1 Wind Turbines

Most of the turbines being repowered in the APWRA were installed in the 1980s and represent first- and second- generation utility-grade commercial wind turbine technology, now considered old technology. The terms *first-generation*, *second-generation*, *third-generation*, and *fourth-generation* are used to group wind turbine types with similar technologies currently installed or to be installed in the program area. In this context, first-generation wind turbines are those designed and installed during the 1980s. Second-generation turbines are those designed and installed in the 1990s. Third-generation turbines are those installed in previous repowering projects that use similar design to turbines proposed for the project but that are of smaller size (i.e., up to 1 MW). Fourth-generation turbines—such as those proposed for installation at Rooney, are large, 1.6–4.0 MW turbines.

The proposed repowering project would entail installation of up to seven new-generation turbines in the project area. A range of turbines is being considered for the proposed project. Turbines being considered range in nameplate capacity from 2.3 to 4.0 MW, a rotor diameter of 90–140 meters (295–459 feet), towers of 80–110 meters (262–361 feet), and a maximum total turbine height of up to152 meters (499 feet). The current project layout assumes the use of turbines with the specifications presented in Table 2-1.

Lighting for wind turbines will be consistent with FAA requirements. If necessary, and approved by the FAA, Rooney would also implement lighting management techniques as part of the project to minimize the need for turbine lighting. The exact lighting minimization methods would be determined through consultation with the FAA. Intensity of the lights would be based on a level of ambient light, with illumination less than 2 foot-candles being normal for nighttime and illumination greater than 5 foot-candles being the standard for daytime. Because some evidence suggests that lights may be an attractant for birds during nighttime migration, the minimum number of required lights would be used to minimize attractants for birds during nighttime migration. Through 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. The FAA could also determine that the absence of marking and/or lighting would not threaten aviation.

Table 2-1. Turbine Specifications[a]

	Turbine Model		
Turbine Characteristic	General Electric 2.3-116	General Electric 3.6-137	General Electric 3.8-130
Rotor type	3-blade/horizontal axis	3-blade/horizontal axis	3-blade/horizontal axis
Blade Length	56.9 m (187 ft)	67.2 m (220 ft)	63.7 m (209 ft)
Rotor diameter	116 m (381 ft)	137 m (449 ft)	130 m (427 ft)
Rotor-swept area	10,568 m^2 (113,753 ft^2)	14,741 m^2 (158,671 ft^2)	13,273 m^2 (142,869 ft^2)
Rotational speed	Variable: 5.0–14.9 rpm	Variable: 6.3–13.6 rpm	Variable: 6.95–12.1 rpm
Tower type	Tubular	Tubular	Tubular
Tower (hub) height	80 m (308 ft)	81.5 m (267 ft)	85 m (279 ft)
Rotor height (from ground to lowest tip of blade)	22 m (72.2 ft)	13.0 m (42.7 ft)	20 m (65.6 ft)
Total height (from ground to top of blade)[b]	138 m (453 ft)	150 m (492 ft)	150 m (492 ft)

[a] Depending on availability at the time of construction, turbines of up to 4.0 MW may be used for the proposed project. Turbine dimensions would not exceed those shown in the table and the project capacity would not exceed 25.1 MW.

[b] Depending on the type of turbine and tower height used for the proposed project, total height would be up to but would not exceed 152 m (499 ft).

2.4.1.1 Siting Requirements

The City has encouraged Rooney to adhere to the County's requirements to the extent possible to maintain consistency with regional planning that has been conducted to date. Setback requirements were originally developed for Alameda County windfarms in the 1980s and 1990s in consideration of a variety of factors, such as appropriate distance between upwind and downwind turbines for effective wind production, noise effects on sensitive land uses, visual impacts resulting from proximity to residences and possible shadow flicker, concerns with tower collapse, and blade throw hazard (where all or part of a rotor blade may break loose from the nacelle and strike an occupied area or infrastructure). While there is no ordinance dictating setback conditions in Alameda County, setbacks have historically been determined on a project-by-project basis in accordance with the standard conditions of approval for a conditional use permit (CUP). However, while the standard conditions applied in the 1980s and 1990s were appropriate for the older generation turbines, they may not be so for the fourth-generation turbines proposed for repowering. Accordingly, the County has developed a set of updated standards to be used for proposed repowering projects. These are shown in Table 2-2.

Table 2-2. Updated Alameda County Turbine Setback Requirements

Affected Land Use or Corridor	General Setback	Setback Adjustment for Turbine Elevation Above or Below Affected Use[a]	Alternative Minimum[b]
Adjacent parcel with approved wind energy CUP[c]	1.1 times rotor length	1% TTH added or subtracted per 10 ft of turbine elevation, respectively, above or below affected parcel	50% of general setback
Adjacent parcel without approved wind energy CUP	1.25 times TTH	1% TTH per 10 ft above or below affected parcel	1.1 times rotor length
Adjacent dwelling unit	3 times TTH	1% TTH per 10 ft above or below affected unit	50% of general or elevation differential setback
Public road (including I-580), trail, commercial or residential zoning	2.5 times TTH	1% TTH per 10 ft above or below affected right-of-way	50% of general setback with report by qualified professional, approved by Planning Director
Recreation area or property	1.25 times TTH	1% TTH per 10 ft above or below affected property	TTH
Transmission line[d]	2 times TTH	1% TTH per 10 ft above or below path of conductor line at ground level	50% of general setback with report by qualified professional, approved by Planning Director

Note: TTH = total turbine height: the height to the top of the rotor at 12:00 position. Setback distance to be measured horizontally from center of tower at ground level.

[a] The General Setback based on TTH will be increased or reduced, respectively, based on whole 10-ft increments in the ground elevation of the turbine above or below an affected parcel, dwelling unit, road right-of-way, or transmission corridor conductor line. Any portion of a 10-ft increment in ground elevation will be disregarded (or rounded down to the nearest 10-ft interval).

[b] *Alternative Minimum* refers to a reduced setback standard, including any adjustment for elevation, allowed with a notarized agreement or an easement on the affected property (if applicable), subject to approval of the Planning Director.

[c] CUP = conditional use permit. No setback from parcel lines is required within the same wind energy CUP boundary. Knowledge of proposed wind energy CUPs on adjacent parcels to be based on best available information at the time of the subject application.

[d] Measured from the center of the conductor line nearest the turbine.

2.4.1.2 Wind Turbine Installation

Foundations

The type of turbine foundation used depends on terrain, wind speeds, and wind turbine type. Two foundation types may be used in repowering APWRA wind projects: an inverted “T” slab foundation and a concrete cylinder foundation.

An inverted T slab foundation is a type of spread footing foundation. A single concrete pad is placed at ground level. Part of the pad may be placed below ground level depending on the slope. At the center of the pad is a cylindrical concrete pedestal to which the wind turbine tower is bolted; hence the name, inverted T.

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

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

Construction

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

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

The turbine towers, nacelles, and blades would be delivered to each turbine location in the order of assembly, once the concrete of the foundation has been poured and has cured sufficiently. Large cranes are brought to each site to lift and assemble the turbine components. First, the base section of the tower is secured to the foundation using large bolts. The remaining tower sections are then lifted with the crane and connected to the base section. After the nacelle and rotor are delivered to the turbine site, the turbine blades are bolted to the rotor hub, and the nacelle and rotor are lifted by a crane and connected to the main shaft.

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

2.4.2 Site Preparation and Access Roads

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

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

Culverts will be installed as part of the road drainage system on slopes. No stream crossings are present in the project area where proposed roads would be installed, and therefore culverts for stream crossings will not be necessary. Existing culverts may need to be replaced with larger culverts or reinforced to provide adequate size and strength for construction vehicles.

2.4.3 Staging Areas

Six staging areas of various sizes, totaling up to 15 acres, would be established in the project area. These areas would be used for the storage of turbine components, construction equipment, water tanks, office trailers, and other supplies needed for project construction. The trailers would be used to support workforce needs and site security and would also house a first aid station, emergency shelter, and hand tool storage area for the construction workforce. Parking areas would be located near the trailers. Vegetation would be cleared and the staging areas would be graded level. These areas would use native material, supplemented with gravel or soil stabilizer, if needed, and appropriate erosion control devices (e.g., earth berm, silt fences, straw bales) would be installed to manage water runoff. Diversion ditches would be installed, as necessary, to prevent stormwater from running onto the site from surrounding areas. Following completion of construction activities, the contractor would restore the temporary staging areas. The gravel surface would be removed, and the areas would be contour graded (if necessary and if environmentally beneficial) to conform with the natural topography. Stockpiled topsoil would be replaced, and the area would be stabilized and reseeded with an appropriate seed mixture.

2.4.4 Meteorological Towers

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

2.4.5 Power Collection System

Each new wind turbine must be connected to the medium-voltage electrical collection system via a pad-mounted transformer. The collection system carries electricity generated by the turbines to a substation, where the voltage level of the collection system is stepped up to that of the power grid.

From the substation, electricity is carried through an interconnection point to the transmission lines that distribute electricity to the power grid. Transmission lines in the project vicinity are maintained by PG&E. Each of the collection system components are discussed below.

2.4.5.1 Collection Lines

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

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

2.4.5.2 Transformers and Power Poles

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

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

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

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

2.4.5.3 Substation

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

The existing onsite substation served as the collector substation for the previous wind project. The substation consists of a graveled footprint area of approximately 0.2 acre, a 12-foot chain-link perimeter fence, and an outdoor lighting system. This substation may be expanded to a 0.3-acre footprint to accommodate the installation of new, upgraded equipment. Any new lights would be shielded or directed downward to reduce glare. The upgraded substation would be fenced in, keeping with the fencing around the existing substation (i.e., 12-foot chain link perimeter fencing).

2.4.6 Operations and Maintenance Facility

An existing off-site O&M building and yard will be used for the project. Additional small storage buildings may be required at the site, but would be constructed within the existing fenced area of the existing O&M yard.

2.5 Project Construction

Turbines would be delivered to the site from the Port of Stockton or other nearby port or rail transfer locations. Tower assembly requires the use of one large track-mounted crane and two small cranes. The turbine towers, nacelles, and rotor blades would be delivered to each foundation site and unloaded by crane. A large track-mounted crane would be used to hoist the base tower section vertically then lower it over the threaded foundation bolts. The large crane would then raise each additional tower section to be bolted through the attached flanges to the tower section below. The crane then would raise the nacelle, rotor hub, and blades to be installed atop the tower. Two smaller wheeled cranes would be used to offload turbine components from trucks and to assist in the precise alignment of the tower sections. Estimated disturbance areas associated with project construction are provided in Table 2-3 and were calculated by estimating disturbance associated with each alternative layout and by using the most impactful scenario. The extent of impacts of the two alternatives under consideration would be nearly identical.

Table 2-3. Estimated Disturbance Associated with Project Construction (acres)[a]

Activity	Permanent Impact	Temporary Impact
Power collection system installation	0.0	3.0
Staging area installation	0.0	15.0
Access road expansion[b]	1.0	7.0
Turbine foundation installation	0.5	17.6
Meteorological tower installation	0.1	0.2
Substation expansion	0.1	0.1
Subtotal	1.7	42.9

[a] The extent of impacts of the two alternatives under consideration would be approximately the same.
[b] Existing access roads will be reused to the extent possible, however some small sections of new access road will be required and are included in the totals presented

2.5.1 Schedule

Project construction would proceed after all construction-related permits are issued. These activities are anticipated to proceed according to the sequence described below. Construction-related best management practices (BMPs) would be implemented during the November–April wet season. The final approved work hours would be specified in the proposed project's Notice to

Proceed, if issued by the City. If extended hours are necessary or desired, the appropriate approvals would be sought.

2.5.2 Construction Sequence

Typical construction steps are listed below.

- Demarcation of construction areas and any sensitive biological, cultural, or other resources needing protection.
- Construction of temporary staging areas.
- Road infrastructure upgrades.
- Erosion and sediment control.
- Wind turbine construction.
  - Final site selection and preparation.
  - Crane pad construction.
  - Foundation excavation and construction.
  - Tower assembly.
  - Installation of nacelle and rotor.
- Power collection system and communication line installation.
- Upgrades to the substation.
- Permanent meteorological tower installation.
- Final cleanup and restoration.

The construction contractors would prepare the project area, deliver and install the project facilities, oversee construction, and complete final cleanup and restoration of the construction sites. Rooney would implement BMPs consistent with standard practice and with the requirements of the PEIR as well as any state or federal permits to minimize soil erosion, sedimentation of drainages downslope of the project area, and any other environmental impacts. Examples of likely erosion control measures are listed below.

- Use of straw wattles, silt fences/straw bale dikes, and straw bales to minimize erosion and collect sediment (to protect wildlife, no monofilament-covered sediment control measures would be used).
- Reseeding and restoration of the site.
- Maintenance of erosion control measures.
- Regular inspection and maintenance of erosion control measures.

The construction activities and the approximate duration of each are listed below.

- Staging areas: 2 weeks.
- Road construction: 8 weeks.
- Foundations/electrical: 8 weeks.

- Turbine delivery and installation: 12 weeks.
- Electrical trenching and substation upgrades: 12 weeks.
- Cleanup: 12 weeks.

2.5.3 Demarcation of Sensitive Resources

Sensitive resources in and adjacent to construction areas would be marked to ensure adequate avoidance. Sensitive areas identified through the environmental approval and permitting processes would be staked and flagged. Prior to construction, the construction contractor and any subcontractors would conduct a walk-through of areas to be affected, or potentially affected, by construction activities. The preconstruction walk-throughs would be conducted regularly to identify sensitive resources to be avoided, limits of clearing, location of drainage features, and the layout for sedimentation and erosion control measures. Following identification of these features, specific construction measures would be reviewed and any modifications to construction methods or locations would be agreed upon before construction could begin.

2.5.4 Workforce

Based on data provided for typical wind energy projects of similar size, an average of 50 workers would be employed during construction, with a peak workforce of 75. Craft workers would include millwrights, iron workers, electricians, equipment operators, carpenters, laborers, and truck drivers. Local construction contractors and suppliers would be used to the extent possible.

2.5.5 Construction Equipment

Equipment used for construction of repowering activities generally includes the types listed below.

- Cranes
- Lowboys/trucks/trailers
- Flatbed trucks
- Service trucks (e.g., pickup trucks)
- Backhoes
- Bulldozers
- Excavators
- Graders
- Dump trucks
- Track-type dozers
- Rock crushers
- Water trucks
- Compactors
- Loaders

- Rollers
- Drill rigs
- Trenching cable-laying vehicles
- Cement trucks
- Concrete trucks and pumps
- Small hydraulic cranes
- Heavy and intermediate cranes
- Forklifts
- Generators

2.5.6 Hazardous Materials Storage

Hazardous materials would be stored at the staging area (use of extremely hazardous materials is not anticipated). To minimize the potential for harmful releases of hazardous materials through spills or contaminated runoff, these substances would be stored within secondary containment areas in accordance with federal, state, and local requirements and permit conditions. Storage facilities for petroleum products would be constructed, operated, and maintained in accordance with the Spill Prevention Control and Countermeasures (SPCC) Plan that would be prepared and implemented for the proposed project (Title 40 Code of Federal Regulations Part 112). The SPCC Plan would specify engineering standards (for example, secondary containment); administrative standards (for example, training with special emphasis on spill prevention, standard operating procedures, inspections); and BMPs.

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

2.5.7 Traffic and Parking

Construction traffic routing would be established in a Construction Traffic Plan, which would include a traffic safety and signing plan prepared by Rooney in coordination with the City, County, and other relevant agencies. The plan would define hours, routes, and safety and management requirements.

This plan would incorporate measures such as informational signs, traffic cones, and flashing lights to identify any necessary changes in temporary land configuration. Flaggers with two-way radios would be used to control construction traffic and reduce the potential for accidents along roads. 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. Onsite construction traffic would be restricted to the roads developed for the proposed project. Use of existing unimproved roads would be restricted to emergency situations.

Vehicle trips to the site during construction would include oversized vehicles delivering wind turbine generator and substation materials, heavy equipment, and other construction-related materials. Construction of the proposed project components (roads, turbines, substation, and electrical/communication lines) would take place concurrently, using individual vehicles for multiple tasks. There would also be daily round trips of vehicles transporting construction personnel to the site.

Construction-related parking would be located in the construction staging area. Carpooling would be used when possible.

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

2.5.8 Water and Wastewater Needs

Water for construction activities would be provided through an agreement with municipal or private suppliers. Temporary onsite water tanks and water trucks would be made available for fire water support, dust suppression, and construction needs. Daily water use would vary, depending on the weather conditions and time of year, both of which affect the need for dust control. Hot, dry, windy conditions would necessitate greater amounts of water. Tanker trucks would apply water to construction areas where needed to aid in road compaction and reduce construction-generated dust.

A minimal amount of water would be required for construction worker needs (drinking water, sanitation facilities). This water would be trucked in or delivered as bottled drinking water. A local sanitation company would provide and maintain appropriate construction sanitation facilities. Portable toilets would be placed at each of the staging areas. When necessary, additional facilities would be placed at specific construction locations. Appropriate BMP training would be provided to truck operators to prevent runoff from dust suppression and control activities. Water used for cement mixing and truck washing would be managed in accordance with applicable permit conditions (and BMPs).

While the proposed project would require only a minimal amount of water on a temporary basis during construction, and an even smaller amount of water during operations for the O&M building, Rooney has voluntarily prepared a water supply assessment (WSA) for the purpose of ensuring that sufficient water supply is available for the proposed project. Water for construction (primarily for dust control) would be provided from Zone 7 Water Agency, Byron-Bethany Irrigation District, the City of Livermore, or other approved water district or agency, if available. The WSA concludes that there is adequate water supply available to meet the needs of the proposed project for both construction activities and operations.

2.5.9 Inspection and Startup Testing

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

2.5.10 Restoration

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 workday through all stages of construction. Existing vegetation would be cleared only where necessary. All excavations would be backfilled with compacted earth and aggregate as soon as cable infrastructure is tested. Disposal of cuttings and debris would be in an approved facility designed to handle the waste.

Before construction is complete, all remaining trash and debris would be removed from the site. Any debris would be properly disposed of offsite consistent with restoration requirements for nearby projects and described in a Reclamation Plan, which would be developed prior to construction as part of the construction planning and permitting process. Any material placed in the areas of the foundations or roads would be compacted as required for soil stability.

2.5.11 Safety and Environmental Compliance Programs

2.5.11.1 Quality Assurance and Quality Control

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

2.5.11.2 Environmental Compliance

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

2.5.11.3 Stormwater Control

Because the project would disturb more than 1 acre, it would require coverage under the state's General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order 2010-0014-DWQ) (Construction General Permit). Permit coverage would be obtained by submitting permit registration documents (PRDs) to the State Water Resources Control Board through its Stormwater Multiple Application and Report Tracking System (SMARTS) website. The PRDs include a notice of intent, site maps, a stormwater pollution prevention plan (SWPPP), a risk level assessment, and other materials. The SWPPP would include the elements described in Section A of the Construction General Permit and maps that show the location and type of erosion control, sediment control, and non-stormwater BMPs, all of which are intended to prevent significant water quality impacts on receiving waters. The SWPPP would also describe site inspection, monitoring, and BMP maintenance procedures and schedules.

2.5.11.4 Safety Compliance

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

2.5.11.5 Emergency Situations

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

2.5.11.6 Public Access and Security

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

2.5.11.7 Hazardous Materials Storage and Handling

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

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

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

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

2.6 Operation and Maintenance Activities

Maintenance of turbines and associated infrastructure includes a wide variety of activities. Routine maintenance involves activities such as checking torque on tower bolts and anchors; checking for cracks and other signs of stress on the turbine mainframe and other turbine components; inspecting for leakage of lubricants, hydraulic fluids, and other hazardous materials and replacing them as necessary; inspecting the grounding cables, wire ropes and clips, and surge arrestors; cleaning; and repainting. Most routine maintenance activities occur within and around the tower and the nacelle. Cleanup from routine maintenance activities would be conducted at the time maintenance is performed by the O&M personnel. While performing most routine maintenance activities, O&M staff would travel by pickup or other light-duty trucks. In addition, nonroutine maintenance such as repair or replacement of rotors or other major components could be necessary. Such maintenance would involve use of one or more cranes and equipment transport vehicles.

Monitoring of project operations would be computer-based; computers in the base of each turbine tower would be connected to the O&M facility through fiber-optic or wireless telecommunication links.

The O&M workforce would consist of turbine technicians, operations personnel, administrative personnel, and management staff. O&M staff would monitor turbine and system operation, perform routine maintenance, shut down and restart turbines when necessary, and provide security. All O&M staff would be trained regularly to observe BMPs. Approximately two full-time staff would be required to conduct O&M activities.

2.7 Post-Project Decommissioning

The anticipated life of the windfarm is more than 30 years, as upgrading and replacing equipment could extend the operating life indefinitely with appropriate permit approvals. However, the life of the project for CEQA purposes would be 35 years.

Decommissioning would involve removing the turbines, transformers, and related infrastructure in accordance with landowner agreements. Substations and met towers may be removed and the sites reclaimed; alternatively, the sites could be retained for continued use. A single large crane would be used to disassemble the turbines, and smaller cranes would lift the parts onto trucks to be hauled away. Generally, turbines, electrical components, and towers would either be refurbished and resold or recycled for scrap. All unsalvageable materials would be disposed of at authorized sites in accordance with federal, state, and local laws, regulations, ordinances, and adopted policies in effect at the time of final decommissioning. Existing service roads would be used. Road reclamation would be accomplished using scrapers and gravel trucks. Site reclamation after decommissioning would be subject to a locally approved reclamation plan. Based on site-specific requirements, the reclamation plan would include regrading, spot replacement of topsoil, and revegetation of disturbed areas with an approved seed mix.

