2 PROJECT DESCRIPTION

2.1 INTRODUCTION

PG&E is proposing to reinforce the electric transmission and distribution system in Sonoma County by replacing existing conductor ("reconductoring") on two power lines pursuant to CPUC General Order (GO) 131-D, Section III.B. PG&E proposes to replace the conductor on a 9.~~8~~9-mile-long section of the Fulton-Hopland 60-kilovolt (kV) Power Line (Fulton-Hopland line or 60-kV line) between Fulton Substation and Fitch Mountain Substation. The proposed project would also include replacing poles along 8 miles of the Fulton-Hopland line, replacing conductor on 1.4 miles of the Geysers #12-Fulton 230-kV Transmission Line (Geysers #12 line or 230-kV line), and making modifications to Fitch Mountain Substation. The proposed project would be comprised of two segments: the Southern Segment and the Northern Segment[1]. The Southern Segment would extend from Fulton Substation to Shiloh Ranch Regional Park, and the Northern Segment would extend between Shiloh Ranch Regional Park and the Fitch Mountain #1 Tap 60-kV Power Line (Fitch Mountain #1 Tap).

This section describes facilities changes and other activities that would be undertaken during construction, operation, and maintenance of the proposed project. Information in this section was used to analyze the project's potential environmental effects presented in Sections 3.1 through 3.17.

2.2 PROJECT LOCATION

2.2.1 Regional Area

The proposed project would be located in central Sonoma County, east of the Town of Windsor and south of Healdsburg, on the eastern margin of the Santa Rosa Valley. The regional project area is shown on Figure 2.2-1.

[1] PG&E's PEA and other supporting documentation prepared for the project refer to the Southern Segment as the Fulton-Shiloh Segment and the Northern Segment as the Shiloh-Fitch Segment. For clarity, the terms "Southern" and "Northern" are used in this IS/MND to differentiate the two segments.

Figure 2.2-1 Regional Location Map

Sources: (ESRI 2016, PG&E 2016-2017, USGS 2012)

2.2.2 Project Alignment

The proposed project would include sections of the Fulton-Hopland line, the Geysers-Fulton lines, and the Fitch Mountain #1 Tap between Fulton Substation and Fitch Mountain Substation. These lines, sections, and substations are collectively referred to as the "project alignment." The project alignment is roughly oriented from the southeast to northwest as shown on Figure 2.2-2 through Figure 2.2-5.

The project alignment would pass through the Town of Windsor[2], the unincorporated communities of Fulton and Larkfield-Wikiup, and two regional parks (Shiloh Ranch Regional Park and Foothill Regional Park). The project alignment would originate at Fulton Substation in Fulton, and travel north through residential neighborhoods, rural residential areas, regional parks, vineyards, rangeland, woodland, and open space to the second pole along the Fitch Mountain #1 Tap, south of Bailhache Avenue. Project activities would also occur at Fitch Mountain Substation, located east of the City of Healdsburg between the Russian River and Bailhache Avenue.

Fulton Substation and Fitch Mountain Substation are located on land owned by PG&E. The existing lines and poles in the project alignment are all located on land subject to existing PG&E easements. PG&E's easements and access rights to the project alignment are described further in Section 2.6.2: Work Areas and Access Routes.

Southern Segment

The Southern Segment would begin at Fulton Substation on River Road immediately south of US Highway 101 (US 101). The line would cross US 101 and proceed north along Lavell Road, Mark West Common's Circle, and Faught Road. The Southern Segment would end where the Fulton-Hopland line separates from the Geysers-Fulton lines and diverts northward near the southwestern corner of Shiloh Ranch Regional Park. The Southern Segment is shown on Figure 2.2-2.

Northern Segment

The Northern Segment would begin where the Fulton-Hopland line splits away from the Geysers-Fulton line in Shiloh Ranch Regional Park. The Northern Segment would travel roughly northwest through steep terrain along a ridgeline at the eastern margin of the Santa Rosa Valley. The Northern Segment would end on the second pole of the Fitch Mountain #1 Tap. The Northern Segment is shown on Figure 2.2-3 through Figure 2.2-5.

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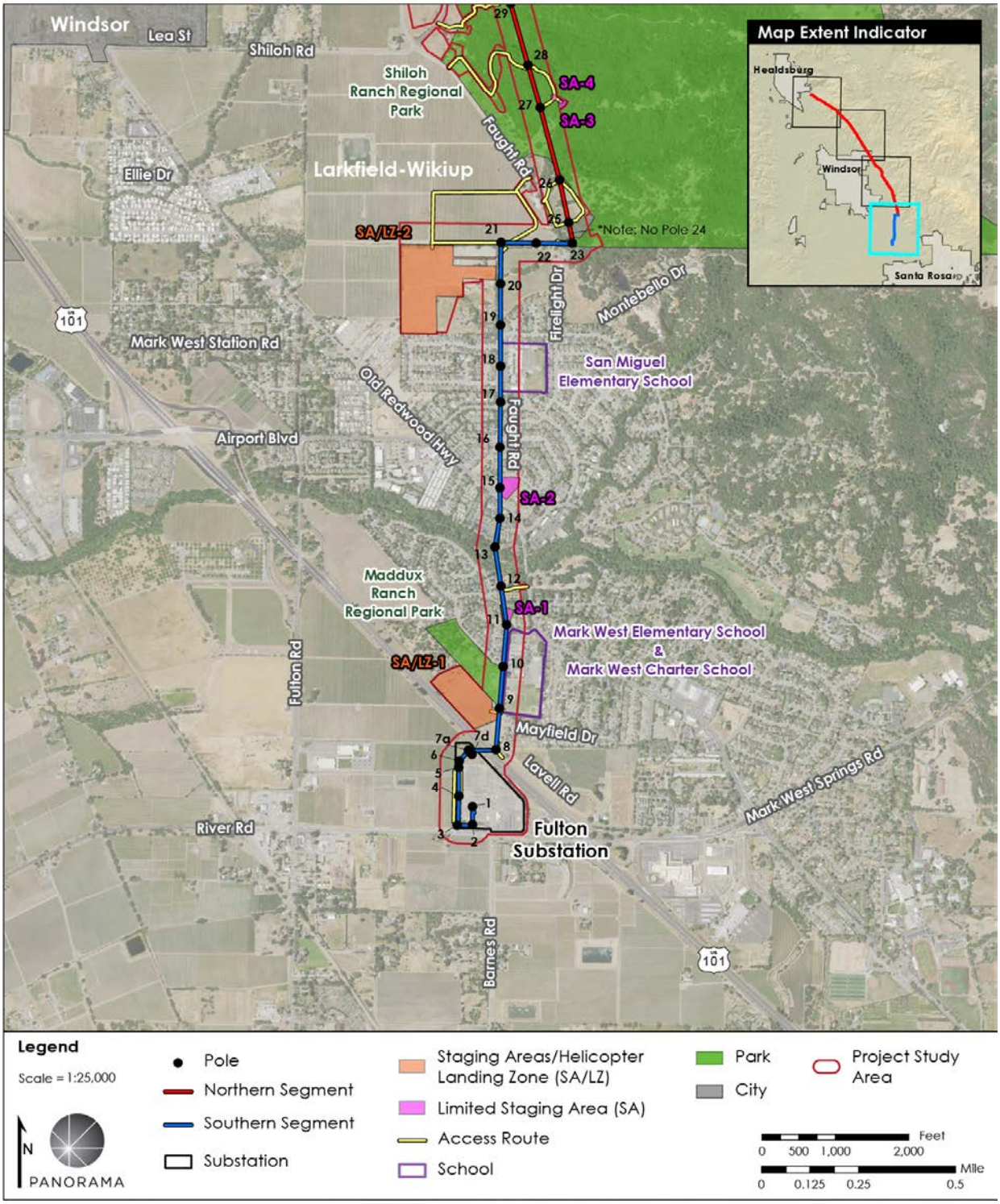
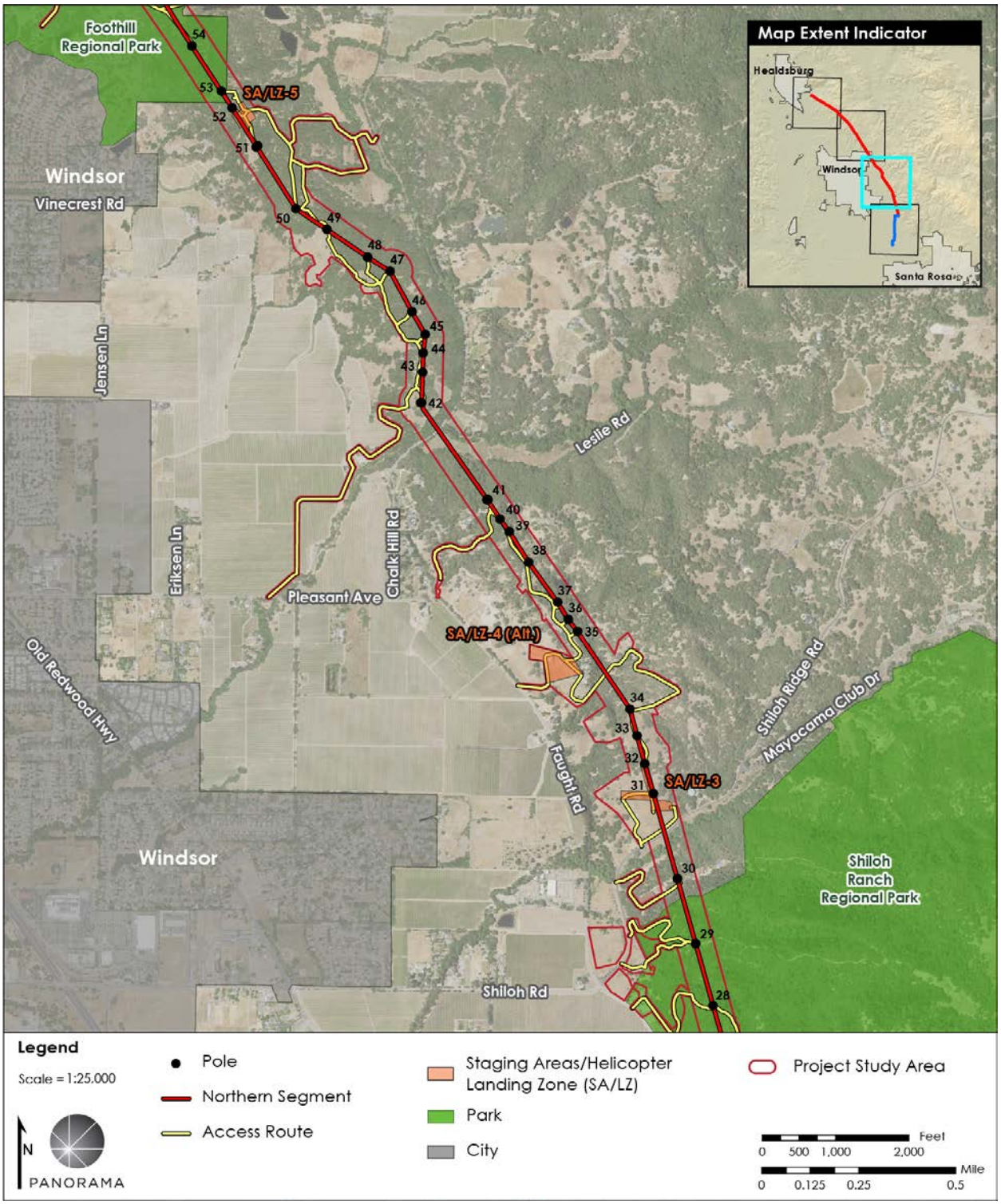
[2] The only portion of the project that would be located within the Town of Windsor is where the project alignment would pass through Foothill Regional Park. The Sonoma County Regional Parks District independently manages Foothill Regional Park even though the park is entirely within the Town of Windsor. The Town of Windsor has no authority over activities within the park boundary (Euphrat 2016, Legge 2016, Whitaker 2016).

Figure 2.2-2 Project Alignment and Study Area (Map 1 of 4) – *Revised*



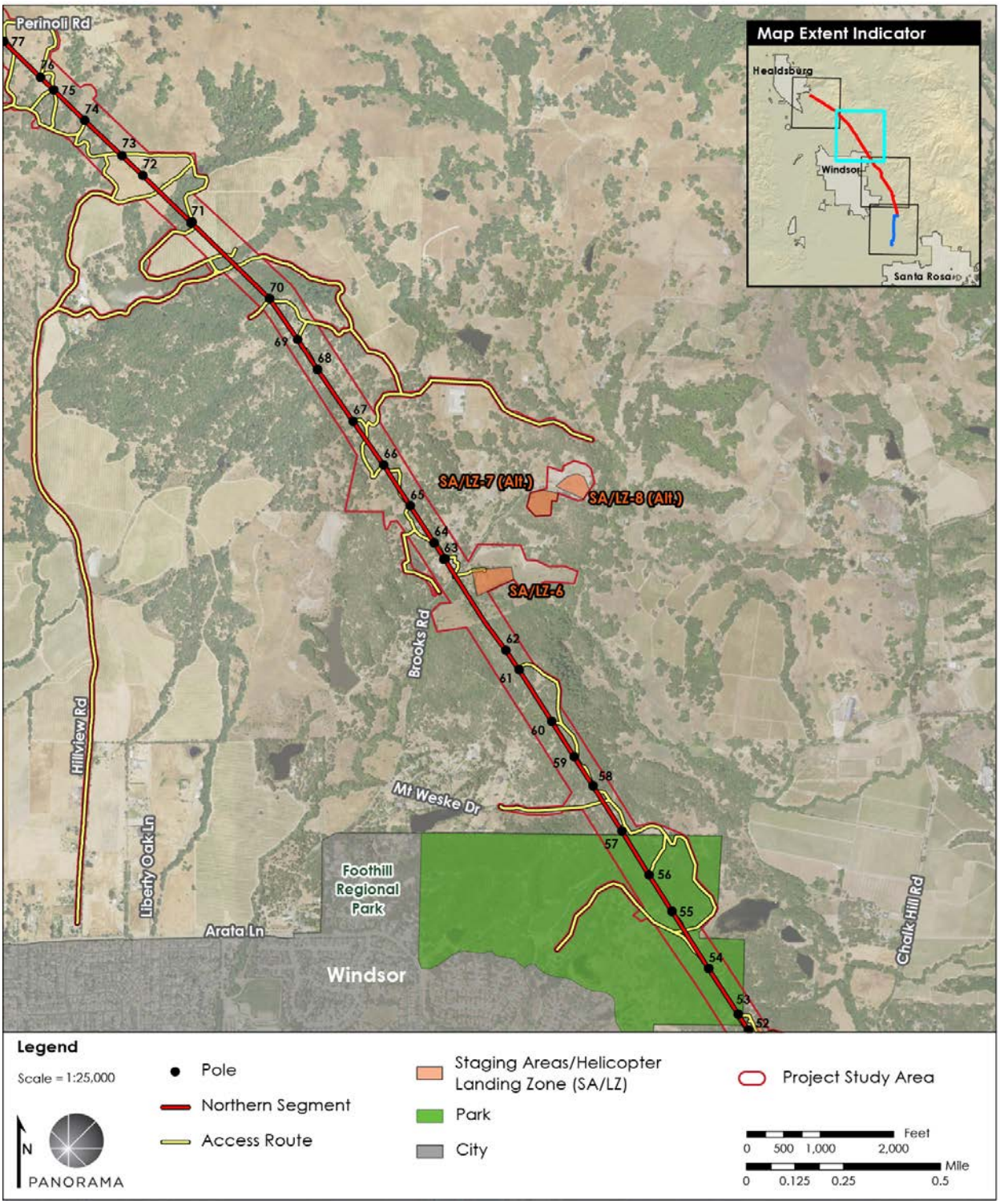
Sources: (ESRI 2016, PG&E 2016-2017, USDA 2014)

Figure 2.2-3 Project Alignment and Study Area (Map 2 of 4) – *Revised*



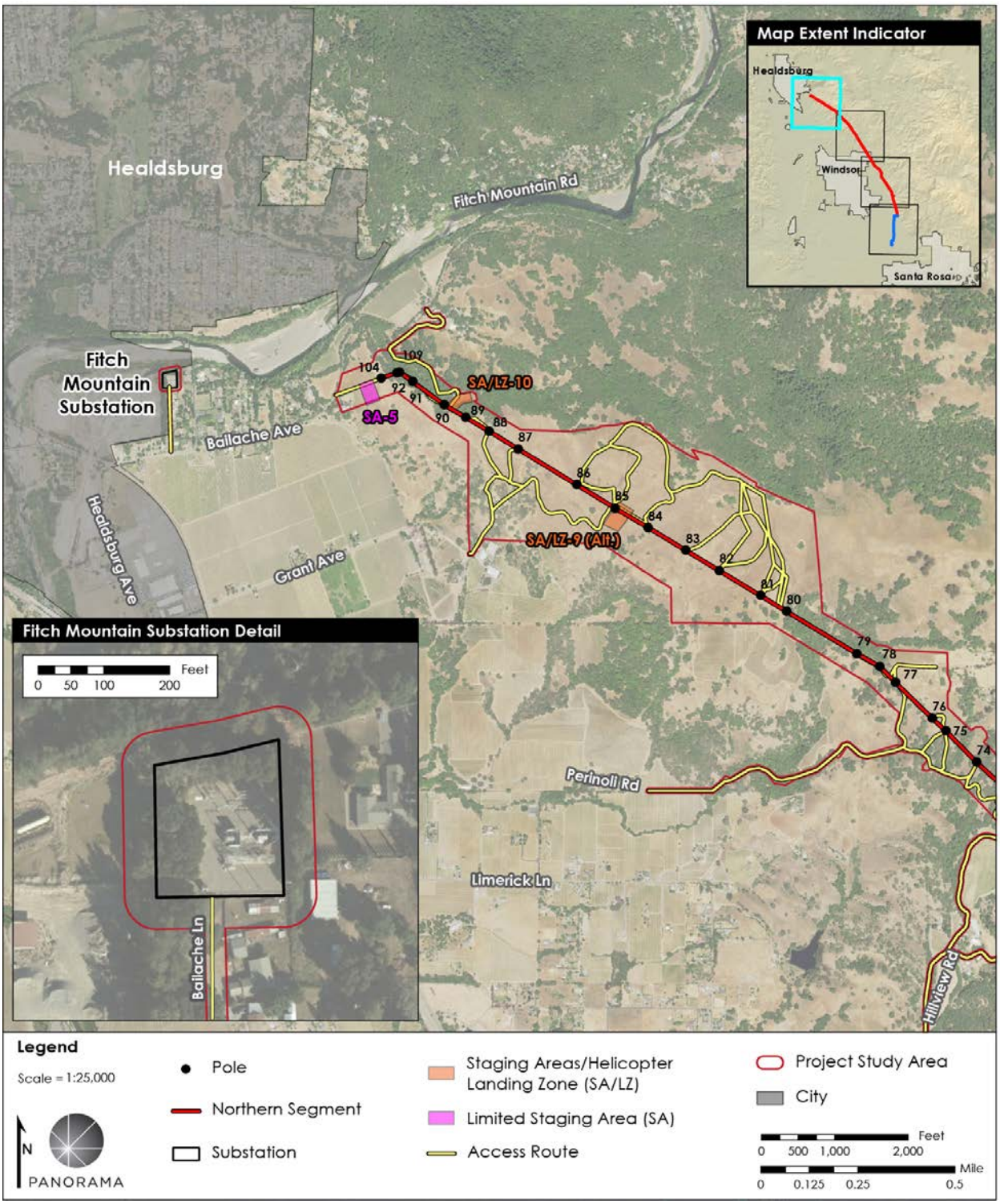
Sources: (ESRI 2016, PG&E 2016-2017, USDA 2014)

Figure 2.2-4 Project Alignment and Study Area (Map 3 of 4)



Sources: (ESRI 2016, PG&E 2016-2017, USDA 2014)

Figure 2.2-5 Project Alignment and Study Area (Map 4 of 4) – *Revised*



Sources: (ESRI 2016, PG&E 2016-2017, USDA 2014)

2.2.3 Project Study Area

The project study area is a corridor of land that generally defines the limits of potential direct and indirect land impacts evaluated in the IS/MND, unless otherwise noted in individual resource sections. The project study area is comprised of the contiguous and overlapping areas listed in Table 2.2-1, which primarily include the locations where proposed construction areas are located and resource surveys were completed. The project study area is shown on Figure 2.2-2 through Figure 2.2-5 and on maps in Appendix A.

Table 2.2-1 Project Study Area Components

Area Descriptions	Additional Buffer Distance (feet) [a]
Existing pole and conductor alignment in the Southern and Northern Segments	250
Fulton Substation and Fitch Mountain Substation	50
Access routes (refer to Section 2.6.2)	30
Temporary construction work areas (refer to Section 2.6.2)	0
Biological survey areas and extent of vegetation mapping (refer to Section 3.4: Biological Resources)	0
Cultural survey areas (refer to Section 3.5: Cultural and Tribal Cultural Resources)	0
Other contiguous space [b]	0

Notes:

[a] The additional buffer distance refers to the area surrounding all sides of a feature boundary or centerline.

[b] Small gaps and spaces between the other areas were generally included in the project study area if they were less than a few acres.

The final locations of proposed poles, conductor, temporary work areas, and access routes may be adjusted or moved within the project study area based on final engineering and ground conditions, to the extent described in the Project Description, and subject to applicable mitigation requirements and CPUC consistency determinations. The potential impacts from any activities that may move within the project study area are therefore addressed in the IS/MND.

