

# NextEra Energy Transmission West and Pacific Gas and Electric Company

## Estrella Substation and Paso Robles Reinforcement Project

### Proponent's Environmental Assessment (A.17-01-023)

#### Response to Deficiency List No. 4

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The California Public Utilities Commission (CPUC) identified deficiencies in NextEra Energy Transmission West, LLC (NEET West) and Pacific Gas and Electric Company's (PG&E) Proponent's Environmental Assessment (PEA) for the Estrella Substation and Paso Robles Reinforcement Project. Below are responses to Deficiency List No. 4 issued by the CPUC on February 27, 2018. Each deficiency is numbered according to the list, followed by NEET West's and PG&E's response. This document includes the following attachments, which are described in more detail in the text below under the applicable response:

- Attachment 4-3.1a: PG&E Confidential and Highly Commercially Sensitive Cost Information
- Attachment 4-3.1b: PG&E Design Criteria #073131 - Bus Configuration
- Attachment 4-3.1c: Letter from CAISO responding to the CPUC dated February 23, 2018
- Attachment 4-3.2a: Public Response to Deficiency List No. 2
- Attachment 4-3.2b: Preliminary Templeton Alternatives Desktop Environmental Study
- Attachment G (1.1): Updated Appendix G, Distribution Need Analysis (clean and track change versions)

### Chapter 3. Environmental Impact Summary

#### ***Deficiency 3.4-1.1 (updated):***

*CPUC has initiated discussions with the U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife (CDFW). CPUC and these agencies are concerned about potential impacts of the proposed project on special-status species, including golden eagles and the San Joaquin kit fox. CPUC, USFWS, and CDFW are very concerned about the lack of survey data. Barriers to migration, for example, are not the only potential impacts of the proposed project on the kit fox.*

*However, the lack of detailed surveys for these species for 10 miles of the 70-kV line project areas would inappropriately defer the disclosure of potentially significant impacts and development of appropriate mitigation until after the EIR is completed. Given the existence of suitable habitat, species presence would be assumed in the absence of sufficient data demonstrating otherwise.*

*The wildlife agencies recommend conducting the site assessments/early evaluations following the guidance listed at the following URLs, and we concur:*  
*<https://www.fws.gov/ventura/endangered/species/surveys-protocol.html> and*

*<https://www.wildlife.ca.gov/Conservation/Survey-Protocols#377281284-birds>. After completion of these evaluations, the USFWS and CDFW will review the results to determine if additional surveys are needed to determine potential effects on listed species.*

*Follow-Up Request:*

*Please conduct the site assessments/early evaluations recommended by the resource agencies. For the Proposed Project, CPUC staff disagree that preconstruction surveys would be sufficient to avoid potentially significant impacts to special-status species in suitable habitat. Furthermore, preconstruction survey results would not inform CEQA EIR preparation. CPUC staff also disagree with the notion that, without further substantiation, “potential presence” of special-status species is different from assuming “presence.” If the Applicants would like to assume presence in lieu of conducting the required surveys in time to be considered during preparation of the EIR, please respond to this effect in writing and provide a detailed plan for working with the wildlife agencies to identify appropriate levels of compensatory mitigation.*

*Please provide GIS data of the survey results. These data must not be submitted as confidential.*

**Response:**

PG&E has met with both the USFWS and CDFW on separate occasions (communications and dates provided to the CPUC) to discuss the proposed Estrella project and the methodology to avoid take of either San Joaquin kit fox or golden eagle during the construction of the Estrella project.

*Golden Eagle*

PG&E and the CPUC have received confirmation from the USFWS that the biological approach and process for protecting golden eagles in the vicinity of the proposed Estrella project is appropriate. PG&E will follow the recommendations of the USFWS, which include:

1. Following Avian Power Line Interaction Committee guidelines and including feasible measures to increase the visibility of the power lines;
2. Working with the USFWS to determine the need for installation of bird diverters in areas near the existing golden eagle nest;
3. Prior to construction, conducting nesting bird surveys (as identified in the PEA) to determine if the golden eagle nest is active. If the nest is determined to be active, PG&E will establish exclusion buffers to avoid nesting disturbance.

Additionally, PG&E had its consultant assess the status of the golden eagle nest on April 5, 2018. The Cava Robles Recreational Vehicle (RV) Park, located between the Estrella project and the nest, is currently under construction and has a biological monitor present on-site. PG&E’s consultant viewed the nest location and received a status report of the nest from the Cava Robles RV Park project biologist. There are two nesting sites and only one appears to be occupied by a pair of eagles. Geographic information system (GIS) data of the two nesting sites will be provided to the CPUC separately.

San Joaquin kit fox

SWCA previously performed an early evaluation for San Joaquin kit fox along both the preferred power line route and at the proposed substation site. The early evaluation was conducted in accordance with the guidance provided in the 1999 USFWS San Joaquin Kit Fox Survey Protocol for the Northern Range. Although the findings from the early evaluation are not summarized in a stand-alone report, the informational requirements are provided in the PEA and the Biological Resources Technical Reports. Exhibit 3.4-1.1 below provides a crosswalk table identifying where this information can be found in the PEA and technical reports and was submitted to the CDFW on March 3, 2018 and USFWS on March 20, 2018.

**Exhibit 3.4-1.1: SJKF Early Evaluation Crosswalk to PEA and Technical Reports**

<b>San Joaquin Kit Fox Early Evaluation Requirements</b>	<b>PEA Section and Page #</b>	<b>Biological Resources Technical Report for the 70 Kilovolt (kV) Power Line Section and Page #</b>	<b>Biological Resources Technical Report for Estrella Substation Section and Page #</b>
Project Description and Location, Acreage of San Joaquin Kit Fox Habitat, and Map	<ul style="list-style-type: none"> <li>• Project Description (p. 2-1)</li> <li>• Environmental Setting (p. 3.4-13)</li> <li>• Acreages of habitat: Land Cover, Vegetation, Wildlife Habitats (p. 3.4-14)</li> <li>• Habitat Map: Figure 3.4-2a-g (p. 3.4-16)</li> </ul> <p><b>Note:</b> No known kit fox or den sites were observed during the surveys. Therefore, the location of known dens or sightings are not provided on Figure 3.4-2a-g.</p>	<ul style="list-style-type: none"> <li>• Project Description and Location: Section 1 Introduction (p. 1)</li> <li>• Acreages of Habitat: Section 4.2.2 Vegetation Communities (p. 20)</li> <li>• Habitat Map: Appendix E. Biological Resources Map</li> </ul>	<ul style="list-style-type: none"> <li>• Project Description and Location: Section 1 Introduction (p. 1)</li> <li>• Acreages of Habitat: 4.2.2 Vegetation Communities and Cover Types (p. 14)</li> <li>• Habitat Map: Figure 6. Vegetation Communities and Cover Types (p. 18)</li> </ul>
Compile USFWS and California Natural Diversity Database (CNDDDB) Site Records within 10-mile Radius	<ul style="list-style-type: none"> <li>• Database Search (p. 3.4-8)</li> <li>• San Joaquin Kit Fox (p. 3.4-39)</li> </ul>	<ul style="list-style-type: none"> <li>• Literature and Records Review (p. 9)</li> <li>• Figure 7. CNDDDB Records (p. 50)</li> <li>• Section 4.4.2.21 San Joaquin Kit Fox (p. 49)</li> </ul>	<ul style="list-style-type: none"> <li>• Literature and Records Review (p. 8)</li> <li>• Figure 8. CNDDDB Records (p. 30)</li> <li>• Section 4.4.2.14 San Joaquin Kit Fox (p. 31)</li> </ul>
Vegetation Communities	<ul style="list-style-type: none"> <li>• Land Cover, Vegetation, Wildlife Habitats (p. 3.4-14)</li> <li>• Figure 3.4-2a-g (p. 3.4-16)</li> </ul>	<ul style="list-style-type: none"> <li>• Section 4.2.2 Vegetation Communities (p. 20)</li> <li>• Appendix E. Biological Resources Map</li> </ul>	<ul style="list-style-type: none"> <li>• 4.2.2 Vegetation Communities and Cover Types (p. 14)</li> <li>• Figure 6. Vegetation Communities and Cover Types (p. 18)</li> </ul>

<b>San Joaquin Kit Fox Early Evaluation Requirements</b>	<b>PEA Section and Page #</b>	<b>Biological Resources Technical Report for the 70 Kilovolt (kV) Power Line Section and Page #</b>	<b>Biological Resources Technical Report for Estrella Substation Section and Page #</b>
Habitat Suitability Analysis Via Walking Transects	<ul style="list-style-type: none"> <li>• Reconnaissance Surveys (p. 3.4-11)</li> <li>• Focused Surveys (p. 3.4-11)</li> </ul>	<ul style="list-style-type: none"> <li>• Section 3.3 Field Surveys (p. 11)</li> </ul> <p><b>Note:</b> Although SWCA assessed the survey area for suitable den sites and prey base, potential den sites were not individually mapped while walking transects. Permanent impacts to suitable kit fox habitat are minimal along the power line route and primarily occur along roadside shoulders. The majority of impacts along the power line route will be temporary impacts, and will not create any migration barriers for this species. Therefore, our intent was to identify habitat suitability, not to mark individual locations several years prior to the start of construction. It was determined that pre-construction surveys/mapping efforts would be conducted prior to the start of construction where impacts would occur.</p>	<ul style="list-style-type: none"> <li>• Section 3.4 Field Surveys (p. 11)</li> <li>• Section 4.4.2.14 San Joaquin Kit Fox (p. 31)</li> </ul> <p><b>Note:</b> Permanent loss of potential kit fox habitat is significantly larger at the substation site (~15 acres); therefore, potential den sites were individually mapped to assist in evaluating the quality of habitat where permanent impacts would occur.</p>
Analysis of Adverse Effects of the Project on San Joaquin Kit Fox	<ul style="list-style-type: none"> <li>• Bio-a (p. 3.4-50)</li> <li>• Bio-e (p. 3.4-66)</li> </ul>	Not Applicable (N/A)	N/A
Recommendations for Mitigating Adverse Effects	<ul style="list-style-type: none"> <li>• APM GEN-1 (Chapter 2 p. 2.-64)</li> <li>• APM BIO-1 (p. 3.4-48)</li> <li>• APM BIO-3 (p. 3.4-49)</li> <li>• APM BIO-4 (p. 3.4-49)</li> <li>• Bio-a (p. 3.4-50)</li> <li>• Bio-e (p. 3.4-66)</li> </ul>	N/A	N/A
Analysis of Cumulative Effects	<ul style="list-style-type: none"> <li>• Chapter 3.18 Cumulative Impacts (p. 3.18-3, 3.18-19, 3.18-20, 3.18-22)</li> </ul>	N/A	N/A

A poor choice of words was used to describe the likelihood of encountering San Joaquin kit fox within the project area; PG&E should have used “a low likelihood of presence” instead of “potential presence.” The project study area identified several areas supporting habitat for the San Joaquin kit fox, but the probability of presence of kit fox was considered low because these areas are in isolated locations bounded by vineyards, roads, and other developments.

In follow up emails, and at the request of the USFWS, PG&E has agreed to observing project buffers for San Joaquin kit fox that the USFWS had approved for California Flats Solar Project (2014). The buffers are defined as radii from the den and are: 100 feet from an occupied known den, 500 feet from an occupied natal/pupping den, and 50 feet from an occupied atypical den. All project email conversations with the USFWS have been forwarded to the CPUC.

### Conclusion

Both the USFWS and CDFW have agreed there is no need for additional surveys at this time for either the San Joaquin kit fox or golden eagle and conveyed this message to both PG&E and the CPUC verbally and in writing. Therefore, since the analysis, avoidance measures, and preconstruction surveys have been agreed upon by the resource protection agencies, they are sufficient to avoid species take. There is no justification to conclude the project will have potentially significant impacts on either the golden eagle or San Joaquin kit fox.

The Applicant Proposed Measures described in the PEA are sufficient with the modifications to the San Joaquin kit fox buffers identified above. No additional surveys are needed at this time for the Estrella project.

### ***Deficiency 3.4-4.1:***

*Please provide CPUC with the wetland delineation report prepared for the proposed project that is referenced in the PEA.*

### Follow-Up Request:

*Thank you for providing the wetland delineation report.*

*Please provide the GIS data used to generate the figures in this report.*

### **Response:**

The GIS data used to generate the figures in the Wetland Delineation Report was provided to the CPUC on March 7, 2018.

## **Chapter 4. Alternatives**

### ***Deficiency 4-3.1:***

*Please update the PG&E estimates provided with a separate estimate that only assumes the existing Templeton-Paso Robles 70-kV ROW would be used or that it would be used with minimal expansion as required. If a shoo-fly line would be required to facilitate construction, include this in the estimate. Insert this estimate as a new column within the table provided.*

*In addition to updating the table, explain whether the replaced 70-kV line would be double or single-circuit and why.*

*Discuss the extent to which each routing option would meet the identified NERC violations that are mandatory to address (i.e., Category B contingency due to loss of either the Templeton 230/70 kV #1 Bank or the Paso Robles-Templeton 70 kV Line).*

Follow-Up Request:

- a. Respond in full to this deficiency item as requested.
- b. In addition, identify the amount of load that would be shed if the contingency associated with the Templeton-Paso Robles 70-kV line or associated 230/70-kV transformer identified by CAISO were to occur.

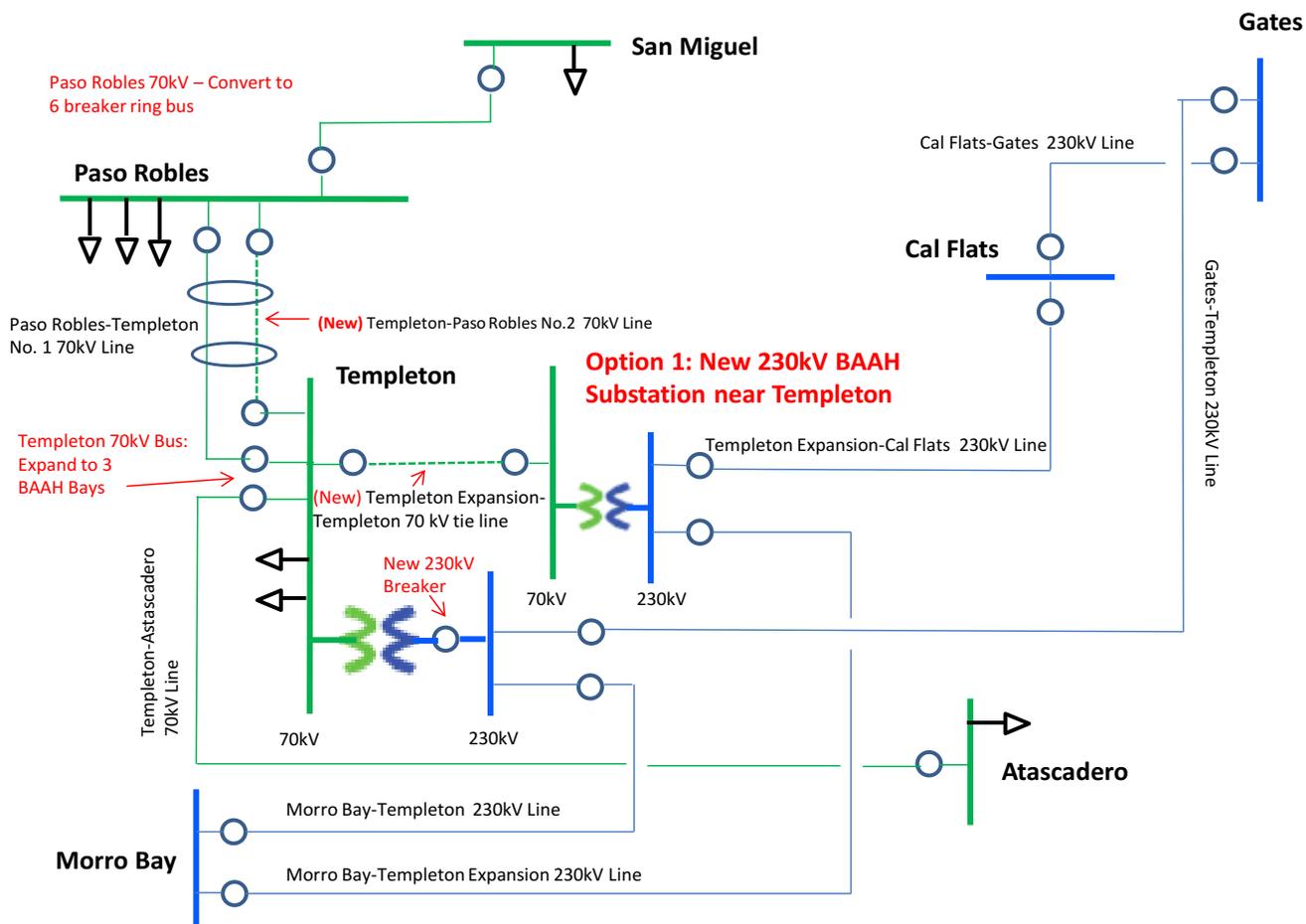
*The PEA indicates that 60 MW to 70 MW would be at risk (p. 2-2). However, some of the load served by the Templeton-Paso Robles 70-kV line would still be served by the San Miguel-Paso Robles 70-kV line in the event of the contingency identified by the CAISO. It is our understanding that closer to 20 MW may be the amount of load that would actually be at risk (i.e., shed).*

**Response:**

- a. **Updates to the PG&E cost estimates assuming the existing Templeton-Paso Robles 70 kV ROW would be used:** The updated PG&E cost estimate is provided in Attachment 4-3.1a: PG&E Confidential and Highly Commercially Sensitive Cost Information.

