2.0 PROJECT DESCRIPTION

2.1 PROJECT OVERVIEW

Pacific Gas and Electric Company (PG&E) currently owns a 115 kilovolt (kV) electric transmission system in the Petaluma–Napa–Sonoma area. To address low voltage and overloading problems in the area, PG&E proposes to construct the Lakeville–Sonoma 115 kV Transmission Line Project, which will add a second circuit between Lakeville Substation (at the eastern edge of the City of Petaluma) and Sonoma Substation (at the southern edge of the City of Sonoma), to be installed on a rebuilt version of an existing single-circuit 115 kV transmission line. Key components of the project are listed in Table 2-1.

Figure 2-1 shows the location and alignment of proposed project, which is divided into three segments for purpose of analysis (segments 1-2-17). A number of other routes and alternatives were considered before selecting the proposed project. These alternatives are discussed in Chapter 3.

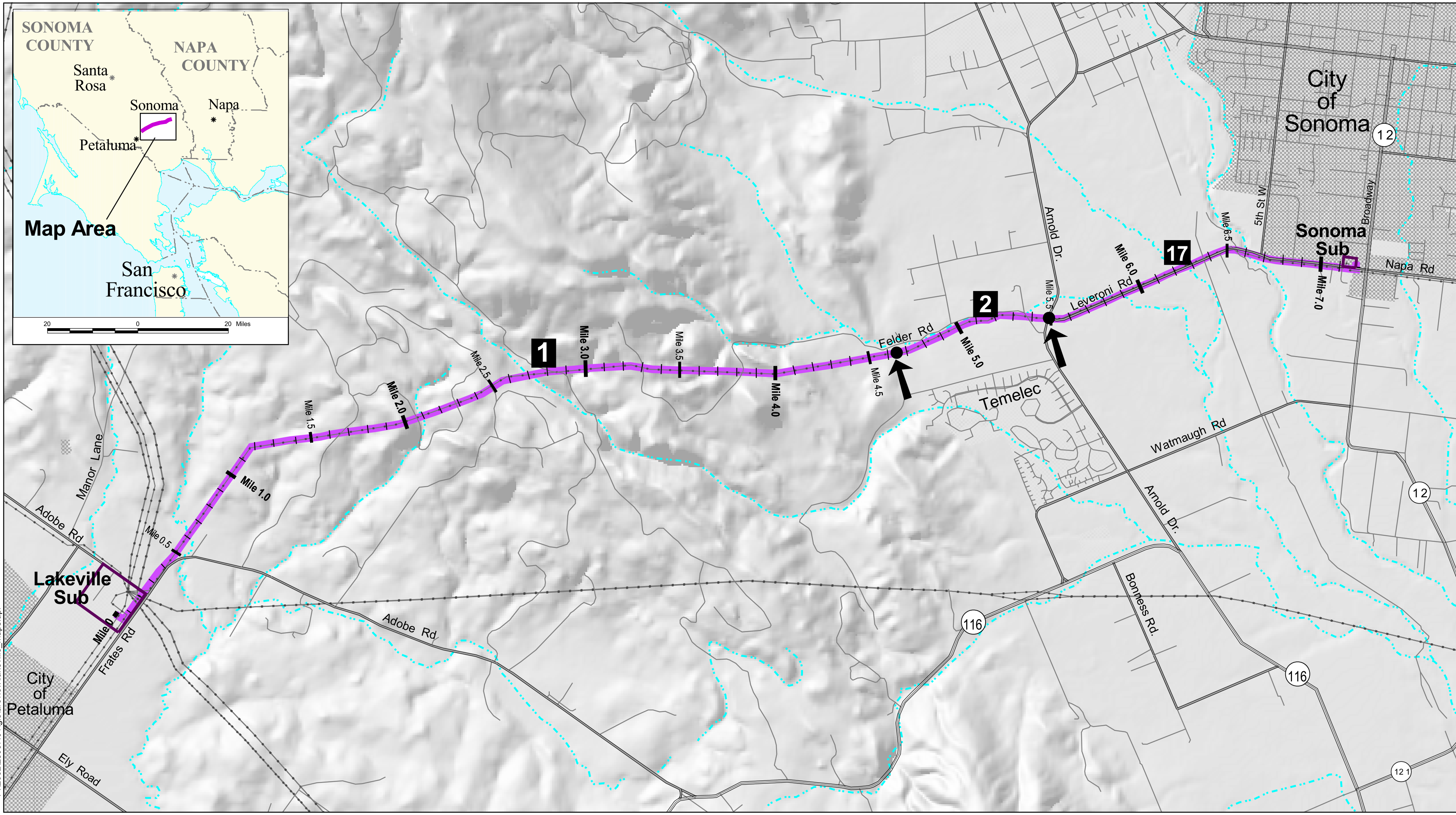
Table 2-I
Summary of Project Components

115 kV Transmission Line
– Replace an existing single-circuit 115 kV transmission line with a double-circuit 115 kV line from Lakeville Substation to Sonoma Substation – Existing transmission, distribution and telecommunication lines will be transferred to the new poles. – Voltage of new circuit: 115 kV alternating current – Pole Type: tubular steel poles[a] and wood poles – Pole Height: generally 55 to 100 feet[b] – Span between Poles: approximately 200 to 1,370 feet[c] – During construction, existing land access and helicopters will be used to minimize environmental impacts.
Lakeville Substation
– Modification of existing substation yard on PG&E property. Existing landscape along Frates Road will provide screening. – Installation of facilities to support a 115 kV line position. One new tubular steel pole will be located inside the substation.
Sonoma Substation
– Installation of facilities to support a 115 kV line position. One tubular steel pole will replace an existing wood pole inside the substation. Installation of additional landscaping along Leveroni Road.

[a] *PG&E will use self-weathering steel poles, which oxidize to a natural looking reddish-brown color within about one year.*

[b] *One new pole will be approximately 130 feet high to enable the transmission line to span over an earthquake fault. For comparison purposes, the existing single circuit wood poles range from about 50 to 70 feet in height. Note that these figures assume implementation of the "low cost" electric and magnetic fields (EMF) reduction measures recommended in PG&E's Preliminary EMF Management Plan.*

[c] *For comparison purposes, the existing spans are approximately 300 to 960 feet. Completion of the project as proposed by PG&E will result in the elimination of approximately 20 poles from within the existing Lakeville-Sonoma corridor.*



P:\2002\2s067.01\gis\arcview\lakeville_maps.apr

Source: PG&E GIS / EDAW, Inc. 2004

1 0 1 Miles

Scale 1 : 47,520
1" = 0.75 mile

LEGEND

- Proposed Transmission Line
- 1 Route Segment #
- Existing Transmission or Distribution Line
- Existing Substation

FIGURE 2-1

Lakeville-Sonoma 115kV Transmission Line Project

Proposed Project

115 kV Transmission Line and Substation Modifications

EDAW

Pacific Gas and Electric Company

11/9/04

2.1.1 Existing Regional Electric System

The Napa–Sonoma area is currently served by a number of substations and transmission lines, as shown in Figure 2-2. There is also an extensive network of distribution lines throughout the region, which carry lower voltage electricity from the substations to PG&E residential and commercial customers. Distribution lines generally follow city streets and back property lines and are not shown in the figure.

In general, electrical power systems consist of power generation facilities, transmission lines, substations, and distribution lines. Figure 2-3 shows a diagram of a typical electric transmission system. Electricity is delivered from power generation facilities (1, 2) to customers through a series of wires and cables that make up electric transmission lines (3, 4). Transmission lines carry electricity at high voltages from generation facilities to regional substations (5), while distribution lines (6, 7) carry electricity from substations to individual customers at much lower voltages.

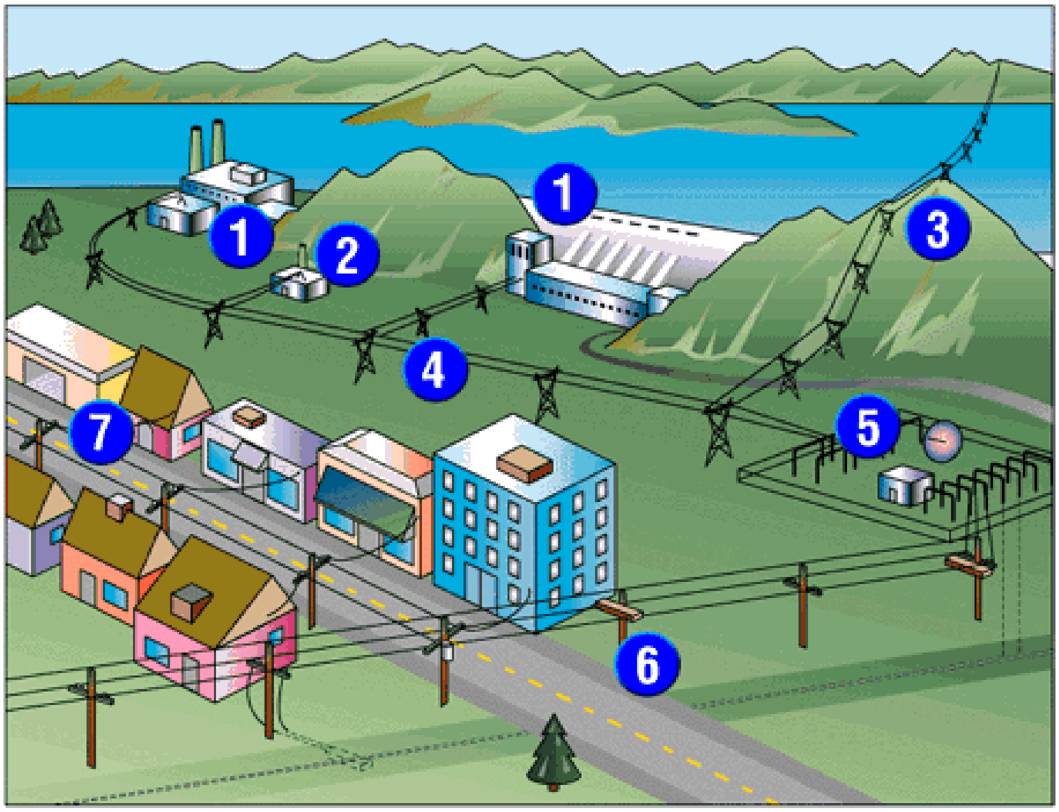
Ideally, the power transmission system is made up of a grid-like configuration in which multiple transmission lines serve each substation, thereby creating a redundant and thus more reliable system. This redundancy helps provide uninterrupted service to utility customers during normal maintenance procedures and during emergency repair situations.

