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4 DESCRIPTION AND EVALUATION OF ALTERNATIVES

Section 15126.6, subdivisions (a) and (f)(2)(A) of the California Environmental Quality Act (CEQA) Guidelines (Title 14 California Code of Regulations) and Assigned Commissioner's Ruling on Application 01-07-004 (dated October 16, 2002) do not require a review of alternatives when a project will not result in significant environmental impacts after mitigation, as is the case with the Proposed Project. However, the CPUC has adopted an "Information and Criteria List" to determine whether applications for projects are complete, which specifies the information required from any applicant for a project subject to CEQA. As the lead agency, the CPUC requires applicants for a Permit to Construct or a Certificate of Public Convenience and Necessity to describe a reasonable range of alternatives within the PEA. This section summarizes and compares the environmental advantages and disadvantages of the Proposed Project and the alternatives considered. In accordance with the CPUC requirements, SDG&E evaluated a reasonable range of alternatives that meet most of the project objectives.

4.1 INTRODUCTION

The CPUC PEA Checklist asks public utilities to provide a summary of alternatives that would meet most of the objectives of the Proposed Project and an explanation as to why they were not chosen as the Proposed Project. The CPUC PEA Checklist requests that the discussion of alternatives include alternatives capable of substantially reducing or eliminating any significant environmental effects, even if the alternative(s) substantially impede the attainment of the project objectives, and are more costly. As analyzed within PEA Sections 5.1 through 5.18, no significant unavoidable impacts are anticipated to result from construction, operation, or maintenance of the Proposed Project.

4.2 METHODOLOGY

This section of the PEA describes the alternatives considered by SDG&E and CAISO during the Project planning process. This section then also evaluates each alternative as to whether or not it achieves the Proposed Project objectives as well as whether or not it may reasonably be expected to reduce adverse effects on the environment when compared with the Proposed Project, especially where significant, unavoidable impacts have been identified for the Proposed Project.

It is important to note that while SDG&E has reviewed the alternatives described herein from an electrical feasibility perspective, SDG&E has not completed a review of the engineering feasibility or constructability. SDG&E has also not performed a preliminary design for said alternatives.

4.3 DESCRIPTION OF ALTERNATIVES

In accordance with the CPUC PEA Checklist, this section considers the following potential alternatives:

- No Project Alternative
- Alternative 1 – 3rd Sycamore to Pomerado 69kV Power Line
- Alternative 2 – Proposed Project with GIS 230kV Substation Design
- Alternative 3 – Chicarita 69kV Conversion Alternative

4.3.1 No Project Alternative

CEQA requires consideration of a "No Project Alternative." The purpose of the No Project Alternative is to enable decision-makers to compare the impacts of approving the Proposed Project against the impacts of not approving the Proposed Project. The No Project Alternative assumes the Artesian Substation would not be expanded and that none of the other system upgrades included within the Proposed Project would be implemented.