**Explanation whether the replaced 70 kV line would be double or single-circuit:** To address the two Category B contingencies for thermal overloads and voltage concerns within the Paso Robles Distribution Planning Area (DPA), it would be necessary to convert the existing Templeton-Paso Robles 70 kV line to a double-circuit pole line. One of the purposes of this project is to improve reliability by having another 230 kV source introduced into the local area 70 kV system and providing Paso Robles Substation with an additional power flow path. The existing Templeton-Paso Robles 70 kV line is currently being fed through an existing 230/70 kV transformer at Templeton Substation. This transformer is connected to the Templeton-Gates and the Morro Bay-Templeton 230 kV transmission lines. An additional 230/70 kV transformer can be supplied by looping the Gates (now Cal Flats)-Morro Bay 230 kV transmission line through a new 230 kV substation adjacent to Templeton Substation. A new 70 kV breaker and a half (BAAH) yard would be built on the north end of the Templeton Substation and connected to both the existing 230/70 kV transformer and the new 230/70 kV transformer at the new substation. A second transmission line would then travel from the 70 kV BAAH yard to Paso Robles Substation where it would connect to a reconfigured 70 kV ring bus at Paso Robles. Because this option conceives of using the existing Templeton-Paso Robles 70 kV alignment, a second 70 kV circuit would have to be added and convert the existing single-circuit 70 kV line to a double-circuit 70 kV line. This second 70 kV line would provide an additional power flow path from Templeton Substation to Paso Robles Substation in the event of the loss of the existing Templeton-Paso Robles 70 kV power line, the loss of the existing Templeton 230/70 kV transformer, or the loss of the Templeton-Gates 230 kV and the Morro Bay-Templeton 230 kV transmission lines (see Exhibit 4-3.1a, Single Line Diagram for Templeton Substation Expansion, Option 1).

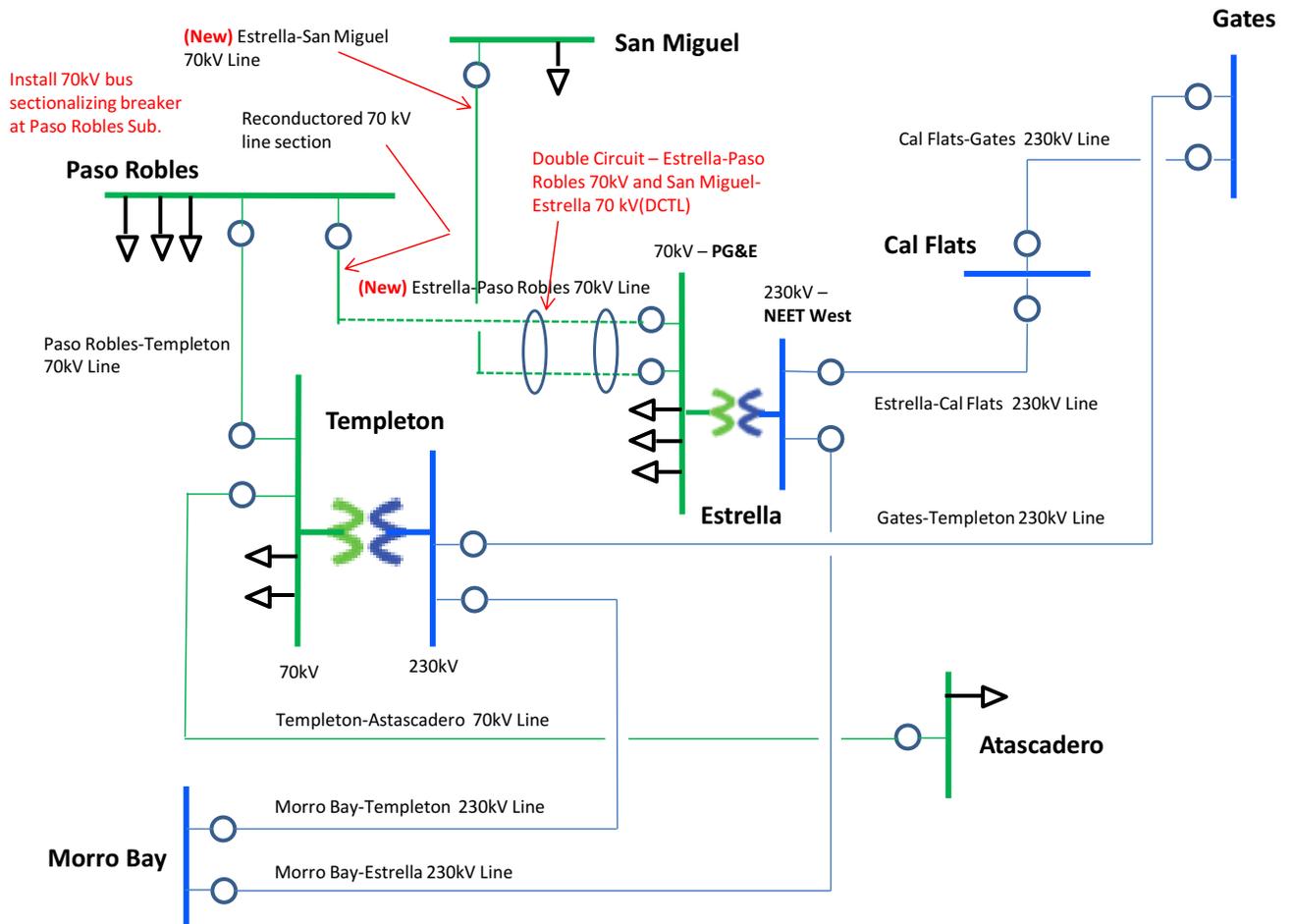
### Exhibit 4-3.1a: Single Line Diagram for Templeton Substation Expansion, Option 1



A shoo-fly would need to be constructed along the existing Templeton-Paso Robles 70 kV route to keep Paso Robles Substation energized while a double-circuit Templeton-Paso Robles line is constructed. Currently Paso Robles Substation has five 70 kV connections (or elements) connected to a single bus: three connections to the existing distribution transformers; one connection with the 70 kV line to San Miguel Substation; and one connection with the 70 kV line from Templeton Substation. Bringing one additional 70 kV line into Paso Robles Substation would increase the number of elements on the 70 kV bus to six, which requires expansion of the existing single bus at Paso Robles to a ring bus per Attachment 4-3.1b, PG&E Design Criteria #073131 – Bus Configuration.

By comparison, under the proposed Estrella project, a new double-circuit 70 kV line would be installed from Estrella Substation, with both circuits being fed from the Gates (now Cal Flats)-Morro Bay 230 kV transmission line. The new double-circuit line would tap into the existing San Miguel-Paso Robles 70 kV power line (see Exhibit 4-3.1b, Single Line Diagram for the Proposed Estrella Project). One of the new circuits would tie in and maintain service to the San Miguel Substation and the other would tie in and provide the additional power flow path to Paso Robles Substation.

### Exhibit 4-3.1b: Single Line Diagram for the Proposed Estrella Project



From the point where the double-circuit line from the new 230/70 kV transformer substation would tie into the 70 kV line serving Paso Robles Substation, the existing power line would need to be reconducted back to Paso Robles Substation. This would not add an additional 70 kV connection to Paso Robles Substation, so expansion of the existing single bus at the substation to a ring bus would not be required under PG&E’s bus design criteria.

A similar grid modification would be accomplished under the Templeton Expansion Alternative by running a new double-circuit 70 kV line from Templeton Substation to Paso Robles Substation along the South River or Creston route alternative (see Exhibit 4-3.1c, Single Line Diagram for Templeton Expansion, Option 2). The new double-circuit line would tap into the existing San Miguel-Paso Robles 70 kV power line. One of the new circuits would tie in and maintain service to the San Miguel Substation and the other would tie in and provide the additional power flow path to Paso Robles Substation. From the point where the new double-circuit 70 kV line from Templeton Substation would tie into the existing San Miguel-Paso Robles 70 kV line, the existing power line would need to be reconducted back to Paso Robles Substation. Similar to the proposed Estrella project, this would not add an additional 70 kV connection to Paso Robles

Substation so expansion of the existing single bus at the substation to a ring bus would not be required under PG&E's bus design criteria.

**Extent to which each routing option would meet NERC violations that are mandatory to address:** In order to mitigate the identified reliability concerns, the options being considered should provide a new source of electric power to Paso Robles Substation as well as transformer redundancy at Templeton Substation (or adjacent location) along with bus upgrades to ensure that any of the following outages do not result in loss of electrical power at Paso Robles Substation:

Critical contingencies and event categories<sup>1</sup>:

- |  |    |
|--|----|
| • Templeton-Paso Robles 70 kV Line           | P1 |
| • Templeton 230/70 kV Transformer Bank No. 1 | P1 |
| • Templeton 230 kV bus                       | P1 |
| • Templeton 70 kV bus                        | P2 |
| • Templeton 70 kV Circuit Breaker No. 12     | P2 |

Please note that, although any option that involves converting the existing single-circuit Templeton-Paso Robles 70 kV pole line into a double-circuit pole line would address the single line outage (N-1) of the Templeton-Paso Robles 70 kV Line, it would not address a double line outage (N-2) that would occur when the two lines on the pole line fail, or are deenergized for maintenance, such as when a pole breaks and brings down both lines simultaneously or when the pole or pole hardware needs to be replaced. This N-2 event, similar to the current single line situation, would then result in the interruption of power at Paso Robles Substation. While NERC and CAISO planning standards do allow for load to be dropped for this N-2 contingency, a double-circuit pole line arrangement is not recommended in this situation as electric customers in this area would still be susceptible to poor reliability for any issues on the new double-circuit pole line and the limited transmission load serving capabilities from San Miguel Substation. The better design in this case is to have the new line to Paso Robles travel a different alignment in order to have a diverse and more reliable source of power to customers served out of Paso Robles Substation.

Option 1 – Templeton Expansion - New Substation located across from Templeton Substation. New single 70 kV circuit from Templeton Substation to Paso Robles Substation with Paso Robles 70 kV bus converted to a ring configuration. (See Exhibit 4-3.1a, Single Line Diagram for Templeton Expansion Option 1).

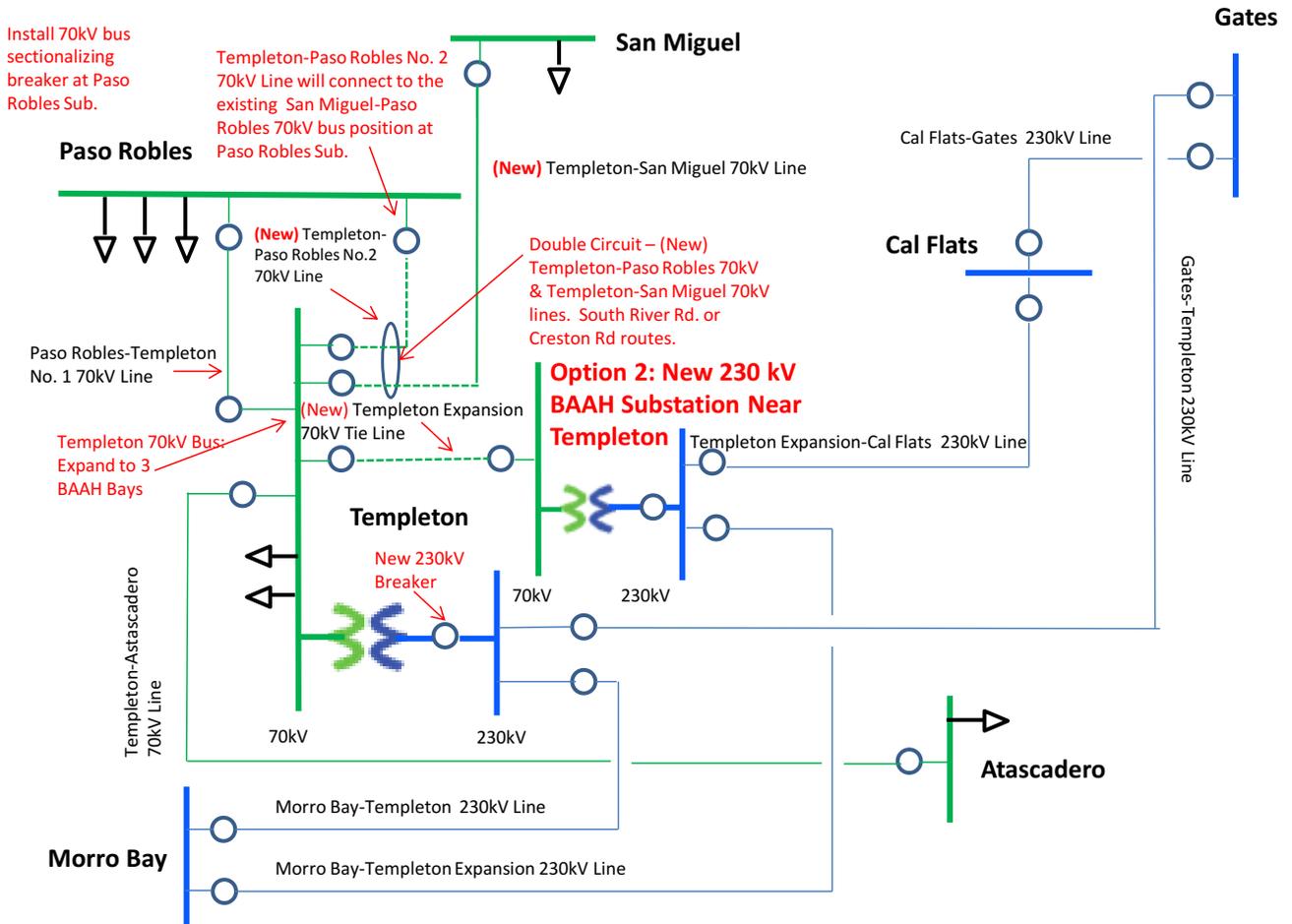
- P1 (Templeton-Paso Robles 70 kV line): The issue is mitigated due to an additional line from Templeton to Paso Robles. However, if the line is on the same poles, a single pole failure would result in the loss of both lines and would have the same effect as today.
- P1 (Templeton 230/70 kV Bank No. 1 & Templeton 230 kV bus): These issues are mitigated due to the additional, new 230 kV BAAH substation located across from Templeton Substation.

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<sup>1</sup> See letter from CAISO responding to the CPUC dated February 23, 2018 (Attachment 4-3.1c)

- P2 (Templeton 70 kV bus, Templeton 70 kV Circuit Breaker No. 12): These issues are mitigated due to the installation of a 70 kV BAAH yard at Templeton Substation.

**Exhibit 4-3.1c: Single Line Diagram for Templeton Substation Expansion, Option 2**



Option 2 – Templeton Expansion - New 230 kV Substation located across From Templeton Substation. New double-circuit 70 kV line from Templeton Substation connecting into the San Miguel-Paso Robles 70 kV line with no bus work at Paso Robles Substation. (See Exhibit 4-3.1c, Single Line Diagram for Templeton Expansion Option 2).

- P1 (Templeton-Paso Robles 70 kV line): The issue is mitigated due to an additional line from Templeton to Paso Robles.
- P1 (Templeton 230/70 kV Bank No. 1 & Templeton 230 kV bus): These issues are mitigated due to the additional, new 230 kV BAAH substation located across from Templeton Substation.
- P2 (Templeton 70 kV bus, Templeton 70 kV Circuit Breaker No. 12): These issues are mitigated due to the installation of a 70 kV BAAH yard at Templeton Substation.

- b. The PEA is accurate in indicating 60 MW to 70 MW would be at risk.

The Paso Robles area receives its electrical power primarily from the local Templeton 230/70 kV Substation and, to a much lesser degree, from the Gates 500/230/70 kV Substation located in Fresno County. Paso Robles and San Miguel substations are electrically 4.8 and 14.7 miles from Templeton Substation, respectively. From the Fresno area, Paso Robles and San Miguel substations are electrically 60.1 and 50.2 miles from Gates Substation, respectively. The electrical supply from Gates Substation to Paso Robles Substation is comprised of three lines: the Gates-Coalinga #1 70 kV line, the Coalinga #1-San Miguel 70 kV line, and the San Miguel-Paso Robles 70 kV line, which has a summer normal rating of 36.0 MVA and emergency rating of 41.7 MVA.

As PG&E and the CAISO have identified in analysis of this project, various transmission equipment outages in the local area remove the primary source to Paso Robles and would result, if left unmitigated, in system overloads and extremely unacceptable low voltages, which severely limits the transmission load serving capability in this local area. The main reason for the voltages to depress so low after these outages is that lines from Gates Substation, which become the only feed to both San Miguel and Paso Robles Substations, are extremely long.