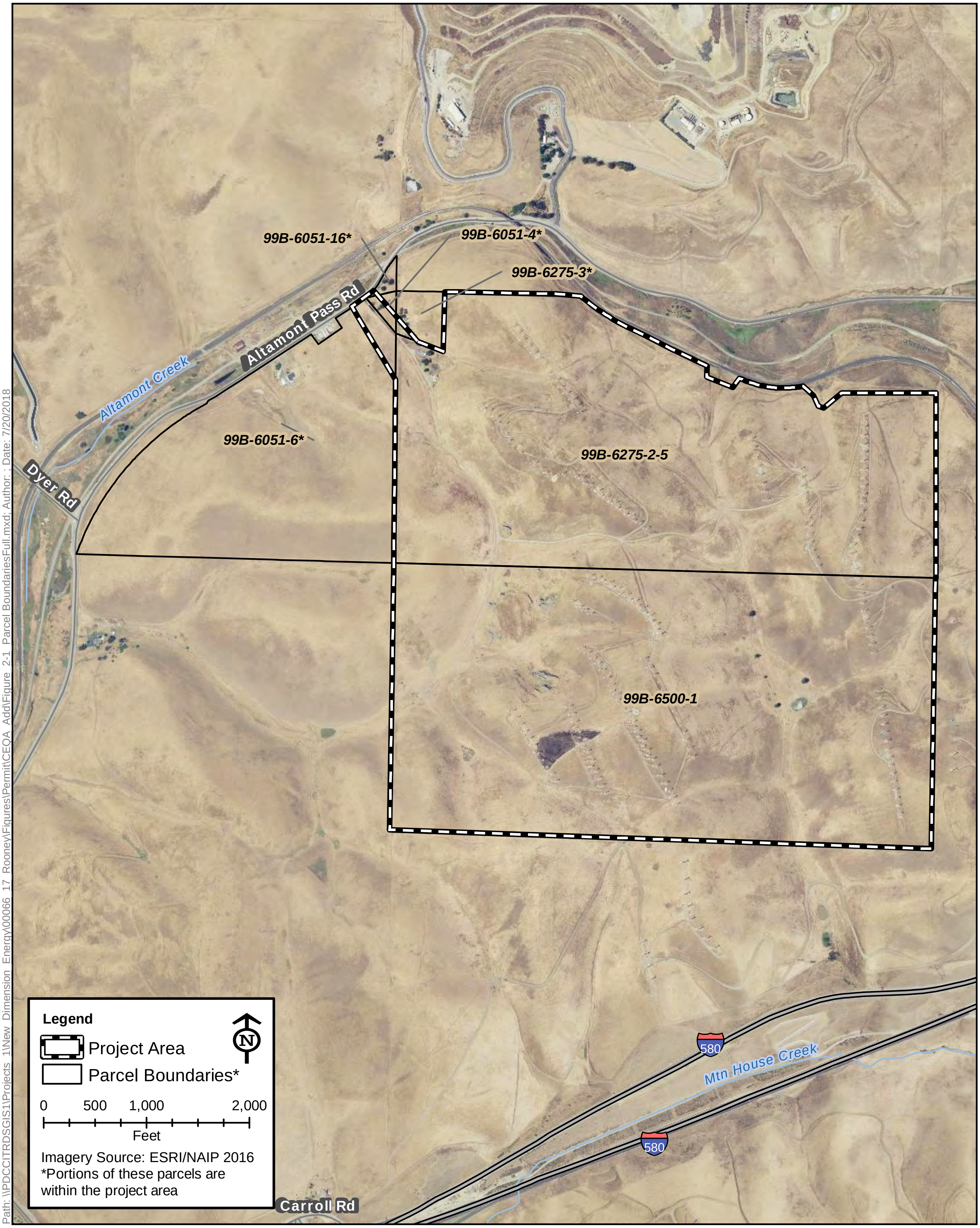

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Figure 2-1
Parcel Boundaries

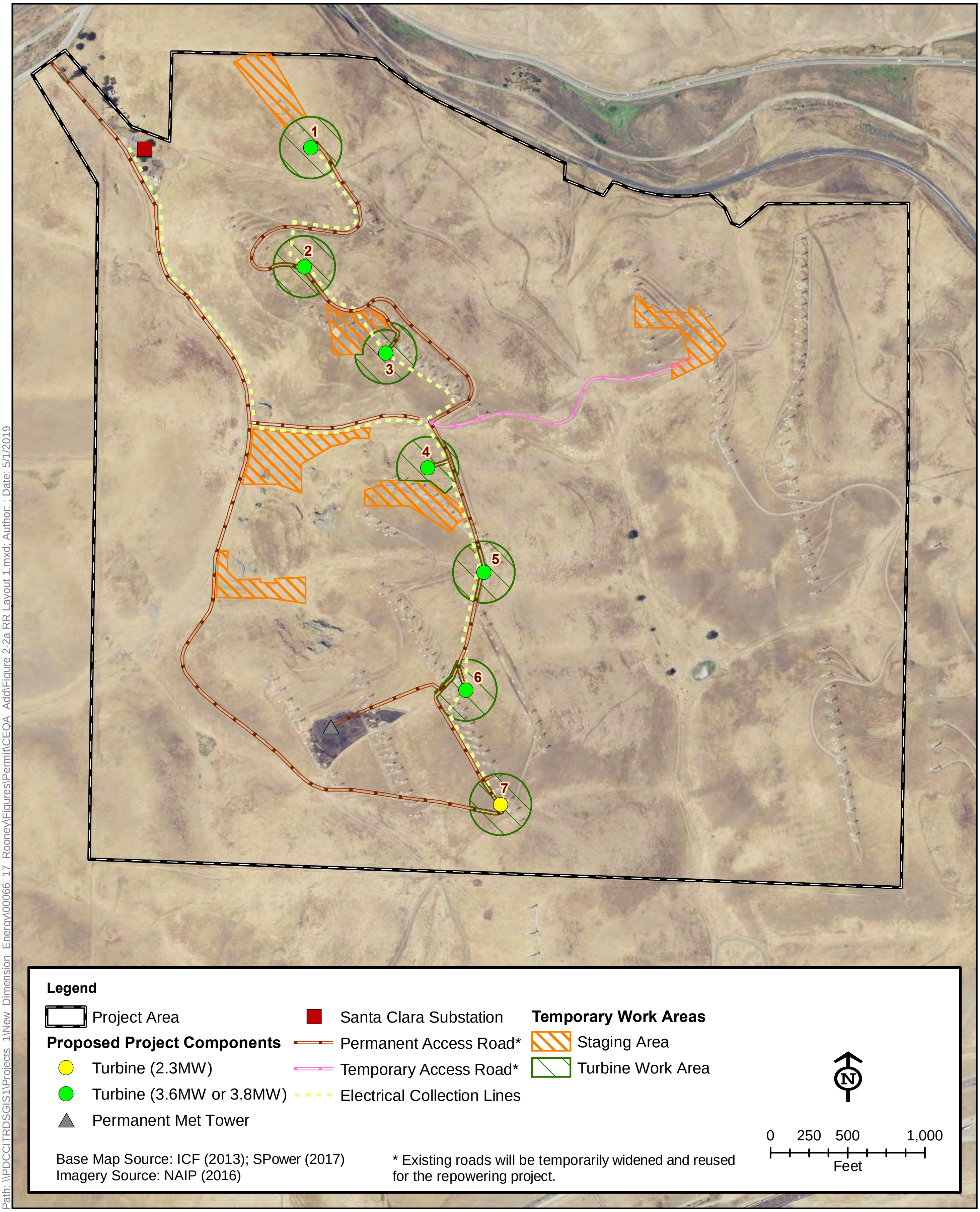

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Figure 2-2a
Rooney Ranch Wind Repowering Project—Layout 1

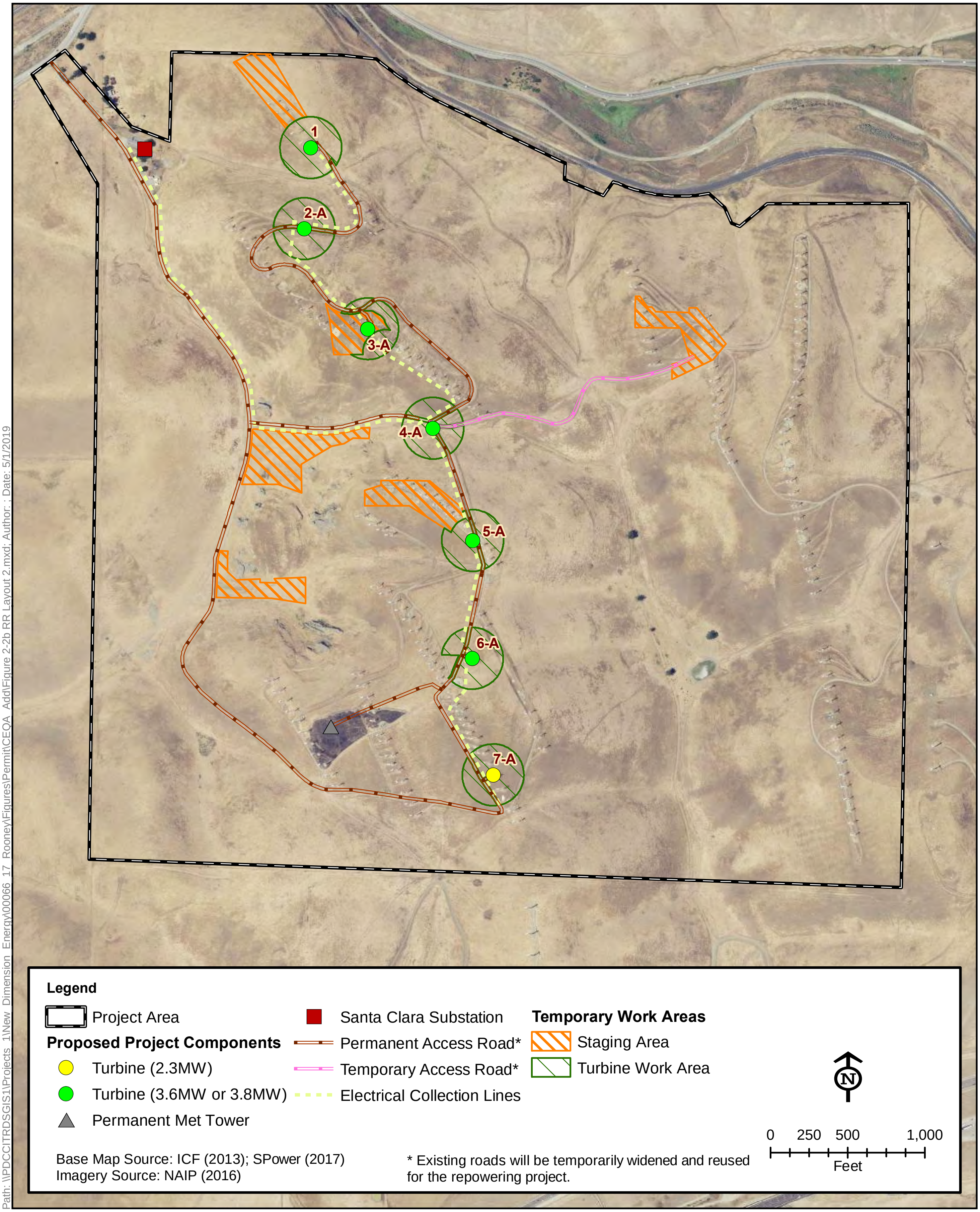

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Figure 2-2b
Rooney Ranch Wind Repowering Project—Layout 2

Chapter 3
Environmental Analysis

As discussed in Chapter 1, *Introduction*, the analysis in this document parallels the organization of the PEIR. While some resource topics might have been summarily dismissed, it was deemed preferable to provide a brief argument supporting the decision to omit a more detailed analysis.

The resource discussions are organized as shown below. Where references are cited, they are provided at the end of each section.

- Section 3.1—Aesthetics and Visual Resources
- Section 3.2—Agricultural and Forestry Resources
- Section 3.3— Air Quality
- Section 3.4—Biological Resources
- Section 3.5—Cultural Resources
- Section 3.6—Geology, Soils, Mineral Resources, and Paleontological Resources
- Section 3.7—Greenhouse Gas Emissions
- Section 3.8—Hazards and Hazardous Materials
- Section 3.9—Hydrology and Water Quality
- Section 3.10—Land Use and Planning
- Section 3.11—Noise
- Section 3.12—Population and Housing
- Section 3.13—Public Services
- Section 3.14—Recreation
- Section 3.15—Transportation/Traffic
- Section 3.16—Utilities and Service Systems

3.1 Aesthetics and Visual Resources

The PEIR presented a broad and thorough analysis of the impacts on aesthetics and visual resources that would result from repowering the program area, selecting key viewpoints to develop photo simulations comparing the view under existing conditions with the same view under repowered conditions. To conduct the project-level analysis, analysts selected three project-specific viewpoints to characterize visual changes that would result from project implementation (Figure 3.1-1).

- Viewpoint 1—Looking southwest from Altamont Pass Road east of the project area.
- Viewpoint 2—Looking southeast from Altamont Pass Road west of the project area.
- Viewpoint 3—Looking northeast from the intersection of I-580 and Flynn Road North.

A review of the two alternative layouts was conducted to determine if they differ substantially from a visual analysis perspective. The results of that review indicated that the layouts are not substantially different; consequently, Layout 1 was selected for the visual simulations. Visual simulations were prepared for each viewpoint, using the largest and tallest turbine model proposed to ensure a conservative approach to the analysis—that is, a worst-case scenario.

3.1.1 Existing Conditions

As described in the PEIR, the project vicinity is mostly characterized by grass-covered, rolling hills, with road cuts to accommodate rural roads and I-580. Strings of turbines, power lines, transformers, access roads, and substations are the most visually distinct artificial features throughout most the vicinity. Rural residences dot the vicinity surrounding the project area, but there are no residences within it. Both Altamont Pass Road, north of the project area, and I-580, south of the project area, are designated scenic routes.

3.1.2 Environmental Impacts and Mitigation Measures

The project-level analysis was based on review of the PEIR and on the visual photo simulations listed above. These photo simulations are presented in Figures 3.1-2 through 3.1-4.

The PEIR relied on a qualitative evaluation of the visual impacts of repowering the program area overall. In general, the PEIR characterized the new repowered turbines across the program area in comparison with the existing old-generation turbines. The project's turbines would have a slightly longer blade length (i.e., 15 feet) and rotor-swept area than the turbines evaluated in the PEIR, but the project would require fewer turbines because each would have a higher capacity than those contemplated in the PEIR. The longer blade length is not expected to be visually noticeable from nearby roads or residences because the proposed turbines are consistent with the overall dimensions of those evaluated in the PEIR; consequently, the analysis in the PEIR is relevant and appropriate for the project. Accordingly, the applicant's proposal to use slightly larger turbines would not constitute a new significant effect or a substantial increase in the severity of effects on visual resources compared to those described in the PEIR. Additional analysis specific to the project is provided below.

Impact AES-1: Temporary visual impacts caused by construction activities (less than significant with mitigation)

The PEIR concluded that construction activities could result in a significant impact, particularly for highly sensitive viewers such as residents and recreationists. The analysis specifically called out scenic roadways. Accordingly, the potential visual impacts associated with construction as addressed in the PEIR would apply to the project; as concluded in the PEIR, implementation of Mitigation Measure AES-1, Limit construction to daylight hours, would reduce these impacts to a less-than-significant level. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

Impact AES-2: Have a substantial adverse effect on a scenic vista (less than significant with mitigation)

The PEIR concluded that while the new, large turbines may be more visually evident than the older, smaller turbines, their wide spacing on the landscape would be less disruptive of the landscape features. The program-level analysis raised the greatest concern for areas without turbines. The project area was previously developed with old-generation turbines, making this concern not relevant to the repowering project.

Accordingly, while the repowering project would introduce changes to views in and of the project area, many of these changes might in fact be beneficial, because much of the project area would change from exhibiting many small turbines to fewer, larger turbines. Nevertheless, for purposes of full and conservative disclosure, because of the project area's situation between two designated scenic roadways, the construction of turbines in this area could have a substantial adverse effect; thus, this impact is considered potentially significant. Implementation of Mitigation Measures AES-2b, Maintain site free of debris and restore abandoned roadways, and AES-2c, Screen surplus parts and materials, would reduce this impact to a less-than-significant level. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

Impact AES-3: Substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings along a scenic highway (less than significant with mitigation)

As described above, Altamont Pass Road and I-580 are County-designated scenic roadways. As stated in the PEIR:

> There are also portions of I-580, Altamont Pass Road, Flynn Road, Mountain House Road, Patterson Pass Road, and the proposed Route 239 Freeway … where no turbines currently exist, but motorists on these roads are accustomed to seeing wind turbines along the route, so they would not be adversely affected.

Because the repowering turbines would replace the old-generation wind turbines, this analysis concludes that implementation of Mitigation Measures AES-2b and AES-2c would reduce the impact on scenic roadways to a less-than-significant level. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

Impact AES-4: Substantially degrade the existing visual character or quality of the site and its surroundings (less than significant with mitigation)

The PEIR concluded that, in general, replacing numerous small turbines with fewer, much larger turbines would not degrade the existing visual character of the area but rather would improve the visual quality. While it might be argued that this impact would be less than significant, for purposes of full and conservative disclosure, this impact is considered potentially significant. Implementation of Mitigation Measures AES-2b and AES-2c would reduce this impact to a less-than-significant level. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

Impact AES-5: Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area (less than significant with mitigation)

The PEIR concluded that lighting required by the Federal Aviation Administration (FAA) would not differ substantially from that associated with existing turbines in the project vicinity, that lighting associated with the substations would be shielded and directed downward to reduce glare, and that the color of new towers and rotors would be neutral and nonreflective. Since preparation of the PEIR, the County has informed the City that the new turbines may require more lighting than the previously existing, smaller turbines, most of which were not tall enough to require FAA lighting. However, as discussed in Section 1.3.4, *Turbine Lighting*, this change does not constitute a new or more intense significant effect. Additionally, Rooney Ranch has committed, as part of the proposed project, to consult with the FAA to reduce lighting requirements to the extent allowed under applicable regulations, which will further address potential effects. Finally, although the larger turbines may require more lighting, there will be significantly fewer turbines (7 instead of 199), and any required lighting will be consistent with current conditions that include multiple repowered sites in the APWRA with larger, new turbines that have already installed lights per FAA requirements. Consequently, the project would not result in a new source of substantial light or glare beyond what is described in the PEIR.

However, the PEIR also concluded that shadow flicker—caused by blade rotation—could create a disruptive visual intrusion to residents who are exposed to the condition for extended periods: more than 30 minutes in a given day or 30 hours in a given year. Mitigation Measure AES-5, Analyze shadow flicker distance and mitigate effects or incorporate changes into project design to address shadow flicker, Rooney will retain a qualified engineering firm to conduct a shadow flicker analysis for the proposed project. The terms of the mitigation measure require that Rooney implement measures to minimize the effect in consultation with any owner of a residence affected more than 30 minutes in a given day or 30 hours in a given year. Implementation of Mitigation Measure AES-5 would reduce this impact to a less-than-significant level. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

Impact AES-6: Consistency with state and local policies (less than significant with mitigation)

The City commits to comply with measures set forth to protect visual resources along scenic roadways and open space areas identified for protection, as detailed in the Scenic Route and Open Space Elements of the Alameda County General Plan (Alameda County 1966). In addition, the City commits to comply with measures set forth in the East County Area Plan (ECAP) to protect visual resources such as sensitive viewsheds, streets and highways, scenic highways, and areas affected by windfarms (Alameda County 2000). Implementation of Mitigation Measures AES-2b, AES-2c, 3, and 5 would reduce this impact to a less-than-significant level. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

3.1.3 References Cited

Alameda County. 1966. *Scenic Route Element of the General Plan*. May. Reprinted June 1974, Amended May 5, 1994.

———. 2000. *East County Area Plan*. Adopted May 1994. Modified by passage of Measure D, effective December 22, 2000. Oakland, CA.

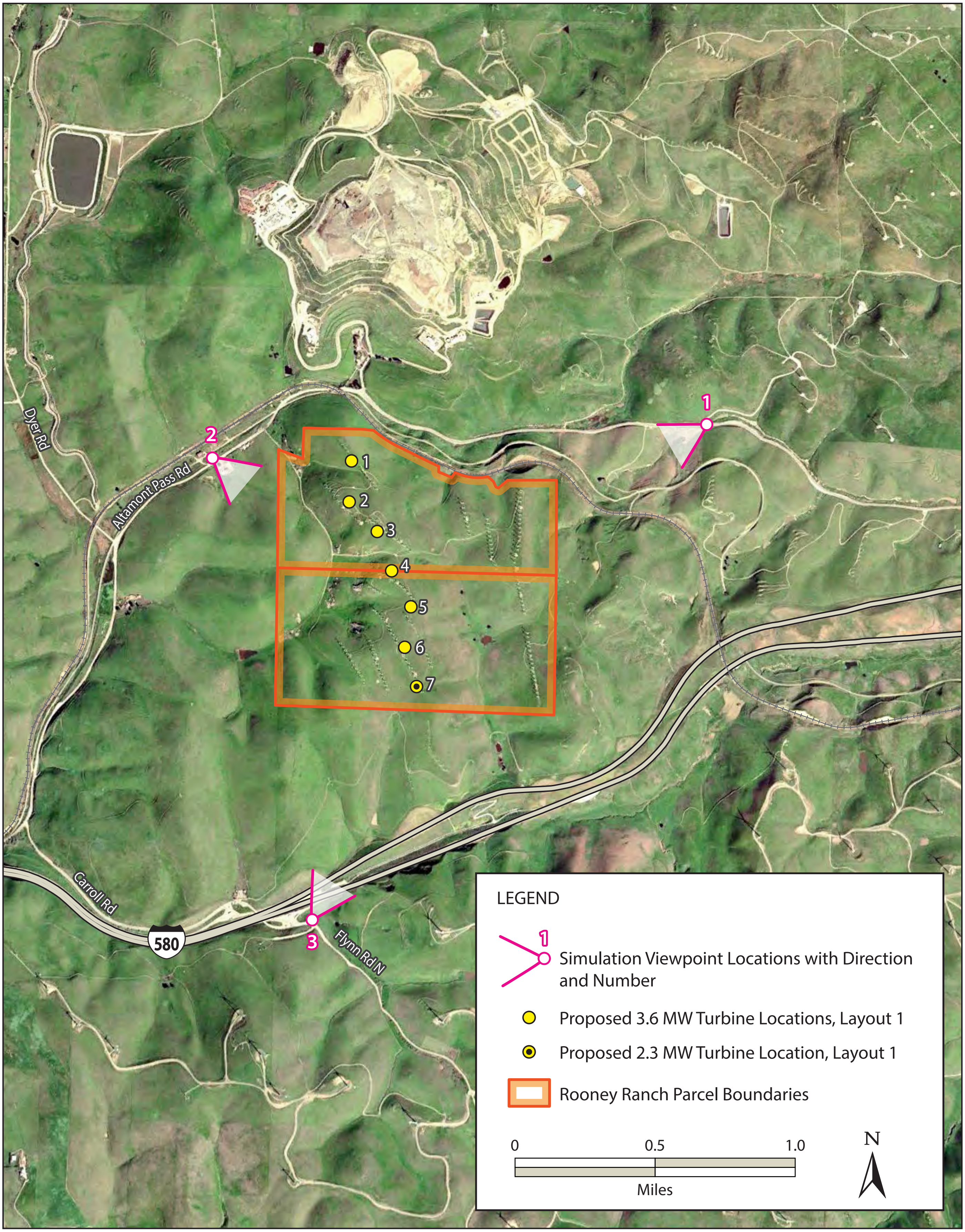

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Figure 3.1-1
Visual Simulation Viewpoint Locations

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Figure 3.1-2
Viewpoint 1—Looking Southwest along Altamont Pass Road

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Figure 3.1-3
Viewpoint 2—Looking Southeast along Altamont Pass Road

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Figure 3.1-4
Looking Northeast near the intersection of Flynn Road and Interstate 580

3.2 Agricultural and Forestry Resources

The PEIR identified approximately 24 acres of Prime Farmland in the extreme northeast corner of the program area and found that conversion of this agricultural land would constitute a significant impact, which could be mitigated to a less-than-significant level. However, because the Prime Farmland is outside the project area, there would be no impact. Similarly, the PEIR found that because wind turbines are a conditionally permitted use on grazing land under Williamson Act contract, there would be no impact pertaining to conflicts with existing zoning. Finally, there is no forest land in the program area. Accordingly, agricultural and forestry resources are not discussed further in this analysis.

3.3 Air Quality

The PEIR evaluated impacts associated with development of up to 450 MW in combined nameplate capacity within the program area. Project-level criteria pollutant emissions and associated air quality impacts were assessed using many of the same methods and models as described in the PEIR. Specifically, analysts estimated combustion exhaust and fugitive dust based on project-specific construction and operating data (e.g., schedule, equipment, truck volumes) provided by the project engineer and a combination of emission factors and methodologies from CalEEMod, version 2016.3.2; California Air Resources Board's (ARB's) EMFAC2017 model; the U.S. Environmental Protection Agency's (EPA's) AP-42 Compilation of Air Pollutant Emission Factors, and several other industry-accepted tools. Appendix A provides additional modeling detail, including equipment and vehicle assumptions.

