4. Project Description

Pacific Gas & Electric Company (PG&E) is proposing to build a new 115/12 kilovolt (kV) distribution substation in the Fulton-Fitch Mountain Distribution Planning Area (DPA).[1] The Windsor Substation would provide a capacity increase of 89.1 megawatts (MWs) at ultimate build-out. The proposed substation site is on Old Redwood Highway in the Town of Windsor in Sonoma County, six miles from the existing Fulton Substation and three miles from the existing Fitch Mountain Substation. The Windsor Substation would step-down power from 60 kV to 12 kV for local distribution. In addition to constructing and operating the substation, PG&E would improve its 12 kV distribution system in the project area. In the future, the substation would be upgraded to 115 kV from the initial 60 kV, and the step-down would be from 115 kV to 12kV. See Figure 4-1 for a Project Overview Map and Figure 4-2 for a Proposed Substation Site Aerial Map. (All figures are found in Appendix C.) The proposed project would include the major activities described in Section 1.2 above.

As demand increases for electric power in the future, additional equipment would be installed at the substation and conductors would be installed in the conduits constructed as part of the proposed project. The substation would be designed and built to accommodate the future equipment; therefore, limited construction would be required for the future upgrades. Because the existing Fulton No. 1 60 kV line was built to 115 kV standards, only minor changes at the Windsor Substation would be required to establish the 115 kV circuit. At the time of the transmission line upgrade, the Windsor Substation 60 kV transformer would be replaced with a 115 kV transformer. PG&E anticipates a new transformer bank would be installed every five to 10 years after the installation of the preceding bank. New distribution circuits would be installed after each new bank is installed and would occur over several years. The specific equipment required for the fully constructed three-bank substation is outlined in Section 4.9 (Project Components). The locations of the proposed substation and distribution line upgrades are shown in Figure 4-3.

The proposed Windsor Substation would be located on a 4.11-acre privately-owned parcel. The site is zoned Service Commercial (SC), and it contains asphalt paving and concrete foundations from a previous structure. Currently, 3.83 acres of the 4.11-acre parcel are fenced. The permanent fenced footprint of the substation would be approximately 2.6 acres. The north, east, and west sides of the substation would be bordered by 10-foot tall prefabricated perimeter walls. The south side would be enclosed by a chain-linked fence. During construction, the entire 4.11-acre site would be used for parking and for lay down and staging of construction materials and equipment; no additional lay down areas would be required outside of the property.

The proposed project would include work outside of the substation footprint:

- Access to the substation property would be from Old Redwood Highway and Herb Road (public section). Pole replacement and line work would occur along Old Redwood Highway, Starr Road, and Gumview Road
- An existing wood pole on the Fulton No. 1 60 kV Power Line located across the railroad tracks west of the Windsor Substation site would be replaced with a new tubular-steel pole (TSP).
- Underground distribution lines would connect the substation to existing and future infrastructure.

[1] The Fulton-Fitch Mountain DPA serves northern Santa Rosa, Windsor, and the greater Larkfield-Wikiup area.

- Approximately 1.5 miles of the existing Fulton No. 1 60 kV Power Line would be rebuilt. This would require replacing 39 wooden poles (with 38 wood poles and 1 steel pole) and installation of 2 new wood riser poles.
- Approximately 1.8 miles of existing distribution line with 12 kV double-circuit conductor along Old Redwood Highway would be reconductored. This would require replacement of 44 wooden poles with taller wood poles and the installation of 3 additional wood riser poles.

The replacement TSP would be used to loop[2] the existing Fulton No. 1 60 kV power line from its position west of the Northwestern Pacific Railroad (NWPRR) over the tracks and into the substation. A 270-foot, 60 kV power line loop would be built between the TSP and the new substation. Distribution circuits and proposed improvements are described in Section 4.9.4 (Distribution Lines).

Offsite, distribution line undergrounding, pole placement and replacement, and reconductoring would take place primarily in public rights-of-way. Access to conduct construction activities at individual pole locations along the Fulton No. 1 60 kV Power Line may require the installation of a temporary access road along the power line route and from the power line across the southern edge of the vacant parcel west of the substation site (Site Alternative 6 in Section 4.18) to Herb Road. This access road will be within the 45 foot wide corridor extending 500 feet east from Herb Road shown in Figure 5.4-1 (Biological Resources Mapset). An easement would be required over the railroad to install the loop linking the existing 60 kV line and the substation.

4.1 Project Title

Pacific Gas & Electric Company's Windsor Substation Project

4.2 Project Sponsor's Name and Address

Pacific Gas & Electric Company (PG&E)
245 Market Street
Mail Code N10A
San Francisco, California 94105

4.3 Lead Agency Name and Address

California Public Utilities Commission
Energy Division
505 Van Ness Avenue, Fourth Floor
San Francisco, California 94102

4.4 Lead Agency Contact Person and Phone Number

Eric Chiang, Project Manager
Energy Division
California Public Utilities Commission
505 Van Ness Avenue, Fourth Floor
San Francisco, California 94102
(415) 703-1956

[2] Looping is the term used for tying a substation into an existing transmission line by opening the line and looping it into and out of the substation, thereby providing a circuit through the substation. A looped line feeds all the power carried on the line into the substation. A step-down substation transforms the power to a lower voltage for distribution.

4.5 Project Location

The proposed Windsor Substation would be located at 10789 Old Redwood Highway in the Town of Windsor, Sonoma County. The property is 850 feet west of Highway 101. The substation property is bounded by Herb Road on the northwest, rural residential on the north, Old Redwood Highway on the northeast, a school bus yard on the southeast, and the Northwestern Pacific Railroad (NWPRR) and rural residential areas on the west.

4.6 Project Objectives

PG&E has defined the basic objectives of the proposed project as follows:

- **Meet Immediate Capacity Needs**: Provide the necessary electric distribution capacity to serve existing and new customers within and around Windsor in the Fulton-Fitch Mountain 12 kV DPA.
- **Meet Long-Term Capacity Needs**: Eliminate electric distribution capacity deficiencies expected to occur beyond 2012.
- **Construct a New Substation to Reinforce Existing System**: Maximize system efficiency and increase future flexibility by constructing a new distribution substation within the limits of the DPA and approximately three to five miles from the existing distribution substations.
- **Construct a New Substation Near Load Growth**: Minimize ratepayer costs and environmental impacts, and maximize system efficiency and reliability by locating the new substation near the center of the load growth so that distribution circuit routes are short.

4.7 Purpose and Need

The Windsor Substation Project is needed to meet projected electric demand in the Fulton-Fitch Mountain DPA. The project would help ensure the ability of the regional electrical system to safely and reliably serve the area without interruptions or emergency conditions that could otherwise result.

Under Federal Energy Regulatory Commission (FERC), North American Electric Reliability Council (NERC), Western Electricity Coordinating Council (WECC), and CPUC rules, guidelines, and regulations, electrical transmission systems must have sufficient capacity to maintain safe, reliable, and adequate service to customers. The safety and reliability of the system must be maintained under normal conditions (base case), when all facilities are in service, and also under abnormal conditions (both likely and unlikely contingencies) that can result from equipment or line failures, maintenance outages or outages that cannot be predicted or controlled due to weather, earthquakes, traffic accidents, and other unforeseeable events.

The Fulton-Fitch Mountain 12 kV DPA currently is served by the Fulton and Fitch Mountain Substations. These substations are built out to maximum capacity. There is continuing residential, commercial, and light-industrial growth in the area, contributing to increasing demand for electricity. The current annual growth rate in demand for electricity is 1.8 MW/year. At the Fulton Substation banks 5 and 6 there is a projected electricity supply deficiency of 12 and 14 percent in 2013 (PG&E 2011-2013). The highest concentration of demand for electricity in the Fulton-Fitch DPA is within the Town of Windsor. The recent economic downturn has not substantially reduced growth and electricity demand in this area (PG&E 2010).

4.8 Setting and Surrounding Land Uses

The Town of Windsor, incorporated in 1992, is the fourth largest town in Sonoma County. Until the 1980s, much of the area surrounding Windsor was agricultural. In 2010, Windsor had a population of 26,801 (CADOF 2011).

Local land use plans and zoning are considered in this analysis in order to assist the CPUC in determining the proposed project's consistency with local policies. However, local discretionary permits (such as conditional use permits) and an evaluation of local plan consistency are not required for the proposed project because the CPUC has preemptive jurisdiction over the construction, maintenance, and operation of public utilities. The long-term land use and development goals for Windsor are identified in the Town of Windsor General Plan (Town of Windsor 2005). Land use designations in the vicinity of the site are shown in Figure 5.10-1 (General Plan Map) and discussed in Section 5.10 (Land Use).

The proposed substation site is zoned Service Commercial. "Utility infrastructure" is an allowed use in the Service Commercial Zoning District. The school bus yard to the south is zoned for Public Institutional use. Land to the west are zoned Estate Residential, and land to the east, on the east side of Old Redwood Highway, are zoned Gateway Commercial. Lands to the north and west of Herb Road are outside of the Town of Windsor jurisdiction in unincorporated Sonoma County. These properties are zoned for Rural Residential in the Sonoma County land use plan.

The adjacent parcels to the north and west each contain two single-family dwellings. There also is one residence on the east side of Old Redwood Highway (in the area zoned Gateway Commercial). The nearest homes are approximately 60 feet north and 160 feet west of the project property boundary and 125 feet north and 200 feet west of the proposed substation fenceline. Homes to the north are separated from the site by Herb Road and homes to the west are separated from the site by the railroad tracks. The home to the east of the site is approximately 265 feet from the project property boundary and 355 feet from the proposed fenceline; this home is separated from the site by Old Redwood Highway and a row of trees. See Figure 4-2 for an aerial view of the site. See Figure 5.12-1 for a map of residences in the project area.

4.8.1 Zoning

Town of Windsor Zoning Ordinance, Section 27.10.020

D. SC (Service Commercial). The SC zoning district is applied to areas suitable for land intensive personal and business service uses, including automobile repair shops, construction equipment sales and rental yards, service stations, and outdoor recreation uses. The SC zoning district is consistent with the Service Commercial land use classification of the General Plan.

