MULQUEENEY RANCH
WIND REPOWERING PROJECT
PROJECT DESCRIPTION

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October 2019
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## Acronyms and Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>APWRA</td>
<td>Altamont Pass Wind Resource Area</td>
</tr>
<tr>
<td>BMP</td>
<td>best management practice</td>
</tr>
<tr>
<td>County</td>
<td>Alameda County Community Development Agency</td>
</tr>
<tr>
<td>CUP</td>
<td>conditional use permit</td>
</tr>
<tr>
<td>CUPA</td>
<td>Certified Unified Program Agency</td>
</tr>
<tr>
<td>EIR</td>
<td>environmental impact report</td>
</tr>
<tr>
<td>H&amp;S</td>
<td>Health and Safety</td>
</tr>
<tr>
<td>HMBP</td>
<td>Hazardous Materials Business Plan</td>
</tr>
<tr>
<td>kV</td>
<td>kilovolt</td>
</tr>
<tr>
<td>MW</td>
<td>megawatt</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>Operations and maintenance</td>
</tr>
<tr>
<td>PG&amp;E</td>
<td>Pacific Gas and Electric Company</td>
</tr>
<tr>
<td>PRD</td>
<td>Permit Registration Document</td>
</tr>
<tr>
<td>project</td>
<td>Mulqueeney Wind Repowering Project</td>
</tr>
<tr>
<td>QA/QC</td>
<td>quality assurance/quality control</td>
</tr>
<tr>
<td>SPCC</td>
<td>Spill Prevention Control and Countermeasures</td>
</tr>
<tr>
<td>SWPPP</td>
<td>stormwater pollution prevention plan</td>
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</table>
Introduction

Mulqueeney Wind Energy, LLC (Mulqueeney Wind), a subsidiary of Brookfield Renewable (Brookfield), is proposing the Mulqueeney Ranch Wind Repowering Project (project or proposed project) on 29 privately owned parcels in the Altamont Pass Wind Resource Area (APWRA) (Figures 1 and 2). The proposed project would entail the replacement of approximately 518 old generation wind turbines installed in the 1990s with up to 36 new wind turbines. The proposed project is expected to use turbines with generating capacities between 2.2 and 4.2 megawatts (MW) to develop a maximum of 80 MW. The exact turbine model has not yet been selected. For purposes of environmental review, Brookfield has identified 36 possible turbine sites and a range of potential turbine specifications. The final configuration would be determined on the basis of site constraints, data obtained from meteorological monitoring of the wind resources, results of bird use surveys and avian micrositing considerations, turbine availability, and resulting cost of energy ($/MW-hour).

The project will use existing roads where possible, and temporary widening and construction of some new roads would be necessary. The project would also require the installation of underground electrical lines connecting the turbines to a new substation that would be built adjacent to the Pacific Gas and Electric Company (PG&E) Tesla substation. Other than the short connection to the Tesla substation, the project would not require any high-voltage overhead transmission lines (Figure 3).

In 2014, the Alameda County Community Development Agency (County) published and approved 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 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.

In 2019, the County published a subsequent environmental impact report (SEIR) (Alameda County Community Development Agency 2019) to address a tiered project (the Sand Hill Wind Repowering Project) under the PEIR. As noted in the SEIR, the additional CEQA review was completed to address new information in relation to a specific proposed project and to update several areas of the PEIR. As of the date of this document, the County is receiving public comment on the SEIR; when comments have been received and addressed, the County will prepare a Final SEIR and hold a hearing to certify it. Together, the original PEIR and the SEIR (which amends and adds to the PEIR) will be considered by the County when assessing future projects, including the proposed project.

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1 The old generation turbines were removed from the Mulqueeney Ranch project area in 2016 in preparation for repowering.
Project Location and Land Ownership

The project area, in the eastern and southern portion of the APWRA as identified in the PEIR, comprises 29 parcels (Figure 2 and Table 1), many of which were previously used for wind production. Land use in the project area and the surrounding APWRA consists largely of cattle-grazed land supporting operating wind turbines and ancillary facilities. The area can be 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 project area range from less than 500 to more than 1,900 feet above sea level. Mulqueeney Wind has a long-term easement agreement with the landowner to install, operate, and maintain the repowered wind turbines while permitting ongoing agricultural activities (i.e., ranching operations) to continue.