The amount of electricity that can be transmitted by a particular transmission line depends on the line's properties (i.e., voltage, conductor type, size, length of the line, thermal limit, etc). Because of these factors, power is converted to higher and lower voltages for different purposes. The size of the transmission facility is designed and constructed based upon the needs of the area to be served. As areas grow and electric demand increases, additional customer demand places increased strain on the backbone grid system. At some point, the system needs to be enhanced to adequately support the customers' needs.

At the generation plant, power is converted or "stepped up" to a higher voltage, known as the transmission voltage, in order to reduce the amount of current that flows through the system's transmission lines. This allows power to be delivered from the generation plant to the major load centers (substations) with fewer wires and less energy loss. At the substations, power is "stepped down" to a lower voltage for delivery to individual customers. Transmission and distribution substations are used to "step up" or "step down" the voltage as needed and to route the power over transmission and distribution lines. In the PG&E transmission system, power is transmitted at 500, 230, 115, 70, and 60 kilovolts (kV).

Electric power is currently delivered to substations in the project area at 60kV, 115 kV and 230 kV. Power is then converted to lower voltages for distribution to customers through overhead or underground distribution lines. The local distribution system, typically at 12 and 21kV, is further stepped down to 120 V by individual neighborhood transformers for customer use.

Figure 2-3: Typical Electric Transmission System



Source: Edison Power Research Institute; PG&E 2004

2.1.1.1 Existing Substations

PG&E relies on five distribution substations to serve its electric customers in the cities of Sonoma and Napa, and surrounding areas: Sonoma, Pueblo, Basalt, Napa, and Tulucay substations. Two of these substations, Sonoma and Pueblo, are connected to PG&E's 115 kV transmission network and serve about 60 percent of the customers in this area.[1] The other three substations are connected to PG&E's 60 kV transmission network and serve the remaining customers. The two systems operate independently.

[1] The Sonoma Substation serves the electrical needs of the entire City of Sonoma and some surrounding Sonoma County lands. The Pueblo Substation is located just north of the City of Napa and serves customers in the north half of the City of Napa and some surrounding Napa County lands.

Figure 2-2: Existing Regional Electric System

11x17 insert

Back of Figure 2-2

2.1.1.2 Existing 115 kV Transmission Facilities

In the 115 kV system, the Sonoma and Pueblo substations are tied in a loop configuration to the Lakeville and Fulton substations by the Fulton–Pueblo, Sonoma–Pueblo, and Lakeville–Sonoma 115 kV lines.

As shown in Figure 2-2, the Fulton–Pueblo 115 kV line runs from northern Santa Rosa eastward to St. Helena and then turns south toward the City of Napa. In addition to serving Sonoma and Pueblo substations under normal conditions, this line also backs up Rincon and Silverado substations in the event of an outage on the Fulton–Fulton Junction 115 kV line. The Fulton–Pueblo and the Fulton–Fulton Junction 115 kV lines share the same transmission towers from the Fulton Substation to St. Helena. The Sonoma–Pueblo 115 kV line runs from the Pueblo Substation southward to downtown Napa and then westward to downtown Sonoma. The Lakeville–Sonoma 115 kV line runs from the Lakeville Substation eastward to Sonoma Substation.

2.1.1.3 Existing Generation Facilities

No electric power generation facility exists within the immediate project vicinity. There are approximately 900 MW of generation capacity in the larger area and about 85 percent of this capacity is comprised of geothermal plants known as "the Geysers"; the remaining 15 percent is comprised of gas-fired and hydroelectric generation. The Geysers, located approximately 25 miles north of Santa Rosa, are the closest generation facilities to the project area. The Geysers are connected to the Fulton and Lakeville substations by dedicated 230 kV lines.

2.2 PROJECT PURPOSE AND NEED

Statement of Objectives

The basic objectives of the Lakeville-Sonoma 115 kV Transmission Line Project are as follows:

- **Ensure transmission system reliability** – The main project objective is to ensure that the Napa-Sonoma area transmission system will continue to meet planning standards and criteria established by the ISO and North American Electric Reliability Council (NERC) to ensure the safety and reliability of the transmission system. These planning criteria must be met by the project.
- **Meet electric demand** – The second objective is to ensure that the electric system includes adequate capacity to safely and reliably serve the Sonoma and Napa area (i.e., the cities of Sonoma and Napa and surrounding county lands).
- **Implement the ISO Board of Governors' June 24, 2004 Resolution** – The third basic objective is to implement the June 24, 2004 California ISO Board of Governors' resolution approving the Lakeville-Sonoma 115 kV Transmission Line Project for addition to the ISO-

controlled grid, consistent with the ISO Tariff as adopted by the Federal Energy Regulatory Commission pursuant to the Federal Power Act.

Under California law, any routing alternative analyzed by the CPUC for this project must be capable of meeting these basic project objectives (CEQA Guidelines, Section 15126.6). Of course, CEQA does not require or authorize an analysis of alternatives unless the proposed project will create significant unavoidable impacts (CEQA Guidelines, Sections 15126.6, subd. (a) and (f)(2)(A); see also Assigned Commissioner's Ruling dated October 16, 2002, A.01-07-004, p. 4 ("It is only if the initial study identifies potentially significant adverse impacts on the environment that cannot be mitigated that an environmental impact report will be prepared and alternatives considered")).

The basis for the ISO's and PG&E's conclusion that the Lakeville–Sonoma 115 kV Transmission Line Project is needed is beyond the scope of this Permit to Construct (PTC) Application. As the CPUC has repeatedly acknowledged, "need" issues are beyond the scope of a PTC application. (See, for example, Assigned Commissioner's Ruling dated October 16, 2002, A.01-07-004, p. 5 ("the need for the project is outside the scope of this [Atlantic-Del Mar PTC] proceeding"); D.94-06-014, 55 CPUC 2d 87, 92 (PTC review "focuses solely on environmental concerns, unlike the CPCN process which considers the need for and economic cost of a proposed facility"); GO 131-D, Section IX.B.1.f ("an application for a permit to construct need not include . . .a detailed analysis of purpose and necessity").) Nonetheless, PG&E provides the following discussion of the purpose and need for the project for informational purposes.

The Lakeville-Sonoma project is needed to improve reliability and transmission capacity in the Napa-Sonoma area in order to continue to provide safe and reliable electric service to customers in the cities of Sonoma and Napa and surrounding county lands. PG&E's local 115 kV transmission system (described in Section 2.1.1.2) is at risk of a sudden drop to low voltages and resultant overloading problems should there be a loss of the Lakeville–Sonoma 115 kV transmission line. Installation of a second circuit between Lakeville and Sonoma substations will correct this voltage problem and help meet future demand, maintain compliance with applicable grid reliability criteria, and make it easier to maintain the transmission system.

The Sonoma and Pueblo 115 kV substations are connected to the Lakeville and Fulton 230 kV substations in a loop configuration via the Fulton–Pueblo, Pueblo–Sonoma and Lakeville–Sonoma 115 kV lines. The length of these transmission lines is 35 miles, 18 miles and 7 miles, respectively. Since both Sonoma and Pueblo substations are relatively close to Lakeville Substation, the bulk of the load served by these two substations is supplied by Lakeville Substation.

