# 2.0 PROJECT DESCRIPTION

## 2.1 INTRODUCTION

Pacific Gas and Electric Company (PG&E) is proposing to construct and operate multiple natural gas transmission pipelines that would ultimately cross California's Central Valley in the counties of Yolo, Sutter, Sacramento, and Placer. The "proposed Project" or "Project" would involve the construction and operation of three new transmission pipelines: Line 406, Line 407 (West and East), and the Powerline Road Distribution Feeder Main (DFM). The Project would also include the construction of six aboveground facilities. Fully constructed, the pipelines would span the lower Sacramento Valley.

Project construction would involve a combination of conventional trenching, horizontal directional drilling (HDD), and conventional boring techniques such as hammer boring and auger boring/jack-and-boring. Conventional trenching involves installation of the pipe within an open trench followed by backfilling. The HDD construction technique uses a hydraulically-powered horizontal drilling rig to tunnel under vertically and/or horizontally-large sensitive surface features such as water courses, levees, and wetlands. Hammer boring is a non-steerable pipeline construction technique that drives an open-ended pipe for short distances under surface features such as roads or smaller water features. For this construction method, pits are required on either side of the surface feature to be avoided. Auger boring/Jack-and-boring consist of installing a pipe simultaneously with the excavation process. Section 2.5, Construction Procedures, provides detailed descriptions of these and other pipeline construction techniques that would be used in conjunction with the proposed Project's installation.

The Project traverses four counties within the lower Sacramento Valley from Yolo County, just west of Yolo County Road (CR) 85, and extends approximately 40 miles east to the City of Roseville, Placer County. Figure 2-1 provides a regional orientation of the Project and broadly identifies the geographic area traversed by the Project. In general, the Project crosses a combination of flat to undulating and rolling hill topography with corresponding elevations ranging from approximately 15 to 255 feet above mean sea level (msl) (PG&E 2007a). The locations of each of the three pipelines and the DFM are described individually below. Figure 2-2 provides an overview of the Project.

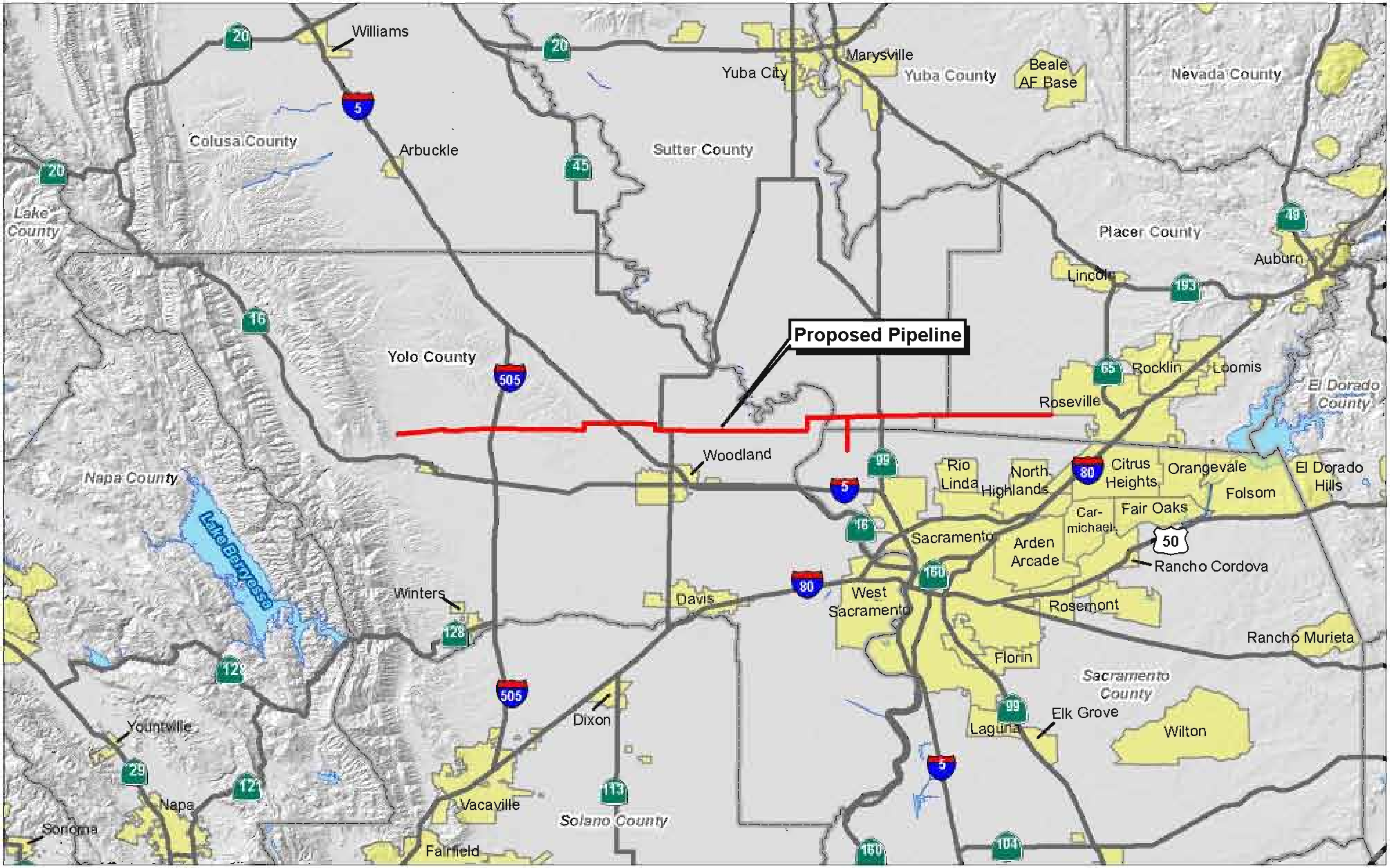
**Line 406** would begin at PG&E's existing Lines 400 and 401 in Yolo County at the foot of the Coast Range and extends east to Line 172A, near the town of Yolo (Figure 2-3). From Lines 400 and 401, Line 406 traverses east across agricultural fields to CR-87, where it extends south for a short distance to a point just north of the intersection with CR-19. The route then proceeds east under CR-87 and across more agricultural fields to Interstate (I) 505. After crossing under I-505, the route parallels CR-17 through the Dunnigan Hills and at I-5, the pipe crosses via HDD and continues east to a tie-in point with Line 172A and Line 407 West, just north of the town of Yolo.

**Line 407** is divided into two major segments, **Line 407 West** (407-W) and **Line 407 East** (407-E), and extends from Line 172A near the town of Yolo to existing Line 123 near the City of Roseville (Figures 2-4 and 2-5). The Powerline Road Distribution Feeder Main (DFM) serves as the boundary between Line 407 West and Line 407 East.

**Line 407-W** would extend east from the tie-in point with Lines 406 and 172A and through agricultural fields to CR-98 (Figure 2-4). At CR-98, the pipeline would cross the roadway and parallel the roadway south to CR-16A where it would then extend east to CR-99A. The alignment would parallel CR-99A south to CR-17, where it would transition back to the east and would continue to the Knights Landing Ridge Cut and across the Yolo Bypass and the Tule Canal. From here, it would jog northeast and north to CR-16 and continue to the Sacramento River crossing. After the Sacramento River crossing, it would parallel Riego Road until Powerline Road.

**Line 407-E** would extend east from the junction of 407-W at Powerline Road along Riego Road, which eventually transitions to Baseline Road, through Sutter and Placer counties (Figure 2-5). The route would cross State Route (SR) 70/99, and a number of irrigation canals, including the North Drainage Canal and the Natomas East Main Drainage Canal (Steelhead Creek). At its eastern extent, 407-E would parallel the northern border of the Placer Vineyards Specific Plan area on the north side of Baseline Road before connecting with Line 123 at the intersection of Baseline Road and Fiddyment Road.

**The Powerline Road Distribution Feeder Main (DFM)** would extend from the connection point with 407-W and 407-E south along Powerline Road to the Sacramento Metro Air Park development in Sacramento County (Figure 2-6). This route would parallel Powerline Road between Riego Road in Sutter County and West Elverta Road in Sacramento County.




Source: Adapted from PG&E 2007.

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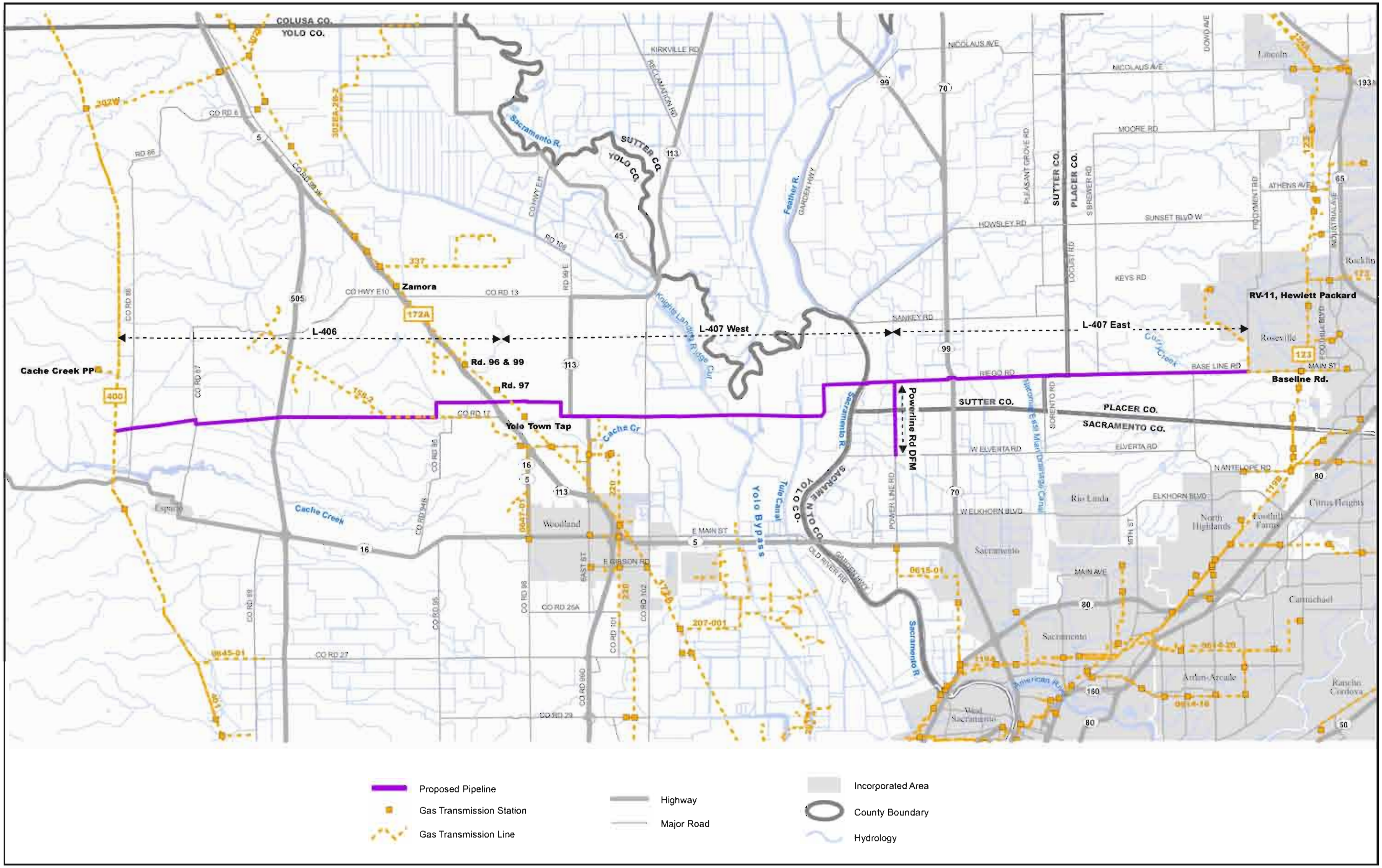
NORTH

0 2.5 5 10 Miles

## Figure 2-1
## Regional Location



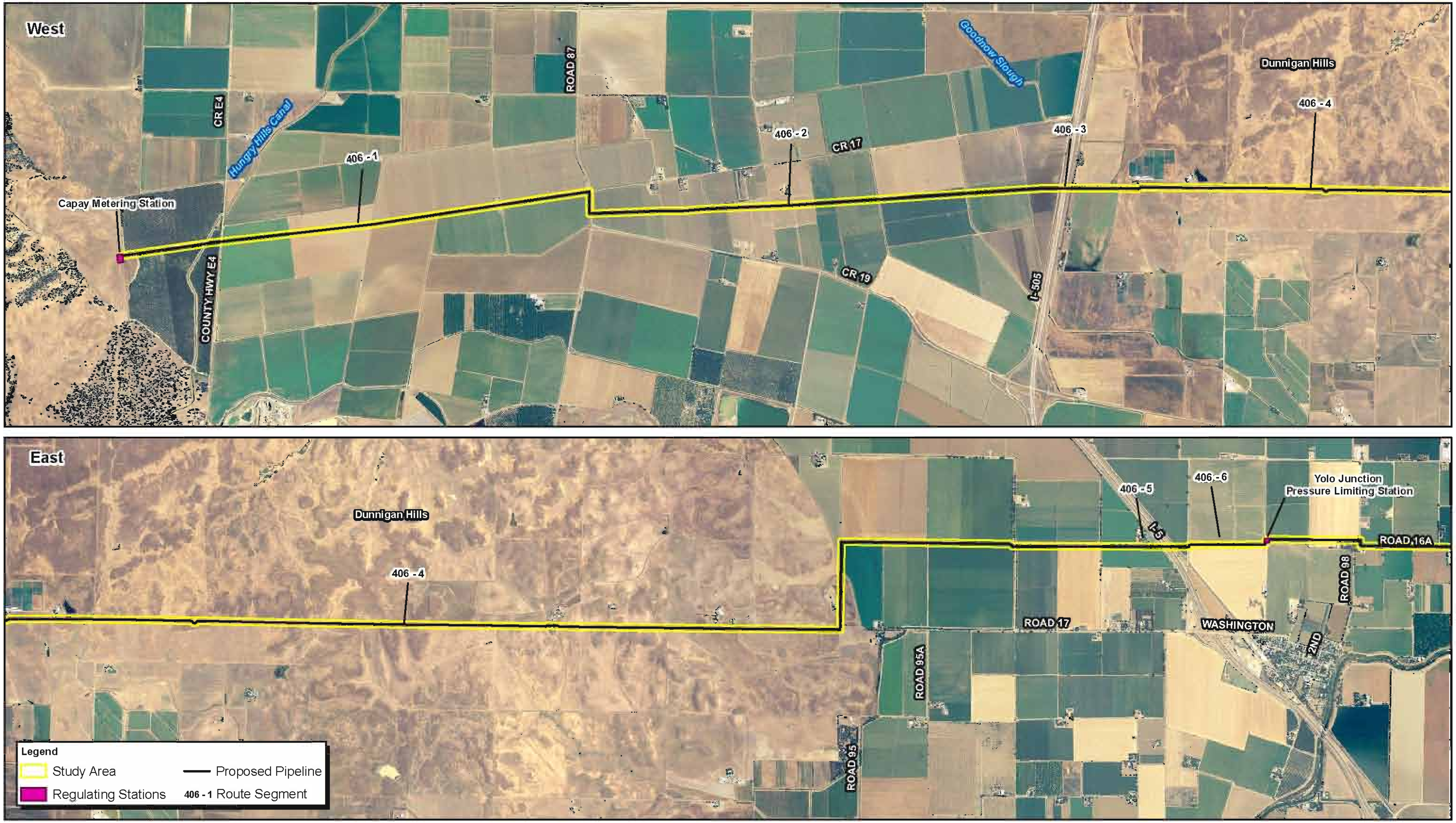

Source: PG&E, March 2009.

Michael Brandman Associates

NORTH

4.5 2.25 0 4.5
Miles

# Figure 2-2
## Project Overview



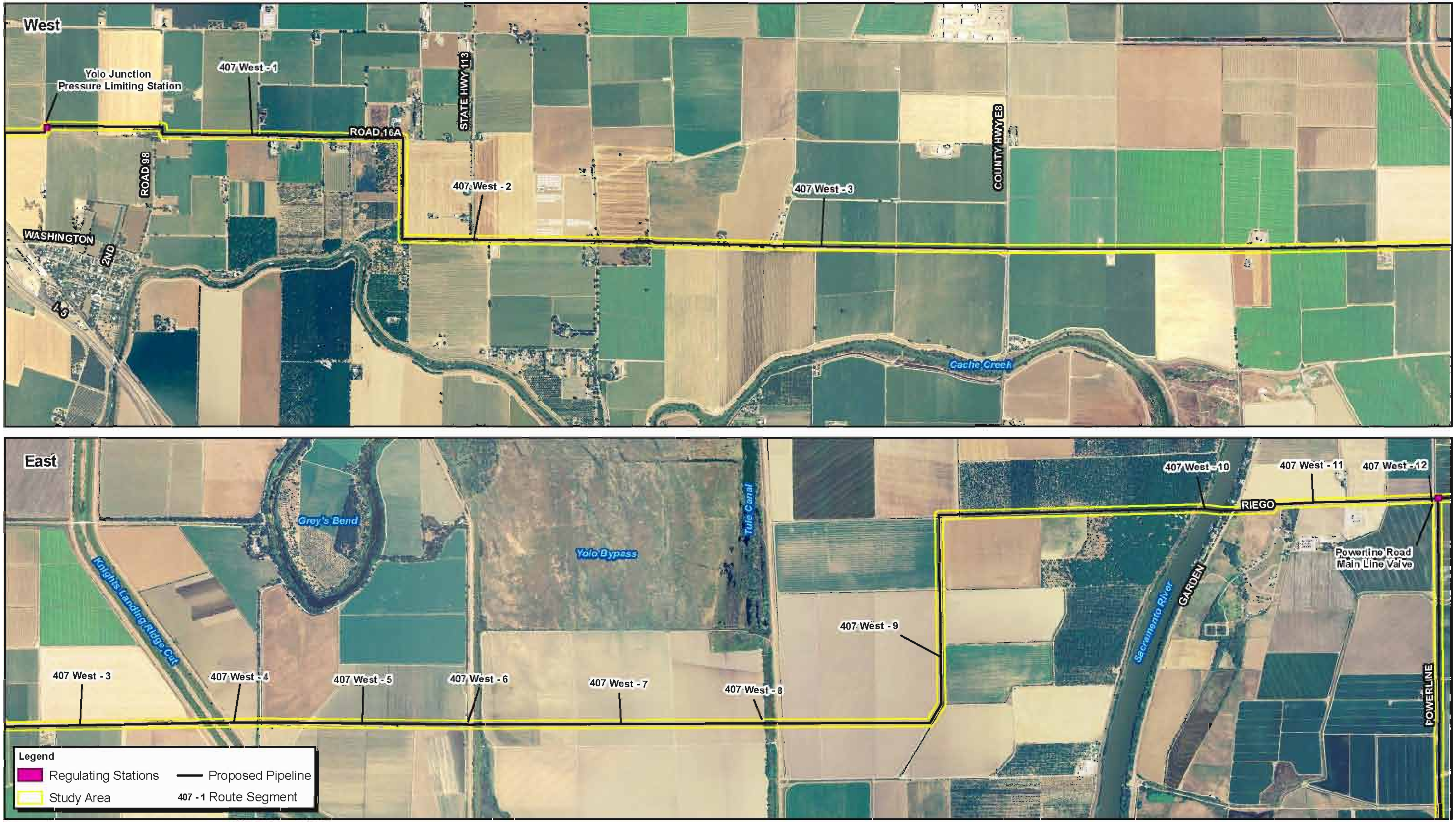

Source: Adapted from PG&E 2007, and USDA NAIP Yolo County 2005.