Table 1. Parcels and Proposed Uses

<table>
<thead>
<tr>
<th>Assessor’s Parcel Number</th>
<th>Acreage</th>
<th>Proposed Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>99A-1800-2-3</td>
<td>154.3</td>
<td>Wind turbines and associated facilities</td>
</tr>
<tr>
<td>99A-1800-2-4</td>
<td>16.5</td>
<td>Access or setbacks</td>
</tr>
<tr>
<td>99B-7890-2-4</td>
<td>232.8</td>
<td>Access or setbacks</td>
</tr>
<tr>
<td>99B-7890-2-5</td>
<td>35.6</td>
<td>Electrical collection lines</td>
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<tr>
<td>99B-7890-2-6</td>
<td>43.3</td>
<td>Substation and temporary construction area</td>
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<td>99B-7890-4</td>
<td>14.0</td>
<td>Electrical collection lines</td>
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<tr>
<td>99B-7900-1-3</td>
<td>15.9</td>
<td>Access or setbacks</td>
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<tr>
<td>99B-7900-1-4</td>
<td>0.1</td>
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<td>99B-7900-1-5</td>
<td>463.1</td>
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<td>99B-7910-1-1</td>
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<td>99B-7925-2-1</td>
<td>19.7</td>
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<tr>
<td>99B-7925-2-2</td>
<td>0.2</td>
<td>collection</td>
</tr>
<tr>
<td>99B-7925-2-3</td>
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<td>collection</td>
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<tr>
<td>99B-7925-2-4</td>
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<td>99B-7925-2-5</td>
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<td>Wind turbines and associated facilities</td>
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<td>99B-7925-3</td>
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</tr>
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<td>99B-7950-2</td>
<td>171.4</td>
<td>Wind turbines and associated facilities</td>
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<td>99B-7975-1</td>
<td>355.6</td>
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<td>99B-7980-1</td>
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<td>99B-8050-1</td>
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<td>Wind turbines and associated facilities</td>
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<td>99B-8100-1-1</td>
<td>2.7</td>
<td>Access or setbacks</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>4,588.8</td>
<td></td>
</tr>
</tbody>
</table>
Figure 3
Mulqueeney Ranch Wind Repowering Project - Conceptual Plan

Submitted to:
Alameda County Planning Department
224 West Winton Avenue, Room 111
Hayward, CA 94544
Contact: Andrew Young
510-670-5400

Submitted by:
Mulqueeney Wind Energy, LLC
200 Liberty Street, 14th Floor
New York, NY 10281
Contact: Dave Hurd
519-980-2206

Contour Interval: 50 feet

Project Layout, Black & Veatch, 10/15/2019
Project Need, Goals, and Objectives

The project objective is to repower the previous wind project on privately owned land to develop 80 MW of commercially viable wind energy. The facility would produce and deliver renewable energy to the electrical grid through a power purchase agreement to help meet the California’s Renewables Portfolio Standard of 60% by 2030 and 100% by 2045. Brookfield was not a party to the 2007 Settlement Agreement described in the PEIR, the proposed repowering would fulfill the broad requirements set forth under that agreement.

Existing Facilities

Wind Turbines and Foundations

All old generation wind turbines and towers on the project site were decommissioned and removed in 2017. Wind turbine foundations (generally pier-type foundations) were also removed at that time. Any previous foundations or infrastructure present above or belowground that conflict with the repowering project would be removed as part of the proposed project.

Access Roads

The project area contains numerous access roads of various widths and maintenance states. The majority of the roads were used to access the previous old generation wind turbines and for ranching operations. Current roads are used by the rancher for routine operations. As discussed in Proposed Project Components, some of the existing roads would be reused and upgraded for the repowering project.

Meteorological Towers

The project area currently has five existing temporary meteorological towers (four 60-meter towers and one 100-meter tower), permitted by the County in August 2015 and installed in 2016. The meteorological towers were installed by Mulqueeney Wind to monitor the wind resource in consideration for a later wind project application and turbine siting. The towers would continue to operate until project construction, at which point they would be disassembled and removed consistent with the terms of the conditional use permit.

Power Collection System

The power collection system for the previous wind project included overhead and underground lines. This system was decommissioned in 2016, at which time all aboveground facilities were removed. Several aboveground facilities (serving the adjacent Golden Hills project) are in the project area. These facilities connect a small substation (described below) to the Tesla substation. The proposed project would remove any remaining belowground facilities that conflict with the project for the repowering project components.
Substations

A small substation occupying approximately 1.5 acres is located in the northwest corner of the project area. This substation is owned (or used) by NextEra Energy Resources for the adjacent Golden Hills Project. The substation is not part of the proposed project and will remain in place.