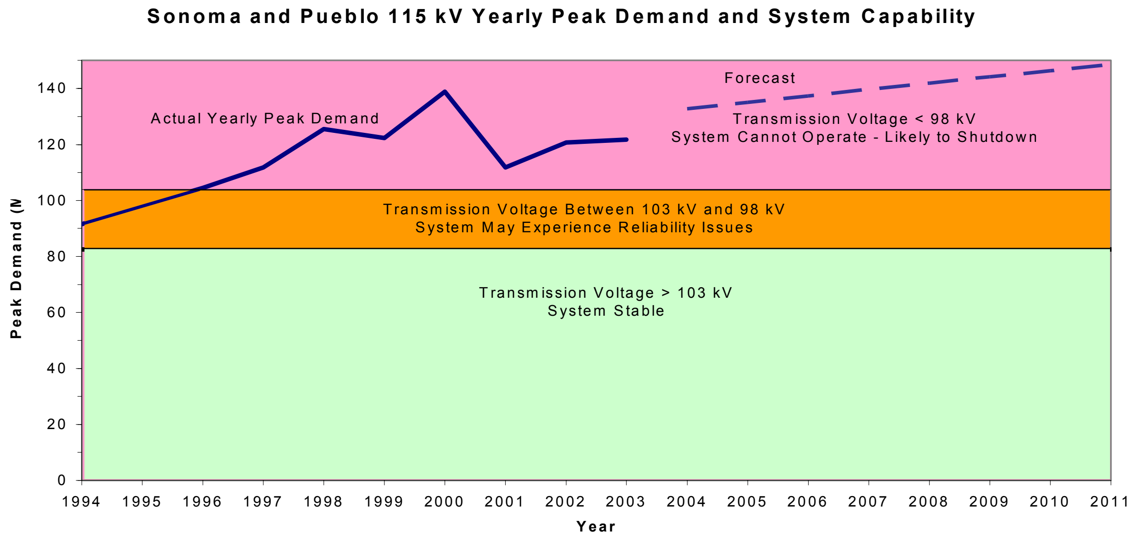
Given that the Lakeville Substation is the main source of electric power for the Sonoma and Pueblo substations, the loss of the Lakeville–Sonoma 115 kV line would likely cause low voltages, system overloading problems, and power outages to both substations, particularly during peak electric demand conditions. If the Lakeville–Sonoma line is unavailable, the only source of power to Sonoma and Pueblo substations is from Fulton Substation. Fulton Substation is 35 miles away from Pueblo Substation and 53 miles away from Sonoma Substation. PG&E's transmission planning study results indicate that, in the event of this line outage, the Fulton-Pueblo 115 kV line would overload by over 30 percent of its emergency rating, and the voltages at Sonoma and Pueblo substations are expected to suddenly drop below 90 kV under certain conditions. In general, a voltage higher than 103 kV is healthy and acceptable, but when voltage drops below 98 kV, the transmission system cannot sustain operation.

Low voltages on the local 115 kV system could cause the two substations serving the area to shut down, affecting service to residential, commercial and industrial customers. Even if the substations are not shut down, low voltages could force the shutdown of voltage-sensitive electric equipment, such as induction motor driven fans, pumps, and compressors and other high-tech equipment that are typically used by commercial and industrial customers. This could be especially devastating if an outage of this line were to occur late in the summer when there is an increase in customer electricity demand due to hot temperatures and electric power demand created by the wine industry's grape harvest in the crush season. According to PG&E customer representatives, harvest runs from late August through early November, and peak loading days often occur late in the summer and early autumn in this area.

The existing system (Sonoma and Pueblo substations) has a maximum load-serving capability (while still maintaining a voltage of 103 kV or above) of about 83 MW with loss of the existing Lakeville-Sonoma 115 kV line. The Sonoma Substation, which mainly serves the electrical needs of the entire City of Sonoma, recorded a historical peak load of 48 MW in the summer of 2000. The Pueblo Substation, which serves customers in the northern half of the City of Napa also experienced its historical peak load of 91 MW in the summer of 2000. The total historic peak of 139 MW far exceeds the maximum load-serving capability of the system when the Lakeville-Sonoma line is unavailable.

With the recent economic downturn and customer conservation efforts resulting from the energy crisis, peak demand levels over the next three years dropped. In 2003, for instance, peak loads at the Sonoma and Pueblo substations were 43 MW and 79 MW, respectively. The combined demand of 122 MW, while lower than in 2000, is still over the maximum load-serving capability of the system (approximately 83 MW with loss of the existing Lakeville-Sonoma 115 kV line). Thus, even with the current lower summer peak load levels, low voltages would result if the Lakeville-Sonoma 115 kV line suffered an outage.

Moreover, in the future, the load at Sonoma Substation is forecasted to grow at a rate of 0.8 MW per year and the load at Pueblo Substation is forecasted to grow at a rate of 1.5 MW per year. (One megawatt (MW) serves approximately 1,000 residential homes.) Analyses show that, with the existing system and forecasted load levels of about 130 MW and above, voltage would drop below 90 kV if the Lakeville-Sonoma line went out of service. The graph below shows the relationship between peak demand and transmission voltage if the existing Lakeville-Sonoma 115 kV line is unavailable.



(The chart assumes that the existing Lakeville-Sonoma 115 kV line is out of service.)

An outage of the existing Lakeville-Sonoma line is considered a Category B disturbance under CAISO and NERC/WECC Planning Standards. These standards require that, during a single element outage, the transmission system must be capable of serving customer demand while maintaining adequate voltage levels and keeping line and equipment loading within their emergency ratings. If the existing Lakeville-Sonoma line fails, especially during peak demand load levels, the existing system will not be able to meet planning criteria for reliability. The resulting low voltage and line overloading problems in the event of this outage could prevent PG&E from serving customer demand.

Fortunately, installing a second 115 kV line from the Lakeville Substation to Sonoma Substation will allow PG&E to meet the above planning criteria and ensure the safe and reliable delivery of electricity to customers during any system disturbance. A second circuit between Lakeville and Sonoma substations would increase the reliability of the system and mitigate the low voltage and overloading problem by providing another source of electrical power to the Sonoma and Napa area. Even if the existing line fails, the new line will ensure that there is an adequate continuous path for power flow from a strong source such as Lakeville Substation. Maintaining this continuous path of electricity prevents sudden voltage drops during contingency events such as loss of the existing Lakeville-Sonoma circuit and eliminates the need to fully rely on the long line from Fulton Substation to provide electrical power to the Sonoma and Pueblo Substations.

Additionally, as mentioned above, during an outage of the existing Lakeville–Sonoma 115 kV single-circuit line, an approximately 15-mile portion of the Fulton–Pueblo 115 kV line is expected to load at more than 30 percent over the line's emergency rating. An overload of this magnitude could potentially damage equipment and would likely cause further outages. Power flow study results show that installation of a second Lakeville-Sonoma 115 kV circuit will prevent the predicted overload of the Fulton-Pueblo line and maintain compliance with applicable grid reliability criteria even under "N-1" (one line out of service) conditions.

Finally, having a second Lakeville-Sonoma line would also facilitate maintenance on the other line and associated equipment at either substation. This is so because, when one line or its associated substation equipment requires maintenance and must be taken out of service, the other line would remain in service and available to serve load, thereby substantially reducing the challenges that presently exist with respect to obtaining ISO-approved clearances needed to maintain the existing line.

PG&E designed the project to address potential concerns about the reliability of putting the two circuits together on the same set of poles from Lakeville to Sonoma. For example, PG&E will use stronger tubular steel poles, use fewer poles, use a route that is mostly in open country, and will move some poles further back from the road (e.g., along Adobe Road north of Lakeville Substation). Poles that run parallel to Felder Road are set back behind a row of trees and vegetation, which reduces their exposure to car collisions. New wood poles would be installed in a similar alignment as the existing wood poles along Leveroni Road (wood poles need to be used instead of tubular steel in this location to avoid a grounding issue with an existing transmission gas line). However, Leveroni is mostly straight and tubular steel poles would be used at the east end and at the curve near Sonoma Creek, which helps reduce the likelihood of a pole going down due to car collision. PG&E's repair records show no history of pole loss due to car collision on Leveroni Road (pers. comm. David Thomas, PG&E Land Planner, August 23, 2004.) Having the second circuit on the line will provide back-up should one circuit go out of service due to, for example, equipment failure (on the line or at the substations) or a bird collision[2]. For these reasons, PG&E transmission planners determined that the proposed project could be designed to minimize the risk of losing both circuits at the same time, while still realizing the environmental benefits of co-locating the proposed project with the existing Lakeville-Sonoma 115 kV transmission line.

[2] The new transmission line poles have been designed to avoid bird fatalities.

In sum, the Lakeville-Sonoma 115 kV Transmission Project will increase overall capacity to eliminate existing voltage concerns and help meet future electrical demand growth in the Sonoma and Napa areas, ensure compliance with all applicable reliability criteria, and make it easier to maintain the transmission system at and between Lakeville and Sonoma substations.

2.3 DESCRIPTION OF THE PROJECT

The Lakeville–Sonoma 115 kV Transmission Line Project will add a second 115 kV transmission circuit to an existing transmission line corridor between the Lakeville Substation and the Sonoma Substation, co-locate the two circuits on a single set of poles to minimize project impacts, and modify these two substations to accommodate the new circuit.

2.3.1 Project Components

2.3.1.1 115 kV Transmission Line

The additional transmission line will be approximately 7.23 miles long. PG&E proposes to replace the existing single-circuit wood pole line with a rebuilt double-circuit line on a combination of self-weathering tubular steel poles and wood poles.

Location and Routing

The double-circuit transmission line will follow the same general alignment as the existing single-circuit line. As shown in the previous Figure 2-1, the transmission line begins at the Lakeville Substation, parallels Adobe Road northeast, then passes north and east through vineyards and ranch lands. The line roughly parallels Felder Road near the junction of Felder Road and Felder Creek to the junction of Felder Road and Leveroni Road. From there it follows Leveroni Road to Sonoma Substation. The transmission line is broken down into three segments (referred to as segments 1-2-17) for purpose of analysis.