Michael Brandman Associates

NORTH

0 0.25 0.5 1 Miles

Figure 2-3
Line 406 Alignment and Study Area




Source: Adapted from PG&E 2007, and USDA NAIP Yolo County 2005.

Michael Brandman Associates

NORTH

0 0.25 0.5 1 Miles

Figure 2-4
Line 407 West Alignment and Study Area

23440005 • 04/2009 | 2-4_407_west_alignment_study_area.mxd

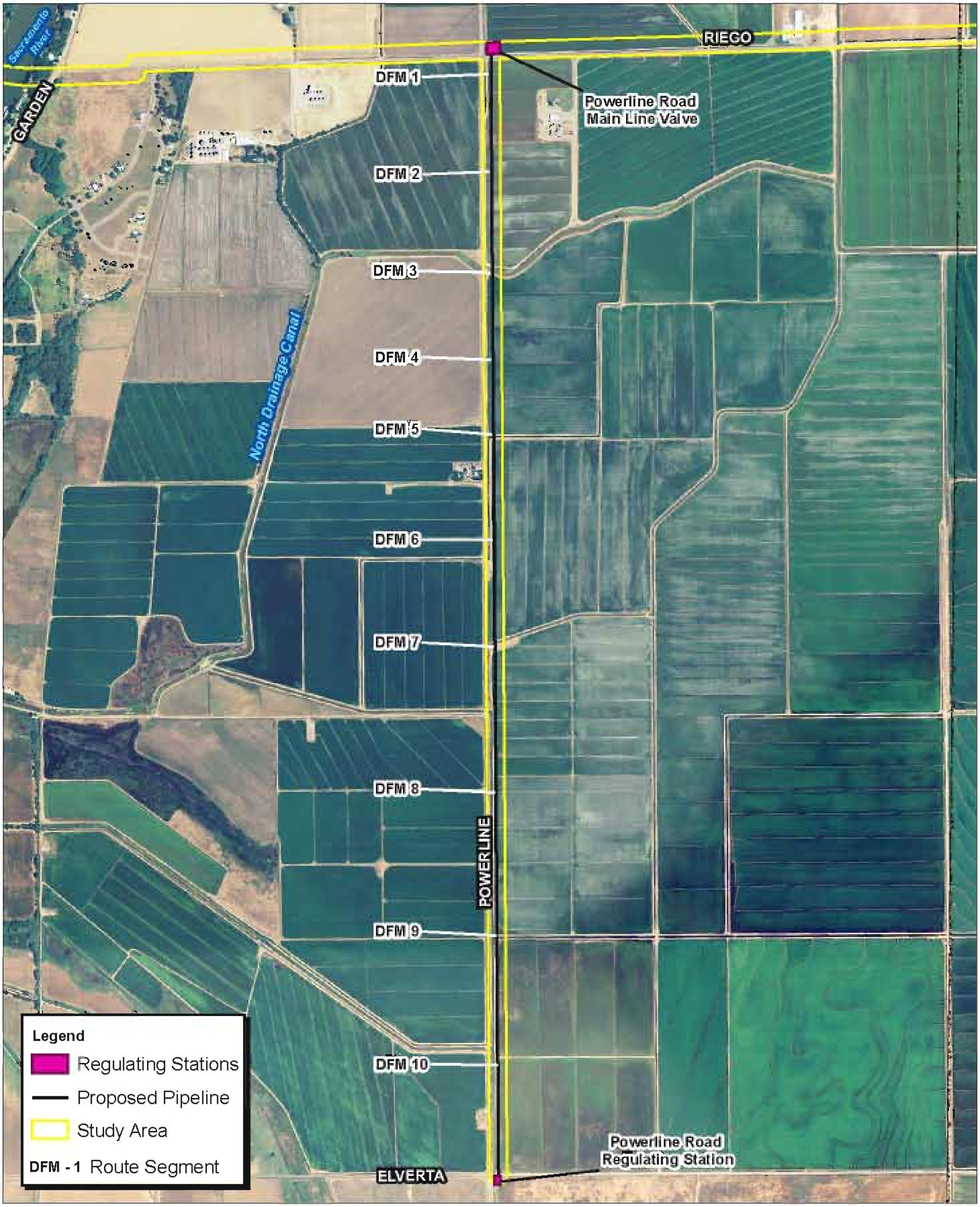

Source: Adapted from PG&E 2007, and USDA NAIP Yolo County 2005, Placer County 2005 .

Michael Brandman Associates

NORTH

0 0.25 0.5 1 Miles

Figure 2-5
Line 407 East Alignment and Study Area




Source: Adapted from PG&E 2007, USDA NAIP Yolo County 2005, Placer County 2005.

Michael Brandman Associates

NORTH

0 0.125 0.25 0.5 Miles

# Figure 2-6
# DFM Alignment and Study Area

## 2.2 PROJECT BACKGROUND

### 2.2.1 Project History

Existing natural gas pipelines in the Project region include Line 400 and Line 401 at the western end of proposed Line 406; Line 158-2 which intersects and then parallels Line 406; Line 172A at the junction of proposed Line 406 with Line 407 West; Line 0647-01 and Line 220 south of the proposed Line 406 and Line 407 West; Line 302W, Line 302EA-2B-2, and Line 337 north of proposed Line 406; and Line 123 at the tie-in with proposed Line 407 East. Currently, there are no PG&E facilities along the proposed Project route.

### 2.2.2 California State Lands Commission Lease Boundary and Regulatory Boundary Areas

The California State Lands Commission (CSLC) is the State agency with jurisdiction and management control over California's sovereign and submerged lands. The EIR will be used by the CSLC to exercise its jurisdictional responsibilities in making its decision to grant a lease for the pipeline river crossing at the Sacramento River. The Sacramento River crossing would be completed using HDD construction methods for approximately 1,400 feet beneath the River.

## 2.3 PROPOSED FACILITIES

The Project would add a new major connection point to Lines 400 and 401, the Capay Metering Station, approximately 15 miles south of the Buckeye Pressure Limiting Station. From this connection point, the Project would construct a large-diameter (30-inch) transmission pipeline across the lower Sacramento Valley, essentially bisecting the existing loop. The Project would connect to existing Line 172 and Line 123 to further reinforce the reliability of the region's natural gas system by providing a second large-diameter connection point between Lines 400 and 401 and existing pipelines serving the area.

### 2.3.1 Pipeline Facilities

The proposed Project would be designed, constructed, operated, and maintained in accordance with all applicable requirements included in the U.S. Department of Transportation (DOT) regulations in 49 Code of Federal Regulations (CFR) 192, "Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards." The proposed Project would also be subject to California Public Utilities Commission (CPUC) standards as embodied under General Order 112E.

With the exception of the 10-inch DFM, all portions of Lines 406, 407-W, and 407-E would be 30 inches in diameter. The proposed pipeline traverses several different class locations, requiring different wall thickness of steel pipe (Grade X-60) designed for a Maximum Allowable Operating Pressure (MAOP) of 975 pounds per square inch gauge (psig). The 10-inch DFM would be designed for a MAOP of 500 psig to 975 psig. Industry standards for pipeline sections installed via Horizontal Directional Drill (HDD) technology require a pipe diameter to wall thickness ratio (D/t) of 50 or below. Refer to Table 2-2 for pipe wall thickness specifications required in each class location.

Gas would flow east from the Line 400/401 to the Baseline Road Pressure Regulating Station. The 30-inch diameter pipeline would be located within a 50-foot private, permanent right-of-way (ROW), to provide PG&E with the necessary control over future construction activities in and around the line to ensure safe and uninterrupted operation of the pipeline. Because the cover requirements referenced in the DOT code are minimums, the Gas Pipeline Technical Committee (GPTC) Guide Material Appendix G-192-13 has been applied to the Project and is described in Table 2-1. The DOT Code of Federal Regulations 49 Part 192.327 establishes minimum cover requirements at 30 inches for transmission pipelines in Class 1 and 36 inches in Classes 2, 3, and 4. PG&E has increased the cover beyond minimum requirements to 5 feet because its past experience has demonstrated that it is sufficient to eliminate most threats from agricultural operations. Excavations in excess of 5 feet present additional construction challenges (and cost) due to the need for trench benching or shoring for worker entry. Maintaining the cover on the pipe at approximately 5 feet will reduce the impact on farming operations. The depths being proposed in Table 2-1 go beyond requirements in order to accommodate for land uses. Use restrictions required in the permanent easement would prohibit the planting of deep-rooted plants, such as trees or vines within 15 feet of the pipeline centerline for protection of the pipeline, but other agricultural uses would be allowed.

**Table 2-1: Depths to Cover**

<table>
<tr><th>Location</th><th>Regulation Requirements Depth (ft)*</th><th>Proposed Depth (ft)</th><th>Justification</th><th>Agricultural Restrictions</th></tr>
<tr><td>Agriculture</td><td>3</td><td>5</td><td>Added cover to prevent damage from outside forces (DOF)** from farming operations.</td><td rowspan="5">Limited to crops with shallow root system, prohibits tree crops, orchards, and vineyards</td></tr>
<tr><td>Drainages</td><td>3</td><td>5</td><td>Prevention of DOF due to maintenance.</td></tr>
<tr><td>Irrigation Canals</td><td>3</td><td>5</td><td>Prevention of DOF due to canal maintenance.</td></tr>
<tr><td>Road Crossings</td><td>3</td><td>5</td><td>Prevention of DOF due to road maintenance.</td></tr>
<tr><td>Highway Crossings</td><td>7.5</td><td>7.5</td><td>Prevention of DOF and to meet Cal Trans requirements for uncased crossings.</td></tr>
<tr><td>Water Crossings</td><td>35</td><td>35 to 60</td><td>Prevention of unintentional drill mud release and to meet CSLC minimum depth requirements.</td><td>None</td></tr>
</table>

* Regulations used include 49 CFR 192, American Petroleum Institute section 1102, General Order 112E, and Caltrans requirements.

** Damage from outside forces (DOF) include impact by mechanical equipment, such as bulldozers and backhoes; earth movements due to soil settlement, washouts, or geological hazards; weather effects, such as winds, storms, and thermal strains; and willful damage.

Source: 49 CFR 192; PG&E 2008.

### Pipeline Wall Classifications

The standards in the Federal regulations are more stringent for pipelines placed near high human population densities. Federal DOT regulations define area classifications, based on population density of the pipeline vicinity and on an area that extends for 660 feet (220 yards) on either side of the centerline of any continuous one-mile length of the pipeline. The four area classifications are defined as:

- **Class 1**: A location with ten or fewer buildings intended for human occupancy;
- **Class 2**: A location with more than ten but less that 46 buildings intended for human occupancy;

- **Class 3**: A location with 46 or more buildings intended for human occupancy or where the pipeline lies within 300 feet (100 yards) of any building or small well-defined outside area occupied by 20 or more people during normal use; and
- **Class 4**: A location where buildings with four or more stories aboveground are prevalent.

Class locations representing more populated areas require higher safety factors in pipeline design, testing, and operation. In addition to population density, other factors are used to determine the design factor used within a class location. A higher safety factor must be used in the design formula for steel pipelines that: (a) cross the ROW of an unimproved public road, without a casing; or (b) cross without a casing, or makes a parallel encroachment on the ROW of a hard-surfaced road, a highway, a public street, or a railroad. The design specifications for each of the pipeline area classes included as part of the Project are provided in Table 2-2.

**Table 2-2: Pipeline General Area Class Specifications**

| Pipeline Attribute | Class 1 | Class 2 | Class 3 | DFM | HDD |
|---|---|---|---|---|---|
| Outside Diameter | 30-inch | 30-inch | 30-inch | 10-inch | 30-inch |
| Grade | 65,000 | 65,000/60,000[3] | 60,000 | 60,000 | 65,000 |
| Wall Thickness | 0.375 | 0.406/0.438[3] | 0.500 | 0.250 | 0.625 |
| Seam Type[1] | DSAW | DSAW | DSAW | DSAW | DSAW |
| Maximum Allowable Operating Pressure | 975 psig | 975 psig | 975 psig | 500-975 psig | 975 psig |
| Percent SMYS at MAOP | 60.0% | 55.4%/55.7% | 48.8% | 40.0% | 36.0% |
| Maximum Operating Pressure (psig) | 975 | 975 | 975 | 975 | 975 |
| Normal Operating Pressure (psig) | 625 to 975 | 625 to 975 | 625 to 975 | 500 to 975 | 625 to 975 |

| Pipeline Attribute | Class 1 | Class 2 | Class 3 | DFM | HDD |
|---|---|---|---|---|---|
| Minimum Operating Pressure (psig) | 625 | 625 | 625 | 500 | 625 |
| ANSI Rating[2] | ANSI 600 | ANSI 600 | ANSI 600 | ANSI 600 | ANSI 600 |

[1] DSAW - Double Submerged Arc Welding.
[2] ANSI - American National Standards Institute.
[3] Second values are for Alternate Class 2 Specifications
Source: PG&E 2008.

Figure 2-7 illustrates the pipeline area classifications along the proposed route. As shown, the pipeline would be Class 1 through much of Yolo County given the predominately agricultural zoning. The exception to this occurs along the I-5 and I-505 corridors and north of the communities of Yolo and Woodland, which are designated as Class 2. Portions of the alignments east of the Sacramento River are designated Class 3 in response to planned growth associated with the Placer Vineyards, Sutter Pointe Specific Plan, Sacramento Metro Air Park, and Sierra Vista projects.

### Valve Spacing

Valve locations are shown in Figure 2-7. Valve spacing was determined by applying DOT 49 CFR section 192.179 (October 1, 2006) which states:

Each transmission line, other then offshore segments, must have sectionalizing block valves spaced as follows, unless in a particular case the Administrator finds that alternative spacing would provide and equivalent level of safety:

- Each point on the pipeline in a Class 4 location must be within 2.5 miles of a valve;
- Each point on the pipeline in a Class 3 location must be within 4 miles of a valve;
- Each point on the pipeline in a Class 2 location must be within 7.5 miles of a valve; and
- Each point on the pipeline in a Class 1 location must be within 10 miles of a valve.

### Route Segments

The following sections summarize the route and proposed construction techniques that would be used to install the pipeline by route segment. Each segment of the Line 406, 407, and Powerline Road DFM routes is uniquely coded to better enable consistent cross-referencing throughout the EIR. Figures 2-3, 2-4, 2-5, and 2-6 provide an illustration of the coded route segments, which are described in further detail below and include the following:

- Line 406 (Segments 406-1, 406-2, etc.);
- Line 407 West (Segments 407-W1, 407-W2, etc.);
- Line 407 East (Segments 407-E1, 407-E2, etc.); and
- DFM (Segments DFM-1, DFM-2, etc.).

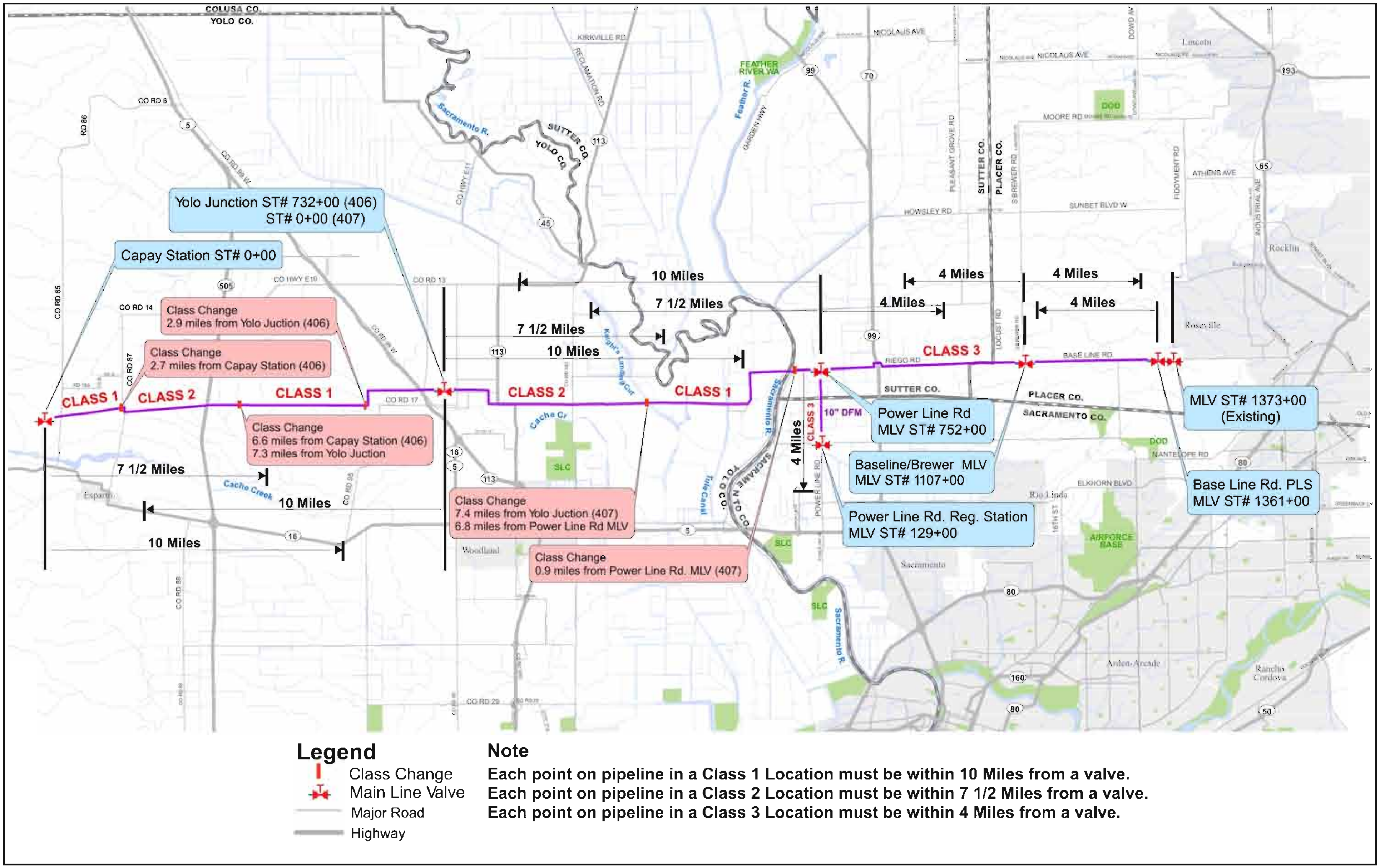
Project-related construction techniques are described in Section 2.5, Construction Procedures.