2.3 PROJECT OBJECTIVES

PG&E's Fulton-Hopland line and Fulton #1 60-kV Power Line (Fulton #1 line) provide electrical service in central Sonoma County, including the City of Healdsburg and Town of Windsor. The California Independent System Operator (California ISO) has determined that an outage of the Fulton #1 line could potentially overload the Fulton-Hopland line above its re-rated summer emergency rating during peak loading conditions (California ISO 2009). PG&E proposes to

reconductor a portion of the Fulton-Hopland line with higher-rated conductor to address the potential overload condition. PG&E has identified the following project objectives:

1. Mitigate the identified system reliability issues in accordance with California ISO and North American Electric Reliability Corporation requirements by alleviating a potential overload condition
2. Increase the capacity of the Fulton-Hopland line to help meet increasing demand
3. Design and build the project in a safe, cost-effective manner that will also minimize environmental impacts

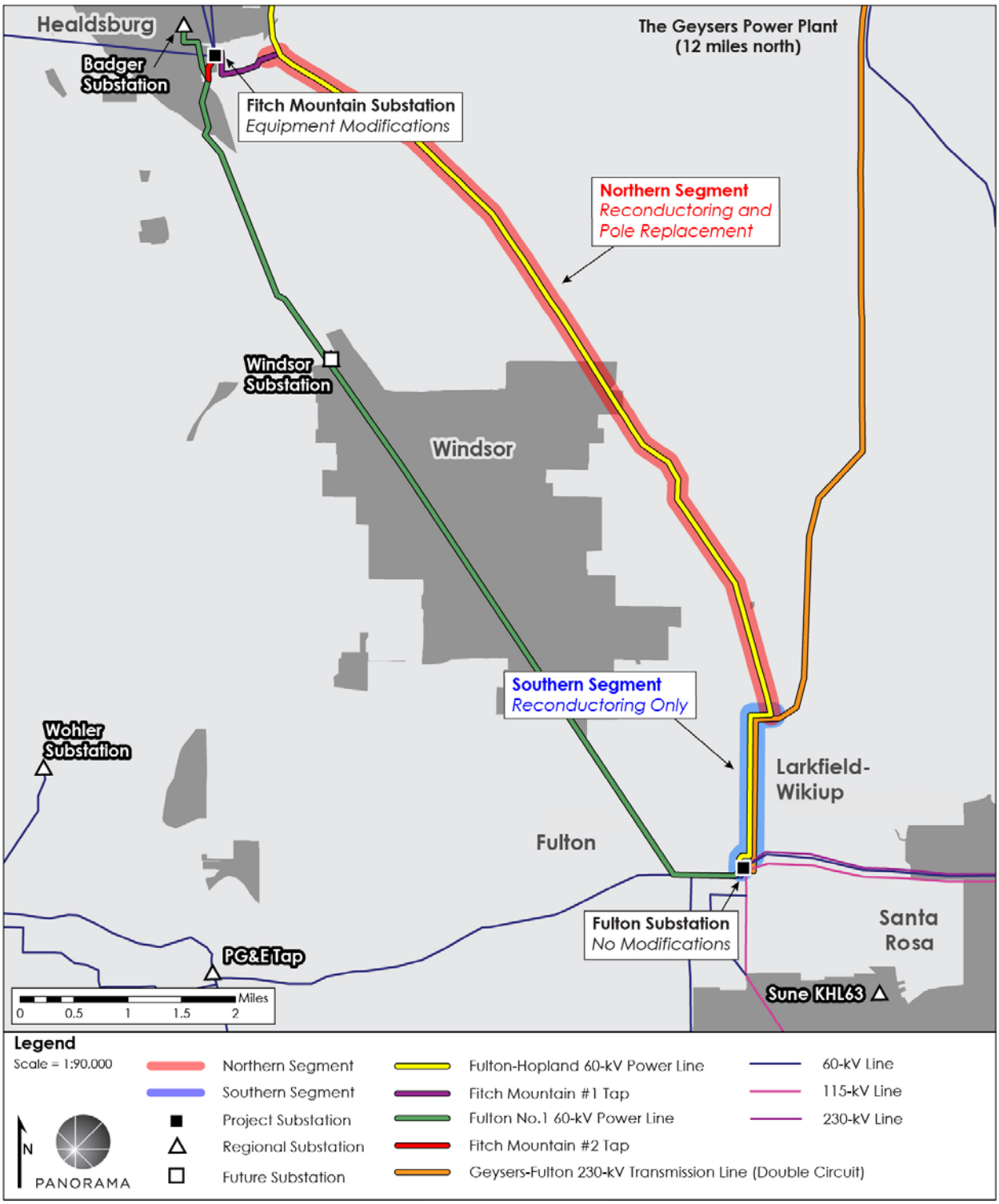
2.4 REGIONAL POWER SYSTEM

Fulton Substation serves an area that includes the communities of Fulton, Windsor, and Healdsburg. Power to the area originates in The Geysers Power Plant, which is located approximately 12 miles north of the project area in the Mayacamas Mountains. The point of interconnection for much of The Geysers' geothermal power generation is Fulton Substation, which also serves as a regional electric switching station. Fulton Substation includes 230-kV, 115-kV, and 60-kV switching and voltage transforming facilities, as well as 12-kV distribution transforming facilities. The regional power system is illustrated on Figure 2.4-1.

Power from The Geysers geothermal field is carried to Fulton Substation by the double-circuit Geysers-Fulton 230-kV Transmission Line, which consists of the Geysers #12 and Geysers #17 circuits (Geysers-Fulton lines), and provides electric service in southern Sonoma and Napa counties. Power is stepped down at Fulton Substation to either 115-kV or 60-kV, depending on the destination. Two 60-kV power lines, the Fulton #1 and the Fulton-Hopland lines, originate at and travel north from Fulton Substation. These lines provide electric power to the City of Healdsburg's Badger Substation and PG&E's distribution substations at Fitch Mountain and Geyserville.

Fitch Mountain Substation serves northern Windsor and the distribution facilities east and west of the City of Healdsburg. The substation is connected to the Fulton-Hopland line to the east by the Fitch Mountain #1 Tap; the Fitch Mountain #2 Tap connects the substation to the Fulton #1 line to the west, creating a loop for system reliability. Geyserville Substation serves customers in the City of Geyserville and surrounding areas; once the proposed project is completed, Geyserville Substation would have an alternate source of power during an outage.

Figure 2.4-1 Regional Power System



Sources: (ESRI 2016, PG&E 2016-2017)

The CPUC approved PG&E's Windsor Substation Project in April 2014 (CPUC 2016). Construction of the new Windsor Substation began in November 2016 and involves building a new 115/12-kV substation at Old Redwood Highway and Herb Road along the Fulton #1 line between Fulton Substation and Fitch Mountain Substation (Aspen 2013). The future substation site is shown on Figure 2.4-1. Windsor Substation is anticipated to be operational in late 2018[3]. The approved project includes upgrading Windsor Substation in the future from 60-kV to 115-kV by increasing the voltage of the Fulton #1 line from 60-kV to 115-kV (Aspen 2013). PG&E has not proposed to increase the voltage of the Fulton-Hopland line or Fitch Mountain Substation greater than 60-kV as part of the Windsor Substation Project or the proposed project.

2.5 PROJECT COMPONENTS

2.5.1 Conductor

Southern Segment

Existing 60-kV and 230-kV conductor would be replaced in the Southern Segment on the Fulton-Hopland line and the Geysers #12 line (one of two 230-kV circuits), respectively. Existing 4/0 aluminum conductor on the Fulton-Hopland line would be replaced with a combination of 477 kcmil[4] aluminum conductor steel supported (ACSS) 24/7 strand "Flicker," and 477 kcmil aluminum conductor composite reinforced 26/7 strand "Hawk." Existing bundled 1113 kcmil all-aluminum conductor on the Geysers #12 line would be replaced with unbundled 954 kcmil ACSS 54/7 "Cardinal" conductor. These lines are currently co-located on tubular steel poles (TSPs) and dead-end structures, with the Fulton-Hopland line installed as underbuild[5].

Conductor in the Southern Segment would be replaced on the Fulton-Hopland line from Fulton Substation to Shiloh Ranch Regional Park (between Poles 1 and 23), and on the Geysers #12 line from the south side of US 101 to just west of the Shiloh Ranch Regional Park (between Poles 7 and 21). Conductor on the section of Geysers #12 line would be replaced to meet the minimum ground clearance and separation distance requirements between the new higher-rated conductor on the Fulton-Hopland line (required by CPUC GO 95). Conductor on the Geysers #17 line (the other 230-kV circuit) would not be replaced because the clearance distances would be sufficient after reconductoring the Fulton-Hopland line. Proposed conductor replacement is summarized in Table 2.5-1.

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[3] The Final IS/MND for the Windsor Substation Project identified an approximately 19-month construction period from December 2014 to June 2016. Construction began in November 2016; therefore, it is anticipated that the substation would be operational in late 2018.

[4] kcmil (1,000 circular mils) is a unit of measure for the size of a conductor. Kcmil wire size is the equivalent cross-sectional area in thousands of cmils. A cmil is the area of the circle with a diameter of 0.001 inch.

[5] Underbuild refers to lower voltage lines that are commonly installed directly under higher voltage lines on the same poles.

Table 2.5-1 Proposed Reconductoring

Segment	Existing Lines	Voltage (kV)	Reconductoring Length (miles)
Southern Segment (1.~~9~~ 8 miles)	Fulton-Hopland	60	1.~~98~~
	Geysers #12	230	1.4 [a]
	Geysers #17	230	–
Northern Segment (~~7.9~~8.1 miles) [b]	Fulton-Hopland	60	~~7.9~~8.1
	Fitch Mountain #1 Tap	60	–

Notes:

[a] The Geysers-Fulton line would only be reconductored where necessary to accommodate clearance requirements for the reconductored Fulton-Hopland line, which is limited to the Geysers #12 line between Poles 7 and 21.

[b] The length of the Northern Segment includes the first 650 feet (0.1 mile) of the Fitch Mountain #1 Tap. The remaining portion of the Fitch Mountain #1 Tap (0.7 mile) connecting the Fulton-Hopland line to Fitch Mountain Substation would not be replaced.

Source: (TRC 2015)

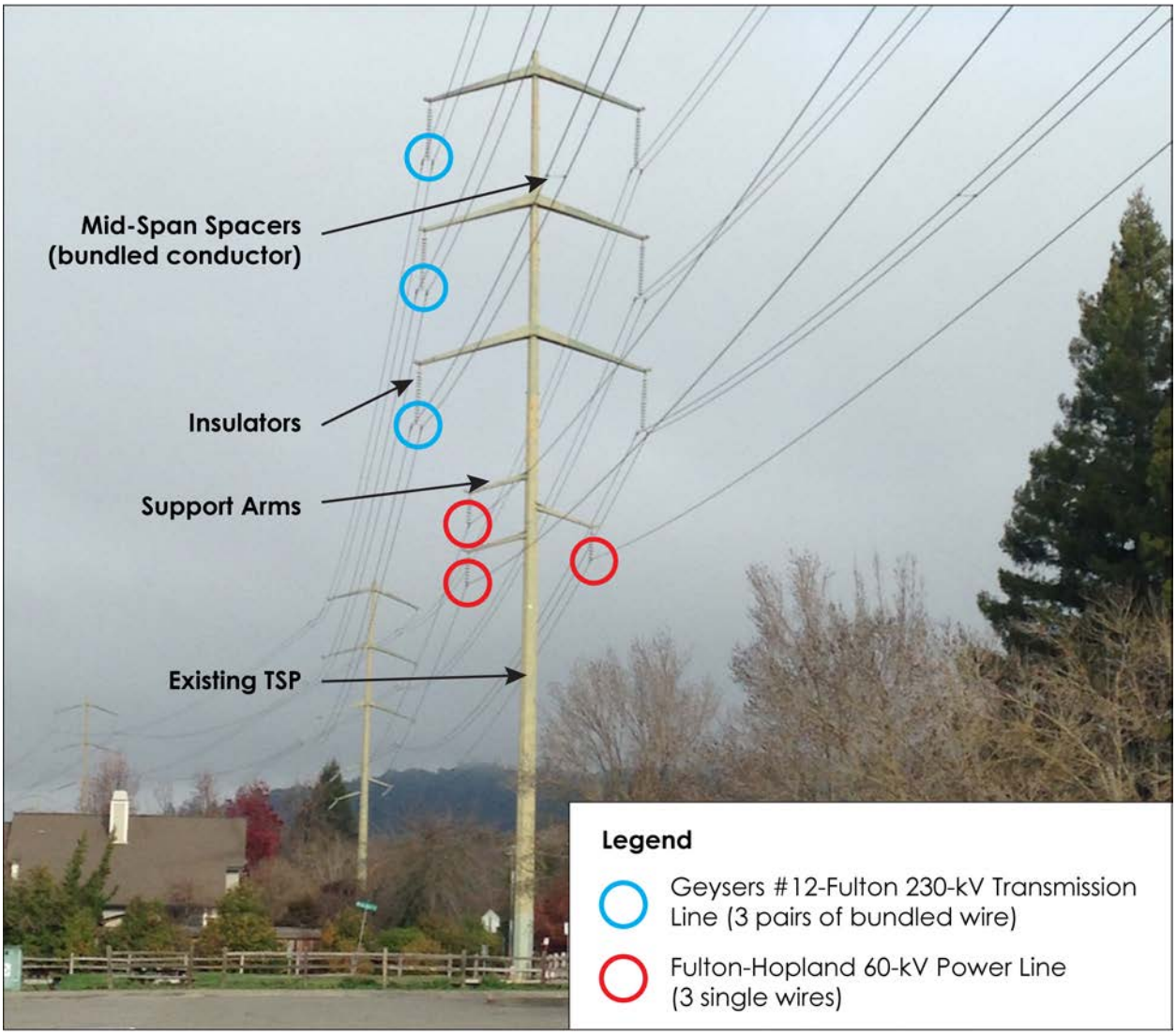
Existing TSPs in the Southern Segment are configured to carry six bundled pairs of 230-kV wires (12 wires total), and three single 60-kV wires installed as underbuild. The bundled 230-kV wires are arranged in a vertical configuration with three bundled pairs on each side of the poles. The bundled conductor on the north and west sides of the poles make up the Geysers #12 line, and the bundled conductor on the south and east sides make up the Geysers #17 line. The single 60-kV wires are arranged in a vertical delta configuration, with two wires on one side of the pole and one on the other, in an alternating pattern. The existing configuration of conductor in the Southern Segment is shown on Figure 2.5-1. New conductor in the Southern Segment would be installed in the same configuration as the existing conductor with one exception: new conductor installed for the Geysers #12 line would not be bundled.

Insulators that connect existing conductor to the poles would be replaced with primarily ceramic insulators to optimize operation and maintenance activities. Composite insulators would be used for TSPs and steel H-frames/dead-end structures at Fulton Substation. Support arms on the poles would not be replaced.

Northern Segment

Existing 60-kV conductor would be replaced in the Northern Segment for the Fulton-Hopland line. Existing 4/0 aluminum conductor on the Fulton-Hopland line would be replaced with a combination of 477 kcmil ACSS 24/7 strand "Flicker." The line is currently installed on primarily wood poles that would be replaced with new poles during the reconductoring process (pole replacement is described in Section 2.5.2). Conductor would be replaced from the Shiloh Ranch Regional Park to the Fitch Mountain #1 Tap (between Poles 23 and 91). The remainder of the Fulton-Hopland line from the Fitch Mountain #1 Tap to Hopland Substation would not be reconductored. Existing conductor on the Fitch Mountain #1 Tap would not be replaced; however, the initial 650 feet of the line connected to the Fulton-Hopland line would be temporarily detached from two existing poles during the reconductoring process.

Figure 2.5-1 Existing Conductor Configuration in the Southern Segment



2.5.2 Poles

Southern Segment

The Fulton-Hopland line and Geysers-Fulton lines in the Southern Segment are supported on approximately 18 TSPs and 6 steel H-frame/dead-end structures. Existing insulators on the poles for both the Fulton-Hopland line and Geysers #12 line would be replaced during reconductoring (refer to Section 2.6.5). One existing 55-foot-tall wood pole that supports the Fulton-Hopland line (Pole 6) would be replaced with an approximately 60-foot-tall light-duty steel pole (LDSP). Existing pole locations in the Southern Segment are shown on Figure 2.2-2 and on maps in Appendix A.

Two wood poles for a 12-kV distribution line (P1 and P2) located immediately north of Old Redwood Highway at Faught Road (refer to Appendix A) may be relocated to meet minimum

clearance requirements for the reconductored Fulton-Hopland line. The poles would be relocated along the distribution line alignment in either direction from the existing location. If needed, the poles may be replaced with new poles that would be a similar type, material, and height as the existing poles.

Two street lights along Faught Road between Manka Circle and El Mercado Parkway may be lowered, relocated, or removed to meet the necessary clearance requirements.

Temporary poles may also be installed during the reconductoring process (refer to Section 2.6.5).

Northern Segment

Existing wood monopoles, three-pole structures, and A-frames in the Northern Segment would be replaced with new TSPs and LDSPs. Existing and proposed pole counts in the Northern Segment are summarized in Table 2.5-2. Existing pole locations are shown on Figure 2.2-3 through Figure 2.2-5 and on maps in Appendix A.

Table 2.5-2 Existing and Proposed Pole Totals in the Northern Segment

Structure Type	Poles per Structure	Existing Structure Count	Proposed Actions	Resulting Structure Count
Wood monopole	1	61	• Remove 60 monopoles • Top 1 monopole [a]	1
Wood three-pole structure	3	4	• Remove 4 three-pole structures • Top 1 pole from 1 three-pole structure [a]	1
Wood A-frame	2	1	• Remove 1 A-frame structure	0
LDSP	1	4	• Install 59 new steel LDSPs • Remove 3 existing LDSPs • Utilize 1 existing LDSP (existing pole reused)	60
TSP	1	0	• Install 7 new TSPs	7
TOTAL		**70**		**67 new poles 2 topped poles**

Note:

[a] Topped poles would remain in place to support existing distribution and communication lines.

Sources: (ESRI 2016, PG&E 2016-2017)

Part of one existing three-pole structure (Pole 63) and one wood monopole structure (Pole 73) would be shortened and left in place ("topped"). One of the poles for the three-pole structure and the monopole support an existing 12-kV distribution feeder line and communication lines in addition to the Fulton-Hopland line. These two poles would be topped and left in place following construction to support the utility lines. The other two poles from the three-pole

structure would be replaced with a single TSP to support the Fulton-Hopland line. Pole topping procedures are described further in Section 2.6.4.

New poles would be approximately 3 to 30 feet taller than existing poles (15 feet on average). Poles would be installed in approximately the same alignment as the existing conductor and within approximately 12 to 35 feet of existing pole locations. Span lengths between poles would generally remain the same (approximately 200 to 1,600 feet), except where the three existing poles would be completely removed. Proposed pole dimensions are provided in Table 2.5-3. The exact characteristics and locations of proposed poles are subject to change based on final engineering and ground conditions.

Table 2.5-3 Proposed Pole Dimensions

Pole Type	Aboveground Height (feet)	Cross Arm Length (feet)	Belowground Depth (feet)	Foundation Type(s)	Base Diameter/ Area per Pole
LDSP	58 to 72	7	14	Direct-embedded	16 inches / 1.4 square feet
TSP	60 to 75	7	20 to 30	Concrete pier [a]	5 feet / 19.6 square feet
			30	Micropile [b]	6.5 feet / 25.4 square feet

Notes:

[a] Concrete pier foundations would extend approximately 18 inches (1.5 feet) aboveground.

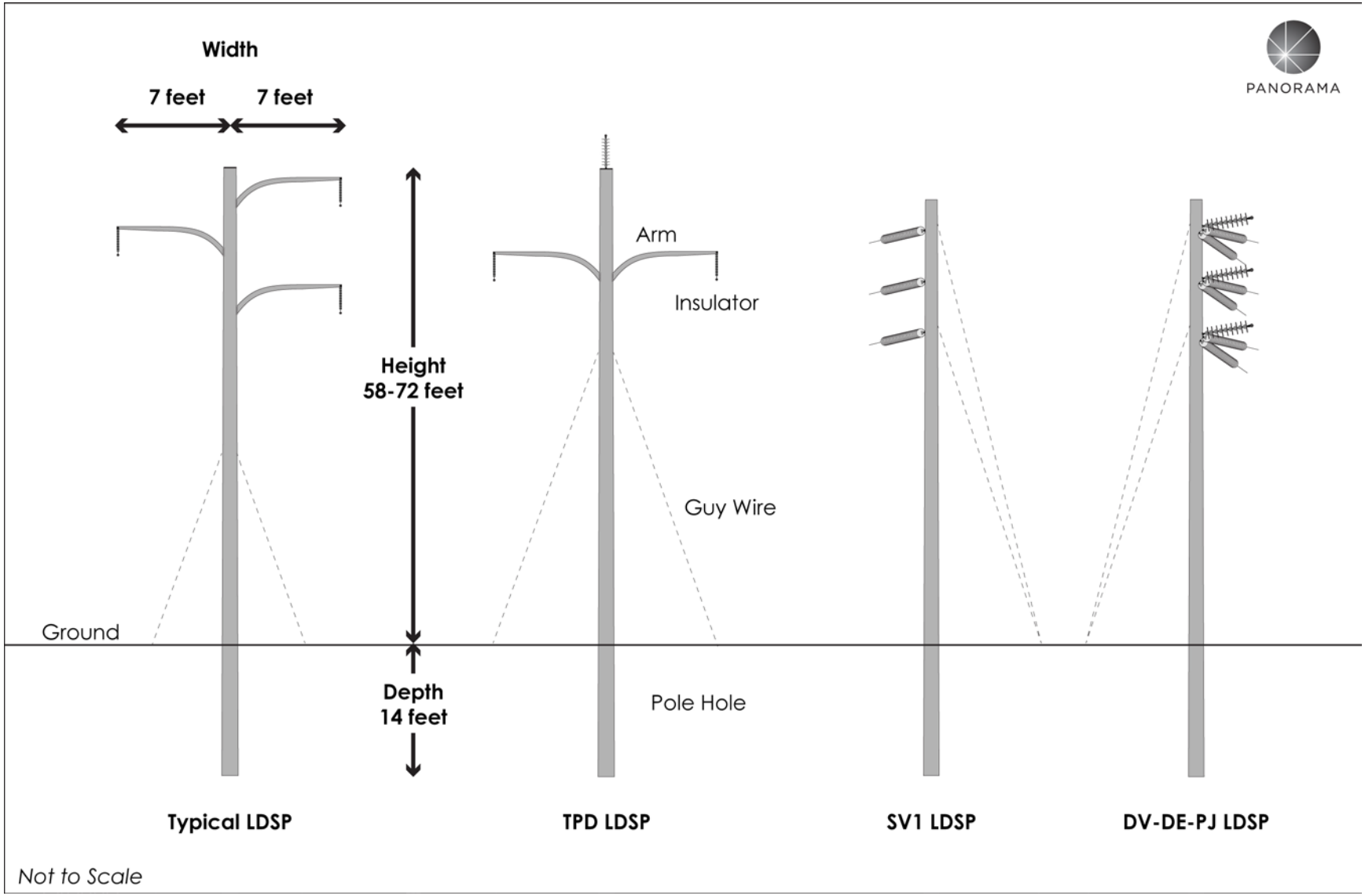
[b] Mircropile foundations would be comprised of 4 to 12 composite piles constructed out of 9-inch diameter high-strength steel casing, high strength all-thread rebar, and grout. The steel casings would extend 1 foot aboveground. The piles would be connected to TSPs with either a steel cap or cast-in-place concrete cap connection.

