APPENDIX B

Final Alternatives Screening Report

This page intentionally left blank.

Estrella Substation and Paso Robles Area Reinforcement Project

Final Alternatives Screening Report

Proceeding A.17-01-023

CALIFORNIA PUBLIC UTILITIES COMMISSION

Prepared by:

Horizon
WATER and ENVIRONMENT

March 2020

ADA Accessibility: For accessibility assistance with this document, please contact the California Public Utilities Commission at (866) 849-8390, by email to public.advisor@cpuc.ca.gov, or through the California Relay Service by dialing 711. This document includes complex figures, tables, and formulas that may be difficult to interpret using an assistive device such as a screen reader.

CALIFORNIA PUBLIC UTILITIES COMMISSION

Estrella Substation and Paso Robles Area Reinforcement Project

Final Alternatives Screening Report

Proceeding A.17-01-023

Prepared for:

California Public Utilities Commission
505 Van Ness Avenue
San Francisco, California 94102

Prepared by:

Horizon Water and Environment, LLC
266 Grand Avenue, Suite 210
Oakland, California 94610
Contact: Tom Engels, Ph.D.
(916) 790-8548

March 2020

Horizon Water and Environment. 2020. California Public Utilities Commission, Estrella Substation and Paso Robles Area Reinforcement Project. Final Alternatives Screening Report. March. (HWE 17.010) Oakland, CA.

TABLE OF CONTENTS

APPENDICES

TABLES

FIGURES

This page intentionally left blank

ACRONYMS AND ABBREVIATIONS

AB	Assembly Bill
APMs	Applicant Proposed Measures
APN	Assessor's Parcel Number
ASR	Alternatives Screening Report
BAAH	breaker-and-a-half
BESS	battery energy storage system
BES	Bulk Electric System
BS	Battery Storage
BTM	behind-the-meter
CAISO	California Independent System Operator
CAL FIRE	California Department of Forestry and Fire Protection
Caltrans	California Department of Transportation
CDOC	California Department of Conservation
CEQA	California Environmental Quality Act
City	City of Paso Robles
CPCN	Certificate of Public Convenience and Necessity
CPUC	California Public Utilities Commission
DDOR	Distribution Deferral Opportunity Report
DEIR	draft environmental impact report
DER	Distributed Energy Resources
DPA	Distribution Planning Area
EBCE	East Bay Community Energy
EIR	environmental impact report
FTM	front-of-the-meter
GHG	greenhouse gas
HOA	Homeowner's Association
HWT	Horizon West Transmission
Kevala	Kevala Analytics, Inc.
kV	kilovolt
kW	kilowatt
kWh	kilowatt-hours
MW	megawatt
MWh	megawatt-hour
NEET West	NextEra Energy Transmission West, LLC
NEER	NextEra Energy Resources
NERC	National Electric Reliability Commission
NOP	Notice of Preparation

PEA	Proponent's Environmental Assessment
PG&E	Pacific Gas & Electric Company
PLR	Power Line Route
Proposed Project	Estrella Substation and Paso Robles Area Reinforcement Project
PTC	Permit to Construct
RA	Resource Adequacy
SR	State Route
SCE	Southern California Edison Company
SDG&E	San Diego Gas & Electric Company
SE	Substation Expansion
SS	Substation Siting
UL	Underwriters Laboratories mark of approval
USFWS	U.S. Fish and Wildlife Service
WECC	Western Electricity Coordinating Council

Chapter 1
INTRODUCTION AND PROJECT BACKGROUND

1.1 PURPOSE AND BACKGROUND

The purpose of the Alternatives Screening Report (ASR) is to document the California Public Utilities Commission's (CPUC's) efforts and process for developing a range of potentially feasible alternatives for the ~~proposed~~ Estrella Substation and Paso Robles Area Reinforcement Project (Proposed Project), proposed by Horizon West Transmission, LLC (HWT) (formerly NextEra Energy Transmission West, LLC [NEET West]) and Pacific Gas & Electric Company (PG&E) (together referred to as the "Applicants"). The ASR will support and inform the analysis of project alternatives in the draft environmental impact report (DEIR) that is being prepared for the Proposed Project. This ASR is intended to identify a reasonable range of potentially feasible alternatives that will be carried forward as part of the DEIR's detailed environmental analysis.

Pursuant to California Environmental Quality Act (CEQA) Guidelines Section 15126.6(a), an environmental impact report (EIR) must describe a reasonable range of potentially feasible alternatives to a project, or to the location of a project, which could feasibly attain most of the basic project objectives and could also avoid or reduce any of the significant effects of the project. CEQA also requires consideration of a No Project Alternative (CEQA Guidelines Section 15126.6[e]). Due to the complex nature of the Proposed Project and number of potential alternatives identified during the scoping period, it was determined that an alternatives screening process would benefit the development of alternatives in the EIR. Therefore, the ASR will help the CPUC understand the range and potential feasibility of alternatives to the Proposed Project prior to conducting a detailed analysis of alternatives in the EIR.

Public Outreach Conducted by CPUC

CPUC circulated a Notice of Preparation (NOP) of an EIR for the Proposed Project on July 30, 2018, and a revised NOP on August 1, 2018. Circulation of the NOP initiated the scoping period for the Proposed Project, which lasted until August 31, 2018. CPUC held a public scoping meeting on Tuesday, August 7, 2018 from 6 p.m. to 8 p.m. at the Winifred Pifer Elementary School located at 1350 Creston Road in Paso Robles. Presentation slides from the public scoping meeting, as well as a Scoping Summary Report, which summarizes the comments received during the scoping period, are available on the Project website here: www.cpuc.ca.gov/environment/info/horizonh2o/estrella/index.html

Refer to Section 2.1.2 of this ASR for further details on the Proposed Project's scoping process. For information on the CPUC Proceeding for the Proposed Project (Application 17-01-023), refer to the following website and search for the application number: apps.cpuc.ca.gov/apex/f?p=401:1:0::NO:RP::

Public Outreach Conducted by the Applicants

Prior to CPUC's involvement, the Proposed Project Applicants coordinated with agencies and conducted outreach to tribes and the general public. The Applicants held meetings with the City

of Paso Robles, County of San Luis Obispo, the Chamber of Commerce, and numerous other stakeholder groups. The Applicants also held public meetings on the following dates and at the following locations:

- December 7, 2015 at the Paso Robles Elks Lodge;
- December 8, 2015 at the Paso Robles Event Center;
- January 11, 2016 at the Paso Robles Park Ballroom;
- January 12, 2016 at the Paso Robles Event Center;
- June 22, 2016 at the Paso Robles Elks Lodge; and
- June 23, 2016 at the Park Ballroom.

As described in the Proponent's Environmental Assessment (PEA) submitted by the Applicants, feedback from the community assisted the Applicants with analyzing the potential substation sites and potential route options and determining the final Proposed Project. Please refer to the PEA for additional information.

1.2 DRAFT ALTERNATIVES SCREENING REPORT REVIEW PERIOD

To provide an opportunity for the public to review and comment on CPUC's preliminary alternatives screening process and results, a Draft ASR was circulated for public review from March 28, 2019, to May 10, 2019. CPUC received a large number of comments during this period. Comments on the Draft ASR varied widely in terms of support and opposition for various alternatives. Concerns regarding potential impacts associated with different alternatives were expressed, and, in some cases, commenters argued that certain alternatives would have lesser or greater impacts than the Proposed Project. A summary of the comments received on the Draft ASR is provided in Appendix A.

1.3 FINAL ALTERNATIVES SCREENING REPORT PREPARATION

CPUC considered the comments received on the Draft ASR in preparing the Final ASR. Where appropriate, the Draft ASR text was revised based on comments received from the public. Revisions/additions to the Draft ASR text are shown in underline/strikeout in this Final ASR.

1.4 SUMMARY OF PROPOSED PROJECT

1.4.1 PROPOSED PROJECT OVERVIEW

HWT ~~NextEra Energy Transmission West, LLC (NEET West)~~ and ~~Pacific Gas & Electric Company (~~PG&E~~), together referred to as the "Applicants," ~~submitted Application 17-01-023 to the CPUC requesting a Permit to Construct (PTC) for the Proposed Project, pursuant to the requirements in CPUC General Order 131-D. CPUC is the state agency responsible for regulating public utilities in California, and must conduct an independent environmental review of the Proposed Project, including evaluation of potential project alternatives, prior to issuing a PTC. The Proposed Project was identified as a needed project to address deficiencies in the Los Padres 70 kilovolt (kV) system (see Section 1.4.2~~1.2.2~~ for further discussion regarding the background and need for

the Proposed Project) by the California Independent System Operator (CAISO) in its 2013-2014 Transmission Plan.

In essence, the Proposed Project would provide system redundancy and increased capacity in the Paso Robles area by adding an area substation and providing an additional source of power to the existing Paso Robles Substation. The Proposed Project would include the following primary components:

- Estrella Substation
  - Constructing a new 230 kV substation to be operated by ~~NEET West~~ HWT
  - Constructing a new 70 kV substation to be operated by PG&E, including with a location for future 70/21 kV distribution facilities:
    - Installing a new 30-MVA, 70/21 kV three-phase power transformer in the 70 kV substation
  - Constructing a 230 kV transmission line interconnection to be operated by PG&E
- 70 kV Power Line
  - Constructing a new 70 kV double-circuit power line between the new 70 kV substation and the existing San Miguel-Paso Robles 70 kV Power Line (new 70 kV power line segment), to be operated by PG&E
  - Replacement (reconductoring and pole replacement) of a portion of the existing 70 kV power line between the interconnection point of the new 70 kV power line segment and Paso Robles Substation, to be operated by PG&E
- Distribution System Components
  - Establishing three new 21 kV distribution feeders connecting from Estrella Substation to the existing distribution system, including:
    - Constructing 1.7 mile of new distribution line to fill in gaps in future Estrella Feeder #2
    - Reconductoring approximately 8 miles of existing distribution circuits to facilitate integration of the new Estrella feeders

The new Estrella Substation would be constructed on an approximately 15-acre site within an existing vineyard off of Union Road in San Luis Obispo County east of the City of Paso Robles. This substation would be looped into the existing Gates-Morro Bay 230 kV line and would connect to the existing Paso Robles Substation via the new and reconductored 70 kV power line.

The new power line segment would extend approximately 7 miles from the Estrella Substation through primarily agricultural, commercial, and rural residential areas before joining the existing San Miguel-Paso Robles 70 kV line. An approximately 3-mile-long segment of this existing line would then be replaced/reconductored from the interconnection with the new 70 kV line originating from Estrella Substation south to the existing Paso Robles Substation. This reconductored line segment would pass through open space and residential areas.

Figure 1-1 shows the Proposed Project location and components~~.~~ (note that PG&E slightly modified the proposed new 70 kV line alignment through the Golden Hill Industrial Park since publication of the Draft ASR; Figure 1-1 has been updated to reflect this change). **Figure 1-2** and **Figure 1-3** show the existing electric transmission system and the proposed electric transmission system with the addition of the Proposed Project. **Figure 1-4** shows a visual simulation of the proposed Estrella Substation.

Basemap Sources: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

N

0 0.25 0.5 Miles

Horizon WATER and ENVIRONMENT

Paso Robles city limits

Proposed Project

- New 70kV Power Line Segment
- Proposed Estrella Substation
- Reconductoring Segment
- Distribution Underbuild
- Power Line Staging Areas

Helicopter Landing Zones

Existing Infastructure

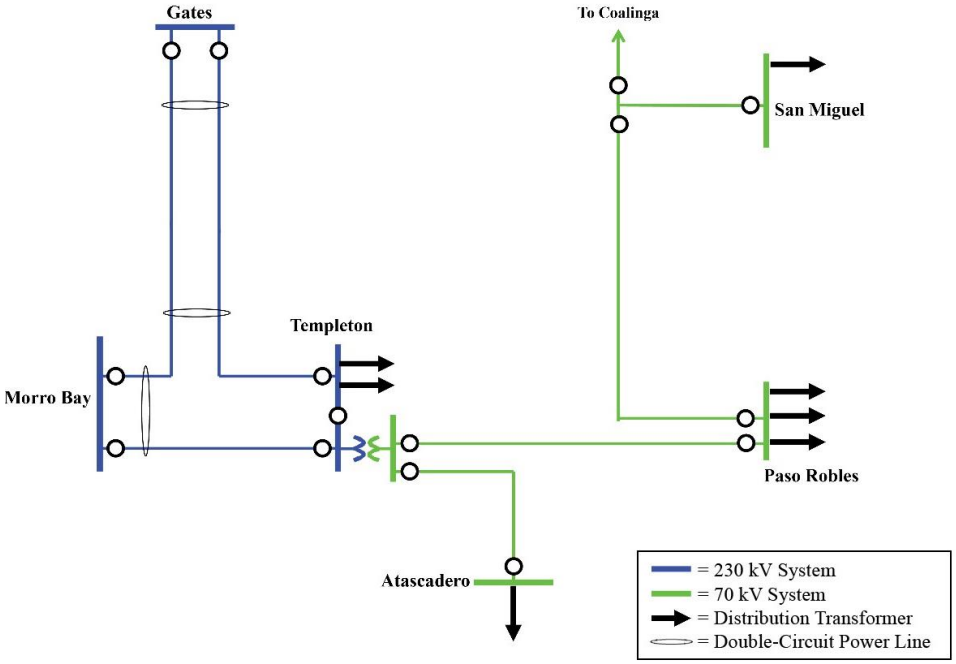
- Existing 500 kV Transmission Line
- Existing 230 kV Transmission Line
- Existing 70 kV Power Line
- Paso Robles Substation

Source: Source: NEET West and PG&E 2017

Figure 1-1
Proposed Project Location and Overview

Estrella Substation and Paso Robles Area Reinforcement Project

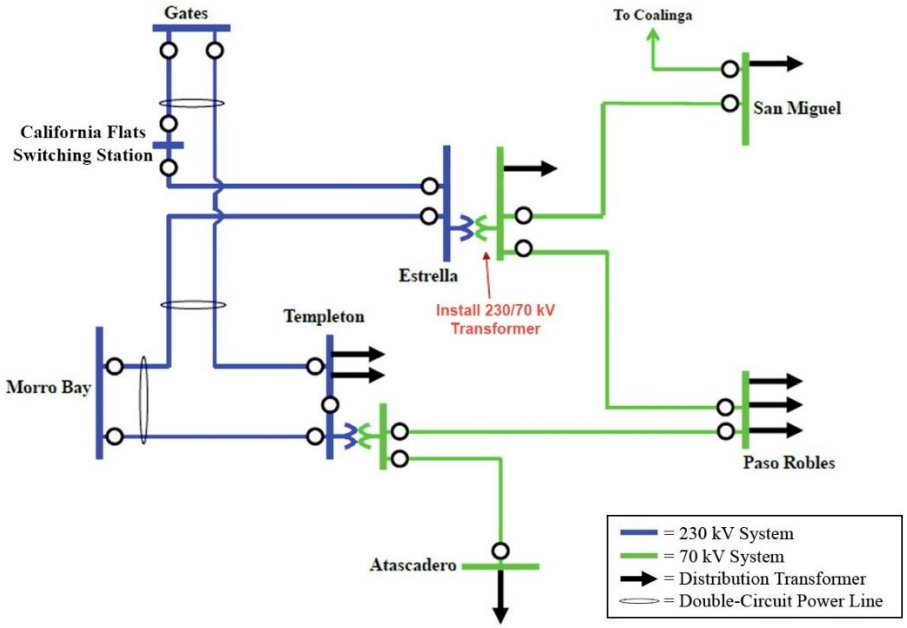
\\h2o-server\GIS_Server_PROJECTS\17010_CPUC_Estrella\mxd\EIR\UpdatedEIR\Fig_1-1_ProposedProjectOverview.mxd 6/26/2019 PG



Note: kV = kilovolt

Source: NEET West and PG&E 2017

Figure 1-2. Existing Electric Transmission System



Note: kV = kilovolt

Source: NEET West and PG&E 2017

Figure 1-3. Proposed Electric Transmission System

Source: NEET West and PG&E 2017

Figure 1-4. Visual Simulation of the Proposed Estrella Substation From Union Road Looking Northeast

Prepared by:
Horizon
WATER and ENVIRONMENT

Estrella Substation and Paso Robles Area Reinforcement Project

1.4.2 PURPOSE AND NEED FOR THE PROPOSED PROJECT

Transmission System

The Proposed Project was identified in the CAISO's 2013-2014 Transmission Plan as a project needed to mitigate thermal overloads and voltage concerns in the Los Padres 70 kV system (specifically in the San Miguel, Paso Robles, Templeton, Atascadero, Cayucos and San Luis Obispo areas) (CAISO 2014a). CAISO modeling determined that thermal overloads and very low voltage conditions could occur in this system following either one of two Category B[1] contingencies: loss of the Templeton 230 kV/70 kV #1 Transformer Bank or loss of the Paso Robles-Templeton 70 kV Transmission Line.

Essentially, if either the #1 Transformer Bank at the Templeton Substation or the 70 kV transmission line connecting the Paso Robles and Templeton Substations were to fail for any reason (e.g., vehicular impact to existing infrastructure, such as a pole; vegetation and/or storm damage to the existing transmission line, wildlife damage to existing electrical connections, and/or mechanical failure), it would result in dangerous overloading and low voltage conditions in the regional system. This is both due to high load (i.e., electrical service demand) in the Paso Robles area relative to substation capacity as well as lack of redundancy in the system. Currently, the only sources of power to the Paso Robles Substation are the San Miguel-Paso Robles 70 kV Transmission Line from the north and the Paso Robles-Templeton 70 kV Transmission Line from the south, with the latter providing the bulk of the power and the nearest connection to a 230 kV power source. The San Miguel-Paso Robles 70 kV Transmission Line does not have the capacity to accommodate the load served through the Paso Robles Substation should the power source from Templeton Substation fail; therefore, thermal

[1] The CAISO uses the National Electric Reliability Commission (NERC) reliability standards to analyze the need for transmission system upgrades. The NERC standards provide criteria for system performance requirements that must be met under a varied but specific set of operating conditions, and prior to 2012, included the following categories:

- Category A – System Performance Under Normal Conditions
- Category B – System Performance Following Loss of a Single Bulk Electric System (BES) Element
- Category C – System Performance Following Loss of Two or More BES Elements
- Category D – System Performance Following Extreme BES Events

The latest adopted NERC TPL-001-4 transmission reliability standard applies new terminology to seven different categories, P0 through P7. P0 through P7 define different scenarios based on the initial system condition and nature of the event (e.g., loss of generator, transmission circuit, bus section fault, etc.). The Category B contingencies identified for the Proposed Project would equate to a P1 (single contingency), while the Category C3 contingency would equate to a P6 (multiple contingency; two overlapping singles) (NERC No Date). The NERC standards allow for load to be dropped for a P6 contingency, but not for a P1 contingency.

NERC also refers to single contingencies (i.e., loss of a single BES element) as N-1 events. A multiple contingency where both BES elements fail at the same time (e.g., two circuits on the same pole line fail when a pole is hit by a vehicle) is known as a N-2 event. A multiple contingency involving the consecutive loss of two single BES elements that are not physically or electrically connected is known as a N-1-1 event. The Category B/P1 contingencies identified for the Proposed Project would be N-1 events, whereas the Category C3/P6 contingency would be a N-1-1 event.

overloads and low voltage could occur on this line during one of the Category B contingencies identified by CAISO (NEET West and PG&E 2018a).

Because PG&E has an Under-Voltage Load Shedding scheme that serves to protect the transmission system infrastructure in the event of such overload scenarios; rather than allow the transmission line to melt or completely fail, load would be systematically dropped to bring voltages to acceptable levels. Practically, without the Proposed Project, this could result in 60-70 megawatt (MW) of load in Paso Robles being dropped during one of the Category B contingencies described above (CAISO 2014a).

In addition to the above issues, CAISO also identified a Category C3 contingency condition involving loss of the Morro Bay-Templeton and Templeton-Gates 230 kV lines that would result in thermal overloads and low voltages in the underlying 70 kV system. The 2013-2014 Transmission Plan states that with the additional source from the Gates 230 kV system, the Proposed Project would provide robust system reinforcement to the Paso Robles and Templeton 70 kV system operations (CAISO 2014a). Because load can be dropped for a Category C3 (i.e., P6) contingency, this contingency is not the primary driver of the Proposed Project. Rather, the two Category B (i.e., P1) contingencies are considered the primary drivers for the Proposed Project.

Distribution System

In addition to the transmission-level issues described above, the Proposed Project also would address existing undesirable conditions and projected load growth in the distribution system in the Paso Robles area. As described in detail in Appendix G of the Proponent's Environmental Assessment (PEA) provided by the Applicants, the Paso Robles system is characterized by very long distribution feeders[2], particularly those extending from Templeton Substation. This is undesirable because long feeders are more susceptible to potential outages caused by vehicle pole strikes, downed vegetation from storms, or other incidents (PG&E and NEET West 2018a). Additionally, outages that occur on long feeders may affect larger numbers of people than similar events that occur on feeders of moderate length. In general, PG&E states that, "Reliable distribution systems consist of substations located at regular intervals and sized correctly in terms of capacity and number of feeders to cover the area between substations without overextending some substations and underutilizing others. The Paso Robles Distribution Planning Area (DPA) is not currently in line with these system goals (PG&E and NEET West 2018a)."

Locating the new substation at its proposed location would allow for the long feeders to be split in half and for some of the load currently being served by the Templeton Substation to be served by the new Estrella Substation. Reducing the length of these feeders would reduce potential outages for customers and improve the reliability of the distribution system in this area. **Table 1-1** shows historical outages on the Templeton feeders.

[2] Distribution *circuits* (i.e., electrical lines or conductors) are commonly referred to as *feeders*. They operate at voltage under 50 kV.

Table 1-1. Five-Year Outage History of Templeton 21 kilovolt Feeders (February 2012 to February 2017)

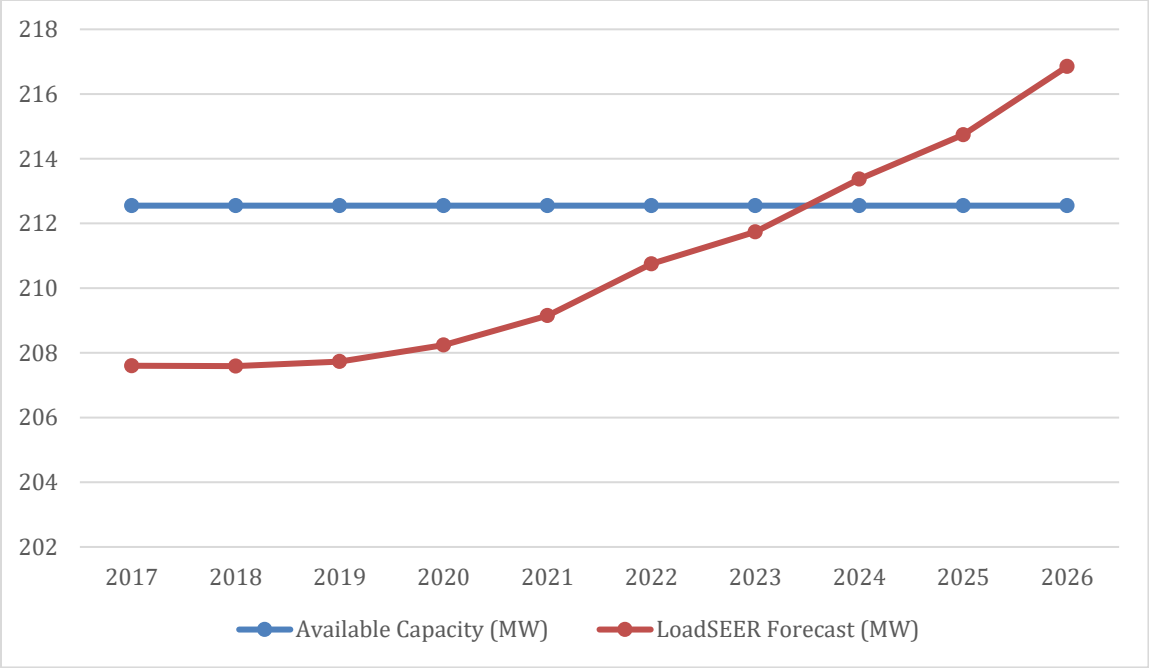
Feeder Name	Area Served Where Outages Occurred	No. of Sustained Outages	No. of Momentary Outages	Average No. of Customer Connections Affected Per Event	Highest No. of Customer Connections Affected by an Event
Templeton 2108	Northern Atascadero	7	10	2,955	3,189
Templeton 2109	Northeast Paso Robles	5	9	2,957	4,325
Templeton 2110	Rural West Paso Robles	4	20	1,802	2,926
Templeton 2111	Western Atascadero	6	10	1,847	2,433
Templeton 2112	Southern Paso Robles	3	10	475	1,068
Templeton 2113	Santa Margarita	7	25	1,911	5,446

Source: NEET West and PG&E 2018a

In addition to the issue of long feeders, the projected growth within the Paso Robles DPA is anticipated to exceed the capacity of the system in the ~~near~~ future. The City of Paso Robles (City) expects strong industrial growth to occur north of State Route (SR) 46 in the Paso Robles city limits (in particular within the Golden Hill Industrial Park and directly south of Paso Robles Airport along Dry Creek Road) within the next 10 years, and a resurgence of residential growth south of SR 46 (NEET West and PG&E 2018a). Overall, City planners are estimating a 50 percent increase in the population of Paso Robles by 2045.

Increases in electrical demand (i.e., load) will place increased demands on the distribution and transmission systems. Using the LoadSEER[3] forecasting tool, PG&E predicts that anticipated normal growth in the area, coupled with the addition of large "block loads" (e.g., large new businesses or developments that require large amounts of electricity), will exceed the available capacity of the Paso Robles system by roughly 2024 (see **Figure 1-5**).

[3] LoadSEER is a spatial load forecasting tool which is used by electric distribution system planners to predict load and power changes, where on the grid the loads will occur, how distributed generation changes the load shape, and when it must be supplied (Integral Analytics No Date). PG&E utilizes the LoadSEER forecasting tool to predict growth in area electrical demand within a DPA for a 10-year period into the future, incorporating the most recent 13 years of substation historical peak-load data.



Source: NEET West and PG&E 2018a

Figure 1-5. LoadSEER Forecast, Paso Robles DPA

As shown in Figure 1-5, the available capacity in the Paso Robles DPA is currently static at just over 212 MW. This capacity is equal to the cumulative capacities of the four substations (Atascadero, Paso Robles, Templeton, and San Miguel) in the DPA, whereas the "LoadSEER Forecast" represents the cumulative load that must be served by the distribution system for this area. As shown in Figure 1-5, the forecasted load will exceed available capacity in the year 2024. In a practical sense, without addition of a new or expanded substation or other facilities to serve ~~the projected~~ increased load, this situation could result in thermal overloads, low voltage, and electrical service outages, as the infrastructure is unable to meet demands.

The intent of the Proposed Project is to add capacity to the system with the addition of the new Estrella Substation, which will be able to absorb load currently served by other substations within the DPA. Additionally, since the new industrial growth is anticipated to occur in the Golden Hill Industrial Park area, the new substation will be able to accommodate this new growth by adding new feeder lines when the need materializes. Please refer to Appendix G of the Applicants' PEA for detailed discussion of the Proposed Project purpose and need, and the modeling conducted for the existing distribution system.

1.4.3 Proposed Project Objectives

Applicants' Stated Objectives

In their PEA, the Applicants identified the following objectives for the Proposed Project:

- **Reinforce Electrical Reliability by Implementing the CAISO-Approved Electrical Plan of Service.** Increase reliability and mitigate thermal overloads and voltage concerns in the

area by having an additional 230 kV source of power that will increase service reliability in northern San Luis Obispo County, and maintain compliance with NERC reliability standards, as described in the *Estrella Substation Project Functional Specifications* issued by CAISO in June 2014. The Estrella Project is also intended to allow NEET West and PG&E to meet their obligation to add the CAISO-approved project to the CAISO-controlled grid, as defined in the *Functional Specifications* and the Approved Project Sponsor Agreement.

- **Meet Expected Future Electric Distribution Demand.** Provide a location for future 21 kV distribution facilities with a 230/70 kV source near the anticipated growth areas in northern Paso Robles to efficiently add distribution capacity and improve service reliability when required in the Paso Robles DPA.
- **Balance Safety, Cost, and Environmental Impacts.** Locate, design, and build the project in a safe, cost-effective manner that will also minimize environmental impacts.

CPUC's Project Objectives

As part of its authority as the lead agency under CEQA for preparation of the EIR for the Proposed Project, CPUC is responsible for identifying appropriate project objectives to inform the CEQA process/evaluation, including the development and screening of project alternatives. These objectives may differ from the Applicants' stated objectives in their PEA. Based on its understanding of the fundamental underlying purpose of the Proposed Project, CPUC and its consultants have identified the following CEQA objectives for the Proposed Project:

- **Transmission Objective:** Mitigate thermal overload and low voltage concerns in the Los Padres 70 kV system during Category B contingency scenarios, as identified by the CAISO in its 2013-2014 Transmission Plan.
- **Distribution Objective:** Accommodate expected future increased electric distribution demand in the Paso Robles DPA, particularly in the anticipated growth areas in northeast Paso Robles.

The issue of long feeders and poor service reliability was not identified as a fundamental project objective by the Applicants or CPUC; however, it is considered a beneficial effect of the Proposed Project, and will be considered during development and screening of project alternatives.

1.5 PRELIMINARY PROJECT IMPACTS ANALYSIS

The EIR analysis has not yet been completed for the Proposed Project; therefore, final project impact determinations have not been made. Nevertheless, development and screening of alternatives requires an understanding of the potential significant impacts of the Proposed Project. As described further in Chapter 2, *Methodology for Identifying and Screening Alternatives,* CEQA alternatives should avoid or reduce at least one of the Proposed Project's potentially significant effects. Therefore, a preliminary discussion of the Proposed Project's impacts is provided here for the purpose of informing the alternatives screening process.

1.5.1 IMPACTS IDENTIFIED IN THE PEA

The PEA submitted by the Applicants identified no potentially significant impacts that would occur as a result of the Proposed Project. However, the PEA included a number of Applicant Proposed Measures (APMs) ~~that CPUC would likely consider mitigation measures~~ (e.g., preconstruction surveys for special-status species and implementation of avoidance measures, if necessary; implementation of measures in the event of discovery of human remains or fossils; noise minimization measures, etc.). Without assuming implementation of these APMs, a number of the impacts identified in the PEA would be potentially significant ~~(but could be reduced to less than significant through implementation of mitigation measures)~~. The impact conclusions in the PEA do not necessarily reflect those of CPUC in its DEIR.

1.5.2 IMPACTS IDENTIFIED IN THE PRELIMINARY EIR ANALYSIS

Preliminary analysis of potential Proposed Project impacts by the EIR consultant team, including solicitation of scoping comments and coordination with local stakeholders, has identified several potentially significant impacts, including the following:

- Aesthetic impacts from the placement of the approximately 15-acre Estrella Substation along Union Road, which traverses an area typified by rolling hills and vineyards;
- Aesthetic impacts from the new overhead 70 kV power line, particularly in the area of Golden Hill Road, where the line would pass through industrial, commercial, and residential areas that do not currently have overhead power lines; and
- Agricultural resources impacts from permanent conversion of at least 15 acres of Important Farmland as a result of construction of the proposed Estrella Substation and power line.

Additionally, review of the Proposed Project materials and scoping comments indicates that the Proposed Project could impact biological resources and cultural resources, and potentially increase wildfire risk due to the new overhead power lines; however, it is anticipated that mitigation measures could be implemented that would be sufficient to avoid or reduce these potential impacts to a level that is less than significant.

This page intentionally left blank

Chapter 2
METHODOLOGY FOR IDENTIFYING AND SCREENING ALTERNATIVES

2.1 IDENTIFICATION OF ALTERNATIVES

As discussed above, the purpose of the ASR is to identify a reasonable range of potentially feasible alternatives to the Proposed Project for consideration and evaluation in the EIR. The range of alternatives considered in the ASR was identified through (1) review of the Applicants' PEA, including review of the PEA's proposed alternatives and selection criteria, (2) collection of input from members of the public and stakeholders during the CEQA scoping process, and (3) independent evaluation of the Proposed Project by CPUC staff and consultants and consideration of CPUC initiatives. As explained further in Section 2.2, the purpose of alternatives under CEQA is to reduce or avoid one or more significant impacts of the Proposed Project (while also meeting all or most of the basic project objectives and feasibility criteria). Therefore, Project alternatives identified and evaluated in the ASR considered these underlying factors.

2.1.1 PEA ALTERNATIVES AND ALTERNATIVES SELECTION CRITERIA

Prior to submitting their application to the CPUC, the Applicants and their consultant teams developed and used selection criteria to identify project alternatives for the PEA analysis. Selection criteria developed as part of the PEA process are described in detail below.

Substation Siting Alternatives

As explained by HWT ~~NEET West~~ and PG&E in their PEA (NEET West and PG&E 2017), potential substation locations were physically and technically limited by the need to improve distribution reliability for the local DPA. As described in Section 1.4.2~~1.2.2~~, new industrial growth is anticipated to occur in the Paso Robles Airport area and the Golden Hill Industrial Park south of the airport~~; new distribution service for this area is anticipated to be needed in 5 to 15 years~~. Additionally, long feeders in the Paso Robles DPA are compromising distribution reliability; therefore, locating the substation in an area where these feeders could be split in half or shortened would be a benefit with respect to reliability.

During its process of selecting HWT ~~NEET West~~ and PG&E as the project sponsors, CAISO identified the location for the new substation to be within a 2.2-mile radius from the intersection of SR 46 and the Morro Bay-Gates/Templeton-Gates 230 kV transmission corridor. This location was a result of a recommendation to CAISO from PG&E's distribution planning engineers, based upon several considerations:

1. The anticipated growth areas are north and east of Paso Robles Substation, so the new distribution substation should be north and east of Paso Robles Substation in order to place the new distribution substation near the growth.

2. Since the new distribution substation would be fed from the 230 kV transmission source, the new substation should be located along the Morro Bay-Gates 230 kV transmission lines to minimize costs and potential project impacts.

3. The locality known as "Estrella" offers the operational advantage of being located where long distribution lines from four existing substations end (i.e., San Miguel, Paso Robles, Cholame, and Templeton). Thus, placing the substation in Estrella would make it possible to back feed and split in half long existing distribution lines from these four sources.

   Of the potential sites in Estrella, those north of Estrella Road would place the new substation off in a northeast corner of the DPA and too far from the growth areas near Paso Robles Airport and Golden Hill Industrial Park. Therefore, the northern-most site considered was a site where the 230 kV lines cross Estrella Road, approximately 2.2 miles northeast of SR 46 along the 230 kV right-of-way. The southern-most site that distribution planning engineers felt was acceptable (i.e., not too close to Templeton or Paso Robles substations and not too far from the growth areas) was a site where Union Road comes close to the Morro Bay-Gates 230 kV lines. This southern-most site is the Proposed Project site.

In addition to the factors described above, potential substation sites needed to be available for outright purchase, and of the size and topography necessary to support the substation design. Also, due to reliability issues in crossing existing 500 kV transmission line, the Applicants focused on potential sites that were located on the east side of the 230/500 kV transmission corridor to avoid crossing under or over the existing 500 kV transmission line.

Based on these criteria, the Applicants' parcel search identified 19 parcels that contained potential sites for the 15-acre substation. Ultimately, following outreach efforts to the landowners of the identified parcels, three substation sites (including the proposed site) were carried forward for further analysis.

Power Line Route Alternatives

Once the proposed substation site was identified, the Applicants developed routing options based on the CAISO Functional Specifications (CAISO 2014b) and that took into account the following goals:

- Construct a safe and reliable system;
- Minimize conflicts with established land uses, including agriculture;
- Minimize the length of the electric power line to reduce the costs and overall footprint;
- Minimize the potential impacts on special-status species and habitats;
- Minimize permitting requirements and potential schedule delays for an in-service date of 2019;
- Minimize constructability and operational constraints;
- Minimize costs to customers;

- Minimize the division of parcels by locating routes near the edge of parcels; and,
- Maximize the use of existing corridors by co-location when feasible.

The Applicants' routing process was separated into the following four distinct stages: study area development, corridor development, route segment development, and final route identification. These stages allowed the team to establish a large 54.8-square-mile study area that would then be narrowed into 42 corridors and 125 route segments that could be evaluated and connected together to build a complete route.

Segments were assigned compatibility ratings, and a spatial analysis was prepared to evaluate the potential for overhead power line structures to interfere with or obstruct navigable air space associated with the Paso Robles Municipal Airport. PG&E conducted desktop technical review and aerial field inspections using helicopters to determine constructability of the various route segments. Route corridors and segments were then further defined and narrowed during outreach activities that were initiated in July 2015, concurrently with the beginning of the routing process.

Ultimately, as a result of this review process, PG&E narrowed the previous 42 corridors and 125 route segments down to three alternatives routes (including the proposed route) (NEET West and PG&E 2017).

2.1.2 PUBLIC AND STAKEHOLDER SCOPING

In accordance with CEQA requirements, CPUC staff and consultants circulated a NOP to interested members of the public on July 30, 2018. A revised NOP was circulated on August 1, 2018 to correct a map depicting potential alternatives, which had inadvertently omitted several possible alternatives. Circulation of the NOP initiated the scoping period, which lasted until August 31, 2018, although several comment letters were accepted beyond this date.

CPUC staff and consultants conducted a public scoping meeting for the Proposed Project on Tuesday, August 7, 2018, from 6 p.m. to 8 p.m. at the Winifred Pifer Elementary School located at 1350 Creston Road in Paso Robles. The meeting was publicized in the local area newspaper and details of the meeting time and location were provided in the NOP, which was sent via direct mailings to numerous households, offices, and agencies. The scoping meeting format consisted of a presentation by CPUC staff and consultants followed by opportunities for attendees to ask questions and submit comments. Written comment cards were provided to all meeting attendees, as well as information on how to access project documents and participate in the public review process going forward. A total of 50 individuals signed in to the meeting in Paso Robles.

During the scoping period, CPUC received numerous comment letters from public agencies, the general public, and other entities, as summarized in **Table 2-1**.

Table 2-1. Comment Letters Received by Commenter Type

Commenter Type	No. of Comment Letters
Public Agencies	5
General Public	37
Community Organization / Group (e.g., neighborhood HOA)	2
Parties to the CPUC Formal Proceeding	1
Tribes	1

The public agencies that submitted scoping comment letters are as follows:

- City of El Paso de Robles
- County of San Luis Obispo
- California Department of Conservation
- California Native American Heritage Commission
- California Department of Conservation, Division of Oil, Gas, and Geothermal Resources

The specific comments within the comment letters submitted on the Proposed Project covered a wide range of topics; refer to the Scoping Summary Report (available via the Project website) for a detailed discussion of the comments received during scoping. The most common generalized comments received are provided in **Table 2-2** below. Key concepts and phrases within the comments shown in Table 2-2 are shown in bold.

Table 2-2. Most Common Generalized Scoping Comments by Number of Commenters

Comment	No. of Commenters
The proposed overhead power lines would have **aesthetic impacts** and be out of scale with the community.	23
Overhead power lines **should be placed underground** to reduce aesthetic impacts and/or minimize fire risk.	16
Overhead power lines could present hazards associated with electromagnetic fields.	15
The addition of overhead power lines could **decrease property values** for nearby properties.	11
The overhead power lines could present a **fire hazard risk** (e.g., if they were downed in an earthquake or high winds).	9
General opposition to the Proposed Project power line route.	8
The overhead power lines would have **noise impacts** from the “buzzing” during operation.	7

Comment	No. of Commenters
Why is the project needed? The rationale for the Proposed Project is not well-founded.	6
The overhead power lines **could adversely affect the flight path** for California Department of Forestry and Fire Protection (CAL FIRE) helicopters accessing the pond by the Circle B properties.	6
The Project 70 kV route alignments could necessitate **removal of oak trees**.	5
The Proposed Project and alternatives could **impact bald and golden eagles** in the area.	5
Project construction ground-disturbing activities could **impact cultural resources**.	4
Project construction activities could result in **noise impacts**.	4
There would be **traffic impacts** during Project construction.	4
Support for the Proposed Project power line route.	4

As shown in Table 2-2, many of the comments received during the scoping period related to potential impacts (e.g., aesthetic impacts, fire hazard risk, noise impacts, etc.) of the overhead power lines associated with the Proposed Project and alternatives. One of the most common generalized comments received was that the proposed overhead power lines should be placed underground.

Other notable comments included the comments from the City of Paso Robles, which expressed concern regarding potential aesthetic impacts of the proposed overhead power lines (particularly with respect to their height) and compatibility of the power line crossing of SR 46 with a planned interchange project at that location. The City also expressed concern regarding a possible battery storage alternative that would expand, or place a large battery at or near, the existing Paso Robles Substation. The City stated that such an alternative could potentially result in a variety of adverse impacts, such as aesthetics, traffic, safety, and land use, particularly due to the fact that the substation is surrounded on all sides by multi-family residential and commercial uses. The City also noted that Niblick Road, which is located immediately south of the existing substation, may need to be expanded in the future, which would further constrain the potential expansion of Paso Robles Substation.

Another individual member of the public commented that expansion of the existing Templeton Substation (i.e., adding transformer capacity) and addition of a second circuit on the existing Templeton-Paso Robles 70 kV Transmission Line would solve the CAISO-identified issues. This individual also noted that this arrangement (a double-circuit line from Templeton Substation to Paso Robles Substation) was originally proposed, but the approach was abandoned due to cost and budgeting issues. The individual argued that this double-circuit approach still makes sense today and that use of steel poles would sufficiently minimize the N-2 exposure (i.e., two circuits on one pole being taken down due to vehicle impact, other manmade causes, or natural causes) associated with this alternative. This individual's comments align closely with Alternative SE-1:

Templeton Substation Expansion and Alternative SE-PLR-1: Existing 70 kV Power Line Route considered in this ASR (see Sections 3.4 and 3.5.1).

2.1.3 INDEPENDENT EVALUATION AND CONSIDERATION OF CPUC INITIATIVES

As part of the independent evaluation of the Proposed Project for the EIR, CPUC staff and consultants identified and considered possible alternatives to the Proposed Project. This process was guided by the alternatives screening criteria (see Section 2.2 for detailed description), comments received during scoping, as well as consideration of CPUC initiatives ~~and relevant sections of the Public Utilities Code~~.

Battery Storage Initiatives and Rulings

The CPUC adopted Decision 13-10-040 on October 17, 2013, which established an Energy Storage Procurement Framework and design program. In accordance with Assembly Bill (AB) 2514, the decision established the policies and mechanisms for procurement of electric energy storage, including:

1. Procurement targets for each of the investor-owned utilities and procurement requirements for other load serving entities;
2. Mechanisms to procure storage and means to adjust the targets, as necessary; and
3. Program evaluation criteria.

The decision specifically established a target of 1,325 MW of energy storage to be procured by PG&E, Southern California Edison Company (SCE), and San Diego Gas & Electric Company (SDG&E) by 2020, with installations required no later than the end of 2024, and sets a schedule for procurement of energy storage. Of the 1,325 MW total, 700 MW shall be transmission-connected, 425 MW shall be distribution-connected, and 200 MW shall be customer-side (CAISO 2018a). The CAISO considers these targets and connection domains when evaluating potential mitigation to transmission constraints in local areas as part of its transmission planning process. **Table 2-3** shows CAISO's operational attribute assumptions for these classes of energy storage and the targets mandated under Decision 13-10-040.