### Line 406

Line 406 (Figure 2-3) would consist of approximately 14 miles of 30-inch-diameter gas transmission pipeline operating at a MAOP of 975 psig, and transporting up to 475,000,000 cubic feet of natural gas per day between existing Lines 400 and 401 and existing Line 172A in Yolo County (PG&E 2007a). The proposed in-service date is February 2010. The Line 406 route is subdivided into six segments that are described in more detail below.

*Segment 406-1*

Segment 406-1 would begin at Lines 400 and 401, approximately 2.5 miles northwest of the community of Esparto and 0.5 miles east of CR-85. The segment extends approximately 2.75 miles between the Line 400 and 401 tie-in and CR-87. From the proposed Capay Metering Station, at the Line 400 and 401 tie-in, the pipeline heads east-northeast roughly parallel with the agricultural parcel boundaries, crossing under Hungry Hollow Canal and CR-85 (also called County Highway E-4) and ends just northwest of the intersection of CR-87 and CR-19.




**Note**

**Each point on pipeline in a Class 1 Location must be within 10 Miles from a valve.**
**Each point on pipeline in a Class 2 Location must be within 7 1/2 Miles from a valve.**
**Each point on pipeline in a Class 3 Location must be within 4 Miles from a valve.**

Source: PG&E, March 2009.

4.5 2.25 0 4.5 Miles

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# Figure 2-7
# Pipeline Area Classifications

One of the conventional boring construction techniques would be used at the Hungry Hollow Canal, depending on whether construction takes place when the canal is transporting irrigation water.

Approximately 1 mile east of CR-85, the segment would run parallel to the south bank of an agricultural irrigation (ditch/canal) to the junction of CR-87 and CR-17. At CR-87, the pipeline turns south and extends approximately 925 feet on the west side of CR-87. Except for the Hungry Hollow Canal Crossing, Segment 406-1 would be a Class 1 pipeline. All county road crossings would be bored using one of the conventional boring techniques described in this Section, per county requirements.

*Segment 406-2*

From the end of Segment 406-1, the pipeline would continue to extend east and would cross under CR-87. East of CR-87, the pipeline would cross approximately 2.6 miles of agricultural land, including crossing under an irrigation canal. This segment would be a Class 2 pipeline.

Segment 406-2 would end just west of I-505 across from the I-505/CR-17 intersection.

*Segment 406-3*

Segment 406-3 would consist of approximately 1,050 feet of pipeline that travels under I-505, CR-90A and Goodnow Slough to the south side of the intersection of CR-90A and CR-17. This segment would be installed using HDD and would be a Class 2 pipeline.

*Segment 406-4*

After crossing under I-505, the pipeline route would parallel the south side of CR-17 for approximately 5.3 miles before turning north at the east end of the Dunnigan Hills. The pipeline would be Class 2 from I-505 to approximately 1 mile east of I-505. At that point, the pipeline would become a Class 1 pipeline until the turn approximately 5.3 miles east of I-505.

Just before turning north, the pipeline would change from a Class 1 pipeline to a Class 2 pipeline. Segment 406-4 would cross north under CR-17 and then transition north for approximately 2,500 feet before resuming in an easterly direction. East of the transition, Segment 406-4 would parallel the south side of unnamed farm roads. At CR-96, the segment would extend under CR-96 and an irrigation canal using one of the conventional boring techniques for approximately 150 feet and continue east. Segment 406-4 ends approximately 3,000 feet east of CR-96.

*Segment 406-5*

Segment 406-5 would be a Class 2 pipeline installed by HDD. The segment would extend east for approximately 1,050 feet, crossing under I-5 and CR-99W, ending approximately 200 feet west of CR-97. The HDD would end just before crossing CR-97.

*Segment 406-6*

East of I-5, Line 406 would continue east as a Class 2 pipeline for approximately 0.75 miles, traveling parallel to the south side of an unnamed farm road to a tie-in point with the existing Line 172A and proposed Line 407 West at the proposed Yolo Junction Pressure Limiting Station.

**Line 407 West**

Line 407 West, as described in Section 2.1 and as shown in Figure 2-4, would consist of approximately 13.5 miles of 30-inch diameter pipeline operating at 975 psig and transporting up to 180,000,000 cubic feet of natural gas per day between Line 172A and the tie-in with Line 407 East near the intersection of Powerline Road and Riego Road in Sutter County. All segments of the pipeline discussed below would be installed using one of the conventional boring techniques. Line 407 West is subdivided into twelve segments that are described in more detail below.

*Segment 407-W1*

Beginning at the tie-in point with proposed Line 406 and existing Line 172A near I-5, Segment 407-W1 would extend east through agricultural fields to CR-98. The segment would cross under CR-98. The pipeline would then extend south along the east side of CR-98 until the CR-16A intersection. At the intersection, the pipeline would resume east along the north side of CR-16A for over 1 mile to CR-99A. Just northeast of the intersection of CR-16A and CR-99A, the segment would turn south to cross from north CR-16A to the south.

South of CR-16A, the pipeline would extend south paralleling the east side of CR-99A to CR-17. At CR-17, Segment 407-W1 resumes extending east along the north side of CR17 until just west of the junction of State Route (SR) 113 and CR-17. All of Segment 407-W1 would consist of Class 2 pipeline.

*Segment 407-W2*

Segment 407-W2 would consist of an approximately 300 foot crossing (using one of the conventional boring techniques) east under SR 113 just north of the junction of SR 113 and CR-17. All of Segment 407-W2 would be a Class 2 pipeline.

*Segment 407-W3*

East of the junction of SR 113 and CR-17, Segment 407-W3 begins and extends approximately 4.3 miles east along the north side of CR-17, crossing under CR-100, CR-101, and CR-102. At the intersection of CR-17 and CR-103, the pipeline would cross south under CR-17 and resume in an easterly direction along the south side of CR-17. The segment would end west of the Knights Landing Ridge Cut. Segment 407-W3 would be a Class 2 pipeline.

*Segment 407-W4*

This segment would extend east under the first Knights Landing Ridge Cut using HDD techniques for approximately 2,400 feet. Segment 407-W4 would end approximately 1,200 feet east of the Knights Landing Ridge Cut bank, on the north side of an unnamed farm road. Segment 407-W4 would be a Class 1 pipeline.

*Segment 407-W5*

Starting approximately 1,200 feet east of the Knights Landing Ridge Cut, Segment 407-W5 would extend east and parallels the north side of an unnamed farm road. The segment would extend east approximately 1 mile before ending west of the western levee of the Yolo Bypass. Segment 407-W5 would be a Class 1 pipeline.

*Segment 407-W6*

Segment 407-W6 would extend east approximately 1,200 feet, crossing under the western levee of the Yolo Bypass. This segment would be installed via HDD methods. Segment 407-W6 would be a Class 1 pipeline.

*Segment 407-W7*

Segment 407-W7 would extend east from the western levee of the Yolo Bypass under agricultural fields for approximately 1.2 miles. This segment would end west of the eastern levee of the Yolo Bypass and Tule Canal. Segment 407-W7 would be a Class 1 pipeline.

*Segment 407-W8*

Segment 407-W8 would consist of an approximately 1,600-foot pipeline that crosses east under the eastern levee of the Yolo Bypass, the Tule Canal and CR-107. This segment would be installed via HDD methods. Segment 407-W8 would be a Class 1 pipeline.

*Segment 407-W9*

Segment 407-W9 would begin and extend east for approximately 3,300 feet before reaching an irrigation canal where it would then proceed to the north. The pipeline would then continue north to CR-16 and cross under CR-16 via trenching construction methods for approximately 150 feet. Segment 407-W9 would be a Class 1 pipeline.

North of CR-16, Segment 407-W9 would turn back to the east along the north side of CR-16 and cross an existing irrigation canal. This route segment traverses through Sacramento River Ranch Conservation Bank lands and walnut orchards to the west bank of the Sacramento River.

*Segment 407-W10*

Segment 407-W10 would cross under the Sacramento River, extending approximately 1,400 feet from the west side of the river to the east side via HDD construction methods. East of the Sacramento River, Segment 407-W10 would turn north, crossing under Riego Road for approximately 150 feet and ending on the north side of the road. Segment 407-W10 would be a Class 1 pipeline on the west side of the Sacramento River and a Class 3 pipeline on the east side of the Sacramento River.

*Segment 407-W11*

Segment 407-W11 would include the installation of a Class 3 pipeline along the north side of Riego Road in Sutter County past the Huffman East, Huffman West, Vestal, and Atkinson Natomas Basin Habitat Conservation tracts. This segment would cross a drainage ditch west of Powerline Road.

*Segment 407-W12*

Segment 407-W12 would be a Class 3 pipeline installed using one of the conventional boring techniques. The segment would travel for approximately 150 feet along the north side of Riego Road, crossing under Powerline Road, and connecting the previous segment with the Powerline Road DFM and Line 407 East at the proposed Powerline Road Main Line Valve.

**Line 407 East**

Line 407 East, as described in Section 2.1 and as shown in Figure 2-5, would consist of approximately 12 miles of 30-inch diameter pipeline operating at 975 psig and transporting up to 180,000,000 cubic feet of natural gas per day. Line 407 East would extend east from the junction of 407 West at Powerline Road along Riego Road and Baseline Road, through Sutter and Placer counties before connecting with Line 123 at the intersection of Baseline Road and Fiddyment Road. All segments of the pipeline discussed below would be installed using one of the conventional boring techniques, and would be rated Class 3. Line 407 East is subdivided into nine segments that are described in more detail below.

*Segment 407-E1*

From the junction of 407 West and the Powerline Road DFM, Segment 407-E1 would extend east along the north side of Riego Road for approximately 1.8 miles before approaching SR 99/70. The segment would include three irrigation canal crossings, each approximately 150 feet wide. Near the western farm road along SR 99/70, Segment 407-E1 extends to the north for approximately 300 feet to line up with the SR 99/70 crossing.

*Segment 407-E2*

Line 407-E2 would be installed via HDD construction methods under the SR 99/70. Segment 407-E2 spans approximately 1,050 feet from east to west.

*Segment 407-E3*

East of SR 99/70, Segment 407-E3 would turn south briefly to realign with the north side of Riego Road and then extend east for approximately 2.3 miles. This segment would involve three irrigation canal crossings of approximately 150 feet wide each, and approximately 100 feet of pipeline under Pacific Avenue. Segment 407-E2 would end west of East Levee Road.

*Segment 407-E4*

Segment 407-E4 would cross approximately 1,200 feet under East Levee Road, the Natomas East Main Drainage Canal (Steelhead Creek), and the Western Pacific

Railroad via HDD installation. This segment would end approximately 350 feet east of Pleasant Grove Road.

*Segment 407-E5*

Segment 407-E5 would extend east along the north side of Riego Road (which turns into Baseline Road in Placer County) and would cross under Locust Road, Brewer Road and Country Acres Lane. The segment would end approximately 0.4 miles east of Country Acres Lane on the north side of Baseline Road. In addition to bores required by county encroachment permits, one of the conventional boring techniques would be used for the following portions of Segment 407-E5:

- 320 feet in front of a private residence; and
- 475 feet in front of a second private residence.

*Segment 407-E6*

Segment 407-E6 would consist of an approximately 2,350-foot crossing under vernal pool/vernal swale habitat on the north side of Baseline Road. This segment would be installed via HDD.

*Segment 407-E7*

Segment 407-E7 would continue east from the end of Segment 407-E6, extending approximately 1.2 miles parallel to the north side of Baseline Road.

*Segment 407-E8*

Segment 407-E8 would include approximately 1,875 feet of HDD-installed pipe along the north side of Baseline Road. The section would start approximately 900 feet west of the intersection of Baseline Road and Watt Avenue, and would contain the proposed Baseline Road Pressure Regulating Station. This segment would be installed under Curry Creek and a series of vernal pools via HDD.

*Segment 407-E9*

Segment 407-E9 would extend east along the north side of Baseline Road from the end of 407-E8 to the existing Line 123 at northwest corner of the intersection of Baseline Road and Fiddyment Road.

**Powerline Road Distribution Feeder Main (DFM)**

The Powerline Road DFM (Figure 2-6) would consist of approximately 2.5 miles of 10-inch-diameter steel pipeline designed to operate at 975 psig and transporting up to 17,000,000 cubic feet of natural gas per day to new land development projects in north Sacramento County. This route would run along the east side of Powerline Road between Riego Road in Sutter County and West Elverta Road in Sacramento County. All segments of the pipeline discussed below would be installed via conventional trenching or one of the conventional boring techniques, and would be a Class 3 pipeline. The Powerline Road DFM route is subdivided into ten segments that are described in more detail below.

*Segment DFM-1*

From the proposed Powerline Road Main Line Valve, Segment DFM-1 would cross under Riego Road.

*Segment DFM-2*

Segment DFM-2 would continue south from the previous segment to the north side of an irrigation canal located approximately 2,300 feet south of Riego Road.

*Segment DFM-3*

This segment would start approximately 2,300 feet south of Riego Road and would extend approximately 300 feet under an existing irrigation canal and would surface on the south side of the canal. HDD techniques would be used to install Segment DFM-3.

*Segment DFM-4*

Segment DFM-4 would span approximately 1,700 feet between two irrigation canals.

*Segment DFM-5*

This segment would be installed using one of the conventional boring techniques to allow for the crossing of another irrigation canal approximately 0.8 mile south of the intersection of Riego Road and Powerline Road. The DFM-5 segment would travel approximately 150 feet from the north to the south side of the irrigation canal.

*Segment DFM-6*

From the southern point of Segment DFM-5, Segment DFM-6 would continue south for approximately 0.4 mile before approaching another irrigation canal.

*Segment DFM-7*

Segment DFM-7 would be installed using one of the conventional boring techniques to allow for an approximately 150-foot crossing under an irrigation canal.

*Segment DFM-8*

This segment would consist of approximately 0.6 mile of pipeline between Segment DFM-7 and DFM-9.

*Segment DFM-9*

This segment of the DFM would cross under an irrigation canal for approximately 200 feet using one of the conventional boring techniques.

*Segment DFM-10*

The final segment of the DFM pipeline would start at the south end of Segment DFM-9 and travel approximately 0.5 mile south to West Elverta Road. At West Elverta Road, the DFM pipeline would cross to the south side of West Elverta Road. At the southeast corner of West Elverta Road and Powerline Road, the DFM pipeline would tie into the proposed Powerline Road Pressure Regulating Station.

### 2.3.2 Aboveground Facilities

The Project would include the construction of additional appurtenances necessary for operation of the four line segments (Line 406, Line 407 West, Line 407 East, and the DFM). Six fenced, aboveground pressure limiting, pressure regulating, metering, and main line valve stations would be constructed along the Project alignment to ensure that proper pressures are maintained in the transmission system and to reduce the pressure of the gas before delivering it to the distribution pipeline system (refer to Figure 2-7 for the locations of these stations). These facilities would also require the installation of valve extensions, actuators, valve hand wheels, risers, meters, Supervisory Control and Data Acquisition (SCADA) equipment, and other appurtenances within and adjacent to the stations. Detailed designs of the proposed facilities are not complete at this time; however, the stations would consist of gas regulation and monitoring equipment, which would provide primary and backup routing of gas flow (called runs) through the stations. Lighting at the aboveground facilities would be minimal and would be used in emergencies only, so as not to create a new source of light in the surrounding area.

These stations would consist of the following.

- The Capay Metering Station (CMS) would be constructed at the connection of Lines 400 and 401 and Line 406, and would consist of just under 1 acre and have sides measuring approximately 134 feet, 142 feet, 209 feet, and 285 feet in length. The CMS would be no greater than 10 feet in height. Access would be provided from an existing dirt road that connects with CR-85 to the east. The Capay Station would be fitted with an aboveground spool and blind flange to accept a portable pig launcher. An automatic shutdown valve would be installed at this station. The valve could be operated by Gas Control Operators in the event of an emergency in order to control the flow of gas into Lines 406 and 407. The location of the CMS is provided in Figure 2-3;

- The Yolo Junction Pressure Limiting Station (YJS) would be constructed at the connection of Line 406 and Line 172A near I-5, and would cover an area of approximately 100 feet by 127 feet (12,700 square feet or 0.29 acres). The YJS would be no greater than 5 feet in height. An automatic shutdown valve would be installed at this station. The valve could be operated by Gas Control Operators in the event of an emergency in order to control the flow of gas into Lines 406 and 407. As shown in Figure 2-3, access would be provided by an unnamed farm road from CR-97 on the west;

- The Powerline Road Main Line Valve (PRV) would be constructed at the connection of Line 407 and the 10-inch DFM and would be installed within a yard measuring approximately 100 feet by 100 feet (10,000 square feet or 0.23 acres) at the intersection of Riego Road and Powerline Road. The PRV would also house the Riego Road Regulating Station (RRS), which would regulate gas pressure from Line 407 into the DFM, and would be no greater than 10 feet in height. The facility would include a main line valve, blowdown facilities, pressure regulating equipment, pressure transmitters, gas flow meter, SCACD/telecom equipments, and cathodic protection equipment. As shown in Figures 2-4, 2-5, and 2-6, access would be provided from an existing dirt road that connects with Riego Road to the south;

- The Powerline Road Pressure Regulating Station (PRS) would be constructed at the southern terminus of the DFM at the southeastern corner of Powerline Road and West Elverta Road. The PRS would regulate gas from the DFM into the local 60-psig distribution system. It would be constructed in an area measuring approximately 40 feet by 102 feet (4,080 square feet or 0.09 acres), would be no greater than 10 feet in height, and would include pressure regulating equipment, gas filtration equipment, and SCADA/telecom equipment. As shown in Figure 2-6, access would be provided directly from West Elverta Road;

- The Baseline/Brewer Road Main Line Valve Station (MLV) would be constructed approximately 250 feet west of Brewer Road along Baseline Road. The main line valve is a manually operated 24 inch ball valve with a high head extension. The MLV would require a permanent easement area of approximately 50 feet by 50 feet (2,500 square feet or 0.06 acres). The MLV would be fenced and include two 10 inch blow-off valves located on each side of the MLV; and

- The Baseline Road Pressure Regulating Station (BRS) would be constructed at the connection of Line 407 and Line 123 on the north side Baseline Road between Watt Avenue and Fiddyment Road. The BRS structure would be no greater than 10 feet in height and would require a permanent easement area of approximately 84 feet by 145 feet (12,180 square feet or 0.28 acres). It would regulate gas from Line 407 into Line 123 and would include a main line valve, blowdown facilities, pressure regulating equipment, pressure transmitters, gas flow meter, SCACD/telecom equipments, and cathodic protection equipment. The BRS would be fitted with an aboveground spool and blind flange to accept a portable pig receiver. Access would be provided directly from Baseline Road (Figure 2-5).