Sources: (ESRI 2016, PG&E 2016-2017)

All new poles would have a matte, dark brown, self-weathering surface, and would be installed with glass or ceramic insulators typically measuring 10 inches in diameter and 4 feet in length. Poles would be configured to carry three individual wires. Most poles would carry conductor arranged in a delta configuration, and conductors would be arranged in a single vertical plane on poles where the line changes direction. Diagrams for typical LDSPs are shown on Figure 2.5-2, and diagrams for typical TSPs are shown on Figure 2.5-3.

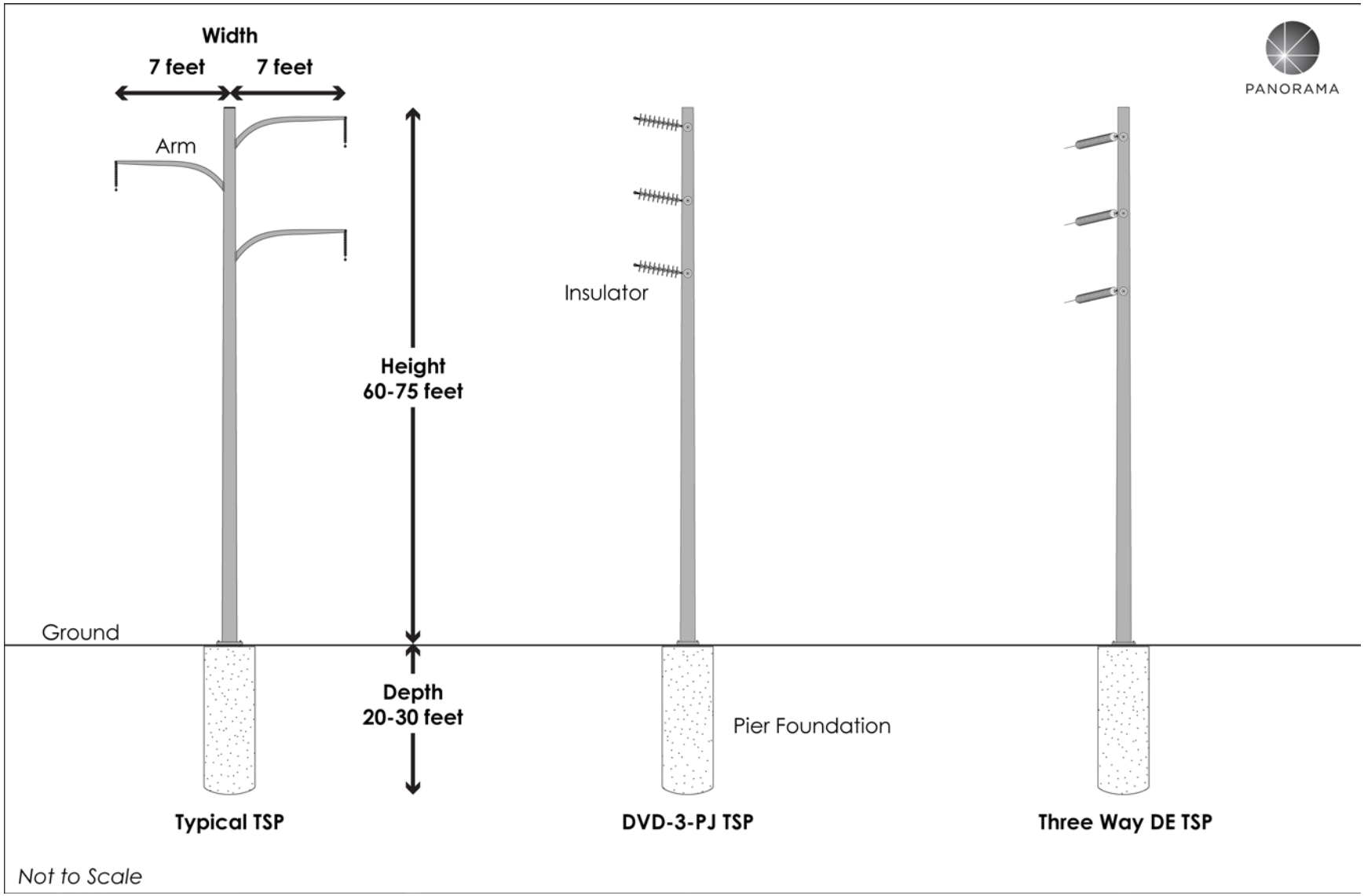
The base of new LDSPs would occupy approximately the same ground area as the existing poles being replaced (approximately 1.4 square feet), and the base of new TSP foundations would occupy approximately 5 to 10 times more ground area (approximately 19.6 to 25.4 square feet), as listed in Table 2.5-3. The additional ground area used by the TSPs would be offset by the reduction in total structures and poles. Temporary poles may also be installed during the reconductoring process (refer to Section 2.6.5).

Figure 2.5-2 Typical Light Duty Steel Poles



Sources: (PG&E 2016b)

Figure 2.5-3 Typical Tubular Steel Poles



Sources: (PG&E 2016c)

2.5.3 Substations

Fulton Substation

The Fulton Substation would not be modified because the substation currently has adequate equipment to support the higher-rated conductor that would be installed for the Fulton-Hopland line. Work on the Fulton Substation property would involve replacing conductor and insulators installed on existing TSPs and H-frame/dead-end structures where the Fulton-Hopland and Geysers-Fulton lines enter the substation. Conductor and insulator replacement in Fulton Substation is included with reconductoring activities described for the Southern Segment.

Fitch Mountain Substation

The proposed project would involve modifying Fitch Mountain Substation by replacing existing equipment with new equipment to accommodate the higher-rated conductor installed for the Fulton-Hopland line. Substation modifications would include upgrading switches with supervisory control and data acquisition systems, and replacing equipment as summarized in Table 2.5-4. Existing communication lines would also be relocated within the substation.

Table 2.5-4 Fitch Mountain Substation

Existing Equipment	Proposed Equipment
Three 69-kV/600 ampere (A) motor-operated air switches	• Two 72.5-kV/1200 A/31.5 kiloampere (kA) sulfur hexafluoride (SF_6) gas insulated circuit breakers • One 72.5-kV/1200 A motor-operated air switch
Two steel lattice structures (approx. 30 feet tall)	• Two dead-end structures (approx. 36 feet tall)
High-end structures and conductor	• New high-end structures and conductor
Control building (8 feet wide × 8 feet long × 8 feet tall)	• New control building (approx. 16 feet wide × 40 feet long × 11 feet tall)

Source: (ESRI 2016, PG&E 2016-2017)

New dead-end structures at Fitch Mountain Substation would require foundations composed of concrete-drilled shafts that would be approximately 3 to 4 feet in diameter and of varying depth, depending on geotechnical parameters that would be determined prior to construction.

The new control building would be preassembled and installed using a crane in the southwestern corner of the substation. The single building unit would have two rooms. The exterior walls and roofing would be constructed of ribbed steel panels with a coil-coated, baked-on, Kynar-500 polyvinylidene fluoride resin-based finish over a baked-on Kynar-500-compatible primer, in "Light Stone" color. Small lights would be installed on and around the new equipment on structures near operating handles for switches and breakers, and potentially near the entrances to the control building.

New substation equipment could be positioned at any location within the existing substation fence line, and would meet or exceed the requirements for the reconductored Fulton-Hopland

line. The proposed project does not include replacement or installation of any oil-filled equipment.~~No oil-filled equipment is currently in the substation and none is proposed.~~

An asphalt road would be installed within the substation footprint following installation of the new equipment. All modifications at Fitch Mountain Substation would be completed within the existing fence line, including the asphalt road.

2.6 CONSTRUCTION

2.6.1 Overview

This section describes the following construction activities and procedures associated with the proposed project:

- Temporary work areas
- Ground and helicopter access
- Vegetation and ground disturbance
- Site development
- Pole replacement and other modifications
- Reconductoring
- Fitch Mountain Substation modifications
- Erosion, sediment, and pollution control
- Traffic control
- Water use
- Waste disposal
- Cleanup and restoration
- Equipment and workforce
- Schedule and timing

2.6.2 Work Areas and Access

Proposed and Alternate Work Areas

The proposed project would be constructed using temporary work areas, access routes, and helicopters to facilitate equipment and material access to the project alignment, and to store equipment and materials during construction. PG&E has identified the preliminary locations of proposed work areas, alternate work areas, and access routes that would be sufficient to construct the project based on the current design; existing land uses and ground conditions; and anticipated environmental conditions. Alternate sites would generally be selected in lieu of the proposed sites if the proposed sites become unavailable, or if the alternate sites become preferable at the time of construction; however, both proposed and alternate sites may be used for either a portion of or the entire construction period, if necessary. The anticipated locations of work areas and access routes are shown on maps in Appendix A.

Several of the proposed work areas are larger than the actual workspace that would be needed, and only a portion of the total area would be used during construction. Where identified, the limits of the actual workspace would be positioned at the time of construction within the larger work area, but would not exceed the maximum workspace identified.

It may be necessary to refine the exact locations of some work areas and access routes at the time of construction to account for final engineering and design specifications, and to address any unforeseeable land use or environmental changes that could occur between PG&E's

application submittal (December 2015) and the start of proposed construction activities (July 2018; refer to Section 2.6.13 below). The extent of such refinements would be minor, restricted to the project study area, and subject to applicable environmental requirements and resource avoidance. Work area and access route refinements would be coordinated in advance with the CPUC to ensure consistency with the analysis presented in this IS/MND. Procedures for minor project refinements are described in Section 4: Mitigation Monitoring and Reporting Program. Factors that may require project refinements include:

- Changes in land use (i.e., agricultural operations or property development)
- Avoidance of sensitive resources identified during pre-construction surveys or an inadvertent discovery
- Avoidance of unnecessary vegetation or ground disturbance
- Avoidance of hazards or other safety considerations

PG&E Easements and Access Rights

Fulton Substation and Fitch Mountain Substation are located on land owned by PG&E, and the existing lines and poles in the project alignment are all located within existing PG&E easements. Easements along the Southern Segment vary in width from 42 to 82 feet, most of which are 80 feet wide. Easements are described by the centerline along the Northern Segment, and there are no specific widths defined. The existing easements include ingress and egress rights to access the project alignment to operate and maintain the lines, clear vegetation, replace poles, and for reconstruction.

In general, PG&E believes that its existing centerline easements in the Northern Segment are adequate to construct the proposed project because they provide secondary access rights to maintain and upgrade existing utility lines in the project alignment; however, PG&E may choose to update their existing easements to bring them into conformance with current company practices. PG&E anticipates that a slight realignment may be necessary for an easement on the Minaglia property to address safety concerns. Any easement updates or modifications would be pursued by PG&E through landowner agreements, and any land rights issues would be resolved in subsequent negotiations following the CPUC's decision regarding PG&E's application for a PTC. Should PG&E pursue easement updates, it is not anticipated that the updated easements would conflict with the locations of existing structures adjacent to the alignment because the existing centerline for building restrictions would remain the same.

Temporary work areas and access routes would be located within PG&E easements or on publicly- or privately-owned land near the project alignment. Where applicable, PG&E would obtain temporary construction easements and/or encroachment permits to use land outside of their easements. PG&E anticipates that landowner outreach to obtain temporary construction easements would begin in early 2017.

Ground Access

Access Routes

Construction materials, equipment, and workers would be transported to project work areas using a network of public highways, public roadways, and proposed access routes on private and public lands. Public highways and roadways that would be used during construction are identified in Section 3.15: Traffic and Transportation. This section describes proposed access routes on private land comprised of existing paved routes, unpaved routes, and overland routes, collectively referred to as access routes. The types of access routes, approximate widths, and total dimension for the project are listed in Table 2.6-1. Access routes for the project are shown on maps in Appendix A.

Table 2.6-1 Access Routes and Establishment Requirements

Type	Approximate Width (feet)	Establishment Requirements [a]	Total Length (miles)
Existing Paved	20	Vegetation clearing, if necessary	1.8~~2.9~~
Existing Unpaved	16	Vegetation clearing, grading, and gravel installation	15.9~~14.4~~
Overland Route	16	Vegetation clearing	7.5~~7.3~~
		TOTAL	**25.2~~24.6~~**

Note:

[a] Grading and vegetation clearing may occur up to 8 feet from centerline of existing unpaved access roads, and vegetation trimming could occur to a height of 14 feet aboveground. ~~Grading and vegetation clearing could occur along any existing unpaved access route up to approximately 8 feet (grading and vegetation clearing) and 14 feet (vegetation/tree limb trimming) from the centerline, except where the~~ Access routes ~~are~~ located along trails in Sonoma County parks (i.e., Shiloh Ranch Regional Park and Foothill Regional Park)~~, which~~ may be graded and cleared to their existing widths, but would not be expanded.

Source: (TRC 2015)

Most of the unpaved access routes (e.g., dirt and gravel) would require vegetation removal up to 8 feet from the centerline (for a 16-foot corridor), and several would require improvements consisting of minor grading and placement of gravel to improve traction and all-weather access. Establishment requirements for unpaved access routes are summarized in Table 2.6-1. Site development activities for establishing access routes (i.e., vegetation clearing and grading) are described in Section 2.6.3. Work vehicles and equipment would need a minimum 12-foot corridor along access routes to operate. Existing unpaved access routes that are less than 12 feet wide may be expanded up to 16 feet wide during reestablishment, except routes that are located along existing recreational trails in regional parks. Access routes along such trails would be limited to the existing trail width, which is sufficient for vehicles and equipment to operate.

Overland routes are identified where no preexisting road or trail is present, or where previously existing routes have been substantially overgrown. Overland routes would be accessed by vehicles unless it is determined that the terrain is too steep to safely operate vehicles. In such cases, workers would drive vehicles as far as possible and continue following the overland

route on foot. Overland footpaths may also be identified at the time of construction between helicopter touch down areas and pole work areas, as described below under Helicopter Access. Vegetation clearing or mowing may be required to establish overland travel routes and footpaths, but grading or blading the ground surface would not occur. New permanent access roads would not be created.

Gates along any access route may be repaired or replaced, and new gates may be installed, if necessary. Any gate replacement or installation would be coordinated with applicable landowners.

Vehicle Turnaround Areas

PG&E has identified the preliminary locations for seven vehicle turnaround areas ("turnarounds") along existing access routes in the Northern Segment that would be needed to maneuver, park, and offload vehicles and equipment. Vehicle turnaround areas may require minor grading, vegetation removal, and placement of gravel to provide a safe and stable work surface. Vehicle turnaround areas are listed in Table 2.6-2 and shown on maps in Appendix A.

Table 2.6-2 Vehicle Turnaround Areas

Work Area ID	Location Description/ Nearest Pole(s)	Total Area (acres)	Maximum Workspace (acres)	Use of Total Area
T-1	East of Pole 23	0.19	0.09	47%
T-2	Southeast of Pole 58	0.10	0.01	10%
T-3	Northeast of Pole 61	0.05	0.05	100%
T-4	Southwest of Pole 70	0.06	0.04	67%
T-5	East of Pole 78	0.45	0.07	16%
T-6	Northeast of Pole 86	0.44	0.15	34%
T-7	Northeast of Pole 84	0.56	0.11	20%

Source: (PG&E 2016-2017)

Helicopter Access

Helicopter Operation

Helicopters would be used during pole replacement and reconductoring activities to transport workers, equipment, and materials where ground access is limited due to steep terrain and dense vegetation. Two light- or medium-lift helicopters (MD 500 helicopter, Hughes 500, or a similar light- or medium-lift model) would be used to carry workers, materials, tools, and hardware generally weighing less than 5,000 pounds. Light- or medium-lift helicopters would also be used to support wire stringing activities. One heavy-lift helicopter (Blackhawk, Bell 214B, or a similar model) would be used to transport the heaviest project materials weighing between 5,000 and 20,000 pounds, such as rock/gravel, new poles, old poles, and potentially concrete for TSP foundations.

Helicopters would be stored overnight at the Charles Schultz Airport in Santa Rosa, the Nut Tree Airport in Vacaville, or another suitable hanger location. Helicopters may also intermittently fly directly to the project site from the contractor's base of operations in Red Bluff, California. Helicopters would not be stored overnight at project work areas.

Helicopter Landing Zones

Helicopter landing zones (LZs) would be located at designated staging areas, as described below under Staging Areas. Helicopter activities at designated LZs would include landing and taking off, refueling, and hovering to pick up or drop off workers, equipment, and materials. Helicopter LZs would require approximately 1 acre of the total staging area workspace for landing and support vehicles. Helicopter LZs would typically be equipped with a refueling truck with a minimum capacity of 500 gallons during helicopter activities.

Helicopter Touch Down

Helicopters would typically transport workers, equipment, and materials using a rope or cable hanging approximately 60 to 80 feet below the helicopter, which would eliminate the need for landing. In addition, helicopters may briefly land ("touch down") at locations along the project alignment to drop off and pick up workers and equipment where ground access is constrained, such as by steep topography. Helicopter touch down would occur in designated "open areas" within the project study area that are level and free of dense vegetation, environmental resources, and other obstacles. Overland footpaths would be identified from the helicopter touch down location to pole locations, generally following the most direct path.

The specific locations where helicopter touch down and overland footpaths are needed would be determined at the time of construction based on an assessment of ground access and environmental constraints. Flat and open areas that may be suitable for helicopter touch down and overland footpaths are shown on maps in Appendix A. Vegetation clearing, grading, or gravel installation would not occur at helicopter touch down areas or the associated overland footpaths.

Flight Paths

Helicopters would generally fly directly between overnight storage facilities and helicopter LZs at the beginning and end of each work day. Once on site, helicopters would generally fly from LZs directly to the closest location along the project alignment and then travel up and down the alignment to pole locations within an approximately 3-mile radius.

A single light- or medium-lift helicopter would be used in the Southern Segment for approximately 2 to 3 hours on two separate occasions. On each occasion, the helicopter would access up to approximately five poles and mid-span locations during reconductoring activities, and operate for a total of approximately 15 minutes at each location. The helicopter would fly to and from the adjacent helicopter LZs approximately 12 to 25 times per location to pick up and drop off equipment, materials, and workers. Helicopter activities in the Southern Segment would be limited to (1) proposed helicopter LZs, (2) pole and mid-span locations where it is

determined that ground access for crane and bucket trucks is substantially constrained, such as at Poles 8, 9, 12, 13, 19, 20, and 21, and (3) the flight paths between these locations.

At least one light- or medium-lift helicopter may be used each day construction occurs in the Northern Segment (approximately ~~10 to 12~~8 months), and up to three helicopters (two light- or medium-lift and one heavy-lift) could be used simultaneously during peak construction periods. Simultaneous helicopter activities could be focused at one location or dispersed across multiple locations along the project alignment. Helicopters would operate at pole sites in the Northern Segment for approximately 3 to 5 days at a time and up to approximately 17 days total. When in use, helicopters would operate in the Northern Segment at varying levels for the entire workday. Active pole sites would be accessed by helicopter approximately three to seven times per day. Active landing zones would be accessed by helicopter approximately 22 to 88 times per day, depending on the number of poles being worked on and specific construction activities. During each trip, helicopters would hover at pole sites for approximately 30 to 60 seconds and at helicopter LZs for approximately 90 to 120 seconds.

It may be necessary to temporarily close roadways and pedestrian walkways (e.g., sidewalks, paths, and trails) where overhead helicopter activities occur for safety purposes. Roadway and walkway closures are described further in Section 2.6.8.

Federal Aviation Administration Rules and Flight Restrictions
Helicopters could fly as close as approximately 70 feet from occupied structures (i.e., residences) unless otherwise restricted by applicable FAA rules, environmental considerations, or other restrictions governing helicopter operations. Helicopters could be used less than 70 feet from structures, if necessary, but only with the proper FAA authorization and if the structures were temporarily evacuated during the helicopter activities. PG&E has identified up to approximately 10 residences within 70 to 100 feet of potential flight paths that may need to be temporarily evacuated for several hours while helicopters are in use.

The helicopter contractor would be responsible for complying with all FAA regulations. Helicopters would not carry loads over occupied structures. If a helicopter route is identified to cross over "congested areas," as described in Federal Aviation Regulations Part 133, the helicopter contractor would submit a Congested Area Plan to the FAA for approval in advance of helicopter operations. Following FAA approval of the Congested Area Plan, the helicopter contractor would notify and obtain approval from the FAA for any changes to the approved plan.

Staging Areas

Staging areas would serve as the principal work areas during construction and act as the base of daily operations. Staging areas would be used for multiple purposes that would vary by construction phase and location. Typical activities at staging areas would include:

- Helicopter landing
- Storing construction material and equipment
- Refueling equipment and helicopters

- Parking vehicles and equipment
- Collecting construction waste prior to disposal
- Conductor replacement (e.g., pulling and tensioning), where positioned directly under project lines
- Construction workforce meetings

PG&E has identified two types of staging areas that would be used during construction: (1) larger staging areas with helicopter LZs where more extensive work activities would occur, and (2) generally smaller staging areas where no helicopter landing would occur. Proposed and alternate staging areas for the proposed project are listed in Table 2.6-3. The locations of staging areas are shown on Figure 2.2-2 through Figure 2.2-5 and maps in Appendix A.