As shown in Table 2-2, the new line will replace existing single-circuit wood poles with double-circuit tubular steel poles (TSPs) and wood poles. Wood poles will be used along Leveroni Road for safety purposes, as steel poles could cause induction problems next to an existing transmission gas line in that area. The TSPs also will be located a little farther to the west along Adobe Road than the existing wood poles to avoid potential conflicts with an existing transmission gas line. The new transmission line will require approximately 20 fewer poles than the existing line; this is because the taller tubular steel poles allow for greater spans (distance) between poles, which reduces the total number of poles needed to support the existing and new circuits.

The route alignment, approximate pole locations, and likely pole types are shown in Figures 2-4(a) through 2-4(d)[3]. These maps also show the tentative locations of staging areas, helicopter landing zones, pull sites, and access roads.

Poles

The transmission line will be supported by tubular steel poles (TSPs) and wood poles, which will be approximately 2 to 3 feet in diameter and generally range from approximately 55 to 100 feet in height[4]. Pole number 43 in the Sonoma Mountains will be 130 feet high due to the need to span the Rogers Creek fault. Span lengths between the poles will range from 200 to 1,370 feet, but average spans will be 500 to 900 feet. The TSPs will be made of self-weathering steel, which oxidizes to a natural-looking rust color within about one year. Use of TSPs eliminates the need to install guy wires, which can interfere with bird flight and property use (e.g., grapevine installation and maintenance). TSPs also require less maintenance than wood poles.

However, wood poles will be used along Leveroni Road for safety purposes, as there is a transmission gas line that runs along the road and steel poles would be incompatible. Typical pole designs are shown in Figure 2-5.

Angle poles will be installed in concrete foundations, which eliminate the need for wire down guys that would otherwise be needed to support a wood angle pole. This reduces visual clutter, increases line integrity by eliminating guy failure consequences, and can decrease bird strikes.

The existing single-circuit transmission line consists of 117 wood poles. It will be replaced with a new double-circuit transmission line consisting of approximately 78 poles (mainly tubular steel poles with some wood poles). The new poles will generally be larger and taller than the existing wood poles, which is necessary to support the additional circuit. Most will be located within 20 feet of an existing pole location. Nineteen existing wood poles will be "topped" (i.e., shortened by removing the existing transmission lines and cut down to the level of the lower distribution lines) allowing the existing distribution lines to remain. This reduces the number and height of new transmission poles required, which reduces visual impacts. Otherwise, more poles and taller poles closer together would be needed to create the clearance required for distribution lines underneath two transmission circuits. One (1) existing tubular steel pole inside the Lakeville Substation will remain.

[3] The information in this project description is based on preliminary engineering, the details of which are subject to change as a result of the CPUC permit process, final engineering, and any necessary adjustments during construction.

[4] Note that these figures assume implementation of the "low cost" EMF reduction measures recommended in PG&E's Preliminary EMF Management Plan for the project. Pole heights may be more or less depending on final EMF mitigation measures determined by the CPUC.

Table 2-2
115 kV Transmission Line Construction

Segment		Existing Lines	Proposed Construction	Miles	Segment Miles
1		Wood Pole Single-circuit w/ Distribution Under	TSP Double-circuit w/ Distribution Under	0.70	4.64
		Wood Pole Single-circuit	TSP Double-circuit	0.92	
		Wood Pole Single-circuit w/ Distribution Under	TSP Double-circuit w/ Distribution Under	0.22	
		Wood Pole Single-circuit	TSP Double-circuit	2.44	
		Wood Pole Single-circuit w/ Distribution Under	TSP Double-circuit w/ Distribution Under	0.36	
2		Wood Pole Single-circuit	TSP Double-circuit	0.45	0.85
		Wood Pole Single-circuit w/ Distribution Under	TSP Double-circuit w/ Distribution Under	0.40	
17		Wood Pole Single-circuit w/ Distribution Under	TSP and Wood Poles Double-circuit w/ Distribution Under	1.74	1.74
				Total Miles:	7.23

The information in this table is based on preliminary engineering, the details of which are subject to change as a result of the CPUC permit process, final engineering, and any necessary adjustments during construction.

Figure 2-4a: Proposed Transmission Line Route West

11 X 17 insert

Figure 2-4b: Proposed Transmission Line Route Mid-West

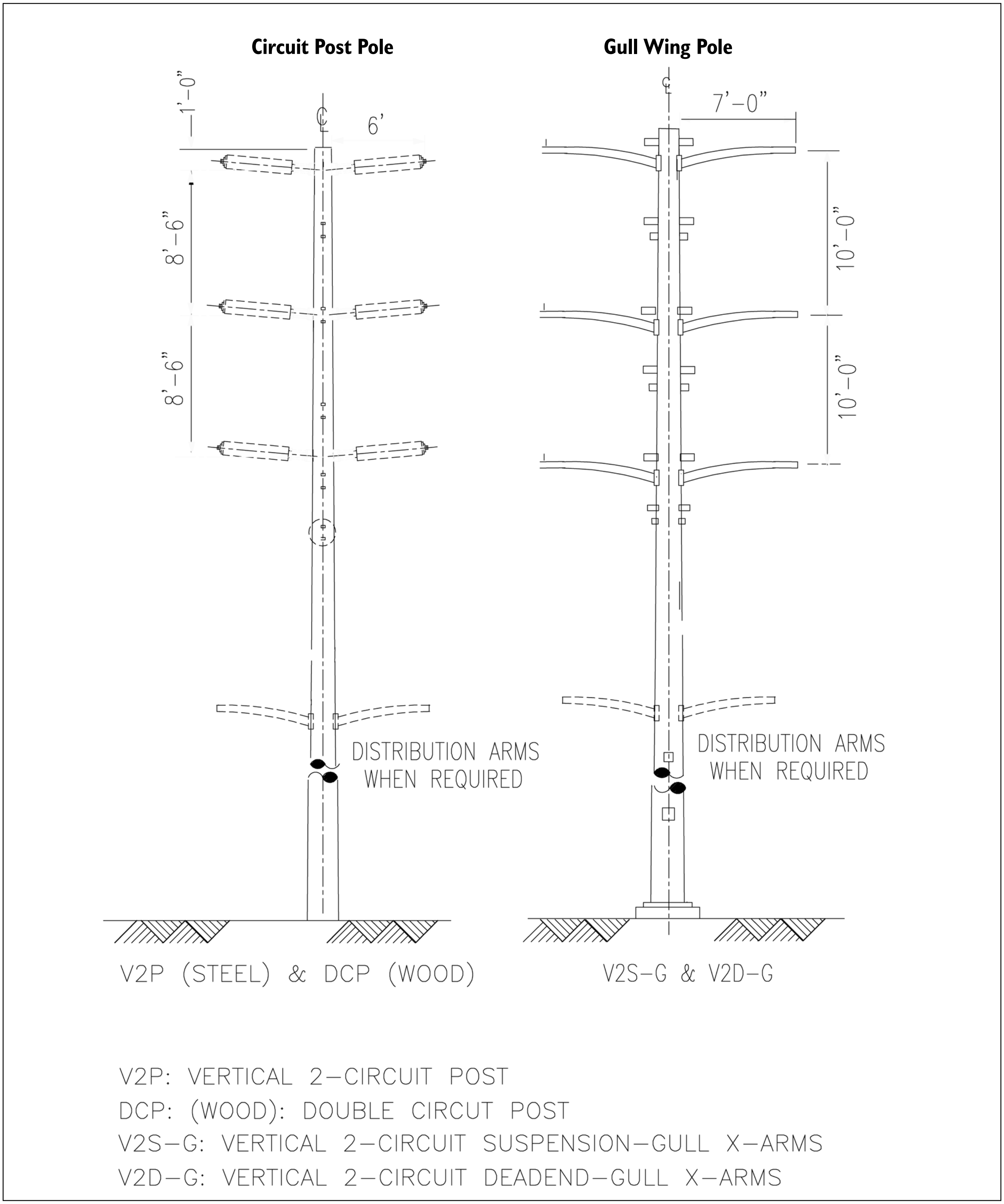
11x17 insert

Figure 2-4c: Proposed Transmission Line Route Mid-East

11x17 insert

Figure 2-4d: Proposed Transmission Line Route East

11x17 insert



This diagram is based on preliminary engineering, which is subject to change as a result of the CPUC permit process, final engineering, and any necessary adjustments during construction.

Lakeville-Sonoma 115kV Transmission Line Project

FIGURE 2-5

Typical Pole Designs

Right-of-Way (ROW)

PG&E currently owns right-of-way easements along segments 1, 2, and 17, as there is an existing single-circuit line along these segments. However, the addition of a second 115 kV circuit may require PG&E to adjust easements to account for slight deviations from the existing alignment, or acquire expanded easements as needed to accommodate taller poles depending on the length of spans between poles and CPUC safety requirements.

2.3.1.2 Substations

The project will also include modifying and adding some equipment at Lakeville and Sonoma substations.