Figure 2-8 shows examples of aboveground facilities.

## 2.4 LAND REQUIREMENTS

### 2.4.1 Pipeline Rights-of-Way and Additional Construction Work Areas

PG&E proposes a 100-foot-wide temporary use area (TUA) for general pipeline trenching consisting of a 50-foot wide permanent easement and a 50-foot wide temporary construction easement (TCE) to accommodate the equipment needed to lay the 30-inch-diameter pipe in a 3.5- to 5-foot-wide trench, an equipment travel lane, and a spoil pile for the excavated soils (Figure 2-9)

**Photo 1: Typical fenced aboveground pipeline valve lot with aboveground portions of valves**


**Photo 2: Typical aboveground portion of pipeline valve**

Source: CSLC 2007.

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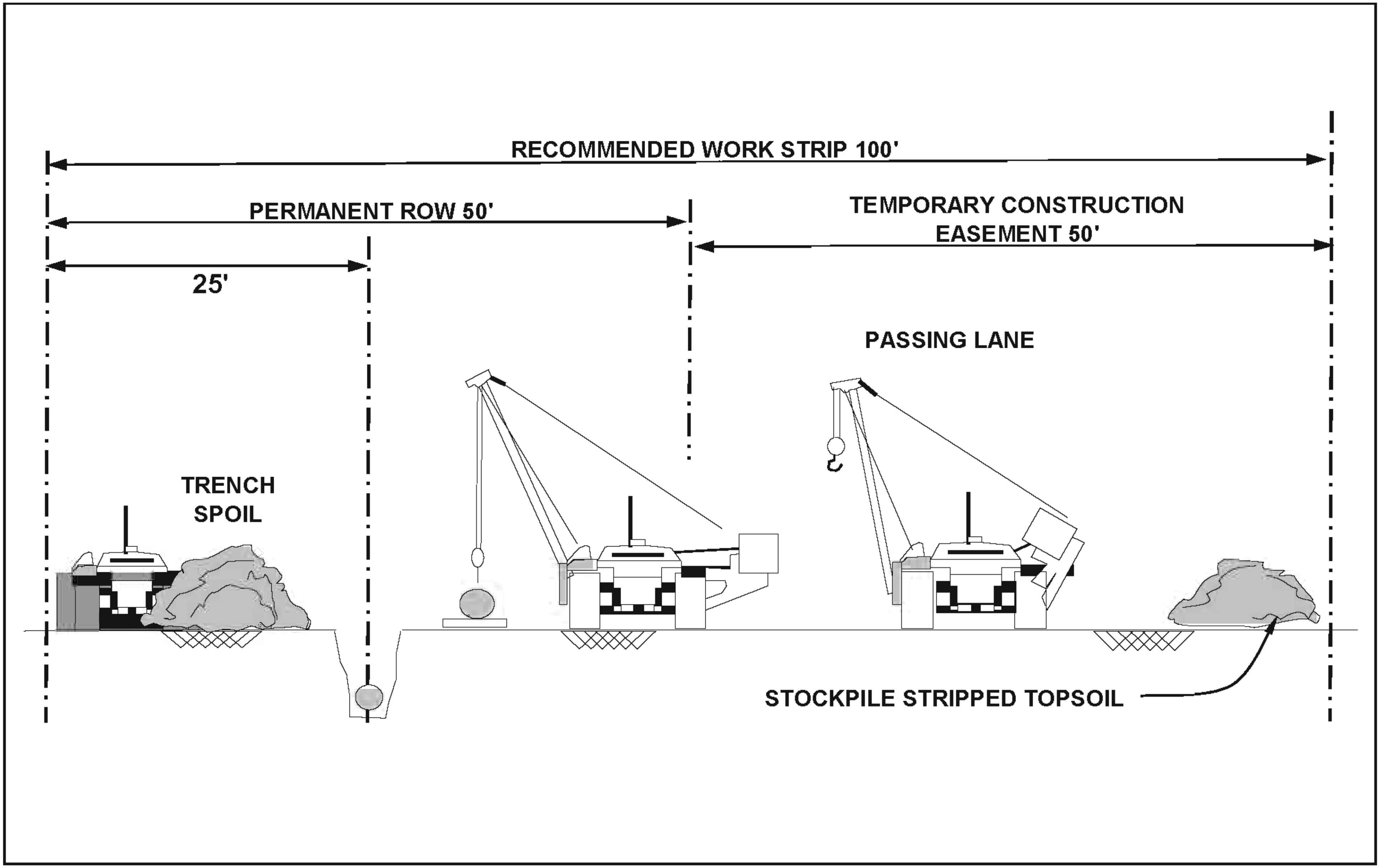
# Figure 2-8
# Examples of Aboveground Facilities




Source: CSLC 2007.

NOT TO SCALE

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Figure 2-9
100-Foot Construction ROW Configuration

A 60-foot wide TUA would be used for construction in constricted workspaces and would require that excavated soil be transported to an adjacent TUA (see Figure 2-10).

Each of the twelve proposed HDDs would require an additional 18,750-square-foot temporary use area for equipment that would be set up at the proposed entry and exit points (Figures 2-11 and 2-12). The proposed TUA is sufficient for the HDD pull sections, the length of which would be proportional to the HDD length. It is not expected that any of the boring techniques would require areas of additional space beyond the proposed TUA.

PG&E proposes to obtain a 50-foot-wide permanent easement over the new pipeline. It is PG&E's standard policy to obtain 50-foot-wide permanent easements surrounding large-diameter underground pipelines for purposes of pipeline maintenance and to minimize potential damage and disruption to infrastructure if ground-disturbance activity is proposed near the pipeline. The exception to the 50-foot permanent easement occurs along the proposed Powerline Road DMF, where PG&E would acquire a 35-foot permanent easement and an adjacent 25-foot TCE for a total 60-foot-wide TUA (Figure 2-10). The easements would be purchased from the existing landowners, who would also be compensated for PG&E's use of temporary use areas during construction. Restrictions in the easement would prohibit the planting of deep-rooted plants such as trees and vines within 15 feet of the pipeline centerline for protection of the pipeline, but other uses would be allowed.

The primary staging areas for vehicles, equipment, materials, and other supplies required for the construction of the pipeline and regulator stations would be near the Project ROW in existing industrial and commercial yards where accessible. In some cases, materials and/or equipment may be stored on the ROW for short periods. Staging areas would generally be approximately 300 feet by 200 feet.

Additional ROW space may be required in areas such as directionally drilled crossings, bore locations, and as needed for lay-down of Project materials. During HDD operations, up to 75 feet of additional space is typically needed on the drill entry side, adjacent to the ROW, for a length of 250 feet for the rig setup, mud tanks, and power units.

**Pipe Storage Yards**

Pending successful negotiations, two locations have been identified for potential pipe storage yards and are identified in Figures 2-13 and 2-14. One is a commercial yard (Northern Truck and Crane) located in Arbuckle near the intersection of SR 99 and Eddy Road and the other is north of the City of Woodland near the intersection of Best Ranch Road and CR-100B. The yards were selected based upon their proximity to the Project, major highways, and railroad spurs. Pipe would be delivered by rail to these pipe storage yards in 80-foot joints. The Woodland yard would require grading and fencing prior to use. Soil contamination tests would be performed prior to utilizing the yards to establish a baseline.

The Arbuckle yard would be utilized for the Line 406 segment of the Project and would be used from Spring 2009 to June 2010 (Figure 2-13). The Woodland yard would be utilized for the Line 407 East and West segments of the Project and would be used from January 2010 to June 2013. Total area that would be temporarily impacted by the Woodland yard is 6.36 acres (Figure 2-14).

### 2.4.2 Aboveground Facilities

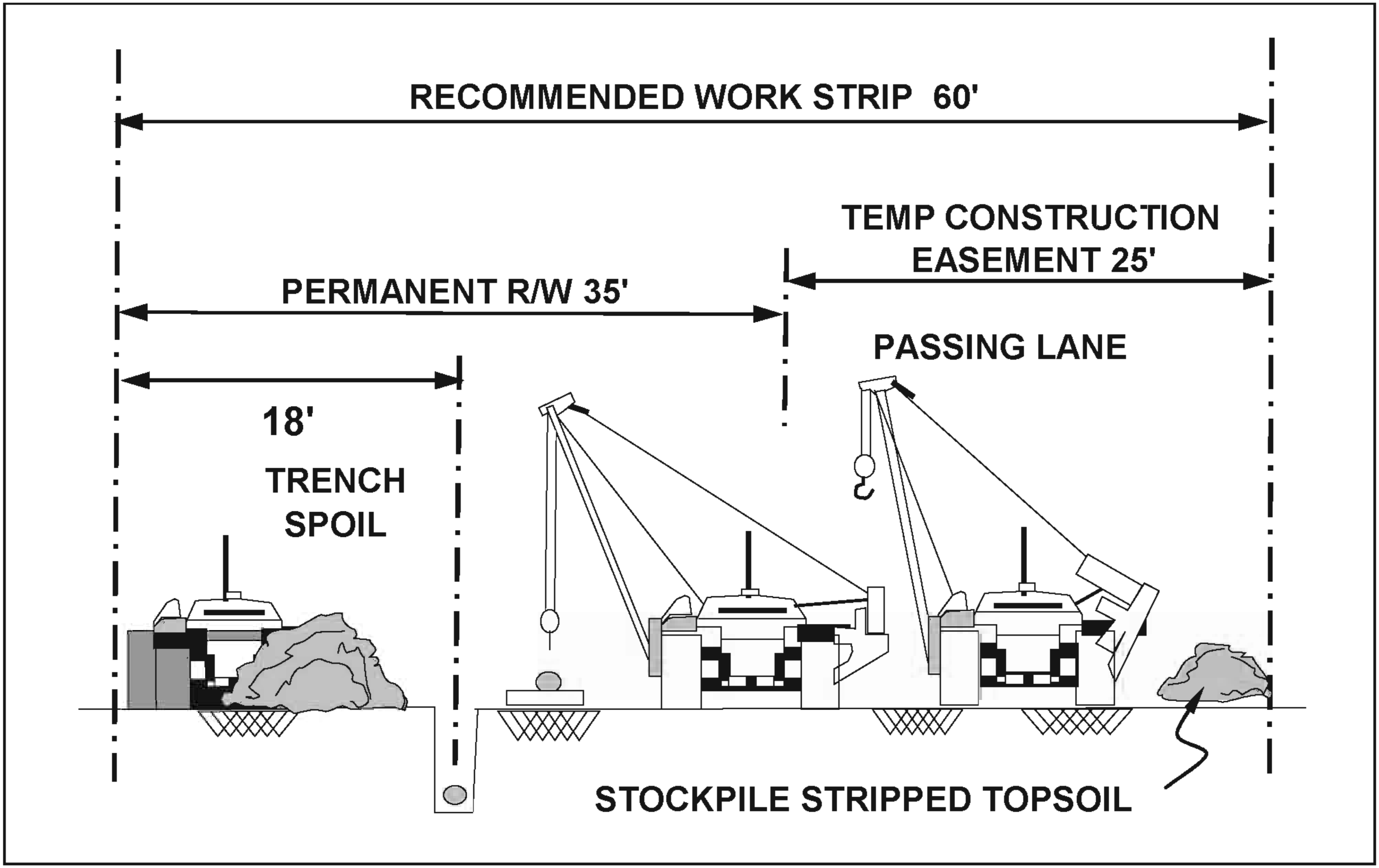
PG&E would be required to obtain additional land rights adjacent to the permanent ROW to accommodate installation of the new PRS, BRS, CMS, YJS, PVS and the passage of internal inspection devices, in compliance with 49 CFR, section 192.150, which requires accommodation of such devices.

Routine maintenance along the majority of the line would consist of quarterly to annual patrolling (e.g., foot or aerial patrol), cathodic protection, and surveys. PG&E would maintain a 50-foot-wide permanent easement along the length of the Project, with the exception of the Powerline Road DFM, which would have a 35-foot-wide permanent easement. Vegetation maintenance would be as needed to maintain a 30-foot-wide corridor centered on the pipe that is free of deep-rooted plants. Because the majority of the route is grassland, row crops, or rice fields, very few areas are expected to require vegetation maintenance by PG&E.

## 2.5 CONSTRUCTION PROCEDURES

### 2.5.1 New Pipeline Construction Procedures

Pipeline trenching construction in urban and rural environments generally proceeds as a moving assembly line. Open trenching techniques would be used to construct approximately 91 percent of the proposed pipeline. HDD methods would be used to construct approximately 7 percent of the proposed pipeline to cross large waterways and sensitive resource areas.




Source: CSLC 2007.

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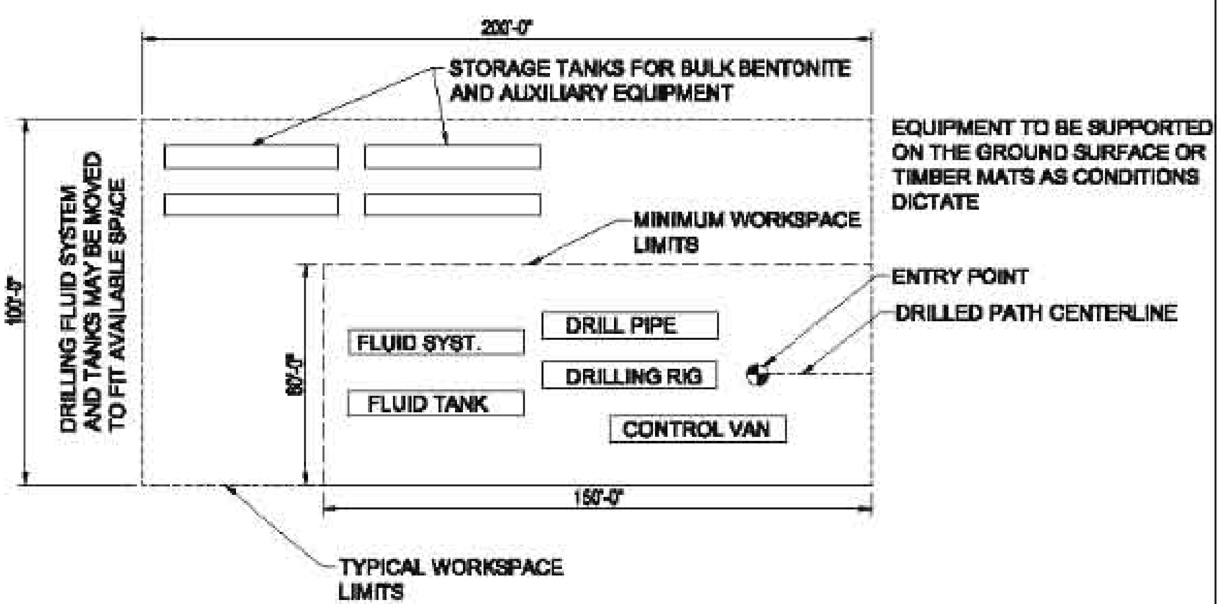
Figure 2-10
60-Foot Construction ROW Configuration

# TYPICAL SITE PLAN

## HORIZONTAL DIRECTIONAL DRILLING RIG

**FRONT VIEW**




Note: Typical footprint configuration. Final equipment layout pending detailed engineering.

Source: CSLC 2007.

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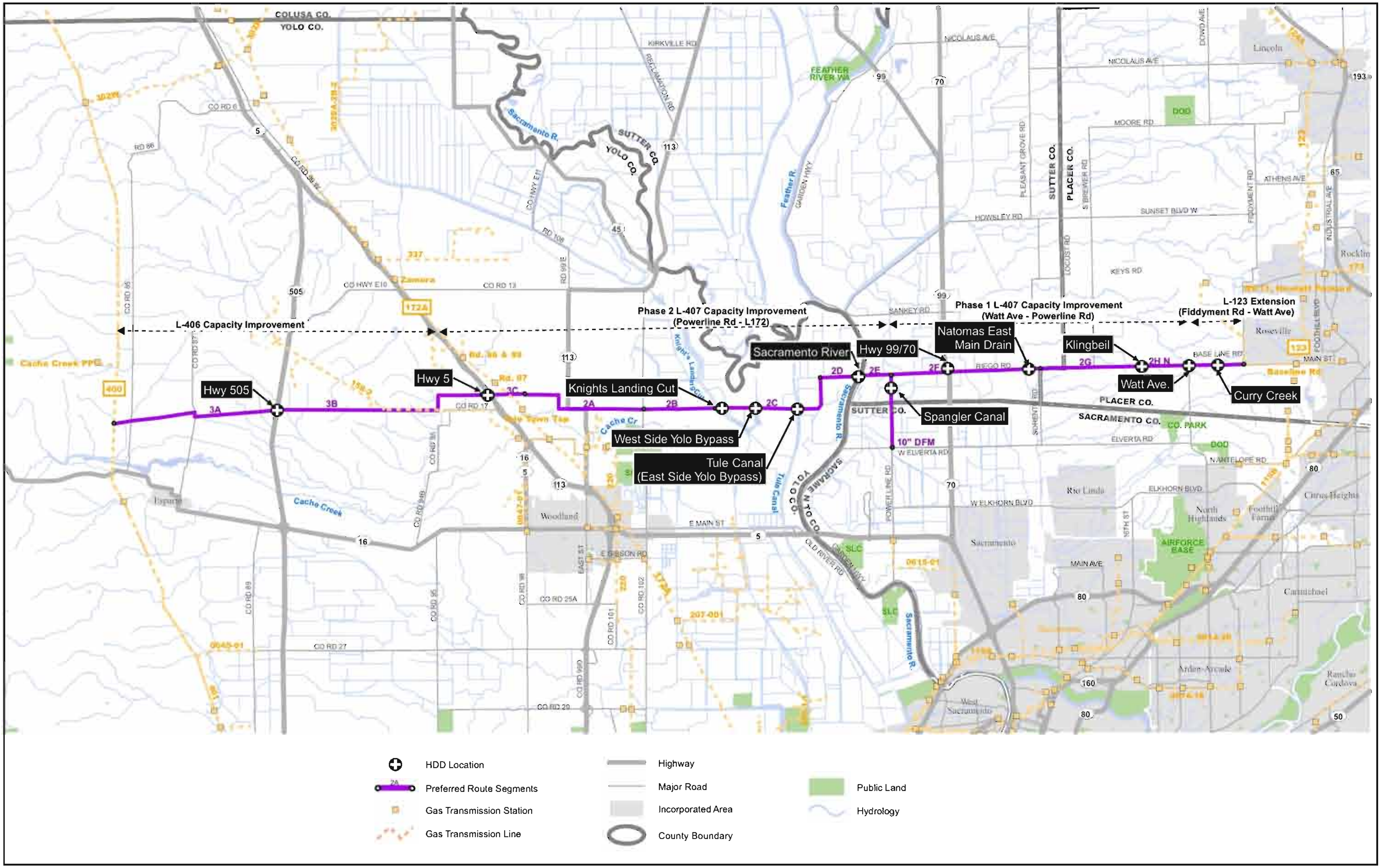
Figure 2-11
Typical HDD Layout




Source: PG&E, March 2009.