Table 2.6-3 Staging Areas

Work Area ID	Southern Segment	Northern Segment	Location Description/ Nearest Pole(s)	Total Area (acres)	Maximum Workspace (acres)	Use of Total Area
Staging Areas with Helicopter LZ						
SA/LZ-1	●		Lavell Road (at Pole 9)	9.13	~~0.93~~1.0	1~~0~~%
SA/LZ-2	●	●	Faught Road (west of Pole 21)	20.81	~~0.92~~1.0	~~5~~4%
SA/LZ-3		●	Shiloh Ridge Road (at Pole 31)	3.11	3.11	100%
SA/LZ-4 (Alt.)		●	Faught Road (southwest of Pole 35)	4.38	4.38	100%
SA/LZ-5		●	Chalk Hill Road (at Pole 52)	1.63	0.81	50%
SA/LZ-6		●	Brooks Road (southeast of Pole 63)	3.28	1.7	52%
SA/LZ-7 (Alt.)		●	Brooks Road (northeast of Pole 63)	2.49	2.49	100%
SA/LZ-8 (Alt.)		●	Brooks Road (northeast of Pole 63)	2.08	2.08	100%
SA/LZ-9 (Alt.)		●	Grant Avenue (at Pole 85)	1.95	1.95	100%
SA/LZ-10		●	Bailhache Ave (at Pole 90)	1.1	~~0.7~~1.1	~~63~~100%
Staging Areas without Helicopter LZ						
SA-1	●		Lavell Road (at Pole 11)	0.7	0.14	20%
SA-2	●		Old Redwood Highway and Faught Road (at Pole 15)	1.52	0.33	22%

Work Area ID	Southern Segment	Northern Segment	Location Description/ Nearest Pole(s)	Total Area (acres)	Maximum Workspace (acres)	Use of Total Area
SA-3		●	Shiloh Ranch Regional Park (northeast of Pole 27)	0.22	0.13	59%
SA-4		●	Shiloh Ranch Regional Park (northeast of Pole 27)	0.11	0.11	100%
SA-5		●	Bailhache Ave (Fitch Mountain #1 Tap)	1.38	1.38	100%

Source: (PG&E 2016-2017)

Proposed and alternate staging areas are positioned along the project alignment in strategic locations on flat or gently sloping land within or near PG&E's existing easements (up to approximately 0.5 mile). Staging areas would support construction activities at neighboring poles and pull sites to reduce the travel distance when transporting or storing materials, equipment, and workers. Two limited staging areas would also be located within the Shiloh Ranch Regional Park (SA-3 and SA-4) to store equipment, vehicles, and a compressor due to the steep terrain and limited workspace at adjacent poles.

Preparation of staging areas may require some vegetation mowing and installation of geotextile fabric and gravel; some grading would be required at helicopter LZs. No electrical distribution connection would be required at staging areas, and security fencing would not be installed. Temporary electrical service at staging areas would be provided by generators, if necessary (approximately 1,000 to 3,000 watts). Site development at temporary work areas is described further in Section~~s~~ 2.6.3.

In addition to staging areas, PG&E would store materials and equipment at their existing Airport Yard located at 1062 Airport Boulevard, Santa Rosa, and within the existing fence lines at Fulton Substation and Fitch Mountain Substation.

Pole Work Areas

The proposed project would involve accessing existing poles in the Southern Segment and installing and/or removing existing poles in the Northern Segment as described in Section 2.5.2. Specific pole replacement and reconductoring procedures that would occur at pole work areas are described in Sections 2.6.4 and 2.6.5, respectively. Pole work areas may also be used to temporarily store vehicles, equipment, and materials during construction.

The minimum workspace needed at pole sites would vary based on the size and type of the pole, access and workspace constraints, and the scope of proposed work (i.e., installation and removal, removal only, or access only). The minimum workspace needed at each pole would vary between approximately 0.2 to 0.4 acre. The larger 0.4-acre work areas would typically be required at TSPs, and the smaller 0.2-acre work areas would be required at all other poles unless additional workspace is needed due to steep terrain, such as at Poles 27 and 28. Representative

boundaries for pole work areas are shown on maps in Appendix A. The exact work areas surrounding each existing and proposed pole would depend on the ground conditions and available access options.

All vegetation and the entire ground surface within pole work areas could potentially be disturbed during construction. Vegetation and trees in pole work areas that cannot be avoided would be trimmed or removed to establish a sufficient workspace. Geotextile fabric and gravel may be installed to stabilize loose soils in the workspace, and protective matting may be placed over drainage crossings that cannot be avoided, to the extent allowable by applicable permits and mitigation. Pole work areas that are not sufficiently level due to the surrounding terrain would be graded flat to create a work pad for large equipment (i.e., excavators and cranes) to operate safely. Site development procedures for temporary work areas are described in Section 2.6.3.

Pull Sites

Pull and tensioning work areas ("pull sites") would be required along the project alignment to position reconductoring equipment (e.g., cranes, trucks, conductor spools, puller, and tensioner) that would be used to remove old conductor and install new conductor on project poles. Conductor between pull sites ("pull spans") would be pulled off and strung on to poles from the pull sites in either direction, and adequate tension on the conductor would be provided from the opposite pull site. Reconductoring procedures that would occur at pull sites are described in Section 2.6.5. If necessary, pull sites could also be used to stage materials. Generally, pull sites would be located directly in line with the pull spans and spaced at strategic locations, such as where the lines change direction, in open areas, or where the distance between poles is greater due to steep terrain (e.g., spans over canyons). Proposed pull sites for the project are listed in Table 2.6-4. Pull site locations are shown on maps in Appendix A. The final boundaries and size of pull sites would depend on the ground conditions and available access options. If necessary, minor refinements would be made to the anticipated pull sites, as described above.

Table 2.6-4 Pull Sites

Work Area ID	Southern Segment	Northern Segment	Nearest Pole(s)	Total Area (acres)	Maximum Workspace (acres)	Use of Total Area
PS-1	●		Poles 2 and 3	1.08	0.50	46%
PS-2	●		Poles 5 to 7	2.40	1.20	50%
PS-3	●		Pole 8	1.84	0.60	33%
PS-4	●		Pole 21	0.86	0.42	49%
PS-5	●		Pole 21	0.37	0.10	27%
PS-6	●	●	Pole 23	1.11	0.60	54%
PS-7		●	Poles 31 and 32	N/A (same as SA/LZ-3)		
PS-8		●	Pole 41	0.38	0.17	45%

Work Area ID	Southern Segment	Northern Segment	Nearest Pole(s)	Total Area (acres)	Maximum Workspace (acres)	Use of Total Area
PS-9		●	Pole 52	N/A (same as SA/LZ-5)		
PS-10		●	Pole 62	0.55	0.25	45%
PS-12 [a]		●	Pole 90	0.36	0.14	39%

Note:

[a] There is no PS-11. A previous pull site between PS-10 and PS-12 was removed from the proposed project.

Source: (PG&E 2016-2017)

Workspaces within proposed and alternate staging areas that are located directly under project lines may be used as pull sites, as described above. Two staging areas would be used as pull sites (e.g., SA/LZ-3 and SA/LZ-4). The minimum workspace needed for pull sites within staging areas would be approximately 0.6 to 0.8 acre. If PG&E selects alternate staging areas from these locations, pull sites would still be positioned at these sites during reconductoring activities.

Pull sites located outside of paved areas may require vegetation removal and/or minor blading, grading, and filling to create a level workspace for reconductoring equipment to safely operate. If loose soils are encountered at pull sites, temporary materials, such as fiberglass mats or other similar materials, would be laid on the ground to minimize ground disturbance.

A temporary wood snub pole would be installed at each pull site during reconductoring that would act as an anchor to accommodate the pulling and tensioning forces that would occur. Snub poles would be installed directly in the ground within the pull site boundary. If necessary, guy wires would be installed with the temporary snub poles to stabilize the pole. Snub poles would be removed following construction.

Mid-Span Work Areas

Guard Structures

PG&E has identified the preliminary locations for 13 crossings where approximately 32 guard structures would be needed. Guard structures would be temporarily installed where reconductoring would occur over energized electrical lines, major roadways (i.e., US 101, Old Redwood Highway, Shiloh Ridge Road, Chalk Hill Road, and Brooks Road), and recreational trails in Shiloh Ranch and Foothill Rregional Pparks. Additional guard structures may be added at the time of construction to address unforeseen safety requirements. Each guard structure would require an approximately 0.06-acre workspace to install temporary poles or position equipment. Representative guard structure work areas are shown on maps in Appendix A. The exact design and locations of guard structures would be determined by construction managers at the time of construction based on the conditions encountered at each location.

Guard structures would typically be installed in disturbed or developed areas. If necessary, vegetation at guard structure work areas would be trimmed. Grading or blading would not

occur. If poles are installed, holes would be excavated in the work areas and backfilled following construction.

Spacer Removal

The three pairs of wire that make up the bundled Geysers #12 line are attached by approximately 84 mid-span spacers—two spacers for each of three phases between TSPs (refer to Figure 2.5-1). Mid-span spacers are short metal rods that separate bundled wire, with one end of the rod bolted to each wire. Mid-span spacers would be removed from the 230-kV circuit prior to reconductoring, using helicopters or cranes and bucket trucks. The work area required to remove mid-span spacers from the ground would be a near-continuous 40-foot corridor where cranes and bucket trucks would be positioned between pole work areas, as shown on maps in Appendix A. Mid-span spacer removal procedures are described further in Section 2.6.5. Vegetation clearing or ground disturbance is not anticipated where mid-span spacer removal would occur. It is expected that cranes and bucket trucks would be positioned in disturbed or developed areas within or adjacent to roadways.

Splice Reinforcement

Locations where conductor has been spliced together on the Fulton-Hopland and Geysers #12 lines would be structurally reinforced with metal sleeves or other hardware to reduce the risk of breaking during removal, if necessary. Splice reinforcement locations would be determined when reconductoring begins, and would be accessed using helicopters, cranes and bucket trucks, or on foot from designated work areas or access routes.

Vegetation and Ground Disturbance

Vegetation Disturbance

Vegetation that would impede construction access or cause a fire risk (i.e., trees, brush, shrubs, and grass, including ornamental landscaping) would be trimmed or completely removed ("cleared") in work areas, along access routes, and in mid-span locations. At a minimum, all work areas would be mowed. Vegetation along access roads could be cleared up to ~~16~~ 8 feet from the centerline (for a ~~32~~16-foot corridor). Vegetation clearing is anticipated at work areas and access routes listed in Table 2.6-5; however, vegetation in any work area and along any access route may be disturbed if it cannot be avoided. Undeveloped areas where vegetation disturbance may occur are listed in Table 2.6-6.

Table 2.6-5 Anticipated Vegetation Clearing Locations

Segment	Pole Work Areas	Mid-span Work Areas	Access Routes
Southern Segment	Poles 6, 7, 8, 9, 11, 13, 14, 17, 18, 19, 20, 21, 22, and 23	Between Fulton Substation and Pole 3	–
Northern Segment	Poles 24, 25, 28, 29, 37, 38, 39, 40, 41, 42, 44, 45, 46, 50, 55, 58, 59, 60, 61, 62, 64, 66, 67, 69, 71, and 74	Between Poles 51 and Pole 52, and Poles 23 and 25	Along routes to Poles 28, 29, 45, 67, and 74, and along routes between Poles 50 and 53, 56 and 57, and 58 and 61, and along routes to Poles 28, 29, 45, 67, and 74

Source: (PG&E 2016-2017)

The project would disturb between approximately 62.9 and 73.2 acres of naturally vegetated (does not include mixed agricultural land) areas depending on the location of final work areas. Approximately 100 trees of any type and size would be removed in these areas. Approximately half of the trees that may be removed are oak trees. Vegetation communities and trees that would be disturbed during construction are discussed further in Section 3.4: Biological Resources. Site development procedures for vegetation clearing are described in Section 2.6.3.

Table 2.6-6 Estimated Vegetation Disturbance, Ground Disturbance, and Cut-and-Fill

Project Areas [a, b]	Natural Vegetation Disturbance (acres) [c]	Ground Disturbance (acres)	Total Impact Area (acres)	Potential Surface Grading?	Cut-and-Fill Volumes (cubic Yards) [c]	Cut-and-Fill Haul Trips [d]
Work Areas						
Staging Areas/Helicopter LZs	14.0 – 20.6	19.3 – 50.6	51.6	Yes	3,700 – 4,400	307
Pole Work Areas	16.1	18.3	23.2	Yes	To be determined based on final pole locations	
Pull Sites	2.7 – 5.3	2.9 – 5.9	7.0	Yes	12,200 – 14,900	1,229
Mid-Span Work Areas	0.4	1.0	4.4	No	–	–
Vehicle Turnaround Areas	0.4 – 1.5	0.4 – 1.5	1.5	Yes	1,500 – 1,900	143
Fitch Mountain Substation	--	--	--	Yes	150	45
Subtotal	*33.6 – 43.9*	*41.9 – 77.3*	*87.7*	–	*6,550 – 21,350*	*1,724*
Access Routes [e, f]						
Existing Paved	–	–	6.3	No	–	–
Existing Unpaved	16.6	26.4	27.8	Yes	450 – 600	26
Overland	12.7	13.7	13.9	No	–	–
Subtotal	*29.3*	*40.1*	*48.0*	–	*45 – 600*	*26*
TOTAL	**62.9 – 73.2**	**82.0 – 117.4**	**135.8**	**–**	**6,595 – 21,950**	**1,750**

Project Areas [a, b]	Natural Vegetation Disturbance (acres) [c]	Ground Disturbance (acres)	Total Impact Area (acres)	Potential Surface Grading?	Cut-and-Fill Volumes (cubic Yards) [c]	Cut-and-Fill Haul Trips [d]

Notes:

[a] Construction activities could disturb any location within the limits of project work areas. It is assumed that both the proposed and alternate sites would be disturbed because there is a potential for PG&E to use all work areas for a portion of or the entire construction period. Where impacts are expressed in a range, the low value represents impacts at anticipated work areas, and the high value represents the total land present that may be disturbed if work areas were repositioned. Actual impacts are expected to be at or below the lower value in the range.

[b] Overlapping work areas are accounted for and are not double-counted in the area calculations.

[c] Natural vegetation disturbance includes all work areas and access routes in undeveloped and undisturbed vegetation communities, and does not include impacts to mixed agricultural land.

[d] Estimates for cut-and-fill volumes were calculated using methods determined through PG&E's coordination with Sonoma County on other projects in the County, which include multiplying an average disturbance depth of 2 inches by the total surface area for work areas and access routes where more substantial grading is anticipated.

[e] The typical truck capacity for each haul trip would be approximately 10 cubic yards.

[f] Vegetation would be cleared up to ~~16~~ 8 feet from the centerline (for a ~~32~~16-foot corridor) of unpaved and overland access routes. Ground disturbance would occur for up to 8 feet from the centerline (for a 16-foot corridor).

Sources: (TRC 2015, PG&E 2016-2017)

Ground Disturbance

All undeveloped surfaces within project work areas and along unpaved and overland access routes could be disturbed during construction activities. Surface disturbance would occur from operating vehicles and equipment, and from installing gravel and geotextile fabric to stabilize loose soils. Where necessary, the surfaces of work areas and unpaved access routes would be graded or bladed to stabilize loose soils and to create a safe and level workspace for equipment to operate.

The project would disturb between approximately 82.0 and 117.4 acres of undeveloped ground surfaces (vegetated or bare soil) depending on the location and extent of final work areas and access routes. Undeveloped ground surfaces that may be disturbed during construction are listed in Table 2.6-6. Site development procedures for grading and gravel installation are described in Section 2.6.3.

2.6.3 Site Development

Surveying

Survey crews would access the project site to mark the locations of new poles, and if necessary, overland access routes and work area boundaries. Survey crews would access project areas either using a pick-up truck or on foot.

Vegetation Clearing

All-surface vehicle mowers or similar equipment would be used to remove brush and grass. Woody vegetation would be trimmed or removed by hand using chainsaws supported by line

trucks, bucket trucks, and pull-behind chippers. Vegetative materials would be chipped and mulched onsite where chipper access is available, and would be used during post-construction restoration, as appropriate. Vegetative debris would be lopped and scattered where chipper access is not available. Any green waste that must be removed from the site (i.e., in residential areas) would be disposed of in an appropriate facility as required by applicable laws.

No trees within the project area have been officially diagnosed with Sudden Oak Death Syndrome (SODS). If there is a possibility of SODS being present in the project area, PG&E would adhere to its Sudden Oak Death Protocols to reduce the potential for spreading contaminated vegetation materials. Vegetation clearing and SODS procedures are discussed further in Section 3.4: Biological Resources.

Grading and Blading

Grading would occur at project work areas and along unpaved access roads to stabilize the ground surface and to create a safe and level workspace. Project locations where grading may occur are listed in Table 2.6-6. Typical equipment that would be used for grading include motor graders, crawlers with a backhoe attachment, dozers, and haul trucks.

Minor cut-and-fill would be required at some work areas and unpaved access routes where the ground surface is uneven. Uneven surfaces at project locations include bumps and dips ranging from approximately 6 to 12 inches. Grading such areas would be considered cut-and-fill because the amount of earth moving would be greater than surficial ground disturbance described above. Cut material removed from the site would be used to fill dips and depressions in project areas. Cut material would not be collected and removed from the project site. Supplemental fill material would be needed at some locations which would be transported to the project site using haul trucks. Estimates for cut-and-fill volumes and haul trips are summarized in Table 2.6-6.

Gravel and Geotextile Fabric

Gravel may be installed along access roads and temporary work areas to stabilize loose soils and create an all-weather working surface. Gravel at temporary work areas would be installed over geotextile fabric, which would create a barrier between the gravel and ground surface. Gravel installed on geotextile fabric would be removed from the site following construction or left in place for use by landowner request if on private land. Gravel installed on existing unpaved access roads would be left permanently in place as an improvement to the road. Typical equipment that would be used to install gravel would be dump trucks and dozers.

Watercourse Crossings

Access routes for the proposed project would cross seasonal watercourses and wetlands at approximately 31 locations. Existing bridges and culverts would be used to cross the features, where present. ~~At one crossing location (crossing FFX24) an existing culvert would be replaced.~~ All other features would be crossed during construction by either installing temporary materials, such as fiberglass mats, steel plates, and/or temporary bridges to establish access, or limiting vehicle access to the dry season when the feature is completely dry. Watercourse

crossings are addressed in Section 3.9: Hydrology and Water Quality. The locations of watercourse crossings are shown on maps in Appendix F.

2.6.4 Pole Replacement

Pole Removal

Pole replacement in the Northern Segment would begin after the existing conductor is removed from the poles. Construction crews would cut existing wood poles down with chainsaws approximately 6 feet above ground level, leaving a pole stub behind to facilitate full removal using either a hydraulic jack, a winch line mounted on a utility-terrain vehicle (UTV) or line truck, or a helicopter. Existing LDSPs would be removed using a backhoe. The remaining hole would be backfilled once the poles are removed.

Poles removed from the alignment would be transported using helicopters and/or trucks as described in Section 2.6.2, and temporarily stored in contractor bins at staging areas before being disposed of in an appropriate waste facility. Waste disposal is described further in Section 2.6.10.

Pole Topping

One of the poles that make up the A-frame structure (Pole 42), and one of the poles in a three-pole structure (Pole 63) would be topped and left in place to support existing utility lines. Topping these two poles would involve removing the transmission portion of the pole and leaving the underbuild portion that supports the utility line in place. The poles would be topped using a line truck and trailer or a boom truck, and a chainsaw. The portion of the pole that is removed would be disposed of in the same manner as other existing poles.

Pole Installation

New LDSPs and TSPs would be installed once the existing poles are removed. Installation would begin with excavating a hole for each new pole. Holes would be approximately 3 feet in diameter and 14 feet deep for LDSPs, and 6 feet in diameter and up to 30 feet deep for TSPs. The exact depth of each pole hole would be dependent on the topography, soil properties of the site, pole height, and span length.

Most pole holes would be mechanically drilled and excavated using an auger. LDSP holes would be excavated using a UTV or line truck mounted with an auger. A crawler-mounted auger would be used to excavate TSP holes that would be wider and deeper to accommodate the concrete-pier foundations. Pole holes that cannot be accessed with a mechanical auger due to steep terrain or other access constraints would be excavated by hand. In such cases, work crews and equipment would be transported by helicopter from designated staging areas to helicopter touch down areas located in flat and open areas near the pole site, or by vehicle to the closest location along proposed access routes. Work crews would establish overland footpaths from the helicopter touch down areas and access routes to the pole sites. Equipment used for hand excavations would include standard digging tools, portable equipment, a compressor, and a jackhammer, which would be transported to the pole sites manually or by helicopter. Work crews would excavate a small pad for the compressor for stability in steep terrain, if necessary.

Excavated soils would be spread evenly around the pole site and stabilized. A plastic sleeve would be placed in the hole to prevent the soil from caving in. The sleeve would not be removed after the poles are installed. Plywood and plastic tarps would be used to cover the excavated holes until the poles are installed.

New poles, insulators, and other hardware would be transported to the pole sites following hole excavation and foundation construction by truck or helicopter. The poles would be stored and assembled in the pole work areas.

LDSPs would be embedded directly in the ground and set in place using a line truck or helicopter. The hole would then be backfilled with crushed rock and compacted.

TSPs would be set on either a concrete-pier foundation or micropile foundation[6]. A line truck would be used to place foundation forms, anchor bolts, and rebar in the holes for concrete-pier foundations, and a concrete truck would be used to deliver and pour concrete for the foundation form. Once the concrete has set, the form would be removed and gravel placed around the base. A crane would then be used to install the new TSP on the foundation. Micropile foundations would be installed using a platform mounted componentized helicopter portable micropile drill, two 185 compressors, a grout plant, and a grout transfer pump. The micropile drill would be transported using a small helicopter, and a jackhammer would be used to install a platform for the drill to operate.

After the poles are set, any additional hardware would be added to the cross-arms using a UTV with a worker-lift attachment. Guy wire anchors would be installed as needed on LDSPs ~~within approximately 5 feet of the pole~~ to balance line tension and provide additional stability. Existing guy leads are located within approximately 12 to 40 feet of existing structures. Typically, new guy wires would be installed within 5 feet of their existing configuration~~the pole and~~ at pole locations where they are currently installed ~~on existing poles~~. Diagrams of typical LDSPs with guy wires are shown on Figure 2.5-2. No guy support poles for additional stability are anticipated.