Table 2-3. CAISO Storage Operation Attributes

Values are megawatts in 2024	Transmission-Connected	Distribution-Connected	Customer-Side
Total Installed Capacity	700	425	279
Amount Providing Capacity in Power Flow Studies	560	170	135
Amount Providing Flexibility	700	212.5	135
Amount with 2 Hours of Storage	280	170	100
Amount with 4 Hours of Storage	256	170	135
Amount with 6 Hours of Storage	124	85	0

Source: CAISO 2018a

In addition to Decision 13-10-040, various requirements related to energy storage are included in the Public Utilities Code; in particular, Section 2837(g) states that each electrical corporation's renewable energy procurement plan should address the acquisition and use of energy storage systems to avoid or delay investments in transmission and distribution system upgrades.

In April 2015, the CPUC opened an Order Instituting Rulemaking in response to the enactment and ongoing implementation of Assembly Bill 2514 and to continue to refine policies and program details, such as the Energy Storage Procurement Framework (Proceeding R.15-03-011). The rulemaking considered recommendations included in the California Energy Storage Roadmap, an interagency guidance document jointly developed by CAISO, California Energy Commission, and CPUC.

Assembly Bill 2868 passed in 2016 to spur further Distributed Energy Resources (DER) implementation. It required the CPUC to direct PG&E, SCE, and SDG&E to develop programs to accelerate deployment of an additional 500 MW of distributed energy storage systems. CPUC Decision D.17-04-039 ordered each of the three utility companies to add up to 166.66 MW of distributed energy storage systems to their energy storage procurement and investment plans. This established a new target of 1,825 MW of energy storage procurement by 2020 (CPUC 2017). To date, PG&E has reported its procurement of extensive amounts of transmission-connected energy storage and limited amounts of distribution-connected and customer-connected (behind the meter)[4] energy storage (CPUC 2019a).

~~*Public Utilities Code Considerations for Alternatives and Certificate of Public Convenience and Necessity (CPCN) Applications*~~

~~With respect to identification and consideration of alternatives in an EIR, the CPUC takes the following into account:~~

> ~~Public Utilities Code Section 1002.3 requires CPUC to "…consider cost-effective alternatives to transmission facilities that meet the need for an efficient, reliable, and affordable supply of electricity…", and the CPUC's Information and Criteria List for project applications requires discussion of "…alternatives capable of substantially reducing or eliminating any significant environmental effects, even if these alternatives substantially impede the attainment of the project objectives, and are more costly."~~

~~Additionally, Public Utilities Code Section 1002 states the following with respect to issuance of CPCNs:~~

> ~~(a) The commission, as a basis for granting any certificate pursuant to Section 1001 shall give consideration to the following factors:~~

[4] The term, "behind the meter" (BTM), refers to connecting energy storage behind a customer's meter (i.e., connecting it to a specific customer's electrical system). The term, "front of the meter" (FTM), refers to connecting energy storage to a utility company's electrical grid. FTM connections can be to a utility's distribution system (under 50 kV) or transmission system (above 50 kV).

~~(1) Community values.~~

~~(2) Recreational and park areas.~~

~~(3) Historical and aesthetic values.~~

~~(4) Influence on environment, except that in the case of any line, plant, or system or extension thereof located in another state which will be subject to environmental impact review pursuant to the National Environmental Policy Act of 1969 (Chapter 55 (commencing with Section 4321) of Title 42 of the United States Code) or similar state laws in the other state, the commission shall not consider influence on the environment unless any emissions or discharges therefrom would have a significant influence on the environment of this state.~~

2.2 ALTERNATIVES SCREENING METHODOLOGY

The screening process for identified possible alternatives considered the following primary criteria:

- Does the alternative accomplish all or most of the basic project objectives?
- Is the alternative potentially feasible (e.g., from economic, environmental, legal, social, and technical standpoints)?
- Does the alternative avoid or substantially lessen any significant effects of the Proposed Project?

Each criteria is described further in the following subsections. The criteria are discussed throughout this document in the order shown above; however, the order is not important and all criteria carry equal weight.

2.2.1 CONSISTENCY WITH BASIC PROJECT OBJECTIVES

As described in Section 1.4.3~~1.2.3~~, CPUC identified the following basic project objectives for the Proposed Project:

- **Transmission Objective:** Mitigate thermal overload and low voltage concerns in the Los Padres 70 kV system during Category B contingency scenarios, as identified by the CAISO in its 2013-2014 Transmission Plan.
- **Distribution Objective:** Accommodate expected future increased electric distribution demand in the Paso Robles DPA, particularly in the anticipated growth areas in northeast Paso Robles.

The screening process considered whether a potential alternative addressed at least one of the two basic objectives. Because the two fundamental project objectives address two essentially separate (although interconnected in some ways) issues, alternatives addressing either one of

the two objectives could potentially be combined or constructed in tandem to meet all of the basic project needs. Additionally, because the Proposed Project involves two primary components (i.e., substation and a new/reconductored power line), certain alternatives (e.g., substation siting alternatives or power line routing alternatives) may not on their own meet the project objectives, but could be combined with other alternatives to meet the project needs.

2.2.2 FEASIBILITY

The alternatives screening process also considered whether the alternative is potentially feasible. CEQA Guidelines Section 15364 defines feasibility as "...capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors." According to CEQA Guidelines Section 15126.6(f)(1), the factors that may be considered when addressing the potential feasibility of alternatives include site suitability, economic viability, availability of infrastructure, general plan consistency, other plans or other regulatory limitations, jurisdictional boundaries, and the project proponent's control over alternative sites.

For the screening analysis, the potential feasibility of alternatives was assessed by considering the following factors:

- **Economic Feasibility.** Is the alternative so costly that implementation would be prohibitive? CEQA Guidelines Section 15126.6(b) requires consideration of alternatives capable of eliminating or reducing significant environmental effects even though they may "impede to some degree the attainment of the project objectives, or would be more costly". The Court of Appeals determined in Citizens of Goleta Valley v. Board of Supervisors (2nd Dist. 1988) 197 Cal.App.3d 1167, p. 1181 (see also Kings County Farm Bureau v. City of Hanford [5th Dist. 1990] 221 Cal.App.3d 692, 736): "[t]he fact that an alternative may be more expensive or less profitable is not sufficient to show that the alternative is financially infeasible. What is required is evidence that the additional costs or lost profitability are sufficiently severe as to render it impractical to proceed with the project."
- **Environmental Feasibility.** Would implementation of the alternative cause substantially greater environmental damage than the Proposed Project, thereby making the alternative clearly inferior from an environmental standpoint? To the extent that the alternative could introduce a new significant effect, or increase the severity of a significant effect, this could render the alternative environmentally infeasible.
- **Legal Feasibility.** Does the alternative have the potential to encounter lands that have legal protection that may prohibit or substantially limit the feasibility of permitting a substation and power line, or energy storage facility? Lands that are afforded legal protections that would prohibit the construction of the project, or that would require an act of Congress for permitting, are generally considered infeasible locations for the project. These land use designations include wilderness areas, wilderness study areas, restricted military bases, airports, and Native American reservations.
- **Social Feasibility.** Is the alternative inconsistent with an adopted goal or policy of the CPUC or other applicable agency?

- **Technical Feasibility.** Is the alternative potentially feasible from a technological perspective, considering available technology? Are there any construction, operation, or maintenance constraints that cannot be overcome? Can the transmission, distribution, or energy storage facilities associated with the alternative be feasibly connected to existing transmission and/or distribution system infrastructure?

2.2.3 POTENTIAL TO ELIMINATE SIGNIFICANT ENVIRONMENTAL EFFECTS

Finally, the screening process determined, as far as available information allows, whether the alternative could avoid or substantially lessen any of the significant effects of the Proposed Project. At the screening stage, it is not possible to evaluate all the impacts of the alternatives in comparison to the Proposed Project with absolute certainty, nor is it possible to quantify impacts. However, it is possible to identify elements of an alternative that are likely to be the sources of impacts and to relate them, to the extent possible, to general conditions in the subject area, and to the preliminary identified impacts of the Proposed Project.

Chapter 3
ALTERNATIVES DESCRIPTIONS AND DETERMINATIONS

This chapter describes the alternatives considered in this ASR and the process by which alternatives were either retained for further analysis in the EIR or eliminated from further consideration. Each alternative was evaluated using the process described in Chapter 2. CEQA requires that the No Project Alternative be considered in an EIR; as such, it is not discussed here.

As noted in Chapter 2, due to the nature of the project, alternatives are considered separately for the different primary project components. Specifically, alternatives are considered separately for substation siting and routing of the 70 kV power line. Additionally, wholly different project approaches, such as battery storage, are considered in the analysis.

3.1 SUMMARY OF ALTERNATIVES SCREENING ANALYSIS RESULTS

In total, 7 out of the 12~~11~~ total alternatives considered were retained for detailed analysis in the EIR. ~~Two of these alternatives (BS-1 and BS-2) are not sufficiently defined at this time to definitively determine feasibility and evaluate environmental impacts; but for the purposes of this analysis, the alternatives are considered potentially feasible and likely to reduce significant environmental impacts, and, therefore, are retained for full analysis. Additionally, one alternative (BS-3) is not sufficiently defined at this time to render any conclusion, and, therefore, is discussed briefly and will be further defined and evaluated in the future.~~ One variation of Alternative PLR-1: Estrella Route (i.e., Alternative PLR-1B) was screened out from full analysis in the EIR because this alternative would only be used with Alternative SS-2: Mill Road West Substation Site, which was itself screened out. Another variation of Alternative PLR-1: Estrella Route (Alternative PLR-1D) was screened out due to potential feasibility constraints associated with obtaining access to the alignment. A variation of Alternative SE-1: Templeton Substation Expansion that would only add a 70 kV substation (Alternative SE-1B) was considered subsequent to the publication of the Draft ASR and was screened out from full analysis in the EIR. Additionally, Alternative BS-1: Battery Storage to Address the Transmission Objective was screened out based on comments received on the Draft ASR and additional analysis subsequent to the original Draft ASR publication. As described in detail in Section 3.6.3, CPUC and its consultants conducted a detailed study of behind-the-meter (BTM) solar plus storage adoption propensity pursuant to Alternative BS-3 subsequent to publication of the Draft ASR. The BTM study concluded that BTM resources, in combination with front-of-the-meter (FTM) storage, could potentially meet the Distribution Objective of the Proposed Project.

Table 3-1 provides a summary of the alternatives screening analysis results. Sections 3.2 through 3.6 provide detailed analysis to support determinations provided in this summary table. **Figure 3-1** shows a summary map depicting all of the alternatives considered in this analysis.

Table 3-1. Summary of Alternatives Screening Analysis Results

Name of Alternative	Project Objective	Potential Feasibility	Potential to Reduce Significant Environmental Effects, As Compared to Proposed Project
Alternatives Retained for Full Analysis in the EIR			
Alternative SS-1: Bonel ~~McDonald~~ Ranch Substation Site	Meets both objectives.	Potentially feasible based on its consideration in the PEA. Could increase some environmental effects due to longer 230 kV interconnection, but these effects would likely not be significant.	Would reduce aesthetics impacts due to its more rural location and would reduce agricultural resources impacts.
Alternative PLR-1: Estrella Route *(Variations: Alternative PLR-1A~~,~~ and PLR-1C~~, and PLR-1D~~)*	Meets both objectives.	Potentially feasible based on its consideration in the PEA. Would increase some environmental effects due to longer power line length, but these effects would likely not be significant.	Could reduce potential impacts to biological resources and would reduce aesthetic impacts.
Alternative PLR-3: Strategic Undergrounding (*Variations: Alternative PLR-3A and PLR-3B)*	Meets both objectives.	Potentially feasible. Could increase some environmental effects associated with trenching for installation of underground line, but these are unlikely to be significant.	Would reduce aesthetic impacts and could reduce potential impacts to special-status birds.
Alternative SE-1A: Templeton Substation Expansion – 230/70 kV Substation	Would meet Transmission Objective. Could be paired with an alternative that meets Distribution Objective.	Potentially feasible.	Would reduce aesthetic and agricultural resources impacts.
Alternative SE-PLR-2: Templeton-Paso South River Route	Would meet Transmission Objective. Could be paired with an alternative that meets Distribution Objective.	Potentially feasible.	Would involve less overall ground disturbance and construction activity due to avoided need for a reconductoring segment/reduced overall 70 kV power line length.

Name of Alternative	Project Objective	Potential Feasibility	Potential to Reduce Significant Environmental Effects, As Compared to Proposed Project
~~Alternative BS-1: Battery Storage to Address Transmission Objective *(Variations: Alternative BS-1A, BS-1B, BS-1C, BS-1D, and BS-1E)*~~	~~Would meet the Transmission Objective. Could be paired with an alternative that meets Distribution Objective.~~	~~Potential feasibility constraints due to limited sites/built-out nature of Paso Robles Substation vicinity. Safety and fire risk considerations to be investigated in the EIR.~~	~~Could potentially reduce aesthetics and agricultural resources impacts.~~
Alternative BS-2: Battery Storage to Address Distribution Objective	Would meet Distribution Objective. Could be paired with alternative that meets Transmission Objective.	Feasibility to be evaluated in coordination with Applicants. Safety and fire risk considerations to be investigated in the EIR.	Would likely reduce aesthetic and agricultural resources impacts.
Alternative BS-3: Behind-the-Meter Solar and Battery Storage	~~TBD~~ Could meet the Distribution Objective when paired with FTM storage. Could be paired with alternative that meets Transmission Objective.	~~TBD~~ Potentially feasible.	~~TBD~~ Would reduce aesthetic and agricultural resources impacts, as well as other potential construction-related effects.
Alternatives Screened Out from Full Analysis in the EIR			
Alternative SS-2: Mill Road West Substation Site	Meets both objectives.	Potentially feasible based on its consideration in the PEA. Would require more ground disturbance and construction activity due to need to improve access road, but these environmental effects unlikely to be significant.	May reduce but not altogether eliminate aesthetics impacts. Would have similar agricultural resources impacts.
Alternative PLR-1: Estrella Route *(Variations: Alternative PLR-1B and PLR-1D)*	Meets both objectives.	Potentially feasible based on its consideration in the PEA. Would increase some environmental effects due to longer power line length, but these effects are unlikely to be significant.	Could reduce potential impacts to biological resources and would reduce aesthetic impacts.

Name of Alternative	Project Objective	Potential Feasibility	Potential to Reduce Significant Environmental Effects, As Compared to Proposed Project
Alternative PLR-2: Creston Route *(Variations: Alternative PLR-2A, PLR-2B, and PLR-2C)*	Meets both objectives.	Potential engineering feasibility constraints. Would have similar or possibly more significant aesthetics impacts.	Would not avoid or reduce any significant effects of the Proposed Project.
Alternative SE-1B: Templeton Substation Expansion – 70 kV Substation Only	Would not meet the Transmission Objective and would not fully meet the Distribution Objective.	Infeasible.	Would reduce aesthetic and agricultural resources impacts.
Alternative SE-PLR-1: Templeton-Paso 70 kV Route (Existing)	Would meet Transmission Objective, although would create potential for N-2 contingency (i.e., two lines on one pole being taken down due to vehicular impact, other causes). Could be paired with an alternative that meets Distribution Objective.	~~Potential feasibility constraints associated with need for expansion of Paso Robles Substation to ring bus configuration.~~ Technically and legally infeasible due to insufficient space at Paso Robles to convert the existing bus layout to a ring bus; inability to relocate underground water utilities owned by City of Paso Robles; and insufficient space/access to convert existing wood poles to taller steel poles for conversion of 70 kV line to double-circuit.	Could reduce aesthetics and agricultural resources impacts. Would involve less overall ground disturbance and construction activity due to avoided need for a reconductoring segment/reduced overall 70 kV power line length. Would reduce new permanent disturbance areas due to utilization of an existing transmission line.
Alternative SE-PLR-3: Templeton-Paso Creston Route	Would meet Transmission Objective. Could be paired with an alternative that meets Distribution Objective.	Potential engineering feasibility constraints. Would have similar or possibly more significant aesthetics impacts.	Would involve less overall ground disturbance and construction activity due to avoided need for a reconductoring segment/reduced overall 70 kV power line length.

Name of Alternative	Project Objective	Potential Feasibility	Potential to Reduce Significant Environmental Effects, As Compared to Proposed Project
Alternative BS-1: Battery Storage to Address Transmission Objective *(Variations: Alternative BS-1A, BS-1B, BS-1C, BS-1D, and BS-1E)*	Would meet the Transmission Objective. Could be paired with an alternative that meets Distribution Objective.	Infeasible due to the lack of a recharging window for extended outages (e.g., longer than 24 hours) during peak demand conditions. ~~Potential feasibility constraints due to limited sites/built-out nature of Paso Robles Substation vicinity. Safety and fire risk considerations to be investigated in the EIR.~~	Could potentially reduce aesthetics and agricultural resources impacts.

Notes:

SS = Substation Siting; PLR = Power Line Route; SE = Substation Expansion; BS = Battery Storage; kV = kilovolt;
PEA = Proponent's Environmental Assessment; EIR = Environmental Impact Report; TBD = to be determined

This page intentionally left blank

Bonel Ranch*
Substation Site
(Alternative SS-1)

Estrella
Substation
(Proposed)

Paso Robles Substation

Templeton Substation Expansion
(Alternative SE-1)

Templeton
Substation

San Miguel
Inset Map
Main Map
Paso
Robles
Inset Map
Atascadero
San Luis
Obispo

N. River Road

San Miguel Substation

Morro Road

Atascadero
Lake

Atascadero Substation

Proposed Project

- Estrella Substation
- Proposed Project 70kV Route

Existing Infrastructure

- Existing Substations

Project Alternatives Carried Forward for Full Analysis

- Alternative SS-1: Bonel Ranch Substation Site
- Alternative SE-1A: Templeton Substation Expansion - 230/70 kV Substation
- Alternative PLR-1A: Estrella Route to Estrella Substation
- Alternative PLR-1C: Estrella Route to Bonel Ranch, Option 1
- Alternative PLR-1C: Minor Route Variation 1
- Alternative PLR-1C: Minor Route Variation 2
- Alternative PLR-3A: Strategic Undergrounding, Option 1
- Alternative PLR-3B: Strategic Undergrounding, Option 2
- Alternative SE-PLR-2: Templeton-Paso South River Road Route
- Potential Front-of-the-Meter Battery Storage Locations (Alternative BS-2)

Other Project Alternatives Considered

- Alternative SS-2: Mill Road West Substation Site
- Alternative PLR-1B: Estrella Route to Mill Road West
- Alternative PLR-2: Creston Route (Variations not shown; not carried forward)
- Alternative SE-PLR-1:Templeton-Paso 70kV Route (Existing)
- Alternative SE-PLR-3: Templeton-Paso Creston Route
- Alternative PLR-1D: Estrella Route to Bonel Ranch, Option #2

N

0 1
Miles

Figure 3-1
Alternatives
Summary Map

Note: The route variations shown are offset in order to display the alignments of the alternative routes that may overlap in places.

* formerly McDonald Ranch

Horizon
WATER and ENVIRONMENT

Source: NEET West and PG&E 2017.

Estrella Substation and
Paso Robles Area Reinforcement Project

T:_PROJECTS\17010_CPUC_Estrella_Task_3_EIR\mxd\EIR\Fig_3-1_alternatives_summary.mxd 3/6/2020 PG

Page intentionally left blank.

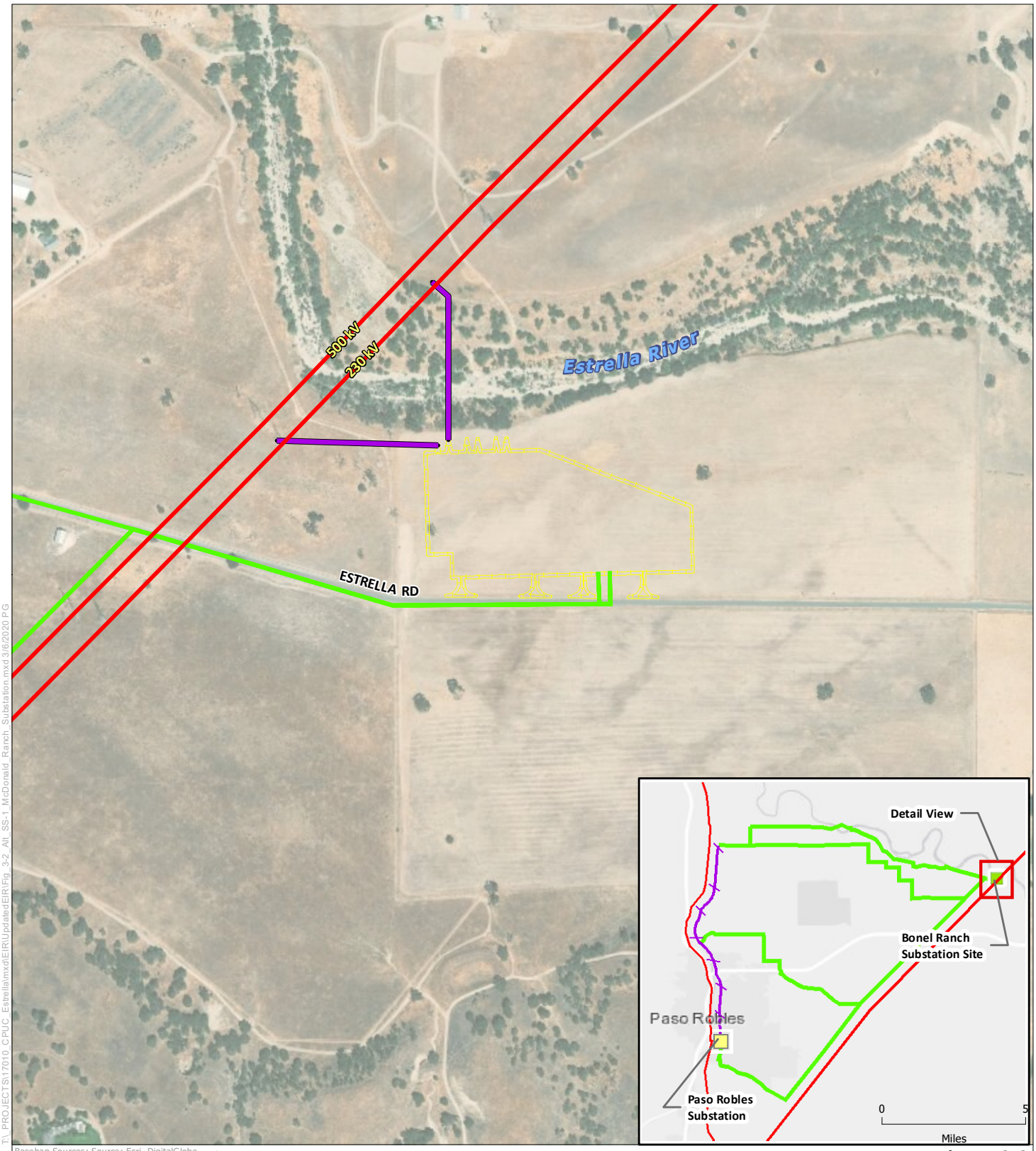
3.2 SUBSTATION SITING (SS) ALTERNATIVES

3.2.1 ALTERNATIVE SS-1: BONEL RANCH (FORMERLY MCDONALD RANCH) SUBSTATION SITE

Description

The Bonel Ranch (formerly McDonald Ranch) Substation Site is situated on an approximately 72-acre parcel, of which the substation would occupy approximately 15 acres. This site is bordered by the Estrella River to the north and Estrella Road to the south, and is generally surrounded by rural development. The Bonel Ranch ~~McDonald Ranch~~ site is located within the County of San Luis Obispo North County Planning Area, El Pomar-Estrella Sub Area, and is currently used to grow alfalfa. Adjacent land uses are also agricultural, including fallow land, livestock grazing, alfalfa, dry farming, and vineyards. Scattered residences are present in the area.

If the substation were constructed at the Bonel Ranch ~~McDonald Ranch~~ Substation Site, it could be connected to the existing Paso Robles Substation via a 70 kV power line following either the Estrella Route (Alternative PLR-1), the Proposed Project power line route, or the Creston Route (Alternative PLR-2). **Figure 3-2** shows Alternative SS-1: Bonel Ranch ~~McDonald Ranch~~ Substation Site and potential power line route alignments.



T:_PROJECTS\17010_CPUC_Estrella\mxd\EIR\Update\EIR\Fig_3-2_Alt_SS-1_McDonald_Ranch_Substation.mxd 3/6/2020 PG

Basebap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics,

Alternative

- Substation Footprint
- 230 kV Interconnections
- 70-kV Power Line Routes that Could be Used for the Bonel Ranch Substation Site
- Reconductoring Segment
- Substation Site Alternatives

Existing Infrastructure

- Transmission Lines (offset)
- Substation

N

0 250 500

Feet

Horizon WATER and ENVIRONMENT

Source: Source: NEET West and PG&E 2017; California Energy Commision 2018

Figure 3-2
Alternative SS-1
Bonel Ranch
Substation Site

Estrella Substation and
Paso Robles Area Reinforcement Project

Consideration of CEQA Criteria

Project Objectives

Alternative SS-1: Bonel Ranch ~~McDonald Ranch~~ Substation Site, when combined with one of the power line route alternatives, would meet both of the project objectives. The substation and power line would provide the same functions as the Proposed Project, including addressing the CAISO-identified Category B contingencies and accommodating future additional load demand in the DPA. Due to its more remote location, however, the Bonel Ranch ~~McDonald Ranch~~ Substation Site may provide a less ideal location for extending future distribution service and splitting in half of existing long feeders in the DPA, as compared to the proposed Estrella Substation site.

Feasibility

The Bonel Ranch (formerly McDonald Ranch) Substation Site was originally identified by the Applicants as part of the PEA. The identification of alternatives as part of the PEA considered feasibility, as discussed above in Section 2.1.1, and in the PEA (page 4-3). As this alternative was analyzed with a substantial level of detail in the PEA, it is reasonable to assume that the alternative is potentially feasible from a legal and technical standpoint. The substation site is not on lands afforded legal protections and no regulatory or technical constraints were identified.

Compared to the proposed substation site, Alternative SS-1: Bonel Ranch ~~McDonald Ranch~~ Substation Site would require a longer 230 kV interconnection to the substation (approximately 1,100 feet), which would span the Estrella River. This would require more overall vegetation removal (both temporary and permanent) due to the presence of riparian habitat that extends along the river. Additionally, the site's close proximity to Estrella River would create the potential for impacting unknown cultural and tribal resources, which have a higher likelihood of occurring in areas near watercourses.

Due to the longer interconnection and associated ground disturbance/vegetation removal, construction of Alternative SS-1: Bonel Ranch ~~McDonald Ranch~~ Substation Site also would take longer (i.e., estimated 1 to 2 months longer construction duration). This could result in a potential for increased soil erosion and sedimentation, as well as increased fugitive dust. The site's close proximity to Estrella River also may necessitate additional import/export of fill material to accommodate soils near the river that are less conducive to compaction. The increased truck trips that would result from the additional soil import/export would increase construction-related air contaminant and greenhouse gas (GHG) emissions compared to the proposed substation site.

These environmental impacts could likely be minimized through mitigation measures, however, and are not anticipated to be significant following mitigation. Therefore, they would not render the alternative environmentally infeasible. Overall, the alternative is considered potentially feasible.

Potential to Reduce Significant Environmental Impacts

Alternative SS-1: Bonel Ranch ~~McDonald Ranch~~ Substation Site could reduce identified impacts of the Proposed Project related to aesthetics and agricultural resources. Due its location along the more rural Estrella Road, which is further removed to the east from the City of Paso Robles compared to the proposed substation site, the visual impacts of this alternative would likely affect a fewer number of receptors (e.g., motorists traveling on adjacent roadways). Additionally, the portion of Estrella Road on which the Bonel Ranch ~~McDonald Ranch~~ Substation Site is located is not visible from any vineyards or wineries, and Estrella Road is not included on the "Wine Line" wine touring route (whereas the proposed substation site is visible from several vineyards and wineries identified as "Wine Line" stops). SR 46 is an Eligible State Scenic Highway (California Department of Transportation [Caltrans] 2018); due to the Bonel Ranch ~~McDonald Ranch~~ Substation Site's distance (1.7 miles) from SR 46, it likely would not be visible by motorists using this highway, but this would need to be confirmed in the EIR.

Additionally, while the Bonel Ranch ~~McDonald Ranch~~ Substation Site is designated as Farmland of Local Importance, building the substation on this site would not affect Unique Farmland, Farmland of Statewide Importance, or Prime Farmland (California Department of Conservation [CDOC] 2016a). By contrast, construction of the proposed substation would result in the conversion of 11.73 acres of Unique Farmland and 2.66 acres of Farmland of Statewide Importance (NEET West and PG&E 2017). Unique Farmland and Farmland of Statewide Importance are generally considered superior agricultural lands to Farmland of Local Importance, as Farmland of Local Importance are lands that do not meet the criteria of the former two categories but are nevertheless determined to be important to the local economy (CDOC 2016b). In San Luis Obispo County, Farmland of Local Importance are those lands which meet all the characteristics for Prime Farmland or Farmland of Statewide Importance with the exception of irrigation (CDOC 2016b).

Conclusion

Alternative SS-1: Bonel Ranch (formerly McDonald Ranch) Substation Site would meet both of the project objectives and is potentially feasible. The alternative has the potential to reduce aesthetic and agricultural resources impacts, which are considered potentially significant impacts for the Proposed Project. Therefore, Alternative SS-1: Bonel Ranch ~~McDonald Ranch~~ Substation Site is **retained** for full analysis in the EIR.

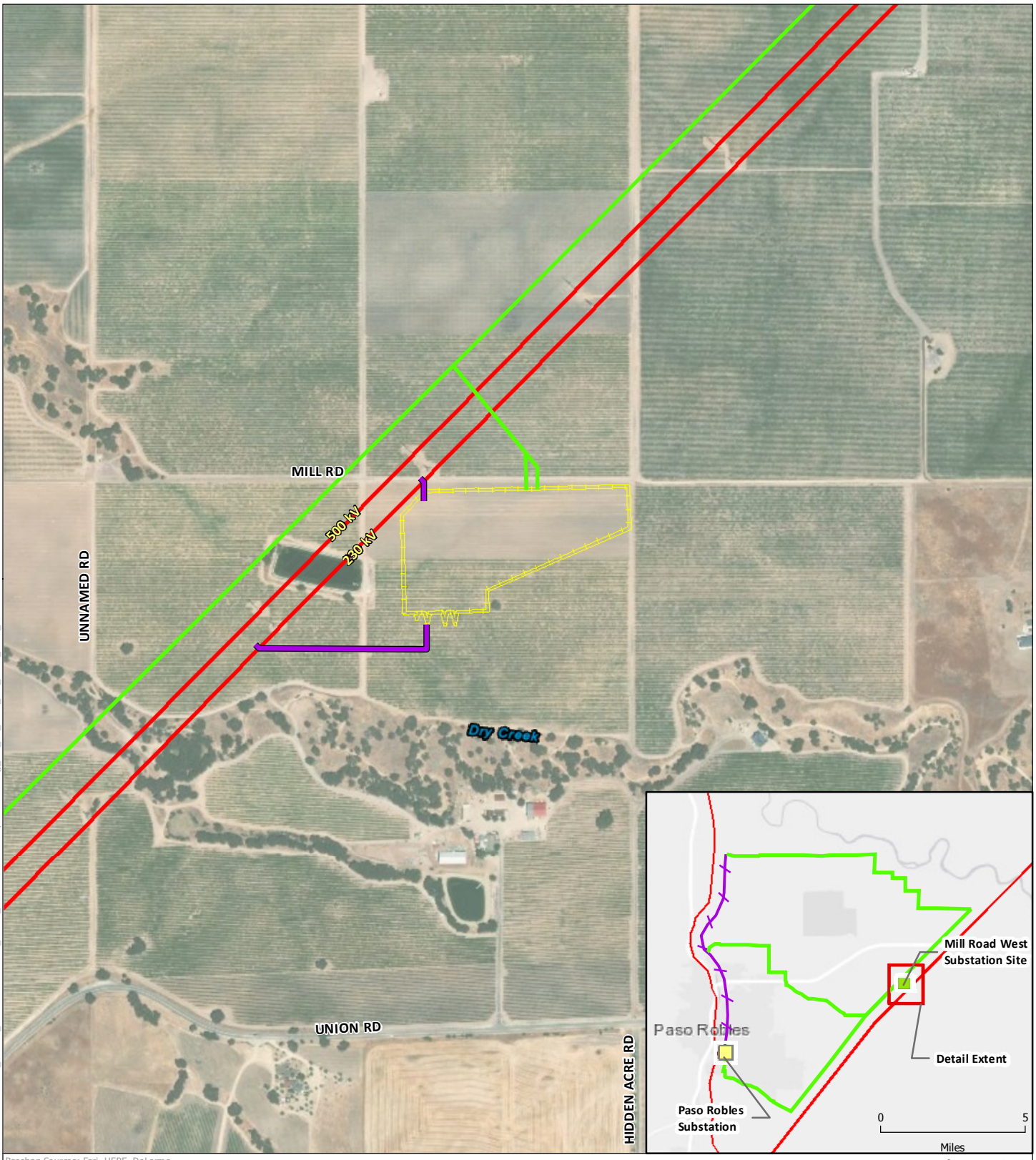
3.2.2 ALTERNATIVE SS-2: MILL ROAD WEST SUBSTATION SITE

Description

The Mill Road West Substation Site is situated on an approximately 42-acre parcel located approximately 0.5 mile east of the proposed Estrella Substation site and Union Road. Similar to the Proposed Project, the substation would occupy an approximately 15-acre portion of the parcel. The site is bounded on the north by Mill Road, the west by an unpaved private road and retention pond, and the south by an unpaved private road and moderate rolling hills, and is located within the County of San Luis Obispo North County Planning Area, El Pomar-Estrella Sub Area. The site is currently used to grow wine grapes. Adjacent land uses include primarily

vineyards and associated wine processing facilities and wine tasting venues. Scattered residences are also present in the area.

The Mill Road West Substation Site could be connected to the existing Paso Robles Substation via either the Proposed Project power line route, the Estrella Route (Alternative PLR-1), or the Creston Route (Alternative PLR-2). **Figure 3-3** shows the Mill Road West Substation Site and possible 70 kV power line alignments.



Basebap Sources: Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap

Alternative

- Substation Footprint
- 230 kV Interconnections
- 70-kV Power Line Routes that Could be Used for the Mill Road West Substation Site
- Reconductoring Segment
- Substation Site Alternatives

Existing Infrastructure

- Transmission Line (offset)
- Substation

N

0 250 500
Feet

Source: Source: NEET West and PG&E 2017

Figure 3-3
Alternative SS-2: Mill Road West Substation Site

Estrella Substation and Paso Robles Area Reinforcement Project

Horizon WATER and ENVIRONMENT

Consideration of CEQA Criteria

Project Objectives

Alternative SS-2: Mill Road West Substation Site, when combined with one of the power line route alternatives, would meet both of the project objectives. The substation and power line would provide the same functions as the Proposed Project, and would address the CAISO-identified Category B contingencies, as well as accommodate additional future load demand in the DPA.

Feasibility

The Mill Road West Substation Site was originally identified by the Applicants in the PEA. As this alternative was analyzed with a substantial level of detail in the PEA, it is reasonable to assume that the alternative is potentially feasible from a legal and technical standpoint. The substation site is not on lands afforded legal protections and no regulatory or technical constraints were identified.

The Mill Road West Substation Site would require additional road improvements in order to accommodate construction equipment and all-weather access during operations and maintenance (approximately 1 mile of an existing dirt road would require improvements such as widening, paving, and associated improvements). The alternative also would require a longer 230 kV interconnection compared to the Proposed Project. As a result, this alternative would require more temporary and permanent ground disturbance and create the potential for increased indirect hydrology and water quality impacts. Additionally, due to the presence of water features (e.g., an irrigation pond, Dry Creek) in the area of the site, there is potential for the alternative to affect wetlands.

These environmental effects could likely be minimized through mitigation measures, however, and are not anticipated to be significant following mitigation. Therefore, they would not render the alternative environmentally infeasible. Overall, Alternative SS-2 is considered potentially feasible.

Potential to Avoid or Reduce Significant Environmental Impacts

As the Mill Road West Substation Site is located approximately 0.5 mile northeast of Union Road, it would be somewhat less visually prominent to drivers traveling along Union Road compared to the Proposed Project site; however, the new substation may still be visible to motorists, as well as other sensitive receptors in the area (e.g., residences). The Mill Road West Substation Site, like the proposed substation site, is located in an area typified by rolling hills and vineyards, which features stops along the “Wine Line” bus tour. As a result, the alternative substation would not completely eliminate the potential for visual impacts.

The Mill Road West Substation Site would be located primarily on Farmland of Statewide Importance and Unique Farmland (CDOC 2016a); therefore, it would have similar agricultural resources impacts as the Proposed Project.

Conclusion

Alternative SS-2: Mill Road West Substation Site would meet both of the project objectives and would be potentially feasible; however, the alternative would not eliminate or substantially reduce any of the potentially significant impacts of the Proposed Project. Therefore, Alternative SS-2: Mill Road West Substation Site is **screened out** from full analysis in the EIR.

3.3 POWER LINE ROUTE (PLR) ALTERNATIVES

3.3.1 ALTERNATIVE PLR-1: ESTRELLA ROUTE

Description

The Estrella Route is an alternative route for the 70 kV power line that would connect the proposed Estrella Substation or one of the alternative substation sites (i.e., Alternative SS-1: Bonel ~~McDonald~~ Ranch Substation Site or Alternative SS-2: Mill Road West Substation Site) to the existing Paso Robles Substation. The Estrella Route would allow for the power line to pass north of the Paso Robles Municipal Airport in a low-density area (see **Figure 3-4**).

Depending on which potential substation site is utilized, four variations of the Estrella Route are possible:

- **Alternative PLR-1A: Estrella Route to Estrella Substation.** This route would be used to connect the proposed Estrella Substation to Paso Robles Substation. As shown on Figure 3-4, this route would follow the existing 230/500 kV transmission corridor northeast until veering north at roughly the intersection of the transmission corridor with Highway 46. The route would then zig zag in a northwest direction through agricultural lands until meeting Wellsona Road. At this point, the route would follow Wellsona Road due west until meeting the existing San Miguel-Paso Robles 70 kV Transmission Line. This existing line would then be reconductored south to the existing Paso Robles Substation.
- **Alternative PLR-1B: Estrella Route to Mill Road West.** This route would be used to connect a substation at the Mill Road West Substation Site (Alternative SS-2) to the Paso Robles Substation. The route would be very similar to Alternative PLR-1A, but would follow the existing 230/500 kV transmission corridor further northeast and veer over to the zig zag to Wellsona Road north of Highway 46.
- **Alternative PLR-1C: Estrella Route to Bonel ~~McDonald~~ Ranch, Option One.** This route is one of the options that could be used to connect a substation at the Bonel ~~McDonald~~ Ranch Substation Site (Alternative SS-1) to Paso Robles Substation. As shown in Figure 3-4, the route would be very similar to Alternatives PLR-1A and -1B, and would cut over to the zig zag to Wellsona Road at the same point as Alternative PLR-1B. Based on comments received following the Draft ASR review period, two Minor Route Variations (MRVs) were identified for Alternative PLR-1C:
    - ***Alternative PLR-1C, MRV 1.*** Starting at the Bonel Ranch Substation Site, this MRV would route the 70 kV line along Estrella Road west until turning south down Jardine Road and then joining the Alternative PLR-1C route that cuts west toward Wellsona Road.

- ***Alternative PLR-1C, MRV 2.*** This MRV would start at the zig zag northwest to Wellsona Road and would instead go to the north and follow a portion of the existing distribution line just south of Estrella Road before turning south down Jardine Road and then re-joining the Alternative PLR-1C route.

- **Alternative PLR-1D: Estrella Route to Bonel ~~McDonald~~ Ranch, Option Two.** This route is the second of two options that could be used to connect a substation at the Bonel ~~McDonald~~ Ranch Substation Site (Alternative SS-1) to Paso Robles Substation. As opposed to Alternatives PLR-1A, -1B, and -1C, this route would follow Estrella Road northwest until roughly the junction with Jardine Road, at which point it would veer to the west through agricultural lands before ultimately joining Wellsona Road and then intersecting with the existing 70 kV San Miguel-Paso Robles Power Line. Like the other Estrella Route variations, the existing 70 kV line would then be reconductored from this point south to the existing Paso Robles Substation.

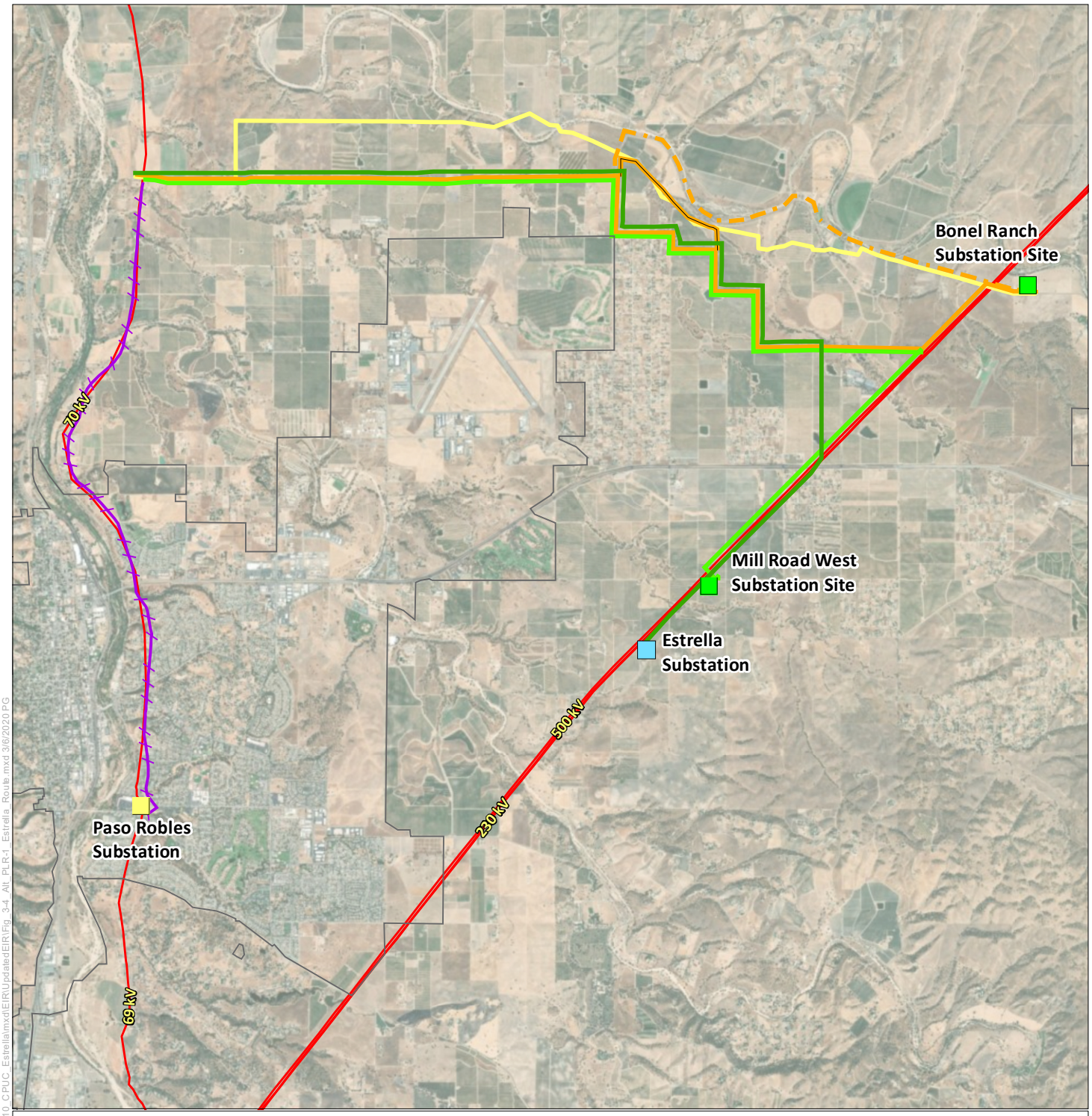
Land uses surrounding the Estrella Route primarily consist of urban and rural residential developments and agricultural areas dominated by vineyards. Alternative PLR-1D traverses more rural, agricultural areas compared to the other alignments. **Table 3-2** shows the length of the Estrella Route variations, as dictated by the potential substation site connection.