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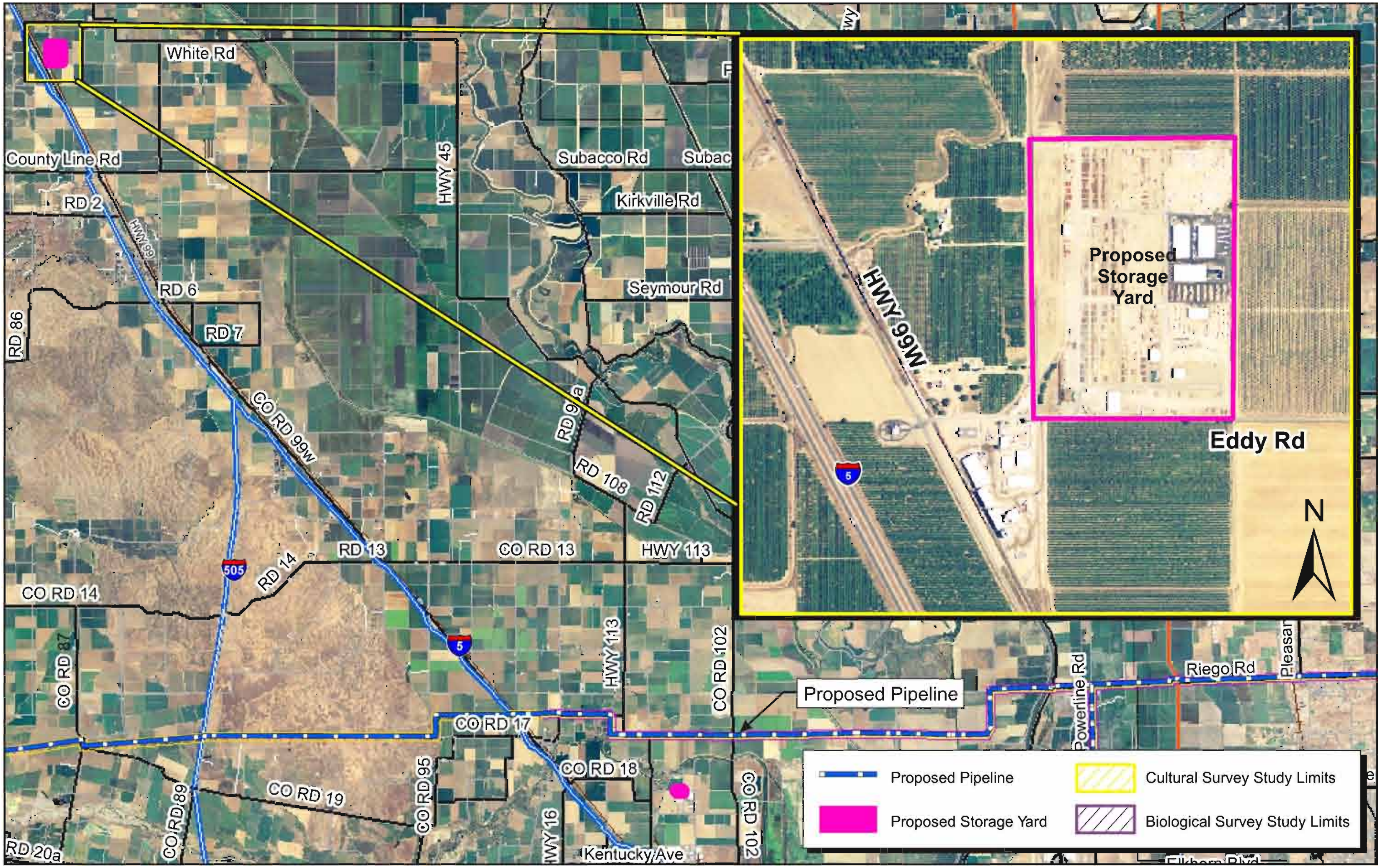
4.5 2.25 0 4.5
Miles

# Figure 2-12
# HDD Sites




Source: PG&E, March 2009.



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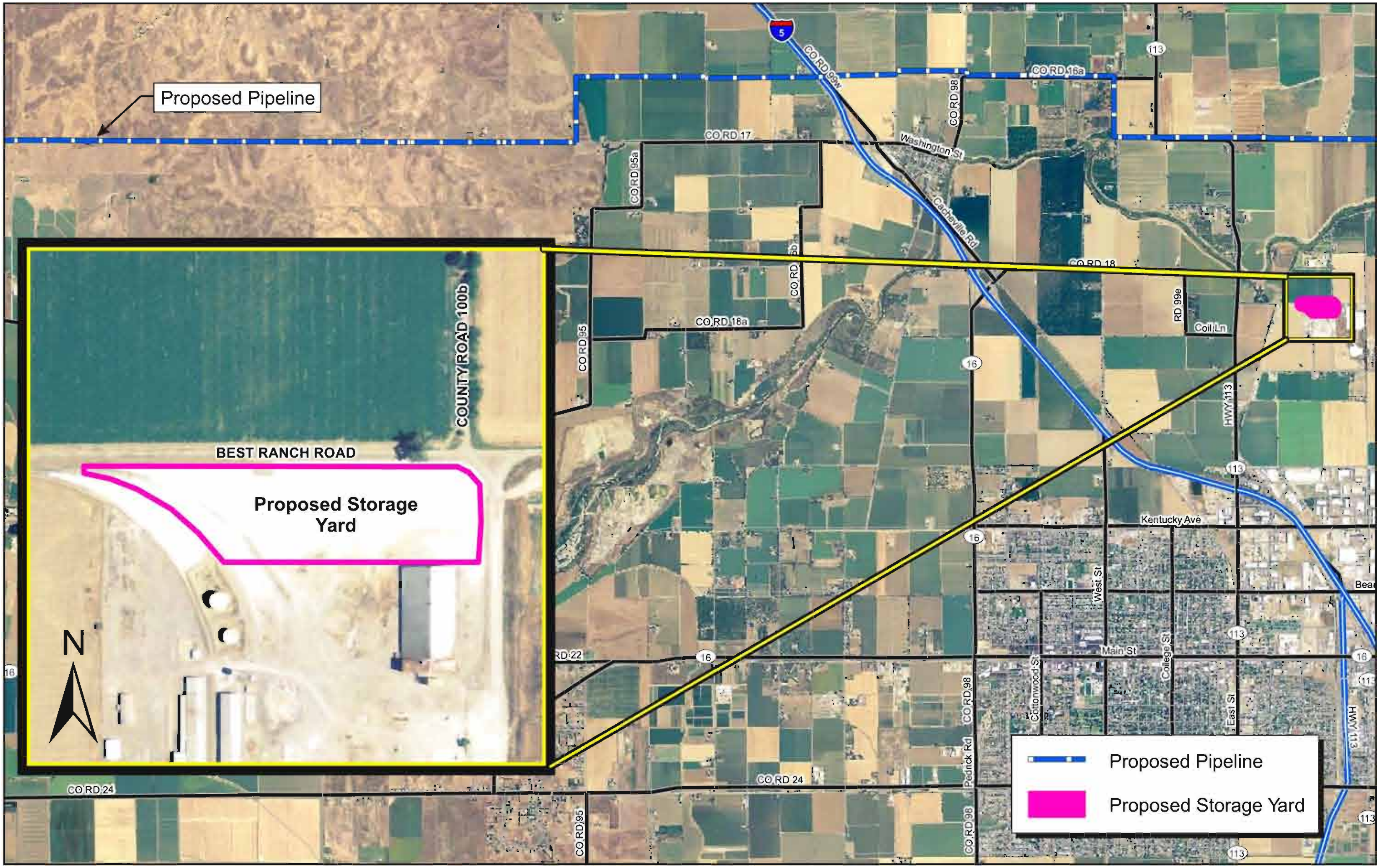
# Figure 2-13
# Pipe Storage No. 1




Source: PG&E, March 2009.

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1.0 0.5 0 1.0 Miles

# Figure 2-14
# Pipe Storage No. 2

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One of the conventional boring techniques would be used to construct approximately 2 percent of the proposed pipeline to cross roads and small waterways (Table 2-3 below).

**Table 2-3: Construction Technique Summary**

| Construction Type | Approximate Depth (feet below ground surface)[1] |
|---|---|
| Trench | 8 |
| Trench in Roadways | 8 |
| Horizontal Directional Drill | 35 to 60 |
| Conventional Bore Techniques* | 8 to 12 |

Notes:
[1] Approximate depth is to bottom of construction type feature, not to be confused with depth to cover in Table 2-1.
*These include hammer bore, and auger bore/jack-and-bore
Source: PG&E 2007b.

Before the start of construction, PG&E would complete easement and permit acquisitions and finalize land surveys to locate the centerline of the proposed pipeline and temporary use areas. Also, PG&E would hold a preconstruction meeting between permitting entities and the construction crew. Prior to construction, the entire proposed pipeline ROW would be videotaped to document existing conditions and access roads. To prevent accidental damage during pipeline construction, the 100-foot-wide construction ROW, HDD pull sections, staging areas, construction yard, and other temporary use areas would be surveyed and staked, along with existing utility lines and other sensitive resources identified by Federal and State agencies.

In conjunction with the pipeline installation process, a variety of construction equipment would be utilized depending on the method of installation. Table 2-4 below shows a list of the possible equipment that may be used.

**Table 2-4: Construction Equipment**

| Quantity | Description | Quantity | Description |
|---|---|---|---|
| 2 | X-Ray Rigs | 4 | 2 Ton Trucks |
| 3 | Water Trucks | 4 | Dump Trucks |
| 2 | Low-Bed Transport | 2 | Graders |
| 6 | Side Booms | 1 | Wheel Trencher |

| Quantity | Description | Quantity | Description |
|---|---|---|---|
| 3 | Excavators | 3 | Front End Loaders |
| 3 | Bull Dozers | 2 | Cranes |
| 2 | Drilling Machine | 8 | Pipe Trucks |
| 14 | Welding Trucks | 1 | Padding Machine |
| 10 | Pickup Trucks | 1 | Mechanic Truck |
| 2 | Horizontal Directional Drill Rigs [1] | — | — |

Notes:
[1] The HDD process utilizes a large hydraulic-powered HDD rig. The drilling rig is transported by semi-trailer truck. New pipeline segments would also be transported to the Project site on tractor-trailer flatbed trucks. The pipeline segments would be offloaded using a small crane, backhoe, or excavator. Additional HDD support equipment and vehicles include a drilling mud tank, a power unit for the hydraulic pumps, mud pumps, backhoe or excavator, forklift, bulldozer with wide boom, and various utility and crew vehicles.
Source: PG&E 2007b.

## Giant Garter Snake Construction Scheduling

### *Construction in Rice Fields*

Pipeline construction is planned through approximately 7 miles of rice fields, which are considered giant garter snake (*Thamnophis gigas*) or (GGS) habitat. Construction in rice fields can pose significant scheduling challenges. The construction window in federally threatened GGS habitat is May 1 through October 1 (refer to Section 4.4, Biological Resources), while rice fields are frequently flooded by May 1 or shortly thereafter and may not be harvested until the end of September. To construct the pipeline in the rice fields during the active farming period, the ROW would need to be isolated from the adjacent fields and not flooded. This would be achieved by constructing temporary earthen berms (rice checks) to segregate the active rice fields from the ROW. While installation of the rice checks would ideally be performed during normal field-preparation activities around late March or early April, this timing is prior to the authorized construction season for GGS. Depending on the weather, harvest timing, and property owner cooperation, construction of the rice checks may be split into two parts to address this scheduling challenge. PG&E would work with the property owners to determine if the berms installed during regular field preparations could accommodate pipeline construction. If this could not be accomplished, PG&E would construct them during the allowable time period between May 1 and October 1, or would consult with the USFWS to acquire permission to construct the berms outside the GGS work window.

*Prior Fall ROW Isolation*

The ROW may be isolated after harvest the fall prior to construction, but not prior to October 1 in order to comply with the Giant Garter Snake construction window, to resolve the scheduling challenge. The edge of the pipeline ROW through rice fields would be adjacent to field edges or canals. The rice checks may be constructed by pushing up soil from adjacent areas, as is traditionally done, or by using the topsoil removed from the trench to form them. Where irrigation flows must be maintained across the ROW, rigid culverts may be installed across the full width of the ROW as part of the pre-construction work. Sand bags would be used to seal around the ends of the culvert, thereby isolating the flowing water from the work area while the crossing is trenched.

By having the ROW isolated the prior fall, pipeline construction can begin on May 1 (or as soon as the field is sufficiently dry) without interfering with the rice field preparation, planting, and flooding schedule.

*Spring ROW Isolation*

Should ROW isolation the fall prior to construction not be feasible, PG&E would work with the farmers to install the rice checks during their normal field preparation in the spring. Otherwise, PG&E may request that farmers delay field flooding until the rice checks are installed, or PG&E may request special authorization from the U.S. Fish and Wildlife Service (USFWS) for installation prior to May 1.

Temporary rice checks and rigid culverts installed to segregate the ROW from flooded rice fields would be removed after the fields have been drained in late August or September following construction.

**Clearing and Grading**

Where necessary, the construction work area would be cleared and graded to provide a relatively level surface for trench-excavating equipment and a sufficiently wide workspace for the passage of heavy construction equipment. Removal of trees in the Project area would be avoided where feasible, but some tree removal may be necessary. As discussed in Section 4.4, Biological Resources, mitigation for tree removal would be provided.

All survey monuments, including United States Geological Survey (USGS) monuments, would be identified and protected during construction activities. If monuments are accidentally damaged or disturbed, PG&E would report the incident to the appropriate agency and would be responsible for the restoration of the monument at its original surveyed location.

Where necessary, erosion controls would be installed immediately following initial disturbance of the soils and maintained throughout construction to contain excavated material within the approved temporary use areas. Erosion controls would consist of methods described in PG&E's Water Quality Construction Best Management Practices Manual (PG&E 2006), as follows:

- Preserve existing vegetation whenever possible;
- If necessary, contact the Project Environmental Representative for clarification regarding areas to be preserved;
- Whenever possible, minimize disturbed areas by locating temporary roadways to avoid stands of trees and shrubs, and follow existing contours to reduce cutting and filling;
- Locate construction materials, equipment storage, and parking areas outside the drip line of any tree to be retained;
- Consider the impact of grade changes to existing vegetation and the root zone;
- Use one or more of the below temporary soil stabilization practices, when applicable - hydraulic mulch, hydro seeding, soil binders, straw mulch, geotextiles, and/or plastic covers and erosion control blankets/mats;
- Implement before the onset of precipitation;
- Implement BMPs such as fiber rolls or gravel bag berms to break up the slope lengths as follows:
    - On steep slopes, place BMPs on slopes 100 feet and greater at intervals no greater than 50 feet;
    - On very steep slopes, place BMPs on slopes 50 feet and greater at intervals no greater than 25 feet;
- Apply permanent erosion control to areas deemed substantially complete during the Project's defined seeding window;
- Refer to individual Soil Stabilization BMPs for specific instructions for use;

- Apply water for dust control evenly and in a manner that does not generate runoff;
- Non-potable water shall not be conveyed in tanks or drainpipes that will be used to convey potable water, and there should be no connection between potable and non-potable supplies. Non-potable tanks, pipes, and other conveyances should be marked “NON-POTABLE WATER - DO NOT DRINK”;
- If reclaimed wastewater is used for dust control, the sources and discharge must meet California Department of Health Services water reclamation criteria and the Regional Water Quality Control Board (RWQCB) requirements; and
- Remove any markings, barriers, or fencing after Project is completed.

Before grading would begin, negotiations would be made with the respective property owners and tenants to avoid conflicts with normal land use and operation.

**Topsoil Removal**

PG&E would remove, stockpile, and replace topsoil during construction activities in accordance with landowner negotiations. All trenches would be backfilled using select excavated subsoils that meet PG&E’s backfilling requirements, and topsoil would then be replaced and restored to its original condition using either tracked construction equipment or water to minimize future settling.

**Trenching**

Trenches would be excavated to a depth sufficient to: (1) provide minimum cover required by DOT specifications (PG&E has proposed a minimum of 5 feet of cover [refer to Table 2-2]); (2) install the proposed pipeline in such a manner to accommodate current agricultural practices; and (3) meet code requirements for proposed activities in roadways. The trench would be approximately 8 to 9 feet deep and typically 4 feet wide in order to allow for approximately 5 feet of cover in agricultural lands (exceeding the DOT standard of up to three feet of cover). The proposed Project would meet Sacramento County Code, Chapter 12.08, Construction in Streets, for activities in roadways. The width of the trench would generally be 3.5 to 5 feet, with wider areas where necessary to accommodate construction personnel to work in the trench.

Construction spoils or excavated overburden would be placed on the opposite side of the trench from construction traffic. To the extent practical, spoil materials would be placed in close proximity to active construction areas to enable efficient space for backfilling. The Project would create a net surplus of construction spoils and, therefore, stockpiling would be necessary.

Numerous roads, driveways, and water features would be crossed during trenching. Table 2-5 identifies major crossings that would be trenched in addition to HDD and bore crossings. Access to all roadways and driveways would be generally maintained with any disruption lasting for no more than four hours, with the exception of HDD crossings, which typically have 24-hour operations. PG&E's contractors would repair any damage to the roadway surface or underground facilities, including irrigation and drainage systems, immediately after construction is completed. Trenches typically would not remain open for more than 5 days in any one area, and there would be approximately 21 days between initial grading and backfilling. Open trenches would be either fenced or otherwise delineated for safety during non-working hours.

For crossings, where it is feasible and where all required permits have been obtained, PG&E plans to open cut features such as county roads and smaller irrigation ditches and canals. When water is flowing, water features that are open cut would likely require a dam-and-pump-around setup where the workspace to be trenched is kept dry during construction and water is pumped around the workspace to continue to flow downstream. Open-cut crossings would be trenched, the pipe installed, and the trench backfilled in one day where possible. If open-cut construction of a county road cannot be completed in one day, the trench would be covered with a plate during non-working hours until construction is complete.

**Horizontal Directional Drilling (HDD)**

The proposed pipeline would cross the Sacramento River, Knights Landing Ridge Cut, I-5, I-505, and other sensitive areas using the HDD construction technique, totaling approximately 17,506 feet in length (Table 2-3 and Table 2-5). This technique uses a hydraulically-powered horizontal drilling rig supported by a drilling mud tank and a power unit for the hydraulic pumps and mud pumps. The variable-angle drilling unit would be adjusted to the proper design angle for the proposed Project (8 to 10 degrees). The first and smallest of the cutting heads would begin the pilot bore at the surveyed entry point in a small pit on the ground surface. The first section of drill stem would have an articulating joint near the drill cutting head that would be controlled by the bore operator.