Lakeville Substation Modifications

The project will require modification of the Lakeville Substation to accommodate installation of some new equipment, but it will be entirely contained within existing land owned by PG&E. As shown in Figure 2-6, the existing chain link fence will be moved slightly closer to Frates Road on the southeast side of the substation, which will be partially screened by existing vegetation along Frates Road. No additional landscaping is expected to be needed.

Additional equipment to be installed includes: galvanized structures, circuit breaker, air switches, aluminum bus, control room control/protection equipment, insulators, and some limited additional lighting. The additional lighting will be near Frates Road and would be imperceptible to any residences near the substation.

Dead end structures for the bus extension will be no more than 40 feet high; other bus support structures will be 9 feet high. One new 60-foot high tubular steel pole will be located inside the substation (see Appendix C Visual Simulation KOP 1).

Sonoma Substation Modifications

At the Sonoma Substation, additional equipment will be installed within the existing fenceline, as shown in Figure 2-7. This will include installation of a 115 kV line position and bus modification to include galvanized steel, 115 kV circuit breakers, 115 kV air switches, surge arrestors, aluminum bus, and a relay protection. The existing control room will be extended to provide for the additional batteries required for the new equipment. Some additional lighting will be required, but will be on only when personnel are on-site for activities such as inspections and maintenance.

Figure 2-6: Lakeville Substation Modifications

11x17 insert

Figure 2-7: Sonoma Substation Modifications

11x17 insert (printed on back of Figure 2-6)

The dead end structure will be no more than 45 feet high; other bus support structures will be 9 feet high. One approximately 75-foot high tubular steel pole will replace an existing 70-foot single-circuit wood pole on the property. A second existing wood pole will be moved a few feet (see Appendix C Visual Simulation KOPs 14 and 15). Low maintenance landscaping and irrigation will be added to provide extra screening along Leveroni Road (note that this landscaping is not shown in the visual simulation).

2.4 CONSTRUCTION

This section describes construction methods to be used along the 115 kV transmission line route and at Lakeville and Sonoma substations.

2.4.1 Transmission Line Construction

Construction of the transmission line will include installation of new tubular steel poles, installation of wood poles, removal of existing wood poles and conductor, topping of some existing wood poles, installation / removal of safety structures at road crossings, and stringing of new conductor for the 115 kV circuits. The existing 115 kV conductor will be removed and replaced with the same 477 ACSS conductor type (aluminum with a steel core). In addition, construction will require the acquisition and preparation of ROW as required for the 115 kV transmission line; establishment of work areas, staging areas, pull and tension sites; and access to pole sites and pull sites along the transmission line route. Details about access and installation at each pole site are detailed in Appendix I – Construction Plan. The information in Appendix I is based on preliminary engineering, which is subject to change as a result of the CPUC permit process, final engineering, and any necessary adjustments during construction.

2.4.1.1 Line Staging Areas

Prior to transmission line construction, two staging areas of approximately 10 acres each will be prepared to provide space for materials delivery, storage, and preparation, equipment storage, crew parking, and offices prior to installation. One staging area will be located off of Adobe Road near the Lakeville Substation, as shown in the previous Figure 2-4(a). The other will be near the Sonoma Substation, as shown in Figure 2-4(d). The sites also will be used as helicopter landing areas.

Once the staging areas are leased by PG&E, the appropriate grading, electrical, traffic control, and other permits will be obtained for potential leveling, ingress/egress, drainage, fencing, temporary construction postings, electrical service, and any other pertinent activities. If construction activities take place during the winter, PG&E will install a rock surface in the yards where heavy traffic is expected. PG&E will secure the areas with fences and locked gates, and contract security will be provided. Upon completion of the project, the areas will be left as specified by the property owner in the lease. The site layouts will be approved by the project's environmental monitor, and work crew activities will follow all PG&E environmental guidelines. The eastern staging area will be set back at least 50 feet from Sonoma Creek to avoid impacts to riparian habitat.

Deliveries to the Adobe Road staging area near the Lakeville Substation will not impact residential or commercial development, as the staging area is located away from residential and commercial areas. In addition, the roads leading to the site are adequate to support truck traffic. Because rush hour traffic can be heavy along Adobe Road, a Traffic Control Plan will be prepared according to Caltrans Manual requirements and submitted for approval by the Sonoma County Transportation and Public Works Department. In addition, each staging area will have a spill prevention plan, and workers will receive written and tailboard instructions on the plan.

2.4.1.2 Pull and Tension Sites

In order to replace or install a length of conductor, a pull site is needed at one end and a tension site is needed at the other. Pull and tension sites are temporary and vary in size depending on the existing terrain for the activity and whether the site will be a pull or a tension site, though typically a 200- by 200-foot area is adequate. A gravel pad will be installed over fabric (likely geotextiles comprised of UV stabilized polypropylene slit film) at each site, and sites will be cleaned up and restored after construction (see Appendix A - Erosion Control and Restoration Plan). Pull sites will require a puller, crew truck, and aerial lift truck, while tension sites will require a tensioner, a crew truck, a reel dolly, an aerial lift, and a truck to move the reel dolly. Removal of the old conductor and replacement of the conductor reel is carried out within the staging area (see Figure 2-8).

Figure 2-8: Conductor Reels and Tensioning Device at Pull Site

2.4.1.3 Access Roads

Construction crews will use existing roads along most of the transmission line corridor to access pole sites; these include paved roads, ranch and vineyard roads, and fire access roads. In a few areas existing roads are not available and new access roads will be needed [see green lines on Figures 2-4(a) through (d)]. Only 1.35 miles of new permanent access roads will be constructed (2.46 acres). In addition, 1.52 miles of new temporary access roads will be cleared (2.70 acres), but they will be restored to their previous condition after construction.

PG&E has selected access road routes that minimize environmental impacts and take advantage of existing topography where possible, minimizing the need for grading. The different types of access roads and improvements needed are shown in green and pink on Figures 2-4(a) through 2-4(d). They fall into five categories:

1. new road permanent;
2. new road temporary;
3. existing road that will have permanent improvements;
4. existing road that will have temporary improvements, and
5. existing paved road (no improvements needed) (not shown in color on map).

Typical access roads will be approximately 15 feet wide. Where needed, existing unpaved access roads will be improved (about 9.5 miles). Some roads will be groomed and surfaced with approximately 4 to 5 inches of road base. These roads will then be compacted with a heavy roller to provide all-weather access, and water bars will be installed at 50-foot intervals (or greater, depending on slope and conditions) where there is an incline of 10 degrees or more. In addition, these roads will be sloped to allow natural run-off. Gates will be installed to provide access through existing fences; gate installation and/or replacement will be discussed with property owners in advance.

Some unpaved access roads will not require surfacing. Where there are potential run-off issues, silt fencing and other appropriate measures will be installed to prevent silt and sediment transport to nearby drainages (see Appendix A - Erosion Control and Restoration Plan). In addition, unpaved access roads that are not surfaced during construction will be repaired following construction. A photographic record will be made prior to work activity to allow for restoration to prior conditions.

Though minimal grading is expected, design drawings will be provided to the Sonoma County Transportation and Public Works Department where access road installation or improvement will require a grading permit. Grading will be carried out by a contractor, and all required environmental protection will be put in place and an environmental monitor will be present during grading activity. If grading takes place near wetlands, riparian habitat or special-status plant or wildlife habitat, a biological monitor (a trained professional biologist) will approve the type and placement of environmental protections and will be present during grading activities (see section 6.4.2).

Some areas will be accessed over land without preparation or grooming. Overland travel will occur on approximately one mile of gently sloping grassy areas and rangeland without the preparation of a road. Overland travel routes will be marked by the project's environmental monitor to avoid sensitive habitat, plants and wildlife species, and project activities will be limited to use of the same pathway to minimize impacts. These overland routes will be restored to their natural condition (see Appendix A) if required. All new access roads will be gated and locked at fence lines and will have a "No Trespassing" sign posted at their entrance from a public roadway.

2.4.1.4 Helicopter Access

Helicopter access will be used to install approximately 11 poles in locations where overland access is not possible or difficult due to topography and vegetation (poles 14, 26, 33, 34, 35, 36, 37, 39, 41, 43 and 56 are currently planned to be installed by helicopter). Helicopters will be used to remove and deliver poles, materials, equipment, concrete, soil, and workers to these pole locations and to other locations where access is difficult or the project schedule requires it (see Appendix I). A temporary helicopter landing area can be created on the closest improved access road. Figures 2-4(a) through 2-4(d) show temporary helicopter landing zones that may be used to drop off construction equipment where access is difficult. An area of 100 by 100 feet is required for clearance. Landing areas will be located on improved access roads as much as possible so no additional gravel or road base material is anticipated to be needed. As with other construction sites, landing zones will be sprayed with water as needed to control dust. In addition, the two staging areas near the substations may be used for helicopter landing. Helicopters of varying size will use the temporary landing areas to pick up and drop off crew and materials, as well as to stage and refuel.

2.4.1.5 Traffic Control

Traffic control will be required for work along Adobe Road and Leveroni Road. All required permitting and notification will be made, including public notifications of the timing and extent of road impacts via digital signs and newspaper notices. Occasionally it will be necessary to close one lane of traffic, and appropriate traffic control and safety measures will be taken. As rush hour traffic can be heavy along Adobe Road, a Traffic Control Plan will be prepared according to Caltrans Manual requirements and submitted for approval by the Sonoma County Transportation and Public Works Department.