3.3.1 Existing Conditions

As described in the PEIR, the proposed project is located in Alameda County, which is in the Bay Area Air Quality Management District (BAAQMD). Concentrations of ozone, carbon monoxide (CO), nitrogen dioxide, sulfur dioxide, lead, and particulate matter (PM10 and PM2.5) are commonly used as indicators of ambient air quality conditions. These pollutants are known as *criteria pollutants* and are regulated by EPA and ARB through national and California ambient air quality standards (NAAQS and CAAQS), respectively. The NAAQS and CAAQS establish limits of criteria pollutant concentrations to protect human health and prevent environmental and property damage. Other pollutants of concern in the project area are nitrogen oxides (NO_X) and reactive organic gases (ROG), which are precursors to ozone, and diesel particulate matter (DPM), which can cause cancer and other human health ailments. In general, the project area is generally well ventilated by winds, resulting in relatively good ambient air quality conditions.

3.3.2 Environmental Impacts and Mitigation Measures

Construction emissions would primarily occur in the project area in the BAAQMD. However, some equipment and materials would originate from the Port of Stockton and the city of Tracy, both of which are within the San Joaquin Valley Air Pollution Control District (SJVAPCD). Accordingly, heavy-duty truck trip exhaust emissions that would be generated in the SJVAPCD have been quantified and included in the construction analysis. Operational emissions would occur exclusively in the BAAQMD. Consistent with the PEIR, thresholds developed by the BAAQMD and SJVAPCD are used to evaluate the significance of the project's emissions and associated air quality impacts (San Joaquin Valley Air Pollution Control District 2015; Bay Area Air Quality Management District 2017).

Impact AQ-1: Conflict with or obstruct implementation of the applicable air quality plan (less than significant)

The PEIR concluded that repowering projects under both alternatives would not conflict with the goals of BAAQMD's Clean Air Plan or SJVAPCD's air quality attainment plans. Accordingly, because the proposed project is consistent with the assumptions used in the PEIR, this impact would be less than significant, and no mitigation is required. This conclusion is consistent with the analysis presented in the PEIR.

Impact AQ-2: Violate any air quality standard or contribute substantially to an existing or projected air quality violation (significant and unavoidable)

The PEIR concluded that maximum daily unmitigated ROG and NO_X from construction of repowering projects would exceed BAAQMD's significance thresholds, resulting in a significant impact. Fugitive dust would also constitute a significant impact without application of BMPs. Implementation of Mitigation Measures AQ-2a, Reduce construction-related air pollutant emissions by implementing applicable BAAQMD Basic Construction Mitigation Measures, and AQ-2b, Reduce construction-related air pollutant emissions by implementing measures based on BAAQMD's Additional Construction Mitigation Measures, would ensure that impacts related to fugitive dust would be less than significant. However, implementation of these measures would not reduce emissions to a less-than-significant level. Accordingly, the impact of construction-related NO_X emissions would be significant and unavoidable in the BAAQMD. Neither long-term operation of the project nor material hauling in SJVAPCD during construction would exceed any air district thresholds, and impacts would be less than significant. These conclusions are consistent with the analysis presented in the PEIR.

Impact AQ-3: Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a nonattainment area for an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors) (significant and unavoidable for construction and less than significant for operation)

The PEIR concluded that construction of repowering projects would exceed BAAQMD's ROG and NO_X thresholds even after implementation of feasible mitigation. Accordingly, the PEIR determined that cumulative construction impacts in the BAAQMD would be significant and unavoidable. Long-term operation of the repowered projects was found to have a less-than-significant cumulative air quality impact.

As discussed under Impact AQ-2, neither long-term operation of the proposed project nor material hauling in SJVAPCD during construction would exceed air district thresholds. Accordingly, cumulative impacts during construction in the SJVAPCD and during operation in the BAAQMD would be less than significant. Construction-related NO_x and PM emissions in the BAAQMD would exceed the air district's thresholds, resulting in a potentially significant impact. Implementation of Mitigation Measures AQ-2a and AQ-2b would ensure that impacts related to fugitive dust would be less than significant. However, NO_X emissions would remain significant and unavoidable and cumulatively considerable. This conclusion is consistent with the analysis presented in the PEIR.

Impact AQ-4: Expose sensitive receptors to substantial pollutant concentrations (less than significant with mitigation)

The PEIR concluded that receptor exposure to DPM from construction of the repowering projects would be less than significant with implementation of Mitigation Measures AQ-2a and AQ-2b, which would reduce both criteria pollutants and DPM emissions.

Long-term operation of the proposed project would not result in a significant new source of emissions. Offsite truck trips during construction would be transitory, using multiple roads over a widespread area, thereby helping to disperse toxic pollutants and minimize exposure. Onsite construction activities would generate DPM, but these would occur over a relatively short period—approximately 6 months, far less than the exposure duration of 30 years that is typically associated with chronic cancer risk (Office of Environmental Health Hazard Assessment 2015). Emissions would also be spatially dispersed throughout the project area and at multiple turbine locations.

While exposure to DPM emissions would be of short duration, two receptors are approximately 2,000 feet from turbine work areas. These receptors may be exposed to increased health risks during construction at these individual locations. Accordingly, this impact is conservatively concluded to be potentially significant. Implementation of Mitigation Measures AQ-2a and AQ-2b would reduce DPM emissions and associated health risks to sensitive receptors. This impact would be less than significant with mitigation. This conclusion is consistent with the analysis presented in the PEIR.

Impact AQ-5: Create objectionable odors affecting a substantial number of people (less than significant)

The PEIR concluded that neither construction nor operation of the repowering projects would result in significant odor impacts. Odor emissions under the proposed project would be similar to those evaluated at the program level; they would be primarily limited to the construction period. Sources of odors during construction would be diesel-powered trucks and vehicles. Potential odors from these sources would be temporary (1 year) and spatially dispersed over the project area. Accordingly, the proposed project is not anticipated to create objectionable odors that would violate air district nuisance rules. This impact would be less than significant, and no mitigation is required. This conclusion is consistent with the analysis presented in the PEIR.

3.3.3 References Cited

Bay Area Air Quality Management District. 2017. *Air Quality Guidelines*. May.

Office of Environmental Health Hazard Assessment. 2015. *Air Toxics Hot Spot Program Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments*. February.

San Joaquin Valley Air Pollution Control District. 2015. *Guidance for Assessing and Mitigating Air Quality Impacts*. March.

3.4 Biological Resources

To evaluate the potential project-specific impacts on biological resources, ICF prepared the *Biological Resources Evaluation for the Rooney Ranch Wind Repowering Project* (Biological Resources Evaluation) (Appendix B). In addition to reviewing previous work conducted in support of the PEIR and the East Alameda County Conservation Strategy (EACCS), ICF biologists searched the California Department of Fish and Wildlife's (CDFW's) California Natural Diversity Database (CNDDB) for the Altamont, Clifton Court Forebay, Byron Hot Springs, and Midway U.S. Geological Survey 7.5-minute quadrangles (California Department of Fish and Wildlife 2018) and the U.S. Fish and Wildlife Service IPaC Trust Resource Report species list for the project area (U.S. Fish and Wildlife Service 2018). They also reviewed aerial photographs from Google Earth for the study area to obtain information on historical habitat conditions.

ICF botanists/wetland ecologists conducted aquatic resource delineation surveys on March 3 and 14, 2017. These were formal delineations undertaken with the purpose of characterizing potential waters of the United States, including wetlands, in the project area.

Biologists conducted habitat surveys of the biological study area (i.e., the project area plus a 1.24-mile buffer around it to account for the possible dispersal distance of California tiger salamanders from aquatic breeding habitat). The surveys included a site assessment for California tiger salamander and California red-legged frog.

3.4.1 Existing Conditions

3.4.1.1 Land Cover Types

Not all the land cover types described in the PEIR were found to be present in the project area. The land cover types and the extent of each identified through the survey efforts are shown in Table 3.4-1.

Table 3.4-1. Approximate Acreage of Land Cover Types

Land Cover/Habitat Type	Acres
Nonnative annual grassland	572.0
Ephemeral drainage	0.2
Rock outcrop	2.3
Pond	0.6
Developed/roads/other infrastructure	3.0
Total	578.1

3.4.1.2 Special-Status Plants

According to the Biological Resources Evaluation, the 10 special-status plant species listed below have been identified as having the potential to occur in the project area. All these species were considered in the PEIR, although additional species that could occur in the program area were determined not to occur in the project area due to microhabitat conditions or range constraints.

- Bent-flowered fiddleneck (*Amsinckia lunaris*)—CRPR 1B.2[2]
- Big-scale balsamroot (*Balsamorhiza macrolepis* var. *macrolepis*)—CRPR 1B.1
- Big tarplant (*Blepharizonia plumosa*)—CRPR 1B.1
- Round-leaved filaree (*California macrophylla*)—CRPR 1B.1
- Lemmon's jewelflower (*Caulanthus lemmonii*)—CRPR 1B.2
- Recurved larkspur (*Delphinium recurvatum*)—CRPR 1B.2
- Diamond-petaled California poppy (*Eschscholzia rhombipetala*)—CRPR 1B.1
- Shining navarretia (*Navarretia nigelliformis* ssp. *radians*)—CRPR 1B.2
- Rayless ragwort (*Senecio aphanactis*)—CRPR 2.2
- Caper-fruited tropidocarpum (*Tropidocarpum capparideum*)—CRPR 1B.1

None of these species have been previously documented within or adjacent to the study area.

3.4.1.3 Special-Status Wildlife

According to the Biological Resources Evaluation, the 20 special-status wildlife species listed below have been identified as having the potential to occur in the project area. All these species were considered in the PEIR, although additional species that could occur in the program area were determined not to occur in the project area due to microhabitat conditions or range constraints.

- Longhorn fairy shrimp (*Branchinecta longiantenna*)—federally listed as endangered.
- Vernal pool fairy shrimp (*Branchinecta lynchi*)—federally listed as threatened.
- Vernal pool tadpole shrimp (*Lepidurus packardi*)—federally listed as endangered.
- California tiger salamander (*Ambystoma californiense*)—state- and federally listed as threatened.
- California red-legged frog (*Rana draytonii*)—federally listed as threatened.
- Western spadefoot (*Spea hammondii*)—CDFW species of special concern.
- Western pond turtle (*Actinemys marmorata*)—CDFW species of special concern.
- San Joaquin coachwhip (*Masticophis flagellum ruddocki*)—CDFW species of special concern.
- Blainville's horned lizard (*Phrynosoma blainvillii*)— CDFW species of special concern.
- White-tailed kite (*Elanus leucurus*)—California fully protected.

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

- Northern harrier (*Circus cyaneus*)—CDFW species of special concern.
- Bald eagle (*Haliaeetus leucocephalus*)—federally de-listed; state-listed as endangered, fully protected.
- Golden eagle (*Aquila chrysaetos*)—California fully protected.
- Swainson's hawk (*Buteo swainsoni*)—state-listed as threatened.
- Western burrowing owl (*Athene cunicularia*)—CDFW species of special concern.
- American peregrine falcon (*Falco peregrinus anatum*)—California fully protected.
- Loggerhead shrike (*Lanius ludovicianus*)— CDFW species of special concern.
- Tricolored blackbird (*Agelaius tricolor*)—state-listed as threatened.
- American badger (*Taxidea taxus*)— CDFW species of special concern.
- San Joaquin kit fox (*Vulpes macrotis mutica*)—state-listed as threatened; federally listed as endangered.

Burrowing owls, foraging golden eagles, and vernal pool fairy shrimp were observed in the study area during the April 4, 2017 surveys (Appendix B).

3.4.2 Environmental Impacts and Mitigation Measures

Impact BIO-1: Potential for ground-disturbing activities to result in adverse effects on special-status plants or habitat occupied by special-status plants (less than significant with mitigation)

The PEIR concluded that ground-disturbing activities associated with project construction could result in adverse impacts on special-status plants and their habitat. Because the activities associated with the proposed project and the special-status plant species with potential to occur in the project area are consistent with those contemplated in the PEIR, the impact would be comparable to that presented in the PEIR, and the same mitigation measures would apply. Implementation of Mitigation Measures BIO-1a, Conduct surveys to determine the presence or absence of special-status plant species; BIO-1b, Implement best management practices to avoid and minimize impacts on special-status species; BIO-1c, Avoid and minimize impacts on special-status plant species by establishing activity exclusion zones; BIO-1d, Compensate for impacts on special-status plant species; and BIO-1e, Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas, would reduce this impact to a less-than significant level. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

Impact BIO-2: Adverse effects on special-status plants and natural communities resulting from the introduction and spread of invasive plant species (less than significant with mitigation)

The potential for the introduction and spread of invasive plant species in the project area as a result of construction activities would be the same as described in the PEIR for repowering projects overall. The introduction of invasive nonnative plant species would constitute a significant indirect impact. Implementation of Mitigation Measures BIO-1b; BIO-2, Prevent introduction, spread, and establishment of invasive plant species; BIO-5c, Restore disturbed annual grasslands; and WQ-1, Comply with NPDES requirements, would reduce this impact to a less-than-significant level. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

Impact BIO-3: Potential mortality of or loss of habitat for vernal pool branchiopods and curved-footed hygrotus diving beetle (less than significant with mitigation)

The PEIR concluded that repowering projects could result in habitat loss for and direct mortality of individual vernal pool branchiopods (i.e., vernal pool fairy shrimp, vernal pool tadpole shrimp, and longhorn fairy shrimp) as well as curved-footed hygrotus diving beetles (*Hygrotus curvipes*). Because potential habitat for vernal pool branchiopods and curved-footed hygrotus diving beetle is present in and near the project area, mortality and habitat loss are potentially significant impacts. The PEIR concluded that implementation of Mitigation Measures BIO-1b; BIO-1e; BIO-3a, Conduct preconstruction surveys for habitat for special-status wildlife species; and BIO-3b, Implement measures to avoid, minimize, and mitigate impacts on vernal pool branchiopods and curved-footed hygrotus diving beetle, would reduce this impact to a less-than-significant level. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

Impact BIO-4: Potential disturbance or mortality of and loss of suitable habitat for valley elderberry longhorn beetle (no impact)

Although the PEIR identified the potential for impacts on valley elderberry longhorn beetle (*Desmocerus californicus*) in portions of the program area, no elderberry shrubs (the species' host plant) have been identified in the project area; accordingly, there would be no impact and no mitigation would be required.

Impact BIO-5: Potential disturbance or mortality of and loss of suitable habitat for California tiger salamander, western spadefoot, California red-legged frog, and foothill yellow-legged frog (less than significant with mitigation)

The PEIR concluded that construction as well as operation and maintenance activities could result in habitat loss for California tiger salamander, western spadefoot, California red-legged frog, and foothill yellow-legged frog, as well as mortality of individuals. Site assessments conducted for the Biological Resources Evaluation found no suitable habitat for foothill yellow-legged frog; however, because suitable habitat for the other three species is present in the project area, the project could result in significant impacts. The PEIR concluded that implementation of Mitigation Measures BIO-1b; BIO-1e; BIO-3c; BIO-5a, Implement best management practices to avoid and minimize effects on special-status amphibians; BIO-5b, Compensate for loss of habitat for special-status amphibians; and BIO-5c would reduce this impact to a less-than-significant level. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

Impact BIO-6: Potential disturbance or mortality of and loss of suitable habitat for western pond turtle (less than significant)

The PEIR concluded that construction activities could result in direct effects on western pond turtles and their habitat. However, according to current project design, all turbine components and work areas are located outside suitable aquatic habitat for western pond turtle identified in the study area (large pond in southeast quadrant of study area). Because project facilities are more than 0.25 mile from suitable aquatic habitat, the proposed project is not expected to affect potentially nesting pond turtles in the study area. This conclusion is consistent with the analysis presented in the PEIR, and no mitigation is required.

Impact BIO-7: Potential disturbance or mortality of and loss of suitable habitat for Blainville's horned lizard, Alameda whipsnake, and San Joaquin coachwhip (less than significant with mitigation)

The PEIR concluded that construction activities and, to a lesser extent, operation and maintenance activities could result in habitat loss for and individual fatalities of Blainville's horned lizard, Alameda whipsnake, and San Joaquin coachwhip. The Biological Resources Evaluation found that Alameda whipsnake had little to no likelihood to occur in the project area; however, the potential remains for direct impacts on the other two species of special-status reptiles. Implementation of Mitigation Measures Mitigation Measures BIO-1b; BIO-1e; BIO-3a; BIO-5c; BIO-7a, Implement best management practices to avoid and minimize effects on special-status reptiles; and BIO-7b, Compensate for loss of habitat for special-status reptiles, would reduce this impact to a less-than-significant level. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

Impact BIO-8: Potential construction-related disturbance or mortality of special-status and non–special-status migratory birds (less than significant with mitigation)

The PEIR concluded that construction activities during the nesting season of white-tailed kite, bald eagle, northern harrier, Swainson's hawk, golden eagle, western burrowing owl, loggerhead shrike, and tricolored blackbird could result in direct effects on these species, as well as on non–special-status migratory birds, if they are nesting in the program area. Because of the scarcity of trees in the project area, particularly near proposed turbine sites and roadways, there is limited potential for construction activities to affect nesting eagles or tree-nest species (e.g., Swainson's hawks, golden eagles, kites). However, shrub- and ground-nesting species (e.g., tricolored blackbird, western burrowing owl) could be affected by construction activities. Because construction activities described in the PEIR are the same as those anticipated for the proposed project, the impacts would be the same. Implementation of Mitigation Measures BIO-1b; BIO-1e; BIO-3a; BIO-5c; BIO-8a, Implement measures to avoid and minimize potential impacts on special-status and non–special-status nesting birds; and BIO-8b, Implement measures to avoid and minimize potential impacts on western burrowing owl, would reduce these impacts to a less-than-significant level. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

Impact BIO-9: Permanent and temporary loss of occupied habitat for western burrowing owl and foraging habitat for tricolored blackbird and other special-status and non–special-status birds (less than significant with mitigation)

The PEIR concluded that repowering projects would result in the temporary and permanent loss of grassland that is suitable foraging habitat for burrowing owls and other special-status and non–special-status migratory birds. However, the PEIR elected not to propose compensatory mitigation for loss of Swainson's hawk foraging habitat, because that species rarely uses grassland in the program area. Because grassland habitat in the project area is consistent with that throughout the program area, the same impacts would apply. Implementation of Mitigation Measures BIO-5b; BIO-

5c; and BIO-9, Compensate for the permanent loss of occupied habitat for western burrowing owl, would reduce this impact to a less-than-significant level. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

Impact BIO-10: Potential injury or mortality of and loss of habitat for San Joaquin kit fox and American badger (less than significant with mitigation)

The PEIR concluded that repowering projects could result in temporary and permanent loss of grassland habitat that could support San Joaquin kit foxes and American badgers, as well as in direct mortality of individuals. The Biological Resources Evaluation concluded that badgers have a high likelihood to occur in the project area, while San Joaquin kit foxes are unlikely to use the area but have a slight likelihood of moving through it between other more suitable areas. Because of declines in both species, any impacts would be significant, especially if they result in fatalities. Because project activities and project area conditions are consistent with those contemplated in the PEIR, the impacts would be the same. Implementation of Mitigation Measures BIO-1b; BIO-1e; BIO-3a; BIO-5c; BIO-10a, Implement measures to avoid and minimize potential impacts on San Joaquin kit fox and American badger; and BIO-10b, Compensate for loss of suitable habitat for San Joaquin kit fox and American badger, would reduce this impact to a less-than-significant level. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

Impact BIO-11: Avian mortality resulting from interaction with wind energy facilities (significant and unavoidable)

Analysis Methods

The PEIR estimated annual avian fatalities for two Program alternatives (a 417 MW alternative and a 450 MW alternative) and two projects (Golden Hills and Patterson Pass). The analysis methods in the PEIR used for the Program alternatives and the two projects were identical. The estimate of the number of birds killed annually under a nonrepowered condition (baseline) was compared to the estimated number of birds killed annually under observed repowered conditions. For the mortality rates, the average of the annual estimates of each mortality rate from the 2005–2011 bird years (n=7 years) provided by the Alameda County Avian Fatality Monitoring Program (ICF International 2013) was based on old-generation turbines only (i.e., results from the Diablo Winds and Buena Vista turbines were excluded because they are not considered old-generation turbines). This average was used because the annual mortality rates vary considerably from year to year.

The analysis was based on five groups of species: focal species, species of local conservation concern, raptors (including owls and turkey vultures), non-raptors, and all birds. Focal species were defined in the 2007 Settlement Agreement as American kestrel, burrowing owl, golden eagle, and red-tailed hawk for the purpose of measuring the reduction in raptor fatalities resulting from implementation of management actions. Four additional species (loggerhead shrike [California species of special concern], prairie falcon [CDFW Watch List], Swainson's hawk [listed as threatened under CESA], and barn owl) were added for the analyses in the PEIR because of high mortality rates, general concerns about the conservation status of the species, or both.

The rates used to calculate the number of fatalities expected to occur as a result of repowering were derived from the rates at three repowering projects in the APWRA that use newer, repowered turbines: Diablo Winds, Buena Vista, and Vasco Winds. Diablo Winds comprises thirty-one 660 kW turbines, Buena Vista comprises thirty-eight 1 MW turbines, and Vasco Wind comprises thirty-four 2.3 MW turbines (Insignia Environmental 2012; Brown et al. 2013; ICF International 2013). Although there is considerable range in turbine sizes among these three projects, they were all considered new-generation turbines relative to the rest of the turbines installed in the APWRA.

The PEIR described potential biases in the avian fatality analysis methods; such biases are useful to consider and revisit as new information becomes available, especially in view of the complexities of estimating fatalities over a large area and timespan as is the case in the APWRA. As described in the PEIR, several factors confound the comparison of avian mortality rates between old- and new-generation turbines. The mortality rates from nonrepowered turbines were obtained while management actions were being implemented to reduce avian fatalities. These actions included the shutdown of turbines during the winter period, a time when winds are lowest but avian use of the area is highest for three of the four focal species. In addition, hazardous turbines were being removed during the period of data collection. These actions in combination resulted in a reduction of avian mortality rates, tending to underestimate the differences between old-generation turbines and newer turbines because the newer turbines are not shut down during the winter period and none were deemed hazardous enough to warrant removal. The new information considered in this analysis neither resolves nor removes these potential issues and biases.

The PEIR also acknowledged several potential biases regarding mortality rates for repowered projects. The mortality rates from two of the three repowered projects are associated with turbines considerably smaller than those likely to be used in all future repowering projects. The PEIR noted that evidence collected to date suggests that avian mortality rates may decrease as turbine size increases (Smallwood and Karas 2009). Consequently, these rates may be biased high relative to the turbines likely to be used in the two projects described in the PEIR and future projects implemented in the rest of the APWRA. These potential issues and biases also remain unchanged in light of the new information.

The PEIR noted considerable variation in collision risk across the various topographies and geographies of the APWRA, presumably due in part to variations in abundance and use of these areas by different species. For example, burrowing owls were known to be abundant in the area around the Diablo Winds turbines when they were installed, and thus there is a relatively high rate (for new-generation turbines) of fatalities at these turbines. Conversely, no burrowing owl fatalities were detected in the Buena Vista project area in the 3 years of fatality monitoring after repowering. Thus, the mortality rates at the three repowered project sites may not be representative of the mortality rates likely to occur at other repowering project sites. Because of the variation between these projects, mortality rates from all three projects were used to provide a range in the estimates of total annual fatalities likely to occur as a result of repowering. This analysis and the recently available information continue to support the finding that (1) variation between projects and areas is likely to occur, and (2) the variation may be substantial for some species but not others. Additionally, this analysis also indicates that variation between survey years may be substantial. For example, the first-year mortality rate for red-tailed hawk (0.91 fatality/MW/year) at the Golden Hills project was more than twice that of the second-year mortality rate (0.37 fatality/MW/year). The authors of the Golden Hills report, H. T. Harvey & Associates, did not offer a hypothesis for the substantial reduction in the mortality rate of red-tailed hawks observed during the second year; however, this difference illustrates the substantial variation that can occur even in a single study from year to year.

