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| **Document Title:** | CEC App_Chapter 2_Project Description_Darden Clean Energy |
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# 2 Project Description

IP Darden I, LLC and Affiliates[1] (Applicant), wholly owned subsidiaries of Intersect Power, LLC, propose to construct, operate, and eventually repower or decommission the Darden Clean Energy Project (Project) on approximately 9,500 acres in western Fresno County (Figure 2-1 and Figure 2-2). The Project would operate 7 days a week, 365 days a year, with an up to 35-year[2] anticipated lifespan. The primary Project components are:

- 1,150 megawatt (MW) solar photovoltaic (PV) facility (solar facility)
- Up to 4,600 MW-hour battery energy storage system (BESS)
- Up to 1,150 MW green hydrogen facility
- 34.5-500 kilovolt (kV) grid step-up substation (step-up substation)
- 10- to 15-mile 500 kV generation intertie (gen-tie) line
- Pacific Gas and Electric Company (PG&E)-owned 500 kV utility switchyard along the Los Banos-Midway #2 500 kV transmission line

The Project site and related facilities were selected taking into consideration the Project objectives, engineering constraints, site geology, environmental impacts, water, waste and fuel constraints, and electric transmission constraints, among other factors. A detailed discussion of site selection is provided in Chapter 6, *Alternatives*.

## 2.1 Generating Facility Description, Design, and Operation

The generating facility includes a 1,150 MWac (1,610 MWdc) solar facility with appurtenant facilities including an up to 4,600 MW-hour BESS, and an up to 1,150 MW green hydrogen facility. Section 2.1.2 summarizes the general site arrangement and layout of the Project and Sections 2.1.3 through 2.1.5 provide a description of each of the generating facility components respectively.

### 2.1.1 Project Location

The Project site is located in an agricultural area of unincorporated Fresno County south of the community of Cantua Creek. The solar facility, BESS, substation, and hydrogen facility would be located on approximately 9,100 acres of land currently owned by Westlands Water District, between South Sonoma Avenue to the west and South Butte Avenue to the east. The Project's gen-tie line (approximately 10 miles to 15 miles) would span west from the intersection of South Sonoma Avenue and West Harlan Avenue to immediately west of Interstate 5, where it would connect to the new utility switchyard along PG&E's Los Banos-Midway #2 500 kV transmission line. Figure 2-1 shows the regional location of the Project.

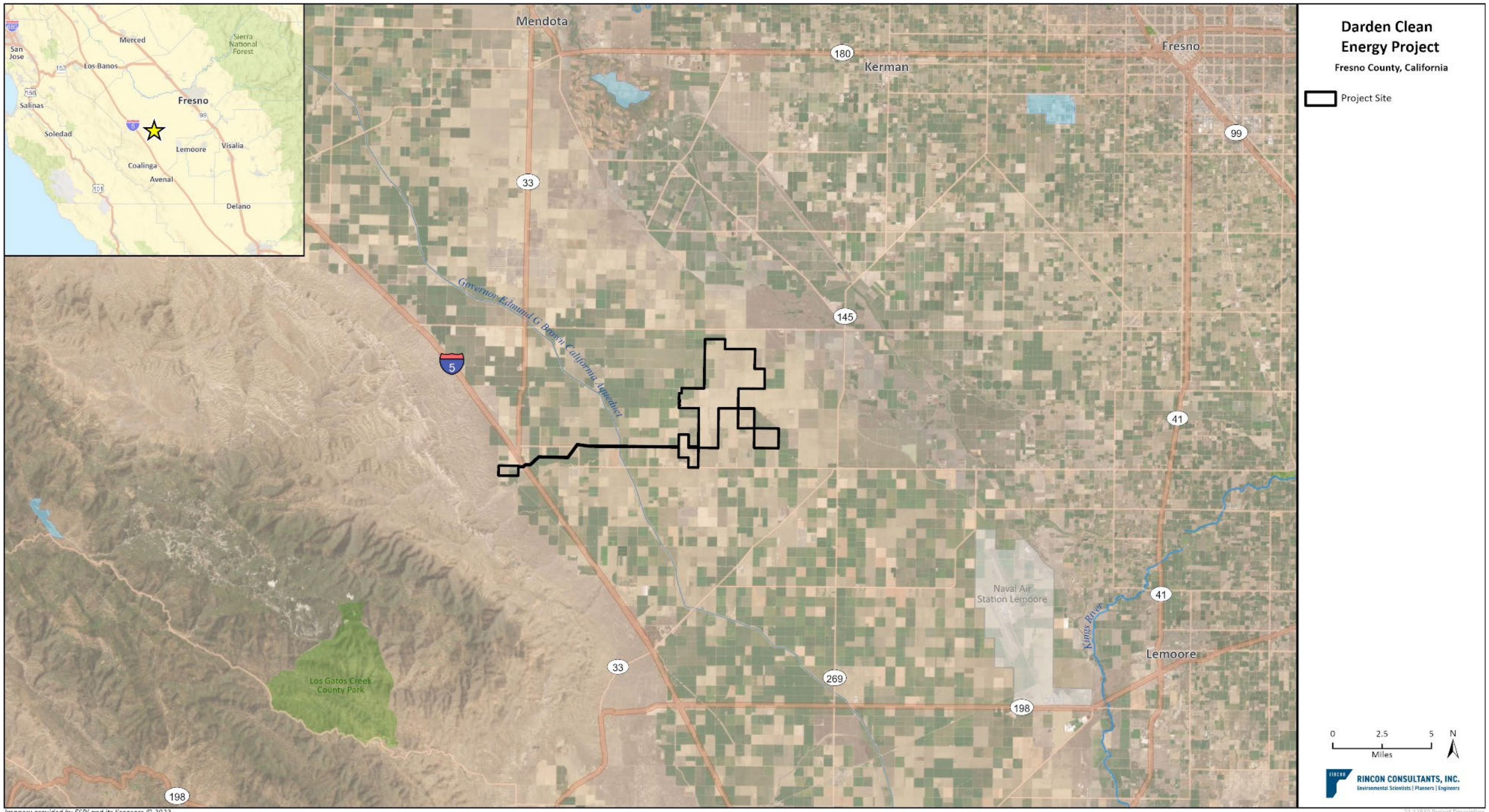
[1] "Affiliates" means IP Darden II, LLC, IP Darden III, LLC, IP Darden IV, LLC, IP Darden BESS I, LLC, IP Darden BESS II, LLC, IP Darden BESS III, LLC, IP Darden BESS IV, LLC, IP Darden I H2, LLC, IP Darden II H2, LLC, and IP Darden BAAH, LLC. IP Darden I, LLC and Affiliates are indirect subsidiaries of Intersect Power, LLC.

[2] After 35 years, the Project would be repowered or decommissioned.

### 2.1.2 Site Arrangement and Layout

Figure 2-2 shows the Project site plan and location of the solar facility, BESS, and green hydrogen facility, as well as the step-up substation, gen-tie line, and utility switchyard, which are discussed in Section 2.2. The gen-tie line would extend from the solar facility west to the proposed utility switchyard along PG&E's Los Banos-Midway #2 500 kV transmission line. As shown on Figure 2-2, two locations (Option 1 and 2 sites) are being considered for the BESS, hydrogen facility, and step-up substation. If the Option 1 sites are selected, the gen-tie line would be extended for approximately four miles to connect from the western edge of the solar facility to the Option 1 project components. In addition, an alternate site is being considered for the hydrogen facility, located west of Interstate 5 and adjacent to the proposed utility switchyard site. If the alternate site is selected, it would include the construction of an additional substation and switchyard. If the alternate site is not selected, the Project would not develop the parcels beyond construction of the gen-tie line. The Executive Summary includes a mapbook that shows the Project parcels, section, township, and range, as well as the proposed locations of the Project components. Appendix A contains a list of property owners. Section 5.5, *Visual Resources*, includes photo simulations of the Project. In addition, Appendix F contains scale plan and elevation drawings depicting the relative size and location of all facilities that were used to create Project visual simulations.

**Figure 2-1 Regional Location**

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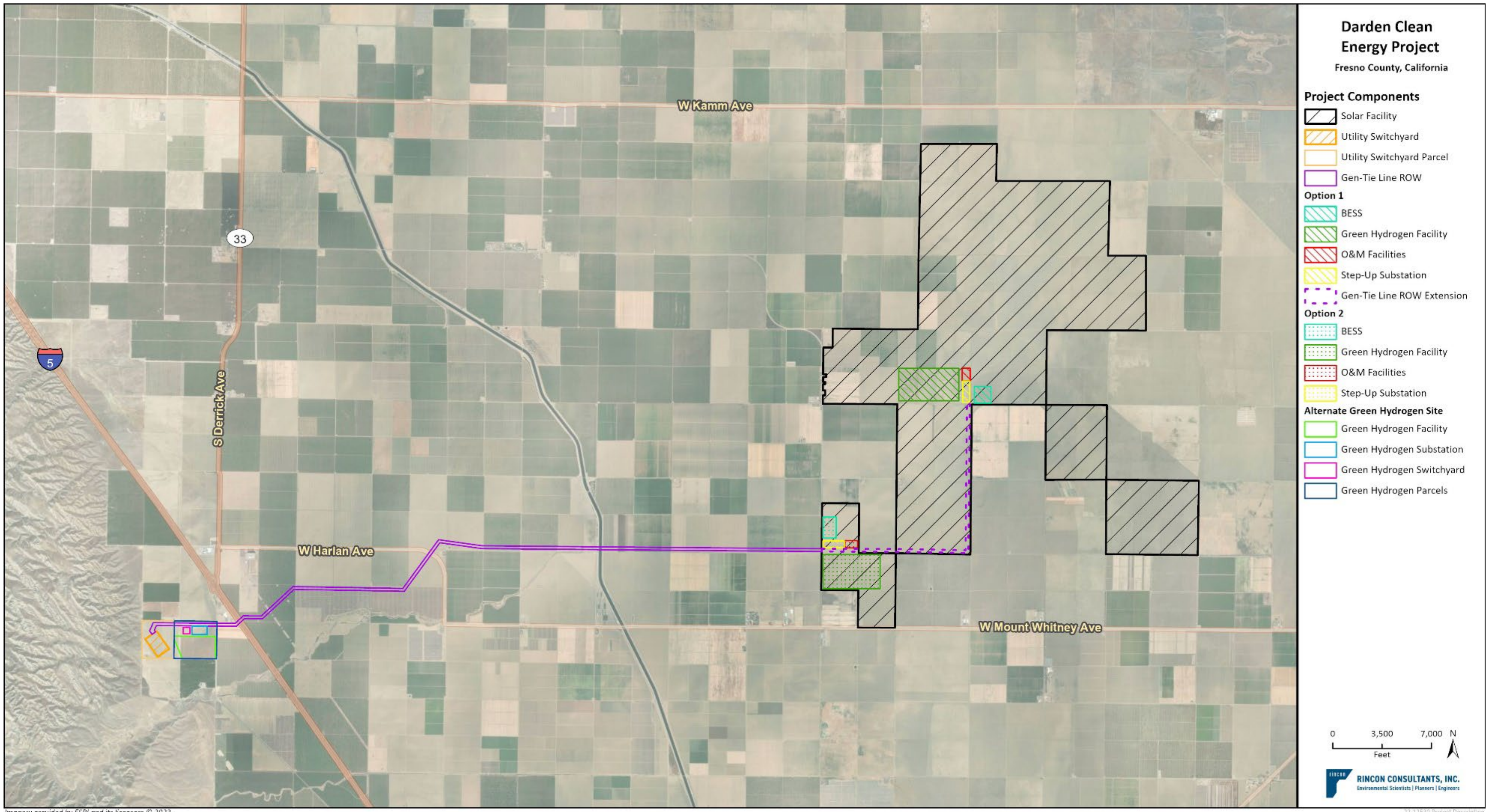
## Figure 2-2 Project Site and Components