Successive drill site sections would be added as the drill head would make its way under the crossing. The drill head would be articulated slightly by the operator to follow a designed path under the sensitive feature and climb upward toward the exit point.

Once the pilot hole is completed, a succession of larger cutting heads and reamers are pulled and pushed through the borehole until it is the appropriate size for the proposed pipeline. While drilling, drilling mud would be pumped under high pressure through the drill stem to rotate the cutting head and return the soil cuttings to the small pit at the surface entry point. The mud would be pumped from this pit to a processing unit where the soil cuttings would be removed and the mud reused for drilling. As part of the bore design process, geotechnical surveys of the subsurface conditions were conducted to determine the underlying geologic strata along the drill path. Infrequently, the geologic strata above the drill may be weaker than anticipated and/or unconsolidated and the high pressure of the drilling mud may result in a fracture of these strata, allowing drilling mud to rise to the ground surface. The drilling operation would be stopped immediately if this occurs. This situation is termed an “inadvertent release” or “frac out” and is usually resolved by reducing the mud system pressure or increasing the mud viscosity. Mud clean-up activities for inadvertent releases are described in Construction Contingency Planning.

While drilling, pipe sections to be pulled through the crossing would be strung on pipe supports in the proposed temporary use areas. The pipe sections would be welded together, x-rayed, and a protective epoxy applied to the joints. A hydrostatic pre-test of the pipe sections would then be performed to ensure integrity prior to pulling. After the drill hole is the correct diameter, a pulling head would be welded on the end of this pipeline section, and the pipe would be pulled through the hole until it surfaces on the other side. Bulldozers with side booms and slings or roller cradles would support the pipe as it would slowly be pulled through the drill hole. The completed drilled crossing would then be connected to the existing pipeline and the entry and exit points would be backfilled and restored as described in Post Construction Activities below.

The Project pipeline would be installed a minimum of 60 feet underneath the bed and banks of any navigable water body and a minimum of 35 feet below any other feature to be crossed by HDD technology. Proposed HDD activities under the Sacramento River are anticipated to be completed during the work window for aquatic species of June 1 through November 30, to avoid impacts to special status fish species.

Each of the 12 HDD bores for Lines 406 and 407 and for the DFM would take approximately two to four weeks to complete. If evening construction would be required during HDD operations, a light plant would be stationed at the entry and exit points. Each light plant would consist of four 1,000-watt fixtures and would be operated by a diesel generator.

**Table 2-5: Pipeline Crossings Summary**

| Feature Name[1] | Project Segment/ Crossing # | Approximate Crossing Width (feet) | Type of Crossing[2] | Feature Acreage |
|---|---|---|---|---|
| Hungry Hollow Canal | Line 406/#1 | 124 | TR or J/B | n/a |
| County Road (CR) 85 | Line 406/#2 | 158 | TR or J/B | n/a |
| CR-87 | Line 406/#3 | 150 | TR or J/B | n/a |
| CR-88A | Line 406/#4 | 59 | TR or J/B | n/a |
| Drainage Canal (406 #1) | Line 406/#5 | 125 | TR | n/a |
| I-505/CR-90A/Goodnow Slough | Line 406/#6 | 1,210 | HDD | n/a |
| Yolo County Flood Control - Irrigation Canal | Line 406/#7 | 94 | TR or J/B | n/a |
| CR-17 | Line 406/#8 | 102 | TR or J/B | n/a |
| CR-96/Acacia Canal | Line 406/#9 | 98 | TR or J/B | n/a |
| CR-97 F/I-5/CR-99W | Line 406/#10 | 1,440 | HDD | n/a |
| CR-98 | Line 407 West/#1 | 51 | TR or J/B | n/a |
| CR-16A | Line 407 West/#2 | 110 | TR or J/B | n/a |
| CR-16A | Line 407 West/#2 | 100 | TR or J/B | n/a |
| State Route (SR) 113 | Line 407 West/#3 | 262 | J/B | n/a |
| CR-100 | Line 407 West/#4 | 123 | TR or J/B | n/a |
| Dense Trees | Line 407 West/#4 | 423 | TR or J/B | n/a |
| CR-101 | Line 407 West/#5 | 136 | TR or J/B | n/a |
| CR-102 | Line 407 West/#6 | 151 | J/B | n/a |

| Feature Name[1] | Project Segment/ Crossing # | Approximate Crossing Width (feet) | Type of Crossing[2] | Feature Acreage |
|---|---|---|---|---|
| CR-17 | Line 407 West/#7 | 120 | TR or J/B | n/a |
| Knights Landing Ridge Cut | Line 407 West/#8 | 2,400 | HDD | n/a |
| West Yolo Bypass/Drainage | Line 407 West/#9 | 1,218 | HDD | n/a |
| East Yolo Bypass/Tule Canal | Line 407 West/#10 | 1,200 | HDD | n/a |
| Drainage Canal (CR-16) #1 | Line 407 West/#11 | 189 | TR | n/a |
| Drainage Canal (CR-16) #2 | Line 407 West/#12 | 184 | TR | n/a |
| Drainage Canal (CR-16) #3 | Line 407 West/#13 | 139 | TR | n/a |
| Sacramento River | Line 407 West/#14 | 2,162 | HDD | n/a |
| Riego Road | Line 407 West/#14 | 119 | TR or J/B | n/a |
| Drainage Canal (Riego #1) | Line 407 West/#15 | 171 | TR | n/a |
| Powerline Road/Irrigation Canal | Line 407 West/#16 | n/a | TR | n/a |
| Riego Road | Powerline Road Distribution Feeder Main (DFM)/#1 | 148 | TR or J/B | n/a |
| North Drainage Canal | Powerline Road DFM/#2 | 547 | HDD | n/a |
| Irrigation Canal (Powerline #1) | Powerline Road DFM/#3 | 172 | TR or J/B | n/a |
| Drainage Canal (Powerline #2) | Powerline Road DFM/#4 | 206 | TR or J/B | n/a |
| Irrigation Canal (Powerline #3) | Powerline Road DFM/#5 | 184 | TR or J/B | n/a |
| West Elverta Road | Powerline Road DFM/#6 | n/a | TR | n/a |
| Irrigation Canal (Riego #2) | Line 407 East/#1 | 130 | TR or J/B | n/a |

| Feature Name[1] | Project Segment/ Crossing # | Approximate Crossing Width (feet) | Type of Crossing[2] | Feature Acreage |
|---|---|---|---|---|
| North Drainage Canal (Riego #3) | Line 407 East/#2 | 191 | TR or J/B | n/a |
| Irrigation Canal (Riego #4) | Line 407 East/#3 | 168 | TR or J/B | n/a |
| SR 70/99/Irrigation Canals (Riego #5) | Line 407 East/#4 | 1,140 | HDD | n/a |
| Irrigation Canal (Riego #6) | Line 407 East/#5 | 136 | J/B | n/a |
| Pacific Avenue | Line 407 East/#6 | 100 | TR | n/a |
| Drainage Canal (Riego #7) | Line 407 East/#7 | 120 | TR | n/a |
| Drainage Canal (Riego #8) | Line 407 East/#8 | 85 | TR | n/a |
| Seasonal Wetlands | Line 407 East/#9 | n/a | TR | n/a |
| East Levee Road, Steelhead Creek #1, Western Pacific Railroad | Line 407 East/#9 | 1,208 | HDD | n/a |
| Pleasant Grove Road | Line 407 East/#10 | 100 | TR | n/a |
| Riego Road Private Residence #1 | Line 407 East/#11 | 296 | TR or J/B | n/a |
| Vernal Pool/Vernal Swale #1 | Line 407 East/#11 | 150 | TR or J/B | 0.03 |
| Locust Road | Line 407 East/#12 | 60 | TR | n/a |
| Seasonal Wetland #1 | Line 407 East/#13 | n/a | TR | 0.05 |
| Seasonal Wetland #2 | Line 407 East/#14 | n/a | TR | 0.05 |
| Seasonal Wetland #3 | Line 407 East/#15 | n/a | TR | 0.09 |
| Seasonal Wetland #4 | Line 407 East | n/a | TR | n/a |
| Brewer Road/Vernal Pool | Line 407 East/#17 | 123 | TR or J/B | 0.04 |
| Seasonal Swale #1 | Line 407 East/#17 | n/a | TR | 0.16 |

| Feature Name[1] | Project Segment/ Crossing # | Approximate Crossing Width (feet) | Type of Crossing[2] | Feature Acreage |
|---|---|---|---|---|
| Riego Road Private Residence #2 | Line 407 East/#18 | 150 | TR or J/B | n/a |
| Seasonal Wetland #5 | Line 407 East | 225 | TR or J/B | n/a |
| Riparian Wetland | Line 407 East/#19 | n/a | TR | n/a |
| Seasonal Wetland #6 | Line 407 East/#20 | n/a | TR | n/a |
| Vernal Pool/ Vernal Swale #2 | Line 407 East/#21 | 2,264 | HDD | 0.47 |
| Seasonal Wetland #7 | Line 407 East/#20 | n/a | TR | 0.12 |
| Seasonal Wetland #8/ Seasonal Swale #2 | Line 407 East/#22 | n/a | TR | n/a |
| Curry Creek #1/Vernal Pool/Vernal Swale #3 | Line 407 East/#24 | 1,872 | HDD | n/a |
| Curry Creek #2/ Vernal Pool Complex | Line 407 East/#25 | 1,900 | HDD | n/a |
| Seasonal Swale #2 | Line 407 East/#26 | n/a | TR | 0.1 |
| Seasonal Wetland #9 | Line 407 East/#27 | n/a | TR | 1.07 |

Notes:
[1] Final routing decisions may alter some of these crossings.
[2] (TR) Trenching, (HDD) Horizontal Directional Drill, (J/B) Jack and Bore, (n/a) Not Applicable or Not Available.
Source: Adopted from PG&E 2007a (updated from information provided by PG&E 2008).

In addition to the HDDs, there would be approximately 30 conventional bores, totaling approximately 6,245 feet. Two methods of conventional boring may be employed depending upon contractor preference and soil conditions.

### Hammer Boring

For the proposed Project, pneumatic pipe ramming, also known as hammer boring, has been selected as the method that would be used for the bore installation. Pipe ramming is a non-steerable system that drives an open-ended pipe using a percussive hammer, resulting in the displacement of soil limited to the wall thickness of the pipe. For this construction method, pits would be dug on either side of the surface feature to be avoided. The pits would be approximately 15 to 40 feet wide and 50 feet long. The width and depth would depend on the feature to be avoided. The boring equipment and pipe would be lowered into the pit and aligned at the appropriate depth and angle to achieve the desired exit location. A compressor would supply air to the pneumatic ramming tool to thrust the pipe forward. A cutting shoe may be welded to the front of the lead pipe to help reduce friction and cut through the soil.

Several options are available for ramming various lengths of pipe. An entire length of pipe could be installed at once or, for longer distances, one section at a time could be installed. In the latter case, the ramming tool would be removed after each section is in place and a new section would be welded on to the end of the newly installed section. The pneumatic ramming machine would be connected to the new section and ramming would continue. In certain installations, a winch could be connected to the lead end of the pipe to assist in pulling it out. This would require installation of a connection via a pilot hole.

Depending on the size of the installation, spoil from inside the pipe would be removed with compressed air, water, a pig system, or a combination of techniques. A seal cap would be installed on the starter pit side of the installation and spoil would be discharged into the receiver pit.

**Auger Boring/Jack-and Boring**

Auger boring also referred to as jack-and-bore consists of a rotating cutting head and auger, internal to a steel sacrificial casing that is being advanced hydraulically. The internal auger turns to remove soils while the hydraulics advance the casing. As with Hammer boring, entrance and exit pits are typically excavated in order to accommodate the auger bore equipment. The pits would be approximately 15 to 40 feet wide and 50 feet long. The width and depth would depend on the feature to be avoided. The boring equipment and pipe would be lowered into the pit and aligned at the appropriate depth and angle to achieve the desired exit location. Hydraulic ram(s) thrust the pipe forward while the rotating cutting head and internal auger remove the soil and deposit it in the entrance pit. The excavated spoil would be removed with excavators. Once the crossing is complete, the product pipe is welded to the sacrificial casing. The product pipe and casing are then forced through the soil opening into the exit pit where the casing is cut off in sections. This process continues until all casing pipe has been removed and the product pipe completes the entire crossing.

**Epoxy Coating**

The pipe would be externally coated for protection at the mill with 16 mils (1 mil = 1/1000 inch) of fusion-bonded epoxy (FBE) before being shipped to either of the two pipe storage areas in 80-foot lengths. In addition, the pipe used for boring would be coated with 40 mils of Powercrete abrasion resistant overcoating (ARO) or equivalent. The weld-joint ARO on HDD-installed pipe would be installed at the temporary use areas. All FBE coatings and application requirements shall be subject to the requirements of CGT Standard EG 4116, latest revision.

Best management practices (BMPs) as outlined in PG&E's Water Quality Construction Best Management Practices Manual would be employed to ensure that these activities would not impact hydrology or other resources based on the use of hazardous materials. These activities would be managed on site as follows:

- The amount of hazardous materials stored at the construction site, and the production and generation of hazardous waste at the construction site, would be minimized;
- Any hazardous materials and wastes would be covered or containerized and protected from vandalism;
- All hazardous materials and wastes would be clearly marked. Hazardous waste containers would be placed in secondary containment systems if stored at the construction site;
- All stockpiled cold mix, an asphalt mixture used exclusively for temporary paving needs, would be placed on plastic and covered with plastic;
- Waste materials would not be intermixed, because this would complicate or inhibit disposal and recycling options and could result in dangerous chemical reactions;
- Storm water that collects within secondary containment structures would be inspected before discharge to ensure that no pollutants are present. Contaminated storm water would be managed according to PG&E's Environmental Practices (EPs), including Vault Dewatering and Spill Prevention, Containment, and Countermeasure (SPCC) pond drainage (these documents are available from PG&E upon request);
- Spills from a secondary containment system would not be discharged; and

- Hazardous waste would be segregated from other solid waste and disposed of properly.

In addition to following this best management practice, employees or contractors would be responsible for compliance with Federal, State, and local laws regarding storage, handling, transportation, and disposal of hazardous waste.

Should a spill occur on the construction ROW or at the storage/staging sites, the following would be implemented:

- The spillage of material would be stopped if it could be done safely;
- The contaminated area would be cleaned, and contaminated materials would be properly disposed;
- The Project foreman and/or the Environmental Representative would be notified;
- To the extent that it would not compromise clean up activities, spills would be covered and protected from storm water run-off during rainfall;
- Spills would not be buried or diluted with wash water;
- Used cleanup materials, contaminated materials, and recovered spill material would be stored and disposed of in accordance with Federal, State, and local regulations;
- Absorbent materials would be used to clean up spills. Spills would not be hosed down with water;
- All water used for cleaning and decontamination of a spill would be collected and disposed appropriately and would not be washed into storm drain inlets or watercourses. Disposal of these wastes would be coordinated with the Environmental Representative; and
- Spill cleanup kits would be kept in areas where any materials would be used and stored.

In the event of a spill, agency representatives or individuals designated by the following agencies would be contacted as necessary. Contact numbers for each agency would be included in PG&E's response plan:

- California State Lands Commission - 24 Hour Emergency Response;

- NOAA Fisheries, Sacramento Office;
- California Department of Fish and Game;
- Central Valley Regional Water Quality Control Board (CVRWQCB);
- U.S. Army Corps of Engineers (USACE); and
- U.S. Fish and Wildlife Service (USFWS).

Other agencies that could be contacted include the Office of Emergency Services, the National Response Center, the U.S. Environmental Protection Agency, and the California Highway Patrol.

**Pipe Delivery, Stringing, and Welding**

The pipe would be delivered either from the construction yard, or from an off-site coating facility, to the proposed pipeline ROW. The main travel routes that would be used for construction access along Line 406 would include CR-85, CR-87, CR-88A, CR-17, CR-19, and some smaller roads on the east side of I-5. Travel routes to be used for construction access along Line 407 would include CR-16, CR-16A, CR-17, Baseline Road, Riego Road, and Powerline Road. Streets and roads perpendicular to the main routes that may also be used to access the Project area include Watt Avenue, West Elverta Road, Walerga Road, SR 70/99, and SR 113. During construction, the transporting of the required amount of pipe and associated construction equipment could result in a temporary increase of up to 40 round trucks trips a day on these respective roadways. Figure 2-15 illustrates the proposed pipe haul routes.

Access to the Yolo Bypass may be available from CR-16 adjacent to Gray's Bend and the western Yolo Bypass levee road. The primary access for equipment would be along the PG&E's ROW or via temporary bridges across canals or other water features. No new roads are expected to be required for the Project.