Finally, the PEIR noted that one of the biggest differences among all studies was variation in detection probability. *Detection probability* as presented in the PEIR refers to the probability that a turbine-related fatality is actually detected. There are various ways of measuring detection probability, the most common being the use of carcass placement trials to measure the rate at which carcasses are removed from the search area and the rate at which searchers detect carcasses that are still present. Detection probability varies among searchers, habitat types, seasons, and years, and it can be influenced by other factors as well. The Alameda County Avian Fatality Monitoring Program measured detection probabilities in only one year, and these probabilities were used to estimate the number of killed birds in all years of the study. If detection probability varies considerably across years, such variation can also confound to an unknown degree comparisons of mortality rates and estimates of total fatalities across projects. A review of the recently available reports indicate that some progress has been made toward a unified approach to detection probability. The final report for the Vasco Winds project (Brown et al. 2016) reported mortality rates adjusted for overall detection probability. The first-year report for the Golden Hills project reported mortality rates in several ways, but did not use a method that used overall detection probability. The authors of the first year Golden Hills report noted that the primary method used to estimate mortality rates (the Huso DS729 estimation method) may have skewed the estimates for golden eagles compared to other estimation methods presented in the report, noting "we think these latter estimates are closer to reality than the Huso DS729 estimate for golden eagles, because they do not inflate the estimate by incorporating searcher efficiency and carcass persistence parameters that represent medium/large birds as a group rather than eagles specifically" (H. T. Harvey & Associates 2018a:xii). The estimates presented for Golden Hills, using different estimators for different years, illustrate the variation in detection probability and the challenges and uncertainties surrounding estimates that can result from it.

This analysis applies the method used in the PEIR to calculate average annual mortality rates, but it uses new data generated since approval of the PEIR, including updated average annual mortality rates for the full monitoring period of the Vasco Winds project (3 years), and average annual mortality rates at the Golden Hills project (2 years). Additionally, in light of the larger body of data available since approval of the PEIR, this analysis considers two other metrics not previously used in the PEIR when calculating total fatalities for species and species groups; the number of fatalities based on an average of the mortality rates for all studies, and the number of fatalities based on a weighted average of the mortality rates for all studies. The average is calculated by simply averaging the mortality rates for all repowering projects considered. The weighted average is calculated by considering each year of fatality monitoring for each wind energy facility in the calculations. For example, the Vasco Winds completed 3 years of fatality monitoring, and each is year is considered in the calculated estimates. Using this method, projects with more monitoring years are given more "weight" compared to projects with fewer monitoring years. Table 3.4-2, updated from Table 3.4-10 in the PEIR, presents updated mortality rates for Vasco Winds and the addition of mortality rates for Golden Hills. For each species or species group, the nonrepowered rate (as calculated and provided in the PEIR) is presented, followed by the average mortality rates (monitoring efforts vary between 2 and 4 years) for each project.

Table 3.4-2. Annual Adjusted Fatality Rates for Nonrepowered and Repowered APWRA Turbines (updated from Table 3.4-10 in the PEIR)

		Repowered			
Species/Group	Nonrepowered[a]	Diablo Winds[b]	Buena Vista[c]	Vasco Winds[d]	Golden Hills[e]
American kestrel	0.59 (0.5902)	0.09	0.15	**0.28 (-0.02)**	**0.17**
Barn owl	0.24 (0.2145)	0.02	0.00	**0.02 (-0.01)**	**0.06**
Burrowing owl	0.78 (0.7754)	0.84	–	**0.06 (+0.01)**	**0.58**
Golden eagle	0.08 (0.0807)	0.01	0.04	**0.06 (+0.03)**	**0.13–0.15[g]**
Loggerhead shrike	0.19 (0.1879)	0.00	–	–	**0.07**
Prairie falcon	0.02 (0.0201)	–	0.00	**0.01 (+0.01)**	**0.01**
Red-tailed hawk	0.44 (0.4391)	0.20	0.10	**0.21 (-0.04)**	**0.64**
Tricolored blackbird[f]	–	–	–	**0.02 (+0.02)**	**0.02**
White-tailed kite[f]	–	–	–	–	**0.02**
Swainson's hawk	0.00 (0.0014)	–	–	–	–
All raptors	2.43 (2.4313)	1.21	0.31	**0.64 (0.00)**	**1.74**
All native non-raptors	4.50 (4.5046)	2.51	1.01	**2.04 (+0.05)**	**5.38**

Notes: Mortality rates reflect annual fatalities per MW. "–" denotes that no fatalities were detected. "0.00" signifies that, although fatalities were detected, the rate is lower than two significant digits. **Information in bold text is changed or new mortality rates available since the PEIR was prepared. Information in bold parentheses is the change in the mortality rate since the PEIR.**

[a] Average of 2005–2011 bird years (as reported in Table 3.4-10 of the PEIR). The numbers in parenthesis are the estimates out to four significant digits that were used to calculate baseline mortality rates in the PEIR.

[b] Average of 2005–2009 bird years (as reported in Table 3.4-10 of the PEIR).

[c] Average of 3 years (2007–2009) (as reported in Table 3.4-10 of the PEIR).

[d] Average of 3 years as reported in Brown et al. 2016. Numbers in parentheses represent the change since the numbers reported in Table 3.4-10 of the PEIR.

[e] Average of 2 years as reported in H. T. Harvey & Associates (2018a, 2018b).

[f] Tricolored blackbird was not reported in this table in the PEIR but has been added because of its recent listing under CESA and reported fatalities at Vasco Winds and Golden Hills. Similarly, white-tailed kite was not reported in this table in the PEIR but has been added because of its fully protected status.

[g] As noted in H. T. Harvey & Associates (2018a:x), the estimates of golden eagle mortality rates varied between 0.07 and 0.13 bird/MW/year for the first year of monitoring, depending on the estimation method used. The authors noted that the more appropriate mortality rate estimate may be 0.09 bird/MW/year because of searcher efficiency and carcass persistence considerations. Consequently, the range of mortality rates reported for Golden Hills (as averaged over 2 years) is presented here for golden eagle.

Analysis Results

The PEIR used the same assessment method for the two Program alternatives and the two project-specific analyses (Alameda County Community Development Agency 2014). In each instance, estimated annual fatalities for existing and repowered scenarios were calculated and presented, followed by a discussion and summary of impacts on individual species and groups of species. A similar approach was used for this analysis, with updates for new information as noted in Tables 3.4-3, 3.4-4, and 3.4-5. The individual species or groups of species are discussed following each table. For each species or group, the number of fatalities that would have occurred at the nonrepowered turbines is presented. The mortality rates for each repowered project (as listed in Table 3.4-2) are then extrapolated to the alternatives from the PEIR and the proposed Project to calculate an estimated number of fatalities for that rate. This method is repeated for each repowered project so that a range of estimated fatalities is presented. Additionally, the magnitude of estimated change is presented as a percent change from baseline. Lastly, for each species or groups of species, the number of estimated fatalities is also presented based on an average of all the repowering projects completed to date, and based on a weighted average[3] of all the repowering projects to date.

PEIR Alternative 1—417MW

[3] The "weighted average" is calculated by considering each year of fatality monitoring for each wind energy facility in the calculations. For example, the Vasco Winds completed 3 years of fatality monitoring, and each is year is considered in the estimates. Using this method, projects with more monitoring years are given more "weight" compared to projects with fewer monitoring years.

Table 3.4-3. Estimated Annual Avian Fatalities for Existing and Repowered Program Area (updated from Table 3.4-11 in the PEIR)

	Estimated Annual Fatalities for the Program Area—417MW								
	Nonrepowered Program Area	Repowered Program (417 MW) Using Average Mortality rates from Comparable Projects							
		Diablo Winds[b]		Buena Vista[c]		Vasco Winds[d]		Golden Hills[e]	
Species	Average Annual Fatalities	Average Annual Fatalities	% Decrease	Average Annual Fatalities	% Decrease	Average Annual Fatalities	% Decrease	Average Annual Fatalities	% Decrease
American kestrel	194.2	37.5	81	62.6	68	116.8	40	70.9	63
Barn owl	79.5	8.3	90	0.0	100	8.3	89	25.0	68
Burrowing owl	255.1	350.3	-37	0.0	100	25.0	90	241.9	6
Golden eagle	26.6	4.2	84	16.7	37	20.9	21	54.2 to 62.6[f]	-106 to -138[f]
Loggerhead shrike	61.8	0.0	100	0.0	100	0.0	100	29.2	53
Prairie falcon	6.6	0.0	100	0.0	100	4.2	37	4.2	37
Red-tailed hawk	144.5	83.4	42	41.7	71	87.6	40	266.9	-84
Tricolored blackbird	0.0	0.0	0	0.0	0	8.3	NA[g]	8.3	NA[g]
White-tailed kite	0.0	0.0	0	0.0	0	0.0	0	8.3	NA[g]
Swainson's hawk	0.5	0.0	100	0.0	100	0.0	100	0	100
All raptors	799.5	504.6	37	129.3	84	266.9	67	725.6	9
All native non-raptors	1,480.5	1,046.7	29	421.2	72	850.7	43	2,243.5	-52

Note: mortality rates reflect annual fatalities (95% confidence interval).

[a] All estimates based on an existing capacity at the time of the 2010 NOP of 329 MW and a proposed capacity of 417 MW for Alternative 1 in the PEIR.

[b] Diablo Winds mortality rates extrapolated to the Program area. Estimates of average annual fatalities are unchanged since they were reported in the PEIR.

[c] Buena Vista mortality rates extrapolated to the Program area. Estimates of average annual fatalities are unchanged since they were reported in the PEIR.

[d] Vasco Winds mortality rates extrapolated to the Program area. Estimates are based on 2 additional years of monitoring completed since the PEIR was prepared, as reported in Brown et al. (2016).

[e] Golden Hills mortality rates were not available at the time the PEIR was prepared. Golden Hills mortality rates extrapolated to the Program area. Estimates are based on 2 years of monitoring as reported in H. T. Harvey & Associates (2018a, 2018b).

[f] As noted in Table 5, the range of credible estimates for the Golden Hills project were used in this analysis to estimate average annual fatalities.

[g] NA = not applicable: a percent decrease cannot be calculated because there were no fatalities reported at nonrepowered turbines.

American Kestrel. As shown in Table 3.4-3, the repowered 417 MW Program would be expected to result in an estimated 38–117 American kestrel fatalities per year—a 40–81% decrease compared to nonrepowered rates at 329 MW of installed capacity. Considering the fatality monitoring information available since the PEIR was published, the final Vasco Wind monitoring results (Brown et al. 2016) resulted in a slightly lower estimated mortality rate for American kestrel (0.28 fatality/MW/year) compared to the mortality rate reported in the PEIR (0.30 fatality/MW/year). The average mortality rate for the first 2 years of the Golden Hills project was significantly lower than the nonrepowered rated reported in the PEIR (0.17 fatality/MW/year versus 0.59 fatality/MW/year) (H. T. Harvey & Associates 2018a, 2018b). The calculated average and weighted average mortality rates across all repowering projects, applied to the 417 MW Program was 71.9 fatalities per year (a 63% decrease) to 66.7 fatalities per year (a 66% decrease), respectively.

The PEIR stated that the overall Program could decrease annual fatalities of American kestrel by 36–81%, a value substantially similar to the results of this report, which considers recently available fatality monitoring results from the Golden Hills and Vasco Winds projects. Consequently, the mortality estimates of the PEIR remain unchanged relative to the 417 MW Program's potential effects on American kestrel.

Barn Owl. As shown in Table 3.4-3, the repowered 417 MW Program would be expected to result in an estimated 8–25 barn owl fatalities per year—a 69–90% decrease compared to nonrepowered rates at 329 MW of installed capacity. The PEIR noted that barn owl populations are stable to possibly declining within the state; it also noted that it was uncertain what effect repowering may have on local barn owl populations. The PEIR also noted that the higher RSA of repowered turbines may reduce the risk of turbine collision because barn owls hunt primarily in low quartering flights at about 1.5–4.5 meters (5–15 feet) above the ground.

Considering the fatality monitoring information available since the PEIR was published, the final Vasco Wind monitoring results (Brown et al. 2016) were in line with the results of monitoring at Diablo Winds (0.02 barn owl fatality/MW/year) reported in PEIR, while the Golden Hills mortality rate was slightly higher (0.06 barn owl fatality/MW/year). The PEIR estimated that the overall program could decrease annual barn owl fatalities by 83–90%—in keeping with the results of this analysis, which considers the recently available fatality monitoring results from the Golden Hills and Vasco Winds projects. The calculated average and weighted average mortality rates across all repowering projects, applied to the 417 MW Program was 10.4 fatalities per year (an 87% decrease) to 9.0 fatalities per year (an 89% decrease), respectively. Consequently, the fatality estimates of the PEIR remain unchanged relative to the 417 MW Program's potential effects on barn owl.

Burrowing Owl. As shown in Table 3.4-3, the repowered 417 MW Program would be expected to result in an estimated 25–350 burrowing owl fatalities per year—a change ranging from a 90% decrease to a 37% increase in fatalities compared to nonrepowered rates at 329 MW of installed capacity. Considering the fatality monitoring information available since the PEIR was published, the final Vasco Wind monitoring results (Brown et al. 2016) yielded a slightly higher estimated mortality rate for burrowing owl (0.06 fatality/MW/year) than the rate reported in the PEIR (0.05 fatality/MW/year). The average mortality rate for the first 2 years of the Golden Hills project (H. T. Harvey & Associates 2018a, 2018b) was significantly higher than the rate reported in the PEIR (0.58 fatality/MW/year); however, it was still lower than the rate reported in the PEIR for Diablo Winds (0.84 fatality/MW/year) and the rate reported in the PEIR for nonrepowered turbines (0.78 fatality/MW year). The calculated average and weighted average mortality rates across all repowering projects, applied to the 417 MW Program was 154.3 fatalities per year (a 40% decrease) to 177.7 fatalities per year (a 30% decrease), respectively.

The PEIR noted that "A growing body of circumstantial evidence indicates that many of the burrowing owl fatalities found during fatality surveys are due to predation rather than turbine collision.…" It concluded that "… the potential reduction in turbine-related burrowing owl fatalities may be underestimated because of the inability to distinguish fatalities resulting from predation from those caused by turbine collision." Just after the PEIR was published, the Alameda County avian monitoring team, with approval of the Scientific Review Committee, began a study of background mortality (ICF 2016). The study was prompted by the finding that substantial numbers of small bird carcasses—including burrowing owls—continued to accumulate in the search area around turbines during the period of seasonal shutdown, even though turbines were not operating (ICF 2016). Overall, the study reported that the patterns were relatively clear for small birds potentially subject to predation, but they were not as clear for burrowing owls. The authors of the study noted that California was in the fourth year of a historic drought, and anecdotal information suggested that the burrowing owl population was rapidly declining. Additionally, as H. T. Harvey & Associates (2018b) noted in their recent monitoring report for the Golden Hills project "… the fact that 84% of the Year 2 burrowing owl fatalities were found as feather spots or carcass remnants, mostly around burrows and along erosion-control wattles, suggests that predation was the primary cause of fatalities for this species …." Thus, substantial uncertainty still remains surrounding burrowing owl mortality rates.

The PEIR stated that the overall Program could decrease annual fatalities of burrowing owl by 92% or could increase them by 37%. The potential reduction and increase in fatalities described in the PEIR is nearly identical to the results of this analysis. This information, when considered in the context of the additional information on background mortality, suggests that effects on burrowing owls may be similar to those described in the PEIR.

Golden Eagle. As shown in Table 3.4-3, the repowered 417 MW Program would be expected to result in between 4–54 fatalities per year and 4–63 fatalities per year, depending on the fatality estimation methods used—a change resulting in an 84% decrease to a 136% increase in fatalities compared to nonrepowered rates at 329 MW of installed capacity. Considering the fatality monitoring information available since the PEIR was published, the final Vasco Wind monitoring results (Brown et al. 2016) indicated a slightly higher estimated mortality rate for golden eagle (0.06 fatality/MW/year) than the rate reported in the PEIR (0.03 fatality/MW/year). The average mortality rate for the first 2 years of the Golden Hills project (H. T. Harvey & Associates 2018a, 2018b) was significantly higher than the rate reported in the PEIR (0.013–0.15 fatality/MW/year, depending on the estimation method used). The calculated average and weighted average mortality rates across all repowering projects, applied to the 417 MW Program was 24.0 fatalities (a 10% decrease) to 18.6 fatalities per year (a 30% decrease), respectively.

The PEIR stated that the overall Program could decrease annual fatalities of golden eagle by 32–83% and that the repowering program was likely to reduce golden eagle fatalities. The additional monitoring results from Vasco Winds support this determination, while the Golden Hills monitoring results do not. As noted in Tables 3.4-2 and 3.4-3, there is some uncertainty regarding the appropriate mortality rate; however, the Golden Hills mortality rate is generally higher than that of other recent repowering projects. Consequently, although the updated results from some repowering projects, such as the updated Vasco Winds results, still indicate that repowering does reduce golden eagle fatalities, as has in fact have been observed during the majority of monitoring studies and years, the recent results at the Golden Hills project renders the outcome of repowering less clear for this species than was indicated in the PEIR, although average estimates across projects, both standard and weighted, still suggest a reduction. At this point, the predictors of high- versus low-level golden eagle mortality rates at a given wind project remain unknown.

Red-Tailed Hawk. As shown in Table 3.4-3, the repowered 417 MW Program would be expected to result in an estimated 42–267 red-tailed hawk fatalities per year—from a 71% decrease to an 85% increase compared to nonrepowered rates at 329 MW of installed capacity. Considering the fatality monitoring information available since the PEIR was published, the final Vasco Wind monitoring results (Brown et al. 2016) resulted in a slightly lower estimated mortality rate for red-tailed hawk (0.21 fatality/MW/year) than the mortality rate reported in the PEIR (0.25 fatality/MW/year). However, the average mortality rate for the first 2 years of the Golden Hills project (H. T. Harvey & Associates 2018a, 2018b) was significantly higher than the rate reported in the PEIR (0.64 fatality/MW/year). The calculated average and weighted average mortality rates across all repowering projects, applied to the 417 MW Program was 119.9 fatalities per year (a 17% decrease) to 103.0 fatalities per year (a 29% decrease), respectively.

The PEIR stated that the overall Program could decrease annual fatalities of red-tailed hawks by 23–69% and that the repowering program was likely to continue to reduce the number of red-tailed hawks killed each year. The additional monitoring results from Vasco Winds support this determination, while the Golden Hills monitoring results do not. Reviewing the Golden Hills monitoring results further, the first-year mortality rate for red-tailed hawk (0.91 fatality/MW/year) was more than twice the second-year mortality rate (0.37 fatality/MW/year). The authors of the Golden Hills report, H. T. Harvey & Associates (2018a:xi), noted that results for red-tailed hawk may have been skewed by perching and nesting opportunities created by nearby old turbines. The second-year report did not discuss this factor further, although the removal of old-generation turbines, which is ongoing in the APWRA, may have had an effect on the second-year mortality rate. Consequently, the recently available information suggests that although reductions in red-tailed hawk fatalities from repowering have been observed during the majority of monitoring studies and years, the outcome of repowering is less clear for this species than indicated in the PEIR, although average estimates across projects, both standard and weighted, still suggest a reduction. The final year of monitoring at the Golden Hills project may provide additional insight into these effects.

Loggerhead Shrike. As shown in Table 3.4-3, the repowered 417 MW Program would be expected to result in an estimated 0–30 loggerhead shrike fatalities per year—up to a 53% decrease compared to nonrepowered rates at 329 MW of installed capacity. The PEIR noted that no documented fatalities of loggerhead shrikes had occurred at any of the repowered projects in the APWRA at the time the PEIR was prepared. As noted in Table 3.4-3, the final 2 years of monitoring at Vasco Winds did not result in any documented loggerhead shrike fatalities. The recent Golden Hills project documented a single fatality of this species, resulting in an estimated mortality rate of 0.07 fatality/MW/year for that project, a reduction from the nonrepowered rate provided in the PEIR (0.19 fatality/MW/year). The calculated average and weighted average mortality rates across all repowering projects, applied to the 417 MW Program was 7.3 fatalities per year (an 88% decrease) to 4.5 fatalities per year (a 93% decrease), respectively.

The PEIR noted that the lack of documented fatalities suggests that there may be a reduced level of fatality from repowered turbines. The recent Golden Hills monitoring results, which documented one fatality, also support the conclusion that repowering may reduce fatalities compared to nonrepowered baseline rates. Consequently, the conclusions of the PEIR remain unchanged relative to the Project's potential effects on loggerhead shrike.

Prairie Falcon. As shown in Table 3.4-3, the repowered 417 MW Program would be expected to result in 0–4 fatalities per year—a 37% decrease compared to nonrepowered rates at 329 MW of installed capacity. The calculated average and weighted average mortality rates across all repowering projects, applied to the 417 MW Program was 2.1 to 1.6 fatalities per year, respectively. Considering the fatality monitoring information available since the PEIR was published, a prairie falcon fatality was documented in the third year of the Vasco Wind monitoring (Brown et al. 2016) resulting in an average mortality rate of 0.01 fatality/MW/year. A single prairie falcon was recorded "on-plot" as a documented fatality in the second year of the Golden Hills project (H. T. Harvey & Associates 2018b), also resulting in an average rate of 0.01 fatality/MW/year. Both mortality rates are half that of the nonrepowered rate provided in the PEIR (0.02 fatality/MW/year). The calculated average and weighted average mortality rates across all repowering projects, applied to the 417 MW Program was 2.1 fatalities per year (a 68% decrease) to 1.6 fatalities per year (a 76% decrease), respectively.

The PEIR noted that fatality estimates at repowered sites were not available because no fatalities had been documented at repowered turbines at the time the PEIR was prepared. The PEIR also concluded that a lack of documented fatalities suggests that there may be a reduced level of fatality from repowered turbines, as well as a potentially lower risk to this species. The recent Vasco Winds and Golden Hills monitoring results support this conclusion.

Tricolored Blackbird. As shown in Table 3.4-3, the repowered 417 MW Program would be expected to result in 0–8 fatalities per year. At the time the PEIR was prepared, tricolored blackbird had not been recorded as a fatality either at nonrepowered turbines or at repowered turbines. Since that time, the Vasco Winds and Golden Hills projects have each reported one fatality, resulting in average mortality rates of 0.02 fatality/MW/year at both facilities (Brown et al. 2016; H. T. Harvey & Associates 2018a, 2018b). These recently available monitoring results suggest a relatively low mortality rate for this species, but a potential for fatalities under the 417 MW Program. The calculated average and weighted average mortality rates across all repowering projects, applied to the 417 MW Program was 4.2 fatalities per year to 3.2 fatalities per year, respectively.

White-Tailed kite. As shown in Table 3.4-3, the repowered 417 MW Program would be expected to result in 0–8 fatalities per year. At the time the PEIR was prepared, white-tailed kite had not been recorded as a fatality either at nonrepowered turbines or at repowered turbines. Since that time, the Golden Hills project reported one fatality in 2017 that was excluded from the fatality estimation methods (H. T. Harvey & Associates 2018a) and one fatality in 2018 (H. T. Harvey & Associates 2018b), resulting in an average mortality rate of 0.02 fatality/MW/year. These recently available monitoring results suggest a relatively low mortality rate for this species, but a potential for fatalities under the 417 MW Program. The calculated average and weighted average mortality rates across all repowering projects, applied to the 417 MW Program was 2.1 to 1.3 fatalities per year, respectively.