Transmission Lines

Several transmission lines of various sizes cross the project area. The transmission lines are owned by PG&E and consist of five 115 kilovolt (kV), one 230kV, and one 500kV lines. The proposed project would be subject to applicable County setbacks from these lines.

Livestock Handling and Staging Areas

Several livestock handling and staging areas are located in the project area. These areas would be unaffected by the proposed project.

Proposed Project Components

The proposed project components are listed below, illustrated in Figures 3 and 4, and discussed in greater detail in the following subsections.

- A total nameplate generation capacity of 80 MW.
- Installation of up to 36 new wind turbine generators, towers, foundations, and pad-mounted transformers.
- Development of project access roads (including the use of existing roads to the extent possible).
- Installation of a temporary construction area.
- Installation of three permanent meteorological towers.
- Installation of a power collection system.
- Construction of a new substation.

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, are large, generally 1.6–4 MW turbines.

The proposed repowering project would entail installation of up to 36 fourth-generation turbines in the project area. A range of turbines is being considered for the proposed project. The range of
**Mulqueeney Wind Farm**

Vestas 2.3MW Layout

Brookfield Renewable

Preliminary, Subject to Change

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**HAUL ROAD WIDENING DETAIL**

Figure 4

**PROPOSED TURBINE CONSTRUCTION LAYOUT DETAIL**

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**Graphics**

00311.19 (10/21/2019) tag

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**DETAILS**
dimensions being considered are outlined in Table 2. These dimensions are similar to the dimensions analyzed in the PEIR and the Sand Hill SEIR.

Table 2. Turbine Specifications†

<table>
<thead>
<tr>
<th>Turbine Characteristic</th>
<th>Range of Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotor type</td>
<td>3-blade/horizontal axis</td>
</tr>
<tr>
<td>Blade Length</td>
<td>55–68 m (180–223 ft)</td>
</tr>
<tr>
<td>Rotor diameter</td>
<td>110–136 m (361–446 ft)</td>
</tr>
<tr>
<td>Rotor-swept area</td>
<td>9,503–14,527 m² (102,289–156,367 ft²)</td>
</tr>
<tr>
<td>Rotational speed</td>
<td>Variable: 4.4–14.9 rpm</td>
</tr>
<tr>
<td>Tower type</td>
<td>Tubular</td>
</tr>
<tr>
<td>Tower (hub) height</td>
<td>80–86 m (262–282 ft)</td>
</tr>
<tr>
<td>Rotor height (from ground to lowest tip of blade)</td>
<td>14–25 m (46–82 ft)</td>
</tr>
<tr>
<td>Total height (from ground to top of blade)†</td>
<td>135–152 m (443–499 ft)</td>
</tr>
</tbody>
</table>

† Turbine dimensions would not exceed the ranges shown in the table and the project capacity would not exceed 80 MW.

‡ Total turbine height would not exceed approximately 152 meters or 500 feet.

rpm = revolutions per minute.

Siting Requirements

Brookfield will adhere to the requirements of Alameda County 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 regarding 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). The PEIR established setback requirements for repowered wind turbines. The County recently published a Subsequent EIR for the Sand Hill Wind Repowering Project (Alameda County Community Development Agency 2019) which further refines and clarifies the County’s setbacks. As noted in the Sand Hill SEIR, the changes and updates to the setback table are meant to more clearly indicate where supporting studies or agreements are required. The current setback requirements are shown in Table 3.

Table 3. Alameda County Turbine Setback Requirements

<table>
<thead>
<tr>
<th>Affected Land Use or Corridor Type</th>
<th>Standard Minimum Setback, without Conditions</th>
<th>Reduced Optional Setback, with Conditions †</th>
<th>Setback Adjustment for Turbine Elevation above or below Affected Use ‡</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjacent parcel with approved or planned wind energy CUP†</td>
<td>1.1 times rotor length</td>
<td>0.55 times rotor length</td>
<td>Notarized agreement or easement</td>
</tr>
</tbody>
</table>
## Wind Turbine Foundations