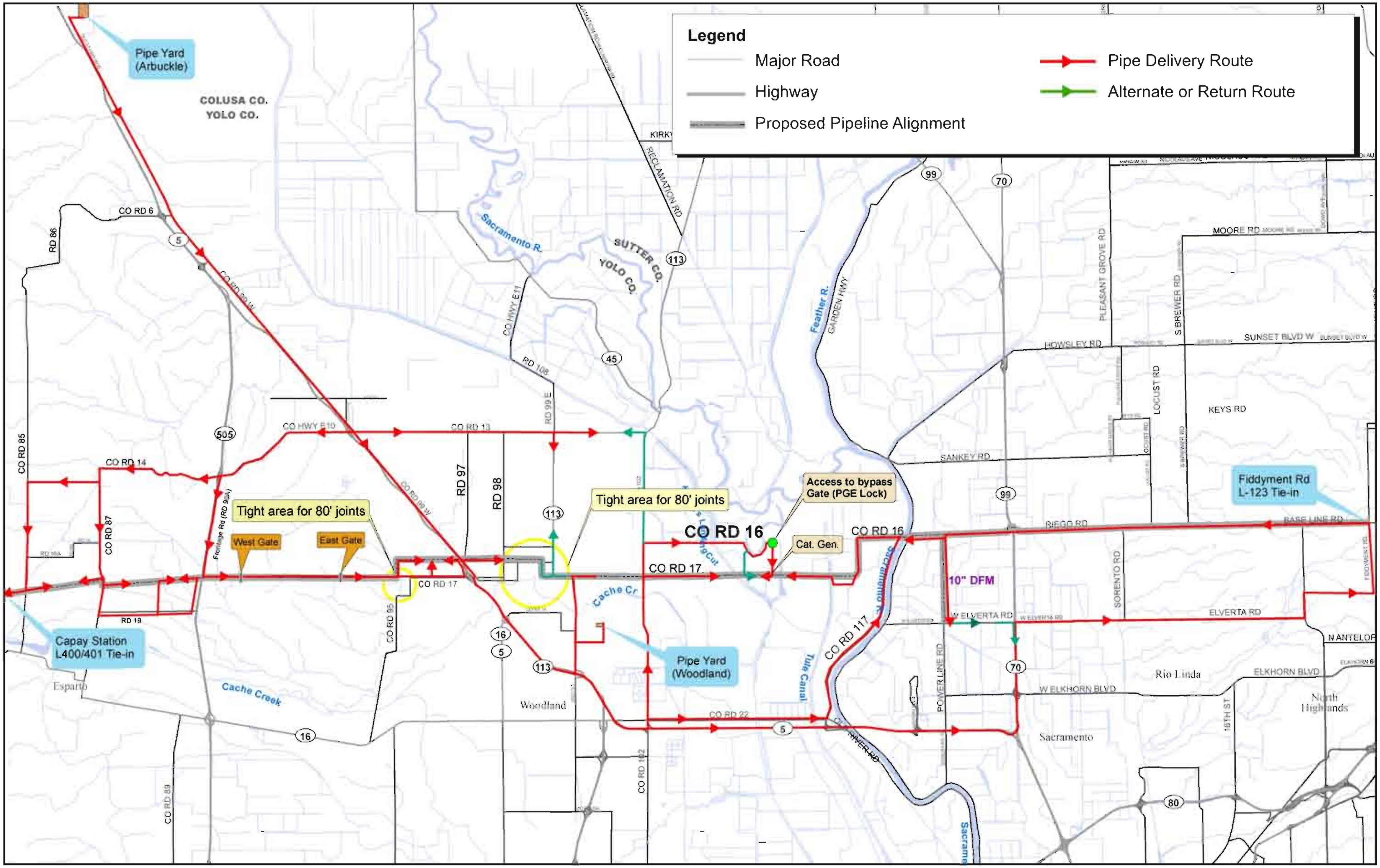
Once in the temporary use areas, individual pipe sections would be aligned and welded together into long strings. All pipeline sections would be "butt-welded," that is, welded together without the ends overlapping. All welds would be x-rayed to ensure structural integrity and compliance with applicable DOT regulations. Welds that do not meet American Petroleum Institute 1104 specifications would be repaired or removed. Once the welds are approved, the welded joints would be covered with a protective coating and the entire pipeline would be electronically and visually inspected for any faults, scratches, or other damage. Any pipe damage would be repaired before being lowered into the trench.

**Lowering-In, Tie-In, and Backfilling**

The pipeline would be lowered into the trench with two or more sideboom tractors, spaced so that the unsupported pipe between them and between the pipe and ground surface would not overstress the pipe and cause buckling. Tie-in welds, made in the trench at the final pipeline elevation, would be used: (1) where the line would be obstructed by utilities crossing the trench; (2) at the ends of HDD and other conventional bores; and (3) at the ends of lowered strings. The welds would be checked with x-ray and the entire pipeline would then be checked by caliper for geometrical integrity prior to final tie-in where necessary. In hilly terrain, trench barriers or breakers would be installed before backfilling at specified intervals to prevent water movement along the pipeline.

Backfilling would typically occur within 72 hours of pipeline installation to minimize potential impacts to wildlife. At the conclusion of each day's trenching activity, the end of the trench would be left ramped at an approximate 2 to 1 slope to allow any wildlife falling into the trench to escape.

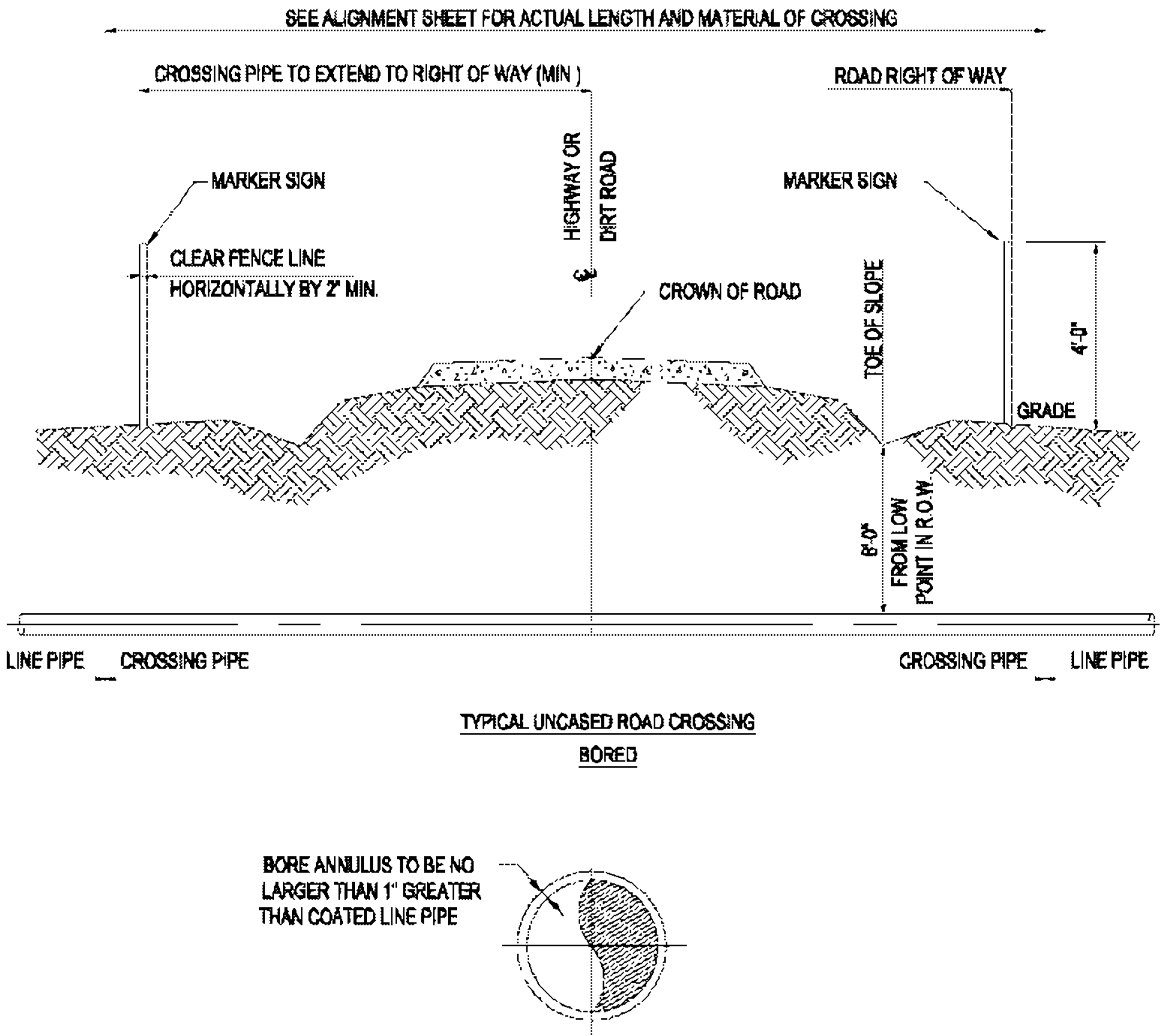
The trench would be backfilled using select excavated subsoils that meet PG&E's backfilling requirements, and topsoil would then be replaced and restored to its original condition using either tracked construction equipment or water to minimize future settling. Soil that is not suitable for backfill or spread as topsoil would be removed from the ROW. It is estimated that approximately 1,200 cubic yards of spoil materials would need to be removed from the pipeline route. All excess spoil would be disposed of appropriately with landowner and agency approval. A moderate level of compaction, 85 percent of maximum density using the American Society for Testing and Materials (ASTM) D-1557 test procedure, would be used to reduce the risk of uplift. Areas that would be under paved surfaces would be compacted to 95 percent or greater as specified by permitting entities. Compacting would be conducted to 85 percent in agricultural areas up to 18 inches from the surface. The entire pipeline ROW would be decompacted/restored per landowner negotiations. Figure 2-16 shows a typical road crossing while Figure 2-17 shows trench backfill operations.




Source: Adapted from PG&E, 2009.

Michael Brandman Associates

# Figure 2-15
# Proposed Haul Routes



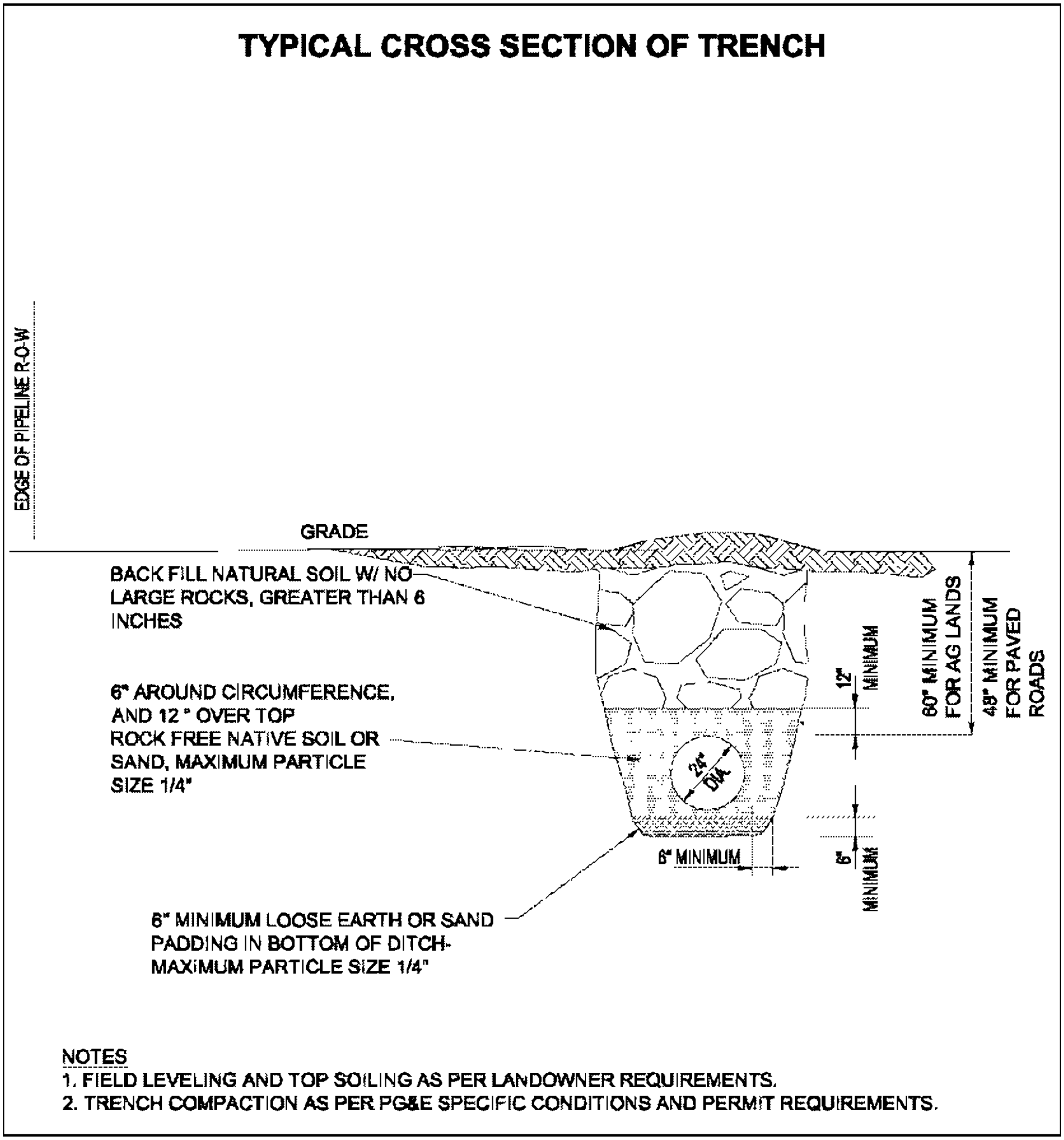

**NOTES:**
1. CROSSINGS SHALL BE IN ACCORDANCE WITH APPLICABLE PERMIT.
2. ROAD CROSSING PIPE SHALL EXTEND AT MINIMUM TO RIGHT OF WAY LINE.
3. THE TYPE AND MINIMUM REQUIRED LENGTH OF PIPE FOR CROSSINGS OF ROADS SHALL BE AS SPECIFIED ON ALIGNMENT SHEETS.
4. PIPELINE MARKER & TEST STATIONS TO BE INSTALLED ON ROW LINE NEXT TO FENCE IF POSSIBLE.
5. THE CROSSING PIPE SHALL BE STRAIGHT WITH NO VERTICAL OR HORIZONTAL BENDS WITHIN ROAD RIGHT OF WAY.

Source: Adapted from PG&E 2006

NOT TO SCALE

Michael Brandman Associates

Figure 2-16
Road Crossing




Source: Adapted from PG&E 2006

Michael Brandman Associates

NOT TO SCALE

Figure 2-17
Trench Backfill

**Pipe Buoyancy**

The Project would cross several 100-year special flood hazard areas. For example, western portions of Line 406 within Hungry Hollow (i.e., west of Dunnigan Hills) traverse several 100-year flood hazard areas. In addition, all of Line 407 West within and east of the Yolo Bypass would be within 100-year special flood hazard areas, as well as all of the proposed Powerline Road DFM and the portion of Line 407 East situated west of Sorento Road.

In response to these conditions, PG&E applied criteria specified in DOT 49 CFR section 192.317 to protect the Project from flooding hazards. For portions of the Project within the FEMA-designated 100-year flood zone, PG&E would apply a factor of safety (FS) of 1.5 to decrease the downward force of backfill acting on the pipe. In addition, a relative compaction of 80 percent would be required to ensure the backfill would be stable during the first winter season.

All underwater crossings would be installed via HDD. Soil conditions, pipe geometry, and depth of the HDD crossings are sufficient to prevent buoyancy concerns of the HDD crossings. To address the potential for scour within the Yolo Bypass, a concrete coating would be applied to provide a downward force of 10 lbs/ft or 2-inch minimum thickness whichever is greater (PG&E 2008).

**Construction Water Use and Disposal**

Water would be required to support Project-related construction for HDD operations, hydrostatic testing, and dust control. Traditional sources would include:

- Public/Private water system (via fire hydrants and irrigation wells);
- Waterways (canals, creeks, or rivers); or
- Water brought in by truck or storage tanks.

The preferred source of water for hydrostatic testing along the route would come from irrigation wells. If irrigation wells could not be secured as a source of water, alternate sources would be used and are identified in Table 2-6. PG&E does not plan to acquire water rights, but would negotiate with landowners for water from agricultural wells, or purchase water from irrigation districts or other commercial water sources.

Final sources would be determined after design drawings are completed and hydrotest procedures are detailed. PG&E would be required to obtain permission from the appropriate agency to obtain the legal right to take water from any water sources.

**Table 2-6: Potential Project Water Sources**

| Line Segment | Description | Location |
|---|---|---|
| 406 (26+50) | Irrigation Canal | Runs Perpendicular to ROW |
| DFM (128+00) | Irrigation Canal | N/E corner Elverta/Powerline Roads |
| 407-E (752+00) | Irrigation Canal | N/E corner Elverta/Powerline Roads |
| 407-E (1372+97) | Fire Hydrant | Opposite side of Fiddyment Road |
| 407-W (692+00) | Natural Waterway | Sacramento River |
| 407-W (396+00x) | Natural Waterway | Knights Landing Cut |
| Source: PG&E 2007b. | | |

*Hydrostatic Testing*

The pipeline would be hydrostatically tested at the end of construction phase, and prior to placing into service, per 49 CFR 192.505 and PG&E Gas Standard A37. Each HDD segment would undergo hydrostatic testing to ensure no manufacturing flaw exists prior to pulling the segment into the crossing. Potential water sources are listed in Table 2-6 above. The amount of water required for the tests is listed in Table 2-7.

**Table 2-7: Water Usage for Hydrostatic Testing Sources**

| Line Segment | Approximate Usage |
|---|---|
| 406 | 2.5 Million Gallons |
| 407 - East | 2.1 Million Gallons |
| 407 - West | 2.6 Million Gallons |
| 10" DFM | 0.06 Million Gallons |
| Source: PG&E 2007b. | |

Hydrostatic test water would be pumped through a filter into the test sections, pressurized to the test pressure, and maintained at that pressure for a minimum of eight hours. The minimum test pressure required is 1.5 times the design pressure

(975 psig) or 1,463 psig, and held for a minimum of 8 hours. The HDD segments would be pre-tested prior to being pulled into the bore to a pressure corresponding to 90 percent SMYS, or 2,708 psig for a duration of 4 hours. Any leaks would be repaired and the section retested until specifications are achieved. Following testing, the water used to test the pipeline and HDDs would be disposed of via the following methods, as described in PG&E's Pre-Construction Review report (PG&E 2007b):

- Discharged into sanitary sewer systems; or
- Discharged into storm drains, drainage ditches, creeks, or rivers (carbon filtering or other form of water conditioning may be required).

The method to be utilized would be determined by the availability and capacity of the systems in the area, requirements of governing agencies, and condition of water after hydrostatic testing. Water quality would be measured from the water source prior to use and after use during discharge to assure that water quality is not compromised as a result of the test. All hydrostatic testing water would be discharged using a flow manifold and energy dissipater to control the rate of discharge and to minimize erosion and turbidity to meet the standards set forth under the terms and conditions of the National Pollutant Discharge Elimination System (NPDES) permit and the General Order for Dewatering and Other Low Threat Discharges to Surface Waters, to be issued by the Central Valley Regional Water Quality Control Board (CVRWQCB).

Based on past experience with similar projects, PG&E anticipates that no contaminants would be introduced to the surface water during the testing process and that all samples would meet standards for gray water and that the water discharged from the hydrostatic test would pose no threat to any plants, fish, or animals.

**Pigging Procedure**

After the pipelines have been hydrostatically tested and dewatered, the contractor would run several "pigs" of various types (brush, cup, dish, polyethylene, etc.) to remove as much water from the pipeline as possible. Debris in the pipe would be minimal and any remaining residue would be removed from the pipe during the pigging procedure. The contractor would install temporary pig launchers and receivers to expedite this procedure and would monitor the amount of water removed to determine when the line is as dry as possible. Super dry air or other super dry compressed gases (usually nitrogen) would be blown through the pipe to bring the pipeline moisture down to 40 Fahrenheit degrees below the ambient dew point. This would ensure that the line would be dry and that equipment downstream of the new line would not freeze up due to water molecules in vapor condensing when pressures would be significantly reduced at regulating and metering stations throughout the system. The contractor would submit a final hydrostatic testing procedure to PG&E that would include the type of equipment to be used during the pigging and drying procedures.