Pole Relocation

Two 12-kV wood distribution poles may be relocated in the Southern Segment to meet the necessary CPUC GO 95 clearance requirements for the reconductored Fulton-Hopland line. A line truck would be used to auger new holes and install the poles. The holes at the old locations would be backfilled after pole removal.

Street Light Modification/Removal

Two street lights may be lowered, relocated, or removed along the Southern Segment to meet the necessary clearance requirements, if necessary. Street light modification or removal would

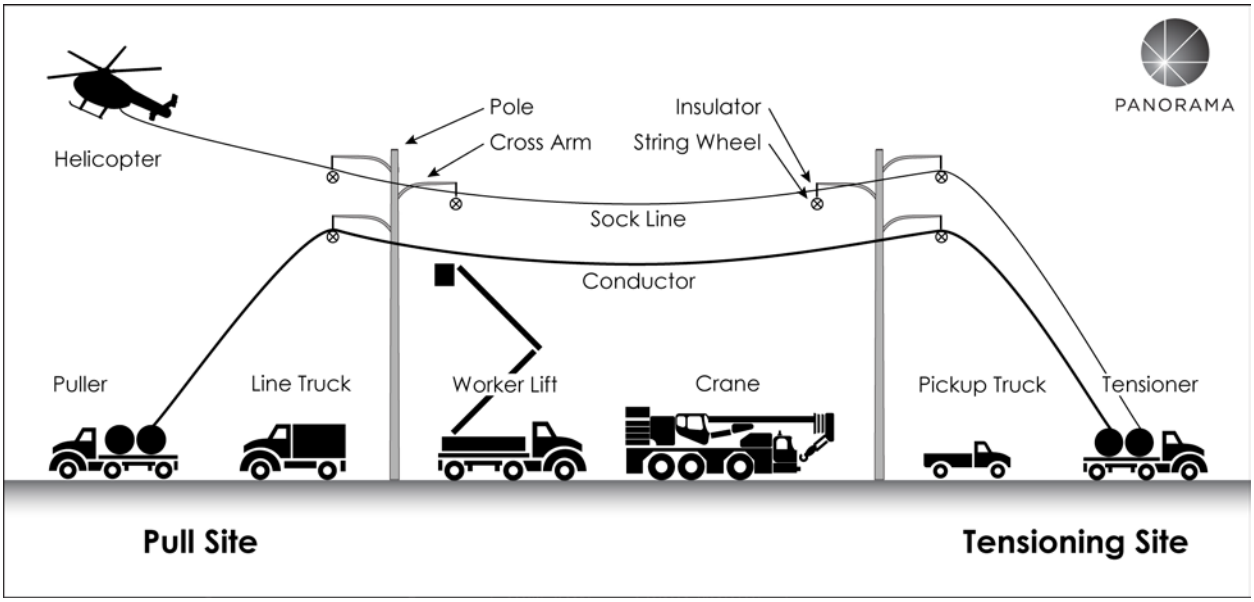
[6] One of the seven TSPs is anticipated to be set on a micropile foundation, but PG&E may use this technique for the other TSP foundations, as needed.

be coordinated with the Sonoma County Department of Transportation and Public Works, as applicable.

2.6.5 Reconductoring

This section describes conductor removal and installation procedures. Reconductoring would occur in pull spans between pull sites and tensioning sites, collectively referred to as pull sites (refer to Table 2.6-4). Typical reconductoring activities and equipment that would be positioned in the project alignment are illustrated in Figure 2.6-1.

Figure 2.6-1 Typical Reconductoring Activities



Guard Structures

The first stage in the reconductoring process would be to install guard structures. Guard structures would be used as a safety precaution to prevent injury or property damage if the conductor loses tension and sags or falls during reconductoring activities. Guard structures would be located to shield and protect sensitive features and public thoroughfares from inadvertent tension loss. Guard structures would generally consist of either temporary poles embedded in the ground with cross-arms and netting, or equipment with an arm lift (i.e., boom truck or bucket truck) set in a position that protects the feature from inadvertent tension loss during overhead reconductoring. Guard structures would be positioned prior to reconductoring at the crossing locations.

One or two guard structures would be needed at each crossing location. The guard structures would be positioned above the crossed features and in alignment with the project lines. Most crossings would require two guard structures with one installed on each side of the feature. A single guard structure may be sufficient for some crossings (i.e., pedestrian walkways and trails).

Various guard structure designs may be used during construction. Typical guard structures consist of one or two temporary poles embedded directly in the ground with horizontal cross-

arms and netting. Equipment with an arm lift (i.e., boom truck or bucket truck) set in a position that ~~that~~ achieves the same purpose. Photos of typical pole and equipment guard structures installed under electrical lines are shown in Figure 2.6-2 through Figure 2.6-4. The exact design and locations of guard structures would be determined by construction managers at the time of construction based on the crossing characteristics and reconductoring activities.

Where guard structures are installed, pole holes approximately 2 feet in diameter and 8 feet deep would be excavated using an UTV or line truck with an auger attachment. If necessary, guy wires would be installed to stabilize the poles. Netting or cross-arms would be installed on the tops of the poles on each side of the feature and, if necessary, over the feature to create a protective barrier. Guard structures would be positioned so that they would not create hazards to pedestrians and traffic. All poles and netting would be removed following construction, and the pole holes would be backfilled with soil.

Figure 2.6-2 Horizontal Pole Guard Structure

Figure 2.6-3 Type "Y" Guard Structure

Figure 2.6-4 Positioned Equipment Guard Structure

PG&E would obtain encroachment permits from the California Department of Transportation (Caltrans) for the US 101 crossing prior to construction. Guard structures installed within the Caltrans right-of-way (ROW) and over US 101 would be installed and removed in accordance with Caltrans requirements specified in the encroachment permits. PG&E anticipates installing two poles with a 12-foot cross arm pole on either side of the highway, supported by guy wires. A net would be installed on the poles in line with the conductors and over the highway. The height of the poles and cross arm elevation would be determined through discussion with Caltrans. Caltrans typically requires that highway crossings maintain a minimum 18-foot height at the lowest point where the netting sags between poles. K-rails and crash barrels would be installed along the edge of the highway to create a barrier between traffic and the poles. Guard structures for US 101 would be needed for approximately 2 months.

Lane closures for both northbound and southbound lanes would be required when netting is installed and removed over US 101. Partial lane closures may be required for installing K-rails and crash barrels. If possible, PG&E would set the guard poles during the week to shorten the duration of lane closures; however, netting can only be installed overnight for safety reasons. Lane closures for netting installation and removal would occur for 1 night each and would typically last from 2 to 4 hours. Installing K-rails and crash barrels would affect the outer lanes (right lane for northbound and southbound traffic) for a total of two days. PG&E would coordinate closely with Caltrans and the California Highway Patrol prior to lane closures on US 101.

Traffic control may be used in lieu of guard structures at roadways and pedestrian walkways to ensure safe access. Traffic control would involve detours and/or flaggers temporarily stopping traffic for short time periods during overhead reconductoring activities. Traffic control may also occur during the installation and removal of guard structures installed over roadways. Flagging and detour routes would be coordinated with the County and specified in applicable encroachment permits. Traffic control procedures are described further in Section 2.6.8.

If guard structures and traffic control cannot be used to ensure safe access, it would be necessary to temporarily restrict vehicle and pedestrian traffic for short periods at a time during overhead reconductoring activities, such as in the Southern Segment where project lines would be located over roadway lanes, pedestrian walkways (i.e., sidewalks and trails), parking lots, and driveways. Temporary driveway closures would be coordinated in advance with landowners. Lane closures are discussed further in Section 3.15: Transportation and Traffic.

Power Clearance and Grounding

Portions of the Fulton-Hopland and Geysers-Fulton lines would be taken out of service ("de-energized") during reconductoring activities through a power clearance process. The power clearance process would involve obtaining approval from PG&E System Operations to de-energize specific electrical lines during a scheduled period. PG&E System Operations would de-energize the lines during approved power clearances through remote-controlled operation of the substations, or by opening and closing line switches. Once the lines have been cleared, the lines would be grounded at either end of construction activities by attaching grounding clamps

to the conductor that are connected to insulated rods, conductor pigtails, and copper ground rods driven into the ground. The line would be tested before initiating work on the conductor to verify that it is not energized. Grounding equipment would be removed at the end of each approved clearance period. The power clearance process would repeat each time the lines are re-energized, until reconductoring is complete.

The Fulton-Hopland line between Fulton Substation and the Fitch Mountain #1 Tap would be taken out of service prior to conductor removal in the Northern Segment. The line would be re-energized approximately ~~10~~ 8 months later when all poles and conductor in the project alignment are replaced.

The Geysers-Fulton line may remain energized when the line is not being worked on to limit impacts on the power system, such as between work days, periods of inactivity, and when construction is focused on the Fulton-Hopland line. Line crews would establish a switch for the Geysers #12 line by installing temporary conductor to connect the Geysers #12 and Geysers #17 lines. The two circuits would be tied together at an existing steel lattice tower located along the Geysers-Fulton line approximately 10 miles north of the project alignment and 8 miles east of Geyserville. Once the two circuits are tied together, crews would open jumpers at the tower on the Geysers #12 circuit going towards Fulton Substation, which would establish a clearance on the Geysers #12 circuit.

The Fitch Mountain #1 Tap would be taken out of service when conductor is temporarily detached from poles along the first 650 feet of the line. The tap line would be reconnected to the Fulton-Hopland line north of proposed reconductoring and re-energized to continue providing power from Hopland Substation to Fitch Mountain Substation for construction activities and customers in the area.

Distribution feeder lines connected to project poles or crossed by the Fulton-Hopland and Geysers #12 lines may also be taken out of service during construction activities. If necessary, small trailer-mounted generators may be used to provide power to customers and facilities connected to the feeder lines.

Conductor Removal

Existing conductor would be removed once any necessary guard structures are installed and the lines are taken out of service. Construction crews would begin by detaching the existing conductor from insulators where they are attached to each pole. Then the conductor would be temporarily lifted and string wheels or rollers (e.g., pulleys) would be hung on the cross-arms of each pole, and the conductor would be placed onto the string wheels. A crane or bucket truck would be used to detach conductor from the insulators and install string wheels. Helicopters may also be used to detach conductor or install string wheels, if necessary, due to pole height, access constraints, or other factors that limit the use of a crane or bucket truck.

Existing insulators in the Southern Segment would be replaced prior to conductor removal when the string wheels are attached to the poles. Insulators for new poles in the Northern

Segment would be attached on the ground prior to setting the pole in place. Old insulators would be removed from the site and disposed of in an appropriate waste facility.

Mid-span spacers for the bundled Geysers #12 line would be removed in the Southern Segment, and the wires would be separated prior to conductor removal using helicopters or cranes and bucket trucks. Helicopters would be used to remove mid-span spacers in the Southern Segment at poles adjacent to helicopter LZs and on either side of Mark West Creek. Roadways and pedestrian walkways would be temporarily closed immediately prior to and during overhead helicopter activities. Approximately 10 residences that would be located within 70 to 100 feet of helicopter flight paths may need to be temporarily evacuated depending on FAA permit authorizations. Once the area is secured, helicopters would transport two aerial linemen from nearby LZs along the alignment to each spacer location. Aerial linemen would be suspended from helicopters on a 60-foot line with a chair harness and a material bag attached. Spacers would be unbolted and placed into the material bag at two mid-span locations between poles. Three spacers would be removed from each location (one for each of the three bundled pairs of wire). Each spacer would take less than approximately 1 minute to unbolt. PG&E estimates that removing the mid-span spacers using helicopter between the limited number of structures identified in the Southern Segment would take approximately 1 to 2 hours in total.

Cranes or bucket trucks would be used to remove the remaining mid-span spacers when the conductor is detached from the insulators and string wheels are installed. Cranes and bucket trucks would travel along the alignment to each pole location to detach conductor and install string wheels, and mid-span spacers (located about 200 feet from each pole) would be removed in the process while the equipment was positioned under them. Spacers would be removed prior to conductor removal, except at the span over US 101 between Poles 7 and 8 where a crane or bucket truck could not reach the spacers. The conductor at these locations would be pulled to the adjacent poles with the spacers still attached until they could be reached and removed from the pole work areas.

Sections of existing conductor that have been spliced together would be structurally reinforced, where necessary, to reduce the risk of breaking during removal. Splice reinforcement locations would be determined when reconductoring begins, and would be accessed using helicopters, cranes and bucket trucks, or on foot.

Reconductoring equipment would be positioned within pull sites on either end of each pull span. Construction crews would access the pull sites and pole locations using helicopters, line trucks, bucket trucks, and pickup trucks. If necessary, temporary snub poles would be installed in the work area to support conductor tensioning procedures. Temporary snub poles for reconductoring would be installed in approximately the same manner as guard structure poles described above.

A sock line or pulling rope on a tensioner attached to a line truck would be connected to the existing conductor at one of the two pull sites for each pull span. A cable on a puller attached to a line truck would be connected to the existing conductor at the opposite pull site. The puller

would wind the existing conductor onto reels. The sock line would maintain tension on the line from the opposite end by resisting forces from the puller and line sagging, while allowing sufficient slack to pull the conductor off the string wheels. This process would result with the sock line replacing the position of the existing conductor.

The sock line and string wheels would be left on existing poles in the Southern Segment and used to install new conductor on the poles. Where existing poles would be replaced in the Northern Segment, the sock line would be removed from the existing poles using a helicopter, and string wheels would be removed in the same manner as they were installed using helicopters, bucket trucks, or line trucks. Reels of conductor removed from the site would be transported on a flatbed truck to an authorized recovery center and reused, recycled, or disposed of in accordance with applicable law.

Conductor Installation

Conductor installation in the Southern Segment would begin shortly after insulators are replaced and existing conductor is removed. The process to install conductor in the Southern Segment would be like the removal process, but in reverse order. The sock line and string wheels would already be in place, and the sock line would be attached to the new conductor at the same pull site where existing conductor was removed and wound onto reels. The sock line would then be pulled back to the opposite pull site where it originated while drawing the new conductor through the string wheels and into position on the poles.

Conductor installation in the Northern Segment would begin following pole replacement in the segment. String wheels would be hung on the new poles in a similar manner as they were for existing poles during conductor removal using helicopters, bucket trucks, or line trucks. A sock line on a puller attached to a line truck would be placed into position on the string wheels using a helicopter. The sock line would be connected to new conductor and pulled into position by the puller from the opposite pull site.

Sufficient tension would be maintained on the conductor and sock line during installation to keep the lines elevated and above obstacles on the ground. The conductor sag between poles would be adjusted to pre-calculated levels by tightening or loosening the line tension. Once the conductor sag has been set, the conductor would be secured to the pole insulators (or "clipped in"). Once the new conductor has been attached to the insulators, the stringing wheels would be removed in the same manner as they were installed using helicopters, bucket trucks, or line trucks, and vibration dampers and any other final hardware would be installed.

Reconductoring equipment would be removed from pull sites following conductor installation. Any temporary snub poles installed in the work area would be removed from the site, and the holes would be backfilled.

2.6.6 Fitch Mountain Substation Modifications

Fitch Mountain Substation would remain in service while existing equipment is replaced with new equipment. Construction at the substation would be performed in phases to allow PG&E to

complete the work without having to take the substation out of service. PG&E would build the required temporary lines to maintain existing pathways for the transformers while allowing work on different positions. Construction would occur in three phases: (1) replace the line switch position 25, (2) replace the line switch position 15, and (3) replace bus tie switch position 27. Substation modifications would take a total of 2 to 3 months to complete.

Existing substation equipment would be removed using a crane, and transported to an authorized recovery center and reused, recycled, or disposed of in accordance with applicable laws. The concrete foundations for the existing equipment that cannot be reused would be removed before installing the new foundations.

Foundations for the new equipment would be composed of concrete drilled shafts approximately 3 to 4 feet in diameter and of varying depth depending on geotechnical parameters that would be determined prior to construction. New dead-end structure foundations would be excavated using a vertical drilling rig with an auger or barrel type bit, depending on soil conditions. Foundation forms, anchor bolts, and rebar would be installed in the holes, and a concrete truck would be used to deliver and pour concrete for the foundations. The forms would be removed and gravel placed around the base of the foundations once the concrete has set. A crane would then be used to install the new equipment on the foundations.

All work at the substation would be completed within the existing fence line, and no work areas would be located outside of the substation perimeter fence. Construction equipment would access the substation using the existing gravel access road that meets the main substation gate. Vegetation trimming may be required along the road margins to allow sufficient clearance for construction vehicles.

An asphalt road would be installed within the substation footprint following installation of the new equipment. Approximately 150 cubic yards of stripped soil and stone will be hauled off site and an equivalent amount of fill and asphalt would be hauled on site to construct the road. A skip loader and skip steer would be used to install the asphalt road.

2.6.7 Erosion, Sediment, and Pollution Control

Ground-disturbing activities for the project would exceed 1 acre, which is the threshold for the California State Water Resources Control Board (SWRCB) General Permit for Storm Water Discharges Associated with Construction Activity Order No. 2009-0009-DWQ (General Permit). PG&E would obtain coverage for the project under the General Permit by filing a Notice of Intent and Storm Water Pollution Prevention Plan (SWPPP) with the SWRCB prior to initiating construction activities.

Specific best management practices (BMPs) for erosion, sediment, and pollution control would be developed by a Qualified SWPPP Developer (QSD) and included in the SWPPP. BMPs in the SWPPP generally act as guidelines for installing materials and implementing procedures to stabilize loose soils and control sediment and other pollutant sources on the project site. Typical BMP materials installed on construction sites include fiber matting, hydroseed, mulch, straw wattles, silt fencing, rock bags, hay bales, and plastic sheeting. Typical BMP procedures

implemented on construction sites include wetting loose, dry soil during ground disturbance; storing and handling hazardous materials (i.e., fuels) within secondary containment barriers; preventing soil track-out onto paved roadways; and covering truck loads when transporting soil. BMPs such as these would be defined in the SWPPP and implemented during construction.

2.6.8 Traffic Control

Construction activities would require temporary lane closures for several roadways along the project alignment to install guard structure poles and netting and where temporary work areas would be positioned within roadways. PG&E would obtain encroachment permits from Caltrans, Sonoma County, and Windsor for lane closures on highways and public roads. PG&E would implement traffic control guidelines specified in encroachment permits and, if required, develop lane closure, width reduction, or traffic diversion plans. PG&E would coordinate with any affected residents if lane closures are required on private roadways. Construction activities would follow typical BMPs to minimize impacts on traffic and transportation. Temporary road closures (all lanes) are not anticipated. Traffic impacts and traffic control procedures are addressed in Section 3.15: Traffic and Transportation.

2.6.9 Water Use

Up to approximately 20,000 gallons of water would be used over the course of construction for dust suppression, concrete washout, and other miscellaneous activities. Water would be purchased from the Town of Windsor, or sourced from a local private or public water supply.

2.6.10 Waste Disposal

The project would generate solid waste from the removal of existing poles, insulators, conductor, substation equipment, and other miscellaneous construction debris. Solid waste generated during construction would be collected in contractor bins at staging areas and removed from the site using flatbed trucks and dump trucks, and recycled or disposed of in an appropriate facility as required by applicable laws. LDSPs, conductor, and substation equipment removed from the site would be reused or recycled if possible. Insulators removed from the site and miscellaneous construction waste would be disposed of in local landfills. Chemically treated wood poles would be disposed of at a permitted landfill, such as Recology Hay Road in Solano County or Forward, Inc. Waste Disposal in San Joaquin County. The project would generate approximately 1,000 cubic yards of solid waste consisting of approximately 700 cubic yards of chemically treated wood poles, 160 cubic yards of insulators, 40 cubic yards of LDSPs (typically hollow), and 100 cubic yards of miscellaneous waste.

PG&E would follow all applicable federal, state, and local laws regarding the disposal of all types of waste (i.e., solid waste, green waste, and hazardous waste). Waste disposal is discussed further in Section 3.16: Utilities and Public Services. Hazardous materials are addressed in Section 3.8: Hazards and Hazardous Materials.

2.6.11 Cleanup and Restoration

Construction equipment, surplus materials, and waste would be removed from the project alignment. PG&E would implement typical BMPs to keep work areas clean during construction and conduct a final inspection of the work areas following construction to ensure that site cleanup has been successfully completed, during which any remaining debris would be removed. Gravel and geotextile fabric used for traction control may be left in place at temporary work areas and access routes on private property if requested by the landowner.

Temporary work areas that have been bladed, graded, or where the seed bank and subsurface roots have been removed would be restored following construction. Typical restoration activities that may be necessary include recontouring disturbed areas with an excavator or hand tools, loosening heavily compacted soils, and reseeding disturbed areas.

Restoration of work areas within regional parks (e.g., Maddux Ranch Regional Park, Shiloh Ranch Regional Park, and Foothill Regional Park) would be coordinated with the appropriate park managers. Restoration on private land would be coordinated with applicable landowners. Any modifications made to private property would be repaired to pre-project conditions, such as the removal or installation of fences and gates, removal of landscaping, or removal of farm and ranch facilities.

Materials installed at watercourse crossings (i.e., fiberglass mats, steel plates, culverts, and/or temporary bridges) would be removed once access is no longer needed, and the area surrounding the crossing location would be restored to pre-project conditions.

2.6.12 Equipment and Workforce

Table 2.6-7 lists construction categories and activities described in Section 2.6, estimated crew members that would be needed, and the types of equipment that would be used during construction and operation.

Construction would require an excavation crew, helicopter crew, pole crew, line crew, and environmental monitor(s). Construction activities would occur concurrently at multiple locations along the project alignment during each construction stage, and crews would progress in a rolling fashion. Approximately 15 workers would be at the project site on a typical work day, and up to approximately 50 workers may be somewhere on the project site at any time during the most active construction periods.