Section 27.06.040 – Exemptions from Land Use Permit requirements

8. Utilities. The erection, construction, alteration, or maintenance by a public utility or public agency of underground or overhead utilities intended to service existing or nearby approved developments shall be permitted in any zoning district. These include: water; gas; electric; telecommunication; supply or disposal systems; including wires, mains, drains, sewers, pipes, conduits, cables, fire-alarm boxes, police call boxes, traffic signals, hydrants, etc., but not including new transmission lines and structures. Satellite and wireless communications antennas are subject to Section 27.34.200 (Telecommunications Facilities).

Section 27.28.040 – Landscape Area Requirements

Landscaping shall be provided in the locations specified below except for single-family uses.

A. Setbacks. All setback and open space areas required by this Zoning Ordinance and easements for utilities, and drainage courses shall be landscaped, except where a required setback is screened from public view or it is determined by the [Town Planning] Director that landscaping is not necessary to fulfill the purposes of this Chapter.

B. Unused areas. All areas of a project site not intended for a specific use, including pad sites in shopping centers held for future development, shall be landscaped unless it is determined by the [Town Planning] Director that landscaping is not necessary to fulfill the purposes of this Chapter.

4.9 Project Components

4.9.1 Windsor Substation

The Windsor Substation would consist of electrical equipment needed to operate the substation and distribution lines, a looped transmission line into and out of the substation, and distribution lines out of the substation. The fenced footprint of the facility would cover approximately 2.6 acres. Site access would be via paved driveways to two gates on the east side of the site, from Old Redwood Highway. The proposed substation layout is shown in Figure 4-4, and the substation profile is shown in Figure 4-5.

Electrical equipment required for the three-bank substation would consist of the following at ultimate 115 kV build-out:

- Three 115 kV bus structures
- Six 115 kV circuit breakers
- Three 115/12 kV power transformers
- Eighteen 115 kV disconnecting switches
- Three 12 kV metal-clad switchgear enclosures
- Twelve 12-kV distribution circuits
- Three 30 MVA power transformers
- Connection of the new substation to an existing 60 kV powerline by way of a new tubular steel pole [TSP] replacing an existing wood pole)
- Two 42-foot-high dead-end structures within the substation supporting the 60 kV powerline entering and exiting the substation

PG&E would also install other necessary electric equipment at the substation, including neutral grounding reactors, instrument transformers, protective relaying, metering and control equipment, remote supervisory control and data acquisition (SCADA) equipment, telemetering equipment, an auxiliary alternating current and direct current power system, an electric grounding system, and underground conduits or trench systems.

The tallest equipment in the substation would be the two 42-feet-tall dead-end structures supporting the looped lines. One switchgear enclosure would be 75 feet long, 18 feet wide, and 12 feet high, and two other switchgear enclosures would be each 28 feet long, 18 feet wide, and 12 feet high. The switchgear enclosures would house sensitive recording and communication equipment that requires weather protection. They also would house the controls and relays for the 115 kV lines and circuit breakers and

the 12 kV switchgear for the initial distribution circuits. Switchgear enclosures would be covered in steel sheeting with sloped roofs. All structures and equipment in the substation would be a non-reflective gray color.

Each transformer would contain up to 5,000 gallons of mineral oil, which would be circulated to cool the transformers. The mineral oil would not contain polychlorinated biphenyls (PCBs). A spill prevention control and countermeasure (SPCC) basin would be installed to contain the mineral oil in the event of a release from any one transformer. The SPCC basin would be designed to contain 110 percent of the transformer's coolant (mineral oil) volume. The initial transformer would contain 5,000 gallons of coolant; therefore, the basins would be designed to contain 5,500 gallons. If a transformer installed at the substation in the future has a larger volume of mineral oil than 5,000 gallons, the SPPC basins would be would be enlarged to accommodate the larger volume.

4.9.2 Site Access

During construction, access to the substation site and the power and distribution lines would be via Highway 101, Old Redwood Highway, Starr Road, Gumview Road, Herb Road (public section), and other minor side streets for short-term access to individual pole locations, as described in Section 5.16 (Transportation and Traffic). Access to the substation site would require driveways to be built off Old Redwood Highway. See Figure 4-4 for site layout. Temporary access roads from Herb Road parallel to the Fulton No. 1 60 kV Line and along Old Redwood Highway could be required to conduct construction at individual pole locations.

4.9.3 Perimeter and Landscaping

The substation would have an earth-tone decorative wall and new landscaping on three sides. This 10-foot-tall prefabricated concrete wall would be installed along the north, east, and west sides of the substation with entrance and exit gates on the eastern side, along Old Redwood Highway. The south side of the substation site would be enclosed by a chain-linked fence for security. Double swing entry and exit gates on the east side of the substation would be designed to blend with the wall. Wall designs and landscaping plans have been submitted to the Town of Windsor for review. As of January 2013, PG&E had received no comments on the proposed landscaping.

4.9.4 Lighting

Five sodium vapor lamps, mounted on substation structures and equipment, would provide security lighting. Exterior lighting would use non-glare light bulbs. The design and location of lighting fixtures would avoid casting light or generating glare off-site. On the east side of the substation, there would be 12-foot-tall free-standing light poles. Switchgear enclosure doors would also have fixed lights.

4.9.5 Drainage

Substation site grading during construction would alter existing onsite drainage patterns so that runoff from the proposed substation pad would flow into a Spill Prevention Control and Countermeasure (SPCC) retention pond on the western end of the site (near the railroad right-of-way). The location of this pond is shown in Figure 4-4 (Typical Three Bank Substation). From this pond, runoff would be pumped or directed into the existing drainage system along the northwestern boundary of the site, an underground concrete pipe that parallels Herb Road. Approximately 200 feet from Old Redwood Highway the underground pipe discharges into an existing 24-inch culvert under Herb Road. From there,

a drainage ditch extends approximately 300 feet to Sotoyome Creek. A second 24-inch culvert under a private lane exists between the project site and Sotoyome Creek. (PG&E 2011-2013)

Because the same retention basin would be used for oil capture and storm water management, the SPCC plan prepared in conjunction with detailed site planning would include engineered methods for containing and controlling a release from oil-filled electric equipment present at the proposed substation, including a water-collection system and retention basin equipped with an oil/water separator. If oil is present in the basin, a vacuum truck would be used to remove the oil for offsite disposal at a permitted facility. This collection and retention system would also regulate the release of stormwater runoff from the northern portion of the substation site (housing the transformers) and serve as a settling basin to reduce turbidity and sedimentation. Releases from this basin into the existing storm drain system would only be made when no oil or sediment would be released with the discharge.

In areas with no mineral oil-filled equipment, storm water not absorbed into the substation yard could flow to the fence around the site and soak into the ground on the remaining PG&E property. Site drainage and use of a SPCC retention pond would be consistent with the National Pollutant Discharge Elimination System (NPDES) and the project's Storm Water Pollution Prevention Plan (SWPPP), as well as local ordinances and best engineering practices. In addition, the substation design would incorporate SPCC Plan design requirements.

4.9.6 Power Lines

To loop the existing Fulton No. 1 60 kV circuit into and out of the substation, an existing wood pole located on the 60 kV power line, approximately 270 feet west of the substation property, would be replaced with a new 75-foot–tall TSP. The pole would support a short power line looped to the substation's 42-foot-tall dead-end structures. This pole location would allow the lines looping into and out of the substation to comply with the railroad's requirement that the tracks be crossed at a right angle. More information on the appearance of the proposed substation and TSP is included in Section 5.1 (Aesthetics).

4.9.7 Distribution Lines

Figure 4-3 (Aerial View of Project Components) shows the 12 kV distribution line reconductoring that would occur as part of the proposed project. Figure 4-3 also shows the locations of pole removals and replacements, underground conduits, and overhead line locations.

The substation would be designed to allow for twelve 12 kV distribution circuits to originate at the substation. Initially, three 12 kV distribution circuits would leave the substation underground. Based on current demand projections, it is estimated that up to nine additional distribution circuits would be installed out of the substation at an approximate rate of two circuits every other year. Provision would be made in the initial substation construction for these additional future circuits. The initial construction phase would include the installation of Circuits 1-3 and their associated vaults, as well as the installation of empty vaults and conduits that would be available for future Circuits 4 through 12, when required.

Circuit 1 would run west out of the substation in a conduit that connects to riser a1 (on the Fulton No. 1 60 kV Power Line); Circuit 1 would be 458 feet long. Circuit 3 would be 538 feet long; it would run in a conduit parallel to Circuit 1, but would extend further, to connect to riser a3. (Pole numbers are shown in Figure 5.4-1, Biological Resources Maps 1 through 10.) These two circuits, 1 and 3, would continue south mounted (underbuilt) on the Fulton No. 1 60 kV Power Line poles and would tie into an existing distribution line along Windsor River Road. To support the new double-circuit 12kV distribution

conductors, the existing Fulton No. 1 60 kV Power Line in this area would be rebuilt on taller wooden poles. This rebuild would require 39 new poles (38 wood replacement poles and 1 steel replacement pole) and 2 new risers.

Circuit 2 would head east in a conduit to pole b1, 620 feet from the substation. Beginning from pole b1, where Circuit 2 rises overhead, 1.8 miles of existing distribution line would be reconductored along Old Redwood Highway.[3] As part of the reconductoring, 44 existing wood poles would be replaced with new taller wood poles and 3 new riser poles would be installed along Old Redwood Highway. Circuit 2 would be undergrounded along Old Redwood Highway where there is existing undergrounding (320 feet at Rio Ruso, 270 feet at Dawn Way, and 480 feet at Godfrey Drive). Circuit 2 would ultimately tie into the existing main feeder line at Windsor River Road.

Initially, the nine future circuits would be stubbed and capped at the Fulton No. 1 60 kV Power Line. The ultimate location of these circuits beyond their termination points will be determined in the future, based on demand and engineering. The partial installation of the nine future distribution-circuit conduits at this time would prevent future disruption of landscaping at the substation property. Four conduits for future circuits would parallel Circuit 1 and 3, heading west out of the substation (one empty conduit would be within the same trench as 1 and 3 and three empty conduits would be in a separate trench, offset approximately 6 feet). At the Fulton No. 1 60 kV Power Line they would be stubbed and capped within PG&E's existing easement. The other five future circuit conduits would parallel Circuit 2, heading east out of the substation (with two of the empty conduits located in the same trench as Circuit 2, and three empty conduits located in a separate trench, offset approximately 6 feet). The conduits for the circuits heading east would be stubbed and capped in a vault at Old Redwood Highway. See Table 4-1 for the lengths of the various distribution circuits.