Table 3-2. Length of Estrella Route Power Line Components by Potential Substation Site Interconnection

Component	Length of Improvements / New Construction (miles)			
	Alternative PLR-1A: Estrella Route to Estrella Substation	**Alternative PLR-1B: Estrella Route to Mill Road West**	**Alternative PLR-1C: Estrella Route to Bonel ~~McDonald~~ Ranch, Option One**	**Alternative PLR-1D: Estrella Route to Bonel ~~McDonald~~ Ranch, Option Two**
New Double-Circuit 70 kV Power Line	10.5	11.25	10	9
Reconductoring of Existing 70 kV San Miguel-Paso Robles Power Line	6	6	6	6
Total	16.5	17.25	16	15

Note: kV = kilovolt

Conductors on the new 70 kV power line and the reconductoring segment for the Estrella Route would be supported by a combination of the same types of structures and conductor configuration as the Proposed Project route. Construction methods and operation and maintenance activities would be identical to the Proposed Project route.



Basebap Sources: Source: Esri, DigitalGlobe, GeoEye,

Alternative

- Alternative PLR-1A: Estrella Route to Estrella Substation
- Alternative PLR-1B: Estrella Route to Mill Road West
- Alternative PLR-1C: Estrella Route to Bonel Ranch, Option 1
- Alternative PLR-1C: Minor Route Variation 1
- Alternative PLR-1C: Minor Route Variation 2
- Alternative PLR-1D: Estrella Route to Bonel Ranch, Option 2
- Reconductoring Segment

- Estrella Substation
- Substation Site Alternatives
- Paso Robles City Limits

Existing Infrastructure

- Substation
- Transmission Line

N

0 1 Miles

Horizon WATER and ENVIRONMENT

Source: Source: NEET West and PG&E 2017

Note: The route variations shown are offset in order to display the alignments of the alternative routes.

Figure 3-4
Alternative PLR-1: Estrella Route

Estrella Substation and Paso Robles Area Reinforcement Project

T:_PROJECTS\17010_CPUC_Estrella\mxd\EIR\Updated\EIR\Fig_3-4_Alt_PLR-1_Estrella_Route.mxd 3/6/2020 PG

Consideration of CEQA Criteria

Project Objectives

Alternative PLR-1: Estrella Route, when combined with one of the substation siting alternatives, would meet both of the project objectives. The substation and power line would provide the same functions as the Proposed Project, including addressing the CAISO-identified Category B contingencies. Utilization of this power line route would not affect the substation's ability to accommodate existing load demand in the DPA and provide for future distribution service for anticipated growth.

Feasibility

The Estrella Route was originally identified by the Proposed Project Applicants as part of the PEA. ~~As described in Section 2.1.1, the Applicants considered legal, technical, and other potential constraints in developing the power line alignment alternatives. As this alternative was analyzed with a substantial level of detail in the PEA, it is reasonable to assume that the alternative is potentially feasible from a legal and technical standpoint.~~ In its comments on the Draft ASR, PG&E noted that there were potential feasibility issues with all of the Alternative PLR-1 variations (i.e., Alternative PLR-1A, -1B, -1C, and -1D) due to lack of all-weather access roads for maintenance. All-weather roads would need to be established adjacent to the pole line in the agricultural areas, which would likely be opposed by the farmers. If no permanent access can be established and the existing access roads are passable, PG&E would need to drop or remove a row of grapevines to drive over the area to conduct maintenance, likely resulting in 5 years of crop loss reimbursement, which would add to the project cost.

In particular, according to PG&E, the Alternative PLR-1D alignment has difficult access or no existing access roads along a majority of the route, as the route runs cross-country through residents' yards and pastures. During the walkdown process to evaluate this route, PG&E's team discovered that access was almost non-existent and new temporary roads would have to be built to construct a double-circuit 70 kV transmission line along much of this route. If a double-circuit 70 kV line was constructed along this route, maintenance would be difficult during the wet season. Many of the new poles would not be adjacent to roads, so trucks would have to cross fields to reach them. Those fields will not be accessible by trucks when they are heavily saturated and muddy. If repairs were needed during these times, access to the site would be limited to by foot or possibly by helicopter.

PG&E acknowledged that the feasibility issues described for Alternatives PLR-1A, -1B, and -1C were not fully vetted and did not object to carrying forward these alternatives for detailed consideration in the EIR. The potential feasibility issues associated with Alternative PLR-1D are more pronounced and PG&E recommended dismissal of the alternative based on these issues.

Due to its longer length (from 2 to 4.25 additional miles of new pole line and 3 additional miles of reconductored line, depending on the variation), Alternative PLR-1: Estrella Route would increase some environmental impacts associated with additional construction activity and a longer construction duration, such as those related to air quality, GHG emissions, cultural resources, noise, and traffic. Compared to the Proposed Project route, the Estrella Route would involve greater overall ground disturbance and operation of construction equipment, thereby

resulting in greater construction-related effects. The proximity of the Estrella Route to the Paso Robles Municipal Airport also would reduce the ability for the new power line to follow property lines, causing a number of properties to be severed by the new utility route; this would also have the effect of reducing maintenance access for PG&E.

None of these increased effects are anticipated to be significant following mitigation, however, and therefore would not render the alternative environmentally infeasible. Overall, Alternative PLR-1A, -1B, and -1C are ~~is~~ considered potentially feasible. Alternative PLR-1D is considered infeasible based on the construction and maintenance accessibility issues described above.

Potential to Avoid or Reduce Significant Environmental Impacts

Because the Estrella Route would pass through a more rural area of San Luis Obispo County and would avoid certain areas of high viewer sensitivity documented during the project scoping period, it could reduce aesthetic impacts compared to the Proposed Project. The Estrella Route would avoid the potentially significant effects on the existing visual quality and character of the areas along Golden Hill Road in the City of Paso Robles that would result from the Proposed Project route. While the Estrella Route could still result in aesthetics impacts in other locations (this would need to be further evaluated in the EIR), at this screening level of analysis, it is believed that the Estrella Route could reduce overall aesthetics impacts compared to the Proposed Project.

Additionally, the Estrella Route would reduce impacts to sensitive natural communities (i.e., blue oak woodlands, sandy wash, Central Coast cottonwood-sycamore riparian forest, and coastal and valley freshwater marsh), as this route would not pass through such sensitive areas. The Estrella Route also would pass substantially further (i.e., approximately 3 mile northeast) from the golden eagle nest documented near the Proposed Project route by Huerhuero Creek north of the Golden Hill Road Industrial Park (see NEET West and PG&E 2017, page 3.4-37); thereby, reducing the potential to impact this nesting golden eagle pair.

Conclusion

Alternative PLR-1: Estrella Route would meet both of the basic project objectives ~~and is potentially feasible~~. Variations PLR-1A, -1B, and -1C are considered potentially feasible. Variation PLR-1D is considered infeasible as it has more significant issues involving lack of maintenance access. ~~The~~ Aalternative PLR-1 could reduce potentially significant effects (i.e., aesthetics and biological resources) of the Proposed Project.

Because Alternative SS-2: Mill Road West Substation Site was screened out from full analysis in the EIR, Alternative PLR-1B, also, is screened out. Additionally, Alternative PLR-1D is screened out due to the feasibility issues described above. Alternatives PLR-1A~~,~~ and -1C ~~and 1D~~ are **retained** for full analysis in the EIR.

3.3.2 ALTERNATIVE PLR-2: CRESTON ROUTE

Description

The Creston Route is a 70 kV power line route that could be used for either the proposed Estrella Substation, Alternative SS-1: Bonel ~~McDonald~~ Ranch Substation Site, or Alternative SS-2: Mill Road West Substation Site. In each case, a new double-circuit 70 kV power line would be installed along the route to connect the substation to the Paso Robles Substation. **Figure 3-5** shows the Creston Route.

The Creston Route variations are identified as follows:

- **Alternative PLR-2A: Creston Route to Estrella.** This route would be used to connect the proposed Estrella Substation to Paso Robles Substation. From the new Estrella Substation, the route would follow the existing 230/500 kV transmission corridor south to roughly the intersection with Creston Road. At this point, the route would veer to the northwest and follow Creston Road, then Charolais Road, and then South River Road before meeting the Paso Robles Substation.

- **Alternative PLR-2B: Creston Route to Mill Road West.** This route would be used to connect a substation at the Mill Road West Substation Site (Alternative SS-2) to Paso Robles Substation. The route would be identical to Alternative PLR-2A except that it would extend further northwest along the existing 230/500 kV transmission corridor to connect with the more northwesterly Mill Road West Substation Site.

- **Alternative PLR-2C: Creston Route to Bonel ~~McDonald~~ Ranch.** This route would be used to connect a substation at the Bonel ~~McDonald~~ Ranch Substation Site (Alternative SS-1) to Paso Robles Substation. The route would be identical to Alternatives PLR-2A and -2B except that it would extend further northwest along the existing 230/500 kV transmission Corridor to connect with the more northwesterly Bonel ~~McDonald~~ Ranch Substation Site.

Land use within the portion of the Creston Route following the 230/500 kV transmission corridor is primarily agricultural and rural residential, while the land use along the portion of the route that follows Creston Road, Charolais Road, and then South River Road varies from rural residential to urban development. The alternative is located on a combination of privately-owned property and PG&E easements, with one parcel owned by the Land Conservancy of San Luis Obispo County. **Table 3-3** shows the length of the new line associated with each variation/potential substation site. The 3-mile-long reconductoring segment would not be required under Alternative PLR-2: Creston Route.

Table 3-3. Length of Creston Route Power Line Components by Potential Substation Site Interconnection

	Length of Improvements / New Construction (miles)		
	Alternative PLR-2A: Creston Route to Estrella Substation	**Alternative PLR-2B: Creston Route to Mill Road West**	**Alternative PLR-2C: Creston Route to Bonel ~~McDonald~~ Ranch**
New Double-Circuit 70 kV Power Line	11.5	8	7.5

Note: kV = kilovolt

Conductors along the Creston Route would be supported by a combination of the same types of structures and conductor configuration as for the Proposed Project route's new 70 kV power line segment. Construction methods and operation and maintenance activities would be nearly identical to the Proposed Project route for most of the new 70 kV power line segment. Temporary and permanent disturbance area assumptions are the same as identified for the Proposed Project route's new 70 kV power line segment along the transmission corridor and along the south side of Creston Road to the south side of Charolais Road.

T:_PROJECTS\17010_CPUC_Estrella\mxd\EIR\Updated\EIR\Fig_3-5_Alt_PLR-2_Creston_Route.mxd 9/6/2020 PG

Basebap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics,

Paso Robles City Limits

Estrella Substation

Substation Site Alternatives

Alternative

Alternative PLR-2A: Creston Route to Estrella

Alternative PLR-2B: Creston Route to Mill Road West

Alternative PLR-2C: Creston Route to Bonel Ranch

Existing Infrastructure

Existing Substation

Existing Transmission Lines

N

0 1

Miles

Horizon WATER and ENVIRONMENT

Source: Source: NEET West and PG&E 2017

Figure 3-5

Alternative PLR-2: Creston Route

Note: The route variations shown are offset in order to display the alignments of the alternative routes that may overlap in places.

Estrella Substation and Paso Robles Area Reinforcement Project

Consideration of CEQA Criteria

Project Objective

This alternative, when combined with one of the substation siting alternatives, would meet both project objectives.

Feasibility

As discussed in the PEA, the Creston Route has potential engineering feasibility conflicts with existing utilities (NEET West and PG&E 2017; page 4-15).

With respect to environmental feasibility, compared to the Proposed Project power line alignment, the Creston Route would have similar, or possibly more significant, aesthetics impacts. The portion of the Creston Route that follows Creston Road passes through a relatively densely populated residential area that does not currently have a transmission line (although there is an existing distribution line). Therefore, addition of the new 70 kV power line along this alignment would subject these residents to adverse visual impacts and cause a decrease in the visual quality of the area. Impacts along the portion of the alignment along South River Road would be less severe considering that the baseline condition in this area includes transmission infrastructure (i.e., the San Miguel–Paso Robles 70 kV Transmission Line). In many respects, these aesthetic impacts would be similar to those for the Proposed Project power line, but could potentially be more severe considering that the Creston Road area is more densely populated than the areas through which the Proposed Project power line would traverse.

The Creston Route also would traverse sensitive habitats, and could potentially increase impacts on heritage oaks and could create potential for impacts to vernal pool fairy shrimp. A number of large heritage oaks are located along Charolais Road and South River Road, which would require removal for implementation of the Creston Route Alternative. These heritage oaks are part of the historic blue oak forest and are highly regarded by the community (NEET West and PG&E 2017). While the Proposed Project power line would require trimming of heritage oak trees, the Creston Route Alternative would require trimming and removal of such trees. The Creston Route could also result in direct or indirect impacts to vernal pool fairy shrimp and/or vernal pool fairy shrimp habitat, whereas the proposed route would avoid such habitat.

The potential for engineering feasibility conflicts and increased potentially significant impacts to aesthetics and biological resources suggest that Alternative PLR-2 may not be feasible.

Potential to Avoid or Reduce Significant Environmental Impacts

The Creston Route would have similar, if somewhat reduced, agricultural resources impacts compared to the Proposed Project. There appear to be fewer agricultural lands and lands designated as Important Farmland by the CDOC along the Creston Route as compared to the Proposed Project power line route; however, the primary impacts of the Proposed Project on agricultural lands are from the permanent loss of Important Farmland associated with the new substation. Like the Proposed Project route, the Creston Route would have relatively minimal permanent impacts on agricultural lands due to the small footprint of individual transmission pole structures.

As described above under "Feasibility," the Creston Route may increase potentially significant aesthetics impacts, as this route would pass through a more densely populated, residential area. Overall, the Creston Route would not substantially reduce or eliminate any potentially significant impacts of the Proposed Project.

Conclusion

The Creston Route would meet both project objectives; however, it is unclear if the alternative would be feasible and the alternative would not reduce or eliminate any potentially significant impacts of the Proposed Project. Therefore, Alternative PLR-2: Creston Route is **screened out** from full analysis in the EIR.

3.3.3 ALTERNATIVE PLR-3: STRATEGIC UNDERGROUNDING

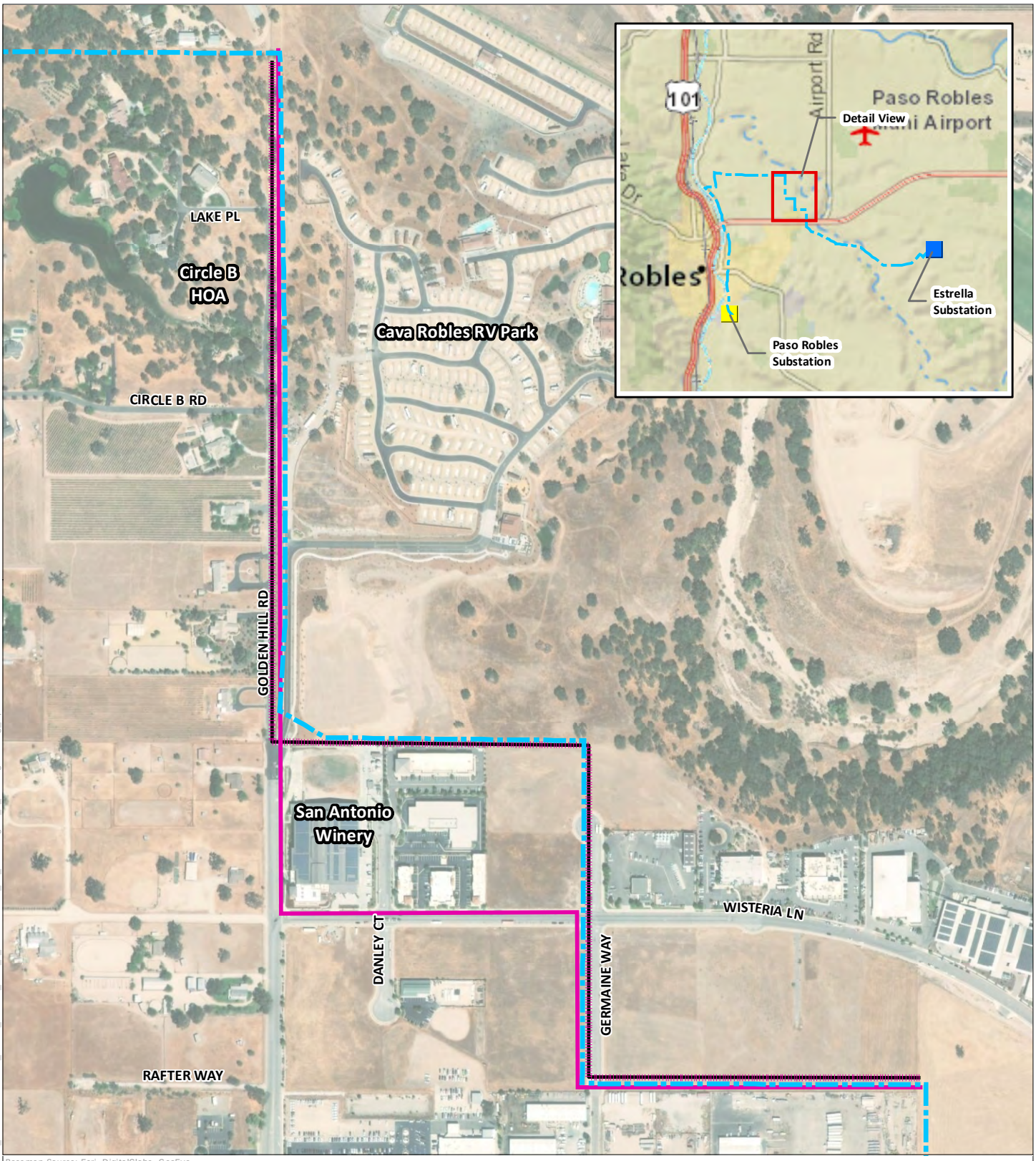
Description

Alternative PLR-3: Strategic Undergrounding would involve undergrounding the portion of the Proposed Project's new 70 kV power line which has the greatest potential for aesthetic and other environmental impacts. During scoping for the Proposed Project (see Section 2.1.2 for discussion), and based on CPUC staff and consultant's preliminary analysis of the Proposed Project's potential impacts, it was identified that the proposed new 70 kV power line has potential for significant impacts to aesthetics, as well as to other resource categories (e.g., biological resources, public services, etc.).

In particular, the portion of the line that passes through the Golden Hill Road area north of Highway 46 has the greatest potential for impacts because this area does not have existing above-ground transmission or distribution electrical infrastructure and is an up-and-coming area of new commercial and industrial development. This area also has existing single-family residential development and recreational uses, and is located near a known golden eagle nest and an area of relatively undeveloped blue oak woodland that could support other special-status and non-special status species. Land uses along other segments of the proposed new 70 kV power line could experience impacts, but these areas either already have transmission infrastructure (e.g., the existing San Miguel-Paso Robles 70 kV Power Line along the proposed reconductoring segment) or are more rural in nature and would not be subject to the same level of aesthetic impacts.

Subsequent to the release of the Draft ASR, the proposed undergrounding segment under Alternative PLR-3 was modified slightly and two separate routes were considered. **Figure 3-6** shows the portion of the new 70 kV power line that would be undergrounded for Alternative PLR-3 and the two variations considered by CPUC. As shown in Figure 3-6, the undergrounded section would begin at roughly the point where the proposed power line alignment turns west to parallel Wisteria Lane. From this point, the undergrounded line would extend west before turning north along Germaine Way. ~~following Wisteria Lane before turning north along Golden Hill Road.~~ From this point, Option 1 would follow Wisteria Lane and then turn north along Golden Hill Road. Under this option, the underground line would be installed within/underneath the roadway. Instead of turning west along Wisteria Lane, Option 2 would continue north along Germaine Way past the cul-de-sac and then west behind the existing businesses there (e.g., San Antonio Winery). Option 2 would follow the revised Proposed Project overhead 70 kV route.

From the junction of Golden Hill Road and the Proposed Project 70 kV route alignment, both Option 1 and 2 ~~The undergrounded section~~ would extend along Golden Hill Road until the point where the proposed 70 kV power line route turns abruptly west, approximately 0.1-mile north of the junction with Lake Place.



Basemap Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS,

N

0 250 500
Feet

Proposed Project 70-kv Route

Undergrounding Option 1

Undergrounding Option 2

Source: NEET West and PG&E 2019

Figure 3-6
Alternative PLR-3:
Strategic Undergrounding

Note: The route variations shown are offset in order to display the alignments of the alternative routes.

Estrella Substation and
Paso Robles Area Reinforcement Project

T:_PROJECTS\17010_CPUC_Estrella_Task_3_EIR\mxd\Misc_for_Client\Figure_2_Undergrounding_Options.mxd 12/18/2019 PG

Construction methods for Alternative PLR-3: Strategic Undergrounding would include trenching for installation of the underground line. Vegetation clearing may be required for portions of the alignment along vegetated areas, and portions of the line within roads or sidewalks would require asphalt cutting to expose the underlying soil. Splice vaults also would likely need to be installed at appropriate intervals, which could require more substantial excavation to install. These activities would involve use of construction equipment such as excavators, dump trucks, asphalt cutting equipment, and related equipment.

Consideration of CEQA Criteria

Project Objectives

Alternative PLR-3: Strategic Undergrounding would meet both of the project objectives. The undergrounded line segment would perform the same functions as the proposed overhead line. When constructed in combination with the proposed Estrella Substation, the alternative would meet the Transmission Objective by providing an additional source of power to Paso Robles Substation. While the alternative would not itself meet the Distribution Objective, it would be constructed with the proposed Estrella Substation, which would meet the distribution needs of the Proposed Project.

Feasibility

While detailed engineering and design has not been performed for Alternative PLR-3: Strategic Undergrounding, at this screening level of analysis, there is no available information to suggest that the alternative is infeasible. Germaine Way, Wisteria Lane, and Golden Hill Road ~~is an~~ are existing roads which may have underground utilities (e.g., water, sewer, natural gas, communications, etc.) within the roadway or sidewalk, but these existing utilities should be able to be negotiated. It is likely that Alternative PLR-3 would be more expensive than the proposed overhead approach, but at this point in time, CPUC does not have evidence to suggest that any increased cost from undergrounding the line would render the project economically infeasible.

With respect to environmental feasibility, Alternative PLR-3: Strategic Undergrounding could increase some environmental impacts associated with the trenching required for installation of the underground conductors and splice vaults. This trenching/excavation would involve additional ground disturbance compared to the proposed overhead power line's installation, and could increase potential for impacts to buried cultural resources; air pollutant and GHG emissions from increased operation of construction equipment, and impacts to special-status plants and animals in the area. The trenching/construction activities also could increase traffic impacts and noise, although these impacts would be temporary, lasting only for the duration of construction activities along this one power line segment.

None of the impacts described above are anticipated to be significant following implementation of mitigation measures, however, and therefore would not render the alternative environmentally infeasible. Overall, the alternative is considered potentially feasible.

Potential to Avoid or Reduce Significant Environmental Impacts

Alternative PLR-3 would reduce aesthetic impacts caused by the proposed overhead power line. Undergrounding the power line would completely avoid the aesthetic impacts in the area of

Golden Hill Industrial Park and the area of Cava Robles RV Park and the Circle B HOA that could occur from the Proposed Project. Once installed, the underground conductors would not be visible by sensitive receptors in the area, and this area of Paso Robles and San Luis Obispo County would continue to have no above-ground transmission infrastructure.

Additionally, Alternative PLR-3: Strategic Undergrounding could reduce potential impacts on biological resources and public services. As noted above, the portion of the proposed overhead power line that follows Golden Hill Road is near (approximately 0.2 mile west) a known golden eagle nesting pair. Additionally, the northern portion of the Alternative PLR-3 undergrounding segment passes through relatively undeveloped oak woodland that could serve as habitat for special-status bird species. Such bird species could potentially be impacted by an overhead 70 kV power line, and U.S. Fish and Wildlife Service (USFWS) staff have requested that "bird diverters" be placed on any overhead lines as an avoidance and minimization measure. Alternative PLR-3 would avoid potential impacts to special-status bird species that could occur from overhead lines along the 1.2-mile segment of line that would be undergrounded.

During the scoping period, CPUC staff and consultants received a number of comments about the potential for overhead transmission lines in the area of the Circle B HOA to obstruct the flight path for CAL FIRE helicopters accessing the pond located within the Circle B HOA (see Figure 3-6). CPUC has not yet verified with CAL FIRE or the Federal Aviation Administration whether this would in fact pose a problem (this will be further evaluated in the EIR); however, to the extent that such an impact could occur, the effect would be avoided (at least for aircraft entering from or exiting to the east) through Alternative PLR-3.

Conclusion

Alternative PLR-3: Strategic Undergrounding would meet both of the project objectives and is potentially feasible. The alternative would reduce potentially significant aesthetics impacts, as well as potential impacts to biological resources and public services. Therefore, Alternative PLR-3 is **retained** for full analysis in the EIR.

3.4 EXISTING SUBSTATION EXPANSION (SE) ALTERNATIVES

3.4.1 ALTERNATIVE SE-1A: TEMPLETON SUBSTATION EXPANSION – 230/70 KV SUBSTATION

Description

Alternative SE-1A: Templeton Substation Expansion – 230/70 kV Substation would involve expansion of the existing Templeton Substation to include a new 230/70 kV substation adjacent to the existing facilities at the Templeton Substation (see **Figure 3-7**). This new substation would include essentially the same equipment as the proposed Estrella Substation (with room for future expansion), and would interconnect with the Morro Bay-Cal Flats #2 230 kV line and the existing Templeton Substation via a new 70 kV tie line. PG&E would modify and expand Templeton Substation to operate in the same manner as the proposed Estrella 70 kV yard (breaker-and-a-half [BAAH] 70 kV expansion at Templeton Substation). Likewise, NEET West

would construct and operate the new 230 kV substation portion of Templeton Substation to be essentially identical to the proposed Estrella Substation.

To address the two Category B (i.e., P1) contingencies for thermal overloads and voltage concerns within the Paso Robles DPA that were identified by CAISO, the expanded Templeton Substation would need to be connected to the existing Paso Robles Substation via a new circuit. This is because an auxiliary source of power is needed at the Paso Robles Substation in the event that the existing Templeton-Paso Robles 70 kV Transmission Line fails. Possible routes for the new circuit are described and evaluated under Alternatives SE-PLR-1, SE-PLR-2, and SE-PLR-3. Figure 3-7 shows the footprint of the expanded/new substation adjacent to the existing Templeton Substation.

Source: NEET West and PG&E 2018c

Figure 3-7.
Alternative SE-1A: Templeton Substation Expansion - 230/70 kV Substation

Prepared by:
Horizon WATER and ENVIRONMENT

Estrella Substation and Paso Robles Area Reinforcement Project

Consideration of CEQA Criteria

Project Objectives

~~The Templeton Expansion~~ Alternative SE-1A, when paired with one of the routing alternatives described in Section 3.5, would meet the Transmission Objective by addressing the Category B Contingency scenarios involving loss of either the Templeton Transformer Bank or the Templeton-Paso 70 kV Power Line. ~~The Templeton Expansion~~ Alternative SE-1A would provide a new source of 230 kV power to the Paso Robles Substation, which would provide needed redundancy in the electrical grid system in this area.

While ~~the Templeton Expansion~~ Alternative SE-1A would not directly address the Distribution Objective, it would add capacity to the Templeton Substation (and thereby the DPA as a whole) with the addition of the new transformer and 230 kV connection. As such, it could absorb some additional load that is currently served through distribution feeders connected to other area substations, or new load in the future associated with future development. Likewise, the expanded Templeton Substation would provide a location for expansion of future distribution facilities (e.g., feeders) that could serve areas within a reasonable distance from the substation. However, this location is not near the anticipated areas of most vigorous growth (e.g., near the Paso Robles Airport), which could be better served by the proposed substation site. Additionally, ~~the Templeton Expansion~~ Alternative SE-1A would not have the benefit of potentially reducing the length of long feeders in the DPA. As a result, ~~the Templeton Expansion~~ Alternative SE-1A would not fully meet the Distribution Objective identified for the project.

Feasibility

PG&E's preliminary analysis of Alternative SE-1A: Templeton Substation Expansion – 230/70 kV Substation (NEET West and PG&E 2018b) identified no fatal faults or conflicts that would suggest the alternative is not feasible. Physical space exists for the new substation adjacent to the existing Templeton Substation, as shown in Figure 3-7. Likewise, the alternative would use standard equipment and technologies (e.g., BAAH 70 kV arrangement) that have been used successfully in numerous other locations. The substation expansion area would not be located on or within any wilderness areas, wilderness study areas, restricted military bases, airports, or Indian reservations, which may preclude implementation of the alternative. As such, the alternative is considered to be potentially feasible from a technical and legal standpoint.

The specific costs of Alternative SE-1A: Templeton Substation Expansion – 230/70 kV Substation are confidential, but the Applicants have indicated that they believe the alternative may be more expensive than the Proposed Project. Costs will need to be further investigated, but, at this point in time, CPUC has no reason to believe that Alternative SE-1A would be so expensive as to be economically infeasible.

With respect to environmental feasibility, Alternative SE-1A could potentially increase biological resources impacts compared to the Proposed Project. The Applicants' preliminary desktop environmental analysis (NEET West and PG&E 2018b) determined that the following special-status species were likely to occur in the substation study area: California red-legged frog (*Rana draytonii*), golden eagle (*Aquila chrysaetos*), and Northern California legless lizard (*Anniella pulchra*). Additionally, Alternative SE-1A: Templeton Substation Expansion -230/70 kV

Substation could necessitate removal of several oak trees. Nesting habitat for migratory passerine birds and raptors protected by the Migratory Bird Treaty Act and California Fish and Game Code, including trees, shrubs, and grasslands, is present throughout the substation expansion area and could be impacted by the alternative. By contrast, the proposed Estrella Substation site is entirely composed of vineyards under active cultivation, which the PEA determines provides low habitat value for sensitive plants and wildlife species.

The Applicants' preliminary desktop analysis also identified a manmade drainage feature in the Templeton Substation Expansion study area (along the southern side of the Templeton Substation) which drains to an unnamed ephemeral drainage feature and eventually into the Salinas River (NEET West and PG&E 2018b). While these features could be considered jurisdictional by applicable regulatory agencies, it does not appear that they would be directly impacted by the substation expansion facilities. In general, Alternative SE-1A: Templeton Substation Expansion – 230/70 kV Substation would have similar potential hydrology and water quality impacts as the Proposed Project, and those impacts could be similarly avoided or minimized through implementation of a Stormwater Pollution Prevention Plan.

It is anticipated that mitigation measures could effectively minimize the potential environmental impacts described; therefore, such constraints would not render the alternative environmentally infeasible. Overall, Alternative SE-1A is considered potentially feasible.

Potential to Avoid or Reduce Significant Environmental Impacts

Compared to the Proposed Project, Alternative SE-1A: Templeton Substation Expansion – 230/70 kV Substation would have reduced aesthetics impacts. While there are a number of wineries located in proximity to the Templeton Substation area, including several stops along the "Wine Train," as indicated on the Paso Robles Visitor's Guide, the existing site is characterized by electrical infrastructure. This existing infrastructure includes the 230/500 kV corridor, which passes directly adjacent to the proposed expansion site and connects with the existing Templeton Substation, and the Templeton Substation itself. As such, the addition of the expanded Templeton Substation facilities would not dramatically change the area's existing visual character.

Additionally, the Templeton Substation vicinity is relatively sparsely populated, and there are few sensitive receptors in the area whose views could be impacted. The surrounding area includes a small-scale 1.5-MW distributed solar array (Vintner Solar) located north of El Pomar Drive; Hanging Heart Ranch and a few trailers located west of Templeton Substation, and a seasonal worker structure located east of Templeton Substation (NEET West and PG&E 2018b). More distant views of the substation site would be limited due to variations in topography and intervening vegetation. U.S. Highway 101 is an eligible state scenic highway in this area; however, the substation expansion site (located 1.2 miles east of the highway) likely would not be visible from this highway. The substation expansion area is not located within an area subject to scenic protection standards by the County of San Luis Obispo (NEET West and PG&E 2018b). Overall, the alternative would not be expected to have significant aesthetics impacts, and would reduce aesthetics impacts compared to the proposed Estrella Substation.

Alternative SE-1A: Templeton Substation Expansion – 230/70 kV Substation also may reduce agricultural resources impacts compared to the Proposed Project substation. The substation

expansion site is primarily designated as Farmland of Local Importance under the Farmland Mapping and Monitoring Program (CDOC 2016a); it is difficult to tell based on aerial photographs whether the site is currently being used for agricultural production. By contrast, the proposed Estrella Substation site is largely Unique Farmland and Farmland of Statewide Importance, both of which are superior classes of land than Farmland of Local Importance, and is under active vineyard cultivation. The alternative would impact small areas of Farmland of Statewide Importance due to the 230 kV interconnection, which would extend across El Pomar Drive to the north of the substation expansion site; however, these impacts would be substantially less severe than under the proposed Estrella Substation and 230 kV interconnection.

Conclusion

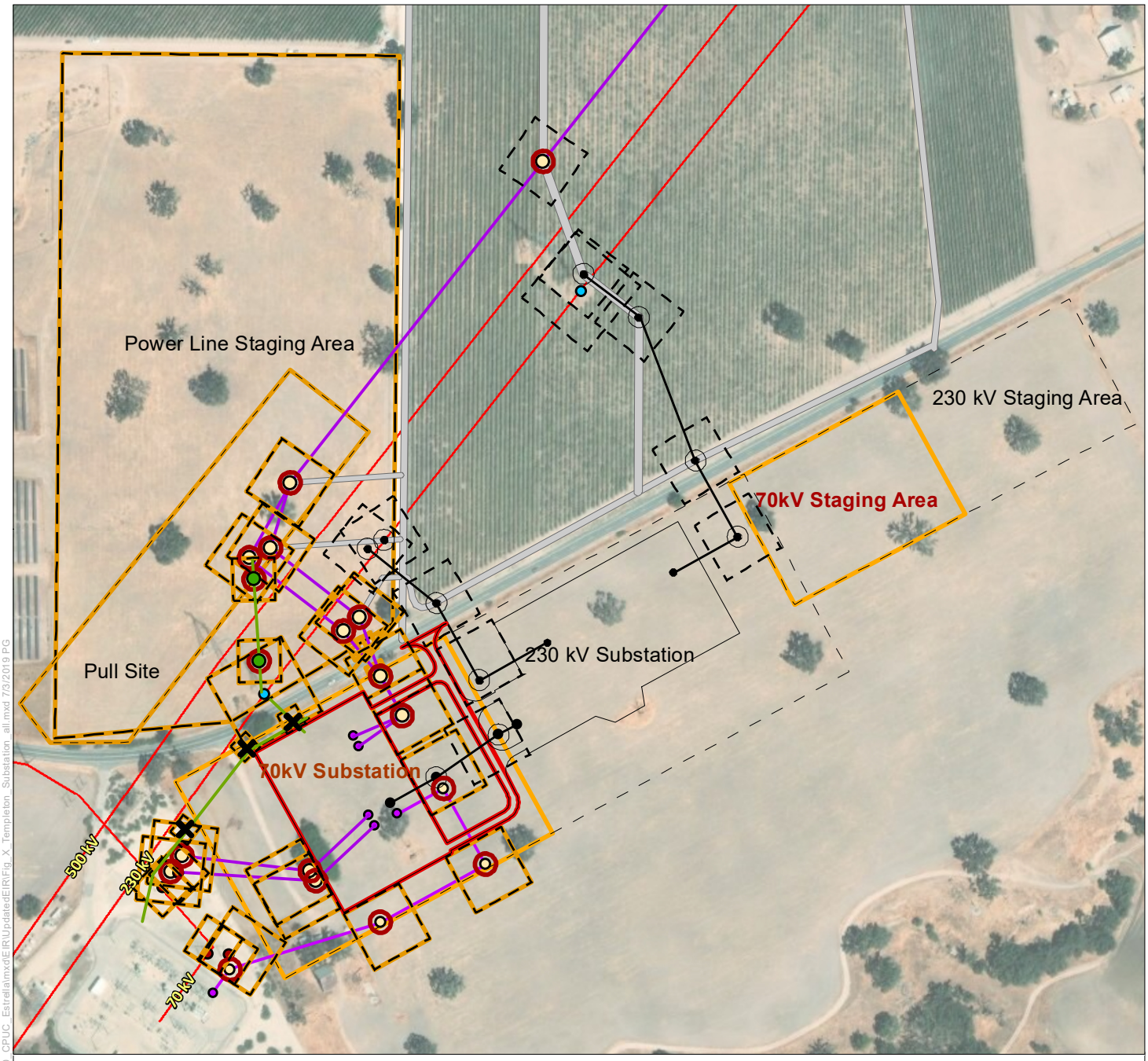
Alternative SE-1A: Templeton Substation Expansion – 230/70 kV Substation would meet the Transmission Objective, but would not, on its own, fully meet the Distribution Objective. However, it could potentially be paired with another alternative that meets the distribution needs of the project. The alternative is considered potentially feasible and would reduce potentially significant impacts of the Proposed Project (i.e., aesthetics and agricultural resources). Therefore, Alternative SE-1A: Templeton Substation Expansion – 230/70 kV Substation is **retained** for full analysis in the EIR.

3.4.2 ALTERNATIVE SE-1B: TEMPLETON SUBSTATION EXPANSION – 70 KV SUBSTATION ONLY

Description

Alternative SE-1B would be similar to Alternative SE-1A; however, only the 70 kV portion of the new substation described under Alternative SE-1A would be built. The 230 kV facilities described in Section 3.4.1 and shown in Figure 3-7 would not be included, and no interconnection to the existing 230 transmission line would be required. The 70 kV substation would still need to be connected to the existing Paso Robles Substation via a new 70 kV power line (i.e., Alternative SE-PLR-1, -2, or -3). It is assumed that under Alternative SE-1B, only half of the staging area required for Alternative SE-1A would be needed to support construction of the 70 kV substation. **Figure 3-8** shows the 70 kV facilities that would be retained under Alternative SE-1B, as well as the 230 kV facilities that would not be included.

Alternative SE-1B was conceived of by CPUC in acknowledgement that it is not required to meet the P6 (N-1-1) contingency identified for the Project involving loss of both 230 kV lines connecting to Templeton Substation. In this regard, Alternative SE-1B could greatly reduce the permanent and temporary disturbance associated with Alternative SE-1A, while still meeting the P1 (N-1) contingencies for the Proposed Project.



Basemap Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS,

N

0 0.09

Miles

- Existing Distribution Pole Removal
- Existing 230kV Towers
- Existing 70kV Pole Removal
- Existing Transmission Lines
- New Telecommunications Poles
- New Telecommunications Line
- Total Permanent Disturbance Area
- Total Temporary Disturbance Area
- New 230kV Poles
- Access Roads for Power Line
- Estimated Permanent Disturbance Area
- Estimated Temporary Disturbance Area
- New 70kV Poles
- New 70kV Power Line
- 70 kV Deadends

Figure 3-8.
Alternative SE-1B: Templeton Substation Expansion - 70kV Substation Only

Horizon WATER and ENVIRONMENT

Source: NEET West and PG&E 2017

Estrella Substation and Paso Robles Area Reinforcement Project

Consideration of CEQA Criteria

Project Objectives

As noted above, Alternative SE-1B was conceived of in the belief that it could address the Transmission Objective (i.e., alleviate adverse conditions under Category B [P1] contingencies). However, after further analysis, it was determined that eliminating the 230 kV portion of the new substation described under Alternative SE-1A would lead to vulnerabilities to the P1 (N-1) contingency involving loss of the existing 230/70 kV transformer at Templeton Substation. If a new 230/70 kV transformer were to be installed, a new loop-in to the existing 230 kV transmission line would be required, which could not be accomplished in a small area within or immediately adjacent to the existing substation. Therefore, it was determined that Alternative SE-1B would not meet the Transmission Objective of the Proposed Project.

New feeders could be installed from a 70 kV substation under Alternative SE-1B, thereby addressing the Distribution Objective; however, as described for Alternative SE-1A, the Templeton Substation location is not ideal for expanding distribution service to meet projected future growth. This location is not near the anticipated areas of most vigorous growth (e.g., near the Paso Robles Airport), which could be better served by the proposed substation site. Additionally, Alternative SE-1B would not have the benefit of potentially reducing the length of long feeders in the DPA. As a result, Alternative SE-1B would not fully meet the Distribution Objective identified for the project.

Feasibility

Installing the 70 kV substation envisioned under Alternative SE-1B would likely be feasible; however, as described above, in order to meet the Transmission Objective, an additional 230/70 kV transformer and loop-in would be needed, which would not be feasibly constructed within the 70 kV substation footprint shown on **Figure 3-8** or within or immediately adjacent to the Templeton Substation because of the unusual configuration of the existing substation. Since the primary purpose of Alternative SE-1B would be to address the Transmission Objective (it would not fully meet the Distribution Objective due to its relatively undesirable location) while resulting in reduced impacts compared to Alternative SE-1A, these facts render the alternative infeasible.

With respect to environmental feasibility, Alternative SE-1B would result in similar impacts to Alternative SE-1A, albeit these impacts would be reduced due to the smaller footprint of Alternative SE-1B. Refer to Section 3.4.1 for discussion of potential biological resources and hydrologic features to be present on or near the Templeton Substation Expansion site.

Potential to Avoid or Reduce Significant Environmental Impacts

Similar to Alternative SE-1A, Alternative SE-1B would reduce aesthetics and agricultural resources impacts compared to the Proposed Project. This is due to its location adjacent to an existing substation away from sensitive receptors and on land primarily designated as Farmland of Local Importance (not Farmland of Statewide Importance or Unique Farmland). Refer to Section 3.4.1 for detailed discussion.

Due to its reduced footprint and temporary disturbance areas, Alternative SE-1B would further reduce environmental impacts compared to the Proposed Project. Although not anticipated to be significant, these would include air pollutant emissions, GHG emissions, noise, and traffic-related impacts.