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## 2.1.3 Solar Facility Description

### *2.1.3.1 Solar Facility Project Objectives*

The Applicant's objectives for the solar facility are as follows:

1. Design, construct, and operate the facility in a manner that respects the local community, its values, and its economy.
2. Operate the facility in a manner that protects the safety of on-site staff and off-site members of the public.
3. Generate sales tax revenues for Fresno County by establishing a point of sale in the County for the procurement of most major Project services and equipment.
4. Create temporary and permanent living-wage, union jobs for local and regional residents.
5. Generate affordable wholesale electric power to serve the ratepayers of the Fresno County region and the State of California.
6. Significantly contribute to addressing the climate crisis by generating renewable energy to displace climate-warming fossil fuel-based generation, and in so doing, helping to create a global climate that is hospitable to future generations and wild places.
7. Substantially contribute to meeting the State of California's renewable energy policy objectives as described by the interim targets in Senate Bill (SB) 1020 to require renewable energy and zero-carbon resources to supply 90 percent of all retail electricity sales by 2035 and 95 percent of all retail electricity sales by 2040.
8. Assist the nation in meeting its Nationally Determined Contribution commitments under Article 4 of the Paris Climate Agreement to achieve a 50 to 52 percent reduction in United States (U.S.) greenhouse gas pollution from 2005 levels by 2030, and to achieve 100 percent carbon pollution-free production in the electricity sector by 2035.
9. Given the urgency of the climate crisis, site and rapidly construct a major renewable energy generation facility on contaminated lands that are poorly suited for agricultural use and where the highest and best use is long-term solar energy generation.
10. Minimize environmental impacts and land disturbance associated with solar energy development by siting the facility on relatively flat, contiguous lands with low quality habitat, high solar insolation in close proximity to existing roads and established utility corridors.
11. Create a new point of interconnection in the Central Valley along California's backbone transmission infrastructure to facilitate this Project and future generators helping meet the state's renewable energy goals.

### *2.1.3.2 Solar Facility Components*

The solar facility layout is illustrated in Appendix F.

#### **Overview of Solar Technology**

Solar cells, also called photovoltaic (PV) cells, convert sunlight directly into electricity. PV gets its name from the process of converting light (photons) to electricity (voltage), which is called the "photovoltaic effect." PV cells are located on panels, which are mounted at a fixed angle facing south or on a tracking device that follows the sun. Many solar panels combined together in a row and controlled by tracker motors create one system called a solar sub-array. For large electric utility or industrial applications, hundreds of solar sub-arrays are interconnected to form a utility-scale PV system.

### Photovoltaic Panels and Support Structures

The solar facility would include approximately 3,100,000 solar panels. It is anticipated that the panels selected for the Project would be First Solar Series 7. The Series 7 panel utilizes First Solar's thin film technology.

The panel mounting system would depend on the market conditions and environmental factors. Either mono-facial or bi-facial panels could be used, and panels would either be mounted in a portrait orientation as single panels or mounted in a landscape orientation and stacked two high on a north-south oriented single-axis tracking system that would track the sun from east to west during the day.

Panels would be arranged in strings with a maximum height of 10 feet at full tilt or slightly higher due to topography or hydrology. Panel faces would be minimally reflective, dark in color, and highly absorptive.

The single axis tracking system would be oriented along a north/south axis with panels facing east in the early morning, lying flat during high noon, and facing west during later afternoon and evening hours.

Spacing between each row would be a minimum of 10 feet. The solar panel array would generate electricity directly from sunlight, which would be collected, converted to alternating current (AC), stored, and delivered to the on-site step-up substation.

Structures supporting the PV panels would consist of steel piles (e.g., cylindrical pipes, H-beams, helical screws, or similar structures). The piles typically would be spaced 18 feet apart. For the tracking system, piles would be installed to a height of approximately 4 to 6 feet above grade (minimum 1 foot clearance between bottom edge of panel and ground but could be higher to compensate for terrain variations and clearance for overland flow during stormwater events).

### Inverters, Transformers, and Electrical Collection System

The solar facility would be designed and laid out primarily in sub-arrays of installed rows of panels, ranging in capacity from 4 to 7 MW. Each sub-array would include a direct current (DC) to AC inverter and medium voltage transformer equipment area (i.e., inverter-transformer station) measuring 40 feet by 25 feet. The color of the inverter equipment would be light colored or neutral, depending on thermal requirements and availability from the manufacturer. The inverter-transformer station would be constructed on either a concrete pad or steel skid centrally located within the surrounding rows of panels. Sub-arrays would be designed and sized as appropriate to accommodate the irregular shape of the Project footprint. The precise sub-array dimensions and configuration would be dependent on available technology and market conditions. Each inverter-transformer station would contain an inverter, a transformer, a battery enclosure, and a switchboard.

The inverter-transformer station would contain a security camera at the top of an approximately 20-foot wood or metal pole. If required based on site meteorological conditions, an inverter shade structure would be installed at each inverter-transformer station. The shade structure would consist of wood or metal supports and a durable outdoor material shade structure (metal, vinyl, or similar). The shade structure, if utilized, would extend up to 10 feet above the ground surface.

Panels would be electrically connected into panel strings using wiring secured to the panel racking system. Underground cables would be installed to convey the DC electricity from the panels via combiner boxes or combiner harnesses with a trunk bus system located throughout the PV arrays, to inverters that would convert the DC to AC electricity. The output voltage of the inverters would be stepped up to the required collection system voltage at the medium voltage pad mount transformer located in close proximity to the inverter. The 34.5 kV level collection cables would be buried underground in a trench about 4 feet deep, with segments installed overhead on wood poles to connect all of the solar facility development areas to the on-site step-up substation, which may or may not involve an overhead or underground road crossing. Thermal specifications require 10 feet of spacing between the medium voltage lines, and in some locations closer to the step-up substation interconnection, more than 20 medium voltage AC lines run in parallel.

In locations where the collection system crosses a road or pipelines overhead, direct embedded wood poles would be used on a case-by-case basis. Wood poles spaced up to 250 feet apart could be installed on the site. The typical height of the poles would be approximately 60 to 100 feet, with an embedment depth of 10 to 15 feet depending on the type of crossing, and diameters varying from 12 to 20 inches.

## 2.1.4 Battery Energy Storage System Description

### *2.1.4.1 Battery Energy Storage System Objectives*

The Applicant's objectives for the BESS are as follows:

1. Contribute to meeting SB 100 policy objectives with a 2045 goal of California's electricity system to be carbon free by capturing and storing renewable energy when it is plentiful and dispatching for use when it is scarce.
2. Contribute to addressing the climate crisis by firming intermittent renewable energy to displace climate-warming fossil fuel-based generation, and in so doing, help create a global climate that is hospitable to future generations and wild places.

### *2.1.4.2 Battery Energy Storage System Facility Components*

BESS facilities can assist grid operators in more effectively integrating intermittent renewable resources into the statewide grid. The Project would include a battery storage system capable of storing up to 1,150 MW of electricity for 4 hours (up to 4,600 megawatt-hour), requiring up to 35 acres that would be located near the step-up substation. As shown in Figure 2-2, the battery system would be located near the step-up substation to facilitate interconnection and metering; two locations (Options 1 and 2 sites) are being considered.

The storage system would consist of battery banks housed in electrical enclosures and buried electrical conduit. Between 610 and 1,220 electrical enclosures measuring approximately 40 feet or 52 feet by 8 feet and 8.5 feet high would be installed on concrete foundations. The Project could use any commercially available battery technology, including but not limited to lithium ion, LFP (lithium iron phosphate), NMC (nickel manganese cobalt), and NCA (nickel cobalt aluminum) batteries.

Battery systems would require air conditioners or heat exchangers and inverters. In addition, a water tank for emergency use is anticipated for each BESS unit/area. The size, final number, and location of water tanks for emergency use would be determined in accordance with California Fire Code (CFC) and be reviewed/approved by the local or State Fire Marshal.

The BESS would comply with the current CFC, which governs the code requirements to minimize the risk of fire and life safety hazards specific to BESS used for load shedding, load sharing and other grid services (Chapter 12 Section 1206 of the 2019 CFC). In accordance with the CFC, the battery enclosure and the site installation design are all required to be approved by the local or State Fire Marshal.

## 2.1.5 Hydrogen Facility Description

### *2.1.5.1 Hydrogen Facility Project Objectives*

The Applicant's objectives for the green hydrogen facility are as follows:

1. Assist California in its goal to become a federal hydrogen hub as part of the Regional Clean Hydrogen Hubs Program which was allocated $8 billion dollars for the development of at least four regional clean hydrogen hubs through the 2021 Infrastructure Investment and Jobs Act.
2. Produce green hydrogen to help California decarbonize its over-the-road transportation, heavy industry, and ports, and assist in meeting the Alliance for Renewable Clean Hydrogen Energy Systems' (ARCHES) 500-ton per day hydrogen goal by 2030.
3. Assist in establishing hydrogen's role in California for decarbonizing the electrical and transportation sectors of the economy, and helping to achieve the goals set forth in The 100 Percent Clean Energy Act of 2018 (SB 100), the California Global Warming Solutions Act of 2006 (AB 32), and the Clean Energy and Pollution Reduction Act of 2015 (SB 350).
4. Achieve economies of scale to enable low-cost delivery of green hydrogen to the Bay Area, Los Angeles Basin, and/or Central Valley.