4.3.2 Alternative 1 – 3rd Sycamore Canyon to Pomerado 69kV Power Line

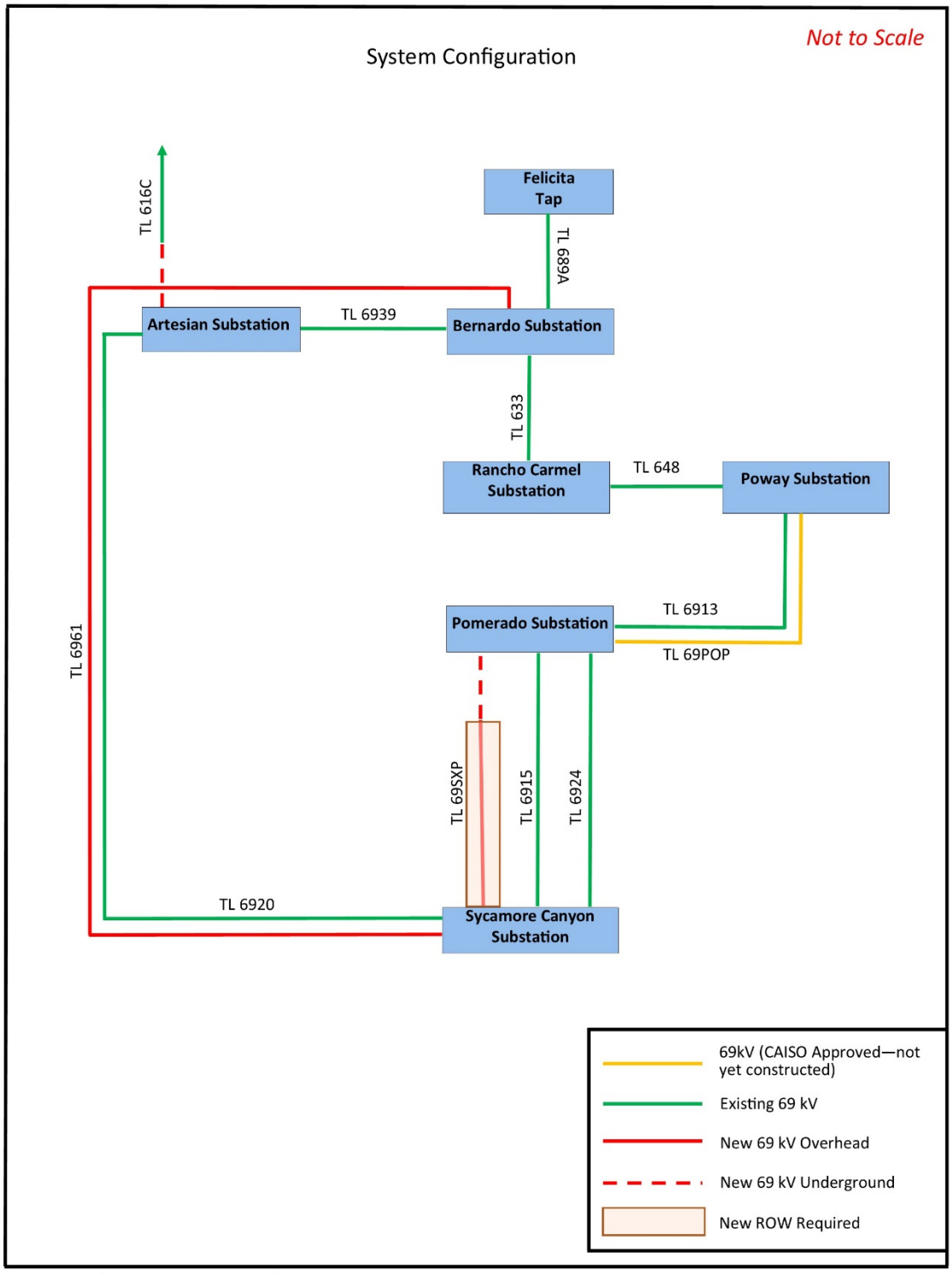
Alternative 1 would create a 3rd Sycamore Canyon to Pomerado 69kV power line. In addition, Alternative 1 also includes other system upgrades, including new power lines and reconductored power lines. The main elements of Alternative 1 are as follows (see Figure 4-1, Alternative 1 System Overview):

- Construction of a new 69kV power line with a minimum rating of 174 MVA between the existing Sycamore Canyon and Pomerado Substations (TL69SXP). TL69SXP would likely be constructed in some combination of overhead and underground, and would have a length between approximately 1.5 to 3 miles. Sufficient ROW does not currently exist to accommodate a new TL69SXP line, therefore a combination of new ROW[1] and franchise position would likely be required.
- Construction of a new, approximately 13-mile 69kV power line with an emergency rating of 174 MVA between the existing Sycamore Canyon and Bernardo Substations[2] (TL6961). TL6961 would be constructed in a predominately overhead position and would utilize existing SDG&E ROW.

[1] SDG&E has not evaluated the existing properties and development between the Sycamore Canyon and Pomerado substations; therefore SDG&E cannot verify if sufficient space exists to obtain sufficient new ROW for TL69SXP.

[2] TL69SXB would not connect to the Artesian Substation. In order to create a position for TL6961 at the Bernardo 69kV substation rack, existing power line TL616C (which is currently connected to Bernardo) would connect to Artesian, creating the vacant position for the new TL6961.

Figure 4-1: Alternative 1 System Overview



4.3.3 Alternative 2 – Proposed Project with 230kV GIS Substation Yard Design

Alternative 2 proposes the 230kV portion of the expanded Artesian Substation to be designed as a gas insulated substation . Under Alternative 2, the 230kV substation yard would be of a gas insulated substation design, whereby the 230kV bus and bay positions and other equipment would be housed within an enclosed gas insulated substation building. The 230/69kV transformer, 230kV line and transformer deadends and remaining substation equipment would remain air insulated (outside of the gas insulated substation building). Construction of the 230/69kV substation yard as a gas insulated substation would necessitate relatively minor changes to the civil design and required grading plans (cut, fill, foundations, etc.). Under Alternative 2, the 69/12kV substation yard would remain as an air insulated substation (AIS) design and would not be substantially different from the Proposed Project layout for the 69/12kV yard. The following elements of Alternative 2 would be substantially similar to the Proposed Project:

- 69kV underground substation getaways (Artesian and Bernardo Substations);
- 69kV power line reconductor (including new structures, structure removals, and cable poles);
- Minor modifications at the Bernardo and Rancho Carmel Substations; and
- Minor Distribution Line