Swainson's Hawk. As noted in the PEIR, there is only one recorded Swainson's hawk fatality in the APWRA (nonrepowered turbines), resulting in an annual estimated mortality rate of approximately zero (Table 3.4-3). No Swainson's hawk fatalities have been detected at Diablo Winds, Buena Vista, Vasco Winds, or Golden Hills. Based on the low (effectively zero) estimated mortality rate from nonrepowered sites, the lack of fatalities detected at repowered sites, and the relatively low number of detections during avian use surveys conducted by the County's avian fatality monitoring team, it is expected that the mortality rate for Swainson's hawk would remain at or near zero for the repowered 417 MW Program. The PEIR concluded that adverse effects on the local Swainson's hawk population were unlikely to occur, and recently available information supports this conclusion.

Raptors. As shown in Table 3.4-3, the repowered 417 MW Program would be expected to result in an estimated 129–726 raptor fatalities per year—a 9–84% decrease compared to nonrepowered rates at 329 MW of installed capacity. Considering the fatality monitoring information available since the PEIR was published, the raptor mortality rate remained unchanged in the final Vasco Wind monitoring report (Brown et al. 2016) at 0.64 fatality/MW/year. The recent Golden Hills project documented an average estimated mortality rate for raptors of 1.74 fatalities/MW/year, a reduction from the nonrepowered rate provided in the PEIR (2.43 fatalities/MW/year). The recently available monitoring results continue to support the conclusion that repowering will reduce effects on raptors as a species group. The calculated average and weighted average mortality rates across all repowering projects, applied to the 417 MW Program was 406.6 fatalities per year (a 49% decrease) to 397.1 fatalities per year (a 50% decrease), respectively.

Native non-raptors. As shown in Table 3.4-3, the repowered 417 MW Program would be expected to result in an estimated 421–2,244 native non-raptor fatalities per year—from a 72% decrease to a 51% increase compared to nonrepowered rates at 329 MW of installed capacity. Considering the fatality monitoring information available since the PEIR was published, the native non-raptor mortality rate remained nearly unchanged in the final Vasco Wind monitoring report (Brown et al. 2016) at 2.04 fatalities/MW/year. The recent Golden Hills project documented an average estimated mortality rate for native non-raptors of 5.38 fatalities/MW/year, a modest increase from the nonrepowered mortality rate provided in the PEIR (4.50 fatalities/MW/year). The calculated average and weighted average mortality rates across all repowering projects, applied to the 417 MW Program was 1,140.5 fatalities per year (a 23% decrease) to 1,041.2 fatalities per year (a 30% decrease), respectively.

PEIR Alternative 2—450 MW

The estimated changes associated with Alternative 2 (450 MW) are shown in Table 3.4-4 and are discussed following the table.

Table 3.4-4. Estimated Annual Avian Fatalities for Existing and Repowered Program Area—450 MW (updated from Table 3.4-12 in the PEIR)

	Estimated Annual Fatalities for the Program Area-450 MW								
	Nonrepowered Program Area	Repowered Program (450 MW) Using Average Mortality rates from Comparable Projects							
		Diablo Winds[b]		Buena Vista[c]		Vasco Winds[d]		Golden Hills[e]	
Species	Average Annual Fatalities	Average Annual Fatalities	% Decrease	Average Annual Fatalities	% Decrease	Average Annual Fatalities	% Decrease	Average Annual Fatalities	% Decrease
American kestrel	194.2	40.5	79	67.5	65	126.0	35	76.5	61
Barn owl	79.5	9.0	89	0.0	100	9.0	89	27.0	66
Burrowing owl	255.1	378.0	-47	0.0	100	27.0	89	261.0	-2
Golden eagle	26.6	4.5	83	18.0	32	22.5	15	58.5 to 67.5[f]	-122 to -156[f]
Loggerhead shrike	61.8	0.0	100	0.0	100	0.0	100	31.5	50
Prairie falcon	6.6	0.0	100	0.0	100	4.5	32	4.5	32
Red-tailed hawk	144.5	90.0	38	45.0	69	94.5	35	288.0	-99
Tricolored blackbird	0.0	0.0	0	0.0	0	9.0	NA[g]	9.0	NA[g]
White-tailed kite	0.0	0.0	0	0.0	0	0.0	0	9.0	NA[g]
Swainson's hawk	0.5	0.0	100	0.0	100	0.0	100	0	100
All raptors	799.9	544.5	32	139.5	83	288.0	64	783.0	2
All native non-raptors	1,482.0	1,129.5	24	454.5	69	918.0	38	2,421.0	-64

Note: mortality rates reflect annual fatalities (95% confidence interval).

[a] All estimates based on an existing capacity at the time of the 2010 NOP of 329 MW and a proposed capacity of 450 MW for Alternative 2 in the PEIR.

[b] Diablo Winds mortality rates extrapolated to the Program area. Estimates are unchanged since they were reported in the PEIR.

[c] Buena Vista mortality rates extrapolated to the Program area. Estimates are unchanged since they were reported in the PEIR.

[d] Vasco Winds mortality rates extrapolated to the Program area. Estimates are based on 2 additional years of monitoring completed since the PEIR was prepared, as reported in Brown et al. (2016).

[e] Golden Hills mortality rates were not available at the time the PEIR was prepared. Golden Hills mortality rates extrapolated to the Program area. Estimates are based on 2 years of monitoring as reported in H. T. Harvey & Associates (2018a, 2018b).

[f] As noted in Table 5, the range of credible estimates for the Golden Hills project were used in this analysis to estimate average annual fatalities.

[g] NA = not applicable: a percent decrease cannot be calculated because there were no fatalities reported at nonrepowered turbines.

American Kestrel. As shown in Table 3.4-4, the repowered 450 MW Program would be expected to result in an estimated 41–126 American kestrel fatalities per year—a 35–79% decrease compared to nonrepowered rates at 329 MW of installed capacity. Considering the fatality monitoring information available since the PEIR was published, the final Vasco Wind monitoring results (Brown et al. 2016) resulted in a slightly lower estimated mortality rate for American kestrel (0.28 fatality/MW/year) compared to the mortality rate reported in the PEIR (0.30 fatality/MW/year). The average mortality rate for the first 2 years of the Golden Hills project (H. T. Harvey & Associates 2018a, 2018b) was significantly lower than the nonrepowered rated reported in the PEIR (0.17 fatality/MW/year versus 0.59 fatality/MW/year). The calculated average and weighted average mortality rates across all repowering projects, applied to the 450 MW Program was 77.6 fatalities per year (a 60% decrease) to 72.0 fatalities per year (a 63% decrease), respectively.

The PEIR stated that the overall program could decrease annual fatalities of American kestrel by 31–79%, consistent with the results of this analysis, which considers recently available fatality monitoring results from the Golden Hills and Vasco Winds projects. Consequently, the mortality estimates of the PEIR remain unchanged relative to the Project's potential effects on American kestrel.

Barn Owl. As shown in Table 3.4-4, the repowered 450 MW Program would be expected to result in an estimated 9–27 barn owl fatalities per year—a 66–89% decrease compared to nonrepowered rates at 329 MW of installed capacity. The PEIR noted that barn owl populations are stable to possibly declining within the state; it also noted uncertainty as to what effect repowering may have on local barn owl populations. The PEIR also noted that higher RSA of repowered turbines may reduce the risk of turbine collision because barn owls typically hunt in low quartering flights at about 1.5–4.5 meters (5–15 feet) above the ground. The proposed Project is generally consistent with the higher RSA of the recent Vasco Winds and Golden Hills projects, with rotor heights of 13–22 meters (43–75 feet) above the ground, depending on the make and model of turbine selected for the Project.

Considering the fatality monitoring information available since the PEIR was published, the final Vasco Wind monitoring results (Brown et al. 2016) were in line with the results of monitoring at Diablo Winds (0.02 fatality/MW/year) reported in PEIR, while the Golden Hills mortality rate was slightly higher (0.06 barn owl fatality/MW/year). The PEIR estimated that the overall program could decrease annual fatalities of barn owl by 81–89%, consistent with the results of this analysis, which considers the recently available fatality monitoring results from the Golden Hills and Vasco Winds projects. The calculated average and weighted average mortality rates across all repowering projects, applied to the 450 MW Program was 11.3 fatalities per year (an 86% decrease) to 9.7 fatalities per year (an 88% decrease), respectively. Consequently, the mortality estimates of the PEIR remain unchanged relative to the Project's potential effects on barn owl.

Burrowing Owl. As shown in Table 3.4-4, the repowered 450 MW Program would be expected to result in an estimated 27–378 burrowing owl fatalities per year—a change ranging from an 89% decrease to a 48% increase compared to nonrepowered rates at 329 MW of installed capacity. Considering the fatality monitoring information available since the PEIR was published, the final Vasco Wind monitoring results (Brown et al. 2016) resulted in a slightly higher estimated mortality rate for burrowing owl (0.06 fatality/MW/year) than the rate reported in the PEIR (0.05 fatality/MW/year). The average mortality rate for the first 2 years of the Golden Hills project (H. T. Harvey & Associates 2018a, 2018b) was significantly higher than the rate reported in the PEIR (0.58

fatality/MW/year); however, it was still less than the rates reported in the PEIR for Diablo Winds (0.84 fatality/MW/year) and nonrepowered turbines (0.78 fatality/MW year). The calculated average and weighted average mortality rates across all repowering projects, applied to the 450 MW Program was 166.5 fatalities per year (a 35% decrease) to 191.8 fatalities per year (a 24% decrease), respectively.

The PEIR noted that "A growing body of circumstantial evidence indicates that many of the burrowing owl fatalities found during fatality surveys are due to predation rather than turbine collision.…" It concluded that "… the potential reduction in turbine-related burrowing owl fatalities may be underestimated because of the inability to distinguish fatalities resulting from predation from those caused by turbine collision." Just after the PEIR was published, the Alameda County avian monitoring team, with approval of the Scientific Review Committee, began a study of background mortality (ICF 2016). The study was prompted by the finding that substantial numbers of small bird carcasses—including burrowing owls—continued to accumulate in the search area around turbines during the period of seasonal shutdown, even though turbines were not operating (ICF 2016). Overall, the study reported that the patterns were relatively clear for small birds potentially subject to predation, but they were not as clear for burrowing owls. The authors of the study noted that California was in the fourth year of a historic drought, and anecdotal information suggested that the burrowing owl population was rapidly declining. Additionally, as H. T. Harvey & Associates (2018b) noted in their recent monitoring report for the Golden Hills project "… the fact that 84% of the Year 2 burrowing owl fatalities were found as feather spots or carcass remnants, mostly around burrows and along erosion-control wattles, suggests that predation was the primary cause of fatalities for this species …." Thus, substantial uncertainty still remains surrounding burrowing owl mortality rates.

The PEIR stated that the overall program could decrease annual burrowing owl fatalities by 91% or could increase them by 48% compared to nonrepowered rates at 329 MW of installed capacity. The potential reductions or increases in fatalities described in the PEIR are nearly identical to the results of this analysis. This information, when considered in the context of the additional information on background mortality, suggests that effects on burrowing owls may be similar to those described in the PEIR.

Golden Eagle. As shown in Table 3.4-4, the repowered 450 MW Program would be expected to result in between 5–59 fatalities per year and 5–68 fatalities per year, depending on the fatality estimation methods used—from an 83% decrease to a 154% increase in fatalities compared to nonrepowered rates at 329 MW of installed capacity. Considering the fatality monitoring information available since the PEIR was published, the final Vasco Wind monitoring results (Brown et al. 2016) indicated a slightly higher estimated mortality rate for golden eagle (0.06 fatality/MW/year) than the rate reported in the PEIR (0.03 fatality/MW/year). The average mortality rate for the first 2 years of the Golden Hills project (0.013–0.15 fatality/MW/year depending on the estimation method used) was significantly higher than the rate reported in the PEIR (H. T. Harvey & Associates 2018a, 2018b). The calculated average and weighted average mortality rates across all repowering projects, applied to the 450 MW Program was 25.9 fatalities per year (a 3% reduction) to 20.1 fatalities per year (a 24% reduction), respectively.

The PEIR stated that the overall program could decrease annual golden eagle fatalities by 32–83%. The additional monitoring results from Vasco Winds support this determination, while the Golden Hills monitoring results do not. As noted in Tables 3.4-2 and 3.4-5, there is some uncertainty regarding the appropriate mortality rate; however, the Golden Hills mortality rates are generally higher than those of other recent repowering projects. Consequently, although the updated results from some previous repowering projects, such as the updated Vasco Winds results, indicate that repowering does reduce golden eagle fatalities, as has been observed during the majority of monitoring studies and years, the recent results at the Golden Hills project renders the outcome of repowering less clear for this species than was indicated in the PEIR, although average estimates across projects, both standard and weighted, still suggest a reduction. At this point, the predictors of high-versus low-level golden eagle mortality rates at a given wind project remain unknown.

Red-Tailed Hawk. As shown in Table 3.4-4, the repowered 450 MW Program would be expected to result in an estimated 45–288 red-tailed hawk fatalities per year—from a 69% decrease to a 99% increase compared to nonrepowered rates at 329 MW of installed capacity. Considering the fatality monitoring information available since the PEIR was published, the final Vasco Wind monitoring results (Brown et al. 2016) resulted in a slightly lower estimated mortality rate for red-tailed hawk (0.21 fatality/MW/year) than the mortality rate reported in the PEIR (0.25 fatality/MW/year). The average mortality rate for the first 2 years of the Golden Hills project (H. T. Harvey & Associates 2018a, 2018b) was significantly higher than the rate reported in the PEIR (0.64 fatality/MW/year). The calculated average and weighted average mortality rates across all repowering projects, applied to the 450 MW Program was 129.4 fatalities per year (a 10% reduction) to 111.1 fatalities per year (a 23% reduction), respectively.

The PEIR stated that the overall program could decrease annual fatalities of red-tailed hawks by 23–69% compared to nonrepowered rates at 329 MW of installed capacity. The additional monitoring results from Vasco Winds support this determination, while the Golden Hills monitoring results do not. Reviewing the Golden Hills monitoring results further, the first-year mortality rate for red-tailed hawk (0.91 fatality/MW/year) was more than twice as high as the second-year mortality rate (0.37 fatality/MW/year). The authors of the Golden Hills report, H. T. Harvey & Associates (2018a:xi), noted that results for red-tailed hawk may have been skewed by perching and nesting opportunities created by nearby old turbines. The second-year report did not discuss this factor further, although the removal of old generation turbines, which is ongoing in the APWRA, may have had an effect on the second-year mortality rate. Consequently, the recently available information suggests that although reductions in red-tailed hawk fatalities from repowering have been observed during the majority of monitoring studies and years, the outcome of repowering is less clear for this species than was indicted in the PEIR, although average estimates across projects, both standard and weighted, still suggest a reduction. The final year of monitoring at the Golden Hills project may provide additional insight into these effects.

Loggerhead Shrike. As shown in Table 3.4-4, the repowered 450 MW Program would be expected to result in an estimated 0–32 loggerhead shrike fatalities per year—up to a 49% decrease compared to nonrepowered rates at 329 MW of installed capacity. The PEIR noted that no documented fatalities of loggerhead shrikes had occurred at any of the repowered projects in the APWRA at the time the PEIR was prepared. As noted in Table 3.4-4, the final 2 years of monitoring at Vasco Winds did not result in any documented loggerhead shrike fatalities. The recent Golden Hills project documented a single fatality of this species, resulting in an estimated mortality rate of 0.07 fatality/MW/year for that project, a reduction from the nonrepowered mortality rate provided in the PEIR (0.19 fatality/MW/year). The calculated average and weighted average mortality rates across all repowering projects, applied to the 450 MW Program was 7.9 fatalities per year (an 87% decrease) to 4.8 fatalities per year (a 92% decrease), respectively.

The PEIR noted that the lack of documented fatalities suggests that there may be a reduced level of fatality from repowered turbines. The recent Golden Hills monitoring results, which documented a single fatality, also support the conclusion that repowering may reduce fatalities compared to nonrepowered baseline rates. Consequently, the conclusions of the PEIR remain unchanged relative to the Project's potential effects on loggerhead shrike.

Prairie Falcon. As shown in Table 3.4-4, the repowered 450 MW Program would be expected to result in 0–5 fatalities per year—up to a 32% decrease compared to nonrepowered rates at 329 MW of installed capacity. Considering the fatality monitoring information available since the PEIR was published, a prairie falcon fatality was documented in the third year of Vasco Wind monitoring (Brown et al. 2016), resulting in an average mortality rate of 0.01 fatality/MW/year. A single prairie falcon was recorded "on-plot" as a documented fatality in the second year of the Golden Hills project (H. T. Harvey & Associates 2018b), also resulting in an average mortality rate of 0.01 fatality/MW/year. Both mortality rates are half the nonrepowered rate provided in the PEIR (0.02 fatality/MW/year). The calculated average and weighted average mortality rates across all repowering projects, applied to the 450 MW Program was 2.3 fatalities per year (a 65% decrease) to 1.7 fatalities per year (a 74% decrease), respectively.

The PEIR noted that fatality estimates at repowered sites were not available because no fatalities had been documented at repowered turbines at the time the PEIR was prepared. The PEIR also concluded that a lack of documented fatalities suggests that there may be a reduced level of fatality from repowered turbines, as well as a potentially lower risk to this species. The recent Vasco Winds and Golden Hills monitoring results support this conclusion.

Tricolored Blackbird. As shown in Table 3.4-4, the repowered 450 MW Program could be expected to result in 0–9 fatalities per year. The calculated average and weighted average mortality rates across all repowering projects, applied to the 450 MW Program was 4.5 to 3.5 fatalities per year, respectively. At the time the PEIR was prepared, tricolored blackbird had not been recorded as a fatality either at nonrepowered turbines or at repowered turbines. Since that time, the Vasco Winds and Golden Hills projects have each reported one fatality, resulting in an average mortality rate of 0.02 fatality/MW/year at each facility (Brown et al. 2016; H. T. Harvey & Associates 2018a, 2018b). These recently available monitoring results suggest a relatively low mortality rate for this species, but a potential for fatalities under the 450 MW Program remains.

White-tailed kite. As shown in Table 3.4-4, the repowered 450 MW Program could be expected to result in 0–9 fatalities per year. The calculated average and weighted average mortality rates across all repowering projects, applied to the 450 MW Program was 2.3 to 1.4 fatalities per year, respectively. At the time the PEIR was prepared, white-tailed kite had not been recorded as a fatality either at nonrepowered turbines or at repowered turbines. Since that time, the Golden Hills project reported one fatality in 2017 that was excluded from the fatality estimation methods (H. T. Harvey & Associates 2018a) and one fatality in 2018 (H. T. Harvey & Associates 2018b), resulting in an average mortality rate of 0.02 fatality/MW/year. These recently available monitoring results suggest a relatively low mortality rate for this species, but a potential for fatalities under the 450 MW Program remains.

Swainson's Hawk. As noted in the PEIR, there is only one recorded Swainson's hawk fatality in the APWRA (nonrepowered turbines), resulting in an annual estimated mortality rate of approximately zero (Table 3.4-4). No Swainson's hawk fatalities have been detected at Diablo Winds, Buena Vista, Vasco Winds, or Golden Hills. Based on the low (effectively zero) estimated mortality rate from nonrepowered sites, the lack of fatalities detected at repowered sites, and the relatively low number of detections during avian use surveys conducted by the County's avian fatality monitoring team, it is expected that the mortality rate for Swainson's hawk would remain at or near zero at the repowered Project. The PEIR stated that adverse effects on the local Swainson's hawk population were unlikely to occur, and recently available information supports this conclusion.

Raptors. As shown in Table 3.4-4, the repowered 450 MW Program would be expected to result in an estimated 140–783 raptor fatalities per year—a 2–83% decrease compared to nonrepowered rates at 329 MW of installed capacity. Considering the fatality monitoring information available since the PEIR was published, the raptor mortality rate remained unchanged in the final Vasco Wind monitoring report (Brown et al. 2016) at 0.64 fatality/MW/year. The recent Golden Hills project documented an average estimated mortality rate for raptors of 1.74 fatalities/MW/year, a reduction from the nonrepowered mortality rate provided in the PEIR (2.43 fatalities/MW/year). The calculated average and weighted average mortality rates across all repowering projects, applied to the 450 MW Program was 438.8 fatalities per year (a 45% decrease) to 428.5 fatalities per year (a 46% decrease), respectively. The recently available monitoring results continue to support the conclusion that repowering will reduce effects on raptors as a species group.

Native non-raptors. As shown in Table 3.4-4, the repowered 450 MW Program would be expected to result in an estimated 455–2,421 native non-raptor fatalities per year—from a 69% decrease to a 63% increase compared to nonrepowered rates at 329 MW of installed capacity. Considering the fatality monitoring information available since the PEIR was published, the native non-raptor mortality rate remained nearly unchanged in the final Vasco Wind monitoring report (Brown et al. 2016) at 2.04 fatalities/MW/year. The recent Golden Hills project documented an average estimated mortality rate for raptors of 5.38 fatalities/MW/year, a modest increase from the nonrepowered mortality rate provided in the PEIR (4.50 fatalities/MW/year). The calculated average and weighted average mortality rates across all repowering projects, applied to the 450 MW Program was 1,230.8 fatalities per year (a 17% decrease) to 1,123.6 (a 24% decrease) fatalities per year, respectively.

Rooney Ranch—Proposed Project

The estimated changes associated with the proposed Project are shown in Table 3.4-5 and are discussed following the table.

Table 3.4-5. Estimated Annual Avian Fatalities for Existing and Repowered Rooney Ranch Project Area (updated from Tables 3.4-13 and 3.4-14 [project-specific tables] in the PEIR)

	Estimated Annual Fatalities for the Rooney Ranch Wind Repowering Project[a]								
	Nonrepowered Rooney Ranch Project	Repowered Rooney Ranch Project Using Average Mortality rates from Comparable Projects							
		Diablo Winds[b]		Buena Vista[c]		Vasco Winds[d]		Golden Hills[e]	
Species	Average Annual Fatalities	Average Annual Fatalities	% Decrease	Average Annual Fatalities	% Decrease	Average Annual Fatalities	% Decrease	Average Annual Fatalities	% Decrease
American kestrel	11.2	2.3	80%	3.8	66%	7.0	37%	4.3	62%
Barn owl	4.6	0.5	89%	0.0	100%	0.5	89%	1.5	67%
Burrowing owl	14.7	21.1	-44%	0.0	100%	1.5	90%	14.6	1%
Golden eagle	1.5	0.3	84%	1.0	34%	1.3	18%	3.3-3.8[f]	-114 to -147%[f]
Loggerhead shrike	3.6	0.0	100%	0.0	100%	0.0	100%	1.8	51%
Prairie falcon	0.4	0.0	100%	0.0	100%	0.3	34%	0.3	34%
Red-tailed hawk	8.3	5.0	40%	2.5	70%	5.3	36%	16.1	-94%
Tricolored blackbird	0.0	0.0	0%	0.0	0%	0.5	NA[g]	0.5	NA[g]
White-tailed kite	0.0	0.0	0%	0.0	0%	0.0	0%	0.5	NA[g]
Swainson's hawk	0.0	0.0	0%	0.0	0%	0.0	0%	0	0%
All raptors	46.0	30.4	34%	7.8	83%	16.1	65%	43.7	5%
All native non-raptors	85.1	63.0	26%	25.4	70%	51.2	40%	135.0	-59%

Note: mortality rates reflect annual fatalities (95% confidence interval).

[a] All estimates based on an existing capacity of 18.9 MW and a proposed capacity of 25,1 MW for the Rooney Ranch project area.

[b] Diablo Winds mortality rates extrapolated to the Rooney Ranch Project area.

[c] Buena Vista mortality rates extrapolated to the Rooney Ranch Project area.