Conclusion

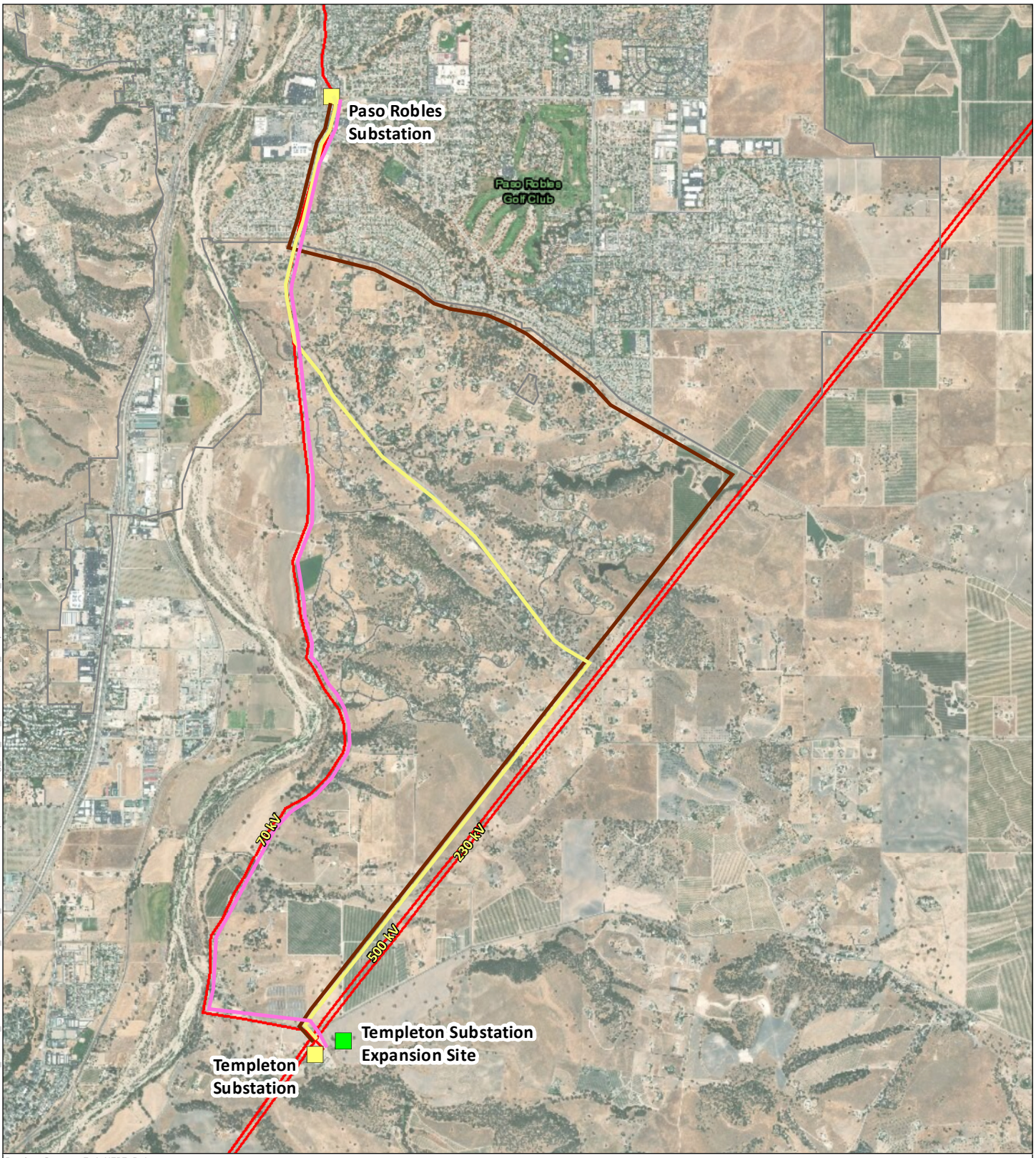
Due to Alternative SE-1B's inability to feasibly meet one of the basic objectives of the Project, the Transmission Objective, it is **screened out** from full analysis in the DEIR.

3.5 EXISTING SUBSTATION EXPANSION (SE) – POWER LINE ROUTE (PLR) ALTERNATIVES

3.5.1 ALTERNATIVE SE-PLR-1: TEMPLETON-PASO 70 KV ROUTE (EXISTING)

Description

As described in Section 3.4.1, Alternative SE-1A: Templeton Substation Expansion – 230/70 kV Substation would require installation of a second circuit connecting the Templeton Substation to the Paso Robles Substation. The three possible routes for this new circuit are shown in **Figure 3-98**. One of the possible routes for the new circuit is the existing Templeton–Paso 70 kV Route (Alternative SE-PLR-1). This alternative would involve rebuilding the existing 70 kV single-circuit power line that runs from Templeton Substation to Paso Robles Substation and converting it into a double-circuit power line.



Basebap Sources: Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap

Alternative

- Alternative SE-PLR-1: Templeton-Paso 70 kV Route (Existing)
- Alternative SE-PLR-2: Templeton-Paso South River Road Route
- Alternative SE-PLR-3: Templeton-Paso Creston Route
- Templeton Substation Expansion Alternative Site
- Paso Robles City Limits

Existing Infrastructure

- Substation
- Transmission Lines

N

0 0.5 Miles

Horizon WATER and ENVIRONMENT

Source: Source: NEET West and PG&E 2017

Note: The route variations shown are offset in order to display the alignments of the alternative routes that may overlap in places.

Figure 3-9.
Alternative SE-PLR-1, -2, and -3: Templeton-Paso 70kV Routes

Estrella Substation and Paso Robles Area Reinforcement Project

Starting at the Paso Robles Substation (located at the northeast corner of Niblick Road and South River Road in the City of Paso Robles), the existing Templeton–Paso 70 kV Route extends southerly along the west side of South River Road for approximately 0.7 mile to the intersection of South River Road and Charolais Road. The route then continues southerly along South River Road for approximately 0.5 mile. The route then leaves South River Road and continues south generally following Santa Ysabel Avenue for approximately 0.5 mile at which point the route would continue south on private property approximately 3 miles to the Templeton tap point (i.e. point at which the line joins the Templeton–Atascadero 70 kV double-circuit line coming from Templeton Substation) (NEET West and PG&E 2018c).

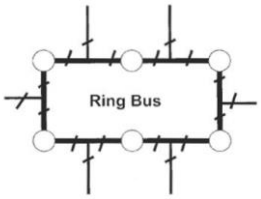
Due to the important role that the existing Templeton-Paso 70 kV Transmission Line plays in the regional transmission system (refer to Section 1.4.2~~1.2.2~~; this existing line provides the main source of power to Paso Robles Substation), construction of Alternative SE-PLR-1 would require construction/utilization of a temporary power line (commonly known as a shoo-fly). This would allow for power flow to be maintained to Paso Robles Substation during the long outages that would be required for conversion of the existing single-circuit power line to a double-circuit line. The shoo-fly would be constructed near the existing line, and in some areas would require construction of the shoo-fly line by adding structures on the east side of the road while constructing the double-circuit on the west side.

Need to Expand Paso Robles Substation to Ring Bus Configuration

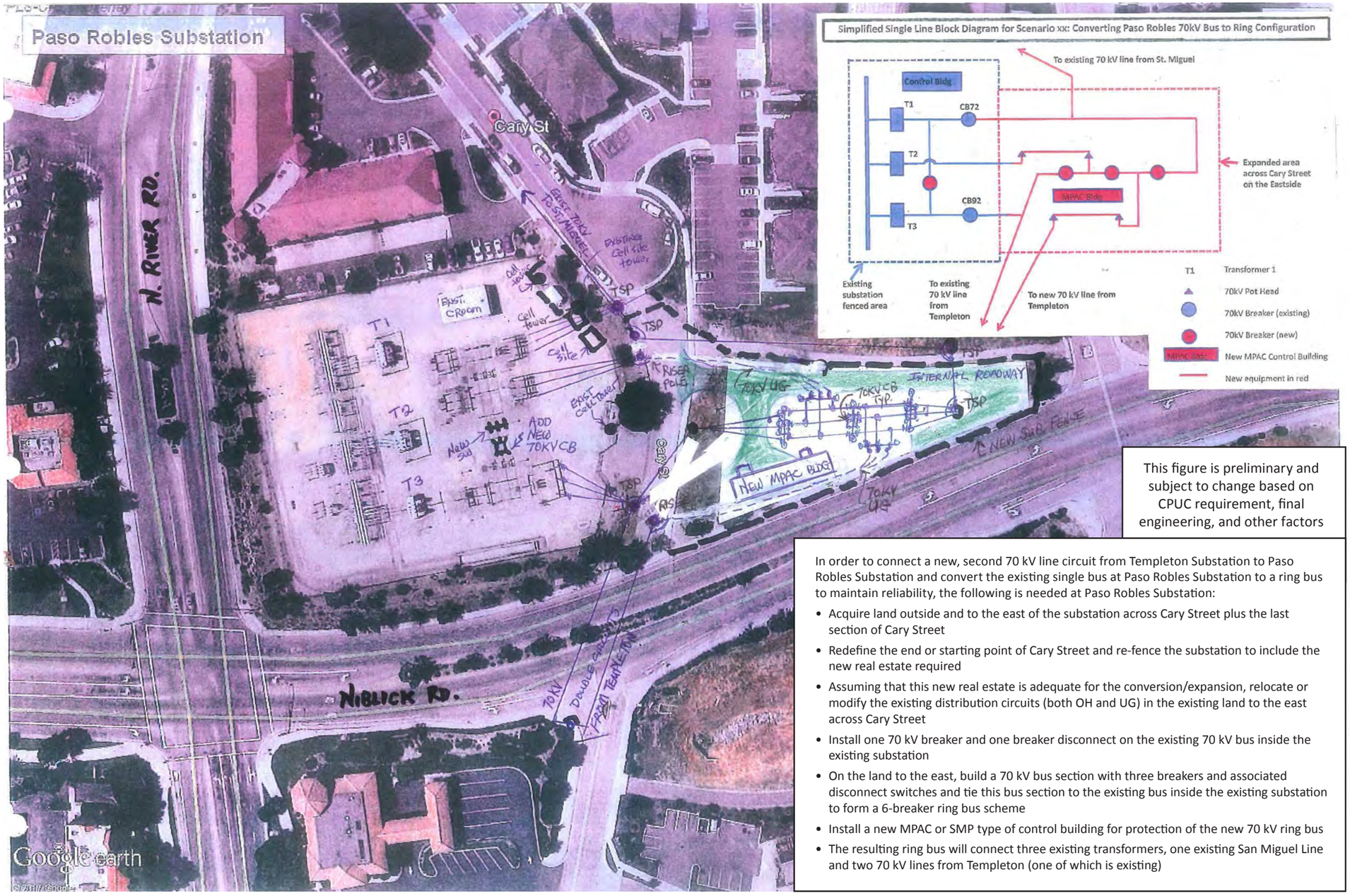
Utilization of the existing 70 kV power line route for the new circuit from Templeton Substation would add another element[5] to the existing Paso Robles Substation, which already has five elements connecting to its single bus. According to PG&E Design Criteria #073131– Bus Configuration (PG&E 2017a), this addition of a sixth element would require expansion of the Paso Robles Substation to a ring bus[6] or BAAH configuration. **Figure 3-10~~9~~** shows a sketch of what would be required at the Paso Robles Substation to reconfigure the existing single bus to a ring bus to accommodate Alternative SE-PLR-1: Templeton–Paso 70 kV Route (Existing). As shown in Figure 3-10~~9~~, a ring bus scheme at the Paso Robles Substation would require acquisition of the property across Cary Street to the east of the substation, and installation of

[5] An element is any power system device connected to a bus, including line, transformer, or reactive compensation device. Bus sectionalizing breakers, bus tie breaks and substitute breakers are not counted as elements.

[6] The ring bus configuration consists of a sectionalized bus with its ends connected (creating a ring) through a power circuit breaker. The ring bus design will have up to six elements and bus sections, with each section sourcing one circuit. This configuration allows for any circuit breaker to be removed from service for maintenance without an outage on any circuit. In the event of a line or bus fault the power circuit breakers on each end of the bus section are opened (PG&E 2017a).



new breaker and bus facilities, as well as construction of a control building to protect the new 70 kV ring bus.



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

1:1,100

0 50 100 200 Feet

Not to Scale

In order to connect a new, second 70 kV line circuit from Templeton Substation to Paso Robles Substation and convert the existing single bus at Paso Robles Substation to a ring bus to maintain reliability, the following is needed at Paso Robles Substation:

- 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 70 kV breaker and one breaker disconnect on the existing 70 kV bus inside the existing substation
- On the land to the east, build a 70 kV 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 a new MPAC or SMP type of control building for protection of the new 70 kV ring bus
- The resulting ring bus will connect three existing transformers, one existing San Miguel Line and two 70 kV lines from Templeton (one of which is existing)

Aerial Imagery Source: ESRI World Imagery (2017)

Source: NEET West and PG&E 2018c

Figure 3-10.

Ring Bus Configuration at the Paso Robles Substation to Accommodate Alternative SE-PLR-1: Templeton-Paso 70 kV Route (Existing)

Prepared by:

Horizon WATER and ENVIRONMENT

Estrella Substation and Paso Robles Area Reinforcement Project

Page intentionally left blank.

Consideration of CEQA Criteria

Project Objectives

Alternative SE-PLR-1: Templeton–Paso 70 kV Route (Existing), when paired with Alternative SE-1A: Templeton Substation Expansion – 230/70 kV Substation, would meet the Transmission Objective. However, while Alternative SE-PLR-1, in combination with Alternative SE-1A, would address all of the Category B (N-1) contingency scenarios identified by the CAISO in its 2013-2014 Transmission Plan, it would not address, and would in fact itself create, the potential for a N-2 event, where two lines on the same pole could fail at one time (e.g., due to a vehicle pole strike or other human-made or natural causes). In many respects, such an N-2 event on a double-circuit line from Templeton Substation is similar to the current exposure of the system to a disturbance on the existing single-circuit line from Templeton Substation to Paso Robles Substation. The Applicants note that while NERC and CAISO planning standards allow for load to be dropped for this N-2 contingency, a double-circuit pole 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 (NEET West and PG&E 2018c).

As described in Section 3.4.1, Alternative SE-1A: Templeton Substation Expansion – 230/70 kV Substation would not, on its own, fully meet the Distribution Objective, but the alternative could potentially be paired with another alternative that addresses distribution needs. By extension, Alternative SE-PLR-1, which would always be paired with Alternative SE-1A, would not fully meet the Distribution Objective.

Feasibility

PG&E has determined that Alternative SE-PLR-1 is technically and legally infeasible for several reasons. First, PG&E found that there is not enough space within the existing Paso Robles Substation yard to convert the existing Paso Robles Substation bus to a ring bus, and that expanding the boundary of the existing substation or building equipment on adjacent lots would be infeasible.

The land area to the east of the Paso Robles Substation is not large enough to accommodate the new equipment and access requirements associated with a ring bus conversion. Additionally, building on this lot or otherwise expanding the substation boundary eastward would require relocating several underground utilities that run between the existing yard and the eastern lot, including a water main owned by the City of Paso Robles. The City has expressed unwillingness to permit PG&E to relocate the water main and PG&E cannot force the City to move the water main in an eminent domain action because the City's public use is deemed "more necessary" as a matter of law. Therefore, this modification would be legally infeasible.

Additionally, PG&E found that converting several existing wood poles along the existing Templeton-Paso 70 kV alignment to TSPs (which would be required to accommodate the double-circuit) would be infeasible due to access and space constraints. The specific infeasible poles are located in the back yards of luxury homes located to the east and bounded on the west by steep slopes bordering the Salinas River. Therefore, the only way to access the sites is from the street in front of the homes to enter the backyards; however, there is not enough

room in the backyards to accommodate the necessary heavy equipment to construct the poles. The use of heavy-lift helicopters during construction is not advisable because the wind shear would damage the homes.

The CPUC has independently evaluated PG&E's determination that this alternative would be infeasible and concurs with this determination. As a result of these issues, Alternative SE-PLR-1 is considered infeasible. ~~There are potential technical and legal challenges associated with Alternative SE-PLR-1: Templeton–Paso 70 kV Route (Existing), particularly with respect to the construction of a ring bus at Paso Robles Substation. The construction of the ring bus could be technically challenging, and would involve a substantial amount of work within an existing substation that provides electrical service to thousands of customers and has limited space available for expansion. Likewise, construction of the shoo-fly could be technically challenging, particularly through inhabited areas along South River Road.~~

~~Additionally, the Applicants do not currently own the land to the east of the substation across Cary Street, and it is unknown whether it could be reasonably acquired. Review of parcel data shows that the land to the east of the substation may be within the road right-of-way (it has no Assessor's Parcel Number [APN]), and thus under the control of the City of Paso Robles, although ownership is not definitively known at this time. The City provided comments during the scoping period for the Proposed Project that it believed that any expansion of the Paso Robles Substation could have significant adverse environmental effects. As such, if the City owns this piece of land, it might be averse to any transfer of the land to the Applicants or any proposal for the substation to be expanded onto City-owned land. While the Applicants could use eminent domain to acquire the land, such a process could take several years and substantially impact the project schedule. This could render the alternative infeasible.~~

~~Cost information for the Templeton Substation Expansion Alternatives is confidential, but the Applicants have indicated that Alternative SE-PLR-1 would be expensive, due in part to the need to expand the existing Paso Robles Substation to a ring bus configuration. Cost will be investigated further, but at this time, no evidence has been presented to suggest that Alternative SE-PLR-1 is so expensive as to be economically infeasible.~~

~~With respect to environmental feasibility, the existing Templeton-Paso 70 kV route's location near the Salinas River lends potential for biological resources impacts, as there are numerous special-status species likely to be present in this area. The Applicants' preliminary desktop analysis (NEET West and PG&E 2018b) found that the following special-status animal species are likely to occur in the alternative study area: American badger, California red-legged frog, golden eagle, Northern California legless lizard, Least Bell's vireo, purple martin, vernal pool fairy shrimp, western pond turtle, western spadefoot, and white-tailed kite. These potential impacts would not be substantially different from those associated with the Proposed Project's reconductoring segment, and it is anticipated that mitigation measures could reduce them to less than significant.~~

Potential to Avoid or Reduce Significant Environmental Impacts

Alternative SE-PLR-1: Templeton–Paso 70 kV Route (Existing) could have some adverse effects on aesthetics, as taller poles would likely be required to accommodate the additional circuit along the existing power line alignment. These taller (and most likely steel) poles would

adversely affect views from residences in the area, as well as from several trails that pass through the power line corridor, and generally decrease the visual quality of the area. However, compared to the Proposed Project, these effects would be less pronounced due to the fact that there is already a transmission line along the proposed alignment. The Proposed Project would add a new power line to areas of San Luis Obispo County and the City of Paso Robles that do not currently have electrical transmission infrastructure; as a result, the contrast between the pre- and post-Project visual landscape would be starker and impacts would be more substantial.

Alternative SE-PLR-1 could decrease agriculture resources impacts somewhat compared to the Proposed Project power line alignment. It would pass through primarily undeveloped and residential (rather than agricultural) areas, whereas the Proposed Project alignment passes through many agricultural areas, including vineyards and areas designated as Farmland of Statewide Importance. However, the agricultural resources impacts of the Proposed Project are primarily the result of the substation rather than the power line, which would have relatively minimal areas of permanent disturbance to agricultural lands.

Due to the shorter length of Alternative SE-PLR-1 compared to the Proposed Project's new power line and reconductoring segment, it would likely have reduced air emissions, GHG emissions, traffic impacts, and noise impacts.

Conclusion

~~Alternative SE-PLR-1, when paired with Alternative SE-1: Templeton Substation Expansion, would meet the Transmission Objective in the strictest sense; however, it would create the potential for an N-2 event, which could result in the same adverse effects on the local system as the current condition, and PG&E advises against this alternative as a solution. Additionally, there are feasibility questions surrounding use of the parcel to the east of the existing substation for expansion to a ring bus. While the alternative would reduce some environmental effects of the Proposed Project, it would not completely avoid any potentially significant effects. On balance, Alternative SE-PLR-1: Templeton–Paso 70 kV Route (Existing) does not offer sufficient advantages compared to other possible power line routes and~~ Because Alternative SE-PLR-1 was found to be technically and legally infeasible, it is **screened out** from full analysis in the EIR.

3.5.2 ALTERNATIVE SE-PLR-2: TEMPLETON–PASO SOUTH RIVER ROAD ROUTE

Description

Alternative SE-PLR-2: Templeton–Paso South River Road Route is one of the possible routes for the new 70 kV circuit from Templeton Substation to Paso Robles Substation that would be installed for Alternative SE-1: Templeton Substation Expansion. As shown in Figure 3-9~~8~~, the route would follow the existing 230/500 kV transmission line corridor northeasterly out of Templeton Substation for approximately 2 miles to where it intersects with South River Road. At this point, the route would veer to the northwest and follow South River Road (on the southwest side), continuing northwesterly through three HOAs until it reaches the intersection of Santa Ysabel Avenue and South River Road. The route would then continue northerly along the easterly side of South River Road paralleling the existing Templeton–Paso single-circuit 70 kV power line (on the other side of the road) until it reaches the city limits of Paso Robles at the intersection of Charolais Road and South River Road. At this point, the route would continue

northerly on the eastern side of South River Road for approximately 0.7 mile, terminating just north of Paso Robles Substation (NEET West and PG&E 2018c).

To avoid the need to expand Paso Robles Substation (see discussion of the ring bus in Section 3.5.1 under Alternative SE-PLR-1), a double-circuit line would be required. With a double-circuit, the power line could tie into the San Miguel–Paso Robles 70 kV power line immediately adjacent to the north side of Paso Robles Substation, with one circuit creating a San Miguel–Templeton 70 kV connection and the other circuit creating a second Templeton–Paso Robles 70 kV connection. Under this scenario, no new elements would be added to the Paso Robles Substation bus; therefore, a ring bus would not be required per PG&E's design standards.

A minor relocation of the existing Templeton–Paso Robles 70 kV Transmission Line would be required under this alternative. The total length of the South River Road Route from Templeton Substation to Paso Robles Substation is approximately 5.2 miles, and the 3-mile-long reconductoring segment would not be required.

Consideration of CEQA Criteria

Project Objectives

Alternative SE-PLR-2: Templeton–Paso South River Road Route, when paired with Alternative SE-1A: Templeton Substation Expansion -230/70 kV Substation, would meet the Transmission Objective. As described in Section 3.4.1, expansion of the existing Templeton Substation would not, on its own, fully meet the Distribution Objective; however, it could potentially be deployed alongside another alternative that would meet distribution system needs.

Feasibility

No ~~legal,~~ regulatory~~,~~ or technical constraints have been identified for Alternative SE-PLR-2: Templeton–Paso South River Road Route. Construction of the new power line and interconnections with the expanded Templeton Substation and the existing San Miguel–Paso Robles 70 kV Transmission Line would be relatively standard technical operations for PG&E and HWT~~NEET West~~, and there are no anticipated regulatory hurdles that would preclude development of this route ~~is no reason to believe that the facilities could not be installed in accordance with applicable regulations and that adequate land entitlements could not be acquired for the power line route~~.

However, PG&E identified potential issues with acquiring easements to construct the power line through two HOAs, including Santa Ysabel Ranch, along the SE-PLR-2 route. In their comments on the Draft ASR, PG&E stated: "Depending on whether HOAs are able to sign-off on easements without signatures from each homeowner and whether there is significant opposition from the HOAs as a whole, eminent domain may be required to obtain the easements, which would add to the time and cost necessary to construct this alternative."

As far as the question of whether there is significant opposition from the HOAs as a whole, the Santa Ysabel Ranch, which is comprised of numerous homes along and near South River Road, made clear that it is opposed to the alternative. Many individuals and homeowners from Santa Ysabel Ranch submitted comments on the Draft ASR in opposition to the South River Road

Route for the 70 kV power line. Additionally, CPUC received a comment letter from a law firm representing the Santa Ysabel HOA stating its client's opposition to the project and its opinion that constructing a power line along South River Road would violate the Open-Space Agreement that was entered into between the County of San Luis Obispo and the HOA. As such, it is likely that the Santa Ysabel Ranch would not willingly grant easements to PG&E to allow construction of Alternative SE-PLR-2.

Specific cost information for the Templeton Substation Expansion Alternatives is confidential. At this point, CPUC has not been presented with evidence to suggest that Alternative SE-PLR-2 would be so costly as to be economically infeasible.

With respect to environmental feasibility, the Applicants' preliminary desktop environmental analysis (NEET West and PG&E 2018b) found that the Templeton–Paso South River Road Route is sensitive for biological resources. Specifically, there is a high concentration of heritage oak trees along South River Road in the northern portion of the alignment. There are also several riparian corridors that bisect the study area; wetlands generally occur from the eastern portion of South River Road to the intersection of Santa Ysabel Avenue. There are no federally designated critical habitat areas for special-status plants or animals, but the following special-status animals were identified as being likely to occur: American badger, California red-legged frog, golden eagle, Northern California legless lizard, purple martin, vernal pool fairy shrimp, western pond turtle, western spadefoot, and white-tailed kite. These impacts would not be substantially different from the Proposed Project's potential biological resources effects and could likely be mitigated to a level that is less than significant.

While the Templeton–Paso South River Road Route has not been comprehensively surveyed for cultural or paleontological resources, the northern portion of the route was surveyed for the proposed Santa Ysabel Ranch Project (NEET West and PG&E 2018b). As a result of this survey, numerous resources were identified in the vicinity of Alternative SE-PLR-2: Templeton–Paso South River Road Route, although none of these resources are directly within the proposed alternative alignment. Due to the proximity of the alternative route to perennial or annual waterways, it is considered sensitive for cultural resources; however, impacts to such resources could likely be avoided or substantially reduced through implementation of mitigation measures. Alternative SE-PLR-2 would follow and occur in close proximity to the Rinconada Fault Zone, which is a quaternary-aged fault zone. Potential hazards associated with the fault zone's location in relation to the power line alignment will be fully evaluated in the DEIR.

Potential to Avoid or Reduce Significant Environmental Impacts

Alternative SE-PLR-2: Templeton–Paso South River Road Route would have similar, or slightly reduced, aesthetics impacts compared to the Proposed Project 70 kV power line alignment. The new power line along South River Road would adversely affect the existing visual character and quality of the largely rural-residential area; however, due to the shorter length of this alternative power line in comparison to the Proposed Project power line, these impacts may be somewhat reduced overall. Additionally, the Templeton–Paso South River Road Route does not pass through new commercial/industrial areas comparable to the Golden Hill Industrial Park, which would be impacted by the Proposed Project. The portion of Alternative SE-PLR-2: Templeton–Paso South River Road Route that would pass through more densely developed areas within the City of Paso Robles is already impacted by existing electric transmission

infrastructure (i.e., the existing Templeton–Paso 70 kV Transmission Line); therefore, the difference between the pre- and post-Project visual landscape would be less pronounced in these areas.

Alternative SE-PLR-2 also may marginally reduce agricultural resources impacts compared to the Proposed Project power line. In general this area of San Luis Obispo County is less sensitive for agriculture than the area that includes the Proposed Project alignment. While there are several pockets of land designated by CDOC as Farmland of Statewide Importance, the majority of lands in the area of Alternative SE-PLR-2: Templeton–Paso South River Road Route are considered Grazing Land or Farmland of Local Importance (CDOC 2016a). Additionally, due to the reduced length of the Templeton–Paso South River Road Route compared to the Proposed Project power line route, it would have fewer permanent impacts on lands due to the new power line pole footprints. In general, by following the existing 230/500 kV corridor and existing roads, it would not directly impact any agricultural operations.

Due to the shorter length of Alternative SE-PLR-2: Templeton–Paso South River Road Route compared to the Proposed Project power line, and avoidance of the need for the 3-mile-long reconductoring segment, the alternative would have fewer construction-related impacts, such as air emissions, GHG emissions, noise, and traffic impacts. Alternative SE-PLR-2 also would always be deployed in tandem with Alternative SE-1A, which, as described in Section 3.4.1, would reduce potentially significant impacts associated with the proposed substation.

Conclusion

Alternative SE-PLR-2: Templeton–Paso South River Road Route, when combined with Alternative SE-1A: Templeton Substation Expansion – 230/70 kV Substation, would meet the Transmission Objective. It would not meet the Distribution Objective, but could be paired with another alternative that meets the distribution needs of the project. Although there are potential feasibility issues with obtaining easements for construction of Alternative SE-PLR-2 and substantial local opposition, the alternative is assumed to be potentially feasible at this stage and would reduce at least one potentially significant environmental impact of the Proposed Project. Therefore, Alternative SE-PLR-2: Templeton–Paso South River Road Route is **retained** for full analysis in the EIR.

3.5.3 ALTERNATIVE SE-PLR-3: TEMPLETON-PASO CRESTON ROUTE

Description

Alternative SE-PLR-3: Templeton–Paso Creston Route is the final possible power line route alternative for the 70 kV power line connection between Templeton Substation and Paso Robles Substation, which would be required for Alternative SE-1: Templeton Substation Expansion. As shown in Figure 3-9~~8~~, the route would follow the existing 230/500 kV transmission line corridor northeasterly out of Templeton Substation for approximately 3 miles to where it intersects with Creston Road. At this point, the route veers to the northwest and follows Creston Road, then Charolais Road, and then turns north and continues along South River Road until it reaches Paso Robles Substation.

Similar to Alternative SE-PLR-2: Templeton–Paso South River Road Route (see Section 3.5.2), to avoid the need to construct a ring bus at the Paso Robles Substation, a double-circuit 70 kV line is required for Alternative SE-PLR-3. This would allow the new power line to tie into the existing San Miguel–Paso Robles 70 kV Transmission Line immediately adjacent to the north side of Paso Robles Substation, with one circuit creating a San Miguel–Templeton 70 kV connection and the other circuit creating a second Templeton–Paso Robles 70 kV connection.

The total length of Alternative SE-PLR-3: Templeton–Paso Creston Route is approximately 6.2 miles. This alternative would not require the 3-mile-long reconductoring segment that would be required under the Proposed Project.

Consideration of CEQA Criteria

Project Objectives

Alternative SE-PLR-3: Templeton–Paso Creston Route, when paired with Alternative SE-1A: Templeton Substation Expansion – 230/70 kV Substation, would meet the Transmission Objective. As described in Section 3.4.1, expansion of the existing Templeton Substation would not fully meet the Distribution Objective because it would not provide an optimal location to expand future distribution facilities to meet future anticipated distribution needs. However, it could potentially be deployed alongside another alternative (e.g., battery storage) which meets the distribution needs of the project.

Feasibility

The Applicants note that there could be engineering feasibility conflicts with existing utilities associated with the Creston Route alternatives (see NEET West and PG&E 2017, page 4-15). Additionally, as described in Section 3.3.2 for Alternative PLR-2, the Creston Route could increase aesthetics impacts compared to the Proposed Project, as well as result in impacts on sensitive biological resources (e.g., heritage oaks). Taken together, these facts suggest that Alternative SE-PLR-3, like Alternative PLR-2, may not be feasible.

Potential to Avoid or Reduce Significant Environmental Impacts

Refer to the discussion of environmental impacts in Section 3.3.2.

Conclusion

Alternative SE-PLR-3: Templeton–Paso Creston Route, when combined with Alternative SE-1A: Templeton Substation Expansion – 230/70 kV Substation, would meet the Transmission Objective. While expansion of Templeton Substation would not fully meet the Distribution Objective, Alternatives SE-PLR-3 and SE-1A could be paired with another alternative that meets the distribution needs of the project. Alternative SE-PLR-3 may be infeasible due to engineering and environmental constraints, and it would not reduce or eliminate any of the potentially significant effects of the Proposed Project. Therefore, Alternative SE-PLR-3 is **screened out** from full analysis in the EIR.

3.6 BATTERY STORAGE (BS) ALTERNATIVES

3.6.1 ALTERNATIVE BS-1: BATTERY STORAGE TO ADDRESS THE TRANSMISSION OBJECTIVE

Description

Alternative BS-1 would include one or more battery energy storage systems (BESSs) to address the CAISO-identified deficiencies at transmission voltages (i.e., above 50 kV). As described in Section 1.4.2~~1.2.2~~, the CAISO identified the possibility for extremely low voltages and system failures to occur in the Los Padres 70 kV system with the loss of any of the following facilities/components: (1) Paso Robles-Templeton 70 kV Power Line (P1 contingency), or (2) Templeton 230/70 kV #1 Transformer Bank (P1 contingency); (3) both the Morro Bay-Templeton and Templeton-Gates 230 kV transmission lines (P6 contingency). The P1 contingencies identified by CAISO are presumed to be the drivers of the Proposed Project because load could not be shed following their occurrence pursuant to the applicable NERC and CAISO transmission planning standards. Solutions for the P6 contingency involving loss of both 230 kV transmission lines are assumed to be beneficial effects of the Proposed Project rather than a primary driver.

Preliminary modeling by ZGlobal, Inc. determined that these failures could be avoided for a period of time with installation of one or more BESSs (ZGlobal, Inc. 2018). The storage size and duration of the BESSs depend on whether the alternative seeks to solve only the P1 contingencies described above or both the P1 and P6 contingencies, as well as the assumptions made regarding outage duration/restoration time. ZGlobal, Inc. modeled a range of scenarios to determine the corresponding requirements for BESS storage size and duration, as shown in **Table 3-4.** Since publication of the Draft ASR, lithium-ion BESS technology has advanced and the space requirement for lithium-ion BESS facilities has been reduced by roughly 40 percent. Therefore, the space requirement numbers associated with BESS scenarios in Table 3-4 have been updated for the Final ASR.

Table 3-4. Alternative BS-1 Storage Sizing Scenarios to Address Transmission Objective

Scenario / Alternative		Paso Robles DPA Peak Load (MW)[1]	Battery Storage Size (MW)	Battery Storage Duration (hours)	Battery Storage Energy Amount (MWh)[2]	~~No. of 50 kW/210 kWh Battery Packs Required~~	~~Space Required for Battery Packs (sq ft)~~[3]	~~Total Space Required with 25% Extra Space for Road, Buildings and Parking (sq ft)~~	Estimated Footprint (Acres)[3]
No.	**Outage Duration Assumptions**								
Battery Energy Storage System (BESS) Sized to Resolve P1 Contingency Involving Outage of Templeton-Paso 70 kV Transmission Line OR Templeton Transformer Bank No. 1									
BS-1A	Short-Term / Peak Shaving (≤4 hrs)	214	65[4]	4	260	~~1,238~~	~~88,623~~	~~110,778~~	1.5 ~~2.5~~
BS-1B	Long Term Outage (10 hrs; 1 pm to 10 pm, Worst Case)	214	65[4]	8	520 Min.: 480	~~2,476~~	~~177,245~~	~~221,557~~	3.1 ~~5.1~~
BS-1C	Long Term Outage (24 hrs)	214	65[4]	11	715 Min.: 710	~~3,405~~	~~243,712~~	~~304,640~~	4.2 ~~7.0~~
BESS Sized to Resolve Either P1 Contingency (see above) or a P6 Contingency Involving Outage of Both Gates-Templeton & Morro Bay-Templeton 230 kV Transmission Lines									
BS-1D	Short-Term / Peak Shaving (≤4 hrs)	214	120[5]	4	480	~~2,286~~	~~163,611~~	~~204,514~~	2.8 ~~4.7~~
BS-1E	Long Term Outage (24 hrs)	214	120[5]	12	1440 Min.: 1425	~~6,857~~	~~490,833~~	~~613,542~~	8.5 ~~14.1~~

Notes: MW = megawatt; MWh = megawatt-hour; kW = kilowatt; kWh = kilowatt-hour; P1 = the loss of a single Bulk Electric System (BES) element, also referred to as a N-1 outage; P6 = the consecutive loss of two BES elements, also referred to as an N-1-1 outage

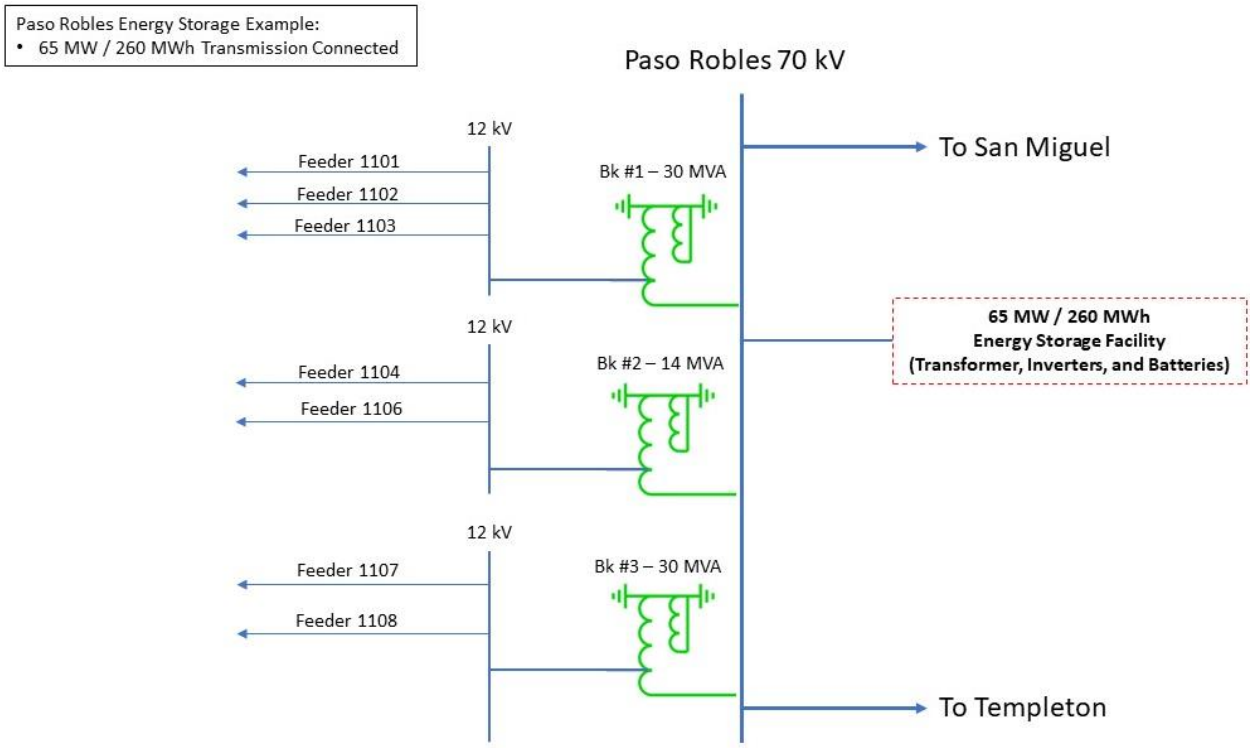
1. All scenarios use the 2023 CAISO Base Case load forecast.
2. Battery storage energy amount (megawatt-hour [MWh]) is dictated by the battery storage size/power output (megawatt [MW]) times the duration (hours [hrs]), the latter of which is expressed in whole numbers for purposes of this analysis. In some cases, the minimum MWh needed was lower than this calculation, as indicated in italics.

3. Footprint assumptions based on lithium-ion battery storage technology. Since publication of the Draft ASR, lithium-ion battery storage technology has advanced substantially and the space needed for lithium-ion battery facilities has been reduced by roughly 40 percent. ~~Assumes approximately 72 square feet (sq ft) is required per pack, based on 2017 product specifications. Tesla PowerPacks were used for the purposes of this analysis, but other providers could have been selected.~~
4. For Alternatives BS-1A, BS-1B, and BS-1C, all of the 65 MW of storage would need to be connected to Paso Robles Substation. This storage could be one or multiple facilities and could be connected to the transmission (i.e., 70 kilovolt [kV]) and/or distribution (12 and 21 kV) systems.
5. For Alternatives BS-1D and BS-1E, the 120 MW of total storage needed could all be connected to Paso Robles Substation. Alternatively, up to 55 MW of that total could be sited at/connected to Templeton Substation.

Source: ZGlobal, Inc. 2019

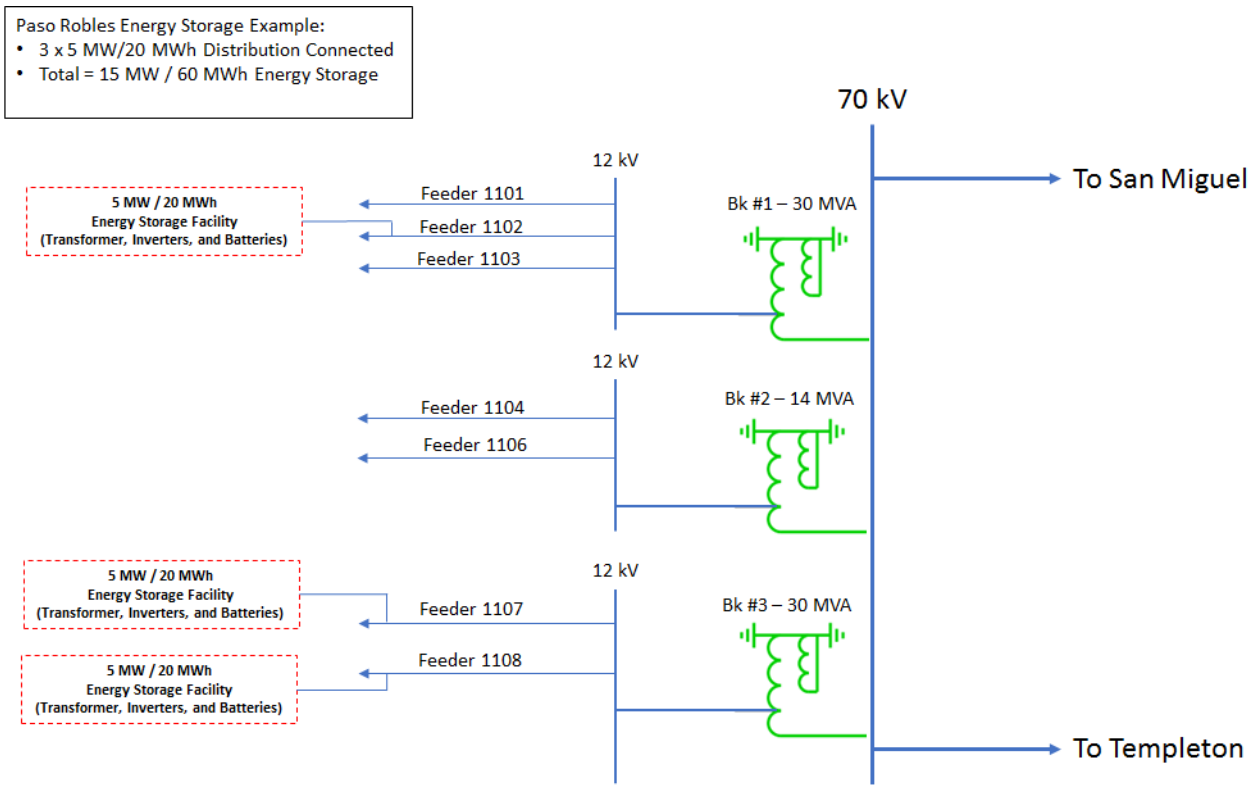
As shown in Table 3-4, 65 MW of storage is needed to mitigate the P1 contingencies identified for the Proposed Project. All of this would need to be connected to the Paso Robles Substation. Assuming a short-term outage or peak shaving scenario, a 4-hour battery could be installed, equating to a 65 MW/260 megawatt-hour (MWh) BESS. If a longer-term outage were to occur, a longer duration battery would be needed (up to 715 MWh for a 24-hour outage), which would correspondingly increase the footprint area of the BESS facility (see Alternative BS-1C in Table 3-4). Alternatives BS-1D and BS-1E considered BESS sizing required to solve the P6 contingency associated with loss of both 230 kV transmission lines. These scenarios required almost double the amount of storage (120 MW), although 55 MW of the total storage needed could be located at Templeton Substation. If a long-term outage (e.g., 24 hours) were to occur, a longer duration battery (up to 12 hours, or 1440 MWh) would be required to mitigate the contingency (see Alternative BS-1E in Table 3-4). The modeling did not consider a potential outage lasting longer than 24 hours. Note: if BTM solar and storage resources were implemented/procured in tandem, this could reduce the amount of FTM storage needed under Alternative BS-1 (see Section 3.6.3 for further discussion).