For instance, the power flow case for 2022 used for transmission planning analysis in the 2017 assessment shows that the net load modeled (already accounting for DERs and DGs) at San Miguel is 11.1 MW, Paso Robles is 67.1 MW, and Templeton is 69.4 MW. If any of the outages listed below were to occur, the San Miguel-Paso Robles 70 kV Line is only able to serve 8.5 MW out of 67.1 MW at Paso Robles due to resulting extremely low voltages when the distant Gates via Coalinga and San Miguel try to serve the considerable Paso Robles load. For the year 2027, the projected unserved load would increase by the net forecasted growth. Therefore, and as explained in the PEA, for the outages that remove the primary source to Paso Robles Substation it is expected that between 60 MW – 70 MW of electric load in the area is at risk of not being served.

Critical contingencies and event categories<sup>2</sup>:

- |  |    |
|--|----|
| • Templeton-Paso Robles 70 kV Line           | P1 |
| • Templeton 230/70 kV Transformer Bank No. 1 | P1 |
| • Templeton 230 kV bus                       | P1 |
| • Templeton 70 kV bus                        | P2 |
| • Templeton 70 kV Circuit Breaker No. 12     | P2 |

In addition, during a double line outage of the Morro Bay-Templeton 230 kV and Templeton-Gates 230 kV lines (P6 contingency category<sup>2</sup>), the San Miguel-Paso Robles 70 kV Line and the Atascadero-Templeton 70 kV Line remain as the only feeds for both Templeton and Paso Robles substations, which essentially have similar or worse effects.

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<sup>2</sup> See letter from CAISO responding to the CPUC dated February 23, 2018 (Attachment 4-3.1c)

It should be noted that currently PG&E relies on an Under Voltage Load Shedding Scheme (UVLS) to automatically drop the load at Paso Robles Substation to mitigate the voltage issues. The UVLS is designed to sequentially (and automatically) drop load at Paso Robles Substation until the 70 kV bus voltage at Paso Robles remains above an acceptable level of 63.5 kV for such transmission system emergency.

The UVLS is designed to trip the following specific elements every 2 seconds only if the Paso Robles 70 kV bus is less than 63.5kV:

1. Paso Robles Transformer Bank #3 will be tripped two seconds after the initial contingency
2. Paso Robles Transformer Bank #2 will be tripped two seconds after item #1
3. Paso Robles Circuits 1100, 1102, and 1103 will be tripped two seconds after item #2
4. Paso Robles Circuit 1101 will be tripped two seconds after item #3

Depending on real-time conditions (such as the loading at Paso Robles Substation and the 70 kV bus voltage at Coalinga Substation Bank #1), it is possible that this UVLS could progress through all four items listed in less than half a minute, in effect dropping the load at Paso Robles Substation in its entirety.

***Deficiency 4-3.2 (updated):***

*Templeton Expansion Alternative*

*Please resubmit the 8/28/17 response to 4-3(A) in a public format. Confidential cost information may be submitted separately as needed. This alternative will be disclosed to the public during the CEQA review process.*

*Please update the response submitted sufficiently to evaluate the Templeton Expansion Alternative in the EIR, including enough detail to determine if it would meet most of the basic project objectives; be feasible; and have less environmental impact than the proposed project. An environmental analysis will be completed on this alternative and documented in the EIR, including the two 70-kV routing alignments between Templeton and Paso Robles. In addition to the two alignments already provided, provide an alignment that assumes only the existing Templeton-Paso Robles 70-kV ROW would be used or would be used with minimal expansions as required. Shoo-fly line use should also be discussed as needed and an alignment(s) provided.*

*Provide a timeframe for submittal of the fully updated response and all associated environmental data. Include all GIS data.*

*Follow-Up Request:*

- a. Respond in full to this deficiency.*
- b. In addition, discuss how forecast peak load on Atascadero Substation could be alleviated with the addition of transformers at and adjacent to Templeton. The only substation forecast to exceed capacity by 2026 is Atascadero (Appendix G, Table 4). The forecast capacity exceedance is by only 0.06 MW.*

- c. *Similarly, discuss to what extent forecast peak load on Paso Robles Substation could be reduced by serving areas nearest to Templeton Substation that are currently served by distribution feeders from Paso Robles Substation. In addition, note that large-load projects 1 and 2 (2.39 MW, combined) and others are relatively close to Templeton Substation (Appendix G, Figure 6)*

**Response:**

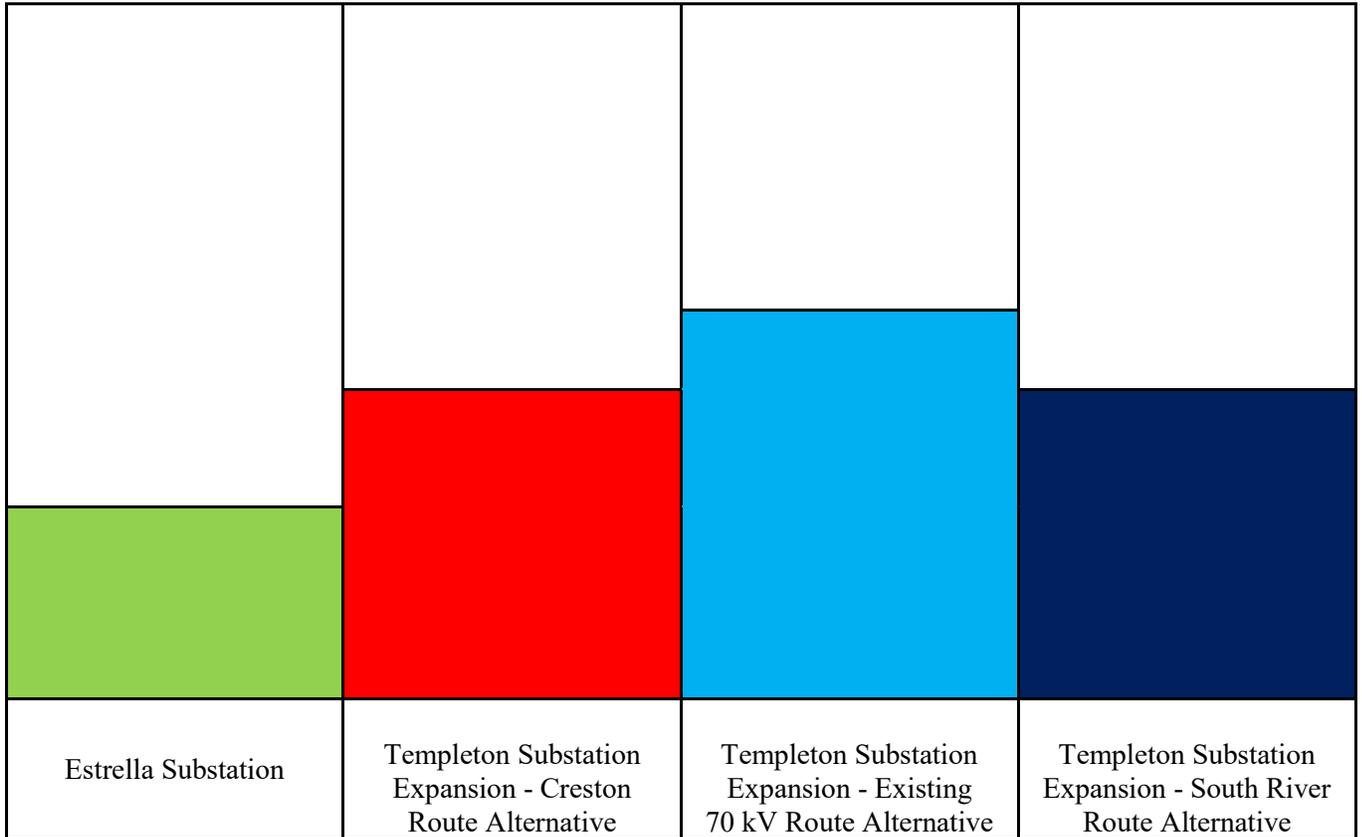
a. A public version of the applicants' August 28, 2017 response to Deficiency Item 4-3 in the CPUC's June 29, 2017 letter is provided as Attachment 4-3.2a: Public Response to Deficiency List No. 2. Note, however, that NEET West and PG&E are maintaining the confidential designation of Attachments 4-3a and 4-3b, which the applicants submitted as part of the August 28, 2017 response to Deficiency Item 4-3. In addition, PG&E submitted an updated confidential cost estimate as Attachment 4-3.1a: PG&E Confidential and Highly Commercially Sensitive Cost Information.

Although the detailed cost information is confidential, the applicants believe it would be helpful to show the relative estimated cost magnitude of the proposed Estrella project as compared to the three 70 kV route alternatives associated with the Templeton Substation Expansion alternative. Note that the estimated cost to construct the 230 kV interconnection and the 230/70 kV substation adjacent to Templeton Substation are assumed to be equivalent for the Estrella project and the Templeton Substation Expansion alternative. Accordingly, Exhibit 4.3-2a, Cost Magnitude of Proposed Projects Compared to Alternatives below compares the magnitude of PG&E's estimated costs to construct the proposed project and the listed alternatives. The chart indicates that all three of the Templeton Substation Expansion alternatives would cost substantially more than the proposed Estrella project, and that the Templeton Substation Expansion alternative that would convert the existing single-circuit Templeton-Paso Robles 70 kV line to a double-circuit line would cost the most by far.

Also see Attachments 4-3.2a: Public Response to Deficiency List No. 2 and 4-3.2b: Preliminary Templeton Alternatives Desktop Environmental Study. Exhibit 4-3.2b, Desktop Study Overview Map, provides an illustration of the study areas included in the desktop study. Additional information on the three route alternatives from Templeton Substation to Paso Robles Substation and the potential Paso Robles Substation expansion to accommodate these alternatives is described below. GIS data for the preliminary study areas and route locations for the alternatives is being provided separately. All information provided in response to Deficiency 4-3.2a is preliminary and subject to change based on CPUC requirements, final engineering, and other factors. The timeframe for submittal of the fully updated response and all associated environmental data was approved by CPUC on April 5, 2018:

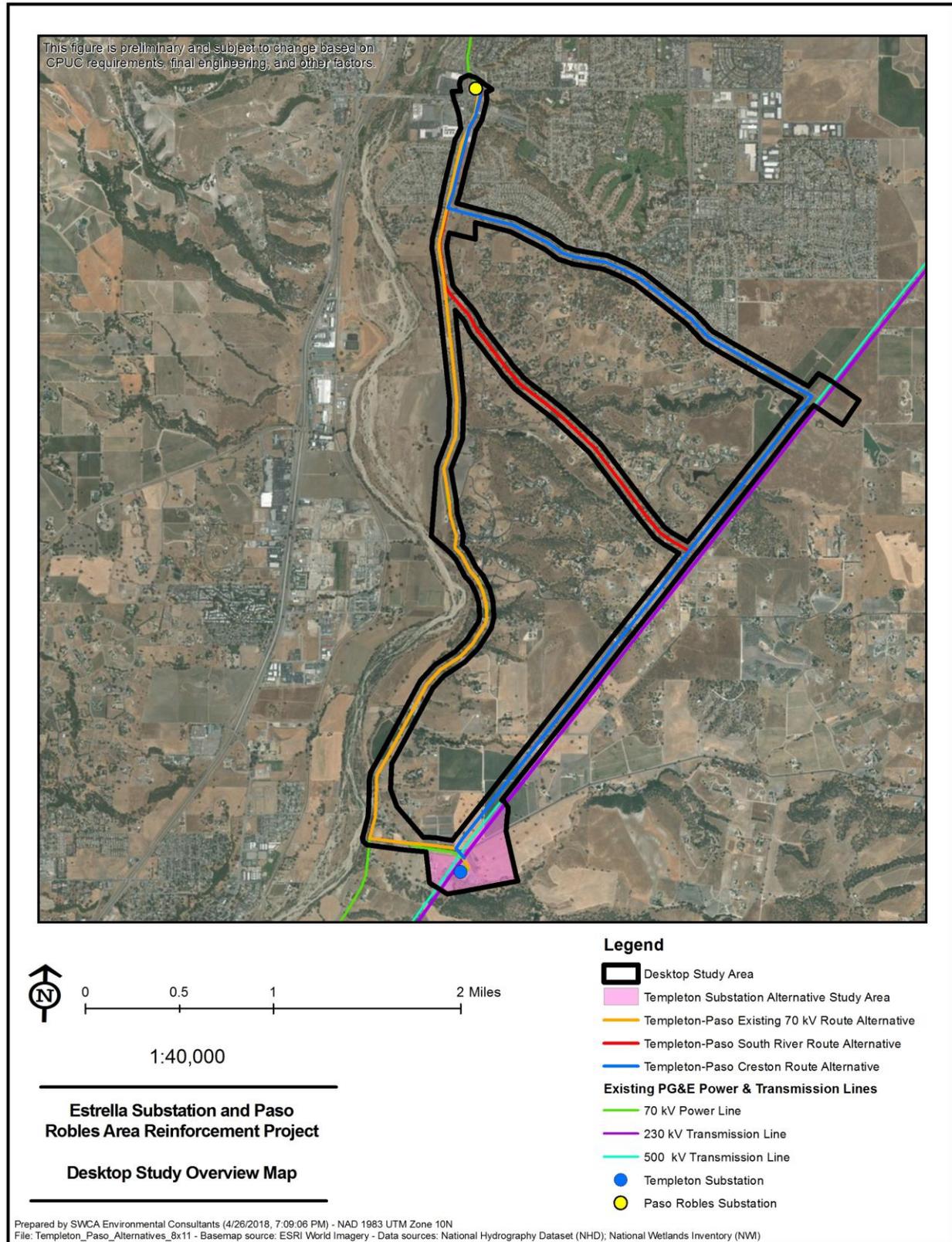
- Desktop and field-verified analysis with 30 percent engineering and agency consultation. Up to 1-year effort.
- PEA-level analysis with 60 percent engineering and agency consultation. Approximately 12 to 18 months to complete (if needed).

**Exhibit 4-3.2a: Cost Magnitude of Proposed Estrella Projects Compared to Templeton Substation Expansion Alternatives**



Note: Distribution components are included for Estrella Substation and the Templeton Substation Expansion Alternative.

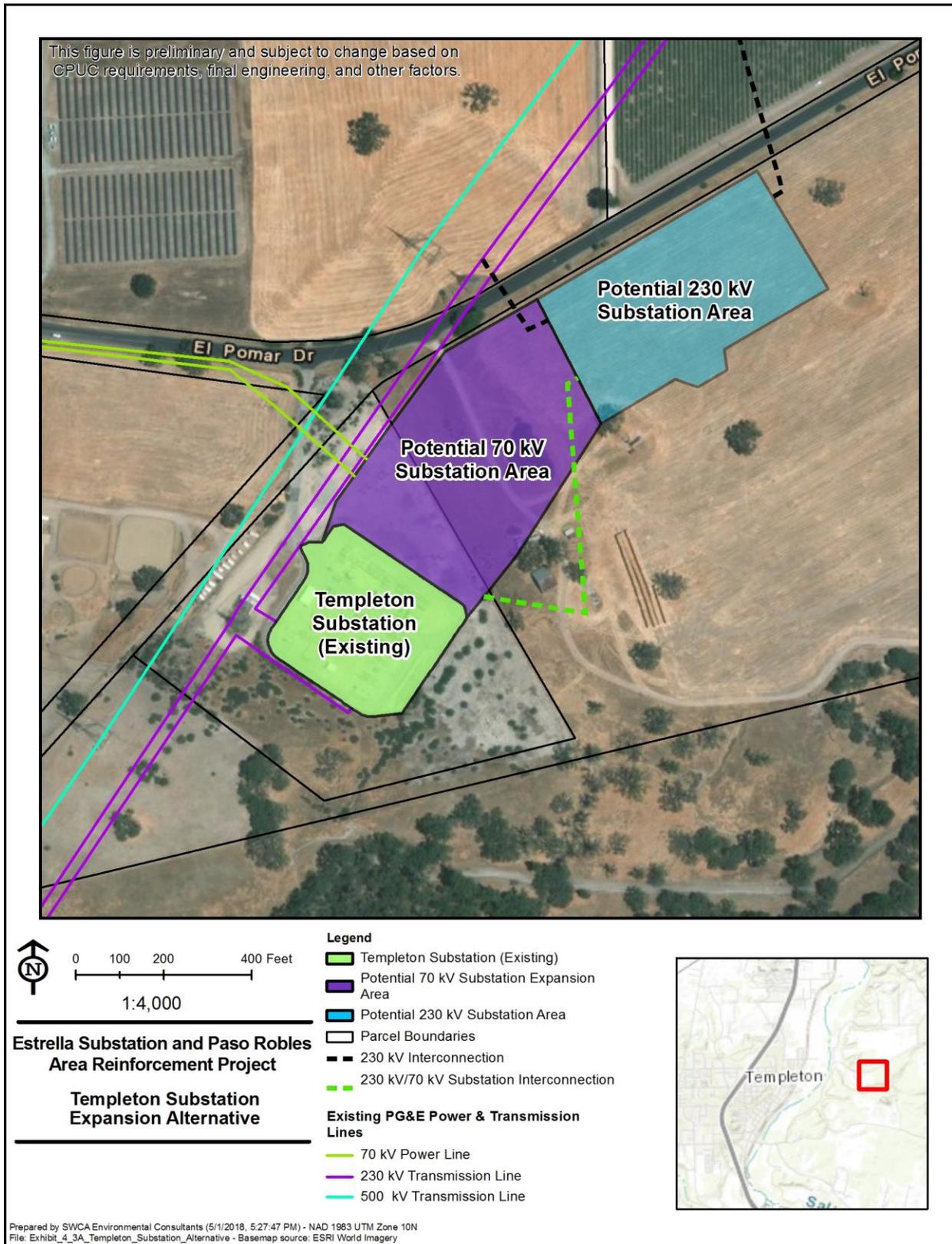
## Exhibit 4-3.2b: Desktop Study Overview Map



## **Templeton Substation Expansion Alternative**

The applicants developed a scope for this alternative that assumed a 230 kV/70 kV substation would be built near the existing Templeton Substation that contains essentially the same equipment as the proposed Estrella Substation (and contains room for future expansion), which would interconnect with the Morro Bay-Cal Flats #2 230 kV line and would interconnect with the existing Templeton Substation using a new 70 kV tie-line (see Exhibit 4-3.2c, Templeton Substation Expansion Alternative). The scope for this alternative assumed that PG&E would modify and expand Templeton Substation to operate in the same manner as the proposed Estrella 70 kV yard (BAAH 70 kV expansion at Templeton Substation). The scope of the 230 kV substation portion of the Templeton Substation Expansion Alternative is essentially identical to the scope of the 230 kV substation portion of the proposed project.