[d] Vasco Winds mortality rates extrapolated to the Rooney Ranch Project area. Estimates are based on the mortality rates from 2 additional years of monitoring completed since the PEIR was prepared, as reported in Brown et al. (2016).

[e] Golden Hills mortality rates were not available at the time the PEIR was prepared. Golden Hills mortality rates extrapolated to the Rooney Ranch Project area. Estimates are based on 2 years of monitoring as reported in H. T. Harvey & Associates (2018a, 2018b).

[f] As noted in Table 5, the range of credible estimates for the Golden Hills project were used in this analysis to estimate average annual fatalities.

[g] NA = not applicable: a percent decrease cannot be calculated because there were no fatalities reported at nonrepowered turbines.

American Kestrel. As shown in Table 3.4-5, the repowered 25.1 MW Project would be expected to result in an estimated 2-7 American kestrel fatalities per year—a 37–80% decrease compared to nonrepowered rates. Considering the fatality monitoring information available since the PEIR was published, the final Vasco Wind monitoring results (Brown et al. 2016) resulted in a slightly lower estimated mortality rate for American kestrel (0.28 fatality/MW/year) than the mortality rate reported in the PEIR (0.30 fatality/MW/year). The average mortality rate for the first 2 years of the Golden Hills project (H. T. Harvey & Associates 2018a, 2018b) was significantly lower than the nonrepowered rated reported in the PEIR (0.17 fatality/MW/year versus 0.59 fatality/MW/year). The calculated average and weighted average mortality rates across all repowering projects, applied to the Project was 4.3 fatalities per year (a 61% decrease) to 4.0 fatalities per year (a 64% decrease), respectively.

The PEIR stated that the overall program could decrease annual fatalities of American kestrel by 31–79%, consistent with the results of this analysis, which considers recently available fatality monitoring results from the Golden Hills and Vasco Winds projects. Consequently, the mortality estimates of the PEIR remain unchanged relative to the Project's potential effects on American kestrel.

Barn Owl. As shown in Table 3.4-5, the repowered 25.1 MW Project would be expected to result in an estimated 1-2 barn owl fatalities per year—a 67–89% decrease. The PEIR noted that barn owl populations are stable to possibly declining in the state and that it was uncertain what effect repowering may have on local barn owl populations. The PEIR also noted that the higher RSA of repowered turbines may reduce the risk of turbine collision because barn owls typically hunt in low quartering flights at about 1.5–4.5 meters (5–15 feet) above the ground. The proposed Project is generally consistent with the higher RSA of the recent Vasco Winds and Golden Hills projects, with rotor heights of 13–22 meters (43–75 feet) above the ground, depending on the make and model of turbine selected.

Considering the fatality monitoring information available since the PEIR was published, the final Vasco Wind monitoring results (Brown et al. 2016) were in line with the results of monitoring at Diablo Winds (0.02 barn owl fatality/MW/year) reported in PEIR, while the Golden Hills mortality rate was slightly higher (0.06 barn owl fatality/MW/year). The PEIR estimated that the overall program could decrease annual fatalities of barn owl by 81–89%, consistent with the results of this analysis, which considers the recently available fatality monitoring results from the Golden Hills and Vasco Winds projects. The calculated average and weighted average mortality rates across all repowering projects, applied to the Project was 0.6 fatalities per year (a 86% decrease) to 0.5 fatalities per year (a 88% decrease), respectively. Consequently, the mortality estimates of the PEIR remain unchanged relative to the Project's potential effects on barn owl.

Burrowing Owl. As shown in Table 3.4-5, the repowered 25.1 MW Project would be expected to result in an estimated 2–21 burrowing owl fatalities per year—a change ranging from a 90% decrease to a 44% increase. Considering the fatality monitoring information available since the PEIR was published, the final Vasco Wind monitoring results (Brown et al. 2016) resulted in a slightly higher estimated mortality rate for burrowing owl (0.06 fatality/MW/year) than the mortality rate reported in the PEIR (0.05 fatality/MW/year). The average mortality rate for the first 2 years of the Golden Hills project (H. T. Harvey & Associates 2018a, 2018b) was significantly higher than the rate reported in the PEIR (0.58 fatality/MW/year); however, it was less than the rates reported in the PEIR for Diablo Winds (0.84 fatality/MW/year) and nonrepowered turbines (0.78 fatality/MW year). The calculated average and weighted average mortality rates across all repowering projects, applied to the Project was 9.3 fatalities per year (a 37% decrease) to 10.7 fatalities per year (a 27% decrease), respectively.

The PEIR noted that "A growing body of circumstantial evidence indicates that many of the burrowing owl fatalities found during fatality surveys are due to predation rather than turbine collision." It concluded that "… the potential reduction in turbine-related burrowing owl fatalities may be underestimated because of the inability to distinguish fatalities resulting from predation from those caused by turbine collision." Just after the PEIR was published, the Alameda County avian monitoring team, with approval of the Scientific Review Committee, began a study of background mortality (ICF 2016). The study was prompted by the finding that substantial numbers of small bird carcasses—including burrowing owls—continued to accumulate in the search area around turbines during the period of seasonal shutdown, even though turbines were not operating (ICF 2016). Overall, the study reported that the patterns were relatively clear for small birds potentially subject to predation, but they were not as clear for burrowing owls. The authors of the study noted that California was in the fourth year of a historic drought, and anecdotal information suggested that the burrowing owl population was rapidly declining. Additionally, as H. T. Harvey & Associates (2018b) noted in their recent monitoring report for the Golden Hills project "… the fact that 84% of the Year 2 burrowing owl fatalities were found as feather spots or carcass remnants, mostly around burrows and along erosion-control wattles, suggests that predation was the primary cause of fatalities for this species…." Thus, uncertainty still remains surrounding burrowing owl mortality rates.

The PEIR stated that the overall program could decrease annual fatalities of burrowing owl by 91% or could increase them by 48%. The potential reduction in fatalities described in the PEIR is nearly identical to the results of this analysis. However, this analysis demonstrates a lower potential increase in burrowing owl fatalities (44%) compared to the PEIR (48%). This information, when considered in the context of the additional information on background mortality, suggests that effects on burrowing owls may be reduced from those described in the PEIR.

Golden Eagle. As shown in Table 3.4-5, the repowered 25.1 MW Project would be expected to result in between 1–3 fatalities per year and 1–4 fatalities per year, depending on the fatality estimation methods used)—from an 84% decrease to an 147% increase. Considering the fatality monitoring information available since the PEIR was published, the final Vasco Wind monitoring results (Brown et al. 2016) indicated a slightly higher estimated mortality rate for golden eagle (0.06 fatality/MW/year) than the mortality rate reported in the PEIR (0.03 fatality/MW/year). The average mortality rate for the first 2 years of the Golden Hills project (H. T. Harvey & Associates 2018a, 2018b) was significantly higher than the rate reported in the PEIR (0.013–0.15 fatality/MW/year, depending on the estimation method used). The calculated average and weighted average mortality rates across all repowering projects, applied to the Project was 1.4 fatalities per year (a 5% decrease) to 1.1 fatalities per year (a 27% decrease), respectively.

The PEIR stated that the overall program could decrease annual fatalities of golden eagle by 32–83%. The additional monitoring results from Vasco Winds support this determination, while the Golden Hills monitoring results do not. As noted in Tables 3.4-2 and 3.4-5, there is some uncertainty regarding the appropriate mortality rate; however, the Golden Hills mortality rates are generally higher than those of other recent repowering projects. Consequently, although the results from some previous repowering projects, such as the updated Vasco Winds results, indicate that reductions in golden eagle fatalities from repowering are still possible, and in fact have been observed during the majority of monitoring studies and years, the outcome of repowering is less clear for this species than indicated in the PEIR because of the recent results at the Golden Hills project, although average estimates across projects, both standard and weighted still suggest a reduction. At this point, the predictors of high-versus low-level golden eagle take rates at a given wind project remain unknown.

Red-Tailed Hawk. As shown in Table 3.4-5, the repowered 25.1 MW Project would be expected to result in an estimated 3-16 red-tailed hawk fatalities per year—from a 70% decrease to a 94% increase. Considering the fatality monitoring information available since the PEIR was published, the final Vasco Winds monitoring results (Brown et al. 2016) resulted in a slightly lower estimated mortality rate for red-tailed hawk (0.21 fatality/MW/year) than the mortality rate reported in the PEIR (0.25 fatality/MW/year). The average mortality rate for the first 2 years of the Golden Hills project (H. T. Harvey & Associates 2018a, 2018b) was significantly higher than the rated reported in the PEIR (0.64 fatality/MW/year). The calculated average and weighted average mortality rates across all repowering projects, applied to the Project was 7.2 fatalities per year (a 13% decrease) to 6.2 fatalities per year (a 25% decrease), respectively.

The PEIR stated that the overall program could decrease annual fatalities of red-tailed hawks by 23–69%. The additional monitoring results from Vasco Winds support this determination, while the Golden Hills monitoring results do not. Reviewing the Golden Hills monitoring results further, the first-year mortality rate for red-tailed hawk (0.91 fatality/MW/year) was more than twice the second-year mortality rate (0.37 fatality/MW/year). The authors of the Golden Hills report, H. T. Harvey & Associates (2018a:xi), noted that results for red-tailed hawk may have been skewed by perching and nesting opportunities created by nearby old turbines. The second-year report did not discuss this factor further, although the removal of old-generation turbines, which is ongoing in the APWRA, may have had an effect on the second-year mortality rate. Consequently, the recently available information suggests that although reductions in red-tailed hawk fatalities from repowering have been observed in the majority of monitoring studies and years, the outcome of repowering is less clear for this species than was indicated in the PEIR, although average estimates across projects, both standard and weighted, still suggest a reduction. The final year of monitoring at the Golden Hills project may provide additional insight into these effects.

Loggerhead Shrike. As shown in Table 3.4-5, the repowered 25.1 MW Project would be expected to result in an estimated 0–2 loggerhead shrike fatalities per year—a 100-51% decrease. The PEIR noted that no documented fatalities of loggerhead shrikes had occurred at any of the repowered projects in the APWRA at the time the PEIR was prepared. As noted in Table 3.4-5, the final 2 years of monitoring at Vasco Winds did not result in any documented loggerhead shrike fatalities. The recent Golden Hills project documented a single fatality of this species, resulting in an estimated mortality rate of 0.07 fatality/MW/year for that project, a reduction from the nonrepowered rate provided in the PEIR (0.19 fatality/MW/year). The calculated average and weighted average mortality rates across all repowering projects, applied to the Project was 0.4 fatalities per year (a 88% decrease) to 0.3 fatalities per year (a 92% decrease), respectively.

The PEIR noted that the lack of documented fatalities suggests that there may be a reduced level of fatality from repowered turbines. The recent Golden Hills monitoring results, which documented a single fatality, also support the conclusion that repowering may reduce fatalities compared to nonrepowered rates. Consequently, the conclusions of the PEIR remain unchanged relative to the Project's potential effects on loggerhead shrike.

Prairie Falcon. As shown in Table 3.4-5, the repowered 25.1 MW Project would be expected to result in zero to less than 1 fatality per year—a 34–100% decrease. Considering the fatality monitoring information available since the PEIR was published, a prairie falcon fatality was observed in the third year of the Vasco Winds monitoring (Brown et al. 2016), resulting in an average mortality rate of 0.01 fatality/MW/year. A single prairie falcon was recorded "on-plot" as a documented fatality in the second year of the Golden Hills project (H. T. Harvey & Associates 2018b), also resulting in an average mortality rate of 0.01 fatality/MW/year. Both mortality rates are half of the nonrepowered rate provided in the PEIR (0.02 fatality/MW/year). The calculated average and weighted average mortality rates across all repowering projects, applied to the Project was 0.1 fatalities per year (a 88% decrease) to 0.1 fatalities per year (a 88% decrease), respectively.

The PEIR noted that fatality estimates at repowered sites were not available because no fatalities had been documented at repowered turbines at the time the PEIR was prepared. The PEIR also concluded that a lack of documented fatalities suggests that there may be a reduced level of fatality from repowered turbines, as well as a potentially lower risk to this species. The recent Vasco Winds and Golden Hills monitoring results support this conclusion.

Tricolored Blackbird. As shown in Table 3.4-5, the repowered 25.1 MW Project could be expected to result in 0–1 fatalities per year. The calculated average and weighted average mortality rates across all repowering projects, applied to the Project was 0.3 to 0.2 fatalities per year, respectively. At the time the PEIR was prepared, tricolored blackbird had not been recorded as a fatality either at nonrepowered turbines or at repowered turbines. Since that time, the Vasco Winds and Golden Hills projects have each reported one fatality, resulting in an average mortality rate of 0.02 fatality/MW/year at both facilities (Brown et al. 2016; H. T. Harvey & Associates 2018a, 2018b). These recently available monitoring results suggest a relatively low mortality rate for this species, but a potential for fatalities at the Project.

White-Tailed kite. As shown in Table 3.4-5, the repowered 25.1 MW Project would be expected to result in 0–1 fatalities per year. The calculated average and weighted average mortality rates across all repowering projects, applied to the Project was 0.1 to 0.1 fatalities per year, respectively. At the time the PEIR was prepared, white-tailed kite had not been recorded as a fatality either at nonrepowered turbines or at repowered turbines. Since that time, the Golden Hills project reported one fatality in 2017 that was excluded from the fatality estimation methods (H. T. Harvey & Associates 2018a) and one fatality in 2018 (H. T. Harvey & Associates 2018b), resulting in an average mortality rate of 0.02 fatality/MW/year. These recently available monitoring results suggest a relatively low mortality rate for this species, but a potential for fatalities at the Project remains.

Swainson's Hawk. As noted in the PEIR, there is only one recorded Swainson's hawk fatality in the APWRA (nonrepowered turbines), resulting in an annual estimated mortality rate of approximately zero (Table 3.4-5). No Swainson's hawk fatalities have been detected at Diablo Winds, Buena Vista, Vasco Winds, or Golden Hills. Based on the low (effectively zero) estimated mortality rate from nonrepowered sites, the lack of fatalities detected at repowered sites, and the relatively low number of detections during avian use surveys conducted by the County's avian fatality monitoring team, it is expected that the mortality rate for Swainson's hawk would remain at or near zero at the repowered Project. The PEIR stated that adverse effects on the local Swainson's hawk population were unlikely to occur, and recently available information supports this conclusion.

Raptors. As shown in Table 3.4-5, the repowered 25.1 MW Project would be expected to result in an estimated 8-44 raptor fatalities per year—a 5-83% decrease. Considering the fatality monitoring information available since the PEIR was published, the raptor mortality rate remained unchanged in the final Vasco Wind monitoring report (Brown et al. 2016) at 0.64 fatality/MW/year. The recent Golden Hills project documented an average estimated mortality rate for raptors of 1.74 fatalities/MW/year, a reduction from the nonrepowered mortality rate provided in the PEIR (2.43 fatalities/MW/year). The calculated average and weighted average mortality rates across all repowering projects, applied to the Project was 24.5 fatalities per year (a 47% decrease) to 23.9 fatalities per year (a 48% decrease), respectively. The recently available monitoring results continue to support the conclusion that repowering will reduce effects on raptors as a species group.

Native non-raptors. As shown in Table 3.4-5, the repowered 25.1 MW Project would be expected to result in an estimated 25-135 native non-raptor fatalities per year—from a 70% decrease to a 59% increase. Considering the fatality monitoring information available since the PEIR was published, the native non-raptor mortality rate remained nearly unchanged in the final Vasco Wind monitoring report (Brown et al. 2016) at 2.04 fatalities/MW/year. The recent Golden Hills project documented an average estimated mortality rate for raptors of 5.38 fatalities/MW/year, a modest increase from the nonrepowered mortality rate provided in the PEIR (4.50 fatalities/MW/year). The calculated average and weighted average mortality rates across all repowering projects, applied to the Project was 68.6 fatalities per year (a 19% decrease) to 62.7 fatalities per year (a 26% decrease), respectively.

Conclusions

The PEIR stated that repowering would result in significant and unavoidable impacts associated with avian mortality, although it anticipated that mortality rates may decrease with the transition from old-generation to new-generation turbines. This conclusion was based on combined estimates of avian mortality from three different repowering projects in the APWRA, given as a rate of bird deaths per MW per year, in various combinations of species (all raptor species, each of eight individual raptor species, and all native non-raptor species). These estimates indicated reductions of 32–83% in raptor fatalities (e.g., 31–79% fewer American kestrel fatalities for buildout of 450 MW in the APWRA). The PEIR acknowledged, however, that the avian mortality estimates were uncertain, stating that: "… while repowering is intended to reduce fatalities, enough uncertainty remains in light of project- and site-specific data to warrant a conservative approach in the impact analysis. Accordingly, the continued or increased loss of birds (including special-status species) *at a rate potentially greater than the existing baseline fatality rates* is considered a significant and unavoidable impact" [emphasis added] (Alameda County Community Development Agency 2014:3.4-103).[4]

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[4] Similar statements are repeated throughout the PEIR; see page 3.4-121:

> As described above, for all avian focal species analyzed, a fully repowered program area would be expected to reduce estimated fatality rates. However, fatalities would still be expected to result from the operation of the repowered turbines, and uncertainty surrounding the accuracy of the estimated fatality rates and the types of species potentially affected remains. Considering this information, and despite the anticipated reductions in avian impacts compared to the baseline rates, the County has determined to use a conservative approach for the impact assessment, concluding that turbine related fatalities could constitute a substantial adverse effect on avian species because the rates for some or all of the species could be greater than the baseline rates. This impact would be significant. Implementation of Mitigation Measures BIO-11a through BIO-11i would reduce this impact, but not to a less-than-significant level; accordingly, this impact is considered significant and unavoidable.

The PEIR recognized the uncertainty of its avian mortality estimates, as well as the consideration of inter-annual and inter-project variation in mortality rates, and concluded that mortality rates under the 450 MW repowering program could exceed baseline, nonrepowered mortality rates (Alameda County Community Development Agency 2014). More specifically, while the PEIR used the "best available" data from three repowering projects to estimate a possible reduction of fatalities under the repowering program, the PEIR's impact conclusion for the 450 MW repowering program expressly acknowledged the uncertainty inherent in such data.

Thus, while the PEIR presented mortality estimates that looked promising, those estimates were uncertain and ultimately were not relied upon as the basis for its impact conclusion. Like the recent Golden Hills reports, the PEIR stated that more data were needed: "[p]ostconstruction monitoring, once the turbines are in operation, will provide data to quantify the actual extent of change in avian fatalities from repowering and the extent of avian fatality for projects in the program area …" (Alameda County Community Development Agency 2014:3.4-119). In light of this uncertainty, the PEIR required adaptive management for any repowering project where "… fatality monitoring … results in an estimate that exceeds the preconstruction baseline fatality estimates (i.e., estimates at the nonrepowered turbines as described in this PEIR) … to ensure that the best available science is used to minimize impacts to below baseline" (Alameda County Community Development Agency 2014:3.4-116).

While the PEIR set forth multiple measures to address avian mortality, it stated that these measures would not reduce the impact to a less-than-significant level. This conclusion holds true for the Rooney Ranch Project, and although it remains difficult to estimate mortality rates with certainty, continued monitoring will contribute to the body of knowledge informing this effort. Implementation of the combined program of mitigation measures—BIO-11a, Prepare a project-specific avian protection plan; BIO-11b, Site turbines to minimize potential mortality of birds; BIO-11c, Use turbine designs that reduce avian impacts; BIO-11d, Incorporate avian-safe practices into design of turbine-related infrastructure; BIO-11e, Retrofit existing infrastructure to minimize risk to raptors; BIO-11f, Discourage prey for raptors; BIO-11g, Implement postconstruction avian fatality monitoring for all repowering projects; BIO-11h, Compensate for the loss of raptors and other avian species, including golden eagles, by contributing to conservation efforts; and BIO-11i, Implement an avian adaptive management program—remains appropriate to reduce impacts as anticipated for the Project, but these measures would still not reduce impacts to a less-than-significant level considering recently available information. This conclusion for the proposed Project is consistent with the analysis presented in the PEIR.

Impact BIO-12: Potential mortality or disturbance of bats from roost removal or disturbance (less than significant with mitigation)

The PEIR identified two special-status bat species—pallid bat (*Antrozous pallidus*) and Townsend's big-eared bat (*Corynorhinus townsendii*)—as having the potential to roost in the program area. Rock outcrops in the study area provide potential roosting habitat for pallid and Townsend's big-eared bats, as well as other bat species. Although the project has been designed to avoid direct effects on rock outcrops, several outcrops are alongside access roads that would be used to transport project components and materials. Passage of heavy vehicles delivering turbine components have the potential to disturb maternity roosts and hibernacula, if any are present. Implementation of Mitigation Measures BIO-12a, Conduct bat roost surveys; and BIO-12b, Avoid removing or disturbing bat roosts, would reduce this impact to a less-than-significant level. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would address this impact.

Impact BIO-13: Potential for construction activities to temporarily remove or alter bat foraging habitat (less than significant)

The PEIR concluded that while construction activities could degrade foraging habitat, the overall repowering effort, by decommissioning numerous old-generation turbines, would offset the loss of habitat associated with installation of new turbines and infrastructure. This impact would be less than significant, and no mitigation is required. This conclusion is consistent with the analysis presented in the PEIR.

Impact BIO-14: Turbine-related fatalities of special-status and other bats (significant and unavoidable)

Analysis Methods

As of the preparation of the PEIR, five species of bats had been documented as fatalities in the APWRA: little brown bat, California myotis, western red bat, hoary bat, and Mexican free-tailed bat (Table 3.4-6 in the PEIR). Since the PEIR, additional monitoring results from Vasco Winds and Golden Hills have detected two additional bat species, big brown bat, and silver-haired bat (Table 3.4-6, updated from Table 3.4-6 in the PEIR, 1 unadjusted fatality for each species).

Table 3.4-6. Raw Bat Fatalities by Species Detected in Standardized Searches at Various APWRA Monitoring Projects (Updated Table 3.4-6 in the PEIR)

Species	2005-2007	2008-2010	2012-2015	2017-2018
APWRA Monitoring[a]				
Hoary bat	3	2		
Mexican free-tailed bat	2	2		
Western red bat	2	1		
Little brown bat	0	2		
Unidentified bat	3	4		
Total bats	10	11		
Buena Vista				
Hoary bat		9		
Mexican free-tailed bat		3		
California myotis		1		
Total bats		13		
Hoary bat			**24**	
Mexican free-tailed bat			**29**	
Western red bat			**2**	
California myostis			**1**	
Total bats			**56**	

Species	2005-2007	2008-2010	2012-2015	2017-2018
Golden Hills [d]				
Hoary bat				**106**
Mexican free-tailed bat				**155**
Western red bat				**5**
Big brown bat				**1**
California myotis				**1**
Silver-haired bat				**1**
Unidentified bat				**2**
Total bats				**271**

The PEIR estimated total numbers of annual bat fatalities for the two Program alternatives and the two individual projects. The analysis methods in the PEIR used for the Program alternatives and the two projects were identical, and methods used to conduct the analysis were similar to those used to assess the potential impacts on avian species. The total installed capacity at the time the NOP for the PEIR was filed was used to estimate the baseline number of fatalities that would occur if the old-generation turbines were to continue operating without any repowering. This value was multiplied by the mortality rate for bats provided by Smallwood and Karas (2009:1066) using data from the Altamont Fatality Monitoring Team for the 2005–2007 bird years to obtain estimates of total bat fatalities per year for the Program and the two projects. These numbers were compared to the number of fatalities expected to occur if old-generation turbines were replaced with newer, modern turbines. The number of fatalities expected to occur as a result of repowering was based on the nameplate capacity for each of the Program alternatives and each of the projects.