### Foundations

The type of turbine foundation used depends on terrain, wind speeds, and wind turbine type. The size of the concrete cylinder and pad is determined by wind turbine model and size and site-specific...
conditions (e.g., expected maximum wind speeds, soil characteristics). The foundation’s weight must be sufficient to hold the wind turbine in place. Specific building plans, based on site-specific geotechnical and engineering requirements, would be submitted to the County Building Department prior to construction. The mostly likely foundation type used would be a gravity-type spread-footing foundation. The foundation will taper from the base upward to a pedestal of approximately 18 feet in diameter with a concrete top between 6 inches and 1 foot above the finished grade. The wind turbine is bolted to the center of the pedestal. Each foundation would contain steel reinforcement, and the concrete volume of each foundation is expected to be between 450 and 800 cubic yards. Each of the turbine models proposed would require a similarly sized foundation and similar engineering requirements. A small graveled area approximately 20 feet wide would encircle each foundation to facilitate maintenance access. The total diameter of the final footprint for each turbine, including the graveled area, would be approximately 58 feet.

Construction

Turbine construction entails placement of a foundation, new tower, nacelle, rotor, and transformer. At each turbine site, a level turbine pad, approximately 450 feet in diameter, would be graded to support the construction of tower foundations, to receive turbine component deliveries, and to support the use of large cranes to lift the turbine components into place. The extent and shape of grading at each turbine pad would depend on local topography; however, each turbine pad would require approximately 3.7 acres of graded area to support the construction of foundations and installation of turbines.

A crane pad would be leveled and graded within each turbine pad. The crane pad—a flat, level, and compacted area near the foundation—would provide the base from which the crane would work to place the turbine. The crane pads would be prepared in accordance with turbine manufacturer and contractor specifications, but each would be approximately 50 by 100 feet with a compacted and graveled surface. Wind turbine construction activities would take place within the turbine pad area. Following construction, the turbine pad would be reclaimed; however, the crane pad would remain in place.

Once the foundation, turbine pad, and crane pads are in place, the turbine towers, nacelles, and blades are delivered to each turbine location in the order of assembly. 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. Alternatively, the contractor may lift the rotor hub and each blade separately and mount them on the tower.

For most turbine sites, the cranes are broken down into their smaller components, transported to the next turbine erection site, and reassembled. This process is repeated for each individual turbine site. For several of the turbine sites, where topography is suitable, the cranes can be driven slowly between sites. In these cases, a 40-foot-wide temporary crane path is required. The crane paths are typically compacted native earth or a graveled surface if necessary, and are restored following construction.

Excess rock generated by foundation construction would be spread on existing roads and maintenance areas surrounding the turbines. Cut and fill at each turbine pad would be balanced onsite. Old foundations from the previous wind project onsite may be removed if they are within
The 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 nearest landfill or disposal facility, likely the nearby Altamont Landfill.

**Safety Lighting**

Lighting of the wind farm would be in compliance with the Federal Aviation Administration (FAA) *Obstruction Marking and Lighting Advisory Circular (AC70/7460-1L)*. Nighttime safety lighting would consist of FAA L-864 aviation red obstruction lights, which would be placed as high as possible on the turbine nacelle to be visible from any direction.

**Access Roads**

Primary access to the project area would be off Patterson Pass Road. Three access points are proposed: one to access the turbines located north of Patterson Pass Road, and two to access the southern turbines. Improvements to Patterson Pass Road are not proposed, although some improvements to the project area entrances may be required to accommodate the turning radii of equipment. These activities would be subject to County encroachment permits as appropriate.

Fourth-generation turbine towers and blades, such as those for the proposed project, 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 project area road infrastructure must be upgraded to accommodate construction of the turbines. Road infrastructure upgrades would include grading, widening, and resurfacing some of the existing roads on the project site, and some sections of new road would be constructed where no roads currently exist. Existing road widths vary from approximately 12 to 20 feet; the proposed roads are expected to be approximately 24 feet wide. A portion of the existing roads would require modifications and grading work, specifically where the road gradient exceeds 16% and where inside turning radii are less than 195 feet, to accommodate turbine deliveries.

The existing onsite drainage pattern would be maintained. Drainage would sheet flow along the sides of roads. Existing culverts would be inspected and replaced if necessary to accommodate the wider roads and other grading work. Existing culverts may need to be replaced with larger culverts or reinforced to provide adequate size and strength for construction vehicles.