### Exhibit 4-3.2c: Templeton Substation Expansion Alternative



### **Templeton-Paso Existing 70 kV Route Alternative<sup>3</sup>**

The Templeton-Paso Existing 70 kV Route Alternative involves rebuilding the existing 70 kV single-circuit power line route that connects Templeton Substation to Paso Robles Substation and converting it into a double-circuit power line (see Exhibit 4-3.2d, Templeton-Paso Robles Existing 70 kV Route Alternative).

Currently the existing Templeton-Paso 70 kV power line is the main source of power for Paso Robles Substation. The existing San Miguel-Paso Robles 70 kV power line does not have enough capacity to support the demand at both San Miguel Substation and Paso Robles Substation. So currently, any work done on the existing Templeton-Paso 70 kV power line is limited to short durations and select times of year so other substations in the area can support the distribution customers that are currently being served by Paso Robles Substation. Converting the existing 70 kV power line to a new double-circuit 70 kV power line would require multiple outages for long durations of the existing line during the construction period.

To maintain the ability for Paso Robles Substation to serve customers during this construction period, a temporary power line (commonly known as a shoo-fly) would need to be constructed. The shoo-fly would be constructed near the existing line, and the power would be transferred to this temporary line while the new double-circuit line is being constructed. The section of new transmission line proposed along South River Road within the city limits would require construction of the shoo-fly line by adding structures on the east side of the road while constructing a double-circuit on the west side.

The current land rights that cover the existing Templeton-Paso 70 kV power line would need to be modified to cover this additional 70 kV power line and a temporary construction easement would be needed for locations where the shoo-fly needs to be installed on private property.

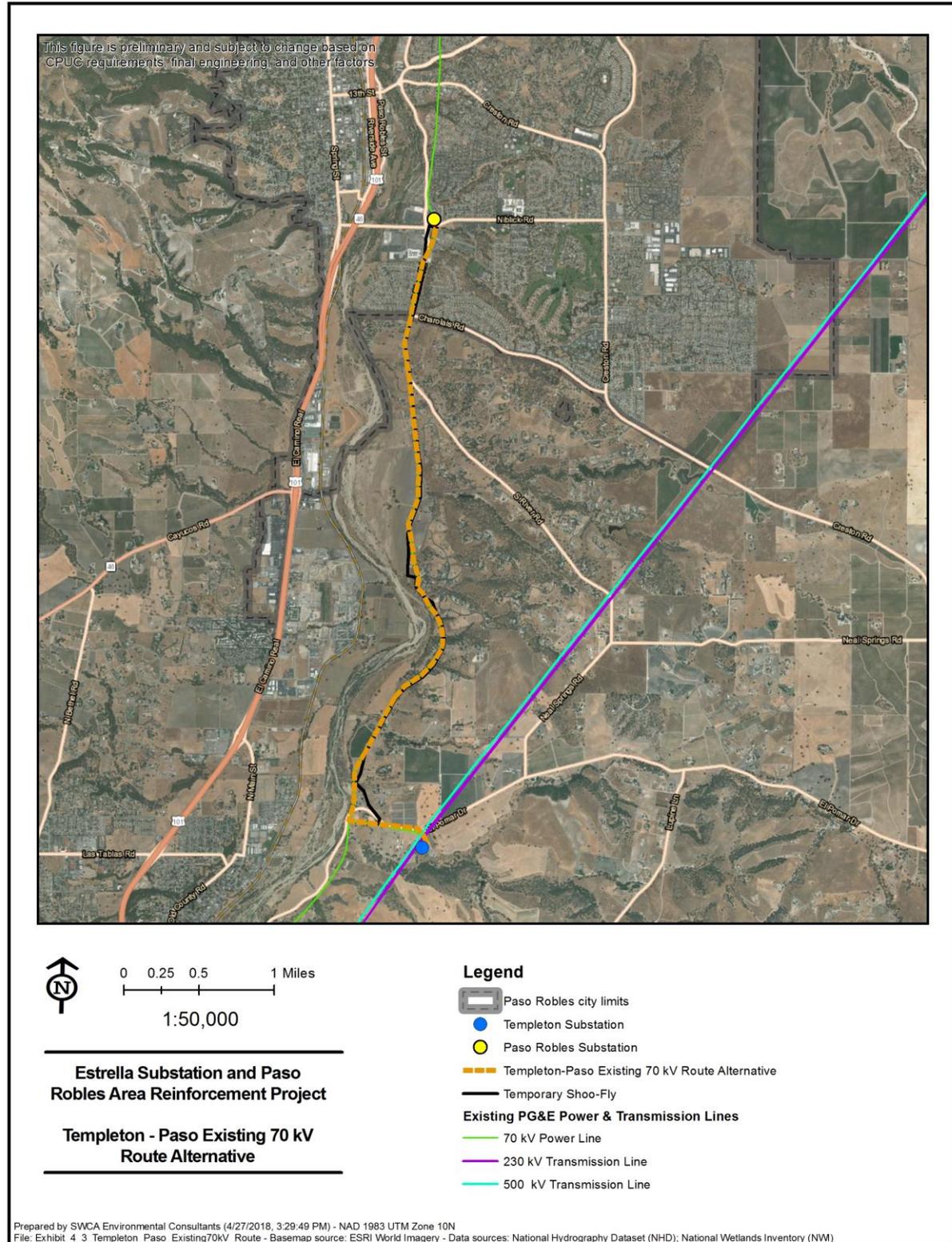
The Templeton-Paso Existing 70 kV Route Alternative starts at Paso Robles Substation located at the northeast corner of Niblick Road and South River Road in the City of Paso Robles and extends from the easterly side of the substation and continues southerly mostly on the west side of South River Road approximately 0.7 mile within the City of Paso Robles to the intersection of South River Road and Charolais Road. The route would continue southerly leaving the city limits along the west side of South River Road for approximately 0.5 mile, leaving South River Road and continuing southerly generally following Santa Ysabel Ave for approximately 0.5 mile at which point the route would continue southerly on private property approximately 3 miles to the Templeton tap point (point at which the line joins the Templeton-Atascadero 70 kV double-circuit line coming from Templeton Substation). At the Templeton tap point, the existing Templeton-Paso 70 kV power line would turn east and would be part of an existing double-circuit power line with the Templeton-Atascadero 70 kV power line that continues easterly approximately 0.5 mile to Templeton Substation. The new circuit would need to leave the existing pole at a point near the northeast corner of Vaquero Drive and El Pomar Drive, angle southeasterly and continue along the northern side of El Pomar Drive, and continue for approximately 0.5 mile to Templeton Substation. Alternatively, a new 70 kV power line would be built south of the existing double-circuit line for approximately 0.5 mile from the Templeton tap point to Templeton Substation, the

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<sup>3</sup> Templeton-Paso refers to Paso Robles-Templeton 70 kV line

existing Templeton-Atascadero 70 kV power line would be transferred to the new pole line, and the new Templeton-Paso 70 kV circuit would replace the Templeton-Atascadero 70 kV on the existing double-circuit pole line. PG&E engineering would need to confirm that the existing double-circuit poles can manage the conductor size of the alternative Templeton-Paso Robles 70 kV circuit. Compared to the proposed 70 kV power line route from Estrella Substation, this alternative is approximately 1.3 miles shorter in length (5.7 miles compared to 7 miles for Estrella). The 3-mile segment of existing 70 kV power line extending north from Paso Robles Substation to the proposed Estrella Substation tie-in point would not be reconducted under this alternative (see Exhibit 4-3.1a, Single Line Diagram for Templeton Expansion Option 1).

### Exhibit 4-3.2d: Templeton-Paso Existing 70 kV Route Alternative



## Templeton-Paso South River Route Alternative

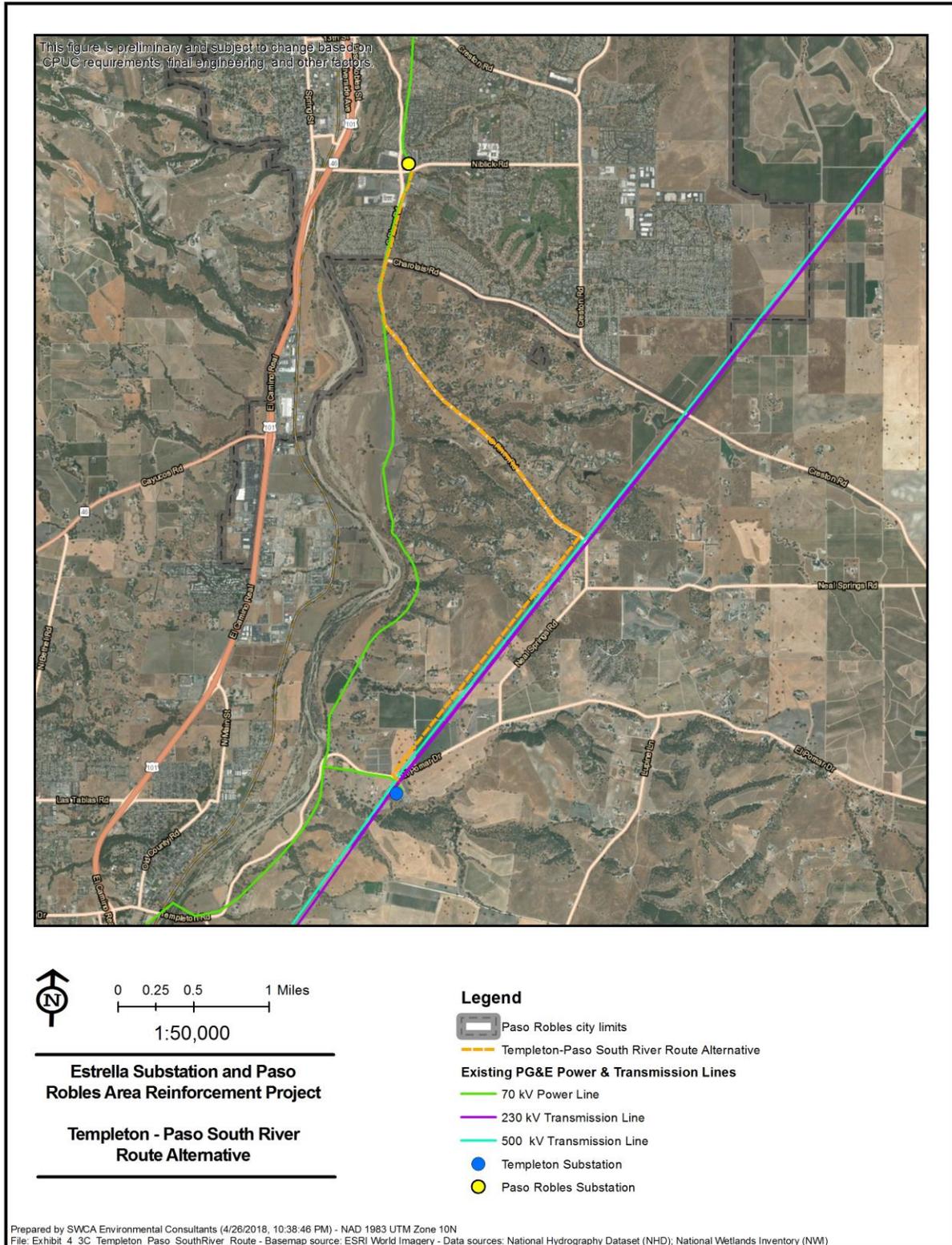
The Templeton-Paso South River Route Alternative is a 70 kV power line route that could connect Templeton Substation to Paso Robles Substation (see Exhibit 4-3.2e, Templeton-Paso South River Route Alternative). A double-circuit line is necessary to avoid expansion of Paso Robles Substation as discussed in the response to 4-3.1a. A new double-circuit 70 kV power line would follow the existing 500 kV and 230 kV transmission line corridor northeasterly out of Templeton Substation for approximately 2 miles to where it intersects with South River Road. Continuing at the intersection of the 500 kV and 230 kV transmission line corridor and South River Road, the new double-circuit 70 kV line would extend northwesterly along the southwesterly side of South River Road, through three homeowner associations (HOAs), to the intersection of Santa Ysabel Avenue and South River Road. The route would continue northerly along the easterly side of South River Road paralleling the existing Templeton-Paso Robles single-circuit 70 kV power line on the other side of South River Road until it reaches the city limits of Paso Robles at the intersection of Charolais Road and South River Road, at which point the route would continue northerly on the easterly side of South River Road for approximately 0.7 mile, terminating just north of Paso Robles Substation.

The new double-circuit line would tie into the San Miguel-Paso Robles 70 kV power line immediately adjacent to the north side of Paso Robles Substation and one circuit would create a San Miguel-Templeton 70 kV line and the other circuit would create a second Templeton-Paso Robles 70 kV line (see Figure 4-3.1c, Single Line Diagram for Templeton Expansion Option 2). A minor relocation of the existing Templeton-Paso Robles 70 kV Power Line would be required to accommodate this route.

A new section along South River Road, which already has one line of transmission poles for the existing Templeton-Paso Robles 70 kV line, would require adding structures on both sides of the road heading northwest to Paso Robles Substation. This would be the case for both the South River and Creston route alternatives.

The total length of the South River Route Alternative from Templeton Substation to Paso Robles Substation is approximately 5.2 miles. Compared to the proposed 70 kV power line route from Estrella Substation, this alternative is approximately 1.8 miles shorter in length (5.2 miles compared to 7 miles for Estrella). The 3-mile segment of existing 70 kV power line extending north from Paso Robles Substation to the proposed Estrella Substation tie-in point would not be reconductored under this alternative.

### Exhibit 4-3.2e: Templeton-Paso South River Route Alternative



## **Templeton-Paso Creston Route Alternative**

The Templeton-Paso Creston Route Alternative is a 70 kV power line route that could connect Templeton Substation to Paso Robles Substation (see Exhibit 4-3.2f, Templeton-Paso Creston Route Alternative). A double-circuit line is necessary to avoid expansion of Paso Robles Substation as discussed in the response to 4-3.1a. A new double-circuit 70 kV power line would follow the existing 500 kV and 230 kV transmission line corridor northeasterly out of Templeton Substation for approximately 3 miles to where it intersects with Creston Road. Continuing at the intersection of the 500 kV and 230 kV transmission line corridor and Creston Road, the route would utilize the existing distribution pole line alignment to generally travel along the southerly side of Creston Road for approximately 0.8 mile, then leaving Creston Road and continuing straight along the existing distribution pole line for approximately 1.4 miles on the southerly side of Charolais Road.