Estimates of bat mortality rates from several sources were used to provide a range of bat fatality estimates that could result from repowering. The primary source, Vasco Winds, was supplemented with bat mortality rate estimates from the two other repowering projects in the APWRA—Diablo Winds and Buena Vista—both of which used turbines smaller than those used in current and future repowering projects. Bat mortality rates from the nearby Montezuma Hills Wind Resource Area were also used because this is the nearest area—other than Vasco Winds—where fourth-generation turbines are in operation. The resultant range of possible mortality rates was compared to the baseline estimates of total fatalities for the two project areas and the Program area.

The PEIR described potential biases in the bat fatality analysis methods. Like potential avian analysis biases, the biases surrounding bats are useful to consider and revisit as new information becomes available. The PEIR disclosed that although the best available evidence was used to estimate the number of bat fatalities potentially resulting from implementation of the proposed Program and projects, there was more uncertainty in these estimates than there was for bird fatality estimates. Because the Alameda County Avian Fatality Program was not designed to count bats, the baseline mortality rate was likely underestimated. Moreover, because Vasco Winds is not representative of the entire Program area, the PEIR cautioned that extrapolation of results from this site to other areas should be interpreted with caution. Finally, the nearby Montezuma Hills Wind Resource Area, while sharing some land use characteristics (e.g., grazing), supports more dryland farming than the APWRA and has a different topographical profile. The recently available information does not change or further illuminate any of these biases.

In addition to the biases described in the PEIR, the recently available information adds some additional biases and issues to consider when reviewing the bat fatality analysis methods. While not specifically a bias, the information in this report confirms that the PEIR erroneously used a mortality rate from the Vasco Winds project first-year report that was later corrected or adjusted in the final Vasco Winds report. Although the corrected mortality rate is still lower than the second rate used from the Montezuma Hills Wind Resource Area, this change essentially results in a narrower range of estimated fatalities using the methods in the PEIR. Secondly, and perhaps most significantly, the Golden Hills monitoring program used scent-detection dogs to conduct fatality searches, the first and only project to use these methods to date. The authors of the Golden Hills report (H. T. Harvey & Associates 2018b) note that the use of scent-detection dogs as well as the shorter 7-day search interval "… clearly resulted in our detecting far greater numbers of bat fatalities than previously reported in the APWRA." The authors of the Golden Hills report also conclude that "… additional years of post-repowering data from different APWRA projects will be necessary before a confident assessment of the patterns and magnitudes of impacts on bats can be confidently assessed." Together, all these factors and biases illustrate the continued challenges associated with estimating bat fatalities for repowering projects.

The method used in the PEIR was used to calculate the number of bat fatalities expected to result from the Project using updated average annual mortality rates for the full monitoring period of the Vasco Winds project (3 years). Additionally, and for added context, the average annual mortality rates for the 2 years of the Golden Hills project were also calculated and presented.

Analysis Results

As noted in the PEIR, resident and migratory bats flying in and through the Project area may be killed by collision with wind turbine blades or other interaction with the wind turbine generators. Repowering in the Project area would introduce increased fatality risk, particularly to migratory bats.

Extrapolating from existing fatality data and from trends observed at other wind energy facilities where fourth-generation turbines are in operation, it appears likely that fatalities would occur predominantly in the late summer to mid-fall migration period; that fatalities would consist mostly of migratory bats, particularly Mexican free-tailed bat and hoary bat; that fatalities would occur sporadically at other times of year; and that fatalities of one or more other species would occur in smaller numbers. As shown in Table3.4-7 (updated from Table 3.4-15 in the PEIR), annual estimated bat fatalities in the Project area are anticipated to increase from the current estimate of 38 (under baseline) to 463–566 fatalities.

Table 3.4-7. Estimated Range of Annual Bat Fatalities (updated from Table 3.4-15 in the PEIR)

Study Area	Capacity (MW)	Baseline Fatalities[a]	Predicted Fatalities[b]
Existing program area	329	87	–
Program Alternative 1	417	110	**1,337–1,635 (700-1,635)**
Program Alternative 2	450	118	**1,443–1,764 (756-1,764)**
Golden Hills[c]	85.9	23	**284–347 (148-347)**
Patterson Pass[d]	19.8	5	**64–78 (33-78)**
Rooney Ranch	18.9	5	**80-98**

Notes: **Information in bold text is changed or new predicted number of fatalities based on information available since the PEIR was prepared. Information in parenthesis is the predicted fatalities indicated in the PEIR.**

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

[b] Estimate of total predicted fatalities are based on corrected fatality rates from the Vasco Winds repowering project (Brown et. al. 2016) (3.207 fatalities/MW/year), and from the multiyear average rates from the Shiloh I project in the Montezuma Hills WRA (3.92 fatalities/MW/year).

[c] Golden Hills was identified in the PEIR as up to 88.4 MW but 85.9 MW were ultimately constructed.

[d] The Patterson Pass project was authorized but has not been constructed.

The PEIR noted that "insufficient data are currently available to develop accurate fatality estimates for bats (Alameda Community Development Department 2014; p.3.4-18). The PEIR provided several hypotheses for evidence of an increased collision risk of repowered turbines, but noted several times that there was a "high degree of uncertainty in bat fatality estimates". The corrected fatality rates for the Vasco Wind project presented in Table 3.4-6, as well as results from the recent Golden Hills project, may serve to lessen the uncertainty in bat fatality estimates.

Conclusions

The PEIR concluded that "Insufficient data are currently available to develop accurate fatality estimates for individual bat species." The PEIR described potential impacts on five species of bats, but noted that two species, Mexican free-tailed bats and hoary bats, were most vulnerable. Indeed, despite the finding that two additional species of bats were detected as fatalities at repowered projects, the additional information discussed in this analysis further supports the conclusion that Mexican free-tailed bats and hoary bats constitute most of the fatalities. The PEIR noted that information available at the time indicated that bat collision risk increases substantially when old-generation turbines are replaced by newer, larger turbines. The PEIR further noted that "Turbines used in future repowering projects are likely to be similar in size to Vasco Winds turbines but much larger than the Diablo Winds and Buena Vista turbines in both overall size and rated nameplate capacity." The proposed Rooney Ranch turbines are moderately larger than Diablo Winds in terms of physical dimensions but are substantially larger in rated nameplate capacity. As noted in this analysis, the larger nameplate capacity of the Rooney Ranch turbines essentially results in a need for fewer turbines to meet the same nameplate capacity. Overall, the PEIR found that "Despite the high level of uncertainty in estimates of bat fatality rates, all available data suggest that repowering would result in a substantial increase in bat fatalities." The recently available information further supports this conclusion in the PEIR and does not alter its significance with regard to the proposed Project.

While the PEIR set forth multiple measures to address bat mortality, it concluded that these measures would not reduce the impact to a less-than-significant level. This conclusion holds true for the Project, and although it remains difficult to estimate bat mortality rates with certainty, continued monitoring will contribute to the body of knowledge informing this effort, as noted in the recent H. T. Harvey & Associates (2018a, 2018b) monitoring reports. Implementation of the combined program of mitigation measures—BIO-14a, Site and select turbines to minimize potential mortality of bats; BIO-14b, Implement postconstruction bat fatality monitoring program for all repowering projects; BIO-14c, Prepare and publish annual monitoring reports on the findings of bat use of the project area and fatality monitoring results; BIO-14d, Develop and implement a bat adaptive management program; and BIO-14e, Compensate for expenses incurred by rehabilitating injured bats—remain appropriate to reduce impacts but would not reduce them to a less-than-significant level considering recently available information. This conclusion is consistent with the analysis presented in the PEIR.

Impact BIO-15: Potential for road infrastructure upgrades to result in adverse effects on alkali meadow (no impact)

The PEIR concluded that road infrastructure upgrades—especially those involving crossings—could result in adverse effects on alkali meadow. However, the aquatic resources delineation surveys conducted in support of the project did not identify any alkali meadow in the survey area. Accordingly, there would be no impact, and no mitigation is required. This conclusion is consistent with the analysis presented in the PEIR.

Impact BIO-16: Potential for road infrastructure upgrades to result in adverse effects on riparian habitat (no impact)

While the PEIR identified several categories of riparian habitat in the program area, the surveys conducted in support of the Biological Resources Evaluation identified no riparian habitat in the project area. Therefore, there would be no impact on riparian habitat, and no mitigation is required. This conclusion is consistent with the analysis presented in the PEIR.

Impact BIO-17: Potential for ground-disturbing activities to result in direct adverse effects on common habitats (less than significant)

The PEIR concluded that ground-disturbing activities would result in the permanent and temporary loss of common habitats—primarily annual grasslands. However, because of the extent of these habitats regionally available and the reclamation activities that are part of the project, this impact would be less than significant, and no mitigation is required. This conclusion is consistent with the analysis presented in the PEIR.

Impact BIO-18: Potential for road infrastructure upgrades to result in adverse effects on wetlands (less than significant)

The PEIR concluded that road infrastructure upgrades would result in placement of fill at crossings, as well as possible hydrologic alteration. However, because the proposed project has been designed to avoid all aquatic resources, and because no access roads would involve crossings of such features, this impact would be less than significant, and no mitigation is required. This conclusion is consistent with the analysis presented in the PEIR.

Impact BIO-19: Potential impact on the movement of any native resident or migratory wildlife species or established native resident or migratory wildlife corridors, and the use of native wildlife nursery sites (significant and unavoidable)

The PEIR concluded that construction activities could interfere with wildlife movement through introduction of barriers to passage; moreover, as discussed in Impacts BIO-11 and BIO-14, turbine operations could interfere with movement of birds and bats through turbine-related mortality. This would constitute a significant impact. Implementation of Mitigation Measures BIO-1b, BIO-1e, BIO-3a, BIO-4a, BIO-5a, BIO-5c, BIO-7a, BIO-8a, BIO-8b, BIO-10a, BIO-11b, BIO-11c, BIO-11d, BIO-11e, BIO-11i, BIO-12a, BIO-12b, BIO-14a, and BIO-14d would reduce this impact but not to a less-than-significant level. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

Impact BIO-20: Conflict with local plans or policies (less than significant with mitigation)

As described in the PEIR, the East County Area Plan has several policies related to windfarms, including establishing a mitigation program to minimize the impacts of wind turbine operations on bird populations. Loss of special-status species and their habitat, loss of alkali meadow, loss of riparian habitat, and loss of existing wetlands as a result of implementing the program would be in conflict with these policies. Because the conditions in the project area and features and characteristics of the proposed project are consistent with those contemplated in the PEIR, the impact would be the same, except that alkali meadow and riparian habitat are not present in the project area, and the project has been designed to avoid all aquatic resources. This impact would be significant; however, implementation of Mitigation Measures BIO-1a through BIO-1e, BIO-3a, BIO-4a, BIO 5a through 5c, BIO-7a, BIO-7b, BIO-8a, BIO-8b, BIO-9, BIO 10a, and BIO-10b would reduce this impact to a less-than-significant level. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

Impact BIO-21: Conflict with provisions of an adopted habitat conservation plan/natural community conservation plan or other approved local, regional, or state habitat conservation plan (no impact)

Because there are no adopted habitat conservation plans (HCPs)/natural community conservation plans (NCCPs) for the program area and the program would not conflict with the EACCS, there would be no impact. The same is true for the project area. This conclusion is consistent with the analysis presented in the PEIR.

3.4.3 References Cited

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

Brown, K., K. S. Smallwood, and B. Karas. 2013. *Vasco Avian and Bat Monitoring Project 2012–2013 Annual Report*. Final. September. Prepared by Ventus Environmental Solutions, Portland, OR. Prepared for NextEra Energy Resources, Livermore, CA.

Brown, K., K. S. Smallwood, and B. Karas, and Szewczak. J.M. 2016*. Vasco Avian and Bat Monitoring Project 2012–2015 Final Report*. June. Prepared by Ventus Environmental Solutions, Portland, OR. Prepared for NextEra Energy Resources, Livermore, CA.

California Department of Fish and Wildlife. 2018. *California Natural Diversity Database*. RareFind 5, July 2018. Search of the Midway and Clifton Court Forebay USGS 7.5-minute Quadrangles and 10 surrounding quadrangles. Sacramento, CA.H. T. Harvey & Associates. 2017. *Golden Hills Wind Energy Center Postconstruction Fatality Monitoring Report: Year 1*. December 15. Prepared for Golden Hills Wind, LLC, Livermore, CA.

H. T. Harvey & Associates. 2018. *Golden Hills Wind Energy Center Postconstruction Fatality Monitoring Report: Year 2*. December 17. Draft Report. Prepared for Golden Hills Wind, LLC, Livermore, CA.

ICF International 2016. *Final Report Altamont Pass Wind Resource Area Bird Fatality Study*. *Monitoring Years 2005-2013.* April. (ICF J&S 00904.08.) Sacramento, CA. Prepared for Alameda County Community Development Agency, Hayward, CA.

Kolar, P.S., and Wiens, J.D., 2017. Distribution, nesting activities, and age-class of territorial pairs of golden eagles at the Altamont Pass Wind Resource Area, California, 2014-2016: U.S. Geological Survey Open-File Report 2017-1035, 18 p., https://doi.org/10.3133/ofr20171035.

Smallwood, K.S, 2018. Addendum to Comparison of Wind Turbine Collision Hazard Model Performance: One-year Post-construction Assessment of Golden Eagle Fatalities at Golden Hills.

Smallwood, K.S. and L. Neher. 2017. Comparison of Wind Turbine Collision Hazard Model Performance Prepared for Repowering Projects in the Altamont Pass Wind Resource Area. (Updated April 5, 2018).

Smallwood, K.S., and L. Neher. 2015a. Siting Wind Turbines to Minimize Raptor Collisions at Golden Hills North Repowering Project, Altamont Pass Wind Resource Area. Report to NextEra Energy Resources, Livermore, California.

Smallwood, K.S., and L. Neher. 2015b. Siting Wind Turbines to Minimize Raptor Collisions at Golden Hills North Repowering Project, Altamont Pass Wind Resource Area. Report to NextEra Energy Resources, Livermore, California.

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

U.S. Fish and Wildlife Service (USFWS). 2014. Final Environmental Assessment, Shiloh IV Wind Project Eagle Conservation Plan, California. Prepared by Division of Migratory Bird Management, Sacramento, CA.

Wiens, J.D. Kolar, P.S., Fuller, M.R. Hunt, W.G. and Hunt, T. 2015. Estimation of occupancy, breeding success, and predicted abundance of Golden Eagles (Aquila chrysaetos) in the Diablo Range, California, 2014: U.S. Geological Survey Open-File Report 2015-1039, 23p., http://dx.doi.org/10.3133/ofr20151039 .

3.5 Cultural Resources

The following analysis is based on cultural resources investigations conducted for the proposed project (Appendix C). Impacts relative to cultural resources depend primarily on project scope and area. The footprint of individual turbines would be the same as described in the PEIR.

3.5.1 Existing Conditions

As directed by Mitigation Measure CUL-2a, Conduct a preconstruction cultural field survey and cultural resources inventory and evaluation, in the PEIR, investigations were conducted for the proposed project. These investigations identified three unrecorded potential resources within the area of potential effects (APE) and one just outside the APE.

None of the four resources has been evaluated for eligibility for inclusion in the National Register of Historic Places (NRHP)/California Register of Historic Resources (CRHR). Under current project design, one of the resources (RR-1) is located in an area that could be used for a temporary laydown area. The four resources identified in or near the APE are briefly characterized below.

- **RR-1—**The remains of a historic foundation and assorted debris were identified in the west central portion of the APE. Preliminary inspection suggests that this resource could date to the late nineteenth or early twentieth century.
- **RR-2—**A collapsed barn was identified in the northern portion of the APE. Ranch features—part of a corral, a wooden fence, and a standing garage—were associated with it.
- **RR-3—**Two metal stakes and assorted metal refuse were identified in the southern portion of the APE.
- **RR-4—**Remains of the Summit School, originally constructed as a church in the late nineteenth century, were identified 30 feet outside the northernmost portion of the APE.

The Native American Heritage Commission (NAHC) was contacted in January 2018 to request a sacred lands file database search and to solicit any new information since the PEIR cultural resources investigations were conducted. To date, no response has been received.

3.5.2 Environmental Impacts and Mitigation Measures

Impact CUL-1: Cause a substantial adverse change in the significance of a historical resource (less than significant with mitigation)

The PEIR identified 19 historic architectural cultural resources in the program area and concluded that repowering projects could result in an adverse change on such resources in the program area. Four potential historic resources were identified in or immediately adjacent to the Rooney Ranch APE, of which one could potentially be affected by a temporary laydown area. This resource was not formally evaluated for eligibility in either the NRHP or the CRHR, and based on initial survey results, it does not appear to be eligible for inclusion. Implementation of Mitigation Measures CUL-1a, Avoid historic resources; and CUL-1b, Appropriate recordation of historic resources, would reduce this impact to a less-than-significant level. This conclusion is consistent with the analysis presented in the PEIR.

Impact CUL-2: Cause a substantial adverse change in the significance of an archaeological resource (less than significant with mitigation)

No previously documented archaeological resources were identified in or directly adjacent to the APE. No previously undocumented archaeological resources were identified within the APE during the pedestrian survey.

Although the APE and vicinity were used by prehistoric peoples, the nature of this land use would primarily have been resource collection. Consequently, the expected range of prehistoric artifact and feature types in the APE would include projectile points and lithic tools, lithic debitage, bedrock mortars, and grinding stones. Although the area could have been used for upland resource collection activities, the APE is located far from permanent water sources and is, therefore, expected to have moderate to low potential to contain prehistoric archaeological resources.

In the event that archaeological resources are inadvertently uncovered during project construction, implementation of Mitigation Measure CUL-2b, Develop a treatment plan for any identified significant cultural resources; CUL-2c, Conduct worker awareness training for archaeological resources prior to construction; and CUL-2d, Stop work if cultural resources are encountered during ground-disturbing activities, would reduce this impact to a less-than-significant level. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

Impact CUL-3: Disturb any human remains, including those interred outside of formal cemeteries (less than significant with mitigation)

The PEIR concluded that although there is no indication that the program area has been used for human burials, because prehistoric sites are known to be present in the program area, the possibility cannot be discounted entirely. In the unanticipated event that human remains are encountered during project construction, implementation of Mitigation Measure CUL-3, Stop work if human remains are encountered during ground-disturbing activities, would reduce this impact to a less-than-significant level. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

3.6 Geology, Soils, Mineral Resources, and Paleontological Resources

As described in the PEIR, there are no known mineral resources in the program area and it was concluded that the program would not affect mineral resources. Accordingly, this topic is not further considered in this analysis.

3.6.1 Existing Conditions

As described in the PEIR, the program area, known for the frequent occurrence of earthquakes and potential ground shaking, contains two active faults, which are zoned under the Alquist-Priolo Act, and a third fault designated as potentially active. The program area is in steep, hilly terrain known to be susceptible to earthquake-induced landsliding. Although the potential for liquefaction is likely low because of the depth to groundwater and the age of the geologic units in the program area, the risk of lateral spread and differential settlement is not known. Expansive soils occur in much of the program area, particularly in the Fontana-Diablo-Altamont soil association, which characterizes the project area. Geologic units in the program area have the potential to contain paleontological resources; however, the project area is not within the Neroly Formation, a geologic unit particularly sensitive for fossil material.

3.6.2 Environmental Impacts and Mitigation Measures

Impact GEO-1: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of rupture of a known earthquake fault (less than significant with mitigation)

The PEIR identified two active faults and one potentially active fault in the program area; however, none of these intersect the project area. The closest of these to the project area is the Green Fault Zone, approximately 2 miles west of the project area. Because the project area is more removed from identified faults than much of the program area, no impacts beyond those identified in the PEIR would result. Implementation of Mitigation Measure GEO-1, Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report, would reduce this impact to a less-than-significant level. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

Impact GEO-2: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of strong seismic ground shaking (less than significant with mitigation)

As disclosed in the PEIR, construction of turbines or power collection systems in areas with the potential to experience strong ground shaking could expose people or structures to potential substantial adverse effects. The turbine could be damaged or collapse and possibly injure personnel or damage property in the immediate area. Implementation of Mitigation Measure GEO-1 would reduce this impact to a less-than-significant level. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

Impact GEO-3: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of seismic-related ground failure, including landsliding and liquefaction (less than significant with mitigation)

As disclosed in the PEIR, if turbine foundations or power collection systems are not properly designed and sited for the earthquake-induced ground failure conditions present in the program area, they could fail and cause damage to or collapse of the turbine towers or collection system. This damage or collapse could cause harm to personnel or property in the immediate area. Although the potential for liquefaction is likely low because of the depth to groundwater and the age of the geologic units in the program area, the risk of lateral spread and differential settlement is unknown. The potential damage and harm that could result from landsliding, lateral spread, or differential settlement would be a significant impact. Implementation of Mitigation Measure GEO-1 would reduce this impact to a less-than-significant level. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

Impact GEO-4: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, as a result of landsliding (less than significant with mitigation)

As disclosed in the PEIR, in addition to seismic-related ground failure discussed in preceding impacts, construction of turbines or power collection systems in areas with potential to experience non-seismic-related landsliding caused by heavy precipitation could also expose people or structures to potential substantial adverse effects. Damage or collapse resulting from landsliding could cause harm to personnel or property in the immediate area.

While the project must comply with existing regulatory requirements (building safety requirements), these requirements may not address all ground failure issues. Implementation of Mitigation Measure GEO-1 would reduce this impact to a less-than-significant level. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

Impact GEO-5: Result in substantial soil erosion or the loss of topsoil (less than significant)

As disclosed in the PEIR, decommissioning and project construction could cause surface disturbance and vegetation removal resulting in soil erosion. However, compliance with federal and local erosion-related regulations (e.g., the SWPPP developed for the project, requirements of the County's Stormwater Quality Management Plan) would ensure that ground-disturbing activities do not result in significant erosion. Moreover, the PEIR requires a reclamation plan with specific measures taken to ensure that repowering sites are regraded and seeded to pre-project conditions. These requirements would ensure that potential impacts of soil erosion would be less than significant, and no mitigation is required. This conclusion is consistent with the analysis presented in the PEIR.

Impact GEO-6: Be located on expansive soil, creating substantial risks to life or property (less than significant with mitigation)

The PEIR disclosed that expansive soils occur in much of the program area, particularly in the Fontana-Diablo-Altamont soil association, which characterizes the project area. Turbine foundations built on expansive soils would be subject to the shrink and swell of these soils, which could damage structures if the subsoil, drainage, and foundation are not properly engineered. However, soil sampling and treatment procedures are addressed by state and local building codes. Compliance with these codes and implementation of Mitigation Measure GEO-1 would reduce this impact to a less-than-significant level. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

Impact GEO-7: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature (less than significant with mitigation)

According to the PEIR, sedimentary rocks—geologic units with potential to contain paleontological resources—include most units in the program area. Because most of the program area is characterized by geologic units considered to be sensitive for paleontological resources, this analysis assumes the same to be true of the project area. Substantial damage to or destruction of significant paleontological resources would be a significant impact. Implementation of Mitigation Measures GEO-7a, Retain a qualified professional paleontologist to monitor significant ground-disturbing activities; GEO-7b, Educate construction personnel in recognizing fossil material; and GEO-7c, Stop work if substantial fossil remains are encountered during construction, would reduce this impact to a less-than-significant level. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

3.7 Greenhouse Gas Emissions

The proposed project is a subset of the APWRA-wide repowering evaluated in the PEIR. Project-level greenhouse gas (GHG) emissions and associated impacts were assessed using the same methods as described above in Section 3.3, *Air Quality*. Refer to Appendix A for additional modeling detail, including equipment and vehicle assumptions.