The storage requirements described for the alternatives in Table 3-4 could be met in a single BESS facility or by multiple BESS facilities. The BESS facilities could be connected directly to a substation (e.g., via a dedicated tie-line), connected to transmission circuits near the substation, or connected to distribution circuits near the substation. **Figure 3-11~~10~~** shows an example of how a single BESS could be connected to the transmission system at Paso Robles Substation. **Figure 3-12~~11~~** shows an example of how multiple BESSs could be interconnected with the Paso Robles Substation distribution system. A combination of these two approaches could be possible.



Notes: MW = megawatt; MWh = megawatt-hour; kV = kilovolt; Bk = Transformer Bank; MVA = mega volt ampere

Figure 3-11~~10~~. Example of Energy Storage Deployment to Transmission – Paso Robles Substation



Notes: MW = megawatt; MWh = megawatt-hour; kV = kilovolt; Bk = Transformer Bank; MVA = mega volt ampere

Figure 3-12~~11~~. Example of Energy Storage Deployment to Distribution – Paso Robles Substation

Siting Criteria and Considerations for BESSs

The CPUC team conducted a preliminary search for sites that could be suitable for BESS facilities in the Proposed Project vicinity. The search was guided by the following siting criteria:

1. **Proximity to Substation.** BESS facilities ideally should be within 2,500 feet (about 0.5 miles) of the distribution substation. In general, the farther from the substation BESSs are located, the greater the chance that the feeder will require some level of upgrades. Where possible, siting adjacent to the existing distribution substation is preferable, as this allows for the possibility of connecting directly to the distribution voltage level bus via a dedicated circuit breaker. The CPUC's search considered sites up to 0.75 miles from Paso Robles Substation to allow for a larger number of candidate sites to be considered.

2. **Proximity to Existing Distribution Feeders or Transmission Lines.** For BESSs not sited directly adjacent to the substation or directly connected to the substation via a dedicated tie-line, proximity to existing distribution feeders or transmission lines is preferable in that it could allow for an easier interconnection. In particular, proximity to an existing feeder that has available hosting capacity would minimize the potential for needed reconductoring/upgrades to the distribution system.

3. **Site Size.** Sites should be at least 0.25 acres to provide enough space for all BESS facility components, including a driveway.

4. **Site Topography.** Sites should be relatively flat. Sites with substantial slopes or uneven terrain were rejected.

5. **Existing Land Use.** Sites should be vacant, as determined by aerial photographs. While the Applicants could potentially acquire already-developed parcels through eminent domain and existing structures could be demolished, parcel acquisition in this way would likely cause substantial project implementation delay. The impact on project schedule could make the alternative infeasible. Sites currently vacant but planned for development as part of a Specific Plan were also rejected.

6. **Potential Environmental Constraints.** Sites should avoid potential environmental constraints, such as the following:

    a. Location within 100-year floodplains. Sites should not be located within a 100-year Flood Hazard Zone, as identified by the Federal Emergency Management Agency. Sites within this zone could be subject to hazards in the event of a large flood event.

    b. Riparian vegetation and biological resources permitting requirements. Sites should not include riparian vegetation and trees, which could provide habitat for sensitive species, such as nesting birds. The presence of habitat on the site may require permitting from biological resources agencies (e.g., CDFW and USFWS). Preferably, sites would be free of documented occurrences or potential habitat for special-status species.

Potential Sites for BESSs

The results of the preliminary site search are shown in **Figure 3-13~~12~~** and **Table 3-5**. For Templeton Substation, the parcel immediately adjacent (east) of the existing substation, within which the Applicants proposed Alternative SE-1: Templeton Substation Expansion, was considered for siting a BESS facility. For Atascadero Substation, where storage may be needed under Alternative BS-2, aerial imagery indicates that space is available on the PG&E parcel where the existing substation is located. Storage also may be needed at San Miguel Substation under Alternative BS-2 and aerial imagery indicates that space is available at this location. The sites identified in the search are also potentially suitable for BESSs to address both the transmission and distribution objectives of the Proposed Project (i.e., Alternative BS-1 and BS-2).

Basebap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics,

Paso Robles City Limits

Potential Battery Storage Site

Potentially Vacant Parcel

Distance from Existing Substaion

Paso Robles Substation 0.75 mile

Paso Robles Substation 0.5 mile

0 0.1 0.2

Miles

N

Existing Substation

Existing Transmission Line

Potential Environmental & Land Use Constraints

Planned Development

100 Year Floodplain

Potential Sensitive Habitats for Plants and/or Animals

Incompatible Topography

Distribution Circuits

PASO ROBLES 1101

PASO ROBLES 1102

PASO ROBLES 1103

PASO ROBLES 1104

PASO ROBLES 1106

PASO ROBLES 1107

PASO ROBLES 1108

Secondary Circuits

Source: SLO County Dept. of Planning 2016, City of Paso Robles 2018, Estrella PEA 2017, FEMA 2005, NEET West and PG&E 2017.

Figure 3-13
Battery Storage Site Screening Summary - Paso Robles Substation Vicinity

Estrella Substation and Paso Robles Area Reinforcement Project

T:_PROJECTS\17010_CPUC_Estrella\mxd\EIR\UpdatedEIR\fig_X_potential_storage_locations_075mi_Feeder.mxd 9/6/2020 PG

Table 3-5. Preliminary Site Screening Results for Potentially Suitable Battery Storage Locations

Assessor's Parcel No. (APN)	Ownership	Land Use Designation	Vacancy	Parcel Size (Acres)	Documented Special-Status Species or Habitat	Distance to Paso Robles Substation (Miles)
Paso Robles Substation Vicinity						
0[1]	Unknown[1]	None	Yes	0.56	No	0.1
009-814-050	Woodland Plaza II	Regional Commercial	Yes	0.87	No	0.2
009-769-042	Land Shak Holdings, LLC	Residential	Yes	1.82	No	0.4
009-611-045	Paso Robles Joint Unified School District	Residential	Yes	0.85	No	0.5
~~009-770-004~~	~~City of Paso Robles~~	~~Residential~~	~~Yes~~	~~2.59~~	~~No~~	~~0.6~~
			Subtotal:	**4.41** **~~6.69~~**		
Templeton Substation						
034-012-006	Terra Linda Ranchos South	County Other	Maybe[2]	51.89	No[3]	N/A
Atascadero Substation						
054-151-029	Pacific Gas & Electric Company	Public Facilities	Partial[4]	1.56[5]	No[6]	N/A
San Miguel Substation						
027-271-004	Pacific Gas & Electric Company	Residential Suburban	Partial	2.54[7]	No	N/A

Notes:

1. This piece of land, which is located immediately adjacent to Paso Robles Substation to the east, does not have an APN. Ownership of the land is unknown, although if the land is within the road right-of-way, it could be under the control of the City of Paso Robles.
2. There is possibly agricultural use on this parcel, as indicated by aerial photographs. However, the Applicants proposed locating an expanded substation on this parcel (see Alternative SE-1A); therefore, this site is considered potentially suitable for BESS facilities.
3. While this site screening exercise did not identify documented occurrences of special-status species or habitat within this parcel, the Applicant's preliminary desktop environmental analysis (NEET West and PG&E 2018b) for the Templeton Substation Expansion Alternatives found that several special-status species were likely to occur in this general area, including California red-legged frog, golden eagle, and Northern California legless lizard. Additionally, the site does have several oak trees present on-site, which could support habitat for nesting birds.

4. The existing Atascadero Substation occupies a portion of the parcel (on the northern corner). The remainder of the parcel is vacant.
5. The total size of the parcel is 1.56 acres. However, approximately 0.74 acre is occupied by the existing Atascadero Substation, leaving approximately 0.82 acre available for storage facilities.
6. No documented special-status plant or animal species occur on the site, based on a review of the California Natural Diversity Database. However, several trees are present on the site.
7. The total size of the parcel is 2.54 acres. However, approximately 1.06 acre is occupied by the existing San Miguel Substation, leaving approximately 1.48 acres available for storage facilities.

The preliminary site screening exercise originally identified 5 parcels within 0.75-mile of the Paso Robles Substation, totaling 6.69 acres. Based on comments received from the City of Paso Robles on the Draft ASR, the site identified as APN 009-770-004 located at the northeast corner of South River Road and Charolais Road is already planned (to include a large parking lot, restrooms, trailhead, and other amenities) and there is not room on the site for a battery installation. Therefore, this site is no longer considered suitable for BESS facilities and has not been carried forward in the DEIR. When omitting APN 009-770-004, the total acreage of suitable sites near Paso Robles Substation is 4.41 acres. The City of Paso Robles also identified another potentially suitable site for a battery facility adjacent to its 4.3-MW solar installation near the Paso Robles Airport. This site will be considered in the DEIR.

The~~se~~ sites identified in Table 3-5 meet the screening criteria described above and are potentially suitable from an engineering and environmental perspective. However, the site screening did not consider whether the parcels are available for sale or whether the Applicants could reasonably obtain site control within an acceptable timeline for development of the alternative. The Paso Robles Joint Unified School District, in particular, indicated its opposition to locating a battery facility on APN 009-611-045 (although its opposition seemed to be based on the supposition that the battery would need to be charged by a high voltage [i.e., 70 kV] transmission line, which is not necessarily the case). The CPUC team will be coordinating with the Applicants, as well as the City of Paso Robles and other stakeholders, regarding the feasibility of these (or other) sites for installing BESS facilities ~~to meet Alternative BS-1~~. This coordination will also include development of feasible BESS designs for parcels considered to be potentially feasible.

Typical BESS facilities would include battery power packs, a control building, step up transformer, switchgear, heating, ventilation, and air conditioning units, and site development features, such as a driveway, stormwater management features, and fencing. Lithium-ion BESSs will be enclosed in buildings as shown in Figure 3-15~~13~~. A BESS interconnecting to an existing transmission line (e.g., 70 kV) is assumed to require a 3-breaker, ring-bus switchyard facility that measures approximately 200 x 350 feet.

Battery Storage Technology

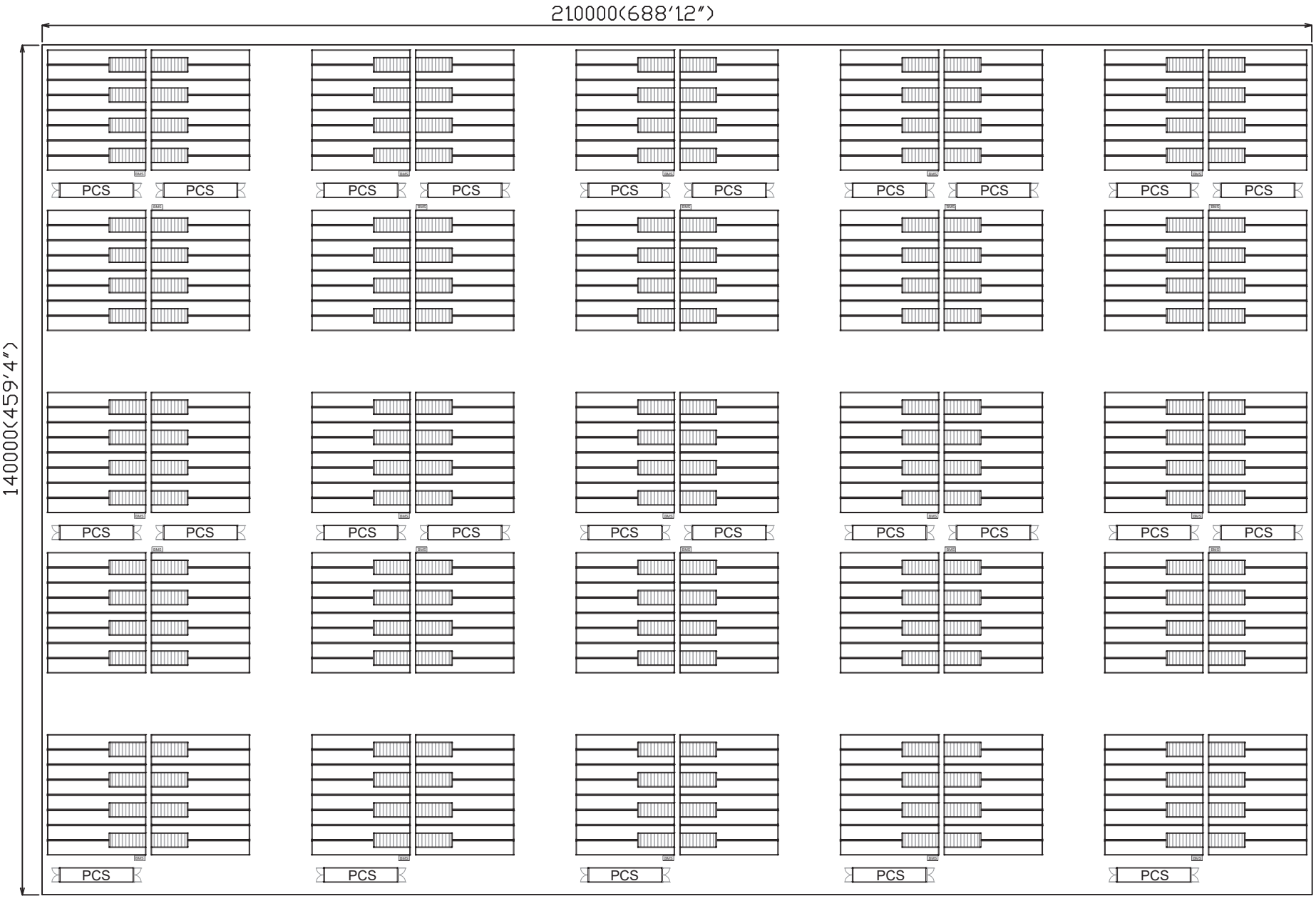
In addition to lithium-ion technology, CPUC also considered other battery storage technology, including redox flow batteries. Redox flow batteries are batteries in which energy storage in the electrolyte tanks is separated from power generation in stacks. The stacks consist of positive and negative electrode compartments divided by a separator or an ion exchange membrane

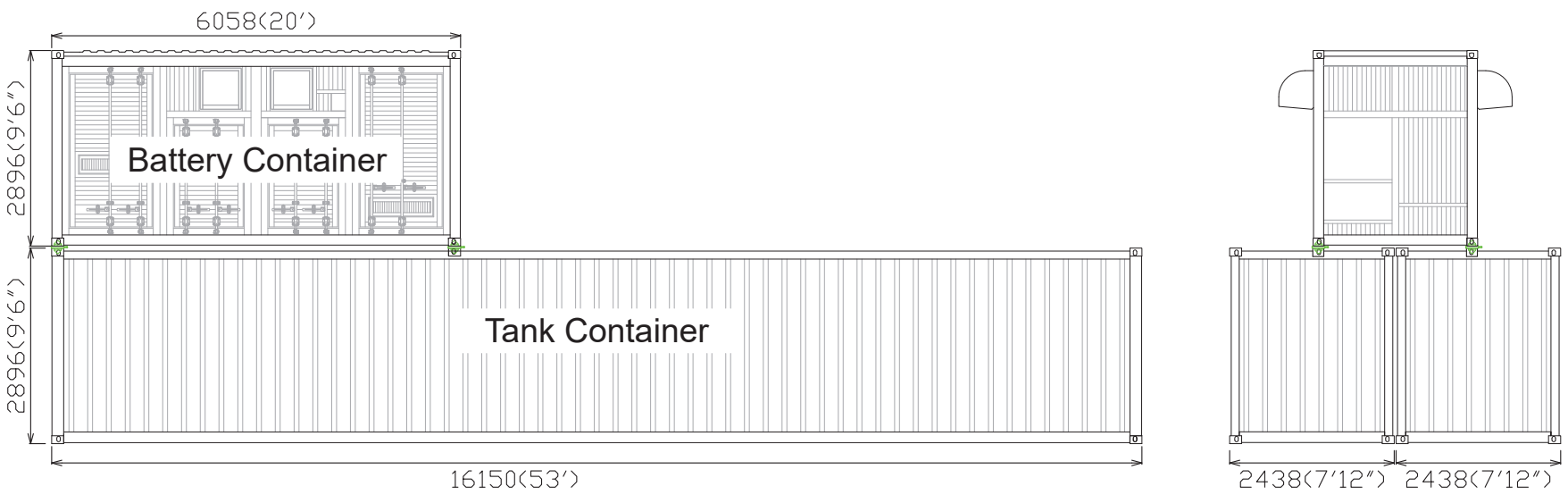
through which ions pass to complete the electrochemical reactions (Mongird et al. 2019). While redox flow batteries are in the relatively early stages of commercialization, they offer potential advantages, such as long lifecycles, low temperature ranges for operation, and easy scalability (Mongird et al. 2019). Redox flow batteries also may have reduced fire risk compared to lithium-ion batteries.

Redox flow batteries are more expensive (currently about twice as expensive on a per kW/h basis) than lithium-ion batteries, which are the most cost-effective electrochemical battery storage technology (Mongird et al. 2019). Redox flow batteries also require a larger footprint compared to lithium-ion batteries. Thus, for the Proposed Project, this technology may make the most sense at the Templeton Substation location where there is ample space available.

CPUC staff coordinated with individuals from Sumitomo Electric Industries, Ltd. (Sumitomo) to investigate the potential for deployment of a redox flow battery(ies) as an alternative to the Proposed Project. Sumitomo provided the conceptual drawing for a 50 MW/400 MWh (i.e., 8-hour) redox flow battery system shown in

Figure 3-14. They estimated that such a facility would occupy about 7.3 acres; assuming an additional 25 percent for ancillary equipment tie-ins and a driveway, this would come out to 9.1 acres.





PCS = Power Conditioning System
BMS = Battery Management System

Source: Sumitomo 2019

Figure 3-14. Redox Flow Battery Conceptual Drawing – 50 Megawatts X 8 Hours

Page intentionally left blank.

Consideration of CEQA Criteria

Project Objectives

As shown in Table 3-4, BESS(s) could solve the P1 and P6 contingencies identified for the Paso Robles DPA by the CAISO. The necessary size/duration of the BESS(s) is based on several factors, including, foremost, the assumed duration of the potential outage. BESSs can only provide power for a limited period of time until they need to be recharged. This means that a BESS could only solve the P1 or P6 outage for a given duration. In addition to the MWh energy amount of the BESS, duration is determined by the load curve and timing of the outage; for example, if the outage occurred at night or in the winter when load is typically lower, a battery could last longer. ZGlobal, Inc.'s modeling for the results shown in Table 3-4 assumed that the outages occurred at peak load.

In their comments on the Draft ASR, CAISO, PG&E, and HWT all argued that Alternative BS-1 is infeasible and would not be able to meet the Transmission Objective of the Proposed Project. All three entities similarly argued that a BESS, regardless of size and capacity, would not be able to recharge to address a very long duration outage or be in an adequate state of charge to address a subsequent outage. PG&E, in its comments on the Draft ASR and in subsequent discussions, indicated that an outage of the Paso Robles-Templeton 70 kV Transmission Line could last more than 24 hours. PG&E provided data showing that unplanned transmission system outages within its service territory lasting longer than 24 hours have occurred, with the longest duration outage lasting 178 days.

If an outage were to occur during peak loading conditions (i.e., summertime), there may not be any charging window in the load curve that would provide an opportunity for a BESS to recharge. For example, if Paso Robles Substation were to lose power from the south (e.g., loss of the Paso Robles-Templeton 70 kV Transmission Line), the northern line from San Miguel would be the only remaining transmission-level power source, and this line can only supply roughly 20 MW of power. During the summertime, it is possible that load demand on the Paso Robles Substation may not drop below 20 MW even during the night-time (typically the period of lowest demand in the daily load curve). This would leave no potential charging window (or period of time during which load would be below the level where supplemental power would be needed) for BESS facilities.

CPUC and its consultants confirmed the recharging issues raised by CAISO and the Applicants. CPUC concurs that this would prevent Alternative BS-1 from fully meeting the Transmission Objective. Even if BESS(s) were sized to meet the identified need during a P1 contingency for 24 hours (see Table 3-4), the BESS(s) may not have the opportunity to recharge to solve the outage for multiple days or subsequent outages. CPUC also fully evaluated the potential for BTM solar plus storage resources to be implemented/procured in tandem with FTM resources to potentially address the Transmission Objective of the Proposed Project (see Section 3.6.3 for further discussion). Even while BTM resources could substantially reduce the amount of FTM storage needed under Alternative BS-1, these resources would ultimately be subject to the same duration and recharging limitations as described above.

Thus, Alternative BS-1, even in combination with BTM resources pursuant to Alternative BS-3, would not meet the Transmission Objective.

~~At this time, we are not aware of adopted standards that address outage duration to provide guidance on BESS sizing. NERC and Western Electricity Coordinating Council (WECC) Reliability Standards, such as TLP-001, are generally focused on validation of acceptable system parameters (i.e. voltage, line loading, frequency) during various system conditions including single and multiple outages of lines and/or generators. These studies are performed with detailed models of the bulk power system and the connected loads and generators which focus on a single snapshot in time of the electrical system, such as summer (peak load). This has been the historical approach to ensuring system reliability as it is generally assumed that less stressed conditions will be covered by considering the worst-case condition at peak loads.~~

~~Resource Adequacy (RA)[7] requires that resources have a duration of 4 hours (CPUC 2014a, 2014b). This requirement reflects the need to support morning and evening ramping periods as well as typical daily peak demand periods. Four hours is the standard in California for supply resources designated to meet peak system demand and is applied to both System and Local reliability areas. Local RA requirements are established based on contingency analyses (i.e. loss of critical transmission system elements) and are designed to ensure that transmission system elements do not violate reliability requirements in the event of outages. Given that that the RA requirement is 4 hours, one could assume that the expected restoration time associated with one of the critical transmission line outages would also be 4 hours.~~

~~However, restoration times vary depending on outage circumstances and system conditions at the time of outage. For example, it is conceivable that a major transmission line feeding a Local Capacity Area could be lost for more than 4 hours and result in risk of loss of load during peak conditions. Restoration time is an important factor when considering use of energy storage in lieu of physical system upgrades. In the case of Aliso Canyon, the request for energy storage only required 4-hour batteries to replace the lost supply from local generation previously designated as Local RA. Under typical planning criteria and RA provisions, it appears that 4 hours is an acceptable restoration time for planning purposes, and, consequently, a 4-hour BESS would be an acceptable means of alleviating adverse system conditions during P1 contingencies.~~

~~CAISO has previously expressed a desire to go with a traditional, "wired" approach (e.g., new transmission lines) for the Proposed Project. As of this writing, CAISO is still in the process of developing its Storage as a Transmission Asset initiative, which would lay out a framework for cost-recovery and market participation of storage assets (CAISO 2018b). In this respect, some of the details/logistics for exactly how a BESS would be integrated into the transmission grid, particularly with respect to maximizing the economic potential of storage to provide multiple services and grid value, have not been fully fleshed out. Nevertheless, CPUC recently approved~~

~~[7] Resource Adequacy (RA) is CPUC program/policy framework with two goals: (1) provide sufficient resources to the CAISO to ensure the safe and reliable operation of the grid in real time, and (2) provide appropriate incentives for the siting and construction of new resources needed for reliability in the future (CPUC 2019b). Developed in response to the 2001 California energy crisis, the RA Program requires CPUC jurisdictional Load Serving Entities (LSEs) to report their procurement of resources/capacity necessary to meet upcoming load demands. There are three distinct RA requirements: "System," "Local," and "Flexible" requirements, each of which looks at a different aspect of the energy market and load demand (CPUC 2019b).~~

~~PG&E's proposal for four new energy storage projects (two of which will connect to the transmission grid), totaling 567.5 MW/2,270 MWhs (4 hour duration), at Moss Landing. Currently, PG&E has procured 692 MW of transmission-connected storage, which exceeds the storage procurement mandate established by AB 2514 (CPUC 2018a).~~

~~Additionally, BESSs have been proposed/selected to address deficiencies identified in CAISO transmission planning processes. For example, as described in the 2017-2018 Transmission Plan (CAISO 2018a), NextEra Energy Resources (NEER) proposed the Alto 45 MW/183 MWh (4 hours) BESS Project and the Las Gallinas 22 MW/91 MWh (4 hours) BESS Project to mitigate reliability issues in the system.. During the same transmission planning process, NEER also proposed a 41.80 MW/167.20 MWh (4 hours) BESS project in Lodi to address thermal overloads on the 60 kV system. Other proposals documented in the adopted 2017-2018 Transmission Plan and Draft 2018-2019 Transmission Plan included BESSs with durations from 1 to 4 hours. In several cases, a duration was not specified for BESSs proposed in the Draft 2018-2019 Transmission Plan.~~

~~In the 2017-2018 Transmission Plan, CAISO approved a proposal submitted by PG&E to address reliability concerns in the East Bay Area caused by the retirement of the Oakland Power Plant (CAISO 2018a). PG&E's proposal would include substation upgrades, transmission switching, and competitively sourced energy storage and preferred resources (both behind the meter [BTM] and in front of the meter [FTM]) (PG&E 2018). The project would be a collaboration between PG&E and East Bay Community Energy (EBCE), with PG&E focusing on addressing the P2 contingency issues and commissioning a FTM 10 MW/40 MWh plus BESS. EBCE will assist with procuring market-participating renewable generation or energy storage, including BTM. An analysis of peak summer day load in the Oakland area found that 10 hours of storage would be needed to address the P2 contingency for an outage during this period, while 15 hours of storage would be needed to address the P6 contingency (PG&E 2018).~~

~~Overall, a BESS appears capable of meeting the Transmission Objective for the Proposed Project. Currently adopted standards (e.g., NERC, WECC) are unclear regarding the duration for which P1 and P6 outages must be alleviated and what is an acceptable restoration time. Due to this uncertainty, multiple scenarios were modeled (see Table 3-4) and CPUC will be coordinating with CAISO and PG&E to further develop the BESS alternatives. For the purposes of this ASR, Alternative BS-1 is considered potentially capable of meeting the Transmission Objective.~~

~~Alternative BS-1 would not address the Distribution Objective, but could be paired with another alternative that meets the distribution needs of the project.~~

Feasibility

A range of potentially feasible sites for BESS facilities have been identified (see Figure 3-13~~12~~ and Table 3-5). Particularly with recent advances in lithium-ion battery storage technology reducing the footprint and space requirements of lithium-ion BESSs, there may be room on suitable sites to install FTM BESS facilities. However, as discussed above, regardless of sizing, a BESS could not fully solve the potential outages under the Transmission Objective. Therefore, Alternative BS-1 would be infeasible. ~~The CPUC team expects to further assess site suitability and to develop specific designs for BESSs for consideration in the EIR. Nevertheless, the information currently available suggests that Alternative BS-1 is potentially feasible from a technical perspective.~~

~~With respect to environmental feasibility, fire risk is a concern with BESS installations and several high-profile fires involving electric vehicles have shown the potential for lithium-ion batteries to spontaneously ignite. Additionally, should BESS facilities catch fire, they could potentially pose a hazard to fire fighters and other first responders due to their chemical components. These issues will need to be fully evaluated in the EIR, but successful (so far) implementation of transmission-scale batteries in other parts of the world (e.g., Australia) suggest that any fire risk of BESS facilities can be adequately mitigated. UL 9540 is a safety standard that has been specifically developed for energy storage systems and equipment. Requiring UL 9540 certification, as well as implementation of measures to provide fire fighter training for how to respond to battery fires and/or measures to obtain review and approval of fire protection drawings and specifications for the proposed facilities by the local fire department, could minimize hazards associated with BESSs.~~

~~Other potential impacts of BESSs include hazards associated with recycling and disposal of batteries and materials at the end of their usable life. BESSs contain hazardous materials, which could expose workers, the public, or the environment to risks if not disposed of properly. This is another area that will need to be evaluated in the EIR, but, at this screening level of analysis, there is no reason to believe that this potential impact would necessarily be significant and/or could not be adequately addressed with mitigation.~~

Potential to Avoid or Reduce Significant Environmental Impacts

~~Information is not sufficiently available regarding Alternative BS-1 to fully evaluate its potential environmental impacts in comparison to the Proposed Project; nevertheless, some general assumptions can be made. First, g~~Given that Alternative BS-1 would require construction/installation of (up to) 8.1 ~~14.1~~ acres of lithium-ion BESS facilities (i.e., for Alternative BS-1E) (or as little as 1.5 ~~2.5~~ acres for Alternative BS-1A), compared to the roughly 15-acre-substation, 7-mile-long new 70 kV power line, and 3-mile-long reconductoring segment needed for the Proposed Project, it can be assumed that the alternative could reduce a number of construction-related impacts (e.g., air pollutant and GHG emissions, potential impacts to biological and cultural resources, etc.) and involve less overall ground disturbance. A redox flow battery may occupy more space, but could still reduce impacts if it were to avoid the need for the new and reconductored power line.

~~While Alternative BS-1 would only address the Transmission Objective, and thus it is not an equal comparison with the Proposed Project, e~~Even considering Alternative BS-1 in combination with another alternative that meets the Distribution Objective (e.g., Alternative BS-2; see Section 3.6.2), it would likely reduce overall ground disturbance/permanent impact area compared to the Proposed Project. Assuming Alternative BS-1 and BS-2 were implemented in tandem, for example, and that this combination could fully meet the objectives of the Proposed Project, this combination would completely avoid the need for the new 7-mile-long 70 kV power line. Therefore, such an approach would avoid the potential aesthetics, biological resources (e.g., special-status birds), and possible public services (i.e., obstruction of CAL FIRE helicopter flight path) impacts that could result from the new 70 kV power line.

Although BESS facilities themselves could result in aesthetics impacts (depending on their location and design), they also could potentially reduce aesthetics impacts, particularly in comparison to the proposed substation and power line. The City of Paso Robles specifically

noted in its scoping comments that it was concerned about potential aesthetics (and other) impacts from battery facilities at or near Paso Robles Substation. However, the CPUC believes that BESSs can be tastefully incorporated into new or existing buildings. **Figure 3-15~~13~~** shows a hypothetical example of such a BESS facility that is enclosed in a building and integrated into the surrounding landscape.

NOTES:

Example 10 MW/40 MWh 4-hour battery; 4,225 sq. ft. building on 0.37 acre lot; All distribution line connections are underground; Unspecified lot location in Any Town, USA

Source: Itani, pers. comm., 2018

Figure 3-15~~13~~. Example Energy Storage Facility Enclosed in Building

When compared to the proposed Estrella Substation, a BESS facility, such as the hypothetical example shown in Figure 3-15~~13~~, could be more compatible with its surrounding landscape and have less adverse visual effects.

Conclusion

Due to the inability for a BESS to charge during peak loading/transmission outage conditions and the possibility of a P1 contingency lasting multiple days, Alternative BS-1 could not feasibly meet the Transmission Objective of the Proposed Project. ~~Alternative BS-1 could potentially meet the Transmission Objective, and could be paired with another alternative that meets the Distribution Objective. The potential availability of suitable sites near Paso Robles Substation suggests that the alternative is potentially feasible. As the alternative could obviate the need for the new 15-acre substation, new 7-mile-long power line, and 3-mile-long reconductoring~~

~~segment required for the Proposed Project, it could reduce potentially significant environmental impacts.~~ Therefore, Alternative BS-1 is **screened out** ~~**retained** for~~ from full analysis in the EIR.

3.6.2 ALTERNATIVE BS-2: BATTERY STORAGE TO ADDRESS THE DISTRIBUTION OBJECTIVE

Description

Alternative BS-2 would involve installation of smaller BESSs connected to the distribution system to defer the need for additional distribution capacity in the Paso Robles DPA, in accordance with the Distribution Objective of the Proposed Project. ~~As described in Section 1.2.2, PG&E estimates that load growth in the Paso Robles DPA could exceed the capacity of local area substations by 2024; the Proposed Project would address this need by providing an additional substation.~~ The substation would be used to provide additional distribution service (i.e., new feeders) to meet increased future demand.

Kevala Analytics, Inc. (Kevala) evaluated the potential for BESSs to address the distribution need (Kevala 2018). Kevala's analysis considered the hosting capacity of specific feeders within the DPA forecasted to be overloaded by 2024 or expected to handle new block load growth, as well as storage modeling, to identify potential sizes for BESSs. The effects of such BESSs on substation capacity were then calculated to determine the capability of the BESSs to defer the distribution capacity need. **Table 3-6** shows the amount of storage that Kevala determined could be deployed on target feeders in the DPA with minimal upgrades to existing distribution facilities.

Table 3-6. Energy Storage Potential by Existing Distribution Circuit

Feeder	Voltage (kV)	Peak Load, 2024[1] (MW)	Storage Capacity Estimate—Minimal Grid Improvement Required (MW)[2]
Atascadero 1103[3]	12	11.9	2.4
Paso Robles 1102[3]	12	8.8	1.8
Paso Robles 1107	12	11.5	1.8
Paso Robles 1108	12	14.3	2.9
San Miguel 1104	12	9.3	1.9
Templeton 2109	12	15.5	3.1
Templeton 2113	21	20.6	2.9
		Total:	16.8

Notes:

KV = kilovolt; MW = megawatt

1. Updated peak load forecasts for 2028 will be available from PG&E in May 2019. They are based on the recorded peak loads from 2018.

2. With conductor upgrades and other improvements to the distribution grid, the storage capacities of each feeder could be increased above the capacities listed in this table.
3. PG&E's Distribution Deferral Opportunity Report listed Paso Robles 1103 as one of the feeders forecast to overload but omitted Paso Robles 1102 and Atascadero 1103 (PG&E 2019).

Source: Kevala 2018

The precise deployment of BESSs would depend on site availability (see Table 3-5) and, when considering that either a single BESS or multiple BESSs could be deployed (and BTM storage could also be employed to reduce loading; see Section 3.6.3), many combinations/scenarios are possible. The amount of storage shown in **Table 3-6** (i.e., a total of 16.8 MW dispersed across 7 feeders) is offered as an Example Storage Solution for the purposes of this discussion. **Table 3-7** shows the aggregated impact of the Example Storage Solution on area substation capacity.

Table 3-7. Example Storage Solution and Aggregated Substation Impact

Substation	Substation Available Capacity (MW)	PG&E 2026 Load Forecast (MW)	Aggregated Impact of Example Storage Solution,[1, 2] 2026[3] (MW)
Atascadero	28.2	29.76 **(-1.56)**	2.44 **(+0.88)**
Paso Robles	84.65	85.48 **(-0.83)**	6.50 **(+5.67)**
Templeton	84.65	86.93 **(-2.28)**	5.95 **(+3.67)**
San Miguel	15.05	14.68 **(+0.37)**	1.86 **(+2.23)**
Totals	212.55	216.85 **(-4.3)**	16.75 **(+12.45)**

Key: **Red text** = overload forecast amount; **Green text** = no overload forecast or overload alleviated by battery energy storage system above substation capacity; MW = megawatt

Notes:

1. The example storage solution is the amount of storage that can be installed on target feeders in the Distribution Planning Area without incurring significant interconnection and distribution grid upgrade costs (see **Table 3-6**).
2. Both front of the meter (FTM) and behind the meter (BTM) battery energy storage systems may be sited to address loads at the substations. ~~The BTM analysis has not yet been completed; r~~Refer to Section 3.6.3 for discussion of BTM resources procurement potential and siting.
3. ~~3.~~ Updated peak load forecasts for 2028 will be available from PG&E in May 2019. They are based on the recorded peak loads from 2018.

Source: Kevala 2018

As shown in Table 3-7, the Example Storage Solution would alleviate forecasted overloading at substations within the Paso Robles DPA and provide excess capacity to accommodate future growth. Implementation of the storage solution would provide 12.45 MW of excess capacity. **Table 3-8** shows how the Example Storage Solution sizes could translate into BESS facilities and the approximate space requirements for such facilities.

Table 3-8. Example Storage Solution Facilities and Space Requirements

Feeder / Battery Energy Storage System Deployment Site	Example Storage Solution[1] Sizes (MW)	4-Hour Duration (MWh)	~~No. of 50 kW / 210 kWh Battery Packs Required~~	Footprint[2] (Acres)
Atascadero 1103~~[3]~~	2.4	9.6	~~45.7~~	0.05~~9~~
Paso Robles 1102~~[3]~~	1.8	7.2	~~34.3~~	0.04~~7~~
Paso Robles 1107	1.8	7.2	~~34.3~~	0.04~~7~~
Paso Robles 1108	2.9	11.6	~~55.2~~	0.07~~11~~
San Miguel 1104	1.9	7.6	~~36.2~~	0.04~~7~~
Templeton 2109	3.1	12.4	~~59.0~~	0.07~~12~~
Templeton 2113	2.9	11.6	~~55.2~~	0.07~~11~~
Totals	16.8	67.2	~~320~~	0.4~~66~~

Notes:

MW = megawatt; MWh = megawatt-hour; kW = kilowatt; kWh = kilowatt-hour;

1. Behind-the-meter storage may be sited to further address loads at the respective substations. ~~This analysis has not yet been completed; r~~Refer to Section 3.6.3 for discussion.
2. Footprint size estimates based on lithium-ion technology. Since publication of the Draft ASR, lithium-ion battery storage technology has advanced substantially and the space needed for lithium-ion battery facilities has been reduced by roughly 40 percent. ~~Footprint calculations are based on Tesla 2017 product specifications and assume that approximately 72 sq ft is needed per 50 kW/210 kWh power~~ pack~~. An additional 25 percent extra space is then assumed to be needed for roads, buildings, and parking on the Battery Energy Storage System site. Tesla PowerPacks were used for the purposes of this analysis, but other providers could have been selected.~~
3. PG&E's Distribution Deferral Opportunity Report listed Paso Robles 1103 as one of the feeders forecast to overload but omitted Paso Robles 1102 and Atascadero 1103 (PG&E 2019).

Source: Kevala 2018

As shown in Table 3-8, assuming a 4-hour duration for BESSs, implementation of the Example Storage Solution would involve the installation of BESSs~~320 battery packs (each providing 50 kW/210 kWh)~~, which would occupy a total of 0.4~~66~~ acres (assuming use of lithium-ion technology). This assumes that 25 percent extra space would be needed at the BESS site for site development (e.g., road, parking, etc.).

Practically, BESSs could be deployed at the substation (preferable) or on sites along the feeders. The siting criteria described in Section 3.6.1 for Alternative BS-1 also generally apply to FTM BESSs targeting the distribution need under Alternative BS-2. As shown in Table 3-5, space appears to be available in immediate proximity to the existing Templeton and Atascadero substations. A portion of the needed storage could be deployed at these locations to meet projected load increases on target feeders emanating from these substations. The preliminary site screening identified 5 sites within 0.75-mile of Paso Robles Substation that could be suitable

for BESS facilities, although one of these sites was eliminated based on comments received on the Draft ASR.

In a practical sense, BESS facilities under Alternative BS-2 would function to "shave" peak loads during periods when energy use along these feeders is high (i.e., reduce peak loads during the summer) to relieve pressure on the area substations and feeders. Although designs have not yet been developed, BESSs may be sited outdoors on concrete slabs or integrated into buildings, as shown on Figure 3-15~~13~~.

~~In many ways, Alternatives BS-2 and BS-1 are related. The more storage that is installed under Alternative BS-2, the less storage may be needed under Alternative BS-1 to address the Transmission Objective. However, the BESS facilities under the two alternatives may function differently (e.g., BESS capacity under Alternative BS-1 may be reserved for substantial output in the event of N-1 or N-1-1 outages, while BESSs under Alternative BS-2 may serve to shave peak load). Additionally,~~ BTM storage considered under Alternative BS-3 could help to reduce peak load on feeders and thereby help to meet the distribution need of the Proposed Project. ~~The interrelationship between Alternatives BS-1, BS-2, and BS-3 will be further fleshed out during the development/refinement of these alternatives and in the EIR.~~

The analysis in this ASR was based on data provided by PG&E in response to CPUC data requests ~~made in 2018~~, as well as information presented in the Applicants' PEA. CPUC will be coordinated~~ing~~ with PG&E to understand the methodology for the results presented in their 2018 Distribution Deferral Opportunity Report (DDOR) and resolve the discrepancies between the DDOR and this ASR (see discussion under "Feasibility" section below).

Consideration of CEQA Criteria

Project Objectives

Preliminary modeling suggests that Alternative BS-2 could meet the Distribution Objective. The alternative would not meet the Transmission Objective, but could potentially be paired with another alternative that meets the Transmission Objective.

Feasibility

As noted above, potentially suitable sites have been identified; however, further coordination and research will be needed to determine the feasibility of acquiring parcels and locating BESSs on these sites. Additionally, PG&E would need to comment on the interconnection of the BESS to the distribution system. A PG&E Interconnection Study is expected to be required.

Similar projects have been successfully implemented in California; for example, PG&E's Brown's Valley 500 kW/2 MWh facility was implemented in part to demonstrate the feasibility of using a utility-operated energy storage asset to address capacity overloads on the distribution system and improve reliability, as well as evaluate energy storage controls systems and integrate energy storage functionality with existing Distribution Operations protocols (PG&E 2017b). Ultimately, this project was a success and the BESS was able to effectively provide autonomous peak-shaving capacity relief for a substation transformer bank. The project report states that "the facility was tested in a variety of control modes as part of system commissioning and proved its

ability to reliably follow real-time control signals as well as to deliver and consume real and reactive power as instructed" (PG&E 2017b).

In addition, numerous BESSs have been successfully implemented on SCE's electric grid. The following passage from the CPUC 2018 Final EIR (CPUC 2018b) for a proposed SCE substation and power line project (CPUC Application A.15-12-007) provides insight into the expected feasibility of implementing BESS solutions within the Paso Robles area to address the Distribution Objective of the Proposed Project:

> *…hundreds of additional energy storage facilities [currently operate] within SCE's service territory, which amount to more than 350 MWs and a much larger total energy capacity (megawatt hours), although total energy capacity was not provided by SCE in response to CPUC Energy Division data requests. SCE does not own many of these additional facilities, but they have been operating within SCE's electric system and are connected both in-front-of-the-meter and behind-the-meter at the customer, distribution, and transmission domains (grid domains).[1] Facilities that SCE does not own still provide SCE with important operational experience. Among the additional 350 MWs of energy storage facilities in operation are those connected pursuant to SCE's Rule 21[2] obligations. According to SCE's public data, the first energy storage facility for which an interconnection agreement was executed with SCE was a 2 MW facility in Orange County. This occurred in 2008 (SCE Rule 21/WDAT interconnection que as of 10/2/2018). By approximately 2022, SCE's public data indicates that about 3.2 gigawatts[3] of energy storage will be operating within their service territory, and more than 3.0 gigawatts of the total will be lithium-ion technology. The majority of the storage facilities through 2022 will be behind-the-meter, but about 135 MWs of the behind-the-meter storage will be under SCE operational control, and SCE uses behind-the-meter resources to meet its obligations for Resource Adequacy—adequate generation resources available to reliably meet forecast load (see http://www.cpuc.ca.gov/RA). SCE will own or contract for about 500 MWs of the 3.2 gigawatt total, and about 220 MWs of the 500 MWs is expected to be under SCE operational control [SCE 2018 of this report].[4]*
>
> *[1] The term, "grid domains," refers to the three levels of the electric system at which an energy storage device may be interconnected—behind the customer meter, on the utility distribution system, or on the transmission system (Decision D.18-01-003).*
>
> *[2] Electric Rule 21 describes the interconnection, operating, and metering requirements for generation facilities to be connected to a utility's distribution system over which the CPUC has jurisdiction. Interconnected generation may be classified as non-export under the CPUC/SCE Electric Rule 21 tariff or export under the Federal Energy Regulatory Commission WDAT—Wholesale Distribution Access Tariff (www.sce.com/wps/portal/home/business/generating-your-own-power/Grid-Interconnections/Interconnecting-Generation-under-Rule-21).*

[3] SCE stated that "projects which have not proceeded beyond an interconnection request are considered speculative, so they are not included" with the data describing the 3.2 gigawatts of storage to be operational through approximately 2022 within SCE's service territory [SCE 2018 of this report]. Hence, the total amount of storage that may be operational in the timeframe may be greater than 3.2 gigawatts.