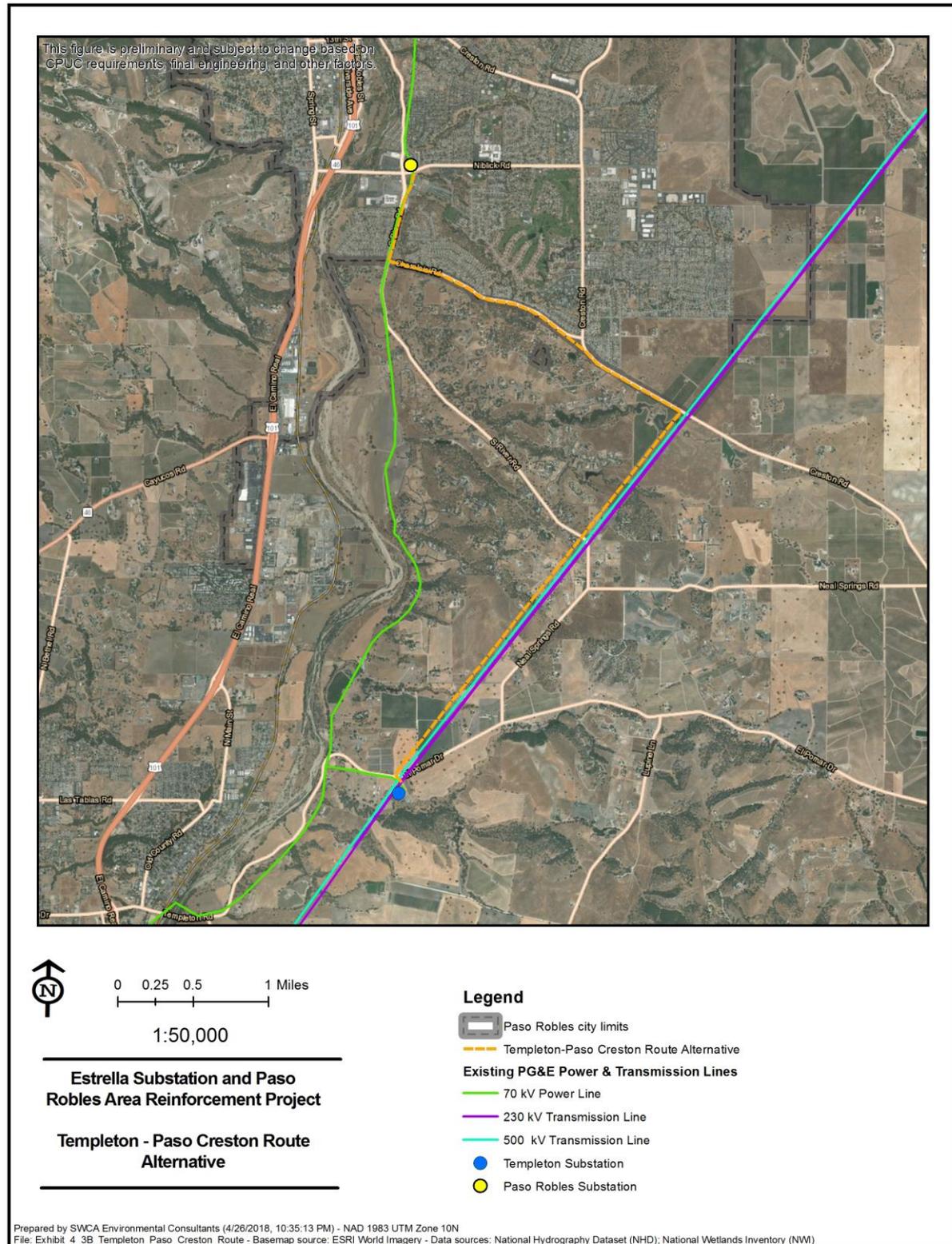
At the intersection of Charolais Road and South River Road, the route would travel northerly along the easterly side of South River Road for approximately 0.7 mile, where it would end north of Paso Robles Substation.

The new double-circuit line would tie into the San Miguel-Paso Robles 70 kV power line immediately adjacent to the north side of Paso Robles Substation and one circuit would create a San Miguel-Templeton 70 kV line and the other circuit would create a second Templeton-Paso Robles 70 kV line (see Exhibit 4-3.1c, Single Line Diagram for Templeton Expansion Option 2). The Creston Route Alternative would not require any rebuild of the San Miguel-Paso Robles 70 kV Power Line. A minor relocation of the existing Templeton-Paso Robles 70 kV Power Line would be required to accommodate the Creston Road Route Alternative.

A new section along South River Road, which already has one line of transmission poles for the existing Templeton-Paso Robles 70 kV line, would require adding structures on both sides of the road heading northwest to Paso Robles Substation. This would be the case for both the South River and Creston route alternatives.

The total length of the Creston Route Alternative from Templeton Substation to Paso Robles Substation is approximately 6.2 miles. Compared to the proposed 70 kV power line route from Estrella Substation, this alternative is approximately 0.8 mile shorter in length (6.2 miles compared to 7 miles for Estrella). The 3-mile segment of existing 70 kV power line extending north from Paso Robles Substation to the proposed Estrella Substation tie-in point would not be reconducted under this alternative.

## Exhibit 4-3.2f: Templeton-Paso Creston Route Alternative



## Potential Paso Robles Substation Expansion

Paso Robles Substation currently has a 70 kV single bus with three 70 kV/12 kV transformers and two 70 kV lines connected to the bus (one 70 kV line from San Miguel Substation and one from Templeton Substation). In order to connect a new single-circuit 70 kV line from Templeton Substation to Paso Robles Substation, PG&E's design standard requires converting the single bus to a 6-breaker ring bus configuration, conforming to PG&E's Design Criteria #073131- Bus Configuration provided in Attachment 4-3.1b.

The design standard requires a 6-breaker ring bus because the single bus configuration has the lowest reliability among all potential substation bus configurations. With a single bus, a single event, such as a bus fault, will cause the entire substation (three transformers and two lines in the case of the existing Paso Robles Substation) to be tripped off. The reliability of a single bus design is inversely proportional to the number of elements connected to it because each element has a given probability of failure. The more elements that are connected to a single substation bus, the higher the probability that any one element could fail and cause the entire substation to trip offline. For this reason, adding a sixth element to the single bus at Paso Robles Substation (e.g., a new 70 kV line circuit) would decrease the reliability of the substation. Converting the existing single bus at Paso Robles Substation to a ring bus is a reasonably economic way to accommodate a connection to a new single-circuit 70 kV line from Templeton Substation. As recognized in industry practice, the ring bus configuration is more reliable than the single bus configuration at a reasonable additional cost.<sup>4</sup>

The recommendation to accommodate the new Templeton-Paso Robles 70 kV line by converting the single bus at Paso Robles Substation to a 6-breaker ring bus assumes that the combination of transformers and transmission lines in the substation would not exceed six in the ultimate build out. If more than six were anticipated, a BAAH (breaker-and-a-half) bus scheme would be needed in order to maintain or increase reliability. A BAAH design would be higher in cost and also require more land to install than a ring bus.

To convert the existing single bus to a ring configuration at Paso Robles Substation, PG&E would have to purchase land outside and to the east of the existing substation across Cary Street as well as that portion of Cary Street. The substation fence would be extended to include the new property. In addition, the existing land to the east across Cary Street has a number of overhead and underground distribution circuits, including four pull boxes (some with underground switches), underground natural gas lines, one or possibly more underground water lines, all of which would have to be relocated. There may also be additional unmarked utilities in the expansion area. The extent of work involving relocation requires further study due to the complexity and challenges identified during the initial evaluation. In addition, the land to the east of Cary Street contains a heritage oak tree that would need to be removed as well as significant slopes. Additional engineering and design work is required to determine if sufficient space would be available for the ring bus expansion after tree removal, grading, and shoring of the property.

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<sup>4</sup> McDonald, J. 2007. Electric Power Substations Engineering, Electric Power Engineering Handbook, 2nd Edition. Published by CRC Press.

Assuming the challenges to utilize the land to the east of Paso Robles Substation could be overcome, a new 70 kV bus section would have to be installed together with three 70 kV breakers and their associated disconnect switches. This new 70 kV bus section would be connected to the existing 70 kV bus inside the current substation and one additional breaker would be added into the existing bus to form a 6-breaker ring bus. See Exhibit 4-3.2g, Paso Robles 70 kV Substation Expansion Alternative, for a layout diagram of the proposed 6-breaker ring bus configuration at Paso Robles Substation.

Because of the extremely limited space, some of the new 70 kV line sections would have to be undergrounded using 70 kV solid dielectric cables and pothead structures. A new Modular Protection, Automation and Control (MPAC) building with Sustainable Modular Protection (SMP) would be needed for the new 70 kV ring bus. New wiring from all six breakers, such as control wires, current transformer and voltage signal wires, would travel to the inside of the new MPAC building. Also, the ground grid of the existing substation would need to be connected to the ground grid of the substation expansion. An in-depth study would be needed to develop a construction sequence plan to rule out any possible “fatal flaws” to completing the work.

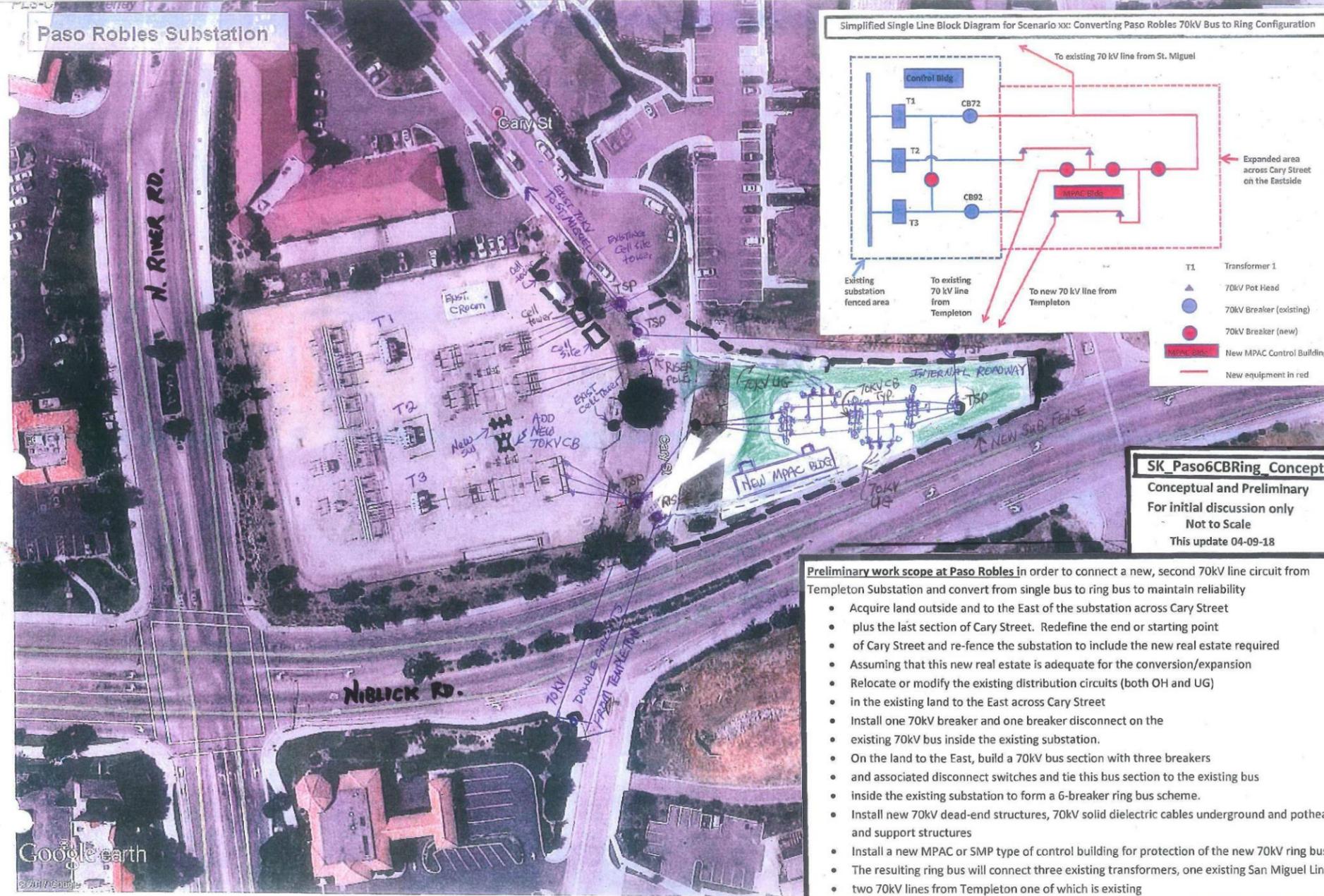
In regard to a question raised, Why a Main and Transfer bus could not be installed inside the existing Paso Robles Substation?; the short answer is that there is not enough space inside the substation to install a transfer bus. A Main and Transfer bus installation still requires an internal roadway on the outside of each bus in order to perform operating and maintenance activities. If a transfer bus was installed in Paso Robles Substation in the area currently occupied by the internal roadway, in parallel with the existing 70 kV bus, and between the 70 kV bus and the substation fence on the east side, there would not be room to create a new internal roadway outside the proposed transfer bus for operation and maintenance. In addition, installing a transfer bus would require the installation of new switching devices, such as a bus tie breaker, to improve the maintenance process by moving the line of the circuit breaker to be maintained to the transfer bus and then protected by the tie breaker. This bus tie breaker would require one additional line breaker bay space, which is not currently available.

Furthermore, a Main and Transfer bus is no more reliable than a single bus. In a Main and Transfer bus design, where all circuits are connected to the Main (single) bus, a single event such as a bus fault will trip all the circuits connected to the Main (single) bus, thus rendering the substation out of service. The reliability of the existing single bus or transfer bus would be degraded by the connection of one additional 70 kV line coming from Templeton, as discussed above. Therefore, no reliability benefit would be gained over the existing single bus by installing a Main and Transfer bus at Paso Robles Substation.

Installation of the new Templeton-Paso 70 kV line into the existing open bay on the single bus has been reviewed and it does not meet PG&E’s current design standards as described above. The current design of Paso Robles Substation met PG&E’s design standards at the time it was built in the early 1950s, but the design standard has changed since then. Adding a sixth element would degrade the reliability of the single bus substation.

**Exhibit 4-3.2g: Paso Robles Substation Expansion Alternative**

This figure is preliminary and subject to change based on CPUC requirements, final engineering, and other factors.



1:1,100

0 50 100 200 Feet

**Estrella Substation and Paso Robles Area Reinforcement Project**  
**Paso Robles 70 kV Substation Expansion Alternative**  
**Ring Bus**

**Legend**

Additional Property Needed

**SK\_Paso6CBRing\_Concept**  
 Conceptual and Preliminary  
 For initial discussion only  
 Not to Scale  
 This update 04-09-18

- Preliminary work scope at Paso Robles** in order to connect a new, second 70kV line circuit from Templeton Substation and convert from single bus to ring bus to maintain reliability
- Acquire land outside and to the East of the substation across Cary Street plus the last section of Cary Street. Redefine the end or starting point of Cary Street and re-fence the substation to include the new real estate required
  - Assuming that this new real estate is adequate for the conversion/expansion
  - Relocate or modify the existing distribution circuits (both OH and UG) in the existing land to the East across Cary Street
  - Install one 70kV breaker and one breaker disconnect on the existing 70kV bus inside the existing substation.
  - On the land to the East, build a 70kV bus section with three breakers and associated disconnect switches and tie this bus section to the existing bus inside the existing substation to form a 6-breaker ring bus scheme.
  - Install new 70kV dead-end structures, 70kV solid dielectric cables underground and potheads and support structures
  - Install a new MPAC or SMP type of control building for protection of the new 70kV bus
  - The resulting ring bus will connect three existing transformers, one existing San Miguel Line and two 70kV lines from Templeton one of which is existing



## Summary

Although the discussion of the Templeton Substation Expansion Alternative, including the three 70 kV line route alternatives and the potential expansion of Paso Robles Substation, is preliminary, it identifies a number of disadvantages of this alternative as compared to the proposed Estrella project. First, all of the Templeton Substation Expansion alternatives cost significantly more than the proposed project and there is lack of site control to expand at either Paso Robles Substation or Templeton Substation. Second, converting the existing Templeton-Paso Robles 70 kV line to a double-circuit line would create an N-2 contingency reliability risk and it would degrade the reliability of Paso Robles Substation unless the existing single bus was converted to a ring bus (which may not be feasible). Third, as discussed in Appendix G, adding new distribution feeders at Templeton Substation to meet forecasted demand increase is suboptimal because of the reliability risk associated with long feeder lines and the time to trouble shoot and restore long circuits during power outages. Fourth, the Preliminary Environmental Study for Templeton Alternatives provided as Attachment 4-3.2b describes a number of potential environmental constraints, including potential impacts to wildlife habitat, heritage oaks, and potentially jurisdictional waters, as well as to cultural and paleontological resources, among others. In summary, constructing the Templeton Substation Expansion alternative may cause significant environmental impacts, it would cost more and result in a less reliable DPA than constructing the proposed Estrella project, and there is lack of site control to expand at either Paso Robles Substation or Templeton Substation.

**b. In addition, discuss how forecast peak load on Atascadero Substation could be alleviated with the addition of transformers at and adjacent to Templeton. The only substation forecast to exceed capacity by 2026 is Atascadero (Appendix G, Table 4). The forecast capacity exceedance is by only 0.06 MW:** While additional capacity at or near Templeton Substation could be utilized to relieve and serve load presently on Atascadero Substation, doing so would not address growth in and around Paso Robles like the Estrella Substation option. Moreover, all three Atascadero distribution circuits are located south and west of Templeton Substation. Load transfers from one or more Atascadero distribution circuits would require new, or reinforced existing, Templeton distribution circuit(s) in the direction of Atascadero Substation.