Table 2.6-7 Estimated Crew Members and Equipment Use by Construction Activity

General Category and Crew Members [a]	Construction Activity	Southern Segment	Northern Segment	Equipment	Estimated Operation		
					Days/ Week	Hours/ Day	Total Weeks
Site Development *2-16 crew members*	Survey	●	●	1 Pickup truck	4	8	5
	Vegetation Clearing	●	●	1-2 Pickup trucks	6	10	5
				1-2 Bucket trucks	6	10	5
				1-2 Chipper trucks with chipper	6	10	5
				1 Rubber tracked mower	2	4	6
	Grading and Blading, and Gravel and Geotextile Fabric Installation (i.e., site improvement and reestablishment)	●	●	1 D4 dozer	4	8	7
				1 Pickup truck	4	8	4
				1 Semi-truck with trailer	1	4	4
				1 Water truck	4	6	4
	Drainage Crossing Establishment	N/A	●	1 Crawler backhoe	4	4	4
				1 Pickup truck	4	4	4
Pole Replacement (Removal/ Installation) and Reconductoring *21 crew members*	LDSP Hole Excavation	●	●	1 UTV with excavator	5	6	6
				1 Pickup truck	5	6	6
				1 Line truck with auger attachment	5	6	2
	TSP Hole Excavation	N/A	●	1 Crawler mounted with auger	5	6	5
				1 Dump truck	5	6	5
	Pole Delivery	●	●	1 Shiflet truck	4	6	2
	LDSP Installation	●	●	1 Crew-cab truck	7	6	4
				1 UTV with worker-lift attachment	5	4	6
				1 Line truck with trailer	7	6	2

General Category and Crew Members [a]	Construction Activity	Southern Segment	Northern Segment	Equipment	Estimated Operation		
					Days/ Week	Hours/ Day	Total Weeks
				1 UTV mounted with hydraulic jack	4	6	12
				1 Back hoe	5	6	15
				1 Jackhammer	4	6	12
				1 Compressor	5	4	15
	TSP Installation (with Concrete Pier Foundation)	N/A	●	1 Crane	5	6	6
				1 Boom truck	5	6	6
				1 2-ton rigging truck	5	6	6
				1 Crew-cab truck	7	6	6
				1 Pickup truck	7	6	6
				1 Concrete truck	2	6	3
	TSP Installation (with Micropile Foundation)	N/A	●	1 Crane	5	6	6
				1 Boom truck	5	6	6
				1 2-ton rigging truck	5	6	6
				1 Crew-cab truck	7	6	6
				1 Pickup truck	7	6	6
				1 Platform mounted componentized micropile drill	7	6	6
				2 Compressors	7	6	6
				1 Jackhammer	7	6	6
				1 Grout plant and transfer pump	7	6	6
	Miscellaneous Transport	●	●	1 Boom truck	7	4	10
				1 F550 truck	5	2	10
				1 Light tower	1	6	2

General Category and Crew Members [a]	Construction Activity	Southern Segment	Northern Segment	Equipment	Estimated Operation		
					Days/ Week	Hours/ Day	Total Weeks
	Guard Structure Installation at US 101 Crossing	●	N/A	1 Bucket truck	1	6	2
				2 Pickup trucks	1	6	2
				1 Crew cab	1	6	2
	Reconductoring (Poles and Mid-Span Locations)	●	●	3 100-ton cranes (or alternatively a boom truck, bucket truck, or line truck with a worker lift attachment)	7	7	13
				3 Pickup trucks	7	7	15
	Reconductoring (Pull-and-Tension Sites)	●	●	1 Line truck with a wire reel attachment or trailer	7	7	13
				3 Pickup trucks	7	7	13
				1 Line truck with a puller attachment	7	7	13
				1 Line truck with a tensioner attachment	7	7	13
	Helicopter Transport and Reconductoring Support	●	●	1 Crew-cab truck	7	4	4
				2 Helicopters (light- or medium-lift)	7	10	17
				1 Helicopter (heavy-lift)	7	10	9
Cleanup and Restoration (within the easement and includes removing temporary drainage crossings) *6 crew members*		●	●	1 Motor grader	5	4	8
				1 D6 dozer	5	4	3
				1 Semi-truck with trailer	5	2	8
				1 Pickup	5	6	8
Fitch Mountain Substation Equipment Modifications (includes restoration and cleanup) *6-8 crew members*		N/A	N/A	1 Bobcat	4	10	12
				1 Excavator	4	10	12
				1 Fork lift	4	10	12
				1 Crane	4	10	12

General Category and Crew Members [a]	Construction Activity	Southern Segment	Northern Segment	Equipment	Estimated Operation		
					Days/ Week	Hours/ Day	Total Weeks
				1 Boom truck	4	10	12
				1 Man lift	4	10	12
				1 Vertical drill rig	4	10	1
Fitch Mountain Substation Road Paving (within existing fence line) *6-8 crew members*		N/A	N/A	3 Crew-cab trucks	5	10	3
				1 Skip loader	5	10	3
				1 Skip steer	5	10	3

Note:

[a] The number of crew members needed would be greater if concurrent sub activities were occurring at multiple locations along the project alignment. It is estimated that between 15 and 50 workers would be present at the project site at any given time during construction.

Source: (PG&E 2016-2017)

2.6.13 Schedule and Timing

Work Schedule

The proposed project would take approximately ~~18~~ 12 months to construct. PG&E would initiate construction in the Northern Segment and Fitch Mountain Substation in approximately July 2018. Construction in the Southern Segment would begin in approximately September 2019. The anticipated construction schedule and estimated duration of construction activities are listed by location in Table 2.6-8. PG&E anticipates that construction crews would work concurrently on a rotating schedule of 11 days on and 3 days off.

Work Periods

Construction would generally progress in stages along the project alignment. Construction activities would occur for varying periods of time depending on the construction stage. Activities within the work areas would be either constant or periodic, meaning that the presence of workers and frequency of trips to the site could be high or low. The estimated number of work days at each project work area is listed in Table 2.6-9 by construction stage. The total duration of each construction stage is listed in Table 2.6-8.

Table 2.6-8 Proposed Construction Schedule

Construction Activity	Period Start	Period End	Estimated Duration
Southern Segment			
Site Development	February~~September~~ 2019	February~~September~~ 2019	4 weeks
Conductor Removal and Installation	March~~October~~ 2019	April~~December~~ 2019	2~~3~~ months
Cleanup and Restoration [a]	May~~December~~ 2019	May~~January~~ 2019~~2020~~	4 weeks~~2 months~~
Total Segment Construction	*February~~September~~ 2019*	*May~~January~~ 2019~~2020~~*	*4~~5~~ months*
Northern Segment			
Site Development	June~~July~~ 2018	August~~September~~ 2018	3 months
Conductor Removal	August~~September~~ 2018	December 2018	2 months
Pole Removal			4 months
Pole Installation			4 months
Conductor Installation			2 months
Cleanup and Restoration [a]	December~~May~~ 2019	January~~July~~ 2019	2 months
Total Segment Construction	*June~~July~~ 2018*	*January~~July~~ 2019*	*8~~5~~12 months*

Construction Activity	Period Start	Period End	Estimated Duration
Fitch Mountain Substation [b]			
Initial Modifications [c]	JuneJuly 2018	SeptemberOctober 2018	2 months
Final Modifications [d]	March 2019	April 2019	
Road/Surface Paving	April 2019	May 2019	3 weeks
Total Project Construction	**JuneJuly 2018**	**MayJanuary 20192020**	**1218 months**

Notes:

[a] The start of final cleanup and restoration would depend on the ground conditions when construction activities are completed. Generally, all project work areas would be kept clean and stabilized during construction through standard work practices and implementation of the SWPPP.

[b] Construction activities at Fitch Mountain Substation would occur intermittently over the course of work in the Southern and Northern Segments, depending on the phasing of work that would occur along the initial 650 feet of the Fitch Mountain #1 Tap.

[c] Initial substation modifications would be completed prior to approximately SeptemberOctober 2018 to accommodate rerouted power from the Fulton-Hopland line south of the Fitch Mountain #1 Tap.

[d] Final substation modifications would be completed once construction is complete in the Southern Segment and the Fulton-Hopland line is re-energized in approximately March 2019.

Source: (PG&E 2016-2017)

Table 2.6-9 Estimated Work Days at Each Work Area

Stage/Period	Staging Areas	Pole Work Areas	Pull Sites	Mid-Span Work Areas
Southern Segment				
Site Development	1-5 days	1-5 days	1-5 days	1-5 days
Conductor Removal and Installation	3 months	3-6 days	11-33 days	1-2 days
Cleanup and Restoration	2 months	1-2 days	1-2 days	1-2 days
Segment Total	**43-5 months**	**5-13 days**	**13-40 days**	**2-4 days**
Northern Segment				
Site Development	1-2 days	1-2 days	1-2 days	1-2 days
Conductor Removal	1-3 months	1-2 days	11 days	1-2 days
Pole Removal		1-2 days	–	
Pole Installation		1-2 days	–	
Conductor Installation		1-2 days	11 days	
Cleanup and Restoration	2 months	1-2 days	1-2 days	n/a
Segment Total	**810-12 months**	**8-18 days**	**13-37 days**	**2-4 days**

Source: (PG&E 2016-2017)

Work Hours

Work activities would typically take place between 7:00 am and 7:00 pm, Monday through Sunday, or in accordance with local noise ordinances, where applicable. Extended work hours between 7:00 pm and 7:00 am may be required on rare occasions, such as to complete a construction procedure that cannot be interrupted due to safety considerations. Guard structures at the US 101 crossing would be installed and removed during night hours between 10:00 pm and 7:00 am for safety purposes and to limit impacts on highway traffic. No other night work is anticipated.

2.7 OPERATION AND MAINTENANCE

2.7.1 Overview

No material changes in maintenance and operation activities are anticipated with implementation of the project. This section describes operation and maintenance activities that occur on the existing project lines and substations. These activities would continue following construction of the project.

2.7.2 Conductor and Poles

Operation and maintenance activities for the Fulton-Hopland and Geysers #12 lines involve routine preventative maintenance and emergency repair. The lines are now and would continue to be inspected annually or as needed when driven by an event, such as an emergency. The current PG&E facility inspection process involves three types of inspections: (1) ground inspections, (2) aerial inspections, and (3) climbing, if ground inspections indicate a need. Aerial inspections are typically completed using helicopters. The conductor and poles would be inspected for corrosion, equipment misalignment, loose fittings, and other common mechanical problems. Poles would also be inspected for stability and any issues related to erosion.

Maintenance for the conductor and poles would continue to be performed on an as-needed basis, when something is discovered in need of repair during inspections, or in response to an emergency. A benefit of using LDSPs and TSPs for the project is that they generally require less maintenance than wood poles. Conductor breakage from corrosion would also be less likely on the new conductor than the older conductor, resulting in fewer events that require emergency response.

Annual vegetation management activities are performed on the entire length of the overhead power lines, which includes tree trimming and removal, where necessary, to maintain sufficient clearance for the conductors as well as around structures. Fire prevention maintenance in the Northern Segment would not change once existing wood poles are replaced with new LDSPs and TSPs.

Herbicides are currently used along the entire project alignment to control vegetation growth, where necessary. PG&E normally uses herbicides to treat the stumps of trees and woody vegetation following removal to prevent re-sprouting. There would be no change in the use of

herbicides from current practices following construction of the project. Herbicides would be applied following PG&E's standard operating procedures and applicable laws and regulations governing the use of herbicides.

2.7.3 Fitch Mountain Substation

The Fitch Mountain Substation would remain unmanned and operated remotely following the proposed modifications. Substation personnel would conduct routine inspections approximately monthly, or as needed under emergency conditions. Maintenance for the substation facilities would continue to be generally conducted on an as-needed basis, when something is discovered in need of repair during inspections, or in response to an emergency.

Vegetation management and maintenance activities would not change following the proposed modifications. Vegetation growth would be restricted within the substation footprint, including a 3-foot area surrounding the fence line, as it is currently.

2.8 PERMITS AND APPROVALS

The CPUC is the state Lead Agency for the proposed project under CEQA because PG&E is required to obtain a PTC in accordance with CPUC GO 131-D, which contains permitting requirements for construction of power line facilities. In addition to the PTC, PG&E is responsible for obtaining all applicable permits for the project from federal, state, and local agencies. PG&E is responsible for obtaining applicable ministerial permits from local governments and agencies; however, local discretionary permits would not apply per CPUC GO 131-D. Permits and approvals that may be required for the proposed project are listed in Table 2.8-1.

Table 2.8-1 Permits and Approvals That May Be Required

Regulatory Authority	Agency	Jurisdiction/Purpose	Project Requirements
Federal			
Section 404 Nationwide Permit	USACE	Work in waters of the US, including wetlands	Access across wetlands that result in placement of fill (refer to Section 3.9: Hydrology and Water Quality)
Section 7 Consultation (federal review process)	USFWS	Potential impacts on federally-listed species or critical habitat	May be required for federally-listed plants and wildlife with a potential to occur in the project area (refer to Section 3.4: Biological Resources)

Regulatory Authority	Agency	Jurisdiction/Purpose	Project Requirements
Section 10 Incidental Take Permit	USFWS	Impacts on federally-listed, threatened, or endangered species	Would be required if the project could result in harm or death of a federally-listed, threatened, or endangered species (see Section 3.4: Biological Resources). PG&E may be able to use its Bay Area Habitat Conservation Plan in lieu of an Incidental Take Permit if adopted prior to construction.
Section 106 Consultation (National Historic Preservation Act)	State Historic Preservation Office	Requires federal agencies to consider the effects of their undertakings on historic properties	USACE may consult with the State Historic Preservation Office as part of the Section 404 permitting process
Notice of Proposed Construction or Alteration under Federal Aviation Regulations (FAR) Part 77	FAA	Regulations apply to poles and/or towers over 200 feet in height above ground level or within certain proximities to local airports	Poles installed within 20,000 feet of Sonoma County Airport require FAA review (refer to Section 3.15: Transportation and Traffic)
Congested Area Plan under 14 Code of Federal Regulations (CFR) § 33.33	FAA	Regulations for carrying external loads in congested areas	The helicopter operator may be required to submit a Congested Area Plan to FAA prior to carrying external loads in congested areas (refer to Section 3.15: Transportation and Traffic)
State			
GO 131-D, Section III.B, PTC	CPUC	For utilities to construct, modify, or alter power line facilities	CPUC must approve PG&E's PTC application for PG&E to construct the proposed project
Section 401 Water Quality Certification	NCRWQCB	Consistency with state water quality standards	A 401 Permit would be required prior to obtaining a Section 404 Permit from USACE (refer to Section 3.9: Hydrology and Water Quality)
Section 1600 Streambed Alteration Agreement	CDFW	For work that affects the bed or bank of a stream or lake	CDFW may issue a Streambed Alteration Agreement for construction activities that affect wetlands or other waterways (refer to Section 3.9: Hydrology and Water Quality)
Section 2081(b) ITP or Consistency Determination	CDFW	Impacts on state-listed, threatened, or endangered species	May be required if the project could result in harm or death of a state-listed, threatened, or endangered species (refer to Section 3.4: Biological Resources)

Regulatory Authority	Agency	Jurisdiction/Purpose	Project Requirements
Standard Encroachment Permit (discretionary or ministerial)	Caltrans	Use of California state highways for purposes other than normal transportation, including construction activities completed within the ROW	A standard encroachment permit would be obtained for reconductoring work across US 101 and installing guard structures within the ROW (refer to Section 2.6.5)
Transportation Permit	Caltrans	Movement of oversized or excessive load vehicles on the state transportation network	If oversized or excessive equipment will be used, a transportation permit would be obtained from Caltrans prior to transporting oversized construction equipment and materials
National Pollutant Discharge Elimination System (NPDES) Construction General Permit	SWRCB	Construction activities disturbing 1 acre or more	A Notice of Intent would be submitted, and a SWPPP would be developed and implemented during construction (refer to Section 2.6.7)
Local			
Encroachment Permit (ministerial)	Sonoma County	Construction activities completed within Sonoma County road ROW	Encroachment permits would be obtained for installing guard structures along County roads, and working within County roadways
Building Permit (ministerial)	Sonoma County	Ministerial permission to conduct certain building activities	A Building Permit would be obtained before attaching the new substation control building to the new foundation (refer to Section 2.6.6)

Source: (TRC 2015)

2.9 APPLICANT PROPOSED MEASURES

PG&E has identified and committed to implementing the applicant proposed measures (APMs) listed in Table 2.9-1 to reduce or avoid the proposed project's potential significant impacts. Because PG&E has committed to their implementation, these APMs were considered part of the proposed project when evaluating the environmental impacts presented in Section 3.1 through Section 3.17.

PG&E's original APMs (as presented in the PEA) were evaluated based on their effectiveness and enforceability. Based on this evaluation, APMs were either incorporated, revised, or excluded, as summarized in Table 2.9-1. If it was determined that an APM would not sufficiently reduce or avoid a potentially significant impact, the APM was superseded by a mitigation measure (MM), as listed in Table 2.9-1. Superseded APMs would not be implemented should the CPUC approve the proposed project. PG&E would be required to implement the incorporated APMs as part of the proposed project, as defined in this Project Description, as conditions of CPUC approval, in addition to all the MMs identified in Section 4: Mitigation Monitoring and Reporting Program.

Table 2.9-1 Original and Final Applicant Proposed Measures

Original APMs	Excluded, Revised, or Superseded APMs
Aesthetics	
APM AE-1: Construction Cleanup Construction activities will be kept as clean and inconspicuous as practical. Construction debris will be picked up regularly from construction areas.	***Excluded*** *– The APM was removed because it is not needed to reduce effects to less than significant levels and it has no clear performance standards to measure the success of implementation.*
Agriculture and Forestry Resources	
None	N/A
Air Quality	
APM AIR-1: Fugitive Dust Emissions Per BAAQMD CEQA guidelines, PG&E will implement the following fugitive dust control measures: • All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) in active construction areas shall be watered two times per day during dry conditions. • All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers or equivalent method at least once per day. The use of dry power sweeping is prohibited. • All vehicle speeds on unpaved roads shall be limited to 15 miles-per-hour. • Post a publicly visible sign with the telephone number and person to contact at PG&E regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.	***Minor Revisions*** *– Minor revisions were required to incorporate the APM AIR-1 into the proposed project. The APM was revised as follows:* **APM AIR-1: Fugitive Dust Emissions** Per BAAQMD CEQA guidelines, PG&E will implement the following fugitive dust control measures: • All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) in active construction zones shall be watered two times per day during dry conditions. • All haul trucks transporting soil, sand, or other loose material off site shall be covered. • All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers or equivalent method at least once per day. The use of dry power sweeping is prohibited. • All vehicle speeds on unpaved roads shall be limited to 15 miles-per-hour. • Post a publicly visible sign at work areas where grading/blading and helicopter activities occur near public and residential areas with the telephone number and person to contact at PG&E regarding dust complaints. This person shall respond and take corrective action within 48 hours. The BAAQMD's dust complaint phone number shall also be visible to ensure compliance with applicable regulations.

Original APMs	Excluded, Revised, or Superseded APMs
	• Helicopter LZs shall be watered prior to takeoff and landings as needed in unvegetated areas in dry conditions.
APM AIR-2: Exhaust Emissions. Per BAAQMD CEQA guidelines, PG&E will implement the following exhaust emission control measures. • Minimize unnecessary construction vehicle idling time. The ability to limit construction vehicle idling time will depend on the sequence of construction activities and when and where vehicles are needed or staged. Certain vehicles, such as large diesel-powered vehicles, have extended warm-up times following start-up that limit their availability for use following start-up. Where such diesel-powered vehicles are required for repetitive construction tasks, these vehicles may require more idling time. The project will apply a "common sense" approach to vehicle use, so that idling is reduced as far as possible below the maximum of 5 consecutive minutes allowed by California law; if a vehicle is not required for use immediately or continuously for construction activities, its engine will be shut off. Construction foremen will include briefings to crews on vehicle use as part of pre-construction conferences. Those briefings will include discussion of a "common sense" approach to vehicle use. Clear signage shall be provided for construction workers at all access points. • All construction equipment will be maintained in accordance with PG&E standards. All equipment shall be checked by a certified visible emissions evaluator.	***Minor Revisions*** *– Minor revisions were required to incorporate the APM AIR-2 into the proposed project. The APM was revised as follows:* **APM AIR-2: Exhaust Emissions** Per BAAQMD CEQA guidelines, PG&E will implement the following exhaust emission control measures: • Minimize unnecessary construction vehicle and equipment idling time. The ability to limit construction vehicle idling time will depend on the sequence of construction activities and when and where vehicles are needed or staged. Certain vehicles, such as large diesel-powered vehicles, have extended warm-up times following start-up that limit their availability for use following start-up. Where such diesel-powered vehicles are required for repetitive construction tasks, these vehicles may require more idling time. The project will apply a "common sense" approach to vehicle use, so that idling is reduced as far as possible below the maximum of 5 consecutive minutes allowed by California law; if a vehicle is not required for use immediately or continuously for construction activities, its engine will be shut off. Construction foremen will include briefings to crews on vehicle use as part of pre-construction conferences. Those briefings will include discussion of a "common sense" approach to use of diesel-powered vehicles and equipment. Clear signage shall be provided for construction workers at all access points. • Construction equipment will be properly maintained by a certified mechanic. All off-road construction diesel engines not registered under the CARB Statewide Portable Equipment Registration Program will meet at a minimum the Tier 1 California Emission Standards for Off-Road Compression-Ignition Engines as specified in CCR Title 13, Chapter 9, Sec. 2423(b)(1).