[4] At this time, SCE defines "operational control" as applicable to projects for which SCE is either bidding into the CAISO market and/or performing distribution deferral dispatches or testing [SCE 2018 of this report].

Significantly, during the course of preparing this draft ASR, PG&E identified the Proposed Project as a Candidate Deferral (i.e., through DER implementations, such as battery storage) in its 2018 DDOR prepared pursuant to the Distribution Resource Planning Proceeding, R.14-08-013 (PG&E 2019). Within the DDOR, PG&E identifies grid need for specific distribution feeders/transformer banks in the Los Padres Division that would be addressed by the Proposed Project. See the BTM Solar plus Solar Adoption Propensity Analysis Report (CPUC 2020) (Appendix B) for further discussion of the relationship between the data provided in DDOR filings and the distribution needs of the Proposed Project. ~~Generally, the data in the DDOR are consistent with Kevala's analysis and the information presented in this section; however, there appear to be several discrepancies. For example, the DDOR identified an overall deficiency of 4.87 MW for the area (PG&E 2019), while Kevala calculated a deficiency of 4.3 MW (see Table 3-7). Also, the DDOR listed Paso Robles 1103 as one of the feeders forecasted to be overloaded, but omitted Paso Robles 1102 as well as Atascadero 1103, which differs from Kevala's conclusions (PG&E 2019).~~

With respect to environmental feasibility, fire risk is a concern with BESS installations (particularly lithium-ion BESSs) and several high-profile fires involving electric vehicles have shown the potential for lithium-ion batteries to spontaneously ignite. Additionally, should BESS facilities catch fire, they could potentially pose a hazard to fire fighters and other first responders due to their chemical components. These issues will need to be fully evaluated in the EIR, but successful (so far) implementation of transmission-scale batteries in other parts of the world (e.g., Australia) suggest that any fire risk of BESS facilities can be adequately mitigated. UL 9540 is a safety standard that has been specifically developed for energy storage systems and equipment. Requiring UL 9540 certification, as well as implementation of measures to provide fire fighter training for how to respond to battery fires and/or measures to obtain review and approval of fire protection drawings and specifications for the proposed facilities by the local fire department, could minimize hazards associated with BESSs. Use of alternative technology, such as redox flow batteries, could also minimize fire risk hazards.

Other potential impacts of BESSs include hazards associated with recycling and disposal of batteries and materials at the end of their usable life. BESSs contain hazardous materials, which could expose workers, the public, or the environment to risks if not disposed of properly. This is another area that will be evaluated in the EIR, but, at this screening level of analysis, there is no reason to believe that this potential impact would necessarily be significant and/or could not be adequately addressed with mitigation.

~~See the discussion in Section 3.6.1 on the potential environmental constraints associated with BESS facilities. In summary, none of the potential environmental impacts/risks (e.g., fire risk, hazardous materials disposal impacts, etc.) are anticipated to be so severe as to render a BESS alternative environmentally infeasible.~~ Overall, while feasibility of Alternative BS-2 may depend

on site availability for sale/acquisition, among other factors, at this screening level of analysis, the alternative is considered potentially feasible.

Potential to Avoid or Reduce Significant Environmental Impacts

See the discussion in Section 3.6.1 on the potential for a BESS alternative to avoid or reduce significant environmental impacts of the Proposed Project. Assuming implementation of the Example Storage Solution (16.8 MW on approximately 0.4~~66~~ acre using lithium-ion technology), Alternative BS-2 could decrease the amount of permanent disturbance and construction activities that would be required for the Proposed Project (e.g., new 15-acre substation, 7-mile-long power line, and 3-mile-long reconductoring segment, as well as future new 21 kV distribution feeders emanating from the proposed substation). Even if Alternative BS-2 was paired with another alternative that addresses the Transmission Objective (e.g., ~~BS-1 or~~ SE-1/SE-PLR-2), the combined effects of the alternatives would likely be less than the effects of the Proposed Project.

Like Alternative BS-1, BESS facilities under Alternative BS-2 could have aesthetic impacts depending on their specific location, but tasteful design of facilities could potentially alleviate these impacts (see Figure 3-15~~13~~).

Conclusion

Alternative BS-2: Battery Storage to Address the Distribution Need could potentially meet the Distribution Objective and could be paired with another alternative that meets the Transmission Objective. ~~If paired, the total energy storage amount would need to be large enough to meet both objectives. For example, if a 65 MW/260 MWh BESS were selected to address the Transmission Objective, we assume that the amount of storage may need to be increased by about 4.3 MW/17.2 MWh to also address the Distribution Objective. This assumes that 4 hours is the optimal duration to address both objectives. The power and duration of battery storage needed for these objectives will be further explored in the DEIR and continually updated based on each, annual load forecast provided by PG&E throughout the duration of the CPUC Proceeding.~~ The potential availability of suitable sites near Paso Robles Substation and at other area substations suggests that the alternative is potentially feasible. As the alternative could obviate the need for the new distribution facilities envisioned under the Proposed Project (e.g., substation, future feeders, etc.), it could reduce potentially significant environmental impacts. Therefore, Alternative BS-2 is **retained** for full analysis in the EIR.

3.6.3 ALTERNATIVE BS-3: BEHIND-THE-METER SOLAR AND BATTERY STORAGE

Description

BTM solar and battery storage (i.e., "BTM resources") adoption also could ~~may be another way to~~ reduce loading on circuits within the Paso Robles DPA, and thereby avoid potential future forecasted substation overloads. BTM resources ~~storage~~ would be metered at the building-level, and could be owned and/or operated by either the building owner or a third party provider. In particular, because (1) the projected DPA overload in 2026 is relatively minor (roughly 4 MW over 10 years); (2) there are numerous potential developers bidding into PG&E requests for offers of energy storage and preferred resources, (3) there are numerous commercial and

industrial parcels in target storage areas, and (4) PG&E has the flexibility to either own BTM resources or procure them with third-party contracts, BTM solar and storage is a potentially viable option to address the Distribution Objective of the Proposed Project. In addition, to the extent BTM resources are ~~storage is~~ sited by customers on customer-owned parcels, this would reduce or eliminate the need for the utility to obtain rights to a particular parcel of land.

Adoption Propensity

CPUC and its consultants evaluated the potential for BTM solar plus storage adoption propensity (Kevala 2020; see Appendix B to this ASR). **Table 3-9** provides a summary of the evaluation's results. ~~Kevala's preliminary analysis of BTM storage potential on Paso Robles distribution circuits.~~

Table 3-9. Summary Results for the BTM Adoption Propensity Analysis – All Customer Types in the Paso Robles DPA

Scenario	BTM Adoption Propensity			
	Solar (MW)	Battery Storage (MW)	Battery Storage (MWh)	Total # of Customers
Low	88	125	240	~17,000
Medium	92	138	272	~19,000
High	100	175	343	~21,000

~~Table 3-9.~~ Aggregated Peak Loading Information for Paso Robles Distribution Circuits

~~Feeder Name / No.~~	~~Aggregated Peak Load from Commercial and Industrial Customers (Non-Coincident) (MW)[1,2]~~	~~No. of Customers (Range[3]) with Peak Load of 50 kW or Higher[1]~~
~~Paso Robles 1101~~	~~6.7~~	~~20-30~~
~~Paso Robles 1102~~	~~3.6~~	~~10-20~~
~~Paso Robles 1103~~	~~9.1~~	~~10-20~~
~~Paso Robles 1104~~	~~5.3~~	~~20-30~~
~~Paso Robles 1106~~	~~3.3~~	~~10-20~~
~~Paso Robles 1107~~	~~2.1~~	~~10-20~~
~~Paso Robles 1108~~	~~6.2~~	~~20-30~~

~~Notes:~~

~~MW = megawatt; kW = kilowatt~~

~~1. Peak load from commercial and industrial customers on the identified feeders is *at least* as high as reported in this table. Some Advanced Metering Infrastructure data points are missing, either from customers choosing to opt out, or because PG&E's dataset is missing some service IDs.~~

~~2. This number represents total peak load from individual commercial and industrial customers, and not coincident circuit-level peak load, to estimate total potential of BTM storage.~~

~~3. A range is provided (e.g., 20-30) rather than an exact number, to avoid any potential customer confidentiality issues.~~

As shown in Table 3-9, across the Paso Robles DPA, there is substantial potential for BTM resources adoption. Under the low scenario, roughly 17,000 customers (residential and C&I) meet the criteria for economically-efficient adoption. If all of these customers adopted BTM solar and/or storage technology at the parameters used in the study, this would equate to 88 MW of solar and 125 MW / 240 MWh of storage (Kevala 2020). Under the high scenario, approximately 21,000 economically-efficient potential adopters were identified, equating to 100 MW of solar and 175 MW / 343 MWh of storage.

For Paso Robles feeders specifically, **Table 3-10** shows that there is relatively substantial BTM adoption potential for customers along feeders in target areas for future distribution service from the Estrella Substation.

Table 3-10. BTM Storage Adoption Propensity for Paso Robles Feeders – Low and High Scenarios

	Low Scenario			High Scenario		
Feeder	**# of Customers**	**MW**	**MWh**	**# of Customers**	**MW**	**MWh**
Paso Robles 1101	123	0.8	3.6	151	1.1	2.5
Paso Robles 1102	676	4.8	9.3	881	7.3	14.3
Paso Robles 1103	1,112	9.7	15.1	1,324	10.9	21.5
Paso Robles 1104	624	4.5	8.8	843	6.7	13.3
Paso Robles 1106	1,737	12.2	23.6	2,325	18.8	36.5
Paso Robles 1107	918	6.6	12.9	1,123	9.5	18.7
Paso Robles 1108	1,399	9.9	19.2	1,822	14.9	29.2
Total:	**6,589**	**48.5**	**90.6**	**8,468**	**69.2**	**136.0**

~~commercial and industrial customers account for a significant portion of the peak load on circuits in the Paso Robles area. A number of these customers individually contribute at least 50 kW to the peak loading. Generally, these findings show that there is potential for BTM storage to be deployed and positively affect loading, as commercial and industrial customers with larger electrical demands logically make the most sense for BTM storage. However, more analysis is needed to determine whether aggregate BTM participation can reduce sufficient demand on the circuit to avoid forecasted substation overloads.~~

Although future load conditions would depend on where future development projects and other new load sources occur in the Paso Robles area, **Table 3-10** shows that there is adoption potential along all of the feeders that connect to Paso Robles Substation. In particular, Paso

Robles Feeder 1107, which passes through two of the anticipated growth areas in Golden Hill Industrial Park and near the Paso Robles Airport, has potential for BTM storage adoption of 9.5 MW / 18.7 MWh under the high scenario. Similarly, Paso Robles Feeder 1102 also passes through the Golden Hill Road area and has potential for adoption of 7.3 MW / 14.3 MWh of BTM storage under the high scenario.

Education and Incentives Program

To capture all or a portion of the BTM resources adoption potential described above, Alternative BS-3 would include a targeted program to provide education and incentives to encourage BTM resources adoption in the Paso Robles DPA. The program would be funded and procured by the Proposed Project Applicants and would generally follow a process of:

1. Applicants issue a Request for Proposals (RFP) that describes the BTM resources program, including the level of incentives to be offered, outreach/education activities, BTM resources installation and operating requirements, etc.;

2. Companies respond to the RFP with proposals (including scopes of work and cost estimates) for administering the BTM resources program;

3. Applicants select a company ("BTM Resources Program Administrator") to administer the BTM resources program;

4. The BTM Resources Program Administrator conducts the BTM resources education and outreach program, manages and tracks issuance of incentives to customers that choose to install BTM resources, coordinates with PG&E to ensure smooth interconnection of BTM resources to the distribution grid, and monitors and reports on the effectiveness of the BTM resources program and BTM resources adoption;

5. The Applicants track data provided by the BTM Resources Program Administrator regarding adoption of BTM resources and monitors the effects of new BTM resources interconnections on distribution system loading;

6. Applicants prepare and submit annual reports to the CPUC describing the BTM resources program activities and BTM resources adoption rates under the current incentive structure, including an updated load forecast for the DPA taking into account the new BTM resources interconnections;

7. CPUC reviews reports and reserves the right to adjust the incentive structure if BTM resources adoption is lagging behind the pace necessary to defer distribution system upgrades such as to meet the Distribution Objective.

The education program would include outreach to specific C&I customers along target feeders in the Paso Robles area, as well as in the Paso Robles DPA as whole, with information on the benefits of BTM solar and storage, annual bill savings that could be achieved, installation and operating costs of BTM solar and storage facilities, and the incentives that are available through the BTM resources program.

BTM Sites and Facilities

Because it is unknown which specific customers will opt into the BTM resources program and install BTM resources on their property, the specific locations of activities under Alternative BS-3 are unknown. In general, BTM resources would be anticipated to be installed within existing commercial and industrial buildings, and within existing residential homes or apartment complexes.

Construction, Operation, and Maintenance

Construction activities under Alternative BS-3 would include deliveries of individual BTM solar and/or storage units to customers' properties, installation of the units on-site, and wiring work to connect the BTM resources to existing electrical systems. In general, it is assumed that minimal ground disturbance would be required since BTM solar and storage facilities would be installed primarily on and within existing buildings; however, it is possible that at some locations building owners may choose to install the BTM facilities on previously undeveloped portions of their property. In this case, some vegetation clearing, light grading, and minor excavation is possible. A concrete slab may be installed to support the BTM solar and/or storage facilities or a small enclosed building with a foundation may be constructed to house the storage facilities.

Once installed, BTM storage facilities would require minimal operation and maintenance. Control systems would be set up at the time of installation which would control the BTM storage systems' behavior (e.g., charging/discharging) in relation to building energy usage, PV energy production, grid pricing, etc. BTM storage systems may require minor adjustments and servicing from time to time, which would typically involve one or two workers traveling to the site and conducting maintenance/repairs. At the end of their usable life, BTM BESSs would need to be recycled (if possible) or disposed of; because BESSs contain hazardous materials, this may require transport of the BESS materials to a hazardous waste landfill.

~~From a practical perspective, CPUC staff and consultants also will need to determine how to frame Alternative BS-3 such that it could be feasibly implemented and properly evaluated under CEQA. Using BTM storage as an option to provide distribution services could require the utility to issue a Request for Offer to source storage resources if the utility does not own the BTM resource. Innovative public-private partnerships may also be an option with interested participants, such as local wineries or at the Paso Robles Municipal Airport (Kevala Analytics, Inc. 2018). At this time, the potential for Alternative BS-3 to adequately address the Distribution Objective, be feasibly implemented, and reduce one or more potentially significant environmental impacts of the Proposed Project is **to be determined.**~~

Consideration of CEQA Criteria

Project Objectives

As described in detail in the BTM Solar plus Storage Adoption Propensity Analysis (BTM Report) (Kevala 2020; see Appendix B to this ASR), the level of potential BTM resources adoption in the Paso Robles DPA would far exceed the overall capacity need (4.3 MW over 10 years) reported by the Applicants in the PEA. Even assuming a BTM resources program could only capture a small portion of the total identified BTM resources adoption potential (88 MW of solar and 125 MW / 240 MWh of battery storage under the low scenario; see **Table 3-9**), this could still potentially

alleviate the cumulative anticipated overloading on distribution feeders with future electrical demand growth.

However, when looking at the specific capacity needs reported in PG&E's 2019 DDOR, the BTM Report found that BTM resources alone could not fully meet all of the capacity needs. Specifically, PG&E reported a 3.6 MW need for a 9-hour time period at the San Miguel Bank 1. Given the long duration, BTM resources could not fully address this need, but could be paired with FTM resources in this location to address the need. Thus, Alternative BS-3 could not, on its own, fully address the Distribution Objective of the Proposed Project, but could be paired with FTM resources (e.g., Alternative BS-2) to fully meet the Distribution Objective.

With respect to the Transmission Objective, deployment of BTM resources could substantially reduce or totally avoid the amount of FTM storage needed under Alternative BS-1 to address a P1 or P6 contingency for a limited period of time. As discussed in more detail in the BTM Report, modeling conducted by ZGlobal, Inc. showed that full adoption of BTM resources under the high scenario would completely avoid the need for FTM storage to address P1 and P6 outage conditions assuming a short duration outage (see Table 8 in the BTM Report). Full adoption of BTM resources under the medium or low scenarios would require some FTM storage connected at the Paso Robles Substation. As described in the BTM Report, however, BTM storage would be subject to the same duration and recharging limitations as FTM storage generally (see discussion under Alternative BS-1), and thus would not be able to address a long-duration outage affecting the Paso Robles Substation and/or may not be in an adequate state of charge following an initial outage to be ready for a subsequent outage. As such, BTM resources, on their own or in combination with FTM resources, are not considered capable of fully meeting the Transmission Objective.

Feasibility

Given that BTM resources would be adopted by individual C&I or residential customers out of their own volition, it is not possible to say with certainty that the alternative is feasible. Even if (hypothetically) the BTM resources program were to cover 100 percent of the cost of the BTM solar and storage systems, individual customers still might not choose to participate for whatever reason. CPUC and/or the Applicants would not force any individual customers to adopt BTM technology; thus, the ultimate level of BTM resources adoption is beyond their complete control.

That being said, only a relatively small portion of the total BTM resources adoption potential identified in the BTM Report would need to be captured to make Alternative BS-3 viable. Additionally, since it would be in customers' interest to adopt BTM solar and storage (although it may take a number of years to realize the economic returns), it is reasonable to assume that a number of the potential adopters identified in the BTM Report would react positively to a BTM resources program. Particularly when considering that incentives could be increased based on the participation rate, it would not be surprising for a substantial proportion of the total identified BTM adoption potential to be successfully captured.

As far as the actual BTM solar and storage facilities, this technology has been successfully deployed in numerous homes and businesses in California and elsewhere. Moreover, the technology continues to improve with better capacity/performance and affordability over time.

Certain businesses or homes in the Paso Robles DPA may have different load curves (e.g., greater or less energy use at night vs. during the day), which may require fine-tuning of BTM solar and storage facility behavior, but there is no reason to believe that BTM resources could not be successfully deployed under Alternative BS-3.

Refer to the discussion in Section 3.6.2 on the potential environmental constraints associated with BESS facilities. In general, BTM storage systems would have similar concerns as FTM BESSs with respect to fire risk, hazardous materials disposal, etc. Solar panels could potentially have impacts related to solid waste disposal and could have minor construction-related impacts (e.g., traffic and air quality/GHG impacts from transport of materials), but none of these potential impacts would render the alternative environmentally infeasible.

Overall, this alternative is considered potentially feasible.

Potential to Avoid or Reduce Significant Environmental Impacts

BTM resources could have even greater potential to avoid or reduce significant environmental impacts than FTM storage, as described under Alternative BS-2. To the extent that BTM resources could meet the Distribution Objective, this could defer or completely avoid the need to build the distribution components of the Proposed Project (i.e., build-out of the 70/21 kV facilities in the 70 kV substation, construction of the new sections of distribution line to complete the Estrella feeders, etc.). As such, the environmental effects of the Proposed Project's distribution components could be deferred or avoided, although none of these are anticipated to be significant and unavoidable.

On their own, BTM resources could not meet the Transmission Objective and thus could not avoid the need for the transmission components of the Proposed Project, including the Estrella Substation and proposed 70 kV power line. As discussed in Section 3.6.1, BTM resources also could not be paired with FTM storage to fully address the Transmission Objective. However, BTM resources could potentially be paired with Alternative SE-1A: Templeton Substation Expansion – 230/70 kV Substation and Alternative SE-PLR-2: Templeton-Paso South River Road Route, which would meet the Transmission Objective. This pairing could meet both objectives of the Proposed Project, while reducing the Proposed Project's aesthetics and agricultural resources impacts (see discussion in Section 3.4.1), as well as avoiding the impacts from constructing the Proposed Project's distribution components.

The environmental effects of BTM resources themselves are anticipated to be relatively minor, particularly since the majority of new BTM solar and storage systems would likely be installed on or within existing buildings and there would be minimal new ground disturbance. Overall, when paired with Alternative SE-1A/SE-PLR-2, Alternative BS-3 could reduce significant impacts of the Proposed Project.

Conclusion

Modeling by CPUC's consultant team has shown that there are a substantial number of C&I and residential customers in the Paso Robles DPA for whom it makes economic sense to adopt BTM resources. It is reasonable to assume that many of these customers could be spurred to BTM resources adoption through an education and incentives program. Particularly when paired with

another alternative that meets the Transmission Objective, BTM resources can avoid or reduce environmental impacts, including the potentially significant aesthetics and agricultural resources impacts of the substation and power line. Therefore, Alternative BS-3 is **retained** for full analysis in the DEIR.

This page intentionally left blank

Chapter 4
REFERENCES

California Department of Conservation. 2016a. San Luis Obispo County Important Farmland Map 2016. Accessed October 16, 2018, Available: ftp://ftp.consrv.ca.gov/pub/dlrp/FMMP/pdf/2016/slo16.pdf.

California Department of Conservation. 2016b. Farmland of Local Importance. Accessed October 16, 2018, Available: www.conservation.ca.gov/dlrp/fmmp/Documents/Farmland_of_Local_Importance_2016.pdf.

California Department of Transportation. 2018. California Scenic Highway Mapping System: San Luis Obispo County. Accessed October 16, 2018, Available www.dot.ca.gov/hq/LandArch/16_livability/scenic_highways/.

California Independent System Operator. 2014a. 2013-2014 Transmission Plan. Accessed November 5, 2018, Available: www.caiso.com/Documents/Board-Approved2013-2014TransmissionPlan_July162014.pdf.

California Independent System Operator. 2014b. Estrella Substation Project Description and Functional Specifications for Competitive Solicitation. Accessed November 5, 2018, Available: www.caiso.com/Documents/Description-FunctionalSpecifications EstrellaSubstation.pdf.

California Independent System Operator. 2018a. 2017-2018 Transmission Plan. Accessed February 21, 2019, Available: www.caiso.com/Documents/BoardApproved-2017-2018_Transmission_Plan.pdf.

California Independent System Operator. 2018b. Storage as a transmission asset. Accessed December 21, 2018, Available: www.caiso.com/informed/Pages/StakeholderProcesses/StorageAsATransmissionAsset.aspx.

California Public Utilities Commission. 2014a. Storage, Flexibility, and Resource Adequacy.

California Public Utilities Commission. 2014b. Decision Adopting Local Procurement and Flexible Capacity Obligations for 2015, and Further Refining the Resource Adequacy Program. Decision 14-06-050.

California Public Utilities Commission. 2017. Decision of Track 2 Energy Storage Issues. Decision 17-04-039 April 27, 2017. Order Instituting Rulemaking to consider policy and implementation refinements to the Energy Storage Procurement Framework and Design Program (D.13-10-040, D.14-10-045) and related Action Plan of the California Energy Storage Roadmap.

California Public Utilities Commission. 2018a. Energy Storage Market Survey and Recommendations: Commissioner Briefing, October 24, 2018.

California Public Utilities Commission. 2018b. Southern California Edison Circle City Substation and Mira Loma-Jefferson 66 kV Subtransmission Line Project: Final Environmental Impact Report. Application A.15-12-007. pp. 3.2-165 to 3.2-169. Available: www.cpuc.ca.gov/environment/info/esa/Circle_City/index.html

California Public Utilities Commission. 2019a. Current Status Towards Meeting AB 2514 Procurement Targets. PG&E chart. Available: www.cpuc.ca.gov/general.aspx?id=3462. Accessed March 5, 2019.

California Public Utilities Commission. 2019b. Resource Adequacy. Accessed February 7, 2019, Available: www.cpuc.ca.gov/ra/.

CAISO. *See* California Independent System Operator.

Caltrans. *See* California Department of Transportation.

CDOC. *See* California Department of Conservation.

CPUC. *See* California Public Utilities Commission.

Integral Analytics. No Date. LoadSEER – Spatial Electric Expansion & Risk. Accessed November 5, 2018, Available: www.integralanalytics.com/files/documents/related-documents/LoadSEER.pdf.

Kevala. *See* Kevala Analytics, Inc.

Kevala Analytics, Inc. 2018. Estrella Initial Results for Alternatives Screening Report. Draft 2.0. November 2018.

Kevala Analytics. 2020. Behind-the-Meter Solar plus Storage Adoption Propensity Analysis. Available: www.cpuc.ca.gov/environment/info/horizonh2o/estrella/docs/2020-0131%20ESTR_BTM_Adoption_Propensity_ADA5.pdf. Accessed February 24, 2020.

Mongird, K., V. Viswanathan, P. Balducci, J. Alam, V. Fotedar, V. Koritarov, and B. Hadjerioua. 2019. Energy Storage Technology and Cost Characterization Report. Hydrowires, U.S. Department of Energy. Available: energystorage.pnnl.gov/pdf/PNNL-28866.pdf. Accessed March 11, 2020.

National Electric Reliability Council. No Date. Standard TPL-001-4 – Transmission System Planning Performance Requirements. Accessed February 21, 2019, Available: www.nerc.com/_layouts/15/PrintStandard.aspx?standardnumber=TPL-001-4&title=Transmission%20System%20Planning%20Performance%20Requirements&jurisdiction=United%20States.

NEET West. *See* NextEra Energy Transmission West.

NERC. *See* National Electric Reliability Council.

NextEra Energy Transmission West and Pacific Gas & Electric Company. 2017. Proponent's Environmental Assessment – Estrella Substation and Paso Robles Area Reinforcement Project. Prepared by SWCA Environmental Consultants. Available: www.cpuc.ca.gov/environment/info/horizonh2o/estrella/docs/Revised_PEAOnly_May2017.pdf.

NextEra Energy Transmission West and Pacific Gas & Electric Company. 2018a. Proponent's Environmental Assessment – Estrella Substation and Paso Robles Area Reinforcement Project. Updated Appendix G, Distribution Need Analysis. Available: www.cpuc.ca.gov/environment/info/horizonh2o/estrella/docs/App%20G%20-%20Update%204.pdf.

NextEra Energy Transmission West and Pacific Gas & Electric Company. 2018b. Estrella Substation and Paso Robles Area Reinforcement Project – Preliminary Desktop Environmental Study for Templeton Alternatives – San Luis Obispo County, California; Attachment 4-3.2b to Proponent's Environmental Assessment – Deficiency Letter No. 4 Response. Available: www.cpuc.ca.gov/environment/info/horizonh2o/estrella/docs/Attachment%204-3.2b_Preliminary%20Desktop%20Environmental%20Study.pdf.

NextEra Energy Transmission West and Pacific Gas & Electric Company. 2018c. Estrella Substation and Paso Robles Reinforcement Project – Proponent's Environmental Assessment – Response to Deficiency List No. 4. Available: www.cpuc.ca.gov/environment/info/horizonh2o/estrella/docs/Estrella%20Def%204%20Response.pdf.

Pacific Gas & Electric Company. 2017a. Design Criteria #073131 – Bus Configuration. Available: www.cpuc.ca.gov/environment/info/horizonh2o/estrella/docs/Attachment%204-3.1b_PG&E%20Design%20Criteria%20073131%20-%20Bus%20Configuration.pdf.

Pacific Gas & Electric Company. 2017b. Electric Program Investment Charge (EPIC) Final Report: EPIC Project 1.02 – Demonstrate Use of Distributed Energy Storage for Transmission and Distribution Cost Reduction. Accessed December 28, 2018, Available: www.pge.com/pge_global/common/pdfs/about-pge/environment/what-we-are-doing/electric-program-investment-charge/PGE-EPIC-Project-1.02.pdf.

Pacific Gas & Electric Company. 2018. Oakland Clean Energy Initiative – Update 7/18/2018.

Pacific Gas & Electric Company. 2019. Distribution Deferral Opportunity Report – Appendix B, Planned Investment Table [CONFIDENTIAL] and Appendix C, Candidate Deferral Tables [CONFIDENTIAL]. Available from the PG&E Grid Needs Assessment (GNA) map, which can be accessed with a PG&E customer login at: www.pge.com/en_US/for-our-business-partners/distribution-resource-planning/distribution-resource-planning-data-portal.page

PG&E. *See* Pacific Gas & Electric Company.

SCE. *See* Southern California Edison.

Southern California Edison. 2018. Southern California Edison CONFIDENTIAL Response to California Public Utilities Commission (CPUC) Data Request No. 18, Question 3 for the Circle City Substation and Mira Loma-Jefferson Subtransmission Line Project, November 2018

Sumitomo. *See* Sumitomo Electric Industries, Ltd.

Sumitomo Electric Industries, Ltd. 2019. Redox Flow Battery System (50 MW X 8hr Type 1) – Equipment Layout Drawing.

ZGlobal, Inc. 2018. Estrella Substation BESS Alternative Analysis. October 22, 2018.

ZGlobal, Inc. 2019. Calculations for ASR Table.

Personal Communications

Itani, Omar, Transmission Planning Engineer, ZGlobal, Inc. December 2018. Personal communication with Horizon Water and Environment and CPUC via email providing a 3D simulation of an example battery storage facility contained in a building.

Appendix A
SUMMARY OF COMMENTS RECEIVED ON THE DRAFT ASR

Table A-1. Summary of Comments Received on the Draft Alternatives Screening Report

Comment	Commenting Party(ies)
General Comments on the ASR Document / Process	
The Draft ASR should include a description of the Applicants' public outreach efforts and the nature of the comments received through that process.	Horizon West Transmission (HWT)
The project objectives developed by CPUC should be modified to reflect the fundamental objective of increasing service reliability in the area.	HWT
The project objectives developed by the CPUC cannot achieve the project's underlying fundamental purpose.	Pacific Gas & Electric Company (PG&E)
The CPUC project objectives should be modified to include a dual transmission/distribution objective that fully captures the reliability need of the Project.	HWT
The detailed analysis of alternatives in the EIR should not understate the environmental impacts of an alternative (e.g., through piece-mealed review of alternatives that only partially address the project objectives on their own) compared to the Proposed Project.	HWT
The CPUC should not consider battery storage procurement initiatives in developing / screening alternatives.	HWT; PG&E
The consideration of battery storage initiatives in the Draft ASR is prejudicial to HWT, which is not a load-serving entity and would not be able to procure storage if a battery storage alternative were selected by the Commission.	HWT
References to Public Utilities Code Sections 1002.3 and 1002 should be removed since the Commission is not considering granting a Certificate of Public Convenience and Necessity (CPCN) for the Proposed Project.	HWT; PG&E
Applicant Proposed Measures (APMs) are part of the Proposed Project and should not be ignored or converted to mitigation measures.	PG&E
CPUC should consider additional criteria in reviewing alternatives such as public safety, constructability, community perception, long-term maintenance, sustainability and long-term usability and cost.	Member of the public
It's inappropriate for an approving agency to take over and re-develop an environmental report in the manner that CPUC has done.	Member of the public

Comment	**Commenting Party(ies)**
Comments Specific to the Proposed Project or Alternatives	
Proposed Project	
Routing the 70 kV power line through the Golden Hill Industrial Park could benefit economic development and make it less expensive to serve businesses that would locate there.	City of Paso Robles
Preference for the original (i.e., proposed) routing for the 70 kV power line.	City of Paso Robles
If the original 70 kV power line routing could be adjusted to avoid San Antonio Winery but still traverse the industrial park, this would be an improvement.	City of Paso Robles
The Proposed Project 70 kV power line route is within the 100-year floodplain.	County of San Luis Obispo, Department of Public Works
A portion of the Proposed Project 70 kV power line route is in a Municipal Separate Storm Sewer System (MS4) area and may be subject to post-construction stormwater requirements.	County of San Luis Obispo, Department of Public Works
A portion of the Proposed Project 70 kV power line route is within the unincorporated Paso Robles Urban Reserve Line and the County would requiring undergrounding of new utilities in this area, irrespective of Alternative PLR-3: Strategic Undergrounding.	County of San Luis Obispo, Department of Public Works
The Draft ASR overstates the Proposed Project's potential impacts on agricultural resources, which would not be significant according the significance standard applied by CPUC on other projects.	HWT
The portion of the Proposed Project 70 kV route that goes through the Golden Hill Industrial Park needs to be re-routed to avoid a new construction project underway on Tractor Danley Court Street between Germaine Engine Street Way and Golden Hill Road. PG&E proposes to route the 70 kV line up Germaine Engine Street Way past the cul-de-sac and then west behind San Antonio Winery.	PG&E
The Proposed Project 70 kV power line route was rushed to judgment and did not receive the same level of consideration with respect to criteria as the alternatives in the ASR.	Member of the public
Opposition to the Proposed Project 70 kV power line route.	Multiple members of the public
The Proposed Project 70 kV route would adversely affect recreational uses (i.e., RV campers) and potentially expose recreational users to health risks from EMFs, as well as noise.	Member of the public
The Proposed Project 70 kV route would impact previously completed environmental mitigation and landscaping/fencing for the Cava Robles RV Park.	Member of the public
The Union Road route is the most cost effective route and has been recommended by PG&E.	Member of the public

Comment	Commenting Party(ies)
The Proposed Project 70 kV route (Union Road route) would be least disruptive for the community with fewer homes in the affected area, and would be the safest route considering potential and earthquake hazards.	Member of the public
Proposed Project, Alternatives PLR-1, PLR-2, SE-PLR-1, SE-PLR-2, SE-PLR-3: Comments Related to Overhead Power Lines in General	
All overhead lines should be placed underground due to the fire risk associated with these facilities.	Member of the public
Overhead power lines adversely affect property values.	Multiple members of the public
Overhead lines will cause adverse health impacts from EMF radiation.	Multiple members of the public
Power lines should include an "advanced falling conductor protection system" that will cut power to a falling line before it hits the ground.	Member of the public
The pole towers are too tall and could interfere with emergency response helicopters.	Member of the public
Alternative SS-1: Bonel Ranch (formerly McDonald Ranch) Substation Site	
This alternative should be screened out because it would not eliminate or reduce environmental impacts of the Proposed Project.	HWT
Alternative SS-1 would have a significant adverse effect on aesthetics due to the potential visual incompatibility of the substation with the surrounding landscape, as seen from Estrella Road.	HWT
Overall, the Draft ASR improperly downplays the potential impacts of Alternative SS-1 (e.g., longer construction time; increased erosion, sedimentation, and fugitive dust), which would be greater than those of the Proposed Project.	HWT
Support for Alternative SS-1.	Adamski Moroski Madden Cumberland & Green, LLP (AMMCG) (law firm representing San Antonio Winery)
Alternative SS-2: Mill Road West Substation Site	
The Draft ASR properly eliminates Alternative SS-2 from full analysis in the DEIR, but it would have additional environmental impacts beyond that identified in the Draft ASR.	HWT
Alternative PLR-1: Estrella Route	
Alternative PLR-1 (Estrella Route) appears to have fewer constraints from the perspective of the County Department of Public Works.	County of San Luis Obispo, Department of Public Works

Comment	Commenting Party(ies)
There are potential feasibility issues associated with all of the Alternative PLR-1 variations (i.e., PLR-1A, -1B, -1C, and -1D) due to lack of all-weather access roads for maintenance. In particular, Alternative PLR-1D would have significant access issues and should therefore be removed from further consideration.	PG&E
If no permanent access can be established for Alternative PLR-1 variations and existing roads are not passable, PG&E would need to drop or remove a row of grapevines to drive over the area to conduct maintenance, which could result in 5 years of crop loss reimbursement, adding to the project cost.	PG&E
Alternative PLR-1 variations would have greater impacts on agricultural resources than the Proposed Project 70 kV route.	PG&E
Alternative PLR-1 variations would traverse more rural/agricultural areas compared to the Proposed Project 70 kV power line route, which would result in a more drastic change to the visual quality of the landscape.	PG&E
Biological resources impacts for Alternative PLR-1 variations would be reduced compared to the Proposed Project.	PG&E
Alternative PLR-1 variations would result in increased air and GHG emissions, noise, and truck trips than the Proposed Project 70 kV route due to the 2 months longer construction schedule.	PG&E
Alternatives PLR-1B and -1C would cross a stream/river in the area of Treasury Wine Estates, which could result in increased impacts due to potential increased truck trips for stabilizing soils for structure foundations, as well as the possibility of impacting cultural resources and increased erosion.	PG&E
Portions of the Alternative PLR-1D route would traverse an elevated plateau that is subject to erosion; this could require use of engineered fill to address slope instability issues.	PG&E
Due to its location on an elevated plateau, Alternative PLR-1D would be visible to motorists along Estrella Road and would result in a stark contrast from the surrounding landscape.	PG&E
Obtaining easements for development of the Alternative PLR-1D route would result in properties being severed, leaving a large amount of unusable land in the middle of these properties. This route was also opposed by many members of the public during open houses in 2015 and 2016.	PG&E
All of the Alternative PLR-1 routes include more sharp direction changes requiring angle poles, which involve more permanent ground disturbance and are more costly to install.	PG&E
Overall, due to the longer length (5 to 7 miles longer), more difficult access, and more angle poles, Alternative PLR-1 routes would cost 50 to 100% more than the Proposed Project 70 kV route to construct.	PG&E
Support for Alternatives PLR-1C and PLR-1D.	AMMCG
Support for the Alternative PLR-1 generally.	Member of the public

Comment	Commenting Party(ies)
Alternative PLR-2: Creston Route	
Opposition to the Creston Route.	Member of the public
Constructing a power line along Charolais Road will result in traffic impacts.	Member of the public
Installing new overhead transmission lines along Charolais Road would create an eyesore for the community and discourage tourism.	Member of the public
The Creston Route is in the planned growth area for Paso Robles and widening Creston Road may be required in the next 5-10 years. This could require relocating the newly installed larger poles and increase the cost of the project.	Member of the public
Aesthetic impacts would be more severe along this route due to the density of homes and planned homes approved to be built in the future.	Member of the public
If a fire were to occur in this area due to the power lines, it could be especially devastating due to the current and planned housing density.	Member of the public
Impacts to heritage oaks along this route would alter the rural feel the community now enjoys and expects.	Member of the public
Alternative PLR-3: Strategic Undergrounding	
Undergrounding would result in greater environmental impacts due to the additional ground disturbance required and would cost considerably more to construct and maintain than the Proposed Project overhead 70 kV route.	PG&E
As a result of Alternative PLR-3, new large block load customers moving to the Golden Hill Industrial Park would find connection to the underground 70 kV power line cost-prohibitive.	PG&E
The Draft ASR overstates the aesthetic impacts of the Proposed Project 70 kV route in the area of Golden Hill Road; this area is largely zoned for commercial/industrial use and the transmission line is appropriate for this zoning.	PG&E
Alternative PLR-3 would result in increased biological resources impacts compared to the Proposed Project due to the need to remove all scrub oaks within a 60- to 80-foot-wide corridor from the entrance to the Circle B Homeowners' Association (HOA) north to the end of the underground segment to facilitate trenching as well as operation and maintenance of the underground line.	PG&E
Alternative PLR-3 is conditionally supported by San Antonio Winery. This alternative would be more desirable to San Antonio than the proposed overhead 70 kV lines assuming that the towers and transmission lines are still not within the viewshed of the owners and residents of this area.	AMMCG
Undergrounding the transmission line would be a lengthy and noisy construction process and would result in greater impacts on adjacent property owners than the Proposed Project.	Multiple members of the public

Comment	Commenting Party(ies)
To accommodate construction of Alternative PLR-3, new sidewalks will have to be altered and the new fencing and landscaping along the route will also be altered or removed.	Member of the public
Putting the power lines underground will not completely alleviate the dangers of high voltage and EMF radiation.	Member of the public
There is no information in the ASR on how deep the lines will be.	Member of the public
If the Union Route is ultimately selected, undergrounding the lines would be the most visually and environmentally acceptable option.	Member of the public
Alternative SE-1: Templeton Substation Expansion	
Work done on the Templeton Substation could potentially affect the Santa Ysabel Pump Station, which is a high electrical demand pump station located on the south end of River Road near Santa Ysabel Ranch.	County of San Luis Obispo, Department of Public Works
The Draft ASR properly retains Alternative SE-1, but its environmental impacts are likely greater than the proposed Estrella Substation.	HWT
Alternative SE-1 would disrupt traffic flow along El Pomar Road and would result in greater traffic impacts than the proposed Estrella Substation due to the higher average daily traffic on El Pomar Road compared to Union Road.	HWT
Alternative SE-1 would result in significant impacts to biological resources, including impacts to oak trees and nesting and foraging habitat for passerine birds and raptors, including golden eagle, which is likely to occur in the substation expansion site.	HWT
Support for Alternative SE-1.	AMMCG; Multiple members of the public
Alternative SE-1 would involve far less environmental and agricultural resources impacts than the proposed Estrella Substation and also would likely support battery storage technologies discussed in Alternatives BS-1, BS-2, and BS-3.	AMMCG
Alternative SE-PLR-1: Templeton-Paso 70 kV Route (Existing)	
There are significant feasibility constraints associated with converting Paso Robles Substation to a ring bus and in converting the existing 70 kV line to a double-circuit.	PG&E
Alternative SE-PLR-1 would have increased aesthetics and biological resources impacts compared to the Proposed Project, and also would impact known cultural resources sites.	PG&E

Comment	Commenting Party(ies)
Alternative SE-PLR-2: Templeton-Paso South River Road Route	
Opposition to the South River Road Route (Alternative SE-PLR-2).	City of Paso Robles; County of San Luis Obispo, Supervisor Peschong; Multiple members of the public
The South River Road Route (Alternative SE-PLR-2) could result in impacts to heritage oak trees.	City of Paso Robles; County of San Luis Obispo, Supervisor Peschong; Keilah Smith, District Director for Assemblyman Jordan Cunningham; Multiple members of the public
Alternative SE-PLR-2 could impact various species of birds (e.g., bald eagles, great blue herons, red-tail hawks, great egrets, great horned owls) that nest and forage in the area.	Multiple members of the public
Alternative SE-PLR-2 would result in greater impacts to biological resources than the Proposed Project, as more oak trees would need to be removed/topped for construction, thereby impacting habitat for birds.	PG&E
The route would destroy habitat for endangered mammals (kit fox) and amphibians (red legged frog).	Multiple members of the public
There are active golden eagle nests in close proximity to the proposed route. Additional nests and golden eagle activity have been documented in the past. In total, there are 8 documented raptor nests in Santa Ysabel Ranch.	Member of the public
The South River Road Route could adversely affect aesthetics.	City of Paso Robles; County of San Luis Obispo, Supervisor Peschong
Alternative SE-PLR-2 would have greater aesthetics impacts than the Proposed Project due to the higher average daily traffic along El Pomar Drive compared to Union Road and because Alternative SE-PLR-2 would be visible from HOA residences on elevated bluffs to the west and east.	PG&E
The Draft ASR is incorrect in stating that the South River Road Route "would have similar or slightly reduced aesthetic impacts compared to the Proposed Project." In fact, the South River Road Route would have more severe aesthetic impacts due to the rural quality of the area, smaller road width, undulating terrain and oak tree canopy, and other factors.	Member of the public
Alternative SE-PLR-2 would destroy the last pastoral route entering Paso Robles, including the blue oaks that were seen in the 18th Century by Europeans encountering Native American in the area.	Multiple members of the public