Lines 406 and 407 would be a continuous 30-inch pipeline separated by a normally open valve at Yolo Junction. When any pigging is done on the pipelines, the pigs would be launched at Capay Station and removed at the Baseline Road Regulating Station. At that regulating station, the pressure would be reduced from 975 psig to 500 psig. A permanent yard would be required to house the equipment and facilitate the required on-going maintenance. The pig receiver would be located at this point to take advantage of the yard. An additional 1,000 feet of pipeline would be required to tie the new Line 407 into PG&E's system at the northwest corner of Baseline and Fiddyment Roads. This major intersection is planned for commercial development and there is no suitable location for a pig receiver. PG&E would monitor this segment of the pipeline per 49 CFR 192 subpart M. Should this area become a HCA in the future, as defined in 49 CFR 192.903, PG&E will assess the integrity of this segment by the use of "direct assessment" techniques as outlined in 49 CFR 192 subpart O.

The 10-inch DFM would include aboveground spools and blind flanges to serve as launchers and receivers. The launcher would be located at Riego and Powerline Roads, and the receiver would be located at Elverta and Powerline Roads.

### Blow-Down and Purging Procedure

After hydrostatic testing and drying the pipeline, PG&E would review weather patterns with the local air districts to determine an optimum range of dates for connecting (tying-in) the proposed Project to the existing pipeline network. Data from PG&E’s Department of Meteorological Sciences would be used in coordination with the SMAQMD, YSAQMD, PCAPCD, and FRAQMD to determine dates when air quality constraints would be minimal. Natural gas would be released during the blow-down/tie-in procedure. All local emergency service agencies and schools would be notified of the pending blow-down/tie-in within 72 hours of the proposed activities.

Prior to the day of the tie-in, PG&E would prepare a detailed shut down and tie in procedure. The procedure would be prepared by the Operations Supervisor and reviewed by the PG&E pipeline engineering and gas control departments prior to tie-in. In general, on the day of the tie-in, PG&E's personnel from the Sacramento Division Transmission and Regulation (T&R) Department would reduce the pressure in the existing Line 400/401 pipeline to zero pounds per square inch. PG&E's General Construction Division (GC) would then cut a draft hole in Line 400/401 near the future CMS. Air movers would be installed up and downstream of the CMS to remove the gas from the pipeline and into the atmosphere. When both air mover locations are clear of gas, PG&E would proceed with the tying-in of Line 406.

When all tie-in welds are completed and the x-rays are accepted, the line would be turned over to PG&E's T&R Department for operations. The air movers would be removed and valves would be set up to purge the air from the pipeline. The main line valve at CMS would be opened and fresh air purged through to the YJS. When it is determined that Line 406 is completely filled with natural gas, the blow-off valve would be closed and Line 406 would be brought up to operating line pressure. This same process would be applied to 407-W and 407-E.

### 2.5.2 Aboveground Facility Construction Procedures

The majority of all station piping would be pre-fabricated at the construction yard and then transported to the station locations for final assembly and tie-in to the pipeline facilities. After installation, the aboveground facilities would be fenced and painted. Figure 2-8 provides an illustration of an existing facility representative of the Project facilities.

### 2.5.3 Construction Contingency Planning

PG&E has developed a number of contingency plans to be implemented during construction of the proposed Project if certain unexpected events occur.

#### HDD Abandonment Contingency Planning

If extreme conditions are encountered during horizontal directional drilling operations and retrieval of down-hole tools becomes impossible, the HDD contractor could be forced to abandon a portion of the directional drilled hole or possibly the entire hole. This could occur during any phase of the HDD process and could potentially require the abandonment and grouting of the hole. The HDD contractor would use procedures to substantially reduce the possibility of this occurring. However, the following are potential abandonment scenarios that could take place during different stages of the drilling process.

**Abandonment of Pilot Hole/Pilot Hole Continuation**

In the event that the HDD contractor becomes unsuccessful in completing the directional drill pilot hole and the hole must be abandoned, the HDD contractor would make every effort to remove as much pipe as possible from the hole and abandon the unusable portion of the hole. Procedures would be invoked for the successful continuation of the drilling, including the following:

- The down-hole assembly would be advanced and the drill stem would be stopped;
- Cement, bentonite, or an industry-approved fill material would be made available at the drill rig location;
- The drill mud rig would be prepared for pumping material down the hole through the drill stem; and
- Cement, bentonite, or industry approved fill material would be pumped down the hole through the drill stem as the drill stem is withdrawn, to displace bentonite (drilling mud) slurry in the hole.

**Abandonment During Reaming Operation**

In the event that drilling operations are suspended during reaming of the pilot hole, the following procedures would be enacted:

- Advancement of the reamers would be halted;
- Cement, bentonite, or an industry approved fill material would be made available at the drill rig location;
- The drill mud rig would be prepared for pumping material down the hole through the drill stem;
- Cement, bentonite, or industry approved fill material would be pumped down the hole through the drill stem as the drill string is withdrawn, to displace bentonite (drilling mud) slurry in the hole;

- If the Drilling Superintendent ascertains the need to replace the reamer with a cement head, the reamer would be withdrawn and replaced by a special head built for grouting;

- If the reamer could not be extracted, the drill rig would be moved to the opposite side for removal of the reamer from the hole;

  - A cement head would be sent down the hole on pilot string until the previously cemented reamed hole is pumped; and

  - The drill string would be withdrawn and the hole pumped with cement or industry-approved fill material to displace the bentonite slurry material.

**Contingency Plan for Inadvertent Release During HDD**

Inadvertent release of drilling fluids is a potential concern when HDD methods are used for construction conduits under sensitive habitats and waterways. While bentonite is a non-toxic substance, its inadvertent release into waterways could adversely impact aquatic species, smothering benthic invertebrates, aquatic plants, and fish or their eggs with the fine bentonite particles.

The drilling contractor would be required to submit a detailed plan for the inadvertent release of drilling fluid. This plan would be made available to the CSLC prior to construction. During drilling, the driller would monitor the fluids. A noticeable lack of returns and a decrease in annular down hole pressures would warrant further investigation such as visual inspection and duration of loss. In the event that drilling fluid would be noticeably lost from the borehole the driller would implement the following procedures:

1. Temporarily cease drilling operations, including pump shut down;

2. Notify the appropriate Federal and State agencies (including the CSLC) as soon as possible by telephone and/or facsimile of the release event, detailing the nature of the release and corrective actions being taken. The notified agencies would determine whether additional measures need to be implemented;

3. Dispatch experienced observers as required to monitor the area in the vicinity of the drilling, for inadvertent returns of drilling fluid at the ground surface and/or water body;

4. Identify the position of the drill head in relation to the point of entry; and

5. Restart the pump and stroke the borehole up and down in stroke lengths up to 30 feet up to six times but no fewer than two times in an effort to size the borehole annulus and reopen the circulation pathway.

In addition, the drilling fluid could be thickened within the guidelines set forth by the manufacturer to aid in reestablishing circulation as required depending on borehole conditions. Observers would continuously monitor for inadvertent fluid returns as long as the pump would remain on. Occasionally, based on the driller's discretion, the stroke length could be increased up to 90 feet or past the point at which drilling fluid circulation was lost.

If circulation is reestablished, drilling would proceed as usual and monitoring for inadvertent fluid returns would take place once again if the rate of drilling returns progressively decreases at the fluid entry pit. If circulation is not reestablished, monitoring for inadvertent fluid returns to the ground surface and/or water body would continue and drilling would proceed.

If the amount of inadvertent returns is not great enough to allow practical collection, the affected area would be diluted with fresh water and allowed to dry and dissipate naturally back into the earth. If the amount of returns exceeds that which could be suitably contained with hand placed containment barriers, small collection sumps with less than 134 cubic feet (3.8 cubic meter) capacities would be used to pump fluid back to the solids control system.

If drilling fluid returns are observed to be continuously surfacing aboveground at an accessible location, the following procedure would be followed:

1. Pumping of the drilling fluid would immediately cease;

2. The location would be contained so that the drilling fluid could not migrate across the ground surface. Materials and equipment that could be used for containment include:

    - Straw bales;
    - Silt fence;
    - Check dams;

- Backhoe for accessible areas;
- Shovels;
- Portable pumps;
- Flashlights and light towers for night operations; and
- Twenty 100-foot sections of hose;

3. A small sump pit would be excavated at the location to provide a means for the fluid to be returned to either the drilling operations or a disposal site (i.e., pump through hose or into tanker);

4. The on-site contractor supervisor and PG&E's representative would be notified;

5. Drilling operations would continue, maintaining the integrity of the containment measures and monitoring the fluid returns as required to ensure that no surface migration occurs; and

6. Cleanup would be carried out once inadvertent returns are contained/controlled, and the following would occur:

   - Fluid would be pumped to a secure containment vessel;
   - Area would be diluted with water; and
   - Area would be restored to original condition;

If inadvertent drilling fluid returns are observed to be surfacing aboveground at a location that is inaccessible, i.e. along the bed of a water body, or into the water, the following procedures would be followed:

1. Follow the above procedures as outlined to the extent they are appropriate given the location of the returns;

2. Ensure that all reasonable measures within the limitations of the technology have been taken to reestablish circulation; and

3. Continue drilling with the minimum amount of drilling fluid required to penetrate the formation and successfully install the product line.

### Hazardous Materials Contingency Planning

The only known hazardous materials that would be on site during construction of proposed Project would be fuels and lubricants in the construction equipment as well as pipeline coating materials. These materials would be stored at the pipe storage yards, not on the construction ROW. The potential for a fuel/lubricant spill would be limited to the capacity of the involved equipment.

Hazardous materials would be managed on site in accordance with PG&E's Water Quality Construction Best Management Practices Manual as listed in Section 2.5.1, New Pipeline Construction Procedures, under Epoxy Coating.

## 2.6 CONSTRUCTION SCHEDULE

Construction of Line 406 would begin in September or October 2009 with the proposed in-service date scheduled for February 2010. The Line 407 East, Line 407 West, and DFM segments would be constructed in two different phases as dictated by the added load on the transmission system. Current projections are that Phase 1, consisting of Line 407 East and the DFM, would be constructed in May 2010 with an in-service date of September 2010. However, PG&E acknowledges that Phase 1 installation may need to occur in advance, as early as 2009, of several road improvement projects associated with developments along Baseline Road and Riego Road. Phase 2, consisting of Line 407 West, is projected to be required in 2012, but may be required earlier depending upon load growth in the area.

Construction would occur between 6:00 a.m. and 6:00 p.m., Monday through Saturday, except for the HDD operations and hydrostatic testing, which may occur around the clock. Construction and installation of the proposed pipeline would require approximately 90 to 130 workers. Seventy-five to 100 workers would typically be non-PG&E contract employees, 5 to 15 would be from PG&E's labor force, and 10 to 15 would be contract inspectors. These workers would be dispersed over the pipeline Project.

## 2.7 ENVIRONMENTAL COMPLIANCE INSPECTION AND MITIGATION MONITORING

Pipeline construction would be performed in accordance with PG&E's Water Quality Construction Best Management Practices Manual, which is hereby incorporated into the proposed Project description (PG&E 2006). PG&E has also proposed specific Applicant Proposed Measures (APMs) designed to reduce the environmental effects of the proposed Project. The APMs, which are considered by the CSLC to be part of the proposed Project, are identified in the applicable issue area analyses presented in Section 4.0, Environmental Analysis. Several of the Section 4.0 issue area analyses also contain additional mitigation measures (MMs) that the CSLC has determined would be required to reduce potentially significant impacts to less than significant levels.

### 2.7.1 Measures Designed Into Proposed Project to Avoid Potential Impacts

All of the Project APMs and MMs are presented in each resource section of this Draft EIR and are consolidated in Section 6.0, Mitigation Monitoring, Compliance, and Reporting Program (MMRP). A full-time third-party compliance monitor under contract to the CSLC would be present during construction activities to monitor compliance with Project APMs, MMs, and other requirements. Other Federal and State agencies may also conduct inspections and monitoring to the extent determined necessary by the individual agency.

In addition to the mitigation monitoring conducted by the CSLC, PG&E would hire Environmental Inspectors (EIs) to ensure compliance with all APMs, MMs, and permit requirements. The responsibilities of the EIs include ensuring that the environmental conditions of the EIR and other permits or authorizations are met. Specifically, the EI would be:

- Responsible for monitoring and ensuring implementation and compliance with all APMs and MMs identified in the EIR and construction contracts, as well as for other permits, authorizing documents, and BMPs;
- Empowered to order correction of acts that violate the environmental conditions of the EIR and any other authorizing document;
- Hired as a full-time position separate from all other activity inspectors; and
- Responsible for maintaining status reports.

**Post Construction Activities**

Once the proposed Project is packed with gas to operating line pressure, the temporary use areas would be restored in accordance with pre-arranged landowner requirements. PG&E's contractor would obtain landowner verification that all restoration was completed to the satisfaction of the landowner prior to demobilizing from the ROW. Soil would be decompacted and reseeded in accordance with the landowners' requests. The alignment would be marked with 12-inch by 34-inch white and orange striped signs, placed approximately 8 feet high in accordance with PG&E's standards for gas line marking. The requirements for marking gas facilities are outlined in PG&E's DCS/GTS Standard D-S0402/S4122 as follows:

- All markers shall be permanently identified with the manufacturer's name and the date of fabrication;
- Diagonal stripping shall be applied to both sides by directly screening a compatible coating of international orange #27 to the marker after the white coating is applied;
- A pressure sensitive pipeline warning sign (Gas Standard L-12) shall be installed on each side of marker;
- Where required, pressure sensitive pipeline warning sign decal in Spanish shall be placed as per Gas Standard L-12.2;
- In instances where additional detailed information needs to be shown on the marker installation (such as main location or pipeline number), a metal marker plate shall be used per Gas Standard L-13;
- A pipeline number may, as an alternative, be added directly to the marker support by stenciling or by using pressure sensitive marker numbers; and
- For installations where the ground is sufficiently firm, the rail or pipe post can be set in native soil. For installations in unstable ground, concrete shall be used.

An example of a pipeline marker is shown in Figure 4.1-1 of Section 4.1, Aesthetic/Visual Resources.

All construction material and debris would be removed and disposed of at appropriate landfills. All work areas would be graded and restored to pre-construction contours within 20 days of trench backfilling. Restoration activities would commence within 6 days of final grading.

All temporary access roads would be re-graded and restored in a manner similar to the pipeline ROW, unless the property owner requests the road to remain as is. All paving repairs would be made in accordance with current city and county requirements. Following construction of the proposed pipeline, the entire ROW would be videotaped to document post-construction conditions and access roads. No new access roads would be required for pipeline operation and maintenance.

# 2.8 OPERATION, MAINTENANCE, AND SAFETY CONTROLS

## 2.8.1 Public Safety

Existing staff at PG&E's T&R Department would operate and maintain the new pipeline, provide routine maintenance services, and respond to emergencies in accordance with PG&E's Gas System Maintenance and Technical Support Emergency Plan Manual (EMP). The system would be constantly monitored and controlled by a SCADA system that would detect pressure drops in the pipeline indicating a leak or other operating problem. As an additional measure, to prevent third-party damage to the proposed pipeline at a future date, PG&E would take Global Positioning System (GPS) coordinates at the locations of all pipe welds in order to maintain an accurate location of the proposed pipeline once it is in the ground.

The pipeline would be operated and maintained in accordance with all applicable requirements included in the DOT regulations in 49 CFR 192, "Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards." Further, the proposed Project would be subject to CPUC standards as embodied under General Order 112E. In addition, the proposed pipeline would be operated in accordance with PG&E's EMP. The EMP contains procedures, including pre- and post-emergency planning, on-scene response, incident reports, etc., to be followed for prompt effective responses to significant upset conditions detected along the pipeline or reported by the public. Typical testing and inspection procedures that would be conducted by PG&E in compliance with Federal regulations include:

| Inspection/Testing | Frequency |
|---|---|
| Cathodic protection (Pipe to Soil Potential) | Annually |
| Cathodic protection (Rectifier Readings) | Six times per year |
| Valve testing | Annually |
| Pipeline patrols | Annually |
| Class 1 & 2 | Annually |
| Class 3 | Twice per year |
| Leak Surveys | Annually |
| High Consequence Area (HCA) Risk assessment | Every seven years |
| Source: PG&E 2008. | |

PG&E has procedures in place for operations, maintenance, and emergencies, as required under DOT regulations under 49 CFR Part 191 (reporting requirements), and 49 CFR Part 192 (transportation of natural gas), that would apply to the proposed pipeline.

### 2.8.2 Corrosion Protection and Detection Systems

External corrosion control measures for the proposed Project include protective coating on the exterior of the pipe and use of cathodic protection systems. These systems are designed to meet the minimum requirements established by the DOT for protection of metallic facilities from external, internal, and atmospheric corrosion. The location and installation of a rectifier (used for cathodic protection of the pipe) would be determined during final engineering.

### 2.8.3 High Consequence Area

The Office of Pipeline Safety and the DOT have identified specific locales and areas where inadvertent releases from pipelines could have the most significant adverse consequences. An equation has been developed that estimates the distance from a potential explosion at which death, injury, or significant property damage could occur. This is known as the potential impact radius (PIR) and is used to represent potential impact circles. Operators are required to calculate the potential impact radius for all points along their pipeline in order to identify specific populations and structures within each radius. Depending on the makeup of each impact circle, different classes have been designated to define a High Consequence Area (HCA) as follows: potential impact circles that contain 20 or more structures intended for human occupancy; buildings that house populations with limited mobility; buildings that would be hard to evacuate; or buildings and outside areas where 20 or more people gather at least 50 days in any 12 month period.

Specifically, HCAs include areas where a pipeline is within 300, 660, or 1,000 feet of a building or an outside area where 20 or more persons congregate at least 50 days in any 12-month period. Operators must determine which segments of their pipeline could affect HCAs in the event of a release. This determination is made assuming a release can occur at any point. Operators are also required to devote additional efforts and analysis in HCAs to ensure the integrity of the pipelines. The portions of the Project within Class 3 areas, including Line 407 East and the Powerline Road DFM, would be within an HCA. Certain portions of the Project would be required to be included in PG&E's Pipeline Integrity Management Plan, which provides for the assessment and mitigation of pipeline risks in an effort to reduce both the likelihood and consequences of incidents. The Pipeline Integrity Management Plan includes procedures for conducting operations and maintenance activities and for emergency response, as well as procedures for handling abnormal operations.

### 2.8.4 Emergency Response

PG&E's Sacramento Division T&R supervisor would implement guidelines and procedures established in PG&E's EMP, in the event of a pipeline-related emergency (e.g. gas leak, earthquake, accidental release of hazardous materials or waste, fire or explosion, and/or pipeline or facility damage). These procedures have been designed in accordance with State and Federal regulations, including 40 CFR Part 265, Health and Safety Code (Chapter 6.95), and titles 19, 22, and 27 of the California Code of Regulations. This document is reviewed annually with local agencies to ensure that it is current and that all personnel understand the plan and their responsibilities.

## 2.9 FUTURE PLANS AND ABANDONMENT

The expected operational life of the Project is about 50 years and is normally dictated by economic obsolescence. When the proposed Project reaches the end of its useful life, it would be deactivated in accordance with appropriate Federal, State, and local regulations enforced at the time that the pipeline would be taken out of service, including DOT's 49 CFR Part 192.