2.4.1.6 Right-of-Way (ROW) Requirements and Preparation

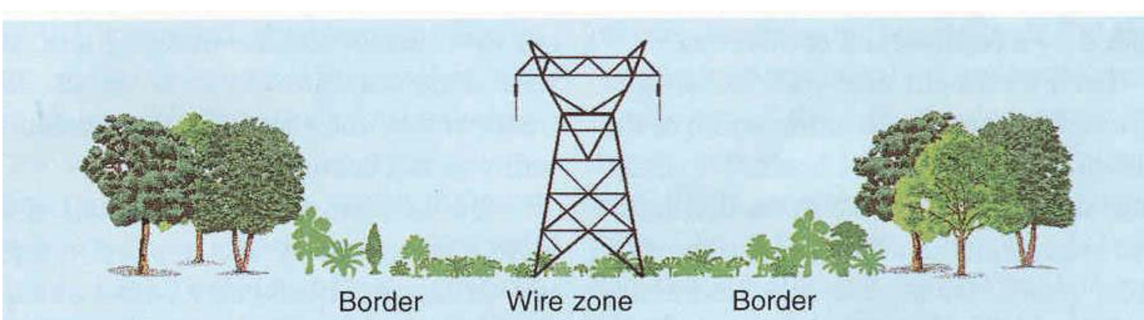
PG&E currently owns right-of-way easements along most of the project route, as there is an existing single-circuit 115 kV line. However, the addition of a second 115 kV circuit will require PG&E to adjust easements to account for slight deviations from the existing alignment or acquire additional easements. Taller poles will require some expansion of the existing PG&E right-of-way easements, depending on the length of spans between poles and CPUC safety requirements.

The expansion of existing easements is not expected to conflict with current land uses since the present and foreseeable land uses for the lands upon which the project will be sited are primarily open space, vineyard, cattle grazing, and, of course, overhead electric transmission utility corridor, and because the portions of the route that pass through residential and commercial areas are adjacent to existing roads.

2.4.1.7 Vegetation Clearance

Following construction, tree trimming and removal, and clearing of vegetation around transmission poles will be performed by outside contractors and, per contract specifications, will follow proper guidelines [e.g., CPUC's General Order 95, Public Resources Code Sec. 4293 (pertaining to removal of hazardous trees that could fall on the line), PG&E's Transmission Right-of-Way Vegetation Management Program and Transmission Routine Patrol Standard (PG&E 2003), and the International Society of Arboriculture's pruning guidelines and the ANSI A300 Pruning Standards]. Vegetation clearing also will be performed in a manner consistent with Mitigation Measure 6.6 Control and Prevention of the Spread of the Sudden Oak Death (SOD) Pathogen in Chapter 6 of this PEA. As shown in Figure 2-9, the objective is to retain the low-growing brush as much as possible, but to remove trees that could grow and contact the conductor.

Figure 2-9: Tree Trimming Diagram



Source: PG&E.

A minimum of 15 feet of clearance between vegetation and conductors is required for safety and to minimize tree-related outages (PG&E 2003). PG&E may remove fast growing trees or trim vegetation back farther than the minimum required to achieve at least 3-4 years of clearance before the next trim. In addition, during fire season, Public Resources Code Sec. 4292 requires that flammable fuels (e.g., vegetation) be cleared at least 10 feet in each direction around wood poles.

2.4.1.8 Pole Removal, Top Removal, and Installation

Project construction will involve removal of 99 existing wood poles, topping of 19 wood poles, and installation of 78 new TSPs and wood poles.

Wood Pole Removal

The wood poles that need to be replaced or eliminated will be removed by a line crew, which will access each pole site with a line truck and trailer or a boom truck. Existing wood poles will be loosened from the ground with a hydraulic jack, then removed from their holes using the line truck, helicopter, or boom truck, and transported from the site on the trailer or boom truck. If the hole will not be reused, a backhoe and dump truck will backfill the hole with imported gravel. The top 12 inches will be backfilled with soil removed from project construction activities (e.g., pole excavations) and stockpiled at the staging areas. The stockpile will be covered to prevent silt from flowing into nearby drainages or creeks. The surface will be seeded with appropriate revegetation seed mix. A few poles will require removal by helicopter.

Top Removal

Top removal or "topping" involves the removal of the transmission portion of an existing pole while retaining the height necessary to carry existing distribution lines. The tops of some wood poles need to be removed so they do not interfere with transmission lines that will be suspended by higher poles on either side. These wood poles cannot be removed entirely because they are needed to hold up the lower distribution lines in some areas where the span between transmission poles is too great (and the distribution line would hang too low to the ground without the existing wood pole).

Poles to be topped will be accessed by a pole crew with a line truck and trailer or a boom truck. The line truck or boom truck will be used to hold the top of the pole in place, while a chainsaw will be used to cut the pole. Once cut, the top section will be placed on the trailer or boom truck for removal and disposal. The remaining pole will continue to serve as a distribution pole.

Some poles are difficult to access and will require special techniques. The hardware and insulators will be removed from the top and lowered to the ground with a hoist. Then small sections of the pole will be cut and lowered in the same fashion to the ground. The cut pieces will be carried out by the crew or hauled out on a quad runner if access is available.

Pole Installation

Installation of steel poles involves these steps: staking the pole location, flagging the work area, installing silt fencing (if required), preparing crane pad (if required), excavating the hole, installing forms, rebar, and anchor bolts, pouring concrete, removing forms, placing gravel around and grooming the base area, installing the new pole, removing old conductor and stringing the new conductor, removing the old wood pole, and transporting excess soil and materials off-site for disposal. Installation of wood poles involves these steps: staking the pole location, flagging the work area, excavating, installing the pole, backfilling, transferring wire and equipment, removing the old pole and backfilling.

Pole locations will be sited to both maximize spans and avoid environmentally sensitive areas. At each pole location, the work area will be flagged by PG&E and/or the environmental monitor prior to construction. For pole installations near wetlands, riparian habitat or special-status plant or wildlife habitat, a biological monitor (a trained professional biologist) will approve type and placement of environmental protections and will monitor the area during construction activities (see Appendix A).

A work area of about a 50-foot radius around each pole will be required. Some work areas may require the removal of vegetation and installation of silt fencing (e.g., during the wet season). Work areas around transmission poles generally will not require grading or surfacing. The nine pull and tension sites will require preparation, including creation of temporary crane pads if the terrain would not allow for safe operation of a crane. The size of the pad will vary based on terrain. Figure 2-10 shows a track auger, which is used for excavating holes for the transmission poles.

Poles supporting straight spans are directly embedded into the soil (wood only). Wood poles may be embedded to a depth of approximately 7 to 12 feet below grade. All tubular steel poles will have concrete pier foundations approximately 5 to 7 feet in diameter and 15 to 30 feet deep. All angle poles will also have concrete pier foundations, which eliminate the need for wire down guys. This eliminates visual clutter at the structure locations, decreases the damage potential to the pole by eliminating the opportunity for contacts with the guys during agriculture and farming operations, and can decrease bird strikes.

Drilling and excavation of holes for both wood and tubular steel poles will employ a hole auger, backhoe, dump truck, and crew truck, all of which will access pole locations via existing paved and dirt roads where available and over land where roads do not exist. A hole auger consists of an auger mounted on a heavy truck chassis or piece of track equipment and will be used to drill holes.

Figure 2-10: Track Auger

A boom truck consisting of a small crane mounted on a flatbed truck will be used to haul foundation forms, anchor bolts, rebar, and pole structures to the TSP locations. The boom truck will also be used to place foundation forms, anchor bolts, and rebar in place prior to pouring of concrete for the foundation, and also to remove the forms following completion of the foundation.

A concrete truck consisting of a four-wheel drive mixer capable of delivering 10 yards of concrete will be used to deliver and pour concrete for the tubular steel pole foundations. Concrete trucks will not be washed out at pole locations; cleaning pits will be established at various locations throughout the project to minimize time between the concrete pour and truck clean out. All cleaning pit locations will be approved by an environmental monitor. These pits will include dike walls and tarping which will allow washed materials to be properly contained and disposed of. The backhoe will be used to load excavated soils and materials into a dump truck for off-site disposal, to place gravel around the TSP foundation after formwork has been removed, and to groom the area immediately surrounding all pole installations.

A crane will be used to place steel poles on the foundations. The line truck is used to place the wood poles in the excavated hole and to remove the old wood pole. Aerial lift trucks are used to install/transfer/remove conductors. Lastly, a crew truck will be used to transport the crew, their hand tools, and other minor materials to and from pole locations. A crew truck will be used to minimize the number of vehicles accessing each site and to reduce vehicle-related impacts.

Table 2-3 shows a summary of pole installation and associated disturbance area estimates.