Comment	Commenting Party(ies)
Alternative SE-PLR-2 is routed through the 100-year floodplain.	County of San Luis Obispo, Department of Public Works
Alternative SE-PLR-2 cross multiple County roads and encroachment would need to be obtained for construction, traffic control, maintenance, access, etc.	County of San Luis Obispo, Department of Public Works
Alternative SE-PLR-2 could have traffic circulation impacts.	County of San Luis Obispo, Department of Public Works
South River Road is narrow with no shoulder and has significant traffic that moves at high speed. Power poles would present a driving hazard, and an accident could result in fatalities, power interruption, and fire.	Member of the public
The Nacimiento Pipeline (and fiber-optic lines) runs along South and North River Road through Paso Robles. These may cause issues with alternative alignments from the Templeton Substation.	County of San Luis Obispo, Department of Public Works
Alternative SE-PLR-2: Templeton-Paso South River Road Route is sensitive for cultural resources due to its proximity to perennial and annual waterways.	County of San Luis Obispo, Supervisor Peschong
Alternative SE-PLR-2 could result in significant impacts to cultural resources as significant Native American artifacts have been found on both sides of River Road and several sites in the area are eligible for the National Register of Historic Places.	Multiple members of the public
The waterway along River Road was declared a Chumash camping site; therefore, it should be a protected area.	Member of the public
The Rinconada Earthquake Fault lies along the length of South River Road and Santa Ysabel Ranch; putting a transmission line in this area could be hazardous.	County of San Luis Obispo, Supervisor Peschong; Keilah Smith, District Director for Assemblyman Jordan Cunningham; Multiple members of the public
According to the Paso Robles Hazard Report of 2016, the Rinconada fault has a maximum magnitude of 7.3.	Multiple members of the public
The South River Road Route would actually encounter two earthquake faults, one underneath South River Road and another larger one a few hundred yards away, both of which are part of the Rinconada fault zone.	Multiple members of the public
The seismic faults in the area would require more significant foundations for power line poles, resulting in larger footprints and greater impacts (particularly to heritage oak trees).	Multiple members of the public

Comment	Commenting Party(ies)
The residents in Santa Ysabel Ranch are confined by the Salinas River on the west and South River Road on the east, such that if the proposed line were to be downed on South River due to earthquake, high winds, fires, etc., there would be very limited alternative evacuation routes.	Member of the public
Placing a transmission line along South River Road could expose residents to fire risk.	Keilah Smith, District Director for Assemblyman Jordan Cunningham; Multiple members of the public
This route is especially susceptible to fire because of the high winds in the area as well as the fuel supplied by the dense blue oak forest on Santa Ysabel Ranch (the area is designated as a High Fire Danger Zone in the Paso Robles Hazard Report of 2016).	Multiple members of the public
The route passes hundreds of single-family homes on both sides of South River Road, as well as a senior living facility that is under construction, and one of the busiest shopping areas in Paso Robles. The new power line could pose a hazard to these residents/land uses.	Multiple members of the public
The South River Road Route cannot accommodate the minimum recommended safety zone (800 to 1,200 feet) between EMF generated by a high voltage transmission line and human habitation.	Multiple members of the public
Constructing Alternative SE-PLR-2 could be complicated due to the need to acquire easements from two HOAs. This could add cost and delay the schedule.	PG&E
Alternative SE-PLR-2 would result in reduced air quality impacts, GHG emissions, noise, and traffic impacts due to its shorter length and shorter duration of construction activities.	PG&E
Support for Alternative SE-PLR-2.	AMMCG
Alternative SE-PLR-2 would violate the terms of the Open Space Agreement between the developer of Santa Ysabel Ranch and the County of San Luis Obispo.	Beaumont Tashjian (law firm representing Santa Ysabel Homeowners' Association); Member of the public
Of all the routes under consideration, this is the most pristine from an aesthetic and ecological standpoint, and it runs through several upscale neighborhoods.	Member of the public
The communities along the South River Road Route adhere to strict CC&Rs to limit development to protect heritage oaks and wildlife; the new overhead power line would degrade the character and appeal of these communities.	Member of the public

Comment	Commenting Party(ies)
Spanish Camp, Spanish Lakes, and Santa Ysabel Ranch are all restricted from removing oak trees or excavating in certain areas; therefore, overhead lines in these areas would not be appropriate.	Member of the public
The development of Santa Ysabel Ranch was permitted only after numerous visual mitigation measures were implemented to preserve views for residents in the area. Alternative SE-PLR-2 would have greater aesthetic impacts than the previous development and should still have to comply with the mitigation.	Member of the public
There are golden eagle nesting sites near River Road that could be impacted by this alternative.	Member of the public
Power poles cannot be placed along the west side of River Road for much of the alignment as this property has already been set aside for environmental mitigation for another project. This was encountered on a project involving Caltrans and they were forced to eliminate an alternative alignment due to this factor.	Member of the public
Alternative SE-PLR-3: Templeton-Paso Creston Route	
Efforts to construct Alternative SE-PLR-3 could be complicated due to the need to acquire easements from HOAs.	PG&E
Public comments received during open houses in 2015 and 2016 indicated that the Alternative SE-PLR-3 route seemed like the most direct and logical route that does not impact property values, has less interference with vineyards and birds, and has less impact on horse farms (although some comments were completely opposed to the route).	PG&E
Opposition to Alternative SE-PLR-3.	Member of the public
Constructing a power line along Charolais Road will result in traffic impacts.	Member of the public
Installing new overhead transmission lines along Charolais Road would create an eyesore for the community and discourage tourism.	Member of the public
The Creston Route is in the planned growth area for Paso Robles and widening Creston Road may be required in the next 5-10 years. This could require relocating the newly installed larger poles and increase the cost of the project.	Member of the public
Aesthetic impacts would be more severe along this route due to the density of homes and planned homes approved to be built in the future.	Member of the public
If a fire were to occur in this area due to the power lines, it could be especially devastating due to the current and planned housing density.	Member of the public
Impacts to heritage oaks along this route would alter the rural feel the community now enjoys and expects.	Member of the public

Comment	Commenting Party(ies)
The Templeton-Paso Creston Route makes more sense for the power line since this area has fewer ecological considerations to contend with and the new line could parallel or replace the existing utility poles along the entire route.	Member of the public
Alternative BS-1: Battery Storage to Address Transmission Objective	
Alternative BS-1: Battery Storage to Address Transmission Objective is not a viable alternative and would not meet the CAISO-identified need.	California Independent System Operator (CAISO); HWT
The analysis of Alternative BS-1 in the Draft ASR fails to demonstrate that the charging of the battery storage system could be sustained for long or multiple, sequential outages.	CAISO; PG&E
Absent a new 230 kV source, use of battery storage would reduce the existing distribution system bank capacity for recharge purposes and may create new, or exacerbate existing, local distribution planning area reliability issues.	HWT
Based on the required storage amount (65 MW or 120 MW) and limited number of potentially suitable parcels, Alternative BS-1 is likely not potentially feasible.	HWT
Completing the CAISO interconnection process for multiple BESS units at multiple sites would delay the project schedule.	HWT
In the event that the Paso Robles-Templeton 70 kV line was lost, a transmission-level BESS would need to provide a minimum of 24 hours of load relief to allow for sufficient time to conduct repairs on this line. Only Alternative BS-1A would meet this minimum need.	PG&E
Load at the Paso Robles Substation during the summer is higher than transmission capacity under the P1 scenario (only Coalinga-San Miguel 70 kV transmission line providing power) even at night; therefore, charging a transmission-level battery during a P1 contingency would not be feasible.	PG&E
If the 65 MW BESS is sited at or near the Paso Robles Substation, the battery connection to the substation bus will trigger a bus conversion, which is infeasible.	PG&E
It is unclear how the five potentially suitable BESS parcels identified in the Draft ASR could be linked together in the 70 kV network based on current transmission design criteria and the location of the parcels.	PG&E
Support for Alternative BS-1.	AMMCG
Alternative BS-1 or BS-2: Comments on Front-of-the-Meter Battery Storage Sites in General	
Any alternative that proposes expansion of Paso Robles Substation would impact existing businesses, transportation infrastructure, the natural environment, and aesthetics.	City of Paso Robles
The identified potential battery storage site at the northeast corner of South River Road and Charolais Road is already planned for improvements / recreational uses and there is not room for a battery installation.	City of Paso Robles

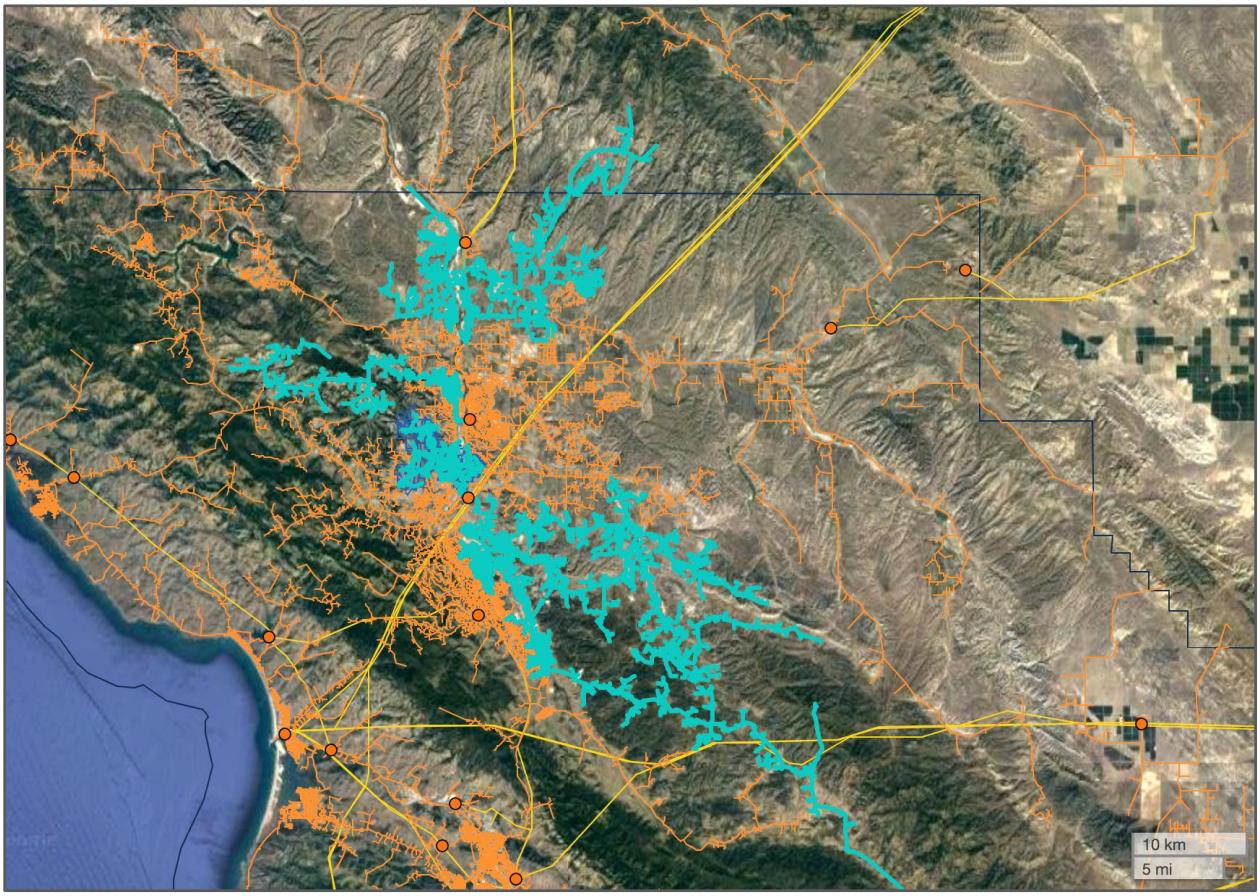
Comment	Commenting Party(ies)
The City of Paso Robles is working on a 4.3 megawatt (MW) solar installation at the Paso Robles Municipal Airport; this could be a good opportunity / location for a battery installation.	City of Paso Robles
It would not be possible to meet California Department of Education minimum setback standards for power lines if a battery facility was placed on the identified Paso Robles High School site.	Paso Robles Joint Unified School District (PRJUSD)
Constructing a battery facility at the Paso Robles High School site could expose students/staff to electromagnetic fields (EMF) and violate best practices instituted by the Department of Public Health, the Division of State Architect, and CPUC.	PRJUSD
Alternative BS-1, BS-2, or BS-3: Comments on Battery Storage in General	
Battery storage will help achieve the State's goal of achieving 100 percent renewable energy by 2045 and would improve grid efficiency and reliability.	AMMCG
Support for battery storage as an alternative.	Multiple members of the public
As the goal of CEQA is to prevent or minimize damage to the environment, it appears that the only viable option among the alternatives considered is battery storage.	Member of the public
Alternative BS-2: Battery Storage to Address Distribution Objective	
Although distribution BESS installations can alleviate overloads at the bank, feeder, or more localized level, they can potentially have detrimental impacts, such as reduced operational flexibility due to charging windows. A BESS also would not improve reliability issues associated with long feeder length.	PG&E
Installing multiple BESSs on multiple feeders would be cumbersome and costly since each BESS installation would require duplication of permitting and facilities, such as step-up transformers, switchgear, protective relaying, and control schemes.	PG&E
Load profiles on individual feeders could change in the future, which could reduce or eliminate a BESS's charging window.	PG&E
Support for Alternative BS-2.	AMMCG
Alternative BS-3: Behind-the-Meter Battery Storage	
Support for Alternative BS-3.	AMMCG

Appendix B
BEHIND-THE-METER SOLAR PLUS STORAGE ADOPTION PROPENSITY ANALYSIS

This page intentionally left blank.

Behind-the-Meter Solar plus Storage Adoption Propensity Analysis

Estrella Substation and Paso Robles Area Reinforcement Project



January 2020

Prepared for:

California Public Utilities Commission
300 Capitol Mall
Sacramento, CA 95814
Contact: Robert Peterson

Prepared by:

Kevala Analytics, Inc.
Contact: Aram Shumavon

Editorial and organizational support by:

Horizon Water and Environment, LLC
Contact: Tom Engels

Cover Photo Credit: *Kevala Analytics' Network Assessor Tool showing distribution lines and substations within the Paso Robles Distribution Planning Area in San Luis Obispo County, California.*

ADA Accessibility: For accessibility assistance with this document, please contact the California Public Utilities Commission at (866) 849-8390, by email to public.advisor@cpuc.ca.gov, or through the California Relay Service by dialing 711. This document includes complex figures, tables, and formulas that may be difficult to interpret using an assistive device such as a screen reader.

Table of Contents

Appendices

List of Tables

List of Figures

Acronyms and Abbreviations

$/W	dollars per watt
AMI	Advanced Metering Infrastructure
Alternative Battery Storage #1	Battery Storage to Address Transmission Objective
Alternative Battery Storage #2	Battery Storage to Address Distribution Objective
Alternative Battery Storage #3	Behind-the-Meter Battery Storage
Applicants	HWT and PG&E
ASR	Alternatives Screening Report
BES	Bulk Electric System
BESSs	battery energy storage systems
BTM	behind-the-meter
Category B	Criteria for system performance following the loss of a single BES element
Category C	Criteria for system performance following the loss of two or more BES elements
C&I	commercial and industrial
CAISO	California Independent System Operator
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CPUC	California Public Utilities Commission
DA	Day Ahead
DDOR	Distribution Deferral Opportunities Report
DEIR	Draft environmental impact report
DER	Distributed Energy Resource
DPA	Distribution Planning Area
feeders	distribution lines
FOM	front-of-the-meter
GNA	Grid Needs Assessment
Horizon	Horizon Water and Environment, LLC
HWT	Horizon West Transmission, LLC
IEPR	Integrated Energy Policy Report
IRP	Integrated Resource Planning
ITC	investment tax credit
Kevala	Kevala Analytics, Inc.
kV	kilovolt
kW	kilowatt

kWh	kilowatt hour
MW	megawatts
MWh	megawatt-hours
NEM	net energy metering
NERC	North American Electric Reliability Corporation
N-1	A single contingency involving the loss of a single BES element
N-2	A multiple contingency involving the simultaneous loss of two BES elements
N-1-1	A multiple contingency involving the consecutive loss of two single BES elements that are not physically or electrically connected
PEA	proponent's environmental assessment
PG&E	Pacific Gas & Electric Company
Proposed Project	Estrella Substation and Paso Robles Reinforcement Project
PV	photo voltaic
P1	A single contingency
P6	A multiple contingency with two overlapping singles
RFP	Request for Proposals
RT	real time
SGIP	self-generation incentive program

1. Executive Summary and Report Purpose

Kevala Analytics, Inc. (Kevala) prepared this report for the California Public Utilities Commission (CPUC) Energy Division to supplement the March 2019 Draft Alternatives Screening Report (ASR) prepared by Horizon Water and Environment, LLC (Horizon). The Draft ASR was prepared in support of the CPUC's California Environmental Quality Act (CEQA) review of the Estrella Substation and Paso Robles Area Reinforcement Project (Proposed Project) proposed by Horizon West Transmission, LLC (HWT) (formerly NextEra Energy Transmission West, LLC) and Pacific Gas & Electric Company (PG&E) (together, the "Applicants"). The Draft ASR and detailed information about the Proposed Project and application to the CPUC are provided here:

www.cpuc.ca.gov/environment/info/horizonh2o/estrella/index.html.

The Draft ASR included a brief description of a potential behind-the-meter (BTM) battery storage alternative (*Alternative Battery Storage #3*)[1] but stated that the feasibility of this alternative was "to be determined." The BTM solution would include the application of Distributed Energy Resources (DERs)[2]. The purpose of this report is to provide further data about the potential for BTM resources (including solar photovoltaic) to serve as an alternative to components of the Proposed Project.

BTM (customer-side) battery energy storage systems (BESSs), including when paired with BTM solar systems, can reduce loading on electric grid facilities in the Paso Robles area such that the need for components of the Proposed Project can be avoided or deferred. This report identifies the amount of electric capacity that could be provided by BTM resources based on Kevala's big data approach to adoption propensity analysis. This information is necessary for the CPUC to determine whether the amount could be sufficient to address the transmission and distribution needs that would otherwise be addressed by the Proposed Project.

Kevala's analysis applied a bottom-up economic propensity for adoption model to identify likely adopters of BTM resources within PG&E's Paso Robles Distribution Planning Area (DPA). Low, medium, and high adoption scenarios were considered to provide a reasonable range of potential BTM solar plus storage adoption, as well as inform the possible development and use of customer incentives to help ensure BTM adoption occurs as required for the Draft ASR's Battery Storage #3 alternative. The issuance of a Request for Proposals (RFP) and development of a BTM storage program

[1] Alternative Battery Storage #1 and #2 would use front-of-the-meter resources to address the Proposed Project's transmission and distribution needs, respectively. Alternative Battery Storage #3 would use BTM resources to address one or both needs.

[2] DERs are small-scale generation or storage facilities that can serve as alternatives to or an enhancement of traditional electric grid facilities.

including economic incentives is one potential pathway for achieving the required BTM resources adoption in the target area.

The model indicates that under the low adoption scenario, there is potential for adoption of 88 megawatts (MW) of solar and 125 MW and 240 megawatt-hours (MWh)[3] of battery storage across residential, commercial, and industrial customers within the Paso Robles DPA (see **Table 7).** Under the high adoption scenario, this potential is 100 MW of solar and 175 MW / 343 MWh of battery storage. For Paso Robles distribution lines (feeders),[4] specifically, there is potential for 48.5 MW / 90.6 MWh under the low adoption scenario, and 69.2 MW / 136 MWh under the high adoption scenario (see Table 7).

Based on the original distribution need presented by the Applicants in their 2017 application to the CPUC (A.17-01-023) (roughly 4.3 MW of additional capacity over the next ten years), Kevala observes that this BTM adoption potential could provide more than enough load reduction to defer the need for the distribution components of the Proposed Project for many years (i.e., build-out of the distribution transformers and electrical lines from Estrella Substation). Only 8.3 percent of the identified BTM adoption potential around Paso Robles Substation would need to be realized to meet the 4.3 MW DPA-wide capacity need. However, based on subsequent filings regarding distribution system capacity need (i.e., PG&E's 2019 Grid Needs Assessment [GNA] and Distribution Deferral Opportunities Report [DDOR] filings pursuant to the CPUC Distribution Resources Plans proceeding [R.14-08-013]), BTM resources alone may not be able to solve all of the specific capacity needs.

The latest filings indicate that 5.9 MW of additional capacity is required to address needs for Paso Robles Feeder 1104 (1.2 MW, 8 hours), San Miguel Substation Transformer Bank 1 (3.6 MW, 9 hours), and Templeton Substation Transformer Bank 3 (1.1 MW, 3 hours) (see **Table 2**) (PG&E 2019a). Kevala's propensity for adoption analysis indicates that BTM resources have potential to directly solve the grid need identified at Templeton Substation Transformer Bank 3 and Paso Robles Feeder 1104 (although a front-of-the-meter [FOM; utility-side] storage facility may also be a good approach for this feeder), and that BTM resources could partially mitigate the grid need at San Miguel Substation Transformer Bank 1. A FOM solution could be paired with BTM resources to address the remaining capacity needs at San Miguel Substation.

With respect to the transmission components of the Proposed Project, Kevala observes that the modeled BTM adoption potential (if fully realized) could fully meet the 65 MW capacity need at Paso Robles Substation (as identified by ZGlobal, Inc. [ZGlobal] and described in the Draft ASR). However, individual BTM resources would only provide up

[3] Battery storage is rated in terms of capacity and energy. Capacity is defined in megawatts and energy is defined in megawatt hours. For example, a storage facility capable of providing 10 MW of capacity for two hours is rated to provide 20 MWh (i.e., 10 x 2) of energy.

[4] Feeders are electrical lines that transfer electricity from substations to customers.

to 2 hours of energy at full output, and even when paired with FOM resources, would not likely be able to address the 11 hours that could be needed if an outage of a transmission resource were to occur during peak summertime loading conditions and lasted at least a day. Furthermore, the California Independent System Operator (CAISO) explained that the need could extend for multiple days depending on how long it would take to resolve the outage or secondary, back-to-back outages that could occur (CAISO 2019). CPUC Energy Division verified that even if BTM and FOM resources could provide the 11 hours of daily capacity required during an outage event lasting for at least 24 hours, the resources could not fully recharge to address an outage that continued for a second day or longer (Rahman 2019).

Hence, Kevala finds that BTM resources, in combination with FOM resources, have the potential to cost-effectively avoid or defer the distribution components of the Proposed Project. The FOM resources might include battery storage or a transformer upgrade at an existing substation site, for example. Kevala's model results, in combination with power flow modeling by ZGlobal, indicates that BTM resources would not be able to avoid or defer transmission components of the Proposed Project, even when combined with FOM resources.

2. Estrella Project Objectives and Alternatives Explored

The objectives of the Proposed Project, as defined by the CPUC for their review of alternatives pursuant to CEQA, are as follows:

- Transmission Objective: Mitigate thermal overload and low voltage concerns in the Los Padres 70 kilovolt (kV) system during Category B[5] contingency scenarios, as identified by the CAISO in its 2013 - 2014 Transmission Plan.

[5] The CAISO uses the North American Electric Reliability Corporation (NERC) reliability standards to analyze the need for transmission system upgrades. The NERC standards provide criteria for system performance requirements that must be met under a varied but specific set of operating conditions, and prior to 2012, included the following categories:

- Category A – System Performance Under Normal Conditions
- Category B – System Performance Following Loss of a Single Bulk Electric System (BES) Element
- Category C – System Performance Following Loss of Two or More BES Elements
- Category D – System Performance Following Extreme BES Events

The latest adopted NERC TPL-001-4 transmission reliability standard applies new terminology; P0 through P7 define different scenarios based on the initial system condition and nature of the event (e.g., loss of generator, transmission circuit, bus section fault, etc.). The Category B contingencies identified for the Proposed Project would equate to a P1 (single contingency), while the Category C3

- Distribution Objective: Accommodate expected future increased electric distribution demand in the Paso Robles DPA, particularly in the anticipated growth areas in northeast Paso Robles.

2.1 Transmission Objective and DER Alternatives

The Draft ASR (CPUC 2019a) identified Alternative Battery Storage #1 as a potential way to address the Transmission Objective of the Proposed Project. This alternative would include one or more FOM BESSs, sized from 65 MW to 120 MW, as shown in Table 3-4 of the Draft ASR. To address the N-1 (i.e., P1 or Category B) scenarios identified by CAISO (i.e., loss of either the Paso Robles-Templeton 70 kV Transmission Line or Templeton Transformer Bank #1), 65 MW of storage sited at or near Paso Robles Substation would be needed. To address the N-1-1 (i.e., P6 or Category C3) scenario (loss of both Templeton-Gates and Templeton-Morro Bay 230 kV Transmission Lines)[6], roughly 120 MW of total storage would be needed and could be split between Paso Robles Substation and Templeton Substation (CPUC 2019a).

Alternative Battery Storage #1 in the Draft ASR also considered different scenarios on the duration of a potential P1 or P6 contingency. Alternative Battery Storage #1C modeled a duration of 24 hours for solving the P1 contingency; under this scenario, FOM BESS(s) at or near Paso Robles Substation would need to be able to provide 11 hours of power, for a total of 65 MW/715 MWh. The Draft ASR found that this size BESS(s) would require roughly 7 acres; however, since publication of the Draft ASR, advances in battery storage technology have reduced the space/footprint needed for facilities substantially (roughly 40 percent), such that roughly 4.2 acres would be needed.

PG&E, HWT, and CAISO all commented on the Draft ASR that the Alternative Battery Storage #1 was infeasible due to the inability for a FOM BESS to recharge during high loading conditions, such as to be able to address long duration outages (i.e., possibly multiple days) or to be in an adequate state of charge after an initial outage to solve a subsequent outage(s) (PG&E 2019b; HWT 2019; CAISO 2019). PG&E, in its comments on the Draft ASR and in subsequent discussions, indicated that an outage of the Paso

contingencies would equate to a P6 (multiple contingency; two overlapping singles) (NERC No Date). The NERC standards allow for load to be dropped for a P6 contingency, but not for a P1 contingency.

NERC also refers to single contingencies (i.e., loss of a single BES element) as N-1 events. A multiple contingency where both BES elements fail at the same time (e.g., two circuits on the same pole line fail when a pole is hit by a vehicle) is known as an N-2 event. A multiple contingency involving the consecutive loss of two single BES elements that are not physically or electrically connected is known as an N-1-1 event. The Category B/P1 contingencies identified for the Proposed Project would be N-1 events, whereas the Category C3/P6 contingency would be an N-1-1 event.

[6] While the Draft ASR modeled the energy capacity needed to address the N-1-1/P6/Category C3 contingencies, the Draft ASR noted that CAISO's transmission planning standards allow for non-consequential load to be shed following such contingencies, thus they are not considered the primary drivers of the Proposed Project.

Robles-Templeton 70 kV Transmission Line could last more than 24 hours. In its response to CPUC's Data Request #3, PG&E provided information on unplanned outages within its service territory, which showed that transmission system outages lasting longer than 24 hours have occurred, with the longest duration outage lasting 178 days (PG&E 2019c, 2019d). ZGlobal confirmed the recharging issues brought up by the Applicants and CAISO, and acknowledge that a FOM BESS solution alone, given existing and projected loading patterns in the Paso Robles DPA, could not achieve the Transmission Objective of the Proposed Project.

BTM resources could potentially change the calculation with respect to an FOM BESS solution to the Transmission Objective by meeting some of the localized electrical demand that otherwise would need to be met through an FOM BESS during an outage. This analysis considered the potential feasibility of Alternative Battery Storage #1 with inclusion of potential BTM adoption in the Paso Robles DPA.

2.2 Distribution Objective and DER Alternatives

The Draft ASR identified Alternative Battery Storage #2, which would include FOM BESSs to address the Distribution Objective of the Proposed Project. These BESSs would be connected to the distribution system (e.g., feeders in the Paso Robles area) and could be sited at the same locations identified for Alternative Battery Storage #1. The Draft ASR considered the hosting capacity of feeders within the Paso Robles DPA forecasted to be overloaded and determined that up to 16.8 MW of energy storage capacity could be connected to feeders with minimal grid improvements required (see Table 3-6 in the Draft ASR) (CPUC 2019a). While specific deployment of BESSs would depend on site availability, this amount of storage could potentially solve the roughly 4.3 MW capacity need over 10 years originally identified in the Applicants' application to the CPUC, shown Table 3-7 of the Draft ASR. Additionally, the Draft ASR identified Alternative Battery Storage #3, which would include BTM resources that could be deployed on their own to address distribution needs or in tandem with FOM storage under Alternative Battery Storage #1.

Subsequent to the release of the Draft ASR, PG&E's 2019 GNA/DDOR filings identified the Estrella Substation (distribution components only) as a Candidate Deferral Opportunity, or a project that could potentially be deferred through DERs. The GNA/DDOR, which was established through the CPUC Distribution Resources Plan proceeding (R.14-08-013), identifies grid needs that could be met through DERs, and ranks Candidate Deferral Opportunities through three qualitative prioritization metrics (cost effectiveness, forecast certainty, and market assessment), such as to assign a

tier[7]. **Table 1** shows PG&E's 2019 DDOR prioritization metrics for the distribution components of the Estrella Substation.

Table 1. PG&E 2019 DDOR Filing Prioritization Metrics - Estrella Substation

Tier	Candidate Deferral	In-Service Date	Cost of the Project[1]	Deficiency (MW)	Prioritization Metrics		
					Cost Effectiveness	Forecast Certainty	Market Assessment
3	Estrella Substation	2024	$18.5 million	19.4	Moderate	Low	Low

Note: 1. The transmission components of the Proposed Project were not included in the $18.5 million cost estimate because only the CPUC-jurisdictional costs are required to be included in PG&E's GNA/DDOR filing.

Source: PG&E 2019a

The designation of "low" forecast certainty is due to the target in-service date of the Proposed Project (2024), which increases the forecast uncertainty and indicates that it might be more appropriate to consider the candidate deferral in future GNA/DDORs. The designation of "low" market assessment is due to the long duration requirement of some of the facility needs associated with the Proposed Project. Table 2 shows the specific facility needs that would be addressed by the Proposed Project and which could potentially be met through DERs, as reported in PG&E's 2019 DDOR.

[7] PG&E uses a 4-tier system, where each tier represents PG&E's proposed priority ranking of those Candidate Deferral Opportunities likelihood of success for DER sourcing (PG&E 2019a). The 4-tier prioritization system is as follows:

- Tier 1: Relatively High Ranking
- Tier 2: Relatively Moderate Ranking
- Tier 3: Relatively Low Ranking
- Tier 4: Already Sourced Elsewhere

Table 2. PG&E 2019 DDOR - Specific Facility Capacity and Reliability Needs Addressed by the Proposed Project That Could Potentially be met through DERs

Facility	Need Date	Distribution Service Required	Day Ahead (DA) or Real Time (RT)[1]	Grid Need (MW)	Months of Forecast Need Occurrence	Occurrences per Year	Time Period	Duration (hours)
Paso Robles Feeder 1104	2019	Capacity	DA	1.2	Jul-Aug	21	2PM-10PM	8
San Miguel Transformer Bank 1	2019	Capacity	DA	3.6	Jul-Sep	122	6AM-10PM	9
Templeton Transformer Bank 3	2023	Capacity	DA	1.1	Jul-Aug	23	12PM-3PM	3
Cholame Between X14 and R96	Existing need[2]	Reliability / Other	RT	1.5	Apr-Oct	8	12AM-12AM	4
Cholame Substation DA	Existing need[2]	Reliability / Other	DA	3.5	Apr-Oct	1	12AM-12AM	48
Cholame Substation RT	Existing need[2]	Reliability / Other	RT		Apr-Oct	8	12AM-12AM	24
L/S R78 – Templeton Feeder 2109	Existing need[2]	Reliability / Other	RT	8.5	Apr-Oct	8	12AM-12AM	4

Note:

1. For DA needs, DER providers would receive advance notice when a service is needed. For RT requirements, notice is available only minutes before the need.
2. The need has existed for at least 10 years according to PG&E's data response to Energy Division. PG&E does not have plans to address the need at this time regardless of whether Estrella Substation is constructed.

Source: PG&E 2019a, PG&E 2019e

The three reliability needs related to Cholame Substation shown in Table 2 were not included in PG&E and HWT's 2017 application to the CPUC or the 2018 GNA/DDOR filing. Energy Division staff learned that these needs are contingent on the outage of a radial 70-kV power line that supplies the substation. Pursuant to CAISO planning

standards, load shedding would be allowed in this instance.[8] The Templeton reliability need relates to the length of Feeder 2109, but PG&E does not have a planning standard based on length.[9] Accordingly, only the capacity-related grid needs are evaluated in this report. These considerations will be further discussed in the Final ASR, which will be included in the CPUC's Draft Environmental Impact Report (DEIR) in 2020.

Much of the reason for the Estrella Substation's relatively low ranking in terms of Candidate Deferral Opportunity prioritization (see Table 1) is due to the fact that the Cholame and Templeton reliability needs were included in the calculation, as well as the assumed 2024 in-service date. Energy Division staff requested that, for comparative purposes, PG&E reconsider the Estrella Substation's deferral prioritization without including the four reliability needs and assuming a 2022 need date instead of 2024. PG&E's 2024 assumption is not entirely appropriate for the analysis given that some of the grid needs that would be addressed by the proposed substation already exist as of 2019 and have existed for a number of years (e.g., more than 10 years). PG&E has not yet prioritized these needs for mitigation, and it remains unclear whether PG&E would mitigate them if the Estrella Substation were not approved for construction. With the change in assumptions, the Estrella Substation would be a Tier 1 Candidate Deferral Opportunity, as shown in **Figure 1**, and possibly the most cost-effective candidate of the deferral options identified in the PG&E's 2019 GNA/DDOR.

This report evaluates whether BTM resources could address the Distribution Objective of the Proposed Project, including the distribution capacity needs identified through PG&E's 2019 GNA/DDOR. The analysis considers whether BTM resources on their own could address the distribution capacity needs and/or defer portions of the Proposed Project, or be deployed in tandem with FOM storage under Alternative Battery Storage #2.

[8] PG&E stated, "A single line outage of the 70-kV line to Cholame 70 kV Substation results in the loss of power to the substation and the direct loss of about 12 MW of current customer load which creates a customer reliability issue for those customers. PG&E does not have any plans at this time to solve the Cholame 70 kV N-1 issue whether the proposed Estrella Substation is constructed or not. The single line outage does not result in any impacts to the transmission system and as such does not result in any NERC or CAISO reliability standards violations" (PG&E 2019e).

[9] "PG&E is aware of no distribution planning standard that determines whether a feeder is too long to provide reliable service" (PG&E and HWT 2018).

Tier	Candidate Deferral	In Service Date	Deficiency (MW)	Prioritization Metrics		
				Cost Effective-ness	Forecast Certainty	Market Assess-ment
1	Alpaugh New Feeder	2022	4.4			
	Calflax Bank 2	2023	cc			
	Santa Nella New Bank & Feeder	2022	9.3			
	Estrella Substation (hypothetical)	2022	5.9			
2	Camp Evers 2107	2022	0.9			
	FMC 1102	2023	0.8			
	Brentwood 2105	2022	1.2			
3	Pueblo Bank 3	2022	23.2			
	Oceano 1106	2022	1.2			
	Rosedale2102	2022	1.8			
	Rob Roy 2105	2022	3.0			
	Peabody 2106	2022	cc			
	Madison 2101	2022	cc			
	Martin SF H 1108	2022	1.0			
	Martin SF H 1107	2022	1.8			
	Avenal 2101	2022	cc			
	Edenvale 2108	2022	1.5			
	Dairyland 1110 New Feeder	2022	4.5			

Notes: Blue = relatively more likely to be deferrable. Magenta = some red flags that indicate they are unlikely to be successfully deferred now, but closely monitor status and project conditions and re-evaluate for a future date. Red = multiple major red flags indicate it is not likely that a deferral solution would be successfully sourced.

Source: PG&E 2019e

Figure 1. Estrella Substation Candidate Deferral Prioritization Assuming Capacity Needs Only and 2022 Need Date (i.e., In-service Date)

3. Methodology

This analysis uses an adoption propensity approach to identify economically feasible adoption of BTM resources at the customer-sited level (i.e., at existing residential and commercial and industrial [C&I] buildings or properties). BTM resources included solar plus storage and storage-only systems. Adoption propensity is based on an individual customer's load profile, payback period for investment in BTM resources, Value of Lost Load, and other factors. The analysis included evaluation of full 8760 time-series load profiles (i.e., 365 days times 24 hours per day) for approximately 75,000 customer meters.

BTM storage systems function by either directly reducing the customer's own grid consumption (i.e., discharging to meet the customer's electrical demand, especially during peak demand periods), or sending excess stored power back to the grid, often in response to a price or event signal. When paired with solar, BTM storage can store excess solar generation to be used when solar goes offline (or, "when the sun goes down"). This allows solar plus storage customers to further reduce consumption from the grid during times of peak demand, and likely save costs on their electricity bill through time-of-use rate arbitrage.

3.1 Approach

Kevala used its Network Assessor platform to ingest data provided by PG&E and run advanced analytics related to grid infrastructure, load, generation, and price. At a high level, Kevala's Network Assessor platform ingests and employs data across the following three key areas (see also **Figure 2**):

- **Load.** Load data are typically provided as time series datasets, which are generally incompatible with geospatial data, as the volume of data associated with time series is much larger than geospatial data systems are often capable of processing. Kevala ingested PG&E-provided metered data to generate an 8760 time series load profile, aggregated to the feeder level.

- **Generation.** This includes both data at the bulk power level, as well as DERs, such as all known installed DG, nameplate capacity, and associated feeder. Kevala uses this dataset to estimate local energy supply and forecasted production profiles. In aggregate, this information additionally factors into analyses such as hosting capacity analysis.

- **Infrastructure.** For this project, Kevala used PG&E-provided geospatial files on electric infrastructure.

The result of this data ingestion process is a 1:1 map of the electric grid, with granularity down to the parcel level. In this way, Network Assessor is both a platform for accessing data and a technology to support grid modernization functions, including circuit

modeling, DER value and solutions analysis, load modeling, rate impacts, and DER forecasting and adoption propensity.

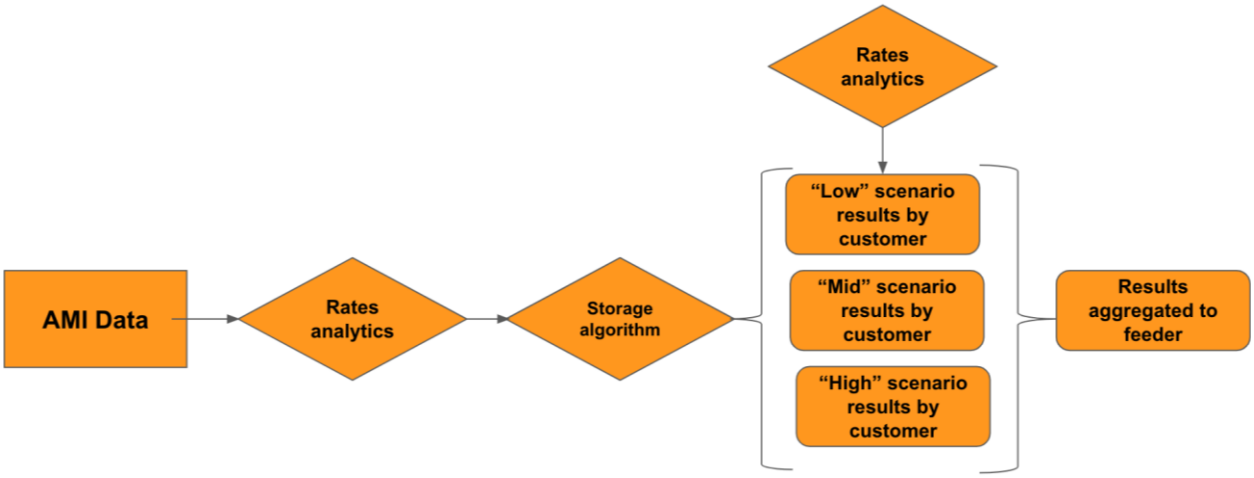


Figure 2. Kevala's Data Analysis Approach

As shown in Figure 2, the Advanced Metering Infrastructure (AMI) (i.e., load) data fed the rates analytics and storage algorithm, which ultimately identified economically-efficient BTM adoption customers under "low", "medium", and "high" scenarios, which were based on the number of outages customers faced in a given year (see detailed information in **Table 3**). Results were then aggregated to the feeder-level.

Separate analyses were performed for residential customers and C&I customers. Whereas the residential analysis considered the potential for new customers to adopt solar plus storage systems, as well as the potential for existing residential solar owners to adopt an incremental BTM storage system; the C&I analysis looked solely at the potential for customers without existing DER to adopt new BTM storage systems, incentivized largely by a desire to reduce demand charges.

The analysis was conducted on historical AMI data for the 2017 calendar year. Actual solar growth was backed out of the total adoption propensity from 2018 and 2019 using the net energy metering (NEM) Currently Interconnected Data Set (California Distributed Generation Statistics 2019). Consideration of DER growth forecasts is discussed in Section 3.3.

3.2 Inputs and Assumptions

To conduct the BTM analysis, Kevala modeled performance of BTM storage resources at the customer level, optimizing size to meet payback period requirements. Inputs used in the analysis (e.g., performance and cost of battery storage systems, and current policies and incentive structures) are consistent with those used by the CPUC in the 2019 - 2020 Integrated Resource Planning (IRP) process. Table 3 summarizes the inputs and assumptions used in the residential and C&I analyses.

Table 3. Summary of Inputs and Assumptions

Input	Residential Analysis	Commercial & Industrial Analysis
Rate	Customers subject to PG&E's 2019 time-of-use rate: Peak: 4pm - 9pm Seasonal: May 1 - October 31	Customers subject to appropriate PG&E rate based on load. Customer is subject to demand charges.
Solar system size, performance, and cost	Photo voltaic (PV) kilowatt (kW) size is optimized based on household energy consumption. PV performance is modeled using NREL PV Watts PV system cost is aligned with IRP assumptions on dollars per watt ($/W) for 2019	N/A
Storage system size, performance, and cost	7 kW/13.5 kilowatt hour (kWh) lithium ion Customer adoption of # of batteries is optimized based on historic load and payback period. Storage performance uses estimates used in the 2019 IRP, including: 10 year warranty 85% round trip efficiency 0% degradation rate Storage system total cost (hardware plus installation) is $9,376, calculated based on IRP "mid cost option" assumption for storage costs for 2019	Customer adoption of kW/kWh size is optimized to minimize customer demand charges while meeting the payback period requirements (10 years). Storage performance uses estimates used in the 2019 IRP, including: 10 year warranty 85% round trip efficiency 0% degradation rate Storage system total cost (hardware plus installation) is based on the formula used to develop the IRP "mid case" assumption for storage costs for 2019-2020 (CPUC 2019b).

Input	Residential Analysis	Commercial & Industrial Analysis
Policy assumptions	Customers are eligible to benefit from the solar investment tax credit (ITC) and self-generation incentive program (SGIP), following current program incentive levels and rules for enrollment. Customers are eligible to benefit from NEM programs as they are currently administered, aligned with 2019 Integrated Energy Policy Report (IEPR) "mid PV" scenario.	Customers are eligible to participate through SGIP, based on current incentive levels in PG&E territory. Customers are not additionally incentivized through participation in other markets (e.g., demand response).
Payback period	10 years or below	N/A
Value of Lost Load 2	Low, medium, and high scenarios are tested at a value of $5/kWh Low: four, 4-hour outages Medium: six, 4-hour outages High: eight, 4-hour outages	$5/kWh for large C&I customers (100 kW peak demand) $9/kWh for medium C&I customers (50 kW peak demand) Low, medium and high scenarios run as follows: Low: four, 4-hour outages Medium: six, 4-hour outages High: eight, 4-hour outages

Notes:

Aligned with CPUC IRP 2019-2020 inputs and assumptions for the "mid cost option" unless otherwise noted and explained (CPUC 2019b).