### *2.1.5.2 Overview of Green Hydrogen Technology*

Green hydrogen is produced by splitting water into hydrogen and oxygen using renewable electricity. Hydrogen made with clean power will aid in decarbonizing areas such as heavy industrial manufacturing, long-distance transport, shipping, and aviation. The hydrogen industry is rapidly evolving with innovation and engineering efforts advancing technologies to the scale needed to facilitate the adoption of hydrogen as a clean energy staple.

The electrolyzer is the primary component of commercial green hydrogen production. Electrolysis is the process by which electricity is utilized to split water into its component elements, hydrogen and oxygen. This process occurs through an electrochemical reaction in an electrolyzer using an anode, cathode, membrane, and electrolyte.

The water used as electrolysis feedstock must be demineralized prior to being processed in the electrolyzer. This requires a water treatment plant (WTP) as part of the hydrogen facility to produce the required demineralized water quality necessary for the electrolysis process. Electrolyzers require approximately 1.2 U.S. gallons of demineralized water for each 1 pound of hydrogen produced. The demineralized water necessary for electrolysis is produced by a reverse osmosis (RO) and Electrodeionization (EDI) process requiring 4 U.S. gallons of potable water for each 1 pound of hydrogen. If potable water is infeasible to obtain, non-potable water would be treated on-site to meet the standards of the RO process.

### 2.1.5.3 Hydrogen Facility Components

The primary components of the green hydrogen facility would include a proton exchange membrane (PEM) electrolyzer and a WTP. The WTP would have RO/EDI facilities and ancillary equipment such as filters, storage tanks, backwash systems and chemical dosing systems. The WTP may also include construction and operation of a Class I injection well for aquifer recharge, which is further discussed in Section 2.1.9.1. Additionally, the electrolyzer would include various electrical equipment such as transformers and rectifiers for the electrolyzer cell stacks. A dry cooling system would be used to reject heat from this equipment. Furthermore, a hydrogen dryer may be required to reduce the moisture content of the hydrogen product. Additional information on the cooling system is provided in Section 2.1.14.

Three locations are being considered for the green hydrogen facility. The Option 1 and Option 2 sites would be approximately 225 acres in size and would be located within the solar facility. The green hydrogen facility at either of the Option 1 and Option 2 sites would generate up to 1,150 MW of green hydrogen. In addition, an approximately 100-acre alternate site located west of Interstate 5 and adjacent to the proposed utility switchyard site is being considered. If the alternate site is selected, it would generate 800 to 1,000 MW and include the construction of an O&M building within the facility boundaries, as well as a substation and switchyard on approximately 20 additional acres adjacent to the facility (Figure 2-2).

### 2.1.5.4 Hydrogen Gas Transport

The hydrogen produced by the Project would be transported via pipeline, and on-site storage would not be required if the interconnection pipeline can accept fluctuating rates of injection. The means for off-site transportation of hydrogen are still under development by third parties and at the current time details of the exact location, dimensions, scope, and placement of the proposed pipeline transport are not available. The Applicant is closely tracking and intends to support efforts by prominent midstream companies in the state to build hydrogen backbone pipelines from production sites like the Project to market in the Bay Area, Los Angeles Basin, and transportation markets along major intra and interstate highways. Though not formally affiliated with those efforts, the Project proposes to be a waypoint and critical source of green hydrogen supply on those pipelines, providing low-cost, gaseous hydrogen to customers throughout California.

The Project is geographically well positioned to serve off takers in the Los Angeles Basin through new and existing pipeline rights of way and Interstate 5, and is strategically located between the Los Angeles Basin and Bay Area to serve future midstream projects connecting the Central Valley to both markets. Once constructed, the Applicant would interconnect into an offtake hydrogen pipeline via a stub pipeline that would be constructed within the Project footprint and require an approximate 90-foot corridor. The Applicant anticipates that an offtake pipeline could be made available by the Southern California Gas Company Angeles Link project, through the ARCHES program, or by other qualified parties. Because construction and operation of the offtake pipeline is being proposed and pursued by other entities, a hydrogen pipeline is not included in the scope of this Project. Construction of any transportation or distribution pipelines would be permitted, constructed, and operated by others.

## 2.1.6 Operations Methods and Activities

Upon commissioning, the Project would enter the operation phase. The Project would operate 7 days a week, 365 days a year. Operational activities at the Project site would include:

- Maintaining safe and reliable solar and clean hydrogen generation
- Site security
- Responding to automated electronic alerts based on monitored data, including actual versus expected tolerances for system output and other key performance metrics
- Communicating with customers, transmission system operators, and other entities involved in facility operations

#### *2.1.6.1 Operations and Maintenance Facility*

The Project would include an O&M facility area on approximately 11 acres near the step-up substation within the solar facility, which would include one to two O&M buildings to accommodate staff members, storage areas, and parking. The O&M buildings would likely be 65 feet by 80 feet and up to approximately 10,400 square feet in size. The O&M buildings would be constructed on a concrete foundation and be approximately 15 feet at its tallest point.

As previously mentioned, if the alternate hydrogen site is selected, an additional O&M building of up to 8,000 square feet would also be developed at the alternate hydrogen facility site.

#### *2.1.6.2 Operations and Maintenance Workforce*

During operation of the Project, an average of 12 permanent staff associated with the solar facility would be on-site daily, with additional staff during intermittent solar panel washing (17 staff), facility maintenance and repairs (4 staff), and vegetation management activities (12 staff). Up to 4 average permanent staff associated with the BESS would be on-site daily. In addition, up to 24 average permanent staff would be required for the operation of the green hydrogen facility, with up to 16 staff members on site each 24-hour period. Off-duty Project operators may be on call to respond to specific alerts generated by the monitoring equipment at the Project site. Security personnel would be on-call. It is anticipated that permanent staff would be recruited from nearby communities in Fresno County. The O&M building would house the security monitoring equipment, including security camera feeds for monitoring the Project 24 hours per day. An equipment list for the O&M phase of the Project is provided in Section 5.7, *Air Quality*.

#### *2.1.6.3 Site Maintenance*

The Project site maintenance program would be largely conducted during daytime hours. Equipment repairs could take place in the early morning or evening when the facility would be producing the least amount of energy.

Maintenance typically would include the following: panel repairs; panel washing; maintenance of transformers, inverters, energy storage system, hydrogen components and other electrical equipment; road and fence repairs; and vegetation and pest management. The Applicant would recondition roads approximately once per year, as needed, such as after a heavy storm event that may cause destabilization or erosion.

Revegetation would be the primary strategy to control dust across the solar facility site. Soil binders would be used to control dust on roads and elsewhere on the solar facility site, as needed. On-site vegetation would be managed to ensure access to all areas of the site, reduce fire risk, and support wildlife habitat. A Vegetation Management Plan is provided in the Biological Resources Assessment (Appendix Q).

Solar panels would be washed as needed (up to four times each year) using light utility vehicles with tow-behind water trailers to maintain optimal electricity production. Periodic rainfall may be sufficient to remove light dust layers, which would reduce the manual washing of panels. No chemical agents would be used for typical panel washing; potential non-toxic cleaning solutions may be occasionally used. Guidance from the panel manufacturer would be followed.

O&M vehicles would include trucks (pickup and flatbed), forklifts, and loaders for routine and unscheduled maintenance and water trucks for solar panel washing. Large heavy-haul transport equipment may be brought to the solar facility infrequently for equipment repair or replacement. No helicopter use is proposed during routine operations although they may be used for emergency maintenance or repair activities.

Long-term maintenance schedules would be developed to arrange periodic maintenance and equipment replacement in accordance with manufacturer recommendations. Solar panels are warrantied for 35 years or longer and are expected to have a life of 50 or more years, with a degradation rate of 0.5 percent per year. Moving parts, such as motors and tracking panel drive equipment, motorized circuit breakers and disconnects, and inverter ventilation equipment, would be serviced on a regular basis, and unscheduled maintenance would be performed as necessary.

#### *2.1.6.4 Drone Use*

Drones may be used to perform annual thermal and visual inspections of the gen-tie line and overhead medium voltage collector line structures. The maximum drone operation heights would be restricted to 300 feet, which is higher than the maximum height of the gen-tie line structures.

Annual visual inspections are required by the North American Electric Reliability Corporation FAC-003-4 Transmission Vegetation Management and utilized for preventative maintenance to reduce risk of equipment malfunction or failure. Drone inspections would be performed once per year between September and November to avoid potential impacts to nesting native and migratory birds. A team of two Federal Aviation Administration (FAA) approved and Unmanned Aircraft System certified pilots would drive a truck on gen-tie line access roads as close to the inspection sites as is safe and feasible, park on the road, and begin the inspection. The drones used would be battery-powered *Matrice 300 RTK* or *Matrice 200 series* drones or similar and would perform the inspections between approximately 76-300 feet above ground level. Operating hours for inspections would be between the hours of 10:00 a.m. and 3:00 p.m. The drone pilots would work in pairs with one flying and one spotting for safety. The use of drones for gen-tie infrastructure inspections would minimize the need for larger vehicles, such as bucket trucks, and no ground disturbance would occur during drone use.

#### *2.1.6.5 Hydrogen Electrolyzer Operations*

The maximum daily average hydrogen production would be approximately 220 metric tons (approximately 243 tons) per day.

The water electrolysis process generates oxygen as a byproduct (8 pounds oxygen per 1 pound hydrogen). Given the Project's remote location, the oxygen would either be vented to the atmosphere, or captured and sold as a byproduct. If the oxygen is to be vented, the facility would be designed to ensure there is no likelihood of high concentrations of oxygen cloud forming or creating a hazard.

Venting of hydrogen on a continuous basis is not considered. However, it is expected that during maintenance and upset conditions (power failure, extreme weather conditions, etc.) hydrogen may be vented into a suitable location, with the vents designed in accordance with local regulations.