Table 2-3
Summary of Pole Installation Metrics[5]

	Double-circuit 115 kV TSP (approximate metrics)
Foundation Diameter	5 to 7 feet
Foundation Depth	15 to 30 feet
Average Work Area around Pole (e.g., for removal, topping, new pole installation)	50-foot radius
Permanent Footprint per Pole	20 sq. feet
Number of Poles in Double-circuit 115 kV Transmission Line	78
Total Permanent Footprint for 78 Poles in Double-circuit 115 kV Transmission Line	0.036 acres
Number of Existing Wood Poles that will be Topped (and carry distribution line)	19
Total Permanent Footprint for 19 Topped Poles	0.0014 acres

2.4.1.9 Helicopter Pole Installation

Installation of eleven tubular steel poles will require the use of a helicopter and special construction techniques (see Appendix I). Typically, an auger will be walked into the site by the pole crew, accompanied by the environmental monitor. Excavated soils, foundation forms, concrete, TSPs, and miscellaneous tools and materials will all be transported in or out by helicopter. The crew will drive on existing roads to a nearby location, park, and walk the remainder of the way to some sites. There may also be helicopter transportation of some construction workers to remote pole sites.

2.4.1.10 Conductor Installation

All of the old conductors (transmission line wires) will be removed and new conductors installed. Prior to stringing conductors, temporary clearance structures will be installed at 11 road crossings and other locations where the new conductors could otherwise accidentally come into contact with electrical or communication facilities, other power lines, and/or vehicular traffic during installation. The temporary structures will be installed across Adobe Road, the Lakeville Substation access, Felder Road, Arnold Road, Leveroni Road (3), Harris Road, Palmer Avenue, David Street, and Birch Road. Traffic control will be provided where necessary during installation and removal of these temporary clearance structures. The structures consist of a wood pole with a frame at the top that resembles a "Y", which are placed on each side of the road or power line being crossed (see Figure

[5] The information in this table is based on preliminary engineering, the details of which are subject to change as a result of the CPUC permit process, final engineering, and any necessary adjustments during construction.

2-11). Foundations and grading are not required. Installation and removal of clearance structures is similar to that of wood poles, though less excavation is required. These structures prevent the conductor from being lowered or falling into traffic or onto another power line. Where distribution lines are involved, netting is installed between the two Y-frame structures and guy wires are installed at each structure.

Replacement of Existing Conductor

In order to replace an existing conductor with a new conductor, the existing conductor will first be detached from its support structure and temporarily lifted. Rollers will then be installed at the conductor's attachment point, and the conductor will be placed onto the rollers. Installation of rollers and detachment of the existing conductor will typically require one aerial lift.

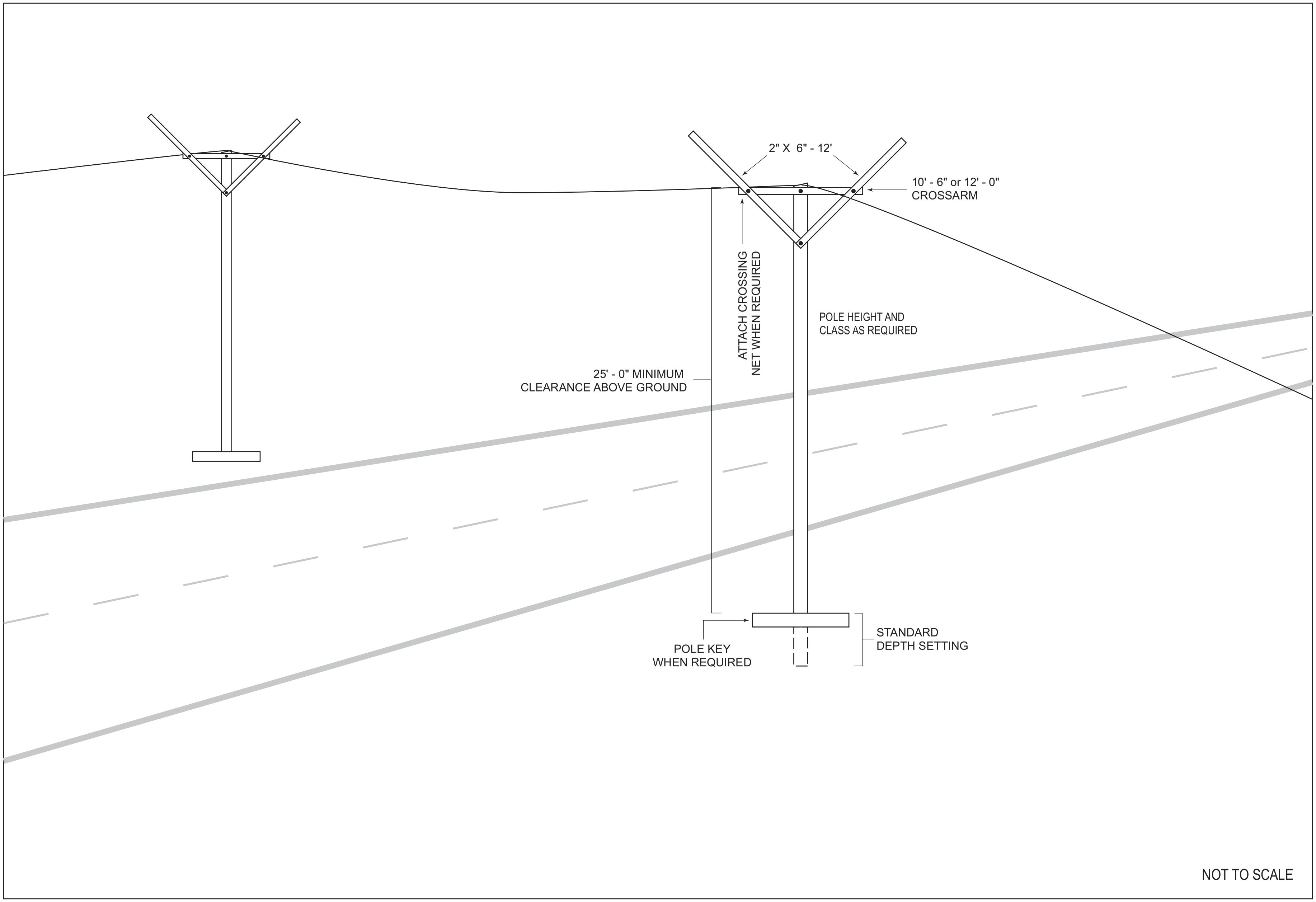
Once rollers are in place for the entire section of conductor being replaced, the existing conductor will be pulled out of place. A cable will be attached to the existing conductor, which will then be used to pull the new conductor into place. Removal of the existing conductor and installation of the new conductor will require the establishment of pull and tension sites. Equipment at the pull sites will pull the conductor onto a reel, where it will be collected for salvage; equipment at the tension site will feed new conductor along the rollers previously installed at each structure, while also maintaining tension in the line so that it does not sag to the ground. Once the new conductor is in place, rollers will be removed and the new conductor will be attached to the structures.

Installation of New Conductor

Prior to the installation of a new conductor, rollers will be installed at vacant positions on new structures using one helicopter lift. The helicopter will then be used to install a pulling (sock) line in the rollers. Once installed, the sock line will be used to pull the new conductor into place. When the conductor has been pulled through the rollers, an aerial lift will typically be used to remove the rollers and attach the conductor to the structures.

2.4.1.11 Cleanup and Post-Construction Restoration

Crews will be required to maintain clean work areas as they proceed along the line and will be instructed that no debris may be left behind at any stage of the project. The cleanup and restoration process will include reseeding disturbed areas as specified in Appendix A–Erosion Control and Restoration Plan to restore the landscape. Where needed, a spring-tooth machine with seed spreader will be used to decompact soil and reseed equipment disturbance areas as approved by property owners. In some cases, and again based on preference of property owners, the land may be left alone for nature to take its course.



Lakeville-Sonoma 115kV Transmission Line Project

EDAW | Pacific Gas and Electric Company

FIGURE 2-11

Y-Frame Crossing Structure

Once the cleanup has been completed, the work areas will be inspected on foot with the specific property owners to make sure that their concerns have been addressed. When all construction is completed, there will be a final walk down of the work areas with the crews and the biological monitor to ensure that proper cleanup and landscape restoration has been carried out. The final walk down will include access roads, pull sites, landing zones, staging areas, and pole locations.

2.4.2 Substation Modifications and Construction

Construction at the Lakeville and Sonoma substations will be performed completely on PG&E property. Materials and equipment will be stored on PG&E property. Each substation work crew will use a mobile office and tool van, both of which will be located within the existing substation yards. Traffic control will be provided if necessary but is not anticipated.

2.4.3 Construction Workforce and Equipment

Project construction will require an excavation crew, a light duty helicopter crew, a heavy duty helicopter crew, a pole crew, line crew, substation crew, and environmental monitor.
Table 2-4 describes the roles of each crew.

Table 2-4
Crews Expected to be Used During Project Construction

Crew	Roles
Excavation	The excavation crew will be a contract crew to PG&E responsible for development of the staging areas, access roads, and pull sites. In addition, the excavation crew will perform construction clean up activities.
Light-Duty Helicopter	The light-duty helicopter crew will be a contract crew to PG&E responsible for FAA permits, the helicopter (including maintenance and refueling), transporting work crews and materials to pole sites, and removal and installation of the sock line, as needed.
Heavy-Duty Helicopter	The heavy-duty helicopter crew will be a contract crew to PG&E responsible for FAA permits, the helicopter (including maintenance and refueling), transporting new poles to pole sites, and installation of poles using sky crane, as needed.
Pole	The pole crew (either a PG&E or contract crew) will be responsible for the excavation contractor, the heavy-duty helicopter contractor, the light-duty helicopter contractor, the development of pole-related staging areas, installation of steel pole foundations, and installation of transmission line steel poles.
Line	The line crew (either a PG&E or contract crew) will be responsible for managing an excavation crew and a light-duty helicopter crew, development of line-related staging areas, establishment of pull and tension sites, installation of rollers and crossbeams, contract removal/installation of the sock line, replacement of wood poles, and installation of new conductor.
Substation	The substation crew (either a PG&E or contract crew) will be responsible for all substation site activity, including installation of on-site telecommunications.