The following statement made in this request requires some context so as not to be misleading: “The only substation forecast to exceed capacity by 2026 is Atascadero (Appendix G, Table 4). The forecast capacity exceedance is by only 0.06 MW.” As noted in Appendix G, overloads at individual transformer banks within the DPA become unavoidable when the DPA load reaches approximately 95 percent of the total aggregate capacity of the substation banks in the DPA. For this reason, PG&E defines “available DPA capacity” as 95 percent utilization, which is 95 percent of the aggregated transformer bank capacity of all the substations in the DPA. The total aggregate bank capacity in the Paso Robles DPA is 223.74 MW, but the available DPA capacity – i.e., the amount of MW below which transformer bank overloads become unavoidable – is 212.55 MW. As noted in Appendix G, Table 4, the total forecasted load for all four substations in 2026 is 216.85 MW, which is over 4 MW greater than the available DPA capacity. A note has been added to Table 4 to indicate that the individual capacity figures have not been reduced to 95 percent utilization.

c. **Similarly, discuss to what extent forecast peak load on Paso Robles Substation could be reduced by serving areas nearest to Templeton Substation that are currently served by distribution feeders from Paso Robles Substation. In addition, note that large-load projects 1 and 2 (2.39 MW, combined) and others are relatively close to Templeton Substation (Appendix G, Figure 6):** While additional capacity at or near Templeton Substation could be utilized to serve existing and planned new loads between Templeton and Paso Robles Substations, this would require new, or reinforced existing, Templeton distribution circuits with which to relieve Paso Robles circuits that currently serve the area south of Paso Robles Substation. Freed-up capacity at Paso Robles Substation could then be used to serve areas of anticipated growth north and east of Paso Robles Substation, but difficulties and complexities of routing new or rebuilt feeders from Paso Robles Substation to the growth areas exist, as detailed in Appendix G, Section V, A and B. Additionally, one or more new Templeton feeders would still be required to adequately serve known and anticipated growth north and east of the City of Paso Robles. This would make for more excessively long feeders that would be very expensive to construct and that would compound the reliability issues already present in the DPA due to long feeders.

## **Appendix G: Distribution Need Analysis**

### ***Deficiency Appendix G (1.1):***

a. *Please recompile and resubmit Appendix G. Include a table that lists deficiency items G1–G16 and all follow-up requests in the current deficiency letter and identifies where updates to Appendix G were made in response to the deficiency items. The responses to the deficiency items must be included within the body of the report. This was the intention of the request on 6/29/17. The request was apparently misunderstood.*

*Provide a track-changes version of the fully updated report (and a clean version) with the table of updates when submitting it to Dockets Office. Use the May 2017 version of Appendix G (the first version) to show track changes.*

*Include Attachment G(4), the PG&E standard, as an attachment to the updated report.*

b. *File the fully updated PEA Appendix G and all attachments to the Appendix G study with the CPUC's Docket Office.*

### *Follow-Up Request:*

*See additional revisions to Appendix G requested below.*

### **Response:**

See Attachment G (1.1): Updated Appendix G, Distribution Need Analysis (clean and track change versions).

### ***Deficiency Appendix G (2.1):***

a. *We acknowledge the Commission's directive to use the IEPR Mid-case DER forecasts in PG&E's A.15-07-006 proceeding, which are currently based on the 2016 IEPR update.*

Please clearly list the “certain adjustments” PG&E made to the IEPR forecast based on data concerning local load growth, solar energy assumptions, and any other affecting factors.

- b. Provide the step-by-step methodology used for deriving the updated load growth curve in Figure 5 of the Updated, August 2017, PEA Appendix G. Include the methodology used to determine the reduction in assumed solar PV. Please provide an accompanying table showing the load components (i.e. initial IEPR forecast figure, assumed DERs, New Loads, etc.) which should sum to the given year’s total LoadSEER Forecast.
- c. Please plot the new load forecast curve against the now removed May 2017, Appendix G, Figure 5, which showed the increments of DER forecasts under the “prior” DRP methodology. This will allow for visual comparison of the May 2017 Appendix G results and August 2017 Appendix G results.
- d. What “type” of load forecast are they using in the LoadSEER? Coincident peak? Non-Coincident? Data taken directly from IEPR? We assume, Non-Coincident Peak, but please verify.
- e. Provide a chart similar to the Updated LoadSEER Forecast in Figure 6 (August 2017 Appendix G) but for each substation in the Paso Robles DPA, including the available capacity of each substation. The available capacities listed should add up to 212.55 MW. If not, please explain why. Note that the capacity values in the legends provided with some of the figures submitted with the May 2017 version do not add up to 212.55.

Provide an unlocked Excel spreadsheet of the values used to create Figure 6 and each of the substation figures provided (all the charts included in the updated report). This should be submitted with the refilled Appendix G.

- f. Historical Recorded Peak Loads: Provide a table outlining the available capacity and load similar to the Forecasted Load table accompanying the chart in Figure 6 (August 2017 Appendix G) but for each year since 2007 (2007, 2008, 2009, through 2016).

Follow-Up Request:

- g. Complete
- h. Complete
- i. Complete
- j. Complete
- k. Provide the unlocked Excel spreadsheets as requested in Deficiency Letter 3. In addition, all the values and functions must be included in the fully functional Excel spreadsheets provided.
- f1. Provide the 2017 recorded peak load and update Table 2.
- f2. In addition, add a footnote to Table 2 that explains what improvements or planning changes were made in 2010 to increase system capacity from 197.51 MW to 212.55 MW.

**Response:**

- e. PG&E is working with the CPUC to provide the distribution load data.
- f1. The 2017 recorded peak load for Paso Robles DPA was 195.06 MW. Table 2 has been updated to include the 2017 recorded peak load.
- f2. The following footnote was added to Table 2: Paso Robles Bank 1 was replaced in 2010 with a 30 MVA transformer unit, bringing available DPA capacity to 212.55 MW.

***Deficiency Appendix G (3.1):***

- a. *Distribution Data: It appears that this deficiency item was unclear. Please respond to this updated request in full.*

*Provide data on the feeder lines out of the existing Paso Robles Substation, preferably in a form that can be read by the PowerWorld powerflow model, PWD or EPC (GE) files. Please include projected loads at each delivery point, conductor impedance data, line lengths, conductor size, etc.*

*Please provide a one-line diagram and location map as well. Please provide details of how feeders from the proposed Estrella Substation would re-connect to the existing feeders and distribution points. Include powerflow data for 230-kV system serving the area.*

*File these data with the fully updated Appendix G. As needed, identify the data that the Applicants believe are confidential and explain why.*

- b. *Templeton Alternative: Please advise on possibility (or difficulties) of supporting the potential feeder overloads from the Templeton Substation to the south. Include this discussion in the fully updated Appendix G.*
- c. *Battery storage alternative: Please advise on location and necessary size of battery storage sites that could delay the need for distribution re-enforcement. See also Deficiency Items G-14 to G-16.*

*Follow-Up Request:*

- a. *No response provided. Please provide the data requested.*
- b. *Complete*
- c. *No response provided. Please provide the data and analyses requested.*

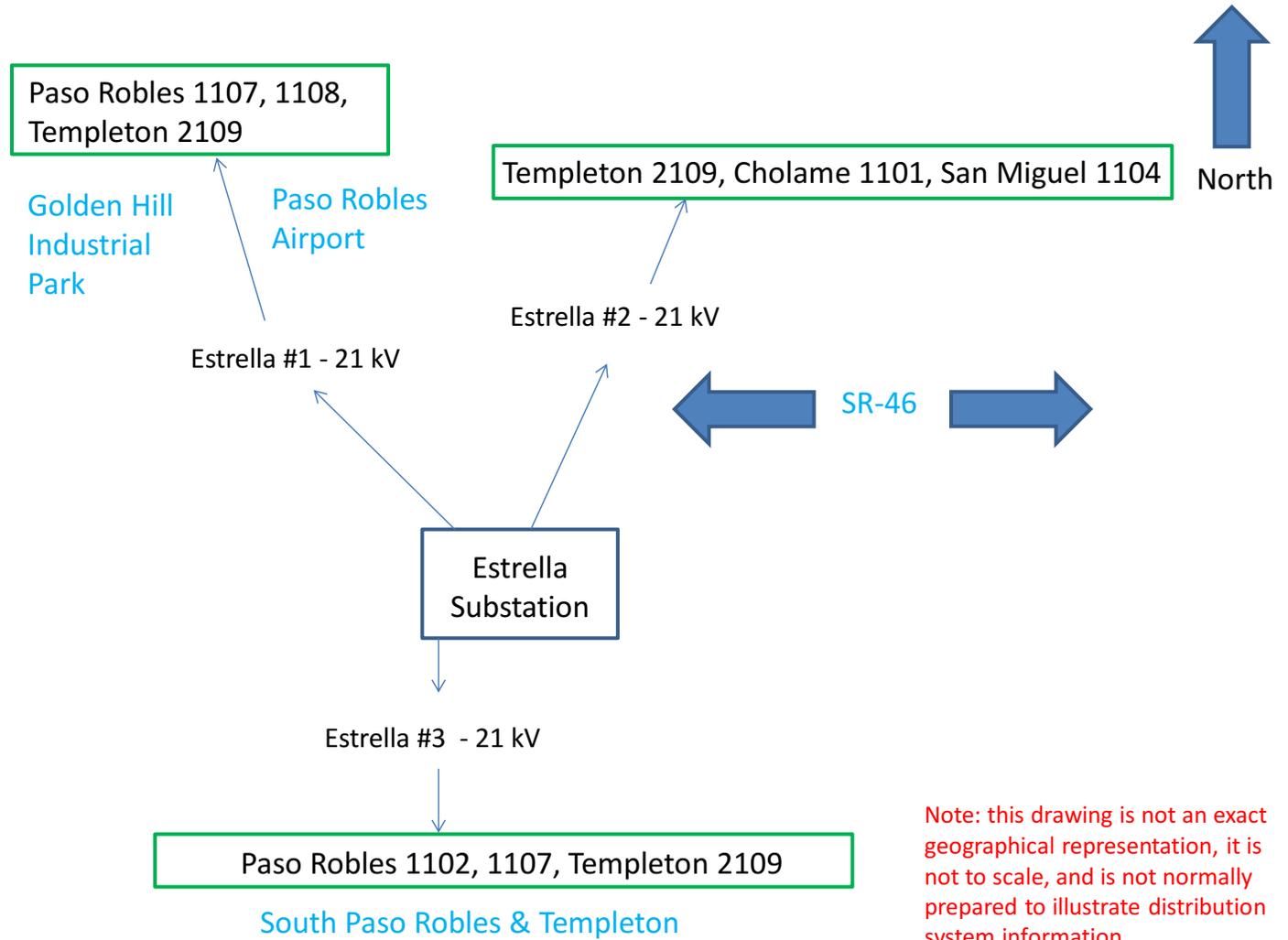
**Response:**

- a. PG&E is working with the CPUC to provide the distribution load data.

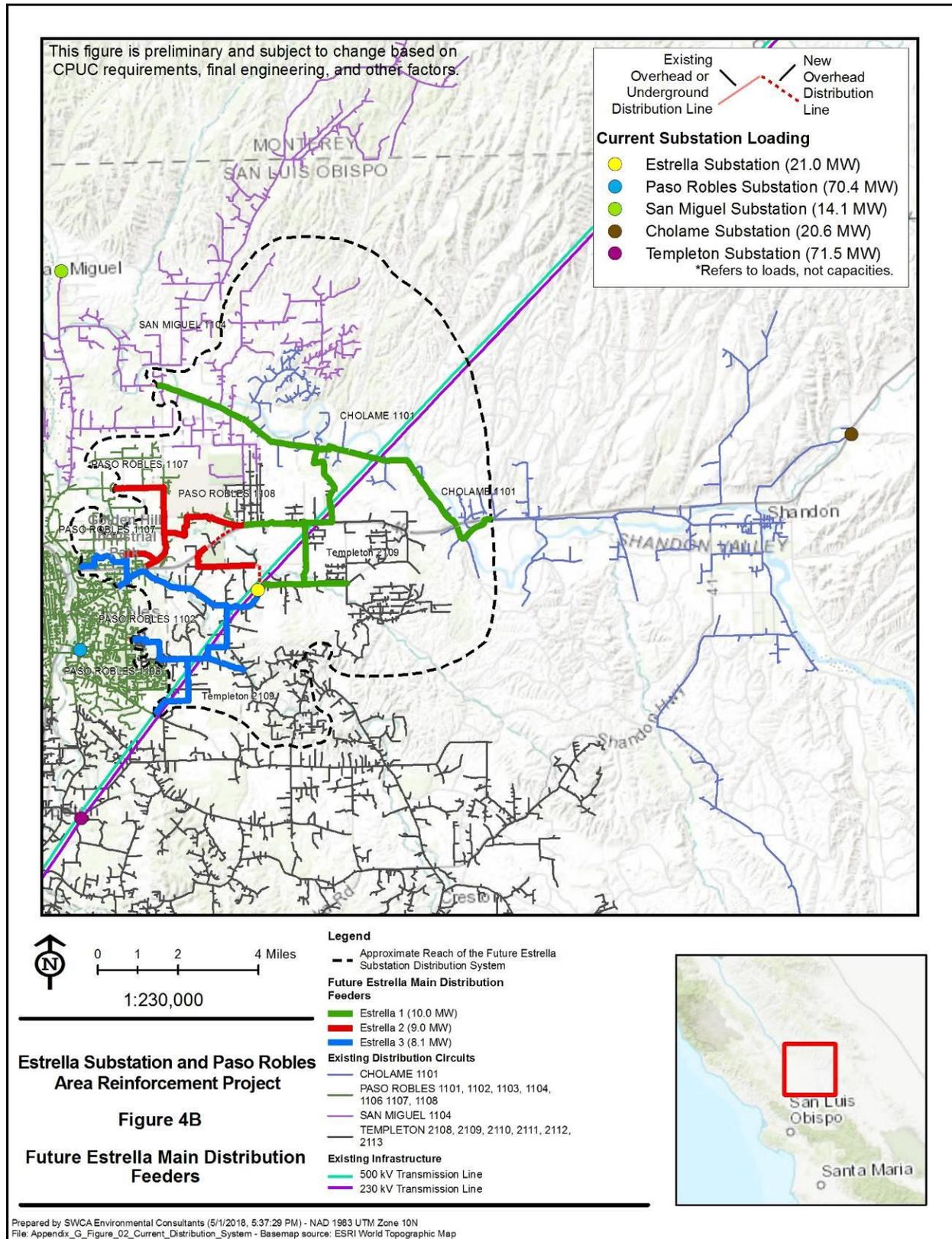
One-line diagrams are not typically used for distribution facilities. However, we have prepared one in response to this request; it is included below as Exhibit G (3.1)a, One Line Diagram, Future Estrella Substation Distribution Feeders and as Figure 4C in Appendix G.

A location map for the distribution system is provided below as Exhibit G (3.1)b, Future Estrella Substation Distribution System and in Appendix G, Figure 4B.

**Exhibit G (3.1)a: One-Line Diagram, Future Estrella Substation Distribution Feeders**



# Exhibit G (3.1)b. Future Estrella Main Distribution Feeders



In addition, Figure 4A in the Updated Appendix G provides the locations of the three additional pad-mounted transformers for the proposed Estrella Substation. In addition to being shown on the location map, Exhibit G (3.1)b and Appendix G Figure 4B, the distribution feeders proposed to extend from Estrella Substation are described in Section V.B in Appendix G as follows:

PG&E proposes to install three 21 kV feeders from Estrella Substation when the distribution substation facilities are constructed (See Exhibit G (3.1)b, Future Estrella Substation Distribution System). Based on preliminary design, the first Estrella feeder—“Estrella 1”—will consist of approximately 1.67 circuit miles of reconducted distribution line, primarily along Union Road north and east, and a total main-line length of 11.76 circuit miles (including 10.09 circuit miles of existing line). The second Estrella feeder—“Estrella 2”—will consist of approximately 6.14 circuit miles of new or reconducted distribution line, primarily along Mill Road, and a total main-line length of 8.54 circuit miles. The third Estrella feeder—“Estrella 3”—will consist of 3.54 circuit miles of reconducted distribution line, primarily along Union Road south and west, and a total main-line length of 5.96 circuit miles. The construction of Estrella Substation will also require three additional 21/12 kV pad-mounted transformers in the field to provide circuit ties between 21 kV and 12 kV feeders. The approximate location of those transformers is shown on Figure 4A.

The transmission power flow base cases for the years 2022 and 2027 are being provided separately in confidential data files accompanied by a declaration from PG&E explaining the basis for confidential treatment. Transmission system data for the entire PG&E system area is in these models, including the requested local 230 kV system serving this area along with the load modeled for the years 2022 and 2027. Note that the Estrella Substation project is also already included in these models. PG&E is also providing two (.m) files to remove the Estrella Substation project and revert the system to its pre-project state. If needed, please apply the “Estrella submittal removal.m” to remove the project. For 2027, please also apply the “Estrella Transfer Removal 2027.m” change to also revert the load in the pocket.