The Value of Lost Load is an economic indicator used to assign a dollar cost to the interruption of electricity delivery. This can represent the cost consumers are willing to pay to avoid an outage or public safety power shutoff. Publicly available studies on this value ranges from $5 - $20/kWh. This analysis used a Value of Lost Load on the low side of stated ranges. The CPUC's new resiliency and microgrids proceeding (R.19-09-009) is expected to provide guidance regarding this assumption.

3.3 Integrated Energy Policy Report (IEPR), DER Forecasts, and Economic Propensity

The responsibility of developing load and DER forecasts is shared among the investor owned utilities in California (e.g., PG&E) and the California Energy Commission (CEC). On a biennial basis, the CEC prepares the IEPR, informed by stakeholders, which includes a top-down forecast of load and DER across the state. PG&E then conducts a load forecast and DER forecast disaggregation process to provide feeder-specific estimates of load and DER impact. This process uses the IEPR system-level forecast and assumptions as inputs, while PG&E is responsible for identifying the best options for disaggregation. Forecast disaggregation is the process of taking a system-level forecast, and determining where on the grid those forecasts will likely occur.

Energy storage forecast estimates are a new component of the IEPR as of the 2019 - 2020 report. PG&E and HWT's 2017 application to the CPUC for the Proposed Project applied the 2016 IEPR to estimate the impacts of DERs and thus does not include feeder-specific impacts for energy storage. PG&E currently uses a proportional allocation technique to disaggregate storage, expecting high locational correlation with known energy storage projects based on SGIP data, proportional to load. As energy storage technology is a nascent and growing market, it is expected that DER forecast and disaggregation techniques will improve in time as available datasets on adoption and performance increase.

At the time of this analysis and report, feeder-specific DER forecasts for battery storage, based on the utility's disaggregation process, have not been published by PG&E, as they are still under development. Thus, it is not feasible to compare feeder-specific future storage forecasts with these analysis results, and "back out" estimates to avoid double counting. This is a recommended step in advance of conducting a targeted procurement, when considering the BTM alternative.

Finally, it is important to understand the difference between a DER forecast and an economic propensity analysis. A forecast identifies what is *likely to occur* given a set of factors, such as, but not limited to, historic adoption rates, cost of technology, cost of energy, demographics, financial ability to adopt, and consumer adoption behavior. The analysis documented in this report is not a forecast; it is an economic propensity analysis. Economic propensity analyses simply identify customers for which it would make economic sense to adopt a technology, not necessarily what is *likely to occur*.

4. Results and Discussion

4.1 BTM Adoption Propensity

Detailed results for the BTM adoption propensity analysis (disaggregated by feeder) are provided in **Appendix B**. **Table 4** summarizes the results for all customer types in the Paso Robles DPA.

Table 4. Summary Results for the BTM Adoption Propensity Analysis - All Customer Types in the Paso Robles DPA

Scenario	BTM Adoption Propensity			
	Solar (MW)	Battery Storage (MW)	Battery Storage (MWh)	Total # of Customers
Low	88	125	240	~17,000
Medium	92	138	272	~19,000
High	100	175	343	~21,000

As shown in Table 4, across the Paso Robles DPA, there is substantial potential for BTM adoption. Under the low scenario, roughly 17,000 customers (residential and C&I) meet the criteria for economically-efficient adoption and/or which could potentially be effectively incentivized to BTM resources adoption through a RFP process. If all of these customers adopted BTM solar and/or storage technology at the parameters used in the study, this would equate to 88 MW of solar and 125 MW / 240 MWh of storage. Under the high scenario, approximately 21,000 economically-efficient potential adopters were identified, equating to 100 MW of solar and 175 MW / 343 MWh. **Table 5** breaks down the summary results from Table 4 by substation within the Paso Robles DPA (i.e., BTM resources at customer sites along feeders associated with a given substation).

Table 5. BTM Adoption Propensity Results by Substation

	Substation				
	Atascadero	**Paso Robles**	**San Miguel**	**Templeton**	**Total**
Low Scenario					
# of Customers	3,269	6,589	909	6,643	17,347
Solar (MW)	17	32	5	34	88
Storage (MW)	23	48	6	47	124
Storage (MWh)	44	91	13	92	242
Medium Scenario					
# of Customers	3,514	7,141	949	7,145	18,749
Solar (MW)	17	34	5	36	92
Storage (MW)	28	51	7	51	137
Storage (MWh)	55	101	15	102	273
High Scenario					
# of Customers	4,041	8,468	970	7,617	21,096
Solar (MW)	19	39	5	37	100
Storage (MW)	33	69	8	64	175
Storage (MWh)	64	136	17	126	343

As shown in Table 5, the greatest BTM adoption potential is associated with the Paso Robles and Templeton substations. At Paso Robles Substation (i.e., along feeders connected to Paso Robles Substation), under the low scenario, there is potential for adoption of 32 MW of solar and 48 MW / 91 MWh of storage. Under the high scenario, this increases to 39 MW of solar and 69 MW / 136 MWh of storage.

In general, the majority of the total adoption propensity (MW) was driven by residential customers adopting new solar plus storage systems. Residential customers with existing solar systems adopting new storage, and new C&I storage customers, played less of a role. One primary reason for this is that there are many more residential customers without existing solar relative to other categories of potential BTM adopters. Even though C&I customers represented a smaller portion of potential BTM adopters, the average payback period for those identified was shorter than it was for residential customers. **Table 6** shows BTM adoption propensity results for C&I customers under the low scenario, disaggregated by substation.

Table 6. C&I Customer BTM Adoption Propensity by Substation - Low Scenario

Substation	# of Commercial Customers	# of Industrial Customers	Total Storage Amount		Average Payback Period (Years)	Percentage of Total C&I Customers
			MW	MWh		
Atascadero	*	*	*	*	6.7	3%
Paso Robles	52	140	1.8	4.2	6.4	7%
San Miguel	*	*	*	*	5.6	9%
Templeton	47	163	2.1	5.1	6.5	6%
Totals / Averages	**116**	**383**	**4.6**	**11**	**6.3**	**6%**

Note: *Redacted customer counts and associated data. Checking with PG&E to confirm whether this data is confidential due to low customer counts in the Commercial or Industrial categories.

As shown in Table 6, a greater number of industrial customers were identified as economically-efficient BTM adopters compared to commercial customers. The area with the greatest C&I BTM adoption potential was that served by Templeton Substation (2.1 MW / 5.1 MWh), followed by Paso Robles Substation (1.8 MW / 4.2 MWh). In general, the analysis found that, under the low scenario, a relatively small proportion (6 percent) of total C&I customers were good candidates for BTM adoption.

Finally, looking specifically at Paso Robles feeders (i.e., feeders connected to Paso Robles Substation), Table 7 shows that there is relatively substantial BTM adoption potential for customers along feeders in target areas for future distribution service from the Estrella Substation.

Table 7. BTM Storage Adoption Propensity for Paso Robles Feeders - Low and High Scenarios

Feeder	Low Scenario			High Scenario		
	# of Customers	MW	MWh	# of Customers	MW	MWh
Paso Robles 1101	123	0.8	3.6	151	1.1	2.5
Paso Robles 1102	676	4.8	9.3	881	7.3	14.3
Paso Robles 1103	1,112	9.7	15.1	1,324	10.9	21.5
Paso Robles 1104	624	4.5	8.8	843	6.7	13.3
Paso Robles 1106	1,737	12.2	23.6	2,325	18.8	36.5
Paso Robles 1107	918	6.6	12.9	1,123	9.5	18.7
Paso Robles 1108	1,399	9.9	19.2	1,822	14.9	29.2
Total:	**6,589**	**48.5**	**90.6**	**8,468**	**69.2**	**136**

4.2 Implications for Alternative Battery Storage #1 and the Transmission Objective

As discussed under Section 2.1, the Draft ASR considered the potential for an FOM BESS to solve the Transmission Objective for the Proposed Project. This alternative was identified as Alternative Battery Storage #1. Using the BTM adoption propensity results from Section 4.1, ZGlobal, Inc. (ZGlobal) re-ran its model to determine the effects of the potential BTM storage on the requirements for an FOM BESS under Alternative Battery Storage #1. ZGlobal's updated analysis generally found that the BTM storage at Paso Robles Substation would equate to a one-for-one reduction in the amount of FOM transmission level storage needed to mitigate the P1 and/or P6 outages (ZGlobal 2019) (see **Table 8**). The BTM storage connected to Templeton Substation feeders would not be helpful in addressing the two P1 contingencies (since these involve loss of power to Paso Robles Substation), but would help with the P6 contingency (i.e., loss of both the Templeton-Gates and Morro Bay-Templeton 230 kV lines), although not quite at a one-to-one ratio.

Table 8. FOM Storage Requirements to Address Critical Outages under Alternative Battery Storage #1 with Inclusion of BTM Storage

Scenario	FOM Storage Connected at Paso Robles Substation (MW)	BTM Storage Connected at Paso Robles (MW)	BTM Storage Connected at Templeton (MW)	Total Storage (MW)
Outage: Paso Robles – Templeton 70 kV Transmission Line (P1)				
No BTM Scenario	65	-	-	65
Low BTM Scenario	18.9	48.5	N/A	67.4
Medium BTM Scenario	16.5	51.1	N/A	67.6
High BTM Scenario	0.0	69.2	N/A	69.2
Outage: Templeton 230/70 kV Transformer Bank #1 (P1)				
No BTM Scenario	45	-	-	45
Low BTM Scenario	0.0	48.5	N/A	48.5
Medium BTM Scenario	0.0	51.1	N/A	51.1
High BTM Scenario	0.0	69.2	N/A	69.2
Outage: Morro Bay – Templeton and Templeton – Gates 230 kV Transmission Lines (P6)				
No BTM Scenario	120	-	-	120
Low BTM Scenario	29.1	48.5	47.2	124.8
Medium BTM Scenario	22.7	51.1	51.3	125.1
High BTM Scenario	0.0	69.2	64.2	133.4

Note: Used Base Case: CAISO 2018/2019 TPP for 2023 Central Coast & Los Padres Area

Source: ZGlobal 2019

As shown in Table 8, under the high BTM adoption scenario, BTM storage alone could completely solve (for a limited duration) all three of the identified critical outages associated with the Proposed Project (note: only the P1 contingency outages are be required to be solved). This would result in avoiding the need for any FOM storage under Alternative Battery Storage #1 to meet the Transmission Objective but for the long duration required (i.e., 11 hours each day for multiple days).

If the duration were shorter, the P1 contingency involving loss of the Templeton 230/70 kV Transformer Bank #1 might be solvable by BTM storage under the low or medium scenarios. Meanwhile, for the P1 contingency involving loss of the Paso Robles – Templeton 70 kV Transmission Line, BTM storage under the low and medium BTM adoption scenarios could substantially reduce the amount of FOM storage needed to

address the contingency (18.9 MW of FOM storage needed under the low scenario and 16.5 MW of storage needed under the medium scenario). ZGlobal's modeling did show that with increasing use of BTM resources, there would be a need for reactive support at Paso Robles Substation, either in the form of capacitors or reactive support from the BTM storage itself (ZGlobal 2019).

The findings in Table 8 indicate that BTM storage alone or in combination with FOM storage could potentially solve the critical outages and meet the Transmission Objective of the Proposed Project for a few hours. Assuming that BTM and/or FOM storage resources are charged and available at the time a transmission-level outage occurred, these resources could discharge to meet the electrical demands on the system, thereby preventing a blackout or other grid failure.

However, batteries can only discharge for so long without being recharged and thus could not solve a longer term or indefinite transmission-level outage as described by the CAISO (Section 2.1, above), particularly if there is no charging window within the load pattern (i.e., point during the day or night at which load is below the threshold where supplemental power would be needed). In the case of the Paso Robles Substation, if power supply is lost from the south (through the loss of either the Paso Robles – Templeton 70 kV Transmission Line or Templeton Transformer Bank #1), the northern line from San Miguel is the only remaining transmission-level power source, which can supply roughly 20 MW of power. During peak summer loading conditions, load demand on the Paso Robles Substation may not drop below 20 MW even during the night-time, leaving no potential charging window for battery storage facilities.

As indicated in Table 3, the residential BTM adoption propensity analysis assumed that customers would be adopting market-ready products (expected 7 kW/13.5 kWh size), which typically supply about 2 hours of power at sustained maximum output. If a given residential customer were to minimize their electricity usage during an outage condition, these BTM storage units could meet basic demands for substantially longer. Even still, at some point the residential and/or C&I BTM storage resource would need to recharge, and thus would no longer be able to support Paso Robles Substation while restoration work is being done on the incapacitated transmission system components, or be in an adequate state of charge to potentially help solve a subsequent outage. As explained by CAISO in its comments on the Draft ASR: "following an initial discharge, the battery will need the ability to be charged to be available in subsequent days either in the event of a long duration outage or in preparation for a subsequent outage to meet the reliability requirements in the area (CAISO 2019)."

Overall, while the BTM adoption propensity results shown in Section 4.1 suggest that BTM storage could greatly reduce or completely avoid the amount of FOM storage needed under Alternative Battery Storage #1, BTM storage would be subject to the same duration limitations and would not fully address the concerns raised by CAISO, PG&E, and HWT. These findings indicate that Alternative Battery Storage #1 be insufficient to meet the transmission-level objective, whether or not BTM resources were

procured alongside (i.e., under Alternative Battery Storage #3). Likewise, the findings indicate that using BTM resources alone to meet the Transmission Objective under Alternative Battery Storage #3 would be insufficient.

4.3 Implications for Alternative Battery Storage #2 and the Distribution Objective

As discussed in Section 2.2, the Draft ASR considered the potential for FOM storage to address the Distribution Objective of the Proposed Project (Alternative Battery Storage #2). The Draft ASR found this alternative to be potentially feasible on its own merits, but the amount of FOM storage needed could be reduced through deployment/adoption of BTM resources. Additionally, BTM resources on their own (i.e., Alternative Battery Storage #3) could potentially fully meet the distribution needs of the Paso Robles DPA that would be addressed through the Proposed Project.

Based on the BTM adoption propensity results (Section 4.1), potential BTM adoption could far exceed the overall Paso Robles DPA capacity needs identified in the Applicants' proponent's environmental assessment (PEA) Appendix G (PG&E and HWT 2018) of 4.3 MW over 10 years. BTM storage can reduce peak load by charging during off-peak hours and discharging during peak hours to meet load demands. Particularly with inclusion of solar (which generates electricity and could directly charge associated BTM storage facilities), these BTM resources could reduce or avoid the forecasted overload conditions identified in the PEA Appendix G.

Although future load conditions would depend on where future development projects and other new load sources occur in the Paso Robles area, Table 7 shows that there is adoption potential along all feeders that connect to Paso Robles Substation. In particular, Paso Robles Feeder 1107, which passes through two of the anticipated growth areas in Golden Hill Industrial Park and near the Paso Robles Airport, has potential for BTM storage adoption of 9.5 MW / 18.7 MWh under the high scenario. Similarly, Paso Robles Feeder 1102 also passes through the Golden Hill Road area and has potential for adoption of 7.3 MW / 14.3 MWh of BTM storage under the high scenario. Capturing this BTM potential would directly reduce loading on these circuits, although BTM resources adoption along any of the Paso Robles feeders would help mitigate cumulative loading on the substation.

With respect to the 2019 GNA/DDOR, the amount of BTM resources adoption identified in Section 4.1 would exceed the identified needs for Paso Robles 1104 and Templeton Bank 3 in the PG&E filings. When taking into account the duration of the need associated with San Miguel Bank 1, the amount of BTM storage adoption potential (as expressed in MWh) would not fully meet this need. **Table 9** provides a comparison of the BTM storage adoption propensity results to the specific facility capacity needs in the 2019 DDOR.

Table 9. Comparison of BTM Storage Adoption Propensity Results to the Identified Capacity Needs in PG&E's 2019 DDOR

	Paso Robles 1104	San Miguel Bank 1	Templeton Bank 3	Total
Grid Needs Summary				
Grid Need (MW)	1.2	3.6	1.1	5.9 MW
Months	Jul – Aug	Jul – Sep	Jul – Aug	n/a
Calls/Year	21	122	23	n/a
Time Period	2 pm – 10 pm	6 am – 10 pm	12 pm – 3 pm	n/a
Duration (Hours)	8	9	3	n/a
Total Grid Need (MWh)	9.6	32.4	3.3	45.3 MWh
BTM Storage Adoption Propensity				
Low Scenario (MWh)	8.8	11.3	30.9	51 MWh
Medium Scenario (MWh)	9.8	13.5	34.2	57.5 MWh
High Scenario (MWh)	13.3	15.4	42.2	70.9 MWh

Source: PG&E 2019a

As shown in Table 9, the BTM storage adoption propensity numbers (expressed in MWh) for Paso Robles 1104 under both the medium and high scenarios would be sufficient to meet the total grid need (MW x Hours). In other words, the BTM storage resources, assuming they were fully charged at the start of the peak period and could be subsequently discharged in a coordinated fashion (a master control system may be required for this), could provide sufficient power over the course of the peak period (lasting from 2 p.m. – 10 p.m. during July to August on Paso Robles 1104) to meet demand. The timing of the duration requirement (July to August) on Paso Robles 1104 indicates that the solar plus storage profile is suitable for meeting this need.

Similarly, for Templeton Bank 3, the BTM storage adoption propensity under all scenarios considered would be sufficient to meet the total grid need. The time period associated with the Templeton Bank 3 grid need would only last 3 hours (from 12 p.m. to 3 p.m. during July to August), and thus the total grid need would only amount to 3.3 MWh, which is far less than the BTM storage that could potentially be achieved in this area. Under the low scenario, only about 23 percent of the identified economically-efficient customers would need to adopt BTM storage to meet the duration requirement.

Due to the grid need of 3.6 MW at San Miguel Bank 1 and long duration of the potential need (6 a.m. to 10 p.m.), BTM resources alone would not be able to fully meet this need. Even under the high scenario (15.4 MWh), the BTM resources would not be sufficient to

meet the total need (32.4 MWh). The shortfall could potentially be made up with FOM storage at or near San Miguel Substation. There appears to be available space at the substation site according to recent aerial imagery.

Overall, the analysis shows that BTM resources could potentially meet future expected load demand in the Paso Robles DPA. The total BTM adoption propensity for the Paso Robles DPA under the high scenario (100 MW of solar, 175 MW / 343 MWh of storage) would far exceed the projected increased load demand (4.3 MW over 10 years), as reported in the PEA Appendix G. However, when looking at specific facility capacity needs identified in the 2019 GNA/DDOR, BTM resources on their own could only meet two of the three needs. For the third need, FOM resources would also be required. All of this suggests that BTM resources could not on their own fully meet the Distribution Objective of the Proposed Project, but could be deployed alongside FOM storage to meet this objective.

5. Recommendations

The analysis in this report is considered adequate for assessing the potential feasibility of Alternative Battery Storage #3 (on its own and in tandem with the other DER alternatives being considered for the Proposed Project pursuant to CEQA). CPUC's DEIR will evaluate the potential environmental impacts associated with implementing Alternative Battery Storage #3 and will further describe the mechanisms by which BTM resources adoption could be encouraged and facilitated (e.g., through a targeted RFP). Should Alternative Battery Storage #3 be selected by the Commission for implementation, Kevala recommends several additional studies to further refine the potential BTM resources program in advance of any targeted procurement efforts that may occur. These include:

A. **Re-run the Analysis Closer to Procurement with Latest Available Data:** As load growth becomes more certain, the analysis should be re-run in advance of any targeted procurement efforts using data sources such as the latest GNA/DDOR filed, address-specific information on existing DER projects, and the most recent customer-specific AMI data.

B. **Consider Likely Adoption:** An adoption propensity study evaluates where adoption is economically efficient but does not consider other factors that impact a customer's ability to adopt, such as socioeconomics in the study area, expected perception or understanding of battery storage technology, efficacy of outreach and marketing programs, available roof space, etc. (Kevala's study does consider homeownership). These factors are considered when conducting a DER growth forecast and should be considered in advance of targeted BTM resource procurement to further refine the BTM program approach and identify the likely needed level of incentive. When possible, these should align with likely adoption factors used by either the CEC or investor owned utilities.

C. **Further Refine the Value of Lost Load**: Currently, there is no singular or universally agreed upon Value of Lost Load. A conservative value was modeled for this study at different outage frequencies. The appropriate value requires further research. Guidance is expected from the CPUC's resiliency and microgrid proceeding (R.19-09-009). The Value of Lost Load assumption can have a significant effect on the perceived cost-effectiveness of BTM resources and associated economic propensity for adoption.

D. **Consider Solar Adoption for C&I Customers:** The model assumed that C&I customers would place the highest value on BTM storage resources, absent solar, for demand charge reduction purposes, and did not consider potential solar plus storage adoption for these customers. Residential customers, by comparison, are not subject to demand charges. Under residential time-of-use rates, solar plus storage (together) is most cost effective. The model could be updated to consider the value of solar plus storage for specific types of C&I customers in the Paso Robles DPA, e.g., wineries.

E. **Evaluation of BTM Storage Growth Forecasts and Location-Specific Allocation, Using Existing and Available Data:** At the time of this analysis and report, feeder-specific forecasts for BTM storage have not yet been published by PG&E. Thus, it is not feasible to compare feeder-specific storage forecasts with the propensity for adoption results and "back out" estimates to avoid double counting. Provided that such forecasts are available in the future (e.g., in PG&E's 2020 GNA filing), this refinement to the propensity for adoption results should occur in advance of conducting a targeted procurement for BTM resources.

   Currently, utilities provide annual DER growth forecasts as total MW reduction on peak, rather than by estimated customer adoption. "Backing out" future DER growth additionally requires understanding of the hours in which DERs are contributing to net load, and their impact on feeder-specific peak load—in short, the "shape" of hourly DER generation. Providing only the total MW reduction on peak does not allow for scenario-based evaluation of changing DER behavior, such as the impact of promoting workplace charging, changing retail rate structures, or offering capacity payments for grid services.

   Understanding where current DER adoption has occurred can be very informative to disaggregation and allocation efforts, from the system level down to the feeder-specific level. Where this location-specific data can be made available, such as SGIP program data, California Solar Initiative program data, Demand Response participation data, or state-incentivized Energy Efficiency adoption data, it can be used to further identify DER growth allocation and likely participating customers.

F. **Evaluation of Current Policies and Incentives:** To align with existing modeling inputs the CPUC currently uses for its IRP modeling, Kevala's model uses the

performance assumptions for storage and total cost of PV + plus storage, including the application of NEM policy and SGIP incentives as these policies and incentives are currently administered. In advance of conducting a targeted procurement, these inputs may need to be adjusted to reflect the most current policies and costs.

G. Carefully Consider RFP Requirements: To ensure operational needs and performance requirements are met, a BTM resources program will require the development of some type of distribution capacity-based demand response program to ensure that resources are available when an event is called. The RFP to procure the required BTM resources should consider the following:

1. *Aggregators Available: Who might procure and aggregate resources?* The RFP should focus on aggregators capable of delivering the quantified net load impacts. It would need to consider the methods available in the service area that could be used to coordinate the BTM DERs such that the desired responses are adequate and reliable.

2. *Incentive Structure:* The adoption propensity analysis considered a Value of Lost Load in low, medium, and high scenarios, which may be used as indicators of the incentive levels required to procure the required BTM resources. Value of Lost Load is an economic value that may be considered by a customer acting on social or emotional responses to risk, but may not translate to a direct willingness-to-pay without extrinsic factors.

3. *Timing of DER and Type of Response to Calls:* The PG&E's 2019 GNA/DDOR identifies the capacity need within the day-ahead market, meaning that participants would receive advance notice when the service is needed, unlike real-time requirements. An RFP should consider when notice would be provided, and whether the required duration for each distribution need would require the BTM storage resource to charge off-peak from the grid to meet that need. The RFP should also consider how and when aggregated resources must behave and respond to meet the full required duration.

6. Conclusions

This report uses Kevala's big data analysis capability to analyze BTM solar plus storage adoption propensity in the Paso Robles DPA in support of the CPUC's CEQA analysis of the Proposed Project. The analysis finds that up to 100 MW of solar and 175 MW / 343 MWh of storage could be efficiently adopted under the high scenario. This amount of BTM resources exceeds the overall capacity needs in the DPA, and the amount of storage that could potentially be adopted at Paso Robles Substation and Templeton

Substation would be sufficient to fully meet demand *for given period of time* during one of the critical outages identified by the CAISO (see Transmission Objective).

However, batteries can only provide power for a certain period of time before needing to recharge. As such, BTM storage could only supply power for so long (standard residential storage products can sustain maximum output for 2 hours), and therefore could not solve a transmission outage for an extended period, even when paired with FOM storage (e.g., under Alternative Battery Storage #1). PG&E indicated that an outage of the Paso Robles – Templeton 70 kV Transmission Line or Templeton Transformer Bank #1 could last for multiple days, and therefore a battery solution would need to have a recharging window to be viable, but such a window would not be available under the outage conditions. For these reasons, BTM resources, even when paired with FOM storage, are not considered a feasible option for addressing the Transmission Objective of the Proposed Project.

Similarly, BTM resources on their own could not fully meet the Distribution Objective due to the duration requirements identified in the 2019 DDOR. While BTM resources could meet the capacity needs for Paso Robles Feeder 1104 and Templeton Bank 3, they could not fully meet the need for San Miguel Bank 1. Strategically placed FOM storage facilities could address this shortfall. Thus, Alternative Battery Storage #3 deployed in tandem with Alternative Battery Storage #2 could feasibly meet the Distribution Objective of the Proposed Project. When looking strictly at overall capacity requirements, the total potential BTM resources adoption far exceeds the stated total 4.3 to 5.9 MW deficiency in the DPA, lending further support for BTM resources as a feasible alternative.

From a practical perspective, customers in the Paso Robles area DPA may want to consider their annual energy use in light of this study with the help of an industry supplier or expert. As of 2019, about 17,000 customers (residential and C&I) of the roughly 75,500 customers studied meet the criteria for economically-efficient adoption of BTM resources. BTM storage can be cost-effective for certain C&I customers with payback times as low as 4.8 years for some but on average about 6.3 years. This applies to 4 percent to 6 percent of the roughly 13,500 C&I customer meters studied, and their BTM storage adoption could reduce peak loads in the Paso Robles area by about 4.6 MW / 11 MWh (under the low scenario) if called upon. For about 20 percent of the roughly 62,000 residential customer meters studied, payback time for solar plus storage is expected to be fewer than 10 years, and these payback periods are expected to improve in the coming years as the cost of storage continues to decline.

Kevala’s conservative assumption regarding Value of Lost Load, which affects BTM adoption efficiency, should also be revisited in light of the CPUC’s new resiliency and microgrid proceeding (R.19-09-009) and many other associated, ongoing proceedings, including the Distribution Resources Plan proceeding (R.14-08-013) and Wildfire Mitigation Plans proceeding (R.18-10-007). Assumptions about how customers value lost load (i.e., keeping the lights on during a potential power loss event) impacts the

payback period calculations for BTM systems. In addition, this study informs the ongoing discussions about location-specific targeting of DER to meet specified grid needs.

7. References

CAISO. *See* California Independent System Operator.

California Distributed Generation Statistics. 2019. Distributed Generation Interconnection Program Data. Available: www.californiadgstats.ca.gov/downloads/.

California Independent System Operator. 2019. CAISO Comments on the Estrella Substation and Paso Robles Area Reinforcement Project (A.17-01-023) – Draft Alternatives Screening Report. Available: www.cpuc.ca.gov/environment/info/horizonh2o/estrella/Draft%20ASR%20Comments/1_Agencies/CAISO.pdf.

California Public Utilities Commission. 2019a. Estrella Substation and Paso Robles Area Reinforcement Project, Draft Alternatives Screening Report. Available: www.cpuc.ca.gov/environment/info/horizonh2o/estrella/docs/2019-0325%20Estrella_ASR_PublicDraft.pdf.

California Public Utilities Commission. 2019b. Proposed Inputs & Assumptions: 2019-2020 Integrated Resource Planning. Available: www.cpuc.ca.gov/uploadedFiles/CPUCWebsite/Content/UtilitiesIndustries/Energy/EnergyPrograms/ElectPowerProcurementGeneration/irp/2018/Prelim_Results_Proposed_Inputs_and_Assumptions_2019-2020_10-4-19.pdf.

CPUC. *See* California Public Utilities Commission.

Horizon West Transmission, LLC. 2019. Comments of Horizon West Transmission, LLC (formerly known as NextEra Energy Transmission West, LLC) (U 222-E) on Draft Alternatives Screening Report for the Estrella Substation and Paso Robles Area Reinforcement Project (A.17-01-023). Available: www.cpuc.ca.gov/environment/info/horizonh2o/estrella/Draft%20ASR%20Comments/2_Applicants/NEET%20West.pdf.

HWT. *See* Horizon West Transmission, LLC.

NERC. *See* North American Electric Reliability Corporation.

North American Electric Reliability Corporation. No Date. Standard TPL-001-4 – Transmission System Planning Performance Requirements. Accessed January 27, 2020. Available: https://www.nerc.com/files/TPL-001-4.pdf

Pacific Gas & Electric Company. 2019a. Revised 2019 Distribution Deferral Opportunity Report – Public Version and Distribution Grid Needs Assessment – Public Version.

Pacific Gas & Electric Company. 2019b. Estrella Substation and Paso Robles Area Reinforcement Project (A.17-01-023) – Pacific Gas and Electric Company Comments on Draft Alternatives Screening Report. Available: www.cpuc.ca.gov/environment/info/horizonh2o/estrella/Draft%20ASR%20Comments/2_Applicants/PG&E.pdf.

Pacific Gas & Electric Company. 2019c. Estrella Substation and Paso Robles Area Reinforcement Project, Proponent's Environmental Assessment (A.17-01-023) – Response to CPUC Data Request No. 3. Available: www.cpuc.ca.gov/environment/info/horizonh2o/estrella/docs/PGE%20Response%20to%20Estrella%20Data%20Request%203.pdf.

Pacific Gas & Electric Company. 2019d. Estrella Substation and Paso Robles Area Reinforcement Project, Proponent's Environmental Assessment (A.17-01-023) – Response to CPUC Data Request No. 3, Exhibit 1. Available: www.cpuc.ca.gov/environment/info/horizonh2o/estrella/Deficiency_Data%20Responses.html.

Pacific Gas & Electric Company. 2019e. Electric Distribution Resources Plan Application 2015, Rulemaking 14-10-003, 15-07-006, Data Response (PG&E Data Request No. ED 019-Q01-18 Rev01).

Pacific Gas & Electric Company and Horizon West Transmission, LLC. 2018. Proponent's Environmental Assessment, Estrella Substation and Paso Robles Area Reinforcement Project – Updated Appendix G. Distribution Need Analysis. Available: www.cpuc.ca.gov/environment/info/horizonh2o/estrella/docs/App%20G%20-%20Update%204.pdf.

PG&E. *See* Pacific Gas & Electric Company.

Rahman, Brian, Executive Director of Engineering, ZGlobal, Inc. October 2019. Personal communication via email with California Public Utilities Commission and Horizon Water and Environment, LLC regarding recharging a battery energy storage system during a transmission-level outage.

ZGlobal. *See* ZGlobal, Inc.

ZGlobal, Inc. 2019. Estrella Substation BESS Alternatives Analysis – Updated with BTM Analysis September 10, 2019.

Appendix A.
Distribution Need Comparison

Table A-1. Comparison of Distribution Needs Identified in PG&E and HWT's 2017 Application and the 2018 and 2019 GNA / DDORs

Facility	Forecasted Overload / Distribution Need				
		2018 PG&E GNA / DDOR		2019 PG&E GNA / DDOR	
	2017 Application to CPUC and Data Responses to Energy Division	Web Portal Download, "Planned Investment" (MW)	Candidate Deferrals (MW, hours)	Estrella "Planned Investment" (MW)	Estrella Candidate Deferral (MW, hours)
Paso Robles 1102	Yes	n/a	n/a	n/a	n/a
Paso Robles 1103	n/a	1.88	0.42, 2 hours	n/a	n/a
Paso Robles 1104	n/a	n/a	n/a	1.15	1.2, 8 hours
Paso Robles 1107	Yes	0.25	0.25, 2 hours	n/a	n/a
Paso Robles 1108	Yes	0.18	0.18, 1 hour	n/a	n/a
San Miguel 1104	Yes	0.28	0.28, 2 hours	n/a	n/a
San Miguel Bank 1	n/a	1.53	1.53, 6 hours	1.68	3.6 MW, 9 hours
Templeton 2109	Yes	n/a	n/a	n/a	n/a
Templeton 2113	Yes	n/a	n/a	n/a	n/a
Templeton Bank 2	n/a	0.75	0.75, 2 hours	n/a	n/a
Templeton Bank 3	n/a	n/a	n/a	0.12	1.1, 3 hours
L/S R78 - Templeton 2109	n/a	n/a	n/a	8.5	8.5, 4 hours

Facility	Forecasted Overload / Distribution Need				
		2018 PG&E GNA / DDOR		2019 PG&E GNA / DDOR	
	2017 Application to CPUC and Data Responses to Energy Division	Web Portal Download, "Planned Investment" (MW)	Candidate Deferrals (MW, hours)	Estrella "Planned Investment" (MW)	Estrella Candidate Deferral (MW, hours)
Cholame (between X14 and R96)	n/a	n/a	n/a	1.5	1.5, 4 hours
Cholame Sub DA	n/a	n/a	n/a	3.5	3.5, 48 hours
Cholame Sub RT	n/a	n/a	n/a		3.5, 24 hours[b]
Totals	**4.3[a]**	**4.9**	**3.4 MW**	**16.5**	**19.4 MW**

Notes:

a. Only the total was provided by PG&E.

b. The 3.5 MW value is only counted once in the 19.4 MW total.

Appendix B.
Detailed BTM Adoption Propensity Results

Table B-1. BTM Adoption Propensity Results for Low, Medium, and High Scenarios – All Customer Types

Feeders	LOW SCENARIO				MEDIUM SCENARIO				HIGH SCENARIO			
	Custo-mers	Solar (MW)	Storage (MW)	Storage (MWh)	Custo-mers	Solar (MW)	Storage (MW)	Storage (MWh)	Custo-mers	Solar (MW)	Storage (MW)	Storage (MWh)
Atascadero 1101	1,439	7.2	10.0	19.4	1,547	7.6	11.0	21.3	1,741	8.0	14.2	27.7
Atascadero 1102	472	2.5	3.3	6.4	502	2.5	7.1	13.7	595	3.0	4.7	9.2
Atascadero 1103	1,358	7.0	9.6	18.6	1,466	7.3	10.4	20.3	1,705	8.3	13.8	26.8
Paso Robles 1101	123	0.4	0.8	1.7	128	0.4	0.9	2.1	151	0.5	1.1	2.5
Paso Robles 1102	676	3.3	4.8	9.3	746	3.5	5.4	10.6	881	3.8	7.3	14.3
Paso Robles 1103	1,112	5.7	9.7	15.1	1,213	6.1	8.6	16.6	1,324	7.0	10.9	21.5
Paso Robles 1104	624	3.4	4.5	8.8	682	3.6	4.9	9.8	843	4.3	6.7	13.3
Paso Robles 1106	1,737	8.0	12.2	23.6	1,881	8.5	13.4	26.0	2,325	10.1	18.8	36.5
Paso Robles 1107	918	4.6	6.6	12.9	981	4.7	7.1	14.2	1,123	5.0	9.5	18.7
Paso Robles 1108	1,399	6.6	9.9	19.2	1,512	6.9	10.8	21.4	1,822	8.0	14.9	29.2
San Miguel 1104	466	2.5	3.3	6.5	495	2.6	3.7	7.8	442	2.2	4.1	8.6
San Miguel 1105	348	1.8	2.5	4.8	376	1.8	2.7	5.4	421	2.4	3.4	6.8
San Miguel 1106	53	0.3	0.4	0.7	56	0.3	0.4	0.8	58	0.4	0.5	1.0
San Miguel 1107	42	0.2	0.3	0.6	48	0.2	0.3	0.6	49	0.2	0.4	0.8

Feeders	LOW SCENARIO				MEDIUM SCENARIO				HIGH SCENARIO			
	Custo-mers	Solar (MW)	Storage (MW)	Storage (MWh)	Custo-mers	Solar (MW)	Storage (MW)	Storage (MWh)	Custo-mers	Solar (MW)	Storage (MW)	Storage (MWh)
Templeton 2108	894	4.4	6.3	12.3	956	4.5	6.8	13.3	1,139	6.0	9.3	18.2
Templeton 2109	1,473	7.2	10.7	20.9	1,576	7.5	11.6	23.4	1,565	7.5	13.8	27.6
Templeton 2110	997	5.1	7.0	13.7	1,077	5.3	7.7	15.1	1,126	5.1	9.3	18.3
Templeton 2111	1,037	5.9	7.3	14.2	1,122	6.1	8.0	15.6	1,231	6.2	10.4	20.2
Templeton 2112	284	1.7	2.0	4.2	300	1.8	2.2	4.8	302	1.3	2.5	5.3
Templeton 2113	1,958	10.2	13.8	26.7	2,115	10.7	15.0	29.4	2,255	11.1	18.9	36.9
Totals	**17,410**	**88**	**125**	**240**	**18,779**	**92**	**138**	**272**	**21,098**	**100**	**175**	**343**

Table B-2. BTM Adoption Propensity Results for Residential Customers

Feeders	LOW SCENARIO				MEDIUM SCENARIO				HIGH SCENARIO			
	Custo-mers	Solar (MW)	Storage (MW)	Storage (MWh)	Custo-mers	Solar (MW)	Storage (MW)	Storage (MWh)	Custo-mers	Solar (MW)	Storage (MW)	Storage (MWh)
Atascadero 1101	1,425	7.2	10.0	19.2	1,532	7.6	10.8	20.8	1,726	8.0	14.1	27.1
Atascadero 1102	463	2.5	3.2	6.2	493	2.5	7.0	13.5	586	3.0	4,7	9.0
Atascadero 1103	1,346	7.0	9.5	18.3	1,453	7.3	10.2	19.7	1,692	8.3	13.6	26.2
Paso Robles 1101	78	0.4	0.6	1.1	83	0.4	0.6	1.1	106	0.5	0.8	1.6
Paso Robles 1102	658	3.3	4.6	8.9	728	3.5	5.2	9.9	863	3.8	7.1	13.7
Paso Robles 1103	1,100	5.7	9.6	14.9	1,201	6.1	8.5	16.3	1,312	7.0	10.8	21.2

Feeders	LOW SCENARIO				MEDIUM SCENARIO				HIGH SCENARIO			
	Custo-mers	Solar (MW)	Storage (MW)	Storage (MWh)	Custo-mers	Solar (MW)	Storage (MW)	Storage (MWh)	Custo-mers	Solar (MW)	Storage (MW)	Storage (MWh)
Paso Robles 1104	597	3.4	4.2	8.1	655	3.6	4.6	8.9	816	4.3	6.4	12.4
Paso Robles 1106	1,712	8.0	12.0	23.1	1,856	8.5	13.1	25.2	2,300	10.1	18.5	35.7
Paso Robles 1107	893	4.6	6.3	12.1	955	4.7	6.7	13.0	1,097	5.0	9.1	17.5
Paso Robles 1108	1,359	6.6	9.5	18.4	1,472	6.9	10.4	20.0	1,782	8.0	14.4	27.9
San Miguel 1104	416	2.5	2.9	5.6	438	2.6	3.1	6.0	385	2.2	3.5	6.8
San Miguel 1105	339	1.8	2.4	4.6	367	1.9	2.6	5.0	412	2.4	3.3	6.4
San Miguel 1106	50	0.3	0.4	0.7	53	0.3	0.4	0.7	55	0.4	0.5	0.9
San Miguel 1107	42	0.2	0.3	0.6	48	0.2	0.3	0.7	49	0.3	0.4	0.8
Templeton 2108	869	4.4	6.1	11.7	931	4.6	6.6	12.7	1,114	6.0	9.1	17.5
Templeton 2109	1,417	7.2	9.9	19.2	1,517	7.5	10.7	20.6	1,506	7.5	12.9	24.8
Templeton 2110	975	5.1	6.8	13.2	1,055	5.3	7.4	14.3	1,104	5.1	9.1	17.6
Templeton 2111	1,026	5.9	7.2	13.9	1,111	6.1	7.8	15.1	1,220	6.2	10.2	19.7
Templeton 2112	232	1.7	1.6	3.1	247	1.8	1.7	3.3	249	1.3	2.0	3.9
Templeton 2113	1,914	10.2	13.4	25.8	2,064	10.7	14.5	28.0	2,204	11.1	18.4	35.5
Totals	**16,912**	**87.9**	**120.3**	**228.5**	**18,255**	**92.0**	**132.1**	**254.8**	**20,576**	**100.2**	**168.8**	**326.0**

Table B-3. BTM Adoption Propensity Results for C&I Customers

Feeders	LOW SCENARIO			MEDIUM SCENARIO			HIGH SCENARIO		
	Custo-mers	Storage (MW)	Storage (MWh)	Custo-mers	Storage (MW)	Storage (MWh)	Custo-mers	Storage (MW)	Storage (MWh)
Atascadero 1101	*	0.02	0.12	*	0.18	0.53	*	0.18	0.53
Atascadero 1102	*	0.06	0.14	*	0.06	0.19	*	0.06	0.19
Atascadero 1103	*	0.14	0.33	*	0.20	0.61	*	0.20	0.61
Paso Robles 1101	45	0.28	0.67	45	0.32	0.96	45	0.32	0.96
Paso Robles 1102	18	0.20	0.43	18	0.22	0.67	18	0.22	0.67
Paso Robles 1103	*	0.11	0.25	*	0.12	0.35	*	0.12	0.35
Paso Robles 1104	27	0.28	0.70	27	0.30	0.91	27	0.30	0.91
Paso Robles 1106	25	0.24	0.54	25	0.27	0.81	25	0.27	0.81
Paso Robles 1107	25	0.35	0.81	26	0.40	1.21	26	0.40	1.21
Paso Robles 1108	40	0.39	0.87	40	0.45	1.36	40	0.45	1.36
San Miguel 1104	50	0.36	0.82	57	0.61	1.82	57	0.61	1.82
San Miguel 1105	*	0.11	0.26	*	0.13	0.40	*	0.13	0.40
San Miguel 1106	*	0.03	0.05	*	0.03	0.08	*	0.03	0.08
San Miguel 1107	0	0	0	0	0	0	0	0	0
Templeton 2108	25	0.21	0.53	25	0.22	0.67	25	0.22	0.67

Feeders	LOW SCENARIO			MEDIUM SCENARIO			HIGH SCENARIO		
	Custo-mers	Storage (MW)	Storage (MWh)	Custo-mers	Storage (MW)	Storage (MWh)	Custo-mers	Storage (MW)	Storage (MWh)
Templeton 2109	56	0.80	1.77	59	0.94	2.81	59	0.94	2.81
Templeton 2110	22	0.22	0.52	22	0.25	0.74	22	0.25	0.74
Templeton 2111	*	0.14	0.34	*	0.16	0.49	*	0.16	0.49
Templeton 2112	52	0.42	1.03	53	0.48	1.45	53	0.48	1.45
Templeton 2113	44	0.36	0.86	51	0.48	1.44	51	0.48	1.44
Totals	**499**	**4.69**	**11.01**	**520**	**5.83**	**17.49**	**520**	**5.83**	**17.49**

Note: *Redacted customer counts and associated data. Checking with PG&E to confirm whether this data is confidential due to low customer counts on these feeders.

This page intentionally left blank