All hydrogen electrolyzer facility operation and resultant product production, storage, and transportation would be conducted in accordance with applicable regulations, including Federal Energy Regulatory Commission Statute/Regulation Order No. 841 and U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration CFR-195 Transportation of Hazardous Liquids by Pipeline.

## 2.1.7 Water Supply and Use

### *2.1.7.1 Construction Water*

Construction of the Project would require approximately 1,100 acre-feet of water. Water demand during construction would primarily be related to dust suppression required for site preparation. Temporary sanitary facilities would be provided during construction and would not require an on-site water supply.

### *2.1.7.2 Operational Water and Wastewater Requirements*

During operation, the total annual water supply for the Project would be approximately 1,039 acre-feet per year (AFY) as shown in Table 2-1. Water demand during operation of the Project would be related to the following: washing the solar panels up to four times per year and managing vegetation; conducting water quality treatment and supplying the electrolyzer with water to produce hydrogen via electrolysis, also referred to as “feedstock” water; and supplying O&M facilities and initial landscaping establishment.

The process of electrolysis requires very high-quality feedstock water; therefore, the Project would include an on-site RO system for water quality treatment. The RO system would produce a waste stream consisting of brine high in total dissolved solids, which would require disposal. Several options for brine disposal are currently being considered, including liquid disposal via deep injection well or discharge to land, solid disposal to a landfill, among others (see Section 2.1.9). It is also currently estimated that water quality treatment would result in water losses equivalent to approximately 24 percent (240 AFY) of the inflow water, and is included in the Project’s operational demands. Section 5.13, *Water Resources*, provides additional details regarding the Project’s water requirements.

**Table 2-1 Operational Water Demands**

| Water Use | Demand Over 35 Years (AFY) |
|---|---|
| PV Panel Washing and Vegetation Management | 25 |
| Solar Facility O&M Building and Initial Landscaping Establishment | 10 |
| Alternate Green Hydrogen Facility O&M Building | 4 |
| Electrolyzer Feedstock Water | 1,000 |
| **Total** | **1,039** |

### 2.1.7.3 *Water Quality*

Section 5.13, *Water Resources*, includes a projection of the water quality based on available testing data.

### 2.1.7.4 *Water Treatment*

The Project would include an on-site RO/EDI system for water quality treatment. Section 5.13, *Water Resources*, includes a description of water facilities and infrastructure, including water quality treatment.

### 2.1.7.5 *Water Availability*

Two water supply components are under consideration and include:

- Surface Water Surplus and Storage
- Land Purchase with Water Rights

The water supply scenario ultimately selected for the Project would likely consist of both components working in tandem. These water supply components and the availability of each to meet Project needs is discussed in the Project's Water Supply Assessment in Appendix S.

## 2.1.8 Stormwater and Drainage

The Project would include construction of solar arrays within the majority of the Project site that would be located above grade with a low maintenance mix of native/non-native grassland that would not require substantial supplemental water below the arrays, along with minimal impervious surfaces. The Project site has been modeled for site runoff in a 100-year storm event considering soil and landcover type. Project design includes detention basins placed throughout the Project site to control the rate and amount of stormwater runoff associated with each drainage area. Detailed layout maps for the proposed detention basins are provided in the 2023 Preliminary Drainage Report prepared for the Project (IP Darden I, LLC 2023) and are described in more detail in Section 5.13, *Water Resources*.

## 2.1.9 Waste Management

Wastes produced at the Project site would be properly collected, treated if necessary, and disposed of. Wastes include process wastewater as well as nonhazardous waste and hazardous waste, both liquid and solid. Waste management is discussed below and in more detail in Section 5.11, *Waste Management*.

### 2.1.9.1 *Wastewater Collection, Treatment, and Disposal*

During Project operation, wastewater production would be associated with permanent toilet and sanitary facilities, brine from water quality treatment, and liquid or solid discharges from electrolyzer operation, as summarized below.

- Sanitary facilities would either consist of portable sinks and toilets that would be regularly emptied by a permitted provider, or permanent facilities with an Onsite Wastewater Treatment System (OWTS), subject to oversight and approval by the County of Fresno Public Works and Planning Department.

- Water quality treatment for the electrolyzer facility would generate brine consisting of concentrated salts removed from the raw water supply; the greater the extent of water quality treatment required for a given supply source, the more brine would be produced. It is estimated the Project would generate approximately 240 AFY of brine from water quality treatment processes. If a zero-liquid discharge system is employed, only solid waste would remain and would be disposed of in an appropriate landfill. It is estimated that this process would generate roughly 8 cubic feet per day of solids.
- Electrolyzer processes would generate liquid discharges that would be treated and reused as electrolyzer feedstock to the maximum extent feasible; this may include sending the liquid discharge through the Project's on-site WTP and RO/EDI system for further treatment. The WTP may also include construction and operation of a Class I injection well for wastewater discharge and aquifer recharge.

No wastewater generated through Project operations would be disposed of through discharge directly to open waterbodies.

#### *2.1.9.2 Solid Nonhazardous Waste*

Solid nonhazardous waste would be produced during Project construction and operation. Nonhazardous construction wastes would generally include soil, scrap wood, excess concrete, empty containers, scrap metal, insulation, and sanitary waste. Nonhazardous wastes generated during Project operation would generally include scrap metal, spent solar panels and transformer components, hydrogen generation-components, reverse osmosis membranes and other filtration membranes, water treatment soil/sludge, sanitary waste, and typical refuse generated by workers.

Construction materials would be sorted on-site throughout construction and transported to appropriate waste management facilities. Recyclable materials would be separated from non-recyclable items and stored until they could be transported to a designated recycling facility. Recycling would be in accordance with applicable California state requirements. Wooden construction waste (such as wood from wood pallets) would be sold, recycled, or chipped and composted. Other compostable materials, such as non-invasive vegetation, may also be composted off-site.

Non-hazardous construction materials that cannot be reused or recycled would likely be disposed of at a Class II/III landfill. All contractors and workers would be educated about waste sorting, appropriate recycling storage areas, and how to reduce landfill waste.

Waste management is discussed further in Section 5.11, *Waste Management*.

#### *2.1.9.3 Hazardous Wastes*

Hazardous waste would be produced during Project construction and operations. Hazardous construction wastes generally include small amounts of waste oil, solvents, detergents, fuels, oily rags/sorbents, and empty hazardous material containers. Hazardous wastes generated during operations generally include small amounts of waste oil, solvents, detergents, fuels, oily rags/sorbents, and spent batteries.

Several methods would be used to properly manage and dispose of hazardous wastes. In general, hazardous waste and electronic waste would not be placed in a landfill, but rather would be stored on-site for less than 90 days and would be transported to a treatment, storage, and disposal facility by a licensed hazardous waste transporter. Waste lubricating oil would be recovered and recycled by a waste oil recycling contractor. Spent lubrication oil filters would either be recycled or disposed of in a Class I landfill. Workers would be trained to handle hazardous wastes generated at the site. Chemical cleaning wastes would be temporarily stored on-site in portable tanks or sumps and disposed of off-site by an appropriate contractor in accordance with applicable regulatory requirements.

Hazardous materials management is further discussed in Section 5.9, *Hazardous Materials Handling*, and Section 5.11, *Waste Management*.

## 2.1.10 Management of Hazardous Materials

A variety of chemicals would be stored and used during the construction and operation of the Project. The storage, handling, and use of all chemicals will be conducted in accordance with applicable laws, ordinances, regulations, and standards. Chemicals would be stored in appropriate chemical storage facilities. Bulk chemicals would be stored in storage tanks, and most other chemicals would be stored in returnable delivery containers. Chemical storage and chemical feed areas would be designed to contain leaks and spills. Containment pits and drain piping design would allow a full-tank capacity spill without overflowing the containment area. For multiple tanks located within the same containment area, the capacity of the largest single tank would determine the volume of the containment area and drain piping with an allowance for rainwater if applicable. Drain piping for reactive chemicals would be trapped and isolated from other drains to eliminate noxious or toxic vapors.

Personnel would use approved personal protective equipment during chemical spill containment and cleanup activities. Personnel would be properly trained in the handling of these chemicals and would be instructed in the procedures to follow in case of a chemical spill or accidental release. Adequate supplies of emergency response equipment including absorbent material would be stored on-site for spill cleanup. Also refer to Section 5.10, *Worker Safety*.

A list of the chemicals anticipated to be used on the Project site and their storage locations is provided in Section 5.9, *Hazardous Materials Handling*.

## 2.1.11 Fire Protection

Fire protection would be provided to limit the risk of personnel injury, property loss, and possible disruption of the electricity generated by the Project. As discussed in Section 5.10, *Worker Safety*, a Fire Protection and Prevention Plan will be implemented during both Project construction and operations. In addition, fire protection as it pertains to the Project components are discussed below.

### Solar Facility

Solar arrays and PV panels are fire-resistant, as they are constructed largely of steel, glass, aluminum, or components housed within steel enclosures. As the tops and sides of the panels are constructed from glass and aluminum, PV panels are not vulnerable to ignition from wildland fires. In a wildfire situation, the panels would be rotated and stowed in a panel-up position. The rotation of the tracker rows would be controlled remotely via a wireless local area network. All trackers could be rotated simultaneously in a hazard situation. During construction, standard defensible space requirements would be maintained surrounding any welding or digging operations.

### O&M Facilities

Fire safety and suppression measures, such as smoke detectors and extinguishers, would be installed and available at O&M facilities, in accordance with current CFC.

### Battery Energy Storage System

The BESS enclosures are outdoors and are not “walk-in” cabinets; therefore, fire suppression is not required by the CFC. The BESS megapacks would be designed and in compliance with National Fire Protection Association (NFPA) Section 855. A hazard mitigation analysis developed by the BESS manufacturer will be provided to the local authorities and will comply with California Codes 1207.1.4.1 and 1207.1.4.2.

### Green Hydrogen Facility

Pure hydrogen is considered a fire risk as it is both highly flammable and also highly explosive. The hydrogen facility would be designed and operated in compliance with applicable standards, such as NFPA 2 and Hydrogen Technologies Code. The Project team would coordinate with the local fire department and follow all applicable detection and suppression requirements in the local fire code and hydrogen-specific fire code. Additionally, the Applicant has prepared a Fire Protection Philosophy for the green hydrogen facility, which provides for fire prevention, active fire protection, fire and gas detection and alarm systems, and personnel safety measures. The Fire Protection Philosophy is included in Appendix P.

## 2.1.12 Emergency Power

Up to six self-contained emergency backup diesel generator sets (genset) would supply emergency power to the hydrogen facility for all critical loads when electric power is not available. Each of the six gensets would have two engines with approximately 670.5 horsepower per engine.[3]

## 2.1.13 Auxiliary Systems

### *2.1.13.1 SCADA and Telecommunications Facilities*

The facility would be designed with a comprehensive Supervisory Control and Data Acquisition (SCADA) System to allow remote monitoring of facility operation and/or remote control of critical components. The fiber optic or other cabling required for the monitoring system typically would be installed in buried conduit within the access road or planned trenching leading to a SCADA system cabinet at the on-site step-up substation for the Project site or a SCADA system cabinet within the O&M building. External telecommunications connections to the SCADA system cabinets could be provided through wireless or hard-wired connections to locally available commercial service providers.

The Project’s SCADA system would interconnect to an external fiber optic network or fixed wireless service at the on-site step-up substation, and would require installation of buried fiber optic cables underground or fixed wireless antennas. External telecommunications connections to the SCADA system cabinets could be provided through wireless or hard-wired connections to locally available

[3] The Project would include six emergency diesel-fired engines to maintain critical loads in the event of a loss of power. These engines are expected to operate less than 100 hours per year for reliability testing and maintenance and would not operate concurrently during testing. They would only otherwise operate in an emergency requiring operation of the critical facility loads when electric power is not available. This emergency backup equipment does not need to operate for the facility to function during normal operation.

commercial service providers, so no additional disturbance associated with telecommunications is anticipated. As such, the Project would not require any substantial construction efforts regarding telecommunications facilities and structures. No relocation of existing telecommunication structures would occur.

### 2.1.14 Cooling System

The green hydrogen facility would include a cooling system. The proposed cooling strategy is to use a closed loop dry cooling system where the water and glycol mixture is used as a cooling fluid. The process stream (hydrogen, water or any other stream which needs to be cooled down) is cooled by the cooling fluid by direct contact in exchangers. The heat from the cooling fluid is then rejected to atmosphere by pumping the cooling fluid through rows of finned tubes that have air blown across them. The cooling system would not discharge to surface waters.

### 2.1.15 Fuel Types, Handling, and Use Scenarios

The Project does not require the use of fossil fuels during normal operations, with the exception of diesel that would be used for the emergency backup generators and fueling equipment. Diesel would be stored in an above ground storage tank in compliance with federal, state and local rules and regulations. Also refer to Section 5.9, *Hazardous Materials Handling*.

### 2.1.16 Safety

The Project would be designed to maximize safe operation. Potential hazards could occur during both Project construction and operation. Facility operators would be trained in safe operation, maintenance, and emergency response procedures to minimize the risk of personal injury and damage to the facilities. Section 5.10, *Worker Safety*, provides a hazards analysis and describes Project training and safety programs.

### 2.1.17 Generation Site and Facilities Selection

The Project site and components were selected taking into consideration engineering constraints, site geology, environmental impacts, water, waste and fuel constraints, and electric transmission constraints, among other factors. The Project site was selected in furtherance of the project objectives. The site selection criteria are discussed in detail in Chapter 6, *Alternatives*.

## 2.2 Transmission and Interconnection Description, Design, and Operation

The Project would be interconnected with the regional electrical grid by a new 500 kV gen tie-line with the route up to 15 miles in length and a corridor width of up to 275 feet. The final placement of the corridor and poles would be within the easements and based on engineering considerations including geotechnical results and existing infrastructure (roads, agricultural facilities, utilities, etc.). In general, the 500 kV line runs west from the Project across privately owned lands, across Interstate 5, and into the new utility switchyard, as shown in Figure 2-2. Figure 2-3a through Figure 2-3h at the end of this chapter provide a map of the proposed gen-tie route and existing transmission lines within 1 mile of the Project. There are no settled areas, parks, recreational areas, or scenic areas within one mile of the Project; therefore, these are not shown on the maps. Section 5.5, *Visual Resources*, provides photographic simulations of the project. The design details upon which the photographic simulations are based are located in Appendix F.

**Figure 2-3a Existing Transmission Lines Within 1 Mile of the Project Site Overview**

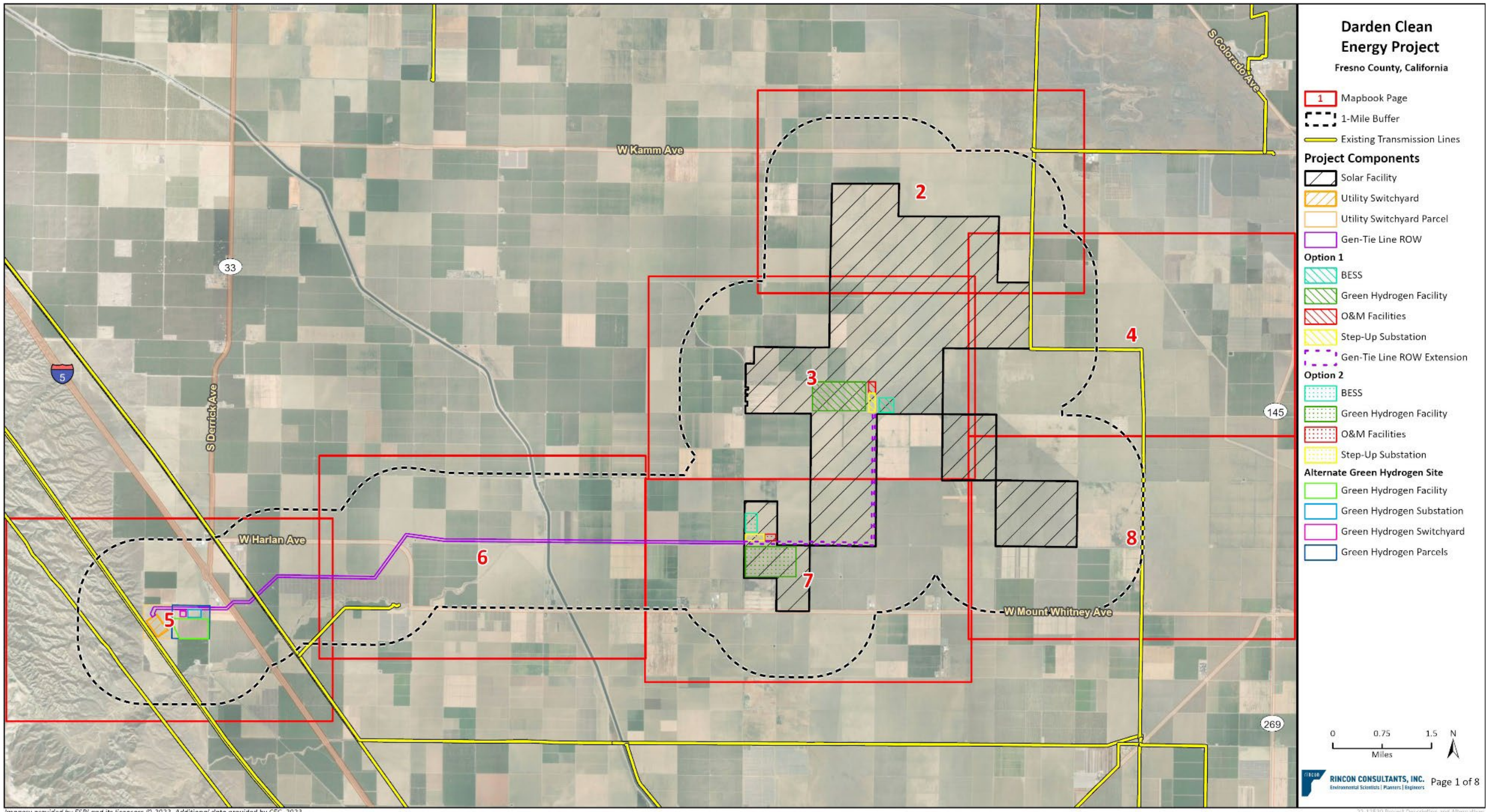


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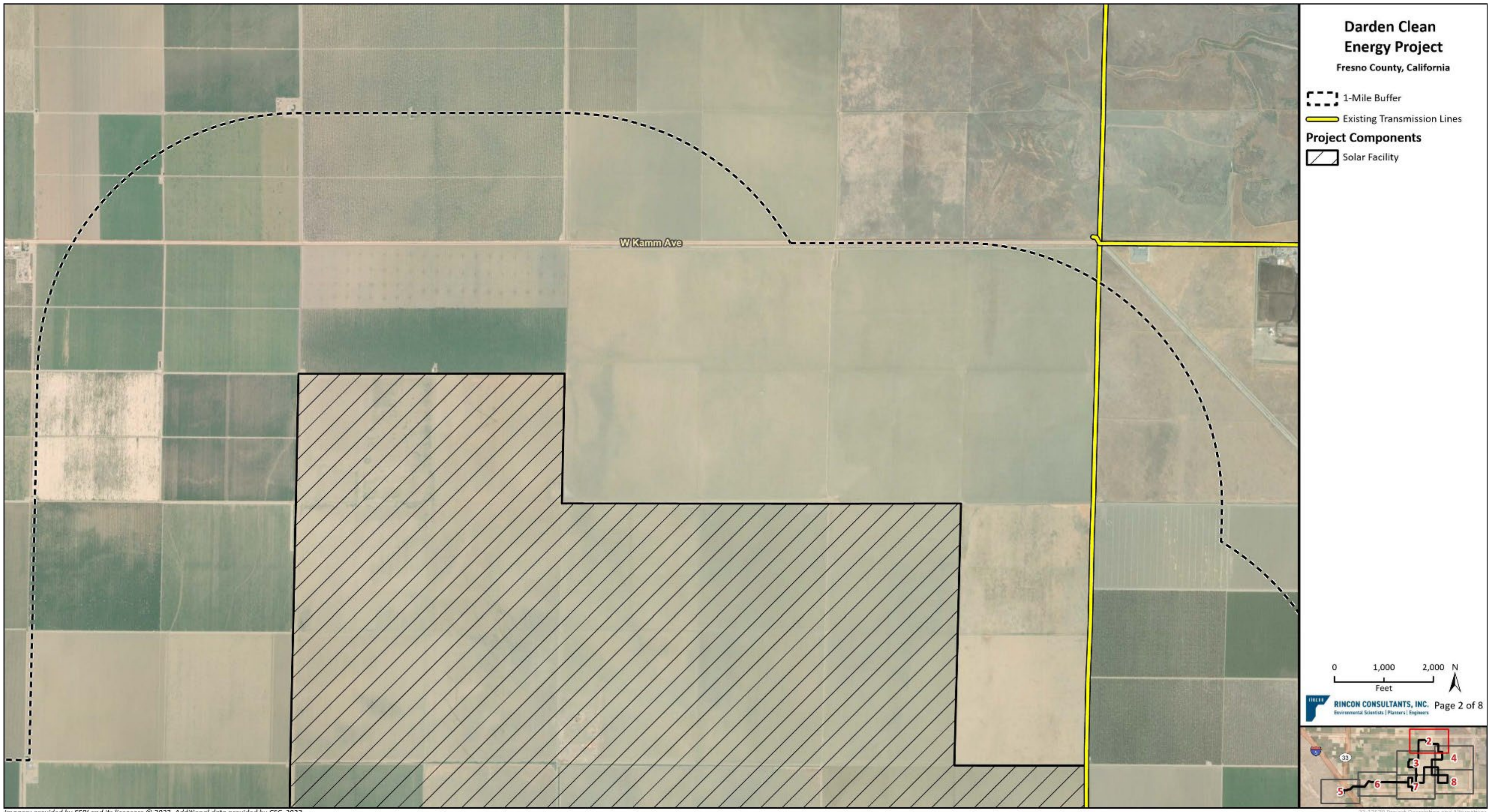
**Figure 2-3b Existing Transmission Lines Within 1 Mile of the Project Site (Mapbook Page 2)**

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## Figure 2-3c Existing Transmission Lines Within 1 Mile of the Project Site (Mapbook Page 3)

**Figure 2-3d Existing Transmission Lines Within 1 Mile of the Project Site (Mapbook Page 4)**

**Figure 2-3e Existing Transmission Lines Within 1 Mile of the Project Site (Mapbook Page 5)**

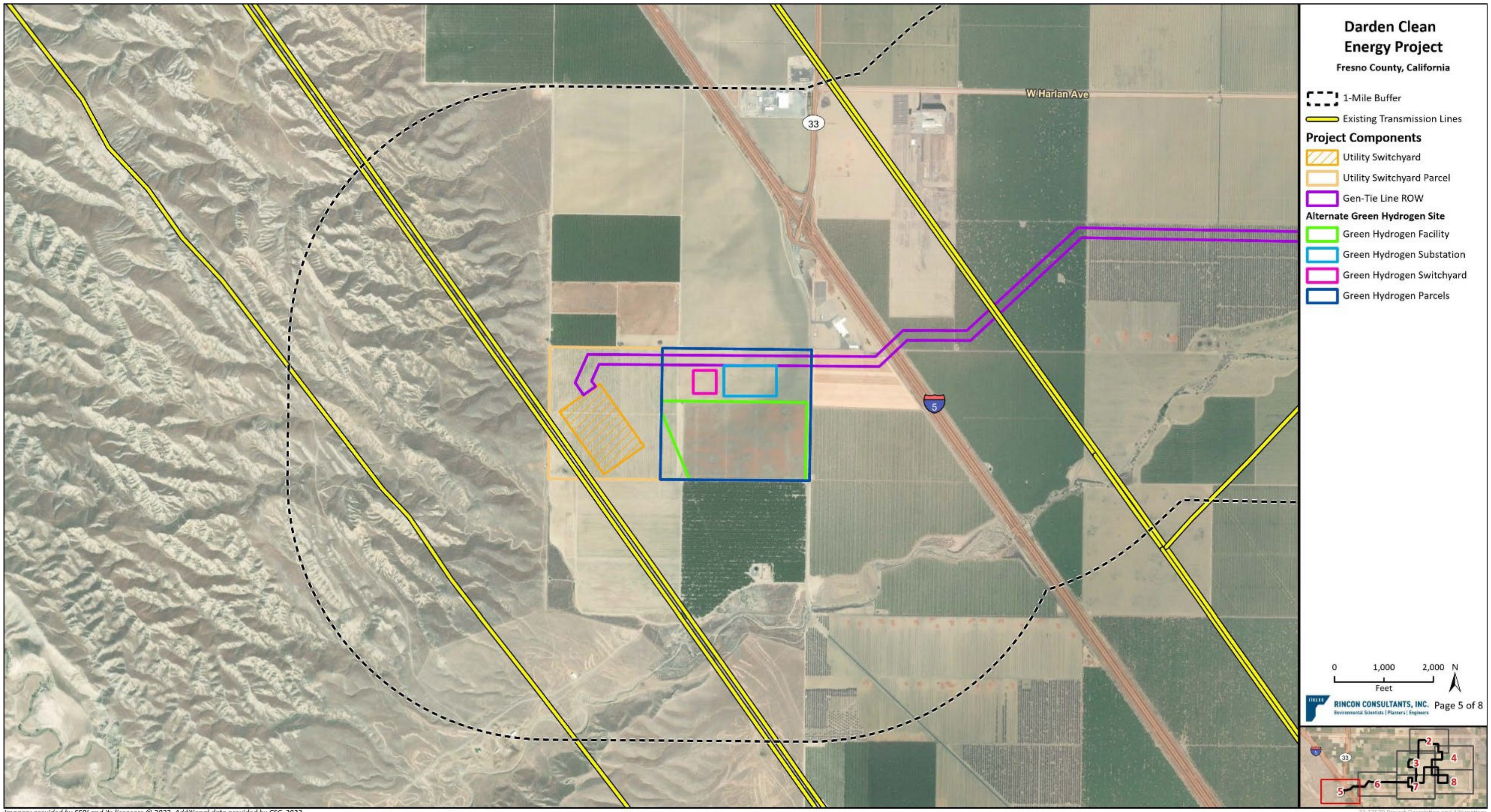


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**Figure 2-3f Existing Transmission Lines Within 1 Mile of the Project Site (Mapbook Page 6)**

**Figure 2-3g Existing Transmission Lines Within 1 Mile of the Project Site (Mapbook Page 7)**

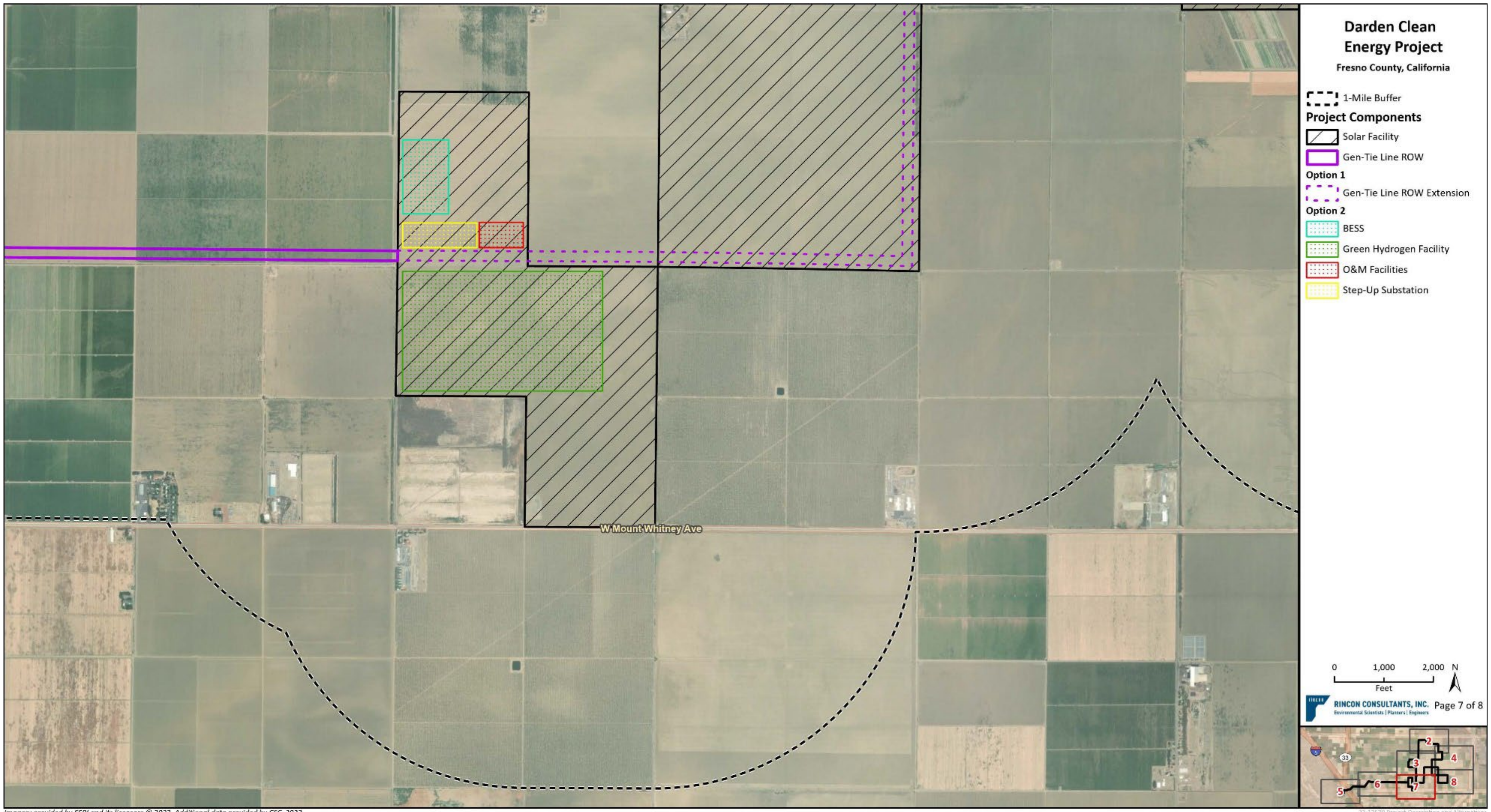


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**Figure 2-3h Existing Transmission Lines Within 1 Mile of the Project Site (Mapbook Page 8)**


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### 2.2.1 Affected Systems

The Project would interconnect to PG&E's transmission system within the California Independent System Operator (CAISO) planning area. CAISO has identified four potential Affected Systems from the QC14 Phase I Interconnection Study: CCSF, CDWR, MID, and WAPA-SNR.

The Applicant has contacted all four potential affected systems as of August 2023. Determination of impacts and associated resolutions/agreements with potential affected systems cannot be kicked off until CAISO completes and publishes the QC14 Phase II Interconnection study, which is on track for early December 2023. Once this information is available, conversations with the four identified systems will resume. If CAISO’s interconnection studies indicate that the Project would affect any other systems, the Applicant would conduct a subsequent study to determine how to mitigate those effects.

### 2.2.2 Generation-Intertie Description

The interconnecting 500 kV transmission circuit would consist of a single-circuit configuration constructed overhead. The gen-tie line would be constructed with either monopole tubular steel poles (TSPs) or steel H-frame structures. Gen-tie structures would be at least 120 feet tall, with a maximum height of 200 feet. There would be a total of approximately 80 monopole or H-frame structures, in addition to dead-end structures. The total number of gen-tie structures would be determined by the final design of the gen-tie line. The Project transmission facilities would be designed consistent with the *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (Avian Power Line Interaction Committee [APLIC] 2006) where feasible. Transmission facilities would also be evaluated for potential collision reduction devices in accordance with *Reducing Avian Collisions with Power Lines: The State of Art in 2012* (APLIC 2012).

### 2.2.3 Step-Up Substation

The step-up substation (Option 1 or Option 2 sites) would step up the medium voltage of the PV collector system from 34.5 kV to 500 kV. The step-up substation would be located on approximately 20 acres within the solar facility, as shown in Figure 2-2. The step-up substation would terminate the medium voltage solar feeders to several common medium voltage busses and transform the power at these busses to the high voltage required for transmission on the gen-tie line to the utility switchyard.

The internal arrangements for the step-up substation would include:

- Eight power and auxiliary transformers with foundations
- Prefabricated control building(s) to enclose the protection and control equipment, including relays and low voltage switchgear (each building measuring is approximately 20 feet by 80 feet, and 10 to 20 feet high)
- Metering stand
- Capacitor bank(s)
- Nine 500 kV circuit breakers and disconnect switches
- Up to two microwave towers, approximately 18 feet by 18 feet and up to 200 feet tall, mounted with an antenna up to 15 feet in diameter
- Dead-end structure(s) up to 100 feet in height to connect the step-up substation to the grid

Two locations (Option 1 and Option 2) are currently being considered for the step-up substation. A preferred location will be selected based on results of the geotechnical study, and further detailed analysis and design of the gen-tie line and medium voltage collection network.

Option 1 is centrally located within the solar facility. This option increases the length of the gen-tie, by approximately four miles but reduces the average length of the medium voltage (34.5 kV) collection lines that bring power from the panels to the substation. Option 1 reduces the footprint of the medium voltage collection system, has a more efficient site footprint, and reduces electrical losses.

Option 2 is located in the southwest corner of the solar facility and was selected to minimize the gen-tie length. This is a more common approach with solar projects since a longer gen-tie is often much more costly than extending the collection lines. However, given the large area of this Project site, as well as the difference in electrical efficiency transmission between 34.5 kV and 500 kV, the more traditional layout may not be optimal.

### 2.2.4 Alternate Green Hydrogen Substation

If the alternate green hydrogen facility site is selected, the Project would include construction and operation of a dedicated green hydrogen substation. This substation would be located on approximately 15 acres adjacent to the alternate green hydrogen facility on the west side of the Project site (Figure 2-2).

The internal arrangements for the alternate green hydrogen substation would be similar to the Project step-up substation and would include:

- Up to eight power and auxiliary transformers with foundations
- Prefabricated control building(s) to enclose the protection and control equipment, including relays and low voltage switchgear (each building measuring is approximately 20 feet by 80 feet, and 10 to 20 feet high)
- Metering stand
- Capacitor bank(s)
- Nine 500 kV circuit breakers and disconnect switches
- Dead-end structure(s) up to 100 feet in height to connect the step-up substation to the grid

### 2.2.5 Alternate Green Hydrogen Switchyard

If the alternate green hydrogen site is selected, the Project would also include construction and operation of a green hydrogen switchyard on approximately 5 acres on the west side of the Project site (Figure 2-2). The alternate green hydrogen switchyard would consist of up to three 500 kV circuit breakers, associated high voltage switches, and steel structures, including A-frames, which would be up to 120 feet in height.

### 2.2.6 Utility-Owned High-Voltage Switchyard Description

The Applicant’s objectives for the utility-owned switchyard are to construct a high-voltage electrical interconnection facility to enhance the capacity of the transmission system and allow for the delivery of wholesale renewable electricity to the statewide grid, on behalf of the regulated utility.

#### 2.2.6.1 Utility Switchyard Facility Components

One utility-owned switchyard would be located on approximately 40 acres and would electrically connect the Project generation onto the utility's 500 kV transmission network. As shown in Figure 2-2, the utility switchyard would be located on the west side of the Project and serve as a termination point for the Project gen-tie and would loop into the Los Banos-Midway #2 500 kV transmission line. The utility switchyard would utilize high-voltage circuit breakers, switches, and series capacitor line compensation equipment in a breaker-and-a-half (BAAH) configuration and would be designed and constructed in alignment with the interconnecting utility's standards.

The tallest structure at the switchyard would be the dead-end structures, which would be up to 175 feet above grade and would terminate the 500 kV gen-tie and utility 500 kV transmission lines.

Structural components in the switchyard area would include:

- One 140-foot-tall free-standing digital microwave antenna (radio tower) to support SCADA communication between the switchyard and the off-site PG&E Operations Center
- Series capacitor banks (sizing to be determined by utility requirements)
- Ten 500 kV steel A-frame dead-end poles up to 150 feet in height with foundations up to 20 feet deep or more
- Ten 500 kV steel H-frame dead-ends poles up to 150 feet in height with foundations up to 20 feet deep or more
- Busbar (a conducting bar that carries heavy currents to supply several electric circuits)
- Modular protection automation and control (MPAC) building(s) approximately 150 feet by 25 feet by 12 feet tall for PG&E's substation control and protection equipment; MPAC building would be installed on a concrete foundation
- Switchyard battery enclosure area(s) approximately 34 feet by 16 feet by 12 feet tall
- Five 500 kV circuit breakers and air disconnect switches
- On-site stormwater retention pond (approximately 1,000 feet by 100 feet) for temporary run-off storage during rainfall events
- Chain-link or similar security fencing up to 8 feet tall and two separate access gates plus one personnel gate

#### 2.2.6.2 Utility Switchyard Operations

At the completion of the switchyard, ownership would transfer to PG&E, who would assume responsibility for operation of the switchyard. It is anticipated that the switchyard would be remotely operated and maintained within PG&E's existing O&M program.

### 2.2.7 Transmission Facilities Selection

The selection process for transmission facilities also followed the process described in Section 2.1.17. In addition, the gen-tie route selected was the shortest possible distance connecting the Project site area to the Point of Interconnection through parcels with landowners who were interested in entering into easement agreements. Where possible, the gen-tie would abut existing roads and parcel boundaries, as well as circumvent existing landowner permanent infrastructure. All major infrastructure that the gen-tie crosses (Interstate 5, California Aqueduct, high voltage utility transmission lines) would be done so as close to perpendicular as possible. Existing land use activities within the gen-tie easement areas are consistent with the overall region; therefore, minimizing the distance of the line best reduces the overall environmental impact.

Project step-up substations are typically located to minimize the gen-tie length; the Option 2 step-up substation location options accomplishes this goal. However, due to the scale of this Project, preliminary design and engineering indicates that a centrally located substation (such as the Option 1 step-up substation location) reduces the footprint of the medium voltage collection lines, has a more efficient site footprint, and reduces electrical losses.

The proposed utility switchyard location is adjacent to the existing PG&E Los Banos-Midway #2 500 kV line and other existing transmission lines, which the Project, as well as future projects, would tie into.

## 2.3 Project Construction

This section describes construction of the overall Project, including the generating facility components and transmission components. Construction of the Project is anticipated to take 18 to 36 months to complete. Construction would begin in late 2025 or early 2026 and the Project would be operational by 2027 or 2028. The 36-month duration would require a peak workforce of approximately 1,200 and the 18-month duration would require a peak workforce of approximately 1,500. Construction would typically occur Monday through Friday from 6:00 a.m. to 7:00 p.m., but may occur seven days a week if necessary. Table 2-2 below includes the anticipated construction phases and dates for each of the construction scenarios.

**Table 2-2 Preliminary Construction Schedules**

| | 18-Month | | | 36-Month | | |
|---|---|---|---|---|---|---|
| Phase | Start | End | Days | Start | End | days |
| Phase 1: Site Preparation | 12/31/2025 | 4/30/2026 | 90 | 12/31/2025 | 7/31/2026 | 140 |
| Phase 2: PV Panel System | 2/28/2026 | 6/28/2027 | 320 | 5/31/2026 | 6/30/2028 | 500 |
| Phase 3: Inverters, Transformers, Substation, and Electrical | 5/28/2026 | 3/28/2027 | 200 | 5/30/2027 | 5/30/2028 | 240 |
| Phase 4: Gen-Tie | 1/30/2026 | 6/30/2026 | 100 | 11/30/2027 | 5/30/2028 | 120 |
| Phase 5: BESS Facility | 10/28/2026 | 4/28/2027 | 120 | 1/30/2028 | 9/30/2028 | 160 |
| Phase 6: Green Hydrogen Facility | 9/28/2026 | 4/28/2027 | 140 | 2/29/2028 | 12/29/2028 | 200 |
| Phase 7: Utility Switchyard | 2/28/2026 | 11/28/2026 | 180 | 5/31/2026 | 3/31/2027 | 200 |

The following sections describe the construction methods and activities for the major Project components.

### 2.3.1 Solar Facility and Step-Up Substation Construction Methods and Activities

The PV panels would be manufactured at an off-site location and transported to the Project site. The structures supporting the PV panel arrays would consist of steel piles (e.g., cylindrical pipes, H-beams, or similar) driven into the soil using pneumatic techniques, similar to a hydraulic rock hammer attachment on the boom of a rubber-tired backhoe excavator. The piles typically are spaced 18 feet apart. Piles typically would be installed to a reveal height of approximately 4 to 6 feet above grade. Following pile installation the associated motors, torque tubes, and drivelines (if applicable) would be placed and secured. Some designs allow for PV panels to be secured directly to the torque tubes using appropriate panel clamps. A galvanized metal racking system, which secures the PV panels to the installed foundations, may be field-assembled and attached according to the manufacturer's guidelines.

DC lines from PV sub-arrays would be installed in conduits. The lines would be collected and combined and routed to the inverters to be converted to AC and stepped up to 34.5 kV via a pad mount transformer. Within the sub-arrays this wiring would typically be hung from the racking equipment. Final sections would be connected to the inverters via an underground stub.

Electrical inverters would be placed on steel skids, elevated as necessary with steel piles to allow for runoff to flow beneath the inverter structures.

Medium-voltage (34.5 kV) cabling from the inverters to the step-up substation (Section 2.2.2) would be installed either primarily underground, or overhead along panel strings in a CAB3 system to avoid the need for underground cabling and trenching, where required. At the end of panel strings, cables would be combined and routed overhead on wood poles roughly 30 to 50 feet high, depending on voltage. Trenches for the 34.5 kV collector lines would be run from the inverters to the on-site step-up substation.

Underground cables would be installed using direct bury equipment and/or ordinary trenching techniques, which typically include a rubber-tired backhoe excavator or trencher. An underground 34.5 kV line would likely be buried at a minimum of 36 inches below grade but could go as deep as 6 feet and include horizontal drilling to avoid environmental resources. Shields or trench shoring would be temporarily installed for safety to brace the walls of the trench, if required based on the trench depth. After the excavation, cable rated for direct burial would be installed in the trench, and the excavated soil would be used to fill the trench and compress to 90 to 95 percent maximum dry density or in accordance with final engineering.

As shown in the site plan (Appendix F), the Project would achieve a minimum 50-foot buffer to adjacent properties by excluding structural improvements and equipment (excluding fencing) from within 50 feet of the outside boundary of the Project site, in accordance with the Fresno County Solar Facility Guidelines. On-site stormwater detention and treatment systems would be designed to limit stormwater-related erosion onto adjacent properties, consistent with County and State Water Resources Control Board requirements and a Pest Management Plan would be implemented to minimize the likelihood of pests (including weeds and rodents) that could impact the Project site and adjacent properties.

Construction of the O&M building and distribution line connection would likely be part of the solar facility development in tandem with the PV panel installation. The site of the O&M building would be cleared and graded, followed by installation of a concrete foundation.

### 2.3.2 Battery Energy Storage System Construction Methods and Activities

The BESS must be nearly level; therefore, the proposed BESS area would be cleared and graded. Site preparation would also include construction of drainage components to capture and direct stormwater flows around the BESS facility. Once the concrete foundations are in place for the BESS, the batteries, inverters, and other electrical equipment would be mounted and installed. Equipment would be delivered to the site on trucks.

### 2.3.3 Green Hydrogen Facility Construction Methods and Activities

The hydrogen facility would be cleared of vegetation and graded, as the facility must be nearly level. Site preparation activities would also include construction of drainage components to capture and direct stormwater flow around the facility. Once the concrete foundations are in place for the facility, the electrolyzer(s), WTP, RO systems, compression or liquefaction facilities (if needed), and other electrical equipment would be mounted and installed. Equipment would be delivered to the site on trucks.

### 2.3.4 Gen-tie Construction Methods and Activities

For the overhead 500 kV line, TSP foundations would be excavated to an average depth of up to 40 feet. Installation would consist of the following basic steps:

- Deliver new poles to installation sites
- Auger new hole using line truck attachment to a depth of up to 40 feet and include concrete supports depending on final engineering
- Pour concrete foundation
- Install bottom pole section by line truck, crane, or helicopter
- Install top pole section(s) by line truck, crane, or helicopter, if required

Once poles are erected, the 500 kV conductor would be strung generally using a wire truck, crane and/or helicopter, splicing rig and puller from conductor pull and tension sites at the end of the power line. Each conductor would be pulled into place at a pre-calculated sag and then tension-clamped to the end of each insulator using sag cat and static truck/tensioner equipment. The sheaves and vibration dampers and accessories would be removed once installation is complete.

Helicopters are anticipated to be used for wire stringing activities including hanging travelers, pulling conductor and optical ground wire, dead-end activities, and the installation of bird diverters. Alternative ground-based construction activities may be utilized as appropriate. There would be one Helicopter Landing Zone (HLZ) located in the 20-acre step-up substation laydown yard. A water truck would be on-site to water the HLZ prior to helicopter activities to prevent fugitive dust from rotor wash. Helicopter refueling would be done within the HLZ from a construction vehicle equipped as a fuel truck. Refueling would occur at one of the nearest local airports, between 2 (Five Points Ranch Airport) and 10 miles away (San Joaquin Airport), where the helicopter would be hangered overnight, before and/or after each day the helicopter is utilized. While the helicopter may land briefly within approved, existing disturbed areas on the gen-tie line to pick up equipment, materials, or personnel, no helicopter refueling would occur on private land. Helicopter activities would occur over a temporary two-month period and would occur within the typical construction hours Monday through Friday 6:00 a.m. to 7:00 p.m. A full-time avian monitor would be on-site for the full duration of helicopter activities to specifically monitor helicopter activities.

The helicopter contractor selected for helicopter operations would abide by all requirements in the Helicopter Use Plan prepared for the Project. All aircraft, pilots, linemen, and mechanics would be in full compliance with applicable Federal Aviation Administration (FAA) requirements and standards. The helicopter crew would be comprised of a qualified pilot, mechanic, and lineman required for Project activities. All linemen would be experienced journeyman lineman and would be Quanta H certified to perform tasks from the helicopter via Human External Cargo and/or from the helicopter skid. The helicopter contractor would utilize an MD-500 helicopter capable of performing light lift and other construction support operations. The flight crew would utilize very high frequency radios to communicate with the selected airport's common traffic frequency as well as ground crews within the Project and HLZs. All helicopters are equipped with geographic positioning system tracking units via Spidertracks, to track helicopter flight paths.

No helicopter use is proposed during routine operations although they may be used for emergency maintenance or repair activities.

### 2.3.5 Utility Switchyard Construction Methods and Activities

The utility switchyard area would be graded and compacted to an approximately level grade. Concrete pads would be constructed on site as foundations for switchyard equipment, and the remaining area would be graveled to a maximum depth of approximately 12 inches. The switchyard would be surrounded by a chain-link perimeter fence in accordance with utility standards. Each of the dead-end structures would require foundations excavated to a depth of 20 feet or more.

### 2.3.6 Commissioning

Often thought of as the last phase of the construction process, once the site is completely built, the Project would go through a commissioning phase that entails energization and testing before full site operation. Commissioning of equipment would include testing, calibration of equipment, and troubleshooting. The step-up substation equipment, inverters, collector system, and PV array systems would be tested prior to commencement of commercial operations. Upon completion of successful testing, the equipment would be energized. The Project may go through commissioning in phases as sections are completed. During commissioning staff members would be driving the site performing energization procedures and troubleshooting bugs to ensure the overall health and safety of the site. Typically, heavy equipment and large crews are not needed at this point, unless repairs or part replacements are required.

## 2.4 Applicant Proposed Measures

The Project also includes implementation of the following applicant proposed measures (APM) that would avoid or minimize potential environmental impacts.

#### *APM BIO-1 Swainson's Hawk Conservation Strategy*

The Swainson's Hawk Conservation Strategy developed for the Project (Rincon 2023a; Appendix V) includes the following measures to minimize impacts to Swainson's hawk:

During construction and some O&M activities, temporary disturbance buffers will be established to minimize disruption to nesting Swainson's hawk. Smaller disturbance buffers are proposed for those activities that are substantially similar to agricultural activity that has been occurring at the project site (e.g., site preparation work that would be similar to harvesting and disking). Alternatively, larger disturbance buffers are proposed for activity that differs substantially from that of agricultural activity (e.g., pile driving and other high-decibel construction activity). Construction activity has been further categorized by the duration of time spent within proximity (as defined by the associated buffer) to a nest and assigned an intensity level (low, medium, heavy) to each definable construction activity. The following outlines proposed disturbance buffers for each **intensity** at each **duration** for construction-related and O&M-related activity (see Table 2-3 for categories of construction activity intensity and see Table 2-4 for temporary construction buffers). Work completed outside the 0.25-mile buffer of an active nest would require no monitoring. All work conducted outside of reduced buffers, but within 0.25 miles of an active nest would be monitored by a Qualified Biologist to ensure work activity will not causing a disruption to Swainson's hawk normal behavior. Biological monitoring for any given activity can be reduced or discontinued once it can be demonstrated that the hawks are not disturbed by the activity.

### Categories of Construction Activity Duration:

Short: Less than 2 hours

Medium: Less than 1 day

Long: 2 days to 2 weeks

Extended: More than 2 weeks

**Table 2-3 Categories of Construction Activity Intensity**

| Heavy | Medium | Low |
|---|---|---|
| Aerial lift | Excavation (backhoe) | Geotech |
| Crane work | Grading (grader) | Hand work (shovel, rake, etc.) |
| Helicopter | Boring/drilling | Surveying |
| Pile driving | Clearing (mower/roller) | Staking |
| | Hauling (tractors, loaders, forklift) | Water truck |
| | Loaders (piles) | General travel (Trucks, trailers, UTV) |
| | Welding | |
| | Trenching | |

**Table 2-4 Temporary Construction Buffers (feet)**

| | | Construction Activity Intensity | | |
|---|---|---|---|---|
| | | Low | Moderate | Heavy |
| Construction Activity Duration | Short | 50' | 100' | 150' |
| | Medium | 100' | 250' | 600' |
| | Long | 150' | 500' | 1,000' |
| | Extended | 250' | 750' | 1,320' |

The conservation strategy will further minimize any impacts through the following conservation actions:

- Preservation of existing nest trees
- Temporary nest structure establishment
- Establishment of new nest trees
- Habitat restoration and promotion of prey species through implementation of a Vegetation Management Plan (Rincon 2023b)
- Pre- and Post Construction research program designed to evaluate habitat management practices and evaluate conservation strategy success criteria

## 2.5 References

Avian Power Line Interaction Committee. 2006 *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006.* Available at https://www.nrc.gov/docs/ML1224/ML12243A391.pdf (Accessed November 2023)

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