Original APMs	Excluded, Revised, or Superseded APMs
Biological Resources	
APM BIO-1: General Avoidance of Biological Resources Impacts[7] This APM consists of the following components: a. **Environmental awareness training.** PG&E will conduct environmental awareness training for all construction and on-site personnel prior to the beginning of site work. Training will include a discussion of the avoidance and minimization measures that are being implemented to protect biological resources, as well as the terms and conditions of any Biological Opinion or other permits that apply to the project. Training will include information on the federal and state Endangered Species Acts and the consequences of noncompliance with these acts. Under this program, workers shall be informed about the presence, life history, and habitat requirements of all listed and special-status species with a potential to be affected within the project area. Training will also include information on state and federal laws protecting nesting birds, wetlands, and other water resources, as applicable and appropriate to the project.	***Minor Revisions*** *– Minor revisions were required to incorporate APM BIO-1a into the proposed project. The APM was revised as follows:* **APM BIO-1a: Environmental Awareness Training** PG&E will prepare and implement a Worker Environmental Awareness Program (WEAP) that includes conducting training for all construction and on-site personnel prior to working on the project site. Training will include a discussion of the avoidance and minimization measures that are being implemented to protect biological resources (e.g., APM and MM requirements), as well as the terms and conditions of any Biological Opinion or other permits that apply to the project. Training will include information on the federal and state Endangered Species Acts and the consequences of noncompliance with these acts. Under this program, workers shall be informed about the presence, life history, and habitat requirements of all listed and special-status species with a potential to be affected within the project area. Training will also include information on state and federal laws protecting nesting birds, wetlands, and other water resources, as applicable and appropriate to the project. A copy of the training materials shall be provided to CPUC for review and approval no less than 30 days before construction. Training logs and sign-in sheets shall be provided to CPUC monthly.
b. **Biological monitoring to avoid impacts near or in potentially sensitive habitat.** A qualified biological monitor will be on site during ground-disturbing construction activities near and within sensitive habitat or resources, and will monitor implementation and compliance with APMs relating to the sensitive habitat. The monitor will have the authority to stop work or implement alternative work practices, as determined by PG&E's biologist in consultation with agencies and construction personnel, as appropriate, if construction activities are likely to impact sensitive biological resources.	***Superseded*** *– APM BIO-1b was superseded by MM Biology-1 and MM Biology-4. Refer to Section 3.4: Biological Resources.*

[7] The CPUC replaced the bullets from the original APM BIO-1 text with consecutive letters to support the impact review process.

Original APMs	Excluded, Revised, or Superseded APMs
c. **Marking of sensitive habitat or resource areas.** Sensitive habitat or resources—such as active bird nests, burrows that are near suitable aquatic habitat that might support CTS or CRLF, and seasonal wetlands—identified during pre-construction surveys to be within or adjacent to project work areas will be marked or otherwise delineated to ensure that no impacts occur.	***Superseded*** *– APM BIO-1c was superseded by MM Biology-1and MM Biology-4. Refer to Section 3.4: Biological Resources.*
d. **Work in California red-legged frog habitat.** Construction activities in suitable CRLF habitat will be restricted to the dry season (April 15 through October 15) to the extent feasible. If construction activities must occur within suitable habitat during the wet season, when CRLF may be migrating overland and breeding in the vicinity, a qualified biologist will determine if it is appropriate to fence the perimeter of pull sites, staging areas, and/or landing zones. Fencing will be effective amphibian exclusion fencing. Installation of exclusion fencing will occur under the supervision of a qualified biologist. The amphibian exclusion fencing will remain in place for the duration of construction during the wet season, and will be monitored regularly by environmental inspectors or biologists. Where access is necessary, gates will be installed with the exclusion fence. These measures may be refined slightly to be consistent with measures established during the Section 7 consultation process with USFWS.	***Superseded*** *– APM BIO-1d was superseded by MM Biology-3. Refer to Section 3.4: Biological Resources.*
e. **Work in California tiger salamander habitat.** The project area has very limited potential habitat for CTS in the area surrounding Fulton Substation, and impacts to the species are unlikely. If construction activities must occur during the wet season, a qualified biologist will determine if it is appropriate to fence the perimeter of work areas around Fulton Substation. Fencing will be effective amphibian exclusion fencing. Installation of exclusion fencing will occur under the supervision of a qualified biologist. The amphibian exclusion fencing will remain in place for the duration of construction during the wet season, and will be monitored regularly by environmental inspectors or biologists. Where access is necessary, gates will be installed with the exclusion fence.	***Superseded*** *– APM BIO-1e was superseded by MM Biology-7. Refer to Section 3.4: Biological Resources.*

Original APMs	Excluded, Revised, or Superseded APMs
f. **Litter and trash management.** All food scraps, wrappers, food containers, cans, bottles, and other trash from the project area will be deposited in trash containers and removed from the project site.	***Minor Revisions*** *– Minor revisions were required to incorporate APM BIO-1f into the proposed project. The APM was revised as follows:* **APM BIO-1f: Litter and Trash Management** All food scraps, wrappers, food containers, cans, bottles, and other trash from the project area will be deposited in trash containers with an adequate lid or cover to contain trash. All food waste shall be placed in a securely-covered bin and removed from the site on a weekly basis to avoid attracting animals.
g. **Parking.** Vehicles and equipment will be parked on pavement, existing roads or road shoulders, developed areas, or approved work areas.	***No Revisions*** *– APM BIO-1g would be incorporated into the proposed project without changes.*
h. **Route and work area limitations.** Vehicles will be confined to established or previously disturbed roadways and pre-approved access roads, overland routes, and work areas. Access routes and construction work areas will be limited to the minimum necessary to achieve the project goals.	***Minor Revisions*** *– Minor revisions were required to incorporate APM BIO-1h into the proposed project. The APM was revised as follows:* **APM BIO-1h: Access Route and Work Area Limitations** Vehicles will be confined to public roadways and pre-approved access routes (e.g., private paved and unpaved roads, and overland routes), previously disturbed and unvegetated roadsides, and work areas. Access routes and construction work areas will be limited to the minimum necessary to achieve the project goals.
i. **Maintenance and refueling.** All equipment will be maintained to minimize the potential for leaks of automotive fluids such as fuels, solvents, or oils. All refueling and maintenance of vehicles and other construction equipment will be restricted to designated staging areas located at least 100 feet from any down-gradient aquatic habitat, unless otherwise isolated from habitat by secondary containment. Proper spill prevention and cleanup equipment will be maintained in all refueling areas.	***Superseded*** *– APM BIO-1i was superseded by MM Hazards-1. Refer to 3.8: Hazards and Hazardous Materials.*
j. **Pets and firearms.** No pets or firearms will be permitted at the project site.	***No Revisions*** *– APM BIO-1j would be incorporated into the proposed project without changes.*
k. **Cover excavations.** All excavations in excess of 2 feet deep will be sloped, or have escape ramps installed that are suitable for the escape of wildlife, or be thoroughly covered at the end of the day. All trenches and excavations will be inspected for wildlife at the beginning of the work day and prior to backfilling. If a special-status	***Minor Revisions*** *– Minor revisions were required to incorporate APM BIO-1k into the proposed project. The APM was revised as follows:* **APM BIO-1k: Cover Excavations**

Original APMs	Excluded, Revised, or Superseded APMs
species is discovered in a trench or excavation area, work in the area will be redirected, and the special-status species will be allowed to leave the trench and the area of its own accord. In the event that any special-status species is trapped in a trench or an excavation and is unable to leave on its own accord, removal will be performed or overseen by a biological monitor with the applicable permits for handling of the species.	Pole excavations shall be thoroughly covered at the end of each work day to prevent people, wildlife, or livestock from falling in. Trench excavations greater than 2 feet deep will be sloped, or have escape ramps installed that are suitable for the escape of wildlife, or be thoroughly covered at the end of the day. All excavations in active work areas will be inspected for wildlife at the beginning of the work day and prior to backfilling. If a special-status species is discovered in an excavation area, work in the area will be redirected and the special-status species shall first be allowed to leave the area of its own accord. In the event that a special-status species is trapped in an excavation and is unable to leave on its own accord, removal will be performed or overseen by a biological monitor with the applicable permits for handling of the species.
l. **Restore temporarily disturbed habitats.** All areas that are temporarily disturbed as a result of project activities will be restored upon completion of construction. Disturbed areas will be restored to pre-project conditions or as otherwise requested by the landowner.	***Superseded*** *– APM BIO-1l was superseded by MM Biology-7. Refer to Section 3.4: Biological Resources.*
m. **Work during the wet season.** During wet weather or the rainy season, all open holes, pits, and trenches will be protected to ensure that frogs and salamanders do not become entrapped. Qualified personnel will install protective fencing, coverings, or ramps to either prevent wildlife from falling into excavations or to allow for escape. At the end of each work day, trenches will be covered and/or fenced. Excavations sites will be inspected each morning, prior to the start of construction activities, to ensure that no wildlife are trapped. During the wet season or after a rain event (with greater than 0.1 inches of rainfall), all construction personnel will check underneath vehicles (i.e., tires, tracks, etc.) for the presence of frogs and/or salamanders. Any discovered wildlife will be reported to the on-site biologist or to PG&E environmental staff for relocation assistance. Use Best Management Practices and implement Stormwater Pollution Prevention Plan (SWPPP) measures to minimize erosion and prevent sediment from leaving work areas and entering any	***Superseded*** *– APM BIO-1m was superseded by MM Biology-3 and MM Biology-4. Refer to Section 3.4: Biological Resources.*

Original APMs	Excluded, Revised, or Superseded APMs
aquatic habitat. Do not use monofilament netting with any erosion-control materials.	
APM BIO-2: Avoid Impacts on Nesting Birds If work is scheduled during the nesting season (February 1 through August 31), nest detection surveys will correspond with a standard buffer for individual species in accordance with the species-specific buffers set forth in Appendix E of the PEA and will occur within 15 days prior to the start of work activities at designated construction areas, staging areas, and landing zones to determine nesting status by a qualified biologist. Nest surveys will be accomplished by ground surveys and/or by helicopter and will support phased construction, with surveys scheduled to be repeated if construction lapses in a work area for 15 days between March and July. Access for ground surveys will be subject to property access permission. Helicopter flight restrictions for nest detection surveys may be in effect for densely populated residential areas, and will include observance of appropriate established buffers and avoidance of hovering in the vicinity of active nest sites. If active nests containing eggs or young are found, the biologist will establish a species-specific nest buffer, as defined in Appendix E of the PEA. Where feasible, standard buffers will apply, although the biologist may increase or decrease the standard buffers in accordance with the factors set forth in Appendix E. Nesting pair acclimation to disturbance in areas with regularly occurring human activities will be considered when establishing nest buffers. The established buffers will remain in effect until the young have fledged or the nest is no longer active as confirmed by the biologist. Active nests will be periodically monitored until the biologist has determined that the young have fledged or once construction ends. Per the discretion of the biologist, vegetation removal by hand may be allowed within nest buffers or in areas of potential nesting activity. Inactive nests may be removed in accordance with PG&E's approved avian permits. The biologist will have authority to order the cessation of nearby project activities if nesting pairs exhibit signs of disturbance. All references in this APM to biologists refer to qualified biologists with a bachelor's degree or above in a biological science field and demonstrated field expertise in ornithology, in particular, nesting behavior.	***Superseded*** *– APM BIO-2 was superseded by MM Biology-5. Refer to Section 3.4: Biological Resources.*

Original APMs	Excluded, Revised, or Superseded APMs
APM BIO-3: Wetland and Water Feature Protection Measures The following measures will be implemented to avoid and minimize project impacts on wetland and water features: • To the maximum extent feasible, design the project to avoid wetland and water features. Where impacts on the features cannot be avoided, coordination may be required with the USACE, USFWS, CDFW, and RWQCB. • Where avoidance is feasible, delineate wetland and water features and establish exclusion zones along the upland margins to restrict entrance by construction personnel and equipment. • Conduct all fueling of vehicles, equipment, and helicopters per APM BIO-1, Maintenance and Refueling. • To the extent feasible, complete any necessary construction activities within or adjacent to wetland or water features during the dry season (October 15 to April 15). For construction activities occurring outside of the dry season, appropriate erosion-control and stormwater protection measures will be implemented as identified in the project SWPPP, if necessary.	***Superseded*** *– APM BIO-3 was superseded by MM Hydrology-4. Refer to Section 3.4: Biological Resources and Section 3.9: Hydrology and Water Quality.*
APM BIO-4: Conduct Pre-Construction Surveys for Special-Status Plants No special-status plants were observed during protocol surveys conducted in 2011 and 2012. Resurvey these areas during the appropriate blooming season prior to construction to confirm that conditions have not changed.	***Superseded*** *– APM BIO-4 was superseded by MM Biology-2 and MM Biology-7. Refer to Section 3.4: Biological Resources.*
APM BIO-5: Conduct Pre-Construction Surveys for Special-Status Bats If reconductoring occurs between April and September (i.e., bat reproductive season) accessible trees that are 10-inches diameter above breast height (dbh) or greater and rural outbuildings located within 100 feet of pull sites and landing zones that could provide potential bat habitat will be assessed by desktop review and field surveys. Potential bat habitat includes woodpecker holes, exfoliating bark, and branch and bole hollows. If desktop review and field surveys determine that trees and/or outbuildings have low to no potential for roosting habitat, no further action is required. If desktop review or field surveys determine that trees and/or outbuildings have moderate to high potential for roosting habitat, the following procedure will be employed during tree trimming and removal:	***Superseded*** *– APM BIO-5 was superseded by MM Biology-6. Refer to Section 3.4: Biological Resources.*

Original APMs	Excluded, Revised, or Superseded APMs
• A qualified biologist will be present for trimming or removal of trees 10 inches or greater dbh. • To the extent feasible, trees/snags/stumps will be cut down on warm days in late morning to afternoon when any bats present are likely to be warm and able to fly. • The qualified biologist will inspect crevices and cavities to the extent possible. If bats may be in a tree bole or branch cavity, the qualified biologist will attempt to expose them and allow escape. For example, if the cavity cannot be investigated by the qualified biologist, then carefully cut successive sections above the cavity to open it, waiting up to 10 minutes in between each cut, and determine if it is empty or allow any bats inside to crawl or fly out. • Create noise and vibration disturbance on the tree (e.g., concussive hitting with equipment and/or chainsaw cutting) for at least 15 minutes before carefully opening up potential crevices and cavities for inspection and clearance. • Remove and set aside any branches that may contain bats. For example, cut the branches off intact and set them upright against trees away from the work activity area to allow any bats present to passively escape.	
APM BIO-6: Conduct Pre-Construction Surveys for California Red-Legged Frog A qualified biologist shall conduct a pre-construction survey of the work areas with potential habitat for CRLF within 24 hours prior to the start of work. Any areas where frogs are observed will be flagged for avoidance, and clear instructions will be given to all crew members during tailboards of areas to avoid where CRLF may be present.	***Superseded*** *– APM BIO-6 was superseded by MM Biology-3. Refer to Section 3.4: Biological Resources.*
APM BIO-7: Conduct Pre-Construction Surveys for California Tiger Salamander A qualified biologist shall conduct a pre-construction survey of the work areas with suitable CTS habitat within 24 hours prior to potential ground disturbance, specifically in the vicinity of Fulton Substation. Burrows will be marked and avoided during construction activities.	***Minor Revisions*** *– Minor revisions were required to incorporate APM BIO-7 into the proposed project. The APM was revised as follows:* **APM BIO-7: California Tiger Salamander** Unless otherwise authorized by USFWS and/or CDFW, PG&E shall implement the following procedures to protect CTS that may be present in designated critical habitat for CTS and in areas identified in the Santa Rosa Plain Conservation Strategy (SRPCS) as locations where CTS could be adversely affected:

Original APMs	Excluded, Revised, or Superseded APMs
	• A qualified biologist, who is approved by USFWS and/or CDFW if required[8], shall conduct a pre-construction clearance survey of the work areas no more than 24 hours in advance of work activities that could adversely affect CTS. • If construction activities must occur during the wet season (October 15 through April 15), a qualified biologist, who is approved by USFWS and/or CDFW if required, will determine if it is appropriate to fence the perimeter of work areas located in areas. Amphibian exclusion fencing will be used. Installation of exclusion fencing will occur under the supervision of a qualified biologist. The amphibian exclusion fencing will remain in place for the duration of construction in that area during the wet season, and will be monitored regularly by environmental inspectors or biologists. Where access is necessary, gates will be installed within the exclusion fence. • Grading and vegetation clearing shall not occur where CTS could be adversely affected during the wet season. • During wet weather or the rainy season, all open holes, pits, and trenches will be protected to ensure that CTS do not become entrapped. Qualified personnel will install protective fencing, coverings, or ramps to either prevent CTS from falling into excavations or to allow for escape. At the end of each work day, trenches will be covered and/or fenced. Excavation sites will be inspected each morning, prior to the start of construction activities, to ensure that no CTS are trapped. • During the wet season or after a rain event (with greater than 0.1 inches of rainfall), construction personnel will check underneath all vehicles (i.e., tires, tracks, etc.) for the presence of CTS. • Best management practices (BMPs) shall be implemented to minimize erosion and prevent sediment from leaving work areas and entering any aquatic habitat. Monofilament netting that could entrap CTS shall not be used for any erosion-control materials.

[8] For purposes of this measure, approval "if required" means if required by USFWS or CDFW.

Original APMs	Excluded, Revised, or Superseded APMs
	PG&E may consult with USFWS and/or CDFW before beginning work in designated critical habitat for CTS and in areas identified in the SRPCS as locations where CTS could be adversely affected to determine the necessity of implementing the requirements listed above based on the habitat characteristics in the project area. Such considerations may include adjacent land uses and lack of connectivity to suitable habitat where project work areas are located. Any discovered CTS will be reported to the on-site biologist or to PG&E environmental staff. If a CTS is found during work activities, PG&E shall redirect work that poses a risk to the animal, as determined by a qualified biologist, and consult with USFWS and/or CDFW before resuming work in the area. CTS handling and relocation may only occur after consultation with the permitting agencies, and must be conducted by individuals with proper qualifications and agency approval. PG&E shall provide CPUC with any agency permits and determinations regarding CTS for the project.
APM BIO-8: Conduct Pre-Construction Survey for American Badger A survey for active dens of American badgers shall be performed by a qualified biologist within 30 days prior to construction grading or land clearing. Surveys shall be conducted within suitable habitat. The width of the pre-activity survey will be 250 feet on either side of the construction area or to the extent of PG&E's right-of-way. Construction may proceed once it is determined that there are no active dens in the survey area. If active dens are present, the dens shall be avoided during the breeding season, and a 50-foot buffer around the den sites shall be established. Smaller buffers may be established through consultation with CDFW.	***Minor Revisions*** *– Minor revisions were required to incorporate APM BIO-8 into the proposed project. The APM was revised as follows:* **APM BIO-8: American Badger** A qualified biologist shall conduct a pre-activity survey for active American badger dens within 30 days prior to grading or vegetation clearing in work areas, or use of overland access routes. The pre-activity survey area shall be limited to potentially suitable habitat for American badger (e.g., grasslands and woodlands) located within 250 feet of work areas where grading or land vegetation clearing may occur and within or immediately adjacent to overland access routes. PG&E shall submit the survey results to CPUC prior to construction. PG&E may use cameras to determine if dens are active. If active dens are identified at any time during construction, the dens shall be flagged and avoided. A 250-foot work restriction buffer shall be established around active maternal dens. For non-maternal dens, a 50-foot work restriction buffer shall be established around active dens. Smaller buffers may be established through consultation with CDFW. If an active non-maternal den cannot be avoided, PG&E may consult with CDFW to determine if it would be appropriate to implement

Original APMs	Excluded, Revised, or Superseded APMs
	passive exclusion techniques, such as sealing the den after animals have vacated. A qualified biologist shall inspect construction activities near active American badger dens on a weekly basis to ensure the work restriction buffers are implemented appropriately and active dens are avoided.
APM BIO-9: Conduct Pre-Construction Survey for Western Pond Turtle A survey for western pond turtle shall be performed by a qualified biologist within 24 hours prior to work within riparian or aquatic habitats. Individual western pond turtles, if found in the work area during spring/nesting season, shall be relocated out of harm's way and outside of the construction area in the direction of travel, or as directed by the CDFW. Similarly, if found during hibernation movements in winter, individual western pond turtles will be relocated outside of the construction area in the direction of travel, or as directed by CDFW.	***Minor Revisions*** *– Minor revisions were required to incorporate APM BIO-9 into the proposed project. The APM was revised as follows:* **APM BIO-9: Western Pond Turtle** A survey for western pond turtle shall be performed by a qualified biologist within 24 hours prior to work within 400 feet of potentially suitable habitat (e.g., ponds, lakes, slow streams, or marshes with vegetated borders, rocks, or logs). A qualified biologist shall also conduct daily sweeps during the spring nesting season of work areas and access routes within 400 feet of suitable habitat for western pond turtle prior to work activities. The daily sweeps shall consist of walking the limits of construction areas and access routes to identify any pond turtles that may be present. Individual western pond turtles, if found in the work area during spring/nesting season, shall be relocated out of harm's way and outside of the construction area in the direction of travel, or as directed by the CDFW. Similarly, if found during hibernation movements in winter, individual western pond turtles will be relocated outside of the construction area in the direction of travel, or as directed by CDFW.
APM BIO-10: Tree Removal and Mitigation Tree removal will be minimized to what is required to implement the project. For removal of large valley oak trees greater than 20-inches dbh or small valley oaks with a cumulative dbh greater than 60 inches that occurs within the Sonoma County Valley Oak Combining District, PG&E will coordinate with landowners to either replace or pay an in-lieu fee to the County valley oak planting program. Any protected trees that are otherwise removed will be documented and replaced at a 1:1 ratio or other measure derived through coordination with Sonoma County or the Town of Windsor that provides an equal level of compensation.	***No Revisions*** *– APM BIO-10 would be incorporated into the proposed project without changes.*

Original APMs	Excluded, Revised, or Superseded APMs
Cultural and Tribal Cultural Resources	
APM CR-1: Avoid Cultural Resources[9] Archaeological resource P-49-001179 (CA-SON-1256) will be avoided by staging trucks on the paved or graveled road shoulder and not on exposed soil within the site boundary. Should the boom trucks need to travel off the shoulder within the site boundary for any reason, PG&E will place rubber mats across the site surface to protect against any soil disturbance that could be caused by driving on the surface. PG&E will also establish a protection zone by flagging the site boundary along the roadway with exclusion fencing to ensure that no vehicles will inadvertently enter the site boundary without the above-mentioned protection measures. A qualified archaeologist will be on call to ensure implementation of this measure prior to and during construction.	***Minor Revisions*** *– Minor revisions were required to incorporate APM CR-1 into the proposed project. The APM was revised as follows:* **APM CR-1: Avoid Cultural Resources** Archaeological resource CA-SON-1256 shall be avoided by restricting equipment and vehicle access to paved or graveled surfaces along the roadway. If travel off paved or graveled surface is necessary within the site boundary for any reason, PG&E shall place rubber mats across the site surface to protect against any inadvertent damage to the site by driving on the surface. PG&E shall also establish a protection zone by flagging the site boundary along the roadway with exclusion fencing to ensure that no vehicles will inadvertently enter the site boundary without the above-mentioned protection measures. A qualified archaeologist shall monitor all construction activity on unpaved surfaces within the resource site.
APM CR-2: Stop Work if Previously Unknown Cultural Resources Are Discovered If buried cultural resources—such as chipped or ground stone, historic debris, or building foundations—are inadvertently discovered during site preparation or construction activities, work will stop in that area and within 100 feet of the find until a qualified archaeologist can assess the significance of the find and, if necessary, develop appropriate treatment measures in consultation with PG&E and other appropriate agencies. With the archaeologist's approval, work may continue on other portions of the site. PG&E will be responsible for ensuring that the archaeologist's recommendations for treatment are implemented.	***Superseded*** *– APM CR-2 has been superseded by MM Cultural-1. Refer to Section 3.5: Cultural and Tribal Cultural Resources.*
APM CR-3: Stop Work if Human Remains are Discovered In the event human remains are encountered during the project, work in the immediate area of the find will be halted and the PG&E archaeologist and 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	***Excluded*** *– APM CR-3 was removed because the measure identifies notification and coordination procedures at are required independently of CEQA review and CPUC oversight (Heath and Safety Code Section 7050.5; PRC Sections 5097.94, 5097.98, and 5097.99)*

[9] PG&E submitted a revised version of APM CR-1 to CPUC on April 26, 2016 to replace the version included in the PEA.