Environmental and Biological Monitors	The environmental monitor will be a contractor to PG&E and be responsible for inspection of all project construction activity, including inspection of work sites prior to the start of construction activity, monitoring of activities and cleanup, preparing and submitting CPUC compliance reports, and otherwise ensuring compliance with the CPUC Permit to Construct. If warranted, a qualified biological monitor will be utilized in areas with sensitive biological resources.

Table 2-5 shows equipment expected to be used during project construction:

Table 2-5
Equipment Expected to be Used During Project Construction

Type of Equipment	Use
▪ Aerial Lifts	▪ Remove old conductor and install new
▪ Backhoe	▪ Excavate foundations, spoil removal, backfill
▪ Boom Truck	▪ Erect structures
▪ Concrete Mixer Truck	▪ Haul concrete
▪ Crane	▪ Erect structures
▪ Crew-cab Truck/Pick-ups	▪ Transport personnel, tools, and materials
▪ Dump Truck	▪ Haul material
▪ Equipment/Tool Vans	▪ Tool storage
▪ Grooming/Grading Equipment:	▪ Road construction (staging, pull sites):
– dozer	– move/compact soils
– water truck	– compaction and dust control
– grader	– to properly pitch road for run-off
– rock transport	– deliver road base for access roads, staging areas and pull sites
– roller	– road, surface compaction
▪ Helicopters (light and heavy duty)	▪ Erect poles, install sock line, haul materials, equipment, and people
▪ Hole Auger	▪ Excavate holes
▪ Hydraulic Jack	▪ Remove wood poles
▪ Line Truck and Trailer	▪ Haul conductor, poles, equipment, materials, and people, and to install pole/conductor
▪ Materials Storage Units	▪ Store material/tools
▪ Mobile Offices	▪ Supervision and clerical office
▪ Puller	▪ Install conductor
▪ Reel Dolly	▪ Install and move conductor
▪ Tensioner	▪ Install conductor

2.5 OPERATION AND MAINTENANCE PROCEDURES

2.5.1 General System Monitoring and Control

Substation and transmission line monitoring and control devices will be installed per PG&E Design Standards and connected to the existing telecommunication and protection schemes at the Lakeville and Sonoma substations. The transmission systems at these two substations are monitored 24 hours a day, 7 days a week by System Operators at the Fulton Substation.

2.5.2 Facility Inspection

The regular inspection of transmission lines, instrumentation, and control and support systems is critical for safe, efficient, and economical operation of electric transmission facilities. Early identification of items needing maintenance, repair, or replacement will ensure continued safe operation of the project and continued reliable service to the Napa–Sonoma area. PG&E has an "Overhead Line Inspection Guideline" that outlines the uniform process used for transmission lines (PG&E 1998).

The process involves three types of inspections: aerial inspection, ground inspection, and climbing. The frequency of inspection may vary depending on factors such as the age of the system, pole type, vegetation conditions, and other factors. For this 115 kV transmission line, it is generally assumed that PG&E "troublemen" will inspect all structures from the ground annually for corrosion, misalignment, deterioration, and foundation failures. In addition, ground inspection will occur on selected lines to check the condition of hardware, insulators, and conductors. Inspection will include checking conductors and fixtures for corrosion, breaks, broken insulators, and failing splices. Annually or bi-annually, the troublemen will climb up the poles to check the insulators.

PG&E will conduct inspections by driving to the poles in a pick-up truck where feasible. Troublemen will use an ATV or go by foot where needed to minimize surface disturbance and in certain areas where access is difficult. Aerial inspection using helicopters may be conducted annually using infrared technology. Any specific access requirements that may result from ROW negotiations with property owners will be documented and provided to the troublemen with instructions to comply with these access requirements during inspection and maintenance. For more detail, please refer to the "Overhead Line Inspection Guideline" (PG&E 1998).

2.5.3 Maintenance Procedures

Maintenance of the transmission line is generally on an as-needed basis, when the troublemen discover something needing repair or in response to an emergency situation. A benefit of using mostly tubular steel poles for this project is that they generally require less maintenance than wood poles. Specific access requirements that may result from ROW negotiations with property owners will be documented and provided to the transmission line troublemen with instructions to comply with these access requirements during inspection and maintenance.

During inspections, the PG&E troublemen also document vegetation conditions. Where needed, vegetation inspections may be conducted more frequently. To maintain appropriate clearance under the transmission line, vegetation removal will be performed on a regular basis, as discussed in section 2.4.1.7 of this chapter.

Maintenance at the substations is not expected to be much different with the equipment additions. Maintenance on the equipment is performed as needed (generally once every 6-7 years). As the transmission line and substation modifications are not expected to require additional new employees for operation and maintenance, the project will not generate additional new traffic.

2.6 PERMIT REQUIREMENTS

The California Public Utilities Commission (CPUC) is the lead agency for the Lakeville–Sonoma 115 Kv Transmission Line Project under the California Environmental Quality Act (CEQA). In accordance with CPUC General Order 131-D, PG&E is submitting this PEA as part of its application for a Permit to Construct. As needed, PG&E will also obtain permits, approvals, and licenses from, and will participate in reviews and consultations with, federal, state, and local agencies as shown in Table 2-6.

Table 2-6
Summary of Permit Requirements

Agency	Permits	Jurisdiction/Purpose
FEDERAL AGENCIES		
U.S. Army Corps of Engineers	Nationwide or Individual Permit (Section 404 of the Clean Water Act)	Waters of the United States, including wetlands
U.S. Fish and Wildlife Service (USFWS)	Section 7 Consultation (through U.S. Army Corps of Engineers' review process)	Consultation on federally-listed species; incidental take authorization (if required)
Federal Aviation Administration (FAA)	Lift Plan Permit	Helicopter Construction Plans
STATE AGENCIES		
California Public Utilities Commission (CPUC)	Permit to Construct	Overall project approval and CEQA review
California Regional Water Quality Control Board (RWQCB), San Francisco Bay Region	National Pollutant Discharge Elimination System—General Construction Storm Water Permit	Permit applies to all construction projects that disturb more than 5 acres of land
RWQCB	Section 401 Water Quality Certification (or waiver thereof)	Requests RWQCB's certification that the project is consistent with state water quality standards
Caltrans/Sonoma County	Road Closures	Any road closure during construction, if required

Table 2-6
Summary of Permit Requirements

Agency	Permits	Jurisdiction/Purpose
California Department of Fish and Game (CDFG)	Endangered Species Consultation	Consultation on State-listed species; incidental take authorization (if required)
	Section 1600 Streambed Alteration Agreement	Alteration of any streambed or drainage channel (if required)
State Historic Preservation Officer (SHPO)	Section 106 of the NHPA Review (through U.S. Army Corps of Engineers' review process)	Cultural Resource Management Plan (if required)
Sonoma County Permit and Resource Management Department	Cultural resources consultation (through CEQA review process)	Cultural resources management plan (if required)
Bay Area Air Quality Management District	Authority to Construct/Permit to Operate	All grading and construction activities, air emission reduction and monitoring
LOCAL AGENCIES		
Sonoma County and/or Sonoma City	Road Encroachment Permit	Permit to install 115 kV facilities in Frates and Leveroni Road right-of-way
	Grading Permit	Access road on Felder Property
	Building Permit	Battery room in Sonoma Substation
Sonoma County Transportation and Public Works Department	Traffic Control Plan	Plan to manage construction vehicles and equipment deliveries to and from the Adobe Road staging area.

2.7 SCHEDULE

Table 2-7 provides a summary of the currently proposed construction schedule for the Lakeville-Sonoma 115 kV Transmission Line Project. The construction period for the transmission line is expected to last approximately 19 months, while construction at each substation is expected to take approximately 14 months.

Table 2-7 Construction Schedule[6]

Permit To Construct Decision Adopted and Effective	July 20, 2005
Acquisition of required permits	July 20, 2005 – April 2006
Right-of-way / property acquisition	July 20, 2005 – January 2006
Final engineering completed	July 20, 2005 – December 2005
Construction begins	November 2005
Transmission line construction	November 2005 – May 2007
Substation construction	April 2006 – May 1, 2007
Project operational	May 1, 2007

2.8 REFERENCES

PG&E. 2004. Personal communication with David Thomas, PG&E Land Planner. August 23.

PG&E. 2003. Lakeville-Sonoma 115 kV Transmission Line Project Study Report. Prepared by PG&E's Transmission Planning Group and submitted to the ISO on October 14, 2003.

PG&E. 2003. Transmission Routine Patrol Standard. Revised April 2003.

PG&E. 1998. Overhead Line Inspection, Guideline G0066 Rev. 1. Electric Transmission Department. February 1.

[6] This schedule is preliminary and subject to change.

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