The power flow base cases are developed and can be accessed using GE Positive Sequence Load Flow software. Please contact General Electric to request a license, if needed.

c. PG&E evaluated two possible locations and two sizes for battery storage. Location 1 would be adjacent to Paso Robles Substation (4 MW, 24 MWh) and would delay installation of distribution capacity upgrades at Estrella Substation for approximately two years. Location 2 would be in the Golden Hill Industrial Park (15 MW, 90 MWh) and would delay installation of distribution capacity upgrades at Estrella Substation for approximately eight years.

Note: These two solutions would only provide a temporary delay before a distribution substation would be needed. Moreover, neither of these battery storage options would provide the operational flexibility or increased distribution system reliability that the installation of the future Estrella distribution project will provide. See response to G (14) for a more detailed discussion on battery storage options.

### **Deficiency Appendix G (7.1):**

*The August 2017 Appendix G, Figure 7 shows the locations of Future Load Centers. If so, provide an updated Figure that labels the Future Load Centers with the Large-Load Adjustments from Table 3.*

*In addition, please add two columns to Table 3, “Year Received/Approved” and “Expected Completion Date.” Use “Approved YEAR” if already approved or just list “Received YEAR.” Label each item with an ID letter or number and insert the ID onto Figure 7 (Future Estrella load centers).*

*Be sure to include and identify any Large-Load Adjustments that have arisen or completed since 2013 (i.e., 2013/2014 TPP approval timeframe) within the updated Table 3. We’d like to better understand how recent projects that have come online have affected loads compared to what was forecast at the time of CAISO TPP approval.*

*In addition, what about the impact of recent solar projects on loads? Why weren’t solar projects listed in Table 3? Please list the solar projects in Table 3 too if this makes sense and/or see also Def. Item G 16. The Solar Projects would also add load to the distribution line loadings if connected at this voltage.*

#### Follow-Up Request:

- a. Several Future Load Centers were removed and a few were added between the prior Figure 7 version and the latest version. Please explain and update Figure 7 as appropriate.*
- b. In many cases, the locations of Large-Load Adjustments do not occur within or near a Future Load Center. Please explain, and explain how Future Load Centers are defined as opposed to Large-Load Adjustments.*
- c. Quantify the MW values attributed to each Future Load Center and label them (e.g., Gold Hill and Airport development sites). Provide a table of Future Load Centers similar to the table of Large-Load Adjustments.*

#### **Response:**

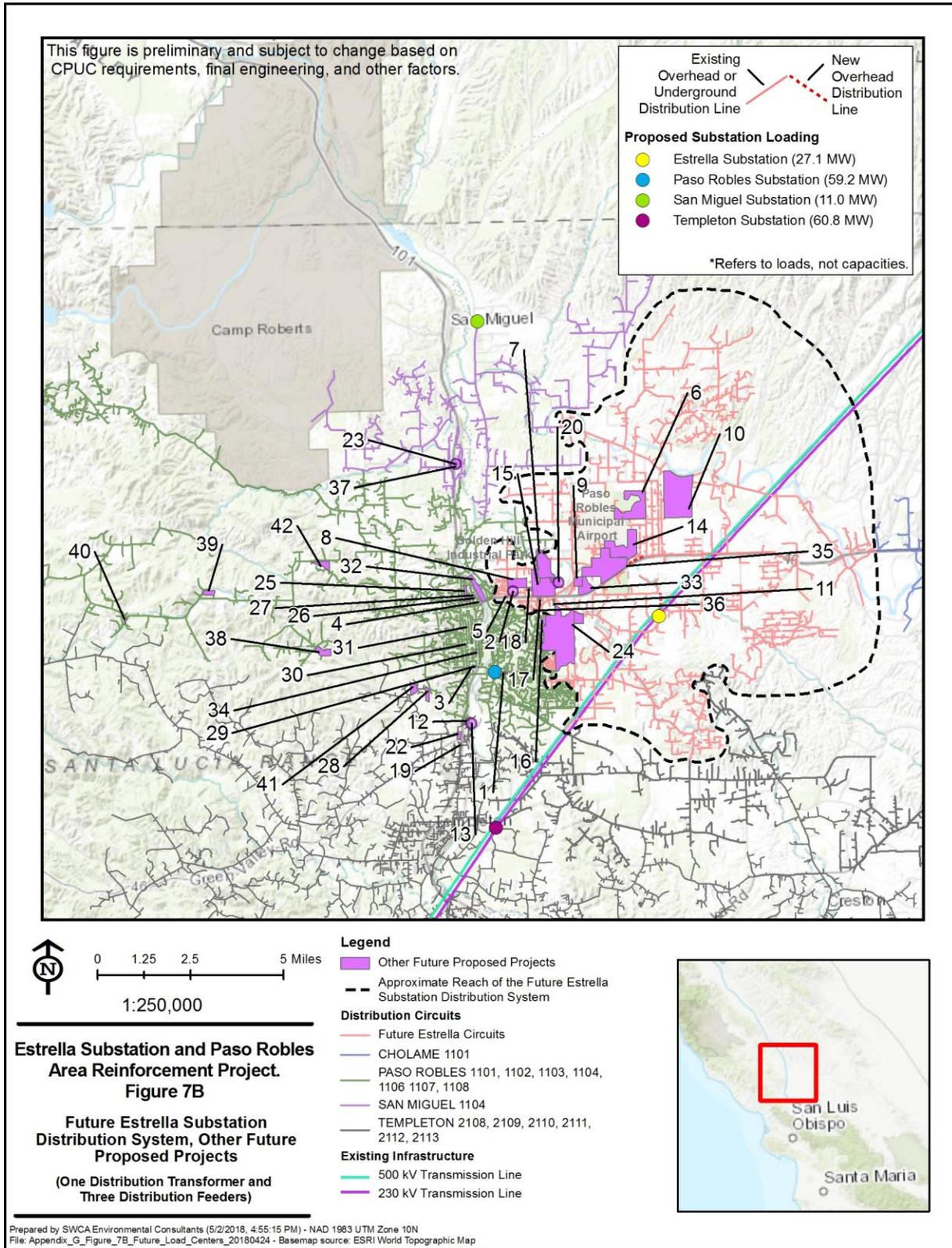
a. Several other future proposed projects (previously referred to by mistake as future load centers) were removed in the latest version of Figure 7 in order to eliminate duplications with large-load adjustments (now Appendix G, Figure 7A) and solar projects (Appendix G Table 8), projects unrelated to the future Estrella Distribution System, and projects for which there was no information. All but the duplicate projects have been added back into the current version (now Figure 7B), and others have been added based on new information on recently proposed projects.

b. As indicated in Appendix G, Section III.C, the updated LoadSEER forecast incorporates Large-Load Adjustments, which are new block loads that were not included in the 2016 IEPR Update forecast. (See Table 6A.) These new loads, based on publicly available data from the City of Paso Robles, include certain large business development applications that have been filed, are in process, or were recently approved. They represent specific customer loads that PG&E and city planners believe have a high probability of becoming operational within the timeframe provided

by the customers. Other future proposed projects are listed in Appendix G, Table 6B; they are being monitored and may be added as adjustments in a future forecast if warranted. Large-Load Adjustments and other future proposed projects can occur anywhere in the DPA, and are not always near identified future load centers. Future load centers are the general locations identified by local agencies as likely to have the most concentrated and sizeable future load growth. Here, the primary future load center identified by the City of Paso Robles is near Dry Creek Road south of Paso Robles Airport and the Golden Hill Industrial Park in northern Paso Robles, where city planners expect large-demand businesses to be located.

c. See Appendix G, Table 6B. As indicated in Appendix G, Figure 7's reference to "Future Load Centers" should have been "Other Future Proposed Projects"; the figure has been corrected (see Exhibit G ([7.1]a and Appendix G Figure 7B).

# Exhibit G (7.1)a: Future Estrella Substation Distribution System, Other Future Proposed Projects



### **Deficiency Appendix G (13.1):**

*The potential new line to Cholame Substation will be included within the cumulative analysis for the EIR. If the Estrella Substation is constructed, what is a reasonable timeframe to assume that a 70-kV line to Cholame Substation would be constructed. For analysis purposes in the EIR, only the new transmission voltage line will be assumed.*

#### Follow-Up Request:

*The Applicants forecast that a 17-mile 70-kV line would be constructed from Estrella Substation to Cholame Substation within two to three years after Estrella is built. Discuss the potential for a battery storage alternative sited at or near Cholame Substation that would eliminate or defer the maintenance clearance and reliability issues described and would defer or eliminate the need for constructing the new 70-kV line.*

#### **Response:**

PG&E evaluated installing a 15 MW, 90 MWh battery storage bank at Cholame Substation to see whether a battery could defer or eliminate the need to install a second 70 kV transmission line into Cholame Substation from either the future Estrella or existing Templeton substations. A primary need for the second line is to provide service to customers during maintenance of the existing, single transmission line or 70/12 kV transformer bank. A battery would provide a limited, second 70 kV source into Cholame Substation, but it would not be able to sustain the substation over multiple days like an additional 70 kV line. The battery could address critical maintenance needs that can be solved within 9 hours, like change-out of transmission poles, installing new transmission line hardware, or conducting limited transformer bank or 70 kV breaker maintenance.

A new line from Estrella Substation would be about 16.5 miles long and a new transmission line from Templeton Substation would be about 24 miles long. Cholame Substation is currently on a radial 70 kV circuit originating from Arco Substation in the San Joaquin Valley. When maintenance is needed on the existing Arco-Cholame 70 kV line or 70 kV portion of the substation, it has been very challenging to schedule it in the past. Expensive stand-by generation has been used more than once to keep the substation's distribution customers energized while transmission line maintenance was completed. The normal daytime load on the substation is approximately 10 MW. Designing the battery bank to accommodate a 9-hour clearance window would allow maintenance crews to schedule daily clearances for transmission line work while keeping distribution customers in service during the maintenance period. The battery would be constructed to discharge into the 12 kV bus, and recharge from the Cholame Substation 70 kV bus. When not needed for other purposes, the battery could provide electricity and market-based services to be sold into the wholesale transmission market to offset the cost of the battery bank installation (although this could limit the availability to use the battery as an emergency back-up to the substation if the single 70 kV transmission line is unexpectedly taken out of service).

Thus, it appears that battery storage could be installed at Cholame Substation to partially address the existing maintenance problem without adding a new 70 kV power line from Templeton or the new Estrella Substation. Installing battery storage at Cholame Substation would not provide the same level of back-up support as installing a 70 kV line from Estrella or Templeton Substations. A looped substation (with two transmission feeds capable of holding the substation load) can

remain energized indefinitely if one transmission line stays energized. This keeps customers in power during single transmission line outages and during periods of extended (multiday) maintenance activities. The issue of installing a new 70 kV line or battery storage at Cholame Substation would need to be studied by the CAISO before such a project could be determined valid or warranted.

***Deficiency Appendix G (14):***

*Have NEET West or PG&E evaluated battery storage as a potential alternative to the proposed Estrella Substation or certain components of the substation? If so, please provide a full update on the analysis performed and results.*

*Follow-Up Request:*

*No response provided. Please provide the data and analyses requested.*

**Response:**

NEET West did not evaluate battery storage as a potential alternative to the proposed Estrella Substation or certain components of the substation because it was not part of the project that was included in the CAISO Functional Specifications from the competitive bid solicitation.

PG&E studied two representative locations for battery storage that could potentially delay the need to add capacity to the Paso Robles distribution system by installing distribution components at Estrella Substation as proposed, or otherwise. First, PG&E studied the option of installing a 4 MW, 24 megawatt hour (MWh) battery bank at Paso Robles Substation, since that is the largest battery that could be installed at the substation (on adjacent land) without taking out neighboring businesses. A 4 MW battery could defer a distribution substation by approximately two years. Second, PG&E studied the option of installing a 15 MW, 90 MWh battery bank at the Golden Hill Industrial Park. This battery size is the maximum that could be charged on an express 12 kV distribution feeder, and could delay the need for distribution substation facilities by approximately eight years. As detailed below, neither of these battery storage alternatives would eliminate the need for a new distribution substation in the foreseeable future, improve operational flexibility in the local distribution area, or increase Paso Robles DPA's circuit reliability – all benefits that distribution components from Estrella Substation would provide.

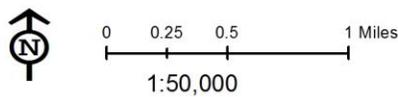
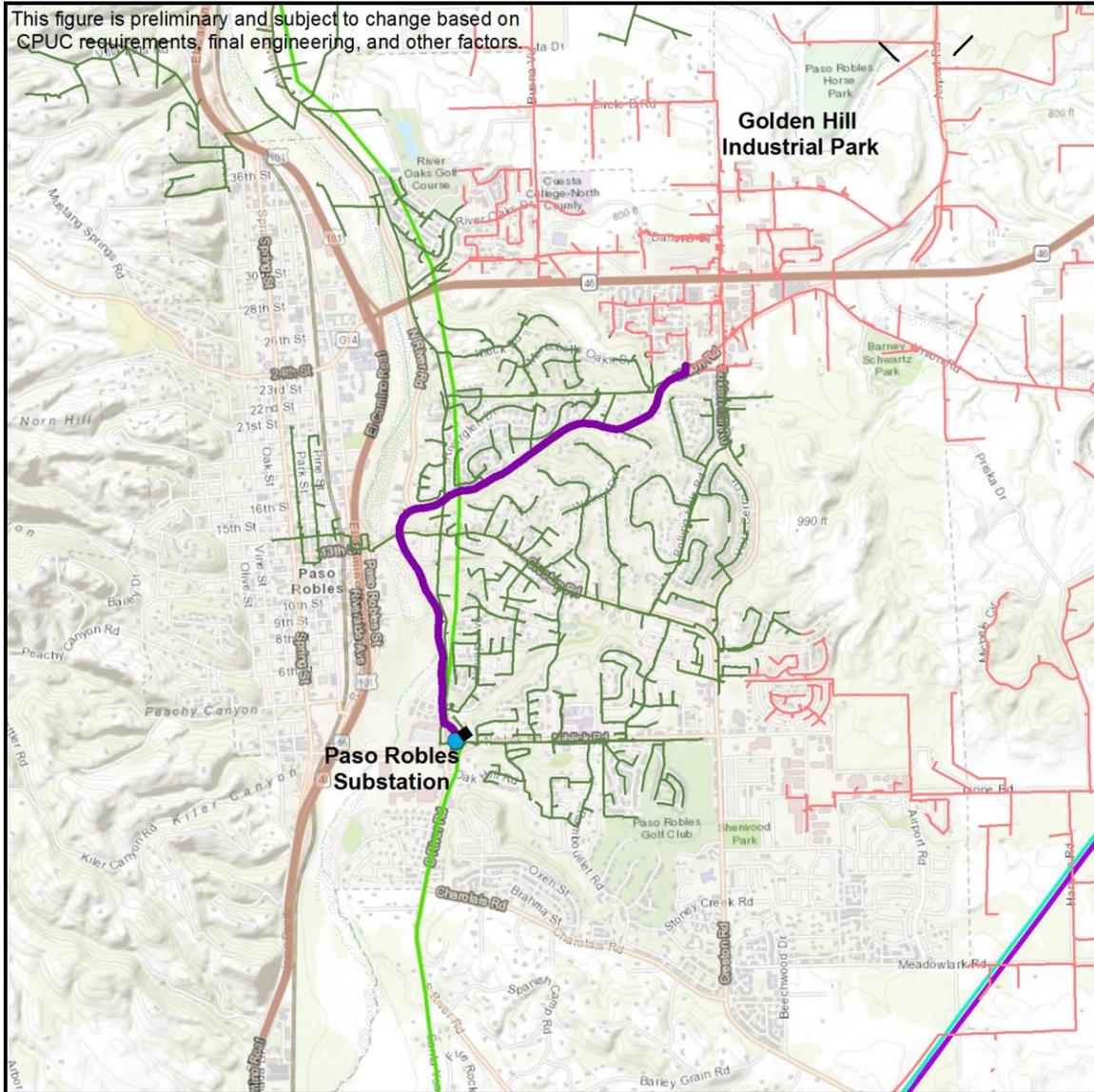
The first battery storage location studied was at Paso Robles Substation, where PG&E could install a 4 MW, 24 MWh<sup>5</sup> battery bank to the east of the existing substation. (Note that this study area, a vacant triangular parcel east of the substation, would be the same expansion area targeted to install a ring bus at Paso Robles Substation to accommodate a single additional 70 kV line from Templeton Substation. The vacant parcel could not accommodate both options.) A new underground express distribution feeder would be constructed from Paso Robles Substation to connect to the existing distribution system at Prospect Avenue in Paso Robles, see Exhibit G (14)a and Appendix G Figure 10, New Paso Robles 1105 Underground Express Feeder to Prospect

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<sup>5</sup> A larger battery was not considered feasible at Paso Robles Substation because it would require obtaining additional property currently occupied by local businesses, which would likely involve eminent domain proceedings and result in significant challenges, time delays and substantial costs.

Avenue. This battery storage would have the potential to delay the installation of Estrella Substation distribution components, from a capacity perspective, for approximately two years. However, as explained further below, it would: (1) provide a solution that is only temporary, (2) limit, rather than improve, operational flexibility, and (3) not increase the circuit reliability of the Paso Robles DPA.