3.7.1 Existing Conditions

Because GHG emissions result in global impacts, and because project-specific activities are commensurate with those evaluated in the PEIR, the description of existing conditions presented in the PEIR is incorporated here by reference. Note that since publication of the PEIR, the state has adopted Senate Bill (SB) 32, which requires ARB to ensure that statewide GHG emissions are reduced to at least 40 percent below 1990 levels by 2030. The 2017 Climate Change Scoping Plan presents measures the state will implement to achieve this goal, including furthering the renewables portfolio standard (RPS) to require that 50% of retail electricity sales originate from renewable resources by 2030.

3.7.2 Environmental Impacts and Mitigation Measures

Impact GHG-1: Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment (less than significant)

The PEIR concluded that while repowering the APWRA (an aggregate of all the anticipated repowering projects proposed within the program area) would result in short-term emissions of GHGs, primarily associated with construction activities, and the potential operational emission of sulfur hexafluoride (SF_6), the repowering projects collectively would result in an annual net reduction of more than 100,000 tons of carbon dioxide equivalent emissions (CO_2e). This beneficial impact would be less than significant.

As detailed in Appendix A, the wind energy generated by the proposed project would reduce GHG emissions by approximately 8,700 metric tons CO_2e per year. This would more than offset emissions generated by project construction and O&M. This impact would be less than significant, and no mitigation is required. This conclusion is consistent with the analysis presented in the PEIR.

Impact GHG-2: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases (less than significant with mitigation)

The PEIR evaluated the repowering of the program area for consistency with the following measures relevant to GHG emissions.

- Assembly Bill (AB) 32 Scoping Plan Measure T-7: Heavy-Duty Vehicle GHG Emission Reduction (Aerodynamic Efficiency)—Discrete Early Action.
- AB 32 Scoping Plan Measure E-3: Renewables Portfolio Standard (RPS)
- AB 32 Scoping Plan Measure H-6: High Global Warming Potential Gas Reductions from Stationary Sources – SF_6 Leak Reduction and Recycling in Electrical Applications.

- Alameda County Climate Action Plan (CAP) Measure E-10**:** Require new construction to use building materials containing recycled content.
- Alameda County CAP Measure WS-2: Strengthen the Construction and Demolition Debris Management Ordinance.

With the exception of Scoping Plan Measure E-3, the PEIR concluded that the repowering projects could potentially conflict with all these measures. However, implementation of Mitigation Measures GHG-2a, Implement best available control technology for heavy-duty vehicles; GHG-2b, Install low SF_6 leak rate circuit breakers and monitoring; GHG-2c, Require new construction to use building materials containing recycled content; and GHG-2d, Comply with construction and demolition debris management ordinance, would reduce this potential impact to a less-than-significant level.

In concept, the proposed project is being pursued to promote sustainability and further alternative energy. Although the measures included in the AB 32 Scoping Plan, 2017 Climate Change Scoping Plan, and Alameda County CAP are necessarily broad, the proposed project is generally consistent with the goals and desired outcomes of the plans. The additional wind energy generated by the project will directly support the decarbonization of the electric power sector, helping California to meet its GHG goals in SB 32 and Executive Order S-3-05.[5] Nevertheless, emissions generated by the project could potentially conflict with applicable measures in the AB 32 Scoping Plan, 2017 Climate Change Scoping Plan, and Alameda County CAP. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

[5] California EO S-03-05 seeks to reduce emissions to at least 80 percent below 1990 levels by 2050.

3.8 Hazards and Hazardous Materials

The PEIR evaluated the potential for impacts relating to hazards and hazardous materials. Because the characteristics of the project area and the activities associated with project construction and operation are the same as those contemplated in the PEIR, existing hazards and hazardous conditions in the project area are generally the same as those analyzed in the PEIR. The use of hazardous materials during project construction, operations, and maintenance activities would be similar. Issues related to the project's proximity to schools and airports are covered under the PEIR as are wildland fire requirements. Due to the larger generation capacity of the project's proposed turbines, fewer turbines would be required. However, they would be larger and would be subject to City review.

3.8.1 Existing Conditions

The project area is in the central portion of the program area between I-580 and Altamont Pass Road. The conditions described in the PEIR also pertain to the project area. The characteristics of the project regarding the type of potential hazards in the area and the type and use of hazardous materials would not differ from those addressed in the PEIR. The potential for and type of blade throw, addressed in the discussion of Impact HAZ-9, would not differ from those hazards considered in the PEIR; however, discussion of the larger turbines is included for purposes of full disclosure.

3.8.2 Environmental Impacts and Mitigation Measures

Impact HAZ-1: Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials (less than significant)

The PEIR concluded that project construction would involve small quantities of commonly used materials, such as fuels and oils, to operate construction equipment. The project would implement standard construction BMPs, as required by the SWPPP, to reduce pollutant emissions during construction. This impact would be less than significant, and no mitigation is required. This conclusion is consistent with the analysis presented in the PEIR.

Impact HAZ-2: Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment (less than significant)

The project would not involve activities or materials beyond those described in the PEIR. Further, the project would not create a significant hazard to the public or the environment through reasonably foreseeable upset or accident conditions involving the release of hazardous materials into the environment. This impact would be less than significant, and no mitigation is required. This conclusion is consistent with the analysis presented in the PEIR.

Impact HAZ-3: Emit hazardous emissions or involve handling hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school (no impact)

There are no public or private K–12 schools within 0.25 mile of the project area. The two nearest schools, Andrew N. Christensen Middle School and Leo R Croce Elementary School in Livermore, are approximately 4 miles west of the nearest project facilities; accordingly it is unlikely that hazardous materials would be emitted or released within 0.25 mile of any schools. There would be no impact, and no mitigation is required. This conclusion is consistent with the analysis presented in the PEIR.

Impact HAZ-4: Location on a hazardous materials site, creating a significant hazard to the public or the environment (less than significant with mitigation)

A search of relevant databases was conducted to confirm that the project site is not located on or meets the Cortese List requirements (CalEPA 2018a; CalEPA 2018b; DTSC 2018a; DTSC 2018b; SWRCB 2018). The project would involve soil disturbance and, as outlined in the PEIR, the City would require that a Phase I Environmental Site Assessment (and remediation, if necessary) be conducted prior to construction activities. Accordingly, implementation of Mitigation Measure HAZ-4, Perform a Phase I Environmental Site Assessment prior to construction activities and remediate if necessary, would reduce this impact to a less-than-significant level. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

Impact HAZ-5: Location within an airport land use plan area or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, resulting in a safety hazard for people residing or working in the project area (no impact)

The closest public airport to the project area is the Byron Airport, approximately 5.66 miles north-northeast of the project area. Livermore Municipal Airport is approximately 8.7 miles west-southwest of the project area, and Tracy Municipal Airport is approximately 11 miles east-southeast of the project area. Because the project area is not within 2 miles of a public airport, implementation of the project would not result in a safety hazard for people residing or working in the project area. No impact would result. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

Impact HAZ-6: Location within the vicinity of a private airstrip, resulting in a safety hazard for people residing or working in the project area (no impact)

The closest private airport is Meadowlark Airfield, 5 miles south-southwest of the project area. Because the project area is not within 2 miles of a private airport, implementation of the project would not result in a safety hazard for people residing or working in the project area and no impact would result. This conclusion is consistent with the analysis presented in the PEIR. .

Impact HAZ-7: Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan (less than significant with mitigation)

The PEIR concluded that impacts associated with emergency response plans would be temporary, occurring primarily during construction, with the potential to cause a substantial traffic increase on local county roads. Implementation of Mitigation Measure TRA-1, Develop and implement a construction traffic control plan, would reduce this impact to a less-than-significant level. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

Impact HAZ-8: Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands (less than significant)

The PEIR concluded that while wind turbines can cause fire ignitions, sufficient fire response providers are already in place. Moreover, fewer turbines and the improved safety of newer models associated with repowered projects are anticipated to result in a reduction of potential fire ignitions. The PEIR concluded that the fire-related impact of individual repowering projects would be less than significant, and no mitigation is required. This conclusion is consistent with the analysis presented in the PEIR.

Impact HAZ-9: During normal operation, the effects of bending and stress on rotor blades over time could lead to blade failure and become a potential blade throw hazard (less than significant)

Blade throw impacts as assessed in the PEIR rely largely on the Updated Alameda County Turbine Setback Requirements (Table 2-3), which are calculated on the basis of rotor (blade) length, total turbine height, or a percentage of the general setback, with some setbacks also adjusted for elevation. The proposed turbines would be within the PEIR specifications for rotor type, tower type, tower (hub) height, and total turbine height. However, blade lengths would be up to 15 feet longer than the blades contemplated in the PEIR. The general and alternative minimum setbacks that use rotor length to apply a setback standard would only apply to adjacent parcels (with and without approved wind energy CUPs). Since the blade lengths differ by only 15 feet, this change would add an additional setback distance of 16.5 feet (1.1 times blade length) when applying the setback requirements—a greater (i.e., more protective) setback than that based on the blade lengths envisioned in the PEIR. Prior to final project design, the City would ensure that all requirements of the alternative minimum setbacks are met. Rooney would be required to either meet the County's general setbacks or meet the conditions required to implement alternative minimum setbacks. Adherence to setback requirements would ensure that impacts related to blade throw are maintained at a less-than-significant level, and no mitigation is required. This conclusion is consistent with the analysis presented in the PEIR. Thus, the change to a larger turbine would have no change to the approach or findings regarding setbacks and hazards. There would be no new significant effects or substantial increase in the severity of effects for hazards.

3.8.3 References

California Department of Toxic Substances Control (DTSC). 2018a. List of Hazardous Waste and Substances sites from Department of Toxic Substances Control (DTSC) EnviroStor database. Search conducted on July 18, 2018

California Department of Toxic Substances Control (DTSC). 2018b. List of hazardous waste facilities subject to corrective action pursuant to Section 25187.5 of the Health and Safety Code. Search conducted on July 18, 2018.

California Environmental Protection Agency (CalEPA). 2018a. List of solid waste disposal sites identified by Water Board with waste constituents above hazardous waste levels outside the waste management unit. Search conducted on July 18, 2018

California Environmental Protection Agency (CalEPA). 2018b. List of active CDO and CAO from Water Board. Search conducted on July 18, 2018.

State Water Quality Control Board (SWRCB). 2018. List of Leaking Underground Storage Tank Sites by County and Fiscal year from Waterboard GeoTracker database. Search conducted on July 18, 2018.

3.9 Hydrology and Water Quality

The PEIR contemplated the impacts on hydrology and water quality that could result from construction and operation of wind repowering projects throughout the program area. The only change relevant to this resource topic from the projects considered in the PEIR is the larger capacity of the turbines proposed for use in the proposed project: 3.6–3.8 MW turbines contrasted with a maximum of 3 MW considered in the PEIR. The consequence of this change would be at least one fewer turbine under the proposed project than would have been necessary to achieve the same nameplate capacity (i.e., 25.1 MW) under the turbine specifications considered in the PEIR. Despite the larger generative capacity of the Rooney turbines, their overall dimensions would be within the parameters established in the PEIR—most importantly (pertaining to the introduction of impervious surfaces), the footprint of individual turbines would be the same as described in the PEIR.

3.9.1 Existing Conditions

As disclosed in the PEIR, the project area is southwest of the San Joaquin–Sacramento Delta in the Clifton Court Forebay, Mountain House Creek, and Upper Arroyo Las Positas watersheds, and is in the Tracy groundwater subbasin. The conditions described in the PEIR pertain to the project area.

3.9.2 Environmental Impacts and Mitigation Measures

Impact WQ-1: Violate any water quality standards or waste discharge requirements (less than significant with mitigation)

The project would entail the same types of construction activities as disclosed in the PEIR, and these activities would potentially result in the same range of impacts. Trenching and site preparation create areas of bare soil that can increase sediment discharge to receiving waters. Implementation of Mitigation Measure WQ-1, Comply with NPDES requirements, (e.g., erosion control BMPs, implementation of a SWPPP), would reduce these impacts to a less-than-significant level. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

Impact WQ-2: Substantially deplete groundwater supplies or interfere substantially with groundwater recharge, resulting in a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted) (less than significant)

As disclosed in the PEIR, project construction and operation would entail minimal use of water beyond standard BMPs such as road and worksite dust control measures. Accordingly, demand on groundwater supplies would be negligible. The PEIR also concluded that the relatively small footprints (approximately 0.46 acre for the seven turbines of the proposed project) of the wind turbines would not interfere with groundwater infiltration. Moreover, while the PEIR assumed a maximum turbine capacity of 3 MW, the project contemplates 3.8 MW turbines, requiring seven turbines to achieve the project's 25.1 MW capacity compared to eight turbines under the PEIR assumptions. The decrease of one turbine would equate to approximately 0.06 acre less of impermeable surface than that considered in the PEIR. The impact would be less than significant, and no mitigation is required. This conclusion is consistent with the analysis presented in the PEIR.

Impact WQ-3: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation onsite or offsite (less than significant with mitigation)

As disclosed in the PEIR, no turbines would be constructed within existing drainage areas, and project facilities would be designed to avoid any downstream erosion during the rainy season. Implementation of Mitigation Measure WQ-1 would ensure that program-related stormwater runoff would not result in substantial erosion or downstream siltation. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

Impact WQ-4: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding onsite or offsite (less than significant with mitigation)

The analysis in the PEIR concluded that the most extensive increase in impervious surfaces would result from road improvements necessary to accommodate the new, larger turbines. However, as disclosed in the PEIR, the soils underlying the program area overall are high runoff soils, with a runoff potential comparable to that of compacted gravel roads. Because the roads themselves would not consequently entail introduction of new impervious surfaces, and because the NPDES stormwater Construction General Permit requires postconstruction runoff management measures be implemented if the SWPPP determines that the project could cause an increase in peak runoff flows, implementation of Mitigation Measure WQ-1 would reduce this impact to a less-than-significant level. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

Impact WQ-5: Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff (less than significant with mitigation)

As established in the PEIR, the program area does not currently have existing or planned stormwater drainage facilities; accordingly, the project would not exceed capacities of such facilities. Moreover, as previously discussed, implementation of Mitigation Measure WQ-1 would ensure that there would be no increase in the rate of polluted runoff. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

Impact WQ-6: Otherwise substantially degrade water quality (less than significant with mitigation)

Because, as disclosed in the PEIR, the program area does not currently have any substantial water quality issues or drainages that could carry a substantial amount of polluted runoff to receiving waters, project construction is not anticipated to substantially degrade water quality. Moreover, project operation would not result in a substantial amount of additional runoff. Implementation of Mitigation Measure WQ-1 would reduce the potential impacts of construction-related discharges to a less-than-significant level. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

Impact WQ-7: Place housing within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map (no impact)

No portion of the project area is within a 100-year flood hazard area.

Impact WQ-8: Place within a 100-year flood hazard area structures that would impede or redirect floodflows (no impact)

No portion of the project area is within a 100-year flood hazard area.

Impact WQ-9: Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam (less than significant)

As disclosed in the PEIR, because the project area is in rolling hills and there are no 100-year floodplains, the likelihood of a flood event in the area is considered minimal. This conclusion is consistent with the analysis presented in the PEIR.

Impact WQ-10: Contribute to inundation by seiche, tsunami, or mudflow (less than significant with mitigation)

As the PEIR concluded, the likelihood of seiche or tsunami is considered minimal. A mudflow is also highly unlikely, but such an event could be possible in rolling hills if proper BMPs are not used during the construction process. Implementation of Mitigation Measure WQ-1 would ensure that project-related stormwater runoff would be properly contained and would drain appropriately to preclude buildup or to cause rills and sedimentation that could result in the potential for a mudflow. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

3.10 Land Use and Planning

Because there are no established communities in the program area that would be bisected by any proposed repowering project, wind energy production is an established and permitted use throughout the APWRA, and the program area is not within an HCP or NCCP area, the PEIR concluded that there would be no impacts on land use and planning associated with repowering projects within the program area. Because the project area is a subset of the program area, the analysis remains valid. Accordingly, this resource topic is not addressed further in this analysis.

3.11 Noise

The results of the analysis conducted for proposed project are presented in *Sound Technical Report for the Rooney Ranch Wind Repowering Project, Alameda County, California* (Sound Technical Report) (Appendix D).

3.11.1 Existing Conditions

The project vicinity is primarily agricultural with some scattered rural residences. Sound sources in the project area are primarily traffic on local and distant roadways and natural sources such as birds and wind blowing through tall grass. The older existing turbines in the project area have been removed. New turbines that have been installed on adjacent properties are a source of sound but are not dominant in the sound environment of the project area.

3.11.2 Environmental Impacts and Mitigation Measures

Impact NOI-1: Exposure of residences to noise from new wind turbines (less than significant)

The PEIR disclosed that exceedances of the 55 A-weighted decibel (dBA) threshold established by the County could affect sensitive receptors, and that such exceedances would constitute a significant impact. However, only two sensitive receptors are present in the project vicinity (R68 and R69), both of which are approximately 2,000 feet from the nearest turbine location. According to the tables in the PEIR, such a distance would preclude noise from turbines reaching the County's threshold. The Sound Technical Report (Appendix D) supports this determination. Consequently, this impact would be less than significant, and no mitigation is required. This conclusion is consistent with the analysis presented in the PEIR.

Impact NOI-2: Exposure of residences to noise during decommissioning and new turbine construction (less than significant with mitigation)

The PEIR concluded that some residences in the program area would be within distances of construction activities that could expose them to noise levels in exceedance of Alameda County noise ordinance standards. The receptors identified as R69 and R68 in the Sound Technical report are within approximately 400 and 1,000 feet of access road construction, respectively. Although most project components are at much greater distances, the noise levels to which these receptors could be exposed during construction of project facilities and infrastructure would constitute a significant impact. As disclosed in the PEIR, implementation of Mitigation Measure NOI-2, Employ noise-reducing practices during decommissioning and new turbine construction, would reduce these impacts to a less-than-significant level. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

3.12 Population and Housing

The PEIR anticipated continuing growth in Alameda County. However, it concluded that the repowering projects constituting the overall APWRA repowering effort would not induce population growth either directly or indirectly. Because the project is a subset of this analysis, the analysis remains valid. The project would not involve creation of any housing units, nor would it displace any existing housing units or people. There would be no impact and no mitigation is required; accordingly, this resource topic is not addressed further in this analysis.

3.13 Public Services

The PEIR concluded that there would be no impacts on public services. Because the reduction in the number of turbines and the improved safety of newer models would result in a reduction of potential fire ignitions, there would be no increase in the demand for fire protection services. Police protection facilities and infrastructure required to protect the program area are already in place to protect the existing wind energy facilities. No residences would be constructed, no schools are present in the project area, and because the PEIR concluded that repowering the APWRA would not induce growth, there would be no increased demand on schools or recreational facilities. There would be no impact and no mitigation is required. This conclusion is consistent with the analysis presented in the PEIR. Because the project area is a subset of the program area, the analysis remains valid. Accordingly, this resource topic is not addressed further in this analysis.

3.14 Recreation

Because there are no recreational facilities in the entire program area and because the repowering program overall would not lead to an increase in use of nearby facilities, the PEIR found that there would be no impact on recreational facilities and no mitigation is required. Because the project area is a subset of the program area, the analysis remains valid. Accordingly, recreation is not further considered in this analysis.

3.15 Transportation/Traffic

The PEIR evaluated traffic impacts for a generic 80 MW project as well as for two specific projects in the program area. No project-specific traffic analysis was necessary for the proposed project because the impacts identified as potentially significant in the PEIR (e.g., increased traffic congestion and traffic hazards) would also apply to the project, and the mitigation measures set forth in the PEIR would adequately address those impacts.

3.15.1 Existing Conditions

The road network and other existing conditions pertaining to traffic and transportation was described in the PEIR for the entire program area, of which the project area is a subset. Most of the project area would be accessed using roads as described in the PEIR (e.g., I-580, Altamont Pass Road). The program-level analysis adequately discloses the potential impacts associated with the proposed project.

3.15.2 Environmental Impacts and Mitigation Measures

Impact TRA-1: Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation, including mass transit and non-motorized travel and relevant components of the circulation system, including, but not limited to, intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit or conflict with an applicable congestion management program, including, but not limited to, level-of-service standards and travel demand measures or other standards established by the county congestion management agency for designated roads or highways (less than significant with mitigation)

The PEIR concluded that construction activities could cause a substantial traffic increase on local county roads that provide direct access to project construction sites, because these roads generally have low traffic volumes. However, these increases, while they could degrade traffic operations, would be of temporary duration. Implementation of Mitigation Measure TRA-1, Develop and implement a construction traffic control plan, would reduce this impact to a less-than-significant level. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

Impact TRA-2: Conflict with an applicable congestion management program, including, but not limited to, level-of-service standards and travel demand measures or other standards established by the county congestion management agency for designated roads or highways (less than significant)

The PEIR concluded that project-related traffic would not substantially degrade the level of service on a congestion management program–designated roadway (i.e., I-580) because it would contribute such a small percentage of total traffic. Accordingly, this impact would be less than significant, and no mitigation is required. This conclusion is consistent with the analysis presented in the PEIR.

Impact TRA-3: Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks (less than significant)

The PEIR concluded that repowering in the program area would not result in a change in air traffic patterns or any increase in related safety risks. Because the project would be within the area analyzed, the project-level impact would also be less than significant, and no mitigation is required. This conclusion is consistent with the analysis presented in the PEIR.

Impact TRA-4: Substantially increase hazards because of a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment) due to construction-generated traffic (less than significant with mitigation)

The PEIR concluded that the presence of large, slow-moving construction and delivery vehicles could increase traffic safety hazards. Additionally, some of these vehicles could exceed roadway load and size limits. Permits from California Department of Transportation District 4 and other relevant jurisdictions would be required for such vehicles. Compliance with permit requirements and implementation of Mitigation Measure TRA-1 would reduce this impact to a less-than-significant level. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

Impact TRA-5: Result in inadequate emergency access due to construction-generated traffic (less than significant with mitigation)

Large, slow-moving construction and delivery vehicles and temporary road and lane closures could delay or obstruct the movement of emergency vehicles, as disclosed in the PEIR. Implementation of Mitigation Measure TRA-1 would reduce this impact to a less-than-significant level. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

Impact TRA-6: Conflict with adopted policies, plans, or programs regarding public transit, bicycle or pedestrian facilities, or otherwise decrease the performance or safety of such facilities (less than significant with mitigation)

The PEIR concluded that no public transit services or pedestrian facilities are present on the project access routes in the program area. However, oversized construction vehicles could potentially disrupt the movement of bicycles traveling on the shoulders of some local access roads (e.g., Altamont Pass Road), and lane or road closures associated with material deliveries could temporarily disrupt bicycle access. Implementation of Mitigation Measure TRA-1 would reduce this impact to a less-than-significant level. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

3.16 Utilities and Service Systems

The PEIR analyzed potential impacts on utilities and service systems and determined that there would be no impacts or that impacts would be less than significant. Similarly, as described in the PEIR, wastewater generation and drainage for the project would not affect capacity of a water or wastewater treatment facility. Because the proposed project would entail one fewer turbine than the same nameplate capacity would require under the assumptions of the PEIR (i.e., a maximum 3 MW turbine), water needs for the project would be equal to or less than those analyzed in the PEIR. Water for construction activities would be provided through an agreement with municipal or private suppliers and would therefore not affect any water supply or require expanded entitlements. Solid waste would be generated primarily during project construction and would not exceed the capacity of landfills. The project would be required to comply with local, state, and federal solid waste regulations. There would be no impact and no mitigation is required. This conclusion is consistent with the analysis presented in the PEIR. Accordingly, this resource topic is not addressed further in this analysis.

Chapter 4
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Appendix A
Air Quality Technical Memorandum

Appendix B

Biological Resources Evaluation Report

Appendix C

Cultural Resources Survey Report

Appendix D

Sound Technical Report