**Temporary Construction Area**

A single temporary construction area would be used for construction trailers, employee parking, laydown, staging, and storage of materials, and potentially for a mobile concrete batch plant. The temporary construction area, east of Patterson Pass Road near the proposed substation and adjacent to the PG&E Tesla substation, would encompass approximately 15.6 acres (Figure 3). As noted above, turbine components would be delivered directly to turbine pads and would not be stored at the temporary construction area. Mobile construction trailers would be used to support workforce needs and site security and would also house a first aid station, emergency shelter, and storage areas for the construction workforce. Parking areas would be located near the trailers. A mobile concrete batch plant may be utilized onsite to accommodate the large pour volumes. The
batch plant would encompass approximately 2.5 acres for operation within the temporary construction area.

Vegetation would be cleared within the temporary construction area, which would be graded level or mostly level. The surface of the temporary construction area 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. Following completion of construction activities, the contractor would reclaim and restore the temporary construction area. The gravel surface would be removed, and the area 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.

**Meteorological Towers**

The project would include construction of three new permanent meteorological towers. The towers would be free-standing towers, placed on a small concrete foundation, up to 80 meters tall. The meteorological towers would be used for power performance tests and forecasting during wind farm operation. Each tower would be reached by a small access road and would be surrounded by a small graveled area to facilitate maintenance access.

**Power Collection System**

Each new wind turbine must be connected to the medium-voltage electrical collection system by means of a pad-mounted transformer. The power collection system carries electricity generated by the turbines to a project substation, where the voltage level of the collection system is stepped up to that of the power grid. From the project substation, electricity would be carried through a short aboveground line connected to the PG&E Tesla substation, where the electricity would be distributed to the power grid. Each of the collection system components is discussed below.

**Collection Lines**

Medium-voltage collection lines would collect power from each turbine for conveyance to the substation. Medium-voltage lines are normally up to 35 kV. The new medium-voltage collection lines would be installed underground.

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

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

Collection lines would terminate adjacent to the substation, at which point they would rise onto 1–2 poles for the aboveground connection to the substation. Overhead poles would be designed in compliance with the latest recommendations of the Avian Power Line Interaction Committee.

**Transformers**

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.

**Substation**

The project would require construction of a new substation immediately adjacent to the PG&E Tesla Substation. The new substation would be connected via an intermediate structure (a single 130- to 150-foot pole) that would be installed outside the Mulqueeney substation. A single span from the new pole into an open bay inside the Tesla Substation would complete the connection. The main functions of a project 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 would be a single main power transformer, a single outgoing high side circuit, and four medium voltage collection circuits. The substation would also include a control enclosure for all protective relaying and Supervisory Control and Data Acquisition equipment. The main outdoor electrical equipment and control enclosure are installed on a concrete foundation, and the remaining area is typically compacted and graveled. The entire facility would be fenced with 12-foot-high chain-link security fencing. The facility would be monitored remotely. Nighttime security lighting at the substation would include motion sensors and would be directed downward. The fenced footprint for the substation would occupy approximately 1.5 acres.

**Operations and Maintenance Facility**

Mulqueeney Wind is not proposing to construct an operations and maintenance (O&M) facility for the project. Existing commercial building space, to facilitate O&M, would be leased in nearby Tracy or Livermore for this purpose.

**Project Construction**

Turbines would likely be delivered to the site from the Port of Stockton or other nearby port or rail transfer locations. From the port or transfer location, they would be loaded onto trucks and transported to the site. Tower assembly typically 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 turbine pad 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 would then 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 4.

Table 4. Estimated Disturbance Associated with Project Construction (acres)

<table>
<thead>
<tr>
<th>Project Component/Activity</th>
<th>Permanent Impacts</th>
<th>Temporary Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind turbines (including crane pads/foundations)</td>
<td>2.2</td>
<td>131.0</td>
</tr>
<tr>
<td>Access roads&lt;sup&gt;a&lt;/sup&gt;</td>
<td>35.4</td>
<td>45.0</td>
</tr>
<tr>
<td>Crane paths</td>
<td>0.0</td>
<td>1.6</td>
</tr>
<tr>
<td>Temporary construction area</td>
<td>0.0</td>
<td>15.6</td>
</tr>
<tr>
<td>Meteorological towers</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Power collection system</td>
<td>0.0</td>
<td>41.5</td>
</tr>
<tr>
<td>Substation</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>38.7</strong></td>
<td><strong>235.8</strong></td>
</tr>
</tbody>
</table>

<sup>a</sup> Existing access roads would be reused to the extent possible; however, some sections of new access road would be required. Estimates exclude the area of existing roads.