# Exhibit G (14)a: New Paso Robles 1105 Underground Express Feeders to Prospect Avenue



## Estrella Substation and Paso Robles Area Reinforcement Project

Figure 10

## New Paso Robles 1105 Underground Express Feeder to Prospect Avenue

### Legend

- Paso Robles Substation
- ◆ Potential Battery Storage Location
- Prospect Underground Express Feeder
- Distribution Circuits**
- Future Estrella Circuits
- PASO ROBLES 1101, 1102, 1103, 1104, 1106 1107, 1108
- Existing PG&E Power & Transmission Lines**
- 70 kV Power Line
- 230 kV Transmission Line
- 500 kV Transmission Line

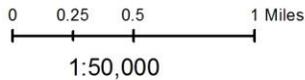
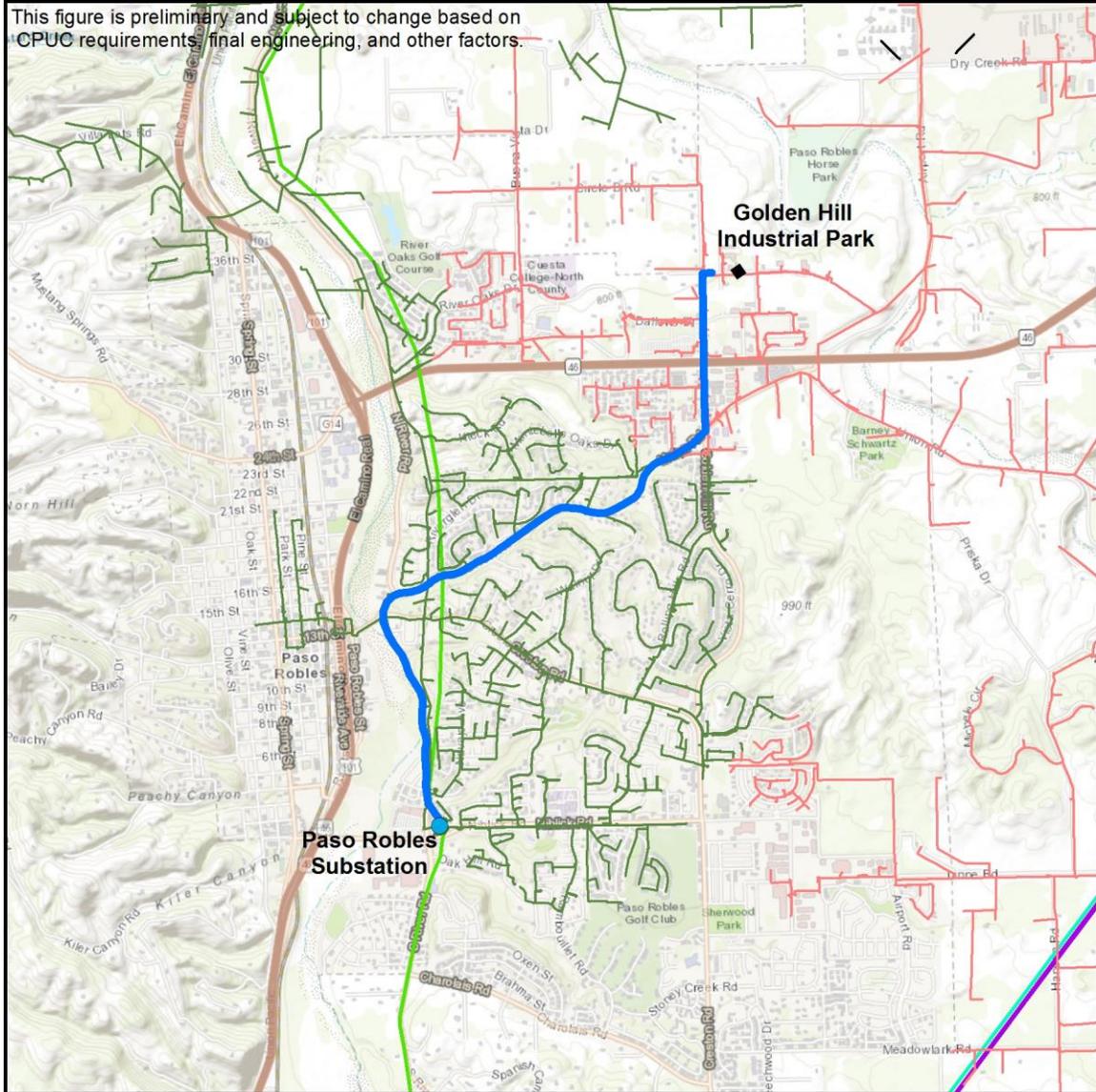


Prepared by SWCA Environmental Consultants (5/2/2018, 3:36:45 PM) - NAD 1983 UTM Zone 10N  
 File: Prospect\_Underground\_20180424 - Basemap source: ESRI World Topographic Map

The second study location considered for battery storage was a vacant lot in the Paso Robles Golden Hill Industrial Park, on the east side of Golden Hill Road. This location would require installing a new underground express distribution feeder from Paso Robles Substation to the Golden Hill site to provide off-peak charging of the battery (see Exhibit G (14)b and Appendix G Figure 11, New Paso Robles 1105 Underground Express Feeder to Wisteria Lane). A battery at this location with a connection to Golden Hill Industrial Park would connect directly to the future load center within the Paso Robles DPA, be located in an area large enough to accommodate the installation (approximately 2 acres), and already zoned for industrial facilities. Moreover, if Paso Robles Substation or San Miguel Substation overloaded, the battery could “off-load” or take over the load being served by either one of these substations because feeder circuits from the battery would connect to circuits extending from these substations. Since it is unknown at this time which substation could overload first, a battery that could connect to either substation seems more prudent than one located at, or tied to, just Paso Robles Substation. The battery would be sized for 15 MW, 90 MWh, to include a 20% reserve capacity above 12 MW, which is the maximum capacity that can be supplied by a new express 12 kV feeder. The reserve capacity would allow the battery to degrade over time while still maintaining the ability to provide 12 MW of output for 6 hours, 72 MWhs.

This 15 MW battery has the potential to delay the installation of Estrella Substation distribution components, from a capacity stand-point, for approximately eight years. However, as explained further below, this option would: (1) provide a solution that is only temporary, (2) limit rather than improve operational flexibility, and (3) offer fewer reliability benefits.

# Exhibit G (14)b: New Paso Robles 1105 Underground Express Feeders to Wisteria Lane



## Estrella Substation and Paso Robles Area Reinforcement Project

Figure 11

## New Paso Robles 1105 Underground Express Feeder to Wisteria Lane

### Legend

- Paso Robles Substation
- ◆ Potential Battery Storage Location
- Wisteria Underground Express Feeder
- Distribution Circuits**
- Future Estrella Circuits
- PASO ROBLES 1101, 1102, 1103, 1104, 1106 1107, 1108
- Existing PG&E Power & Transmission Lines**
- 70 kV Power Line
- 230 kV Transmission Line
- 500 kV Transmission Line



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 File: Wisteria\_Underground\_20180424 - Basemap source: ESRI World Topographic Map

## **Comparison of Battery Storage Options with the Proposed Project**

### Deferral of Capacity Need

Even under the 15 MW/90 MWh battery option, the need for new distribution substation facilities would only be delayed for approximately eight years. The substantial expenditures that would be necessary to install batteries in any or multiple locations would provide only temporary relief, and substantial additional expenditures would be needed to address the capacity needs in approximately two or eight years. Given the capacity projections for the Paso Robles DPA, Estrella or other distribution facilities would be needed in the foreseeable future under either of the battery storage solutions.

### Operational Flexibility

The Estrella distribution substation build-out will provide significant operational flexibility, allowing the substation to off-load several neighboring substations (Paso Robles, San Miguel, Templeton, Atascadero, Cholame) when needed for planned and emergency outages or equipment repairs. Installing a battery at Paso Robles Substation or Golden Hill Industrial Park would actually limit the operational flexibility of some substation equipment at Paso Robles Substation and the associated battery charging feeder, since this equipment must remain in operation during off-peak hours to recharge the battery. Not having this equipment available would limit the time that maintenance or load transfers involving this equipment, or other related equipment, could be accomplished. As a result, a battery at either Paso Robles or Golden Hill Industrial Park would reduce existing operational flexibility rather than providing the significantly-increased operational flexibility of a new distribution substation. Distribution feeders from Estrella Substation will connect to 6 distribution circuits within the Paso Robles DPA and four separate substations (see Exhibit G (3.1)b and Appendix G, Figure 4B), facilitating load transfers between these substations and circuits to support clearances for both planned maintenance and emergency restoration.

### Distribution Reliability

Estrella distribution feeders will increase Paso Robles DPA circuit reliability by reducing the length of existing circuits that originate at neighboring substations and feed the growing areas of Paso Robles. For example, the Templeton 2109 circuit is currently 45 miles in length and will be reduced to 18 miles in length once a new distribution connection is built from Estrella Substation. Shortening these existing circuits, like Templeton 2109, will make them much less susceptible to weather, fire, and car pole accidents. When outages do occur, fewer customers will be impacted. Time to patrol lines and return customers to service during outages will also be reduced. By comparison, installing battery storage at Paso Robles Substation or Golden Hill Industrial Park will not reduce existing circuit lengths, so those alternatives would not have any beneficial impact on circuit reliability for the Templeton 2109 circuit or other circuits in the DPA.

Battery storage located in the Golden Hill Industrial Park area could provide some limited reliability benefits to the interconnected Paso Robles or San Miguel circuits it would feed. This could happen during outages to these circuits where the normal distribution supplies are lost. The battery storage could conceivably sustain these circuits for a period of time. This emergency back-feed would last only for as long as the battery storage could supply the circuit loads, or as long as the express charging feeder from Paso Robles is available to keep charging the battery storage.

This would not be the normal operating configuration and would not provide nearly as much reliability to the overall DPA as a new distribution substation at Estrella.

Since both battery storage options fail to provide the long-term capacity, operational flexibility, or the same level of reliability benefits as installing a new distribution substation with three new distribution feeders, battery storage would not address DPA distribution needs more effectively than the proposed Estrella distribution substation.

***Deficiency Appendix G (15):***

- a. Identify a size range in MWs for a battery storage alternative sufficiently sized to meet the distribution system demand forecasted under the mid IEPR 2016 case cited in the updated August 2017 Appendix G.*
- b. Describe how the battery storage facility would need to be sited.*
- c. Include the response to all parts of this deficiency item within the body of the updated Appendix G as requested under deficiency item G 1.1. In addition, please include a battery storage alternative discussion in Appendix G, Section V (Additional Distribution Q & A).*

*Follow-Up Request:*

*No response provided. Please provide the data and analyses requested.*

**Response:**

- a. The response assumes the question refers to what size battery would delay the forecasted 2024 capacity need shown in Appendix G, Figure 5. Two representative battery storage sizes were evaluated: a 4 MW, 24 MWh at Paso Robles Substation, which represents the largest battery storage PG&E determined it could install on a parcel of property to the east of the substation; and a 15 MW, 90 MWh option located in the Golden Hill Industrial Park of Paso Robles. The 15 MW battery size provides 20% additional battery capacity to account for degradation over time, providing the ability to fully recharge in 6 hours using the full output of a new 12 kV charging circuit from Paso Robles. (See Appendix G, Section V.D.1.) Battery storage at either location would provide only a temporary solution, delaying the need for new distribution capacity by approximately two or eight years, respectively, and would not eliminate the reasonably foreseeable need for a distribution substation. See response to Appendix G (14).
- b. PG&E evaluated two possible locations and two sizes for battery storage. Location 1 would be adjacent to Paso Robles Substation (4 MW, 24 MWh) and would delay installation of distribution capacity upgrades at Estrella Substation for approximately two years. Location 2 would be in the Golden Hill Industrial Park (15 MW, 90 MWh), and would delay installation of distribution capacity upgrades at Estrella Substation for approximately eight years.

Note that neither of these battery storage options would provide a long-term solution to the distribution needs of the Paso Robles DPA or eliminate the reasonably foreseeable need for a distribution substation, but would only delay it for approximately two or eight years, respectively. Moreover, neither option would provide the operational flexibility or increased distribution system

reliability that the installation of the future Estrella distribution project will provide. See response to G (14) for a more detailed discussion on battery storage options.

c. The battery storage alternative discussion is provided in Appendix G, Section V.D.1.

***Deficiency Appendix G (16):***

- a. Identify all expected solar projects to come online in the next 10 years (e.g., 280 MWs California Flats Solar Project) and identify those that have come online in the last 5 years (e.g., the roughly 15-acre site adjacent to Templeton Substation).*
- b. Discuss the benefits of one or more battery storage sites with respect to the solar projects discussed in response to item “a” and how battery storage would be ideally sited and sized.*
- c. Discuss the contribution that a battery storage alternative sized to delay construction of the known and full-build-out distribution components of the proposed project would make with respect to the solar projects discussed in response to item “a”.*

*Note: We realize that some of the solar projects identified would connect to the transmission system and not the distribution system. Please provide the full discussion within Appendix G regardless of this fact.*

*Follow-Up Request:*

- a. Complete*
- b. No response provided. Please provide the data and analyses requested.*
- c. No response provided. Please provide the data and analyses requested.*

**Response:**

b. Installing batteries at multiple solar/battery storage sites has the advantage of diversity of supply should problems develop with one of the solar locations or battery storage sites. The two largest distribution-level solar installations proposed in Appendix G, Table 8 Solar Projects in Paso Robles DPA, for the Paso Robles DPA are one for the City of Paso Robles (3.7 MW) and one for the Paso Robles Airport (4 MW). These two sites would be possible candidates for battery storage depending upon their proximity to the necessary connection points in the DPA that could provide capacity relief to transformer banks at either Paso Robles or San Miguel Substation (see discussion about 15 MW battery storage option and distribution interconnection in Section V.D.1). The closer these solar/battery storage sites could be located to the distribution connection points, the lower the connection costs and the easier the construction. Sizing of the battery storage sites supplied by solar power would need to be designed to match the solar output of the arrays unless utility power is used to supplement the charging cycle. Ideally, the combination of battery storage sites would be close to the 15 MW, 90 MWh site that was studied for the Golden Hill Industrial Park (see Section V.D.1) since, from a capacity perspective, this would delay the need for distribution capacity from Estrella Substation for approximately eight years. It is difficult to see how this would be possible given the low estimates of peak power for the distribution-level solar projects listed in Appendix G, Table 8. In addition, this battery storage solution would not provide

a long-term solution to capacity needs or eliminate the need for a future distribution substation. Furthermore, it would not provide the operational flexibility and improved distribution circuit reliability the Estrella distribution project will bring to the Paso Robles DPA. (See Appendix G, Section V.D.3.)

c. Based on the analysis in Section V.D.1, if a 15 MW, 90 MWh battery storage facility supplied by solar power could be located at or near the Golden Hill Industrial Park and supply consistent power to the electric grid similar to the 15 MW proposal in Section V.D.1, it could provide enough capacity to delay construction of the Estrella distribution components for approximately eight years. The challenge here would be to collect sufficient solar resources from Appendix G, Table 8 to be able to charge a 15 MW battery. Based on the forecasted growth rate in the Paso Robles area of 1.5 MW per year, a smaller 8 MW, 48 MWh solar/battery storage would provide enough capacity to delay construction of Estrella distribution components for approximately five years. The solar projects planned by the City of Paso Robles and the Paso Robles Airport from Appendix G, Table 8 offer a total of 7.7 MW of output at full capacity. If these two sites supplemented the charging of co-located batteries with utility power, they could help provide the deferral benefits of an 8 MW battery. Any battery would need to be designed for 20% over capacity to allow for battery degradation over time, so would likely need to be near 10 MW, 60 MWh installed size (5 MW at one site and 5 MW at the other site). Since a 5 MW unit is close to the evaluated Paso Robles substation battery size (4 MW), there would likely be similar benefits for this size of battery, but the battery interconnection costs would be higher due to the longer distance from the needed distribution connection points; the Paso Robles Substation battery was evaluated as being built adjacent to the Paso Robles substation and not several miles from the distribution connection points. (See Appendix G, Section V.D.3.)

#### Disadvantages of Solar/Battery Storage Over Distribution Substation Facilities

Using solar/battery storage to defer installation of distribution components of Estrella Substation only temporarily addresses the capacity need and does not eliminate the need for future new distribution substation facilities in the foreseeable future. In addition, it does not address the operational flexibility and improved distribution circuit reliability the Estrella project will bring to the Paso Robles DPA. Estrella feeders will be connected electrically to the following circuits and be able to off load those circuits and a portion of the associated substations attached to these circuits: Cholame 1101, San Miguel 1104, Paso Robles 1108, 1107, 1102, and Templeton 2109. The Templeton 2109 feeder is currently 45 miles long; after the Estrella distribution feeder connections are completed it will only be 18 miles long. This will provide an improvement to the reliability of this circuit and, as other circuit connections are completed, to the entire Paso Robles DPA.