Future Circuits 4 through 12 could be installed and directed along other streets, depending on the location of load growth. Depending on location, additional splice boxes for cable pulling and connections at street crossings could be required. If the two-circuit maximum on pole lines is met, remaining circuits would likely be installed underground alongside existing overhead lines.

Table 4-1. Distribution Circuits from Proposed Substation

	Approximate Lengths and Locations of Circuit Installation (feet)		
Circuit	**Underground**	**Overhead**	**Total**
1	458 (west across the substation parcel and under the railroad tracks to the Fulton No. 1 60 kV Power Line)	7,900 (south along existing Fulton No.1 60 kV Power Line to Windsor River Road)	8,358
2	3,190 (620 feet east across the substation parcel to Old Redwood Highway; 320 feet, 270 feet, and 480 feet along Old Redwood Highway at Rio Ruso Drive, Dawn Way, and Godfrey Street; 1,500 feet from Joe Redota Drive until Windsor River Road)	6,850 feet (south on portions of the west and east side of Old Redwood Highway to Windsor River Road)	10,040
3	538 (west across the substation parcel and under the railroad tracks to the Fulton No. 1 60 kV Power Line)	7,900 (south along existing Fulton No.1 60 kV Power Line to Windsor River Road)	8,428
Total for Initial Circuits	**4,186**	**22,650**	**26,836**

[3] Reconductoring is the replacement of existing power lines with new power lines. For the Windsor Substation Project, existing distribution lines would be replaced with upgraded lines.

Table 4-1. Distribution Circuits from Proposed Substation

Circuit	Approximate Lengths and Locations of Circuit Installation (feet)		
	Underground	Overhead	Total
Future:[1] 4	400 (west across the substation parcel and to the Fulton No. 1 60 kV Power Line easement)	None	400
Future: 8 & 9	620 (east across the substation parcel to Old Redwood Highway)	None	620 each (1,240 total)
Future: 5–7	400 (west across to the Fulton No. 1 60 kV Power Line easement)	None	400 each (1,200 total)
Future: 10–12	620 (east across to Old Redwood Highway)	None	620 each (1,860 total)
Total for Future ircuits	**4,700**	**None**	**4,700**
Total for Initial and Future	**8,886**	**22,650**	**31,536**

1 - Conduits for future use would be initially be stubbed and capped.
Source: PG&E 2011 and 2012.

4.9.8 Right-of-Way Acquisition

PG&E would purchase the proposed substation site from the current landowner and acquire a new easement for the power line interconnection loop over the railroad property and for distribution lines under the tracks. Construction work along Old Redwood Highway would take place in the street and public utility easement. PG&E would obtain ministerial encroachment permits to conduct work in public rights-of-way in accordance with the Town of Windsor requirements.

4.10 Substation Construction

4.10.1 Construction

During construction, PG&E would comply with the *PG&E Code of Safe Practices* and its internal safety standards, which address topics such as the use of personal safety equipment (e.g., use of hard hats and eye and ear protection), the use of vehicular safety equipment (e.g., back-up warning beepers on construction equipment), and attendance at regular safety briefings. Construction power to the proposed site would be provided by an existing adjacent distribution line on Old Redwood Highway. A temporary overhead construction service tap and meter set would be installed just inside the substation property.

Site preparation would begin with removal of existing asphalt paving and concrete foundation remnants from previous buildings, clearing of vegetation, and grading of the substation pad. Approximately 1,120 cubic yards of existing material (370 cubic yards of asphalt and 750 cubic yards of concrete) would be removed from the site. The property lacks any significant vegetation except scattered trees along its northern and western edges (along Herb Road and the railroad right-of-way). Three trees would likely need to be removed during construction. Approximately 1,300 cubic yards of soil and aggregate would be required to achieve the substation site's drainage (described in Section 4.9.6) and to bring the substation to its final grade. For this, it is estimated 1,000 cubic yards of material would be excavated and reused on-site, and 300 cubic yards would be imported. As part of site preparation, approximately 1,420 cubic yards of material would be hauled, consisting of 1,070 cubic yards of material to be removed and 300 cubic yards of soil to be imported. (PG&E 2011-2013).

Excavation for the substation's foundations would begin after site grading is complete. Up to 250 cubic yards of excess soil would be generated in this phase of the project. In addition to the substation work, trenching and backfilling of the underground distribution circuits will generate additional truck trips. This is discussed below in Section 4.12 as part of the reconductoring and distribution system. Table 4-2 details the total volume of materials to be imported or exported from the project site, as well as the truck trips required to handle these volumes. (Although not part of the current project, it is expected that installation of future transformer banks and other structures at the substation would generate a total of up to 425 cubic yards of excess soil.

Table 4-2. Volumes of Material Imported and Exported from the Project Sites and Required Truck Trips (10 cubic yards/truck trip)

Phase	Material Removed (cubic yards)	Material Imported (cubic yards)	Total Material (cubic yards)	Truck Trips
Substation Site Preparation	1,120	300	1,420	142
Substation Foundation Excavation	250		250	25
Trench Vaults	202		202	21
Jack and Bore Entry and Exit Pits	200		200	200
Distribution Line – Trench and Bore	796		796	80
Total Current			**2,868**	**288**
Future Installation	425		425	43
Total Current + Future			**3,293**	**331**

Source: PG&E 2010-2012.

Construction of the subsurface ground grid would follow grading and excavation. The grid is used to ground all above grade structures to mitigate any shock hazard. At the same time, the security wall, fencing, and paved interior road would be installed, and aggregate would be placed throughout the remainder of the enclosed site. With the site secured, excavation for subsurface footings for all the aboveground structures would begin. Reinforced concrete footings and slabs would be poured for structure and equipment support. After the concrete is cured, the aboveground steel structures, circuit breakers, transformers, switchgears, buses, dead ends, and other electrical equipment, including associated control system hardware, would be installed.

Structures would be erected to support buses, switches, overhead conductors, instrument transformers, and other electrical equipment, as well as to terminate incoming circuits. Supports for the aluminum bus structures would be fabricated from low profile tubular steel components. Structures within the substation would be grounded to the station-grounding grid. Equipment would be bolted or welded securely to slabs and footings to exceed Uniform Building Code seismic requirements. Additional equipment that would be installed includes high-voltage circuit breakers and air switches, tie structures and buswork, high-voltage instrument transformers and line traps, control and power cables, metering, relaying, and communication equipment.

The final stage of substation construction would be landscaping, including installation of an irrigation system. The proposed site property is outside the Town of Windsor's recycled water service area. The Town of Windsor would supply both potable water for irrigation and water for construction purposes such as dust control from an existing valve box along Old Redwood Highway at the eastern edge of the proposed site. Construction crew members would drink bottled water.

4.10.2 Cleanup

PG&E would ensure that the substation site is kept clean during the construction period. Trash would be picked up daily and either removed from the work site or properly contained. All disturbed areas and temporary work locations would be cleaned after construction activities are complete.

Table 4-3. Construction – Typical Equipment Use

Equipment	Use	Number of Vehicles	Days per Week of Operation	Hours per Day of Operation	Duration of Use (weeks)
Access Road and Substation					
3/4-ton pickup trucks	Transport construction personnel	3	5	8	8
1-ton Truck	Tools, supplies and equipment	1	5	8	8
Truck-mounted Digger	Light excavation	1	5	8	8
Concrete Truck	Transport concrete	1	5	8	8
Man Lift	Elevation of personnel	2	5	8	8
Water Truck	Water site	1	5	8	8
Fork Lift	Elevation of materials	1	5	8	8
Crawler Backhoe	Excavation of foundation	1	5	8	8
D-3 Bulldozer	Grading of site	1	5	8	8
Excavator with breaker	Demolition of existing structure and foundations	1	5	10	4
Sheep's foot roller	Demolition of existing structure and foundations	1	5	10	4
Dump truck	Removal of existing structure and foundations	1	5	10	4
Loader	Demolition of existing structure and foundations	1	5	10	4
Transmission Line Substation Interconnection					
3/4-ton pickup trucks	Transport construction personnel	3	4	3	2
Crew-cab trucks (3/4 to 1 ton)	Transport construction personnel	1	4	3	2
Bucket truck	All line construction activities	2	4	5	2
Puller	Pull conductor wire	1	2	2	1
Line Truck	Install shoo-fly poles	1	2	4	2
50-ton crane	Lift transmission conductors	1	1	6	1
Water Truck	Water site	1	4	8	2
TSP Replacement and Installation					
3/4-ton pickup trucks	Transport construction personnel	3	5	3	1
Crew-cab trucks (3/4 to 1 ton)	Transport construction personnel	3	5	3	1
Boom truck	All construction activities	1	1	6	1
50- and/or 70- ton mobile cranes	Erect structures/install transformers	1	1	4	1
Lo-Drill	Excavate foundations	1	2	12	1
Backhoe or Bobcat	Load excavated dirt	1	2	7	1
Concrete trucks	Transport concrete	8	1	2	1
Air compressor	Operate pneumatic equipment	1	2	2	1

Table 4-3. Construction – Typical Equipment Use

Equipment	Use	Number of Vehicles	Days per Week of Operation	Hours per Day of Operation	Duration of Use (weeks)
Dump Truck	Haul excavated material (5 truck-loads per hole)	5	2	3	1
2-ton flat-bed truck	Haul equipment and materials to job site	1	5	3	1
Potholer and vacuum truck	Hydro probe of excavation site to confirm no subsurface utilities	2	2	2	1
Water truck	Water site	1	5	12	1
Distribution Line Installation (Overhead)					
3/4-ton pickup trucks	Transport construction personnel	3	5	8	22
Crew-cab trucks (3/4 to 1 ton)	Transport construction personnel	3	5	8	22
Line Truck	Drill hole and install poles	3	5	8	22
Puller Rig	Pull conductor wire	1	5	8	13
Bucket truck	String conductor wire	5	5	8	13
Splicing Van	Make splices in conductor	5	5	8	17
Crane Truck	Pole & conductor delivery	6	5	8	14
Water Truck	Water Site	1	5	8	22
Distribution Line Installation (Underground)					
3/4-ton pickup trucks	Transport construction personnel	1	4	3	20
Crawler backhoe	Excavate trench	1	4	8	20
Dump trucks	Haul trench spoils from site & deliver clean backfill	1	4	5	20
HDD Rig	Directional drilling	1	4	8	17
Bore Rig	For jack & bore under railroad tracks	1	4	8	17
Excavator	For large volume excavations	1	4	8	17
Crew truck	Tools and equipment	1	4	2	20
Water truck	Water site	1	4	8	20

Source: PG&E 2011.

4.10.3 Construction Workforce and Schedule

PG&E has targeted construction to begin in February 2014 to meet an in-service date of May 2015.[4] The size and composition of the workforce would vary, depending on the phase of construction. Substation work would occur over eight months. During substation grading, a maximum workforce of approximately 15 workers would be needed over a three to four week period. The security wall and fencing, buswork structure, new TSP, and substation foundation work would require approximately eight workers. Installation of the switchgear enclosure and overhead work would also require approximately eight workers. As phases of the work are completed, the workforce at the substation site would gradually decline. A small workforce would remain at the substation site to complete required project cleanup and landscaping.

[4] Storm events during the rainy season (December through March) could preclude construction activities from occurring, delaying completion of construction.

Distribution line work would require approximately 16 workers and would take six to seven months (between October 2014 and April 2015). Construction crews would work during weekday daylight hours unless otherwise required for project safety or to take advantage of necessary line clearances. The tasks would be conducted in stages, so personnel and equipment would not be working on all tasks simultaneously at a given location.

No permanent workers would be hired for this project. The workforce would be primarily PG&E employees or a contracted workforce. Laborers employed during the construction of the project would commute to the area or stay in nearby hotels for the duration of the project. Contractor construction personnel would be from Sonoma County or surrounding areas.

4.11 Power Line Interconnection Construction

The construction for the power line interconnection work would be in two phases: (1) replacing the existing pole on the Fulton No. 1 60 kV power line with a TSP and (2) installing the conductor.

4.11.1 Pole Installation and Replacement

The existing wooden pole on the Fulton No. 1 60 kV power line that would be replaced with a TSP is located on the west side of the railroad right-of-way in an area containing open space and rural residences. The new TSP would be made of weathered steel tapering upward from a ground-level diameter of approximately 30 inches. A concrete foundation for the TSP would have a diameter of approximately 5.5 feet. The TSP would reach a height of 75 feet; two cross arms would extend 4-feet laterally on each side of the pole.

To erect the pole, a semi-truck and trailer would deliver the TSP to the pole site in sections. A crane would off-load TSP sections in preparation for assembly. An area approximately 50 feet square would be required temporarily for the installation of the TSP. This would require a brief temporary lane closure on Old Redwood Highway that would be coordinated with the Town of Windsor.

The Fulton No. 1 60 kV Power Line currently has two 12 kV distribution circuits mounted under the 60 kV conductors. Installing the replacement TSP requires horizontal and vertical clearance between these two circuits for access and manipulation of equipment and TSP sections. To achieve this, two temporary wood poles called “shoo-flys” would be erected near the existing wood pole. Because the two 12 kV circuits are on opposite sides of the existing pole, the shoo-fly poles would be offset 10 feet east and west of the pole and the 12 kV distribution circuits would be transferred to the two shoo-fly poles. . If necessary, a brace support would help counter any lateral tension on the shoo-fly poles that might result from temporarily offsetting the existing alignment from its original position.

Once the 12 kV circuits have been moved, a tracked drilling rig would excavate the TSP’s foundation. The rig would auger a hole between five feet and eight feet in diameter and approximately 15 to 20 feet deep, with the exact depth determined by local soil characteristics. Excavated soil would be tested and disposed of in accordance with applicable regulations or reused. The completed hole would be temporarily covered by the end piece of a conductor spool until installation of the new foundation. A reinforcing bar cage would be lowered into the hole and foundation bolts would be attached to the cage. Wood forms would then be constructed around the foundation and concrete poured into these forms. Excavating the foundation hole and pouring the concrete would require approximately three days. Once the concrete has cured, the bottom section of the TSP would be delivered to the site and lowered onto the foundation by a crane. The remaining sections would be installed later as described below.

The existing wood pole and, later, the temporary shoo-fly poles would be loosened for removal by a hydraulic jack mounted on a line truck. Once these wooden poles have been removed, the resulting holes would be backfilled with the soil from the TSP foundation auguring. Some unused soil would be used to backfill around the concrete foundation of the TSP and would be feathered around the new pole site. Wooden poles and any sawdust would be deposited at the appropriate Santa Rosa PG&E Service Center collection bin for ultimate disposal at a licensed Class 1 landfill or a composite-lined portion of a solid waste landfill.

Before attaching conductors to the new TSP, a circuit clearance would be scheduled. At that time, a crane or bucket truck would lift the existing 60 kV transmission conductors from their current position and shift them out of the way. A second crane would lower the remaining sections of the new TSP into place. Line crews would then transfer the 12 kV distribution circuits from the shoo-fly poles to the TSP and the 60 kV transmission conductors from the crane to the TSP.

4.11.2 Stringing 60 kV Conductor

Stringing the conductor looping between the Fulton No. 1 60 kV power line and the substation would begin with the installation of sheaves or stringing blocks. Sheaves are rollers that are attached to the cross arm of a supporting structure. The sheaves allow the conductor to be pulled through each pole until it is ready to be pulled up to its final tension position. Once the pull and tension equipment is in place, a small cable used to pull the conductor, a "sock line," would be pulled from structure to structure by ground equipment. The conductor would then be attached to the sock line and strung via the tension-stringing method. This method controls the tension of the conductor as it is pulled through each sheave, ensuring the conductor remains elevated above the railroad. After pulling the conductor into place, sag would be adjusted to a pre-calculated level. Finally, the conductor would be clamped to the end of each insulator, and the sheaves would be removed. Vibration dampers and other accessories would complete the installation.

4.12 Reconductoring of Distribution Line and Power Line Underbuild

Distribution of the increased capacity provided by the new substation would require constructing 1,161 feet of new underground circuits, rebuilding 7,900 feet of the existing overhead Fulton No. 1 60 kV line and installing two underbuilt distribution circuits, and reconductoring of 9,420 feet of the 12 kV power line along Old Redwood Highway.

4.12.1 Pole Replacement

Proposed reconductoring and rebuilding of power lines for the proposed project would require replacement of 88 wooden poles along two existing distribution lines and the installation of 5 new riser poles. Existing poles are approximately 45 feet tall, and new poles would be approximately 20 feet higher, or about 65 feet tall. The new wood poles would employ an avian-safe design to protect raptors and other birds from electrocution.

Pole replacement would require an approximately 75-foot radius of temporary impact around the TSP, a 50-foot radius of temporary impact around wood poles, and an approximately 10-foot-wide corridor of temporary impacts between poles. Most replacement poles would be installed within three to six feet of the existing pole they are replacing. Wood poles would be delivered to each pole site on a line truck with trailer. The line truck would auger a hole to the appropriate depth. The replacement wood pole would be framed with the necessary insulators and hardware, and then installed in the hole by the line

truck or a crane. Soil from the augered hole would be covered with plastic tarps and would be used for filling holes, feathered around the pole base, or would be removed.

Whenever possible, work would take place within previously disturbed areas around the base of the existing poles. At most pole locations, crews would be working from paved streets. In addition to electric lines, the existing wood poles along Old Redwood Highway support telephone and cable television lines. Collocated utility lines would be detached from the existing poles and attached to the replacement poles.

Bucket trucks would be used to remove cross arms and wires from poles. A boom mounted on the line truck would loosen old poles as needed so that crews could then use the line truck to pull the wood poles out of the ground. Based on site-specific conditions, however, some old wood poles may be cut off at the base or six to 12 inches below the surface and left in place. All old poles, associated hardware, and any debris generated would be removed and disposed of properly.

4.12.2 Reconductoring

During reconductoring of overhead distribution lines, the existing conductor would be replaced with heavier-duty 1,100 thousand circular mil (kcmil) [5] all-aluminum conductor, increasing the capacity of the line. Approximately nine pull and tension locations along public streets would be required for the project. These pull and tension sites would be located around dead end or angle poles and would require and area of approximately 400 to 500 square feet (40 to 50 feet long by 10 feet wide) for operations. Insulators would be installed or replaced as part of the reconductoring work.

The exact locations of pull and tension sites would depend on town traffic permits and permission from property owners. PG&E anticipates using two pull and tension sites for Circuits 1 and 3, and seven pull and tension sites for Circuit 2. For Circuits 1 and 3 the approximate sites would be Starr Road where it intersects with the Fulton No. 1 60 kV Power Line, and Windsor River Road where it intersects with the Fulton No. 1 60 kV Power Line. The approximate pull and tension site locations for Circuit 2 would be Old Redwood Highway just east of the substation and on Old Redwood Highway near its intersections with Starr Road, Arata Lane, Rio Ruso Drive, Dawn Way, Godfrey Drive, and Windsor Road (PG&E 2011-2013).

New insulators would be placed on poles with conductor rollers at their end. To install the new overhead conductors, the existing conductor at one end of a given pull section would be attached to a puller-truck cable. The new conductor would be attached to the existing conductor at the opposite end of the pull section. Once the new conductor is in place and the sags between structures have been adjusted to a pre-calculated level, the new conductor would be detached from the rollers and clipped into the end of each insulator. At maximum sag, the conductor would be 25 feet or more above ground level. The rollers would be removed and vibration dampers and other accessories would be installed. A line truck would take the old conductor from the site to the PG&E construction storage yard located at 101 Airport Boulevard in Santa Rosa.

4.12.3 Underground Installation

Underground installation of distribution lines would require horizontal directional drilling, jack and bore, or open trenching. A total of 796 cubic yards of spoils from open trench and bore operations and 200

[5] One circular mil is the unit of area equal to a circle with a diameter of 1 mil (1/1000th inch). It is used to indicate the cross-sectional area of a wire. One thousand circular mils are denoted as 1 kcmil.

cubic yards from entry and exit pits and vaults would need to be removed (see Table 4-2). For underground segments, the 12 kV underground distribution line would be installed pursuant to PG&E's established franchise agreements with the Town of Windsor. Underground installation would include installing three 1,100 kcmil all-aluminum conductor cables in a single conduit. Each conductor would be approximately two inches in diameter and would fit in a 6-inch diameter conduit.

PG&E would coordinate with the Town of Windsor regarding construction techniques; however, PG&E anticipates that it would use the following methods for the underground installation: Undergrounded conductor segments extending across the substation parcel between the Fulton No. 1 60 kV Power Line and Old Redwood Highway would be completed using open trenching. Jack-and-bore techniques would be employed for crossing under the NWPRR tracks. Three underground segments that would extend south on Old Redwood Highway at Rio Ruso Drive, Dawn Way, and Godfrey Drive would be installed using horizontal directional drilling. Underground vaults, approximately 4.5 feet long by 8.5 feet wide by 6 feet deep, would be installed at each of the bore locations along Old Redwood Highway, unless existing vaults could be used. The 1,500-foot underground segment to be reconductored along Old Redwood Highway from Joe Redota Road to Windsor River Road would be placed in an existing 6-inch duct located within a Public Utility Easement.

Regional groundwater occurs at a depth of approximately 80 feet below the ground surface, which is deeper than any of the proposed bores (PG&E 2010). If significant volumes of perched groundwater are encountered, water would be evacuated using a sump pump, transferred into water storage tanks (to be sited at the proposed substation site), sampled, analyzed, transported, and disposed in accordance with all federal, state, and local regulations. If any worker observes potential contamination or signs of pre-existing hazardous waste during excavation, work in that area would be stopped until the contamination is dealt with in accordance with all federal, state, and local regulations. As part of final construction activities, PG&E would restore all paved surfaces, and restore landscaping or vegetation, as necessary and in compliance with the road encroachment permit.

To ensure no contamination would occur to nearby storm drains and water sources, PG&E construction crews would implement best management practices (BMPs) outlined in PG&E's *Water Quality Construction Best Management Practices Manual*, a copy of which would be provided to CPUC staff. These include the following BMPs:

- Evaluate, mark and protect important trees and associated rooting zones, unique areas (e.g., wetlands), and other areas to be preserved;
- Designate parking and fueling areas;
- Control vehicle speed and access near sensitive areas or waterways; and
- Begin excavation, trenching, or grading after installing applicable sediment and runoff control measures.

Open Trenching. PG&E would obtain a Town of Windsor road encroachment permit and comply with its conditions and requirements Where used, trenches would measure approximately 48 to 56 inches deep and 18 to 24 inches wide. A backhoe would be used to dig the trenches; trenching in paved locations would require first saw-cutting and/or breaking the pavement. Cable conduit would be installed in the open trench using reinforcement bar, ground wire, and concrete conduit encasement. To complete the work, thermal select or controlled backfill would be added and compacted in the trench. A road base backfill or slurry concrete cap would then be installed. Soils excavated during trenching would be temporarily stored at the substation property. If testing shows these soils are non-hazardous, they could be used as backfill at any project site. Unused soil would be disposed of in accordance with all federal, state, and local regulations.

Approximately 19 vaults would be installed at various locations along the open trenches. Vaults would be approximately 4.5 feet long by 8.5 feet wide by 6 feet deep and would require excavation of approximately 10.6 cubic yards of soil each. Excavation and disposal of soils from vaults would be conducted as addressed above for trenching. Comcast® would require installation of additional underground vaults along the trenches to access its collocated cable television line, which would be undergrounded within the joint trench. The number and locations of vaults required by Comcast® are not available at this time.

Jack and Bore. Jack and bore techniques would likely be used under the railroad west of the substation. The final location of entrance and exit pits for jack and bore techniques have not been determined. Placement would be determined by PG&E engineering design and a Town of Windsor encroachment permit. Boring would begin with the digging of entrance and an exit pits (approximately 24 feet long, 16 feet wide, and 6 feet deep). Shoring will be installed when necessary. Relief holes along the course of the bore would not require shoring. After shoring, bore equipment would be installed in the bore pit. Steel casing would be welded in sections and jacked into the bore. Finally, assembled conduits would be pulled through the steel casing.

Approximately 200 cubic yards of material would be excavated to create the pits. Approximately 20 truck trips would be needed to haul soils removed from the pits. The soil would be transported to one of three locations: the proposed substation site; Syar Industries at 13666 Healdsburg Avenue, Healdsburg; or a private property at 40887 River Road, Cloverdale for temporary storage. Soils classified as non-hazardous could be used as backfill or at another permitted construction site. Unused soil would be disposed of in accordance with all federal, state, and local regulations.

Horizontal Directional Drilling. Horizontal directional drilling (HDD) is completed by a hydraulically-powered horizontal drilling rig with a variable-angle drilling unit. This rig is supported by a drilling mud tank and a power unit for the hydraulic pumps and mud pumps. The drilling unit would be set to the proper design angle for the particular bore, which has not yet been determined for this project. During the bore, drilling fluid, a water/bentonite (dehydrated clay) mixture, would be pumped under high pressure through the drill stem to rotate the cutting head and return the excavated spoils to a pit at the entry point. The HDD contractor would be responsible for disposal of any soil cuttings, drilling mud, fluids, or waste in accordance with all federal, state, and local regulations.

To begin boring, an entry pit (approximately 4 feet long by 2 feet wide) and exit pit (approximately 20 feet long by 4 feet wide) would first be created. Relief holes (approximately 4 feet long by 2 feet wide) would be added at approximately 100 foot intervals, determined by local ground conditions. Concurrently with boring, sections of steel casings would be welded together. Assembled PVC conduit bundles would then be pulled through these casings. Casings with conduit bundles would be pulled completely through the finished bore hole. Shoring would not be required in the entry and exit pits.

Exact locations for entry and exit pits have not yet to be determined by PG&E engineering design and a Town of Windsor encroachment permit. Geotechnical surveys may be used to analyze underlying strata along the bore path for unanticipated weakness or lack of consolidation. Strata of this type are at risk of fracture, potentially allowing drilling mud to rise to the surface. In this event, boring process would be immediately halted. The HDD contractor would be responsible for minimizing the potential for frac-outs by maintaining the drill drilling fluid pressure at a reasonable level. A PG&E inspector with the authority to shut down HDD operations at any time would provide further oversight at every HDD location.

Mud, fluids, and waste generated by drilling are typically non-hazardous. Soil removed from the entry and exit pits would be transported to the proposed substation site or the PG&E construction storage yard located at 101 Airport Boulevard, in Santa Rosa, Sonoma County for temporary storage. If testing

classifies soils as non-hazardous, they may be used as backfill on site, or at another permitted construction site. Unused soil would be disposed of at a landfill in accordance with all federal, state, and local regulations.

During construction, PG&E would implement the best management practices outlined in the *PG&E Horizontal Directional Drilling Manual.* A copy of this manual would be provided to CPUC staff. Lengths, dimensions, and volumes associated with trenching and boring are listed in Table 4-4.

Table 4-4. Trench and Bore Details for the Proposed Project

Trench/Bore	Approximate Length of Trench/Bore (feet)	Depth & Width Dimensions	Excavated Soil* (cubic yards)	Circuits within Trench/Bore
Trench #1 (west from the substation crossing west of the NWPRR)	400	48 to 56 inches deep, and 18 to 24 inches wide	173	Circuit 1, 3-7
Trench #1a (west of the substation and the NWPRR, branching off from Trench #1 and ending at pole a1)	58	48 to 56 inches deep, and 18 to 24 inches wide	25	Circuit 1
Trench #1b (west of the substation and the NWPRR, branching off from Trench #1 and ending at pole a3)	138	48 to 56 inches deep, and 18 to 24 inches wide	60	Circuit 3
Trench #2 (east from the substation crossing Old Redwood Highway)	620	48 to 56 inches deep, and 18 to 24 inches wide	268	Circuit 2, 8-12
Bore # 1 (crossing from the east side of NWPRR to the west side of NWPRR)	200	Minimum 42 inches deep, and 12 inches wide	32	Circuit 1
Bore #2 (Rio Drive)	320	Minimum 24 inches deep, and 12 inches wide	30	Circuit 2
Bore #3 (Dawn Way)	270	Minimum 24 inches deep, and 12 inches wide	25	Circuit 2
Bore #4 (Godfrey Street)	480	Minimum 24 inches deep, and 12 inches wide	44	Circuit 2
Trench #3 (along Old Redwood Highway from Joe Redota Road to Windsor River Road)	1,500	Minimum 24 inches deep, and 12 inches wide	139	Circuit 2, 8-12

Source: PG&E 2010, 2011, 2012

* The above cubic yard quantities are estimates based upon currently-available information and include a fluff factor of 25% applied to the in-situ quantities.

4.13 Operations and Maintenance

4.13.1 Substation Operations, Maintenance, and Inspection

Distribution equipment at the proposed substation site would be operated remotely from the PG&E Control Center in Vacaville, California. The PG&E Pittsburg Control Center in Pittsburg, California would control transmission equipment for the proposed substation and power lines. Substation operation would be monitored by monthly routine inspections, with additional inspections as needed under emergency conditions. The station and line alarms would connect to control centers via telecommunications

lines. Santa Rosa PG&E personnel would be dispatched in response to an alarm. Because all telecommunication equipment would be located within conduits, switchgear enclosures, and pull boxes, no microwave dish and/or poles would be needed.

Parking for facility inspection, operation and maintenance would be located within the substation site. Substation structures would be inspected annually for corrosion, equipment misalignment, or foundation problems. This ground inspection would also include examination of hardware, insulator keys, and conductors. Additionally, conductors and fixtures would be tested for corrosion, breaks, broken insulators, and bad splices. Electric lines would be checked for correct sag. Annual ground inspections also would be conducted on poles, anchors, and right-of-way conditions. As needed, trimming of vegetation would be performed in accordance with the CPUC's General Order 95.

4.14 Applicant Proposed Measures

PG&E would implement Applicant Proposed Measures (APMs) during the design and construction of the proposed project in order to avoid or minimize potential environmental impacts. The APMs listed in Table 4-5 are part of the proposed project and are considered in the evaluation of environmental impacts (see Section 5, Environmental Analysis and Mitigation). CPUC approval would require PG&E adherence to the proposed project as described in this document, including this project description and the APMs, as well as any adopted mitigation measures identified by this Initial Study.

Table 4-5 details each PG&E APM by environmental resource. Additional mitigation measures recommend to be imposed are presented in Section 5. These are measures that are not otherwise included in the APMs or that expand upon or add detail to the APMs presented, to ensure that potential impacts would be reduced to less than significant levels.

Table 4-5. Applicant Proposed Measures (APMs)

APM Number	Issue Area
	Aesthetics
APM AE-1	Additional landscaping comprised of trees and shrubs will be included along Herb Road and along the east edge of the site in the setback area from Old Redwood Highway to provide additional screening and reduce project visibility. Suggested plant material includes a mix of redwood trees and evergreen native oaks with a small number of deciduous accent trees. Landscaping under transmission lines will consist of small trees and/or shrubs to allow for overhead clearance. All planting will be consistent with PG&E operational requirements for landscaping in proximity to electric transmission facilities.
	Air Quality
APM AQ-1	Water all active construction areas at least twice daily during dry conditions.
APM AQ-2	Cover all trucks hauling dirt, sand, or loose materials, or require all trucks to maintain at least two feet of freeboard.
APM AQ-3	Pave, apply water as necessary to prevent fugitive dust, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites.
APM AQ-4	Sweep daily (with water sweepers) all paved access roads, parking areas and staging areas at construction sites.
APM AQ-5	Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets.
APM AQ-6	Encourage construction workers to carpool to the job site to the extent feasible. The ability to develop an effective carpool program for the project will depend upon the proximity of carpool facilities to the area, the geographical commute departure points of construction workers, and the extent to which carpooling will not adversely affect worker arrival time and the project's construction schedule.

Table 4-5. Applicant Proposed Measures (APMs)

APM AQ-7	Minimize construction equipment exhaust by using low-emission construction equipment where feasible. Portable diesel fueled construction equipment with engines 50 hp or larger and manufactured in 2000 or later will be registered under the California Air Resources Board (CARB) Statewide Portable Equipment Registration Program, or shall meet at a minimum USEPA/CARB Tier 1 engine standards.
APM AQ-8	Minimize unnecessary idling time – less than the 5-minute maximum idling required by law – through application of a "common sense" approach to vehicle use. If a vehicle is not required immediately or continuously for construction activities, its engine will be shut off.
APM AQ-9	Encourage use of natural gas powered vehicles for passenger cars and light duty trucks where feasible and available.
APM AQ-10	Minimize welding and cutting by using compression of mechanical applications where practical and within standards.
APM AQ-11	Encourage the recycling of construction waste where feasible.
APM AQ-12	Comply with California Air Resources Board Early Action Measures as these policies become effective.
APM AQ-13	Maintain substation breakers in accordance with PG&E's maintenance guidelines.
APM AQ-14	Require that the proposed substation's breakers have a manufacturer's guaranteed leakage rate of 0.5 percent per year or less for SF6.
	Biological Resources
APM BIO-1	An ongoing special-status species/sensitive habitat education program for construction crews will be conducted by a qualified biologist(s) prior to the commencement of the project and during construction activities. Sessions will include discussion of the Federal Endangered Species Act (FESA) and California Endangered Species Act (CESA), the consequences of noncompliance with these acts, identification and values of habitats, and the importance of keeping all project activities and sediments within the designated work area.
APM BIO-2	Soil and vegetation disturbance will be minimized to the greatest extent possible.
APM BIO-3	An educational brochure will be produced for construction crews working on the project. Color photos of some of the special-status species will be included, as well as a discussion of protective measures agreed to by PG&E and the resource agencies.
APM BIO-4	A pre-construction wildlife and plant survey will be conducted prior to the start of construction activities to identify any special-status species, nesting birds or mammals, and occupied burrows in the proposed substation site or alignments for the Fulton No. 1 60 kV power line and distribution line. Should a sensitive wildlife or plant species be found, CDFW and/or USFWS will be contacted promptly.
APM BIO-5	A biological monitor will be on-site during grading activities and installation of the silt fence around the proposed substation site perimeter and needed areas along the distribution line alignment. After these activities are completed, the biological monitor will visit the site as needed, depending on work activities and locations. The biologist will complete daily reports from such visits summarizing construction activities observed and environmental compliance.
APM BIO-6	Trash dumping, firearms, and pets will be prohibited in project work areas.
APM BIO-7	If special-status plant species are found during any of the special-status plant surveys, PG&E will modify the project to avoid impacts to special-status plant species. If identified special-status plant species cannot be avoided, PG&E will consult with the appropriate resource agency and comply with permit conditions to ensure that the project will not have a substantial adverse effect on such species, either directly or through habitat modification. Examples of feasible measures that could be required include the following: • acquire suitable habitat for identified species within the project site, • develop a long-term habitat enhancement plan for identified species, and/or • monitor the implementation of and the compliance with mitigation measures outlined in the habitat enhancement plan.
APM BIO-8	Mobile equipment will not be parked overnight within 100 feet of aquatic habitat. Stationary equipment (e.g., pumps and generators) used or stored within 100 feet of aquatic habitat will be positioned over secondary containment.
APM BIO-9	Anti-perch devices will be applied to the overhead distribution line improvements to inhibit raptor perching and nesting.

Table 4-5. Applicant Proposed Measures (APMs)

APM BIO-10	A qualified wildlife biologist shall conduct pre-construction surveys for burrowing owls according to the Burrowing Owl Survey Protocol and Mitigation Guidelines developed by The California Burrowing Owl Consortium (1993). If any ground disturbing activities are planned during the burrowing owl nesting season (approximately February 1 through August 31), avoidance measures shall be implemented following the recommendations in California Department of Fish and Game's Staff Report on Burrowing Owl Mitigation (CDFW, 2012). Avoidance measures shall include a no construction buffer zone of a minimum distance of 656 feet for designated low/medium disturbance activities and 1,640 feet for high disturbance activities. If occupied burrows are closer than those distances to the nearest work site, the specified buffer size may be reduced on a case-by-case basis if, based on compelling biological or ecological reasoning (e.g. the biology of the bird species, concealment of the nest site by topography, land use type, vegetation, and level of project activity) and as determined by a qualified wildlife biologist, that implementation of a specified smaller buffer distance will still avoid project-related "take" of adults, juveniles, chicks, or eggs. Any variance from the standard buffers must be submitted to CDFW in a written report that includes the location, reason for the buffer reduction, the name and contact information of the qualified wildlife biologist(s) who authorized the buffer reduction and conducted subsequent monitoring, the reduced avoidance buffer size, duration of buffer reduction, and outcome to the nest, egg, young and adults. The report should be submitted to CDFW at the end of each nesting season for the duration of the project. The owls will be monitored on a daily basis by a qualified biologist when construction is within the buffer zone during the entire nesting season unless the qualified wildlife biologist has determined that the young have fledged, are no longer dependent upon parental care, or construction ends (whichever occurs first). If the nesting owls show signs of distress within a reduced buffer zone, and that stress is related to construction activities, the qualified wildlife biologist reinstate will the recommended buffers. The recommended buffers will only be reduced after the qualified biologist has determined that the nesting owls are no longer exhibiting signs of stress. Reporting regarding reduction of buffers will be documented in a written report and will follow the procedure described above.
APM BIO-11	Badger dens will be clearly demarcated with appropriate flagging and signs and avoided if possible.
APM BIO-12	If a badger den cannot be avoided, CDFW will be consulted to discuss the possible relocation of the badger.
APM BIO-13	The introduction of noxious weeds carried in with construction equipment will be minimized by ensuring the equipment is clean before it is arrives at the proposed substation site, Fulton No. 1 60 kV power line and distribution line alignment. In addition, only weed-free erosion control materials will be used on the project.
APM BIO-14	Native seed mix will be used when restoring areas of grassland, oak woodland and wetland.
APM BIO-15	The valley oaks and oak woodlands will be denoted as environmentally sensitive and will be avoided to the extent practical. If any protected oak trees are removed, they will be replaced or compensated for in a manner that is consistent with the provisions in the Town of Windsor's Ordinance for Tree Mitigation.
	Cultural Resources
APM CU-1	Prior to the initiation of construction or ground-disturbing activities, PG&E will train all construction personnel to understand the potential for exposing subsurface cultural resources and to recognize possible buried cultural resources. Training will inform all construction personnel of the anticipated procedures that will be followed upon the discovery or suspected discovery of archaeological materials, including Native American remains and their treatment.
APM CU-2	Upon discovery of possible buried cultural materials (including potential Native American skeletal remains), work in the immediate area of the find will be halted and PG&E's archaeologist notified. Once the find has been identified and evaluated, PG&E's archaeologist will make the necessary plans for treatment of the find(s) and mitigation of impacts if the finds are found to be significant according to CEQA. State law will be followed in the event of the exposure of Native American skeletal remains.
APM CU-3	In the event human remains are encountered during the project, work in the immediate area of the find will be halted and the County Coroner will be notified immediately. Work will remain suspended until the Coroner can assess the remains. In the event the remains are determined to be prehistoric in origin, the Coroner will notify the Native American Heritage Commission, who will then identify a Most Likely Descendent. The Most Likely Descendent will consult with PG&E's archaeologist to determine further treatment of the remains.
	Hazards and Hazardous Materials
APM HM-1	A Hazardous Substance Control and Emergency Response Plan will be prepared for the project. It will prescribe hazardous material handling procedures to reduce the potential for a spill during construction or exposure of the workers or public to a hazardous material. The plan will provide a discussion of appropriate response actions in the event that hazardous materials are released or encountered during field activities.

Table 4-5. Applicant Proposed Measures (APMs)

APM HM-2	Emergency-spill supplies and equipment will be clearly marked and immediately available at all work areas. Oil-absorbent materials, tarps, and storage drums will be used to contain and control any minor releases. Detailed information for responding to accidental spills, and for handling any resulting hazardous materials, will be provided in the project's Hazardous Substances Control and Emergency Response Plan.
APM HM-3	An environmental training program will be established to communicate environmental concerns and appropriate work practices to all construction field personnel. The training program will emphasize site-specific physical conditions to improve hazard prevention, and will include a review of the Hazardous Substances Control and Emergency Response Plan and the Stormwater Pollution Prevention Plan (SWPPP).
APM HM-4	If contaminated soils or groundwater due to VOCs, xylene, or other contaminates are encountered, appropriate abatement actions will be implemented in accordance with applicable regulatory requirements.
	Hydrology and Water Quality
APM WQ-1	All BMPs will be on-site and ready for installation before the start of construction activities.
APM WQ-2	PG&E will develop a Stormwater Pollution Prevention Plan (SWPPP), as outlined in General Permit 2009-0009-DWQ, which will describe BMPs to prevent the acceleration of natural erosion and sedimentation rates. The SWPPP will include a written site-specific Construction Site Monitoring Program (CSMP). A monitoring program will be established to ensure that the prescribed BMPs are followed during project construction. BMPs will include: • silt fences or other sediment containment methods placed around and/or down slope of disturbed areas prior to construction; • protection of drain inlets from receiving polluted stormwater through the use of filters, such as fabrics, gravel bags, or straw wattles; • construction of a stabilized construction entrance/exit to prevent tracking onto roadway; • establishment of a vehicle storage, maintenance, and refueling area, if needed, to minimize the spread of oil, gas, and engine fluids. Use of oil pans under stationary vehicles is strongly recommended; and • no overnight parking of mobile equipment within 100 feet of wetlands, culverts, or creeks. Stationary equipment (e.g., pumps, generators) used or stored within 100 feet of wetlands, culverts, or creeks will be positioned over secondary containment.
xAPM WQ-3	A worker education program will be established for all field personnel prior to initiating fieldwork to provide training in the appropriate application and construction of erosion and sediment control measures. This education program will also discuss appropriate hazardous materials management and spill response.
APM WQ-4	All BMPs will be inspected on a weekly basis, and at least once every 24-hour period during extended storm events. BMPs will be inspected as described in the SWPPP, maintained on a regular basis, and replaced as necessary through the course of construction. For each inspection required, an inspection checklist will be completed using a form as described in Attachment C of General Permit 2009-0009-DWQ. This checklist will remain onsite with the SWPPP.
APM WQ-5	The SPCC plan will include engineered methods for containing and controlling an oil release, including a water-collection system and retention pond equipped with an oil/water separator. Oil-absorbent material, tarps, and storage drums will be present on-site to contain and control any minor releases.
APM WQ-6	Permits may need to be obtained prior to construction from the Army Corps of Engineers (404), Regional Water Quality Control Board 401 Certification, and California Department of Fish and Game Streambed Alteration agreement (1600) if any identified jurisdictional waters are found .
APM WQ-7	Construction work will avoid all wetlands, swales and drainages during construction. If waters areas cannot be avoided, work will be performed outside of the wet season.
APM WQ-8	Vehicle maintenance wastes, including used oils and other fluids will be handled and disposed of properly. Fuels and lubricating oils for vehicles heavy equipment will not be stored or transferred within 100 feet of any waterbodies.
	Noise
APM NO-1	All construction equipment will use noise-reduction features (such as mufflers) that are no less effective than those originally installed by the manufacturer.
APM NO-2	Construction will be limited to the hours between 7 a.m. and 7 p.m., Monday through Saturday, to the extent feasible. If nighttime work is needed because of clearance restrictions on the power line, PG&E take appropriate measures to minimize disturbance to local residents, including contacting nearby residences to inform them of the work schedule and probable inconveniences.
APM NO-3	Construction crews will limit unnecessary engine idling. (See Air Quality measures.)

Table 4-5. Applicant Proposed Measures (APMs)

APM NO-4	Construction crews will use equipment that is specifically designed for low noise emissions.
APM NO-5	Locate all stationary construction equipment as far as practical from noise sensitive receptors.

4.15 EMF Summary

4.15.1 Electric and Magnetic Fields

Recognizing that there is a great deal of public interest and concern regarding potential health effects from exposure to electric and magnetic fields (EMF) from power lines, this document provides information regarding EMF associated with electric utility facilities and the potential effects of the Proposed Project related to public health and safety. Potential health effects from exposure to electric fields from power lines (produced by the existence of an electric charge, such as an electron, ion, or proton, in the volume of space or medium that surrounds it) are typically not of concern since electric fields are effectively shielded by materials such as trees, walls, etc., therefore, the majority of the following information related to EMF focuses primarily on exposure to magnetic fields (invisible fields created by moving charges) from power lines. However, this Initial Study does not consider magnetic fields in the context of CEQA and determination of environmental impact. This is because (a) there is no agreement among scientists that EMF does create a potential health risk, and therefore, (b) there are no defined or adopted CEQA standards for defining health risk from EMF. As a result, EMF information is presented for the benefit of the public and decisionmakers.

After several decades of study regarding potential public health risks from exposure to power line EMF, research results remains inconclusive. Several national and international panels have conducted reviews of data from multiple studies and state that there is not sufficient evidence to conclude that EMF causes cancer. The International Agency for Research on Cancer (IARC), an agency of the World Health Organization (WHO), and the California Department of Health Services (DHS) both classified EMF as a *possible* carcinogen (WHO 2001; DHS 2002).

In addition, the 2007 WHO [Environmental Health Criteria (EHC) 238] report concluded that:

- Evidence for a link between Extremely Low Frequency (50–60 Hz) magnetic fields and health risks is based on epidemiological studies demonstrating a consistent pattern of increased risk for childhood leukemia. However, "…virtually all of the laboratory evidence and the mechanistic evidence fail to support a relationship between low-level ELF magnetic fields and changes in biological function or disease status….the evidence is not strong enough to be considered causal but sufficiently strong to remain a concern."
- "For other diseases, there is inadequate or no evidence of health effects at low exposure levels."

Currently, there are no applicable regulations related to EMF levels from power lines or substations. However, following a decision from 1993 (D.93-11-013) that was reaffirmed on January 27, 2006 (D.06-01-042), the CPUC requires utilities to incorporate "low-cost" or "no-cost" measures to mitigate EMF from new or upgraded electrical utility facilities up to approximately 4 percent of total project cost. To comply, PG&E has incorporated such measures to reduce magnetic field levels in the vicinity of the proposed substation and subtransmission lines.

4.15.2 EMF and the Windsor Substation Project

In accordance with Section X(A) of GO 131-D, CPUC Decision No. D.06-01-042, and PG&E's EMF Design Guidelines prepared in accordance with the EMF Decision, PG&E would incorporate "no cost" and "low cost" magnetic field reduction steps in the design of the proposed substation. The design guidelines include the following measures that may be available to reduce the magnetic field strength levels from electric power facilities:

- Optimal phasing of the substation interconnection;
- Keeping high current transformers, capacitors, and reactors away from substation property lines;
- For underground duct banks, keeping at least 12 feet from the adjacent property lines or as close to 12 feet as practical;
- Locating substation near existing power lines;
- Increasing the substation property boundary to the extent practical.

The CPUC's EMF Decision and PG&E's EMF Guidelines require PG&E to prepare a Field Management Plan (FMP) that indicates that no-cost and low-cost EMF measures will be used in engineering design.

Further information regarding EMF and the Windsor Substation Project can be found in Attachment F of the Proponent's Environmental Assessment. PG&E's application (A.10-04-024) and Proponent's Environmental Assessment are available for public review at the CPUC Energy Division CEQA Unit and on the project website at: http://www.cpuc.ca.gov/Environment/info/aspen/windsorsub/toc-pea.htm.

4.16 Other Public Agencies Whose Approval is Required

The CPUC has exclusive authority to approve or deny PG&E's application; however, various permits from other agencies may also need to be obtained by PG&E for the proposed project. If the CPUC issues a PTC, it would provide overall project approval and certify compliance of the project with CEQA. In addition to the PTC, Table 4-6 summarizes the permits from other federal, State, and local agencies that may be needed for the project.

Table 4-6. Permits that May Be Required for the Windsor Substation Project

Agency	Jurisdiction	Requirements
Federal/State Agencies		
United Fish and Wildlife Service	Endangered species consultation	Consultation on federally listed species; possible impacts to threatened and endangered species (if appropriate).
United States Army Corps of Engineers	Clean Water Act Section 404 permits	Consultation on any potential impacts to jurisdictional waters (if appropriate).
California Department of Transportation	Highways and State-owned roadways	Transportation Permit for movement of vehicles that may qualify as an oversized or excessive load (if required)
California Office of Historic Preservation	Consultation (through CEQA review process)	Cultural resources management (if appropriate)
Regional Water Quality Control Board (RWQCB) – North Coast Region	National Pollution Discharge Elimination System, General Construction Storm Water Pollution Prevention Plan (SWPPP)	Submittal of Notice of Intent (NOI) to Regional Board and preparation of SWPPP

Table 4-6. Permits that May Be Required for the Windsor Substation Project

Agency	Jurisdiction	Requirements
RWQCB – North Coast Region	Spill Prevention Control and Countermeasure (SPCC) for mineral oil in transformers. Clean Water Act Section 401 permits.	Calculation of containment requirements and system design. Consultation on any potential impacts to jurisdictional waters (if appropriate).
California Department of Fish and Wildlife	Endangered species consultation. Section 1600 permit (if appropriate).	Consultation on State-listed species; possible impacts to threatened and endangered species (if appropriate). Consultation on impacts to jurisdictional waters and riparian areas (if appropriate).
Local/Regional Agencies		
Town of Windsor	Building and Grading Permits and Safety Requirements	Ministerial approval for construction of new facilities
Sonoma County	Roadway Encroachment and/or Transportation Permit	Ministerial approval for possible closure of roads for transportation of heavy or oversized equipment and construction of facilities within public roadway rights-of-way

4.17 Substation Site Alternatives Considered

CEQA does not require consideration of alternatives when a proposed project would result in no significant environmental impacts after mitigation. This is because, under CEQA, a "reasonable alternative" is one that could feasibly accomplish most of the basic objectives of the project and avoid or substantially lessen one or more of the significant effects of the project. Nevertheless, CPUC's GO 131-D requires that an application for a PTC include the "reasons for adoption of the power line route or substation location selected, including comparison with alternative routes or locations, including the advantages and disadvantages of each" (GO 131-D, section IX.B.1.c.). A summary of the alternatives presented in PG&E's PEA is provided below.

In identifying the project site, PG&E evaluated other sites that could potentially be used for a substation. In all, ten potential sites were considered:

- Site 1 on American Way between the Fulton No. 1 line and Highway 101
- Site 2 is near the center of Windsor on Bell Road, just east of the NWPRR and Fulton No. 1 line
- Site 3 is at the Town of Windsor Public Works Office/Yard, wastewater treatment storage ponds and water treatment plant, west of the NWPRR and the Fulton No. 1 line
- Site 4 is at the end of Star View Drive south of Windsor town limits
- Site 5 is on Wilcox road, just west of the NWPRR and Fulton No. 1 line and 2000 feet south of the proposed site
- Site 6 is south of the proposed project site on Herb Road, west of the NWPRR and Fulton No. 1 line
- Site 7 is southeast of the proposed project site on Old Redwood Highway, east of the NWPRR and Fulton No. 1 line
- Site 8 is the proposed project site. It is near the northern limits of the town of Windsor at the corner of Old Redwood Highway and Herb Road, immediately east of the NWPRR and Fulton No. 1 line
- Site 9 is on Jensen Lane on agricultural land near the eastern border of Windsor
- Site 10 is at the corner of Shiloh Road and Conde Lane in south Windsor, adjacent to the NWPRR and Fulton No. 1 line

Site Alternative 1

Site 1 is located on American Way at Lot 8 of the Evans Drew Industrial Subdivision. The site is zoned light industrial and currently is vacant. The western portion of the site serves as a wetland preserve under a conservation easement. The surrounding land uses include vacant light industrial to the north, east, and south. To the west are the conservation easement, railroad tracks, and single family residential beyond the railroad tracks. The parcel is 5.4 acres including the conservation easement, which cannot be developed. Substation construction would require removal of at least three oak trees, and the fenced footprint would fully occupy the developable area of the site. Only frontage landscaping would be possible. Distribution work would be similar to the proposed substation site (Site 8). Because of the undevelopable areas under conservation easement, the remaining site area is too small to accommodate the substation. Therefore, it has been removed from further consideration.

Site Alternative 2

Site 2 is located at 8711 Bell Road, in an area zoned High Density Residential/Neighborhood Center. Currently the site is vacant; it has a history of industrial use, specifically as the site of a lumber mill. Surrounding areas are zoned for residential, for a public school, for railroad tracks, and for wastewater treatment ponds. The parcel is 8.91 acres. The substation would be located at the southern tip of the parcel, immediately adjacent to the railroad right-of-way, allowing the northern portion of the parcel to remain available for future development. The substation site is immediately adjacent to the Fulton No. 1 60 kV line, so power line connection would be direct.

The potential substation location at Site 2 would conflict with existing development plans by the Town of Windsor, and the Town would be opposed to a substation at this site. A perennial creek with dense riparian vegetation borders the east side of the site, and setbacks would be required. In addition, the site is in close proximity to Windsor Creek Elementary School. Combined, these issues represent significant constraints that would make this site extremely difficult to permit.

Site Alternative 3

Site Alternative 3 is at 8400 Windsor Road, on a 24 acre lot zoned Public/Institutional. Currently, the site serves as a Town of Windsor Public Works Office/Yard, and houses wastewater treatment storage ponds and a water treatment plant. Adjacent land uses include residential, wastewater treatment storage ponds, railroad tracks, the Site Alternative 2, a public works office building, a fire station, and two single-family residences. Windsor High School is 825 feet from Site 3. The Public Works Department has an unfunded plan to expand the wastewater treatment storage ponds, which means the substation would need to be in the northeast corner of the site. The substation would be immediately adjacent to the Fulton No. 1 60 kV line, so connection to the power line would be direct. There is no sensitive habitat on the site. However, proximity to residential areas could create construction traffic and visual impact concerns.

Site Alternative 4

Site Alternative 4 is at 1144 Starr View Drive, at the end of the public street, and is zoned Estate Residential. Currently, the site is vacant pasture and is surrounded by residential subdivisions and rural residential land use. The substation would be in the northeast corner of the 24-acre parcel (at the end of Starr View Drive).

Connecting the substation to the power line would require construction of a 2,400-foot-long, double-circuit 60 kV loop. The loop would extend along a strip of land owned by the Town of Windsor, which is currently occupied by oak trees. The interconnection poles would need to be greater in height than these trees. West of Starr Road, the double-circuit loop would be in a utility franchise along Starr View Drive for approximately 1,500 feet. Starr View Drive is fronted by single-family homes. It may be possible to convert the existing overhead distribution line to underground to help minimize the number of overhead lines viewed by fronting residences. Reconductoring of the existing overhead circuit along Starr Road would still be required from Starr View Road south to Windsor Road River Road.

Review of aerial photographs suggests that a seasonal stream transects the property diagonally from the northwest to the southeast. It is possible the stream could be avoided. However, the overhead double circuit 60 kV power line along a residential street could represent a potentially significant environmental constraint.

Site Alternative 5

Site 5 is located at 309 Wilcox Road. The current land use is rural residential in the southeast corner of the parcel. Neighboring land uses include rural residential, subdivision residential, railroad tracks, a private Christian Academy, and an auto dismantler. The parcel is 5.09 acres, and the substation would be sited on the northeast side of the property adjacent to the railroad tracks. Wilcox road, a private road serving a parcel to the north, is proposed to provide access to the site; this section of road is likely on an access easement.

Because the Fulton No. 1 60 kV power line runs adjacent to the Site 5, power line connection would be direct. Site 5 is located north of town center, and thus would require similarly extensive distribution reinforcement as the proposed substation site (Site 8). Unlike the proposed site, however, there are no adjacent public roads to the undergrounding, meaning routing and installation would be much more challenging. The site has environmental constraints as well. In particular, aerial photos indicate its hydrology may provide suitable habitat to Burke's Goldfields, a state and federally listed plant species. The Christian Academy across the railroad tracks has playing fields and classrooms within 120 and 500 feet, respectively, of Site 5.

Site Alternative 6

Site 6 is located at 10501 Herb Road on a 23-acre parcel. The parcel is zoned Estate Residential, and surrounding land uses include Rural Residential, a vineyard, railroad tracks, the Windsor school bus yard, and the proposed substation site (Site 8). The parcel has approximately 980 feet of frontage along the railroad tracks. The substation would front the railroad tracks, with the actual location to be determined by both potential environmental issues and negotiations with the existing property owner.

The existing Fulton No. 1 60 kV Power Line runs along the northeast side of the parcel, meaning power line connection would be direct. Site 6 is located north of town center, and thus would require similarly extensive distribution reinforcement as the proposed site. Herb Road is the nearest public street, abutting the south side of the parcel. Several environmental constraints apply to the site. A wetland delineation prepared for the parcel by the owner indicates numerous wetlands, both in the center of the parcel and near the existing power lines. The site is known to contain Burke's goldfields, a listed plant species. Three mature oak trees situated approximately 100 feet west of the railroad right-of-way are equally spaced along this frontage, and substation development would likely require removal of at least three trees.

Site Alternative 7

Site Alternative 7 is at 10525 Old Redwood Highway on a 4.81 acre parcel zoned Service Commercial. Currently the parcel is the site of Pick & Pull Auto Parts, an auto dismantling service. Surrounding land uses include auto dismantling, commercial, railroad tracks, and rural residential. The substation would occupy approximately 1.5 acres adjacent to the railroad tracks, covering a minimum of 250 by 270 feet at the southwestern corner of the parcel.

Because the Fulton No. 1 60 kV is directly across the railroad tracks from Site 7, a short span would provide a power line connection. Site 7 is located north of town center, and thus would require similarly extensive distribution reinforcement as the proposed site (Site 8). The site's history as an auto dismantling facility means that hazardous materials could be found at the site. The site is not currently for sale, meaning development at this site would require cooperation from the current owner for purchasing and for an access/distribution line easement from Old Redwood Highway to the site. Furthermore, construction access could significantly affect the daily business operations of neighboring land uses.

Site Alternative 8

This is the proposed substation site. Its location, description, power line connection, and distribution circuits are described at length in the preceding sections. The Town of Windsor supports the use of the rear portion of this site, as long as landscaping along road frontages is consistent with the Town Gateway Concept. Although there is potential presence of rare plants and wetlands along the northern portion of the 60 kV line, it is anticipated that these resources could be avoided or temporary impacts mitigated to a less-than-significant level.

Site Alternative 9

Site Alternative 9 is located at 657 Jensen Lane on a 27.9 acre parcel. The parcel is currently used for vineyards and is zoned Surrounding Residential. Surrounding land uses include additional vineyards to the east and single-family residential around the remainder of the parcel. The substation would be sited along the east parcel border to create the maximum amount of distance from the neighboring residential land uses.

To create power line connection, an approximately 1.10-mile double-circuit line from the substation to the Fulton-Hopland 60 kV Power Line to the east would be built. All 12 distribution circuits would be underground, heading west from the substation approximately 1,000 feet down Jensen Lane. Interconnection would be with an existing distribution circuit on Hembree Lane. This existing circuit would not need reinforcement, as the location is situated close to the center of the Windsor's electrical load. Based on a history of opposition to neighborhood development at the site, this location would likely be difficult to permit for a substation. Additionally, the long power line could result in potential visual and agricultural impacts and add substantial costs.

Site Alternative 10

Site 10 is located at the northeast corner of Shiloh Road and Conde Lane. The north half of the parcel is zoned Recreation, while the south half is zoned Light Industrial. Currently, the land is actively used for agriculture. Site 10 was suggested by the Town of Windsor Planning Department based on its close proximity to heavy industrial land uses south of Shiloh Road. The parcel covers 40 acres, and the substation would be in the northwest corner of the property fronting Conde Lane.

To create a power line connection, an approximately 1,200-foot extension from the existing Fulton No. 1 60 kV Power Line at Shiloh Road to the substation would be required. All distribution circuits would be underground to the north since Conde Lane is an underground distribution district, and would connect to circuits similar to the arrangement at the proposed substation site. However, this site's close proximity to the Fulton Substation would result in minimal distribution benefits.

The site is adjacent to a perennial stream with mature riparian vegetation, which may provide habitat for some sensitive species. The power line connection would avoid most mature oak trees, but potentially significant tree trimming and possible removal would be required for the span over Pool Creek into the station. Additionally, the site is currently proposed for retail development. Even if a substation could be accommodated within this development, the location of this site is too close to Fulton Substation to provide the distribution load support needed for the Town of Windsor.

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