Original APMs	Excluded, Revised, or Superseded APMs
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.	
Geology, Soils, and Mineral Resources	
APM GS-1: Minimization of Construction in Soft or Loose Soils Where soft or loose soils are encountered during project construction, appropriate measures will be implemented to avoid, accommodate, replace, or improve such soils. Depending on site-specific conditions and permit requirements, these measures may include: • Locating construction facilities and operations away from areas of soft and loose soil; • Over-excavating soft or loose soils and replacing them with engineered backfill materials; • Increasing the density and strength of soft or loose soils through mechanical vibration and/or compaction; • Installing material over access roads such as aggregate rock, steel plates, or timber mats; and • Treating soft or loose soils in place with binding or cementing agents.	***No Revisions*** *– APM GS-1 would be incorporated into the proposed project without changes.*
APM GS-2: Reduction of Slope Instability during Construction Existing natural or temporarily constructed slopes affected by construction will be evaluated for stability by qualified construction staff at the beginning of each construction day that employees may be exposed to the areas immediately upslope or downslope from the area of concern. In developing grading and construction procedures for access roads, the stability of both temporary and permanent cut, fill, and otherwise affected slopes will be analyzed. Construction slopes and grading will be designed to limit the potential for slope instability and minimize the potential for erosion and flooding during construction. During construction, slopes affected by construction activities will be monitored by qualified construction staff and maintained in a stable condition. Construction activities likely to result in slope instability will be suspended, as necessary, during and immediately following periods of heavy precipitation when unstable slopes are more susceptible to failure.	***Superseded*** *– APM GS-2 was superseded by MM Geology-1. Refer to Section 3.6: Geology, Soils, and Mineral Resources.*

Original APMs	Excluded, Revised, or Superseded APMs
APM GS-3: Site-Specific Geotechnical Investigation[10] A geotechnical investigation will be conducted to evaluate the potential for surface fault rupture for poles within and adjacent to potentially active fault traces and earthquake fault zones. Where significant potential for surface fault rupture exists, pole locations will be adjusted, where possible, to minimize any potential for damage based on the conclusions in the report.	***No Revisions*** *– APM GS-3 would be incorporated into the proposed project without changes.*
Greenhouse Gas Emissions	
APM GHG-1: Minimize GHG Emissions • Minimize unnecessary construction vehicle idling time per APM AIR-2. • Maintain construction equipment per APM AIR-2. • Minimize construction equipment exhaust by using low-emission or electric 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 CARB Statewide Portable Equipment Registration Program. • Minimize welding and cutting by using compression of mechanical applications where practical and within standards. • Encourage the recycling of construction waste where feasible.	***Excluded*** *– APM GHG-1 was removed because it is not needed to reduce effects to less than significant levels and it has no clear performance standards to measure the success of implementation.*
APM GHG-2: Minimize SF_6 Emissions • Incorporate Fitch Mountain Substation into PG&E's system-wide SF_6 emission reduction program. CARB has adopted the Regulation for Reducing Sulfur Hexafluoride Emissions from Gas Insulated Switchgear sections 95350 to 95359, title 17, California Code of Regulations, which requires that company-wide SF_6 emission rate not exceed 1 percent by 2020. Since 1998, PG&E has implemented a programmatic plan to inventory, track, and recycle SF_6 inputs, and inventory and monitor system-wide SF_6 leakage rates to facilitate timely replacement of leaking breakers. PG&E has improved its leak detection procedures and increased awareness of SF_6 issues within the company. X-ray technology is now used to inspect internal	***No Revisions*** *– APM GHG-2 would be incorporated into the proposed project without changes.*

[10] Two APMs are labeled as GS-1 in the PEA Project Description. The second occurrence was re-numbered to GS-3.

Original APMs	Excluded, Revised, or Superseded APMs
circuit breaker components to eliminate dismantling of breakers, reducing SF_6 handling and accidental releases. As an active member of USEPA's SF_6 Emission Reduction Partnership for Electrical Power Systems, PG&E has focused on reducing SF_6 emissions from its transmission and distribution operations, and has reduced the SF_6 leak rate by 89 percent and absolute SF_6 emissions by 83 percent. • Require that the breakers at Fitch Mountain Substation have a manufacturer's guaranteed maximum leakage rate of 0.5 percent per year or less for SF_6. • Maintain substation breakers in accordance with PG&E's maintenance standards. • Comply with California Air Resources Board Early Action Measures as these policies become effective.	
Hazards and Hazardous Materials	
APM HM-1: Worker Environmental Training Program 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 Stormwater Pollution Prevention Plan (SWPPP), which will also address spill response. The worker environmental training program will be provided separately to CPUC staff prior to construction.	***Superseded*** *– APM HM-1 was superseded by MM Hazards-1. Refer to Section 3.8: Hazards and Hazardous Materials.*
APM HM-2: Fueling of Helicopters Any fueling of helicopters will occur in designated project landing zones, and will comply with the following PG&E guidelines: • Any on-site fuel necessary for equipment operation will be placed in appropriate storage tanks on the bed of fueling vehicles. • Bulk lubricating oil, hydraulic fluids, and other materials used for vehicle and equipment maintenance will not be stored on the construction site. • Minor amounts of lubricants and hydraulic fluid will be stored in vehicles. • Secondary containment and spill rags will be used when fueling. • "Topping-off" fuel tanks will be discouraged.	***Superseded*** *– APM HM-2 was superseded by MM Hazards-1. Refer to Section 3.8: Hazards and Hazardous Materials.*

Original APMs	Excluded, Revised, or Superseded APMs
• A stockpile of absorbent material will be placed where it will be readily accessible. • All fuel trucks and fueling areas will be required to have spill kits. • Absorbent material will be used on small spills. The absorbent material will be removed promptly and disposed of properly. • Vehicles and equipment will be checked regularly for leaking oils and fuel.	
APM HM-3: Smoking and Fire Rules Smoking will not be permitted during fire season, except in a barren area that measures a minimum of 10 feet in diameter and is cleared to mineral soil, or within vehicles or enclosed equipment cabs. Under no circumstances will smoking be permitted during fire season while employees are operating light or heavy equipment, or while walking or working in grass and woodlands.	***Minor Revisions*** *– Minor revisions were required to incorporate APM HM-3 into the proposed project. The APM was revised as follows:* **APM HM-3: Smoking and Fire Rules** Smoking will not be permitted on site, except in barren areas that measures a minimum of 20 feet in diameter and are cleared to mineral soil. Under no circumstances will smoking be permitted during the fire season (approximately July through October) while employees are operating equipment, or while walking or working in grass and woodlands.
APM HM-4: Carry Emergency Fire Suppression Equipment PG&E construction crew trucks and equipment will have, at a minimum, a standard round-point shovel and a fire extinguisher. If construction activities likely to cause sparks (e.g., welding, grinding, or grading in rocky terrain) are conducted, emergency fire tool boxes will be readily available to crews. The tool boxes will contain fire-fighting items such as shovels, axes, and water.	***No Revisions*** *– APM HM-4 would be incorporated into the proposed project without changes.*
Hydrology and Water Quality	
APM WQ-1: Stormwater Pollution Prevention Plan PG&E shall file a notice of intent with the SWRCB and the North Coast RWQCB for coverage under the General Construction Storm Water Permit and shall prepare and implement a SWPPP in accordance with General Order No. 2009-0009-DWQ. Implementation of the SWPPP shall help stabilize disturbed areas and reduce erosion and sedimentation. A monitoring program shall also be established to ensure that the prescribed BMPs are followed during Proposed Project construction. A qualified SWPPP practitioner shall oversee the implementation of the SWPPP and BMPs.	***Superseded*** *– APM WQ-1 was superseded by MM Hydrology-1. Refer to Section 3.9: Hydrology and Water Quality.*

Original APMs	Excluded, Revised, or Superseded APMs
The following measures are generally drawn from that permit and shall be included in the SWPPP prepared for the construction of the Proposed Project: • All Best Management Practices (BMPs) will be on site and ready for installation before the start of construction activities. • BMPs shall be developed to prevent the acceleration of natural erosion and sedimentation rates. • Prior to conducting clearing activities during the wet season and before the onset of winter rains or any anticipated storm events, erosion-control measures shall be installed. Temporary measures such as silt fences or wattles, which are intended to minimize sediment transport from temporarily disturbed areas, shall remain in place until disturbed areas have stabilized.	
APM WQ-2: Best Management Practices Inspection All BMPs will be inspected on a weekly basis, and at least once every 24-hour period before, during, and after 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 on site with the SWPPP.	***Superseded*** *– APM WQ-2 was superseded by MM Hydrology-2. Refer to Section 3.9: Hydrology and Water Quality.*
APM WQ-3: Wetland and Drainage Avoidance To avoid and minimize travel disturbance to wetlands and drainages, temporary materials such as fiberglass mats, steel plates, or temporary bridges will be placed across water features during project access.	***Superseded*** *– APM WQ-3 was superseded by MM Hydrology-3 and MM Hydrology-4. Refer to Section 3.9: Hydrology and Water Quality.*
APM WQ-4: Vehicle Maintenance Vehicle maintenance wastes, including used oils and other fluids will be handled and disposed of properly. Fuels and lubricating oils for vehicles and heavy equipment will not be stored or transferred within 100 feet of any waterbodies, unless otherwise isolated from waterbodies by secondary containment.	***Superseded*** *– APM WQ-4 was superseded by MM Hazards-1. Refer to Section 3.8: Hazards and Hazardous Materials.*
Land Use and Planning	
None	N/A

Original APMs	Excluded, Revised, or Superseded APMs
Noise	
None	N/A
Paleontological Resources	
APM PAL-1: Unanticipated Discovery If significant paleontological resources are discovered during construction activities, the following procedures will be followed: • Stop work immediately within 100 feet; • Contact the designated project inspector and Cultural Resource Specialist (CRS) immediately; • Protect the site from further impacts, including looting, erosion or other human or natural damage; • The project CRS will arrange for a Principal Paleontologist to evaluate the discovery. If the discovery is determined to be significant, PG&E will implement measures to protect and document the paleontological resource. Work may not resume within 100 feet of the find until approval by the Principal Paleontologist and Cultural Resource Specialist.	***Superseded*** *– APM PAL-1 was superseded by MM Paleontology-2. Refer to Section 3.12: Paleontological Resources.*
APM PAL-2: Workers Environmental Awareness Training Because high sensitivity formations have been identified within the project area, PG&E (or contractor) will provide environmental awareness training on paleontological resources protection. For this project, the Sonoma Volcanics, Glen Ellen Formation, and older alluvial fan deposits all have high paleontological sensitivities. This training may be administered by the Principal Paleontologist as a stand-alone training or included as part of the overall environmental awareness training as required by the project. The training will include at minimum, the following: • Types of fossils that could occur at the project site • Types of lithologies in which the fossils could be preserved • Procedures that should be followed in the event of a fossil discovery • Penalties for disturbing paleontological resources	***Minor Revisions*** *– Minor revisions were required to incorporate APM PAL-2 into the proposed project. The APM was revised as follows:* **APM PAL-2: Worker Environmental Awareness Training** PG&E shall provide environmental awareness training on the recognition and protection of paleontological resources to project personnel. Training shall be required for all personnel before construction commences and repeated for all new personnel before they begin work on the proposed project. This training may be administered by the CPUC-approved, qualified Principal Paleontologist as a stand-alone training or included as part of the overall environmental awareness training as required by the project. The training will include at minimum, the following: • Types of fossils that could occur at the project site. • Types of lithologies in which the fossils could be preserved. • Procedures that should be followed in the event of a fossil discovery.

Original APMs	Excluded, Revised, or Superseded APMs
	• Penalties for disturbing paleontological resources. The training materials shall be submitted to the CPUC for approval at least 30 days prior to the start of construction.
APM PAL-3: Monitoring Monitoring will be required for pole hole excavation activities greater than 3 feet in width and grading to depths greater than 2 feet that impact the Sonoma Volcanics, the Glen Ellen Formation, and the older alluvial fan deposits. However, since fossils do not predicatively occur within these formations and the amount of earth disturbance in relatively small, fulltime monitoring is not required, barring the occurrence of an unanticipated, highly-fossiliferous facies. Instead, monitoring will consist of periodic spot checking of grading and augering for pole installation to check for the occurrence of fossils or facies highly likely to produce fossils. In the event that a highly fossiliferous facies is encountered, monitoring shall be fulltime until excavations within that facies are complete. Monitoring will be done by a qualified paleontological monitor. The paleontological monitor will document monitoring activities on monitoring logs. Monitoring logs and reports shall include the activities observed, geology encountered, description of any resources encountered, and measures taken to protect or salvage fossils discovered. Photographs and other supplemental information shall be included as necessary.	***Superseded*** *– APM PAL-3 was superseded by MM Paleontology-1. Refer to Section 3.12: Paleontological Resources.*
APM PAL-4: Fossil Recovery In the event that significant paleontological resources are encountered during the project, protection and recovery of those resources may be required. On public lands, treatment and curation of fossils will follow procedures outlined by the land managing agency. On private property, treatment and curation of fossils will be conducted in consultation with the landowner, PG&E, and the CPUC. The Principal Paleontologist will be responsible for developing the recovery strategy and will lead the recovery effort, which will include establishing recovery standards, preparing specimens for identification and preservation, documentation and reporting, and securing a curation agreement from the approved agency. A paleontological monitor or other qualified individual may conduct the recovery of fossil discoveries under the direction of the Principal Paleontologist.	***Superseded*** *– APM PAL-4 was superseded by MM Paleontology-2. Refer to Section 3.12: Paleontological Resources.*

Original APMs	Excluded, Revised, or Superseded APMs
Population and Housing	
None	N/A
Recreation	
APM REC-1: Coordination with Park Management and Signage PG&E will coordinate closely with park management for temporary public land closures during project construction activities. If traditional access is temporarily unavailable, signs advising recreational facility users of construction activities, including directions to alternative trails and/or bikeways, will be posted at entrance gates to parks and open space areas. Signage will be posted at least 1 week in advance of construction, near parks and open space areas.	***Minor Revisions*** *– Minor revisions were required to incorporate APM REC-1 into the proposed project. The APM was revised as follows:* **APM REC-1: Coordination with Park Management and Signage** PG&E will coordinate closely with park management for temporary public land and trail closures during project construction activities. If any park or trail closures are necessary during construction, PG&E would post signs advising recreational facility users of construction activities, including directions to alternative trails and/or bikeways at entrance gates to regional parks. Signage will be posted at least 1 week in advance of parks or trail closures.
Transportation and Traffic	
APM TRA-1: Air Transit and Neighborhood Coordination PG&E will implement the following protocols that pertain to helicopter use during construction and air traffic: • PG&E will comply with all applicable FAA regulations regarding air traffic within 2 miles of the project alignment. • PG&E's helicopter operator will coordinate all project helicopter operations with the local airport before and during project construction.	***Excluded*** *– APM TRA-1 was removed because compliance with applicable FAA regulations is always required, and not subject to CPUC oversight.*
APM TRA-2: Temporary Traffic Controls PG&E will obtain any necessary transportation and/or encroachment permits, including those for the Highway 101 and Old Redwood Highway crossings and transport of oversized loads and certain materials, and will comply with permit requirements designed to prevent excessive congestion or traffic hazards during lane closures. PG&E will develop lane closure/width reduction or traffic diversion plans as required by the encroachment permits. Construction activities that are in, along, or cross local roadways will follow best management practices to minimize impacts to traffic and transportation in the project area.	***Excluded*** *– APM TRA-2 was removed because obtaining encroachment permits and complying with the permits would be required without CPUC oversight.*

Original APMs	Excluded, Revised, or Superseded APMs
Utilities and Public Services	
None	N/A
Mandatory Findings of Significance	
None	N/A

Sources: (TRC 2015, PG&E 2016-2017)

2.10 ELECTROMAGNETIC FIELDS

2.10.1 Overview

This IS/MND does not consider electromagnetic fields (EMF) in the context of CEQA and does not make any determination regarding environmental impacts associated with EMF. CEQA does not address EMF and does not require that EMF be addressed during environmental review of proposed projects; there are no defined or adopted CEQA standards for defining health risks from EMF. This section provides general information regarding EMF associated with electric utility facilities and the proposed project for the benefit of the public and decision makers.

Electric and magnetic fields are distinct phenomena. Electrical fields are easily shielded by any object within the electrical field, whereas magnetic fields penetrate most objects and are typically the focus of public health concerns related to EMF; therefore, information related to EMF in this section focuses on exposure to invisible magnetic fields from power lines, created by moving charges.

2.10.2 Public Health Effects Research

Numerous laboratory, clinical, and epidemiological studies have been conducted over several decades to evaluate the public health impacts of EMF exposure. Laboratory studies on EMF exposures do not support a conclusion of health impacts from EMF exposure, and clinical studies have found that EMF exposure does not appear to affect general physiology. Epidemiological research indicates there is a weak association between childhood leukemia and average magnetic field exposure greater than 4 milligauss (mG); however, there is no consensus among scientists about the level of magnetic field exposure that could constitute a health risk.

2.10.3 Sources and Public Exposure

EMF originates from many sources in the work place and home, including electrical wiring, electric equipment in the workplace, personal appliances (e.g., hand-held hair dryers, stoves, and personal computers), and overhead and underground electric distribution systems throughout communities. The magnitude of the EMF generated from electrical lines is directly related to the voltage and electric current levels of the lines.

Public exposure to EMFs is widespread and encompasses a very broad range of field intensities and durations. Average magnetic field levels within most rooms is approximately 1 mG, and the EMF in rooms with appliances present ranges from approximately 9 to 20 mG (Severson et al. 1988, Silva 1988). Field values are much higher within 12 inches of appliances. Seventy-five percent of the population experiences an average EMF exposure of 0.5 mG; however, there is considerable variation in the EMF exposure within the population.

The strength of the EMF near a power line is affected by a significant number of variables. The primary variables that affect the intensity of the EMF generated by a power line include:

1. The amount of electric current flowing in the line
2. Proximity to the conductors (wires)
3. Presence of other power lines near the corridor

2.10.4 Regulatory Framework

Overview

There are no adopted federal, state of California, or local regulatory standards that provide any guidance regarding public exposures to EMF that apply to construction or operation of the proposed project.

The International Commission on Non-Ionizing Radiation Protection in recommended guidelines for magnetic field exposure set a magnetic field limit of 2,000 mG for the public and 10,000 mG for occupational exposure. The International Committee on Electromagnetic Safety has published standards for magnetic field exposure to prevent harmful effects in human beings. The International Committee on Electromagnetic Safety standard is 9,040 mG for the public.

The State of Florida and the State of New York have adopted limits for magnetic fields at the edge of transmission line ROWs. Florida set a limit of 150 mG at the edge of ROWs for 230-kV transmission lines. The New York limit is 200 mG at the edge of ROW for transmission lines rated 125-kV and greater.

California Public Utilities Commission

The CPUC, in Decisions D.93-11-013 and D.06-01-042, requires regulated utilities to evaluate EMFs from new and upgraded power lines and substation projects and implement "no cost" and "low cost" measures to reduce EMFs. Regulated utilities are also required to submit an EMF Field Management Plan for qualifying projects, which describes:

- EMF reduction measures that were considered by the utility
- "No cost" and "low cost" EMF reduction measures that are proposed as a part of the project
- EMF modeling indicating relative differences in magnetic field reductions between different transmission line construction methods

PG&E and other regulated utilities developed Field Management Plan design guidelines in accordance with CPUC Decisions D.93-11-013 and D.06-01-042. The Field Management Plan design guidelines describe criteria for determining when Field Management Plans are required and routine magnetic field reduction measures that all regulated California electric utilities will consider for qualifying projects. The guidelines also define standard requirements for Field Management Plans.

PG&E prepared a Field Management Plan for the proposed project, which was included as Exhibit D with their Application. The plan evaluated one field reduction measure that would involve raising the height of conductor near the joint campus of Mark West Elementary School and Mark West Charter School by increasing the heights of six existing poles by 10 feet. The cost of increasing the pole heights was estimated to be approximately 21 percent of the total project cost, which exceeds the low-cost benchmark of 4 percent, and it was determined that the field reduction measure is not feasible. The Field Management Plan concluded that there are no "low-cost" or "no-cost" field reduction measures available for this project.

California Department of Education

The California Department of Education includes EMF as one criterion for evaluating the safety of potential school sites and has established "setback" limits for new school sites and electrical power lines. The California Department of Education selection criteria specify a setback of 37.5 feet between a new school property and the easement for a 230-kV transmission line. The criteria apply to the selection of new school sites; there are no guidelines that apply to the siting or reconstruction of transmission lines in proximity to existing schools.

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