**Schedule**

Project construction would proceed in 2021 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 project’s conditional use permit (CUP). If extended hours are necessary or desired, the appropriate approvals would be sought.

**Construction Sequence**

Typical construction steps are listed below.

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

The construction contractors would prepare the project area, deliver and install the project components, oversee construction, and complete final cleanup and restoration of the construction sites. Mulqueeney Wind would implement BMPs consistent with standard practice and the requirements of the PEIR as well as any state or federal permit requirements 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 (some activities would overlap chronologically).

- 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.

**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.

**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 100 workers. 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.
Construction Equipment

Equipment used for construction of repowering activities typically includes the types listed below. The exact type and mix of equipment used to construct the proposed project would be determined by the contractor based on site conditions, schedule, and equipment availability considerations.

- 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

Hazardous Materials Storage

Hazardous materials would be stored at the temporary construction area. The use of extremely hazardous materials is not anticipated, and materials stored onsite would typically be materials needed to service and maintain equipment and vehicles such as oils and hydraulic fluids. 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 (e.g., secondary containment); administrative standards (e.g., training with special emphasis on spill prevention, standard operating procedures, and inspections); and BMPs.

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

**Water Quality Protection**

**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 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.

**Traffic and Parking**

Construction traffic routing would be established in a traffic control plan, which would include a traffic safety and signing plan prepared by Mulqueeney Wind in coordination with the County and other relevant agencies (i.e., California Department of Transportation). The plan would define hours, routes, and safety and management requirements.

The traffic control plan would incorporate measures such as informational signs, traffic cones, and flashing lights to identify any necessary changes in temporary roadway 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 and substation materials, heavy equipment, and other construction-related materials. Construction of the 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. The total number of trips would be estimated to support analysis by the County. Construction-related parking would be directed to the temporary construction area. After construction, O&M of the proposed project would
require fewer trips, consisting mostly of pickups or other light-duty trucks from a leased commercial building in a local community.

**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 the temporary construction area and at appropriate areas around the project site. 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).

**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 short aboveground power lines interconnecting the project substation to the PG&E system would be tested and inspected as required.

**Restoration**

Clearing and disposing of trash and other debris 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 debris would be at an approved landfill or other 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 local, state, and federal restoration requirements as described in a Reclamation/Restoration 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.
Safety and Environmental Compliance Programs

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. Mulqueeney 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 Mulqueeney’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 for all of their subcontractors.

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.

Safety Compliance

Mulqueeney 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.

Emergency Situations

If severe storms result in a damaged or downed power line, O&M emergency 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 substations as a backup system to provide auxiliary power to project facilities in case of outages. For safety, the collector substations 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.

Public Access and Security

The project would be located entirely on properties with restricted public access. Only authorized access to the project site would be allowed. The site would be 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 substations, transformers, and interconnection riser poles.

**Fire Management**

The project would be subject to County requirements for fire prevention as outlined in the County’s *Altamont Pass Wind Farm Fire Requirements*. These include a requirement to prepare an annual fire prevention plan, which must provide a map of facilities, water supply locations, and access routes. The plan would also require maintenance of firebreaks, clearance around electrical lines, and requirements for year-round water supplies of at least 5,000 gallons to be provided for firefighting purposes.

**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 proposed O&M building in aboveground containers with appropriate spill containment features as prescribed by the local fire code or the SPCC Plan for the O&M building as stipulated by the appropriate regulatory authority. Such materials would be similar in type and amount to those currently stored and used for O&M for the existing facility.

Lubricants used in the turbine gearbox are potentially hazardous. The gearbox 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 another offsite location. No storage tanks are located at the existing project, and none are proposed.

**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 in 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 location 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 remotely, perform routine maintenance, shut down and restart turbines when necessary, and provide security. All O&M staff would be trained regularly to observe BMPs.

**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 CUP purposes would be 35 years. The ultimate decommissioning and removal of the proposed project would be similar to the decommissioning and removal of the previous windfarm components, except that considerably fewer turbines would be removed. In addition, existing service roads would be used.

Decommissioning would involve removing the turbines, transformers, and related infrastructure in accordance with landowner agreements. Substations and met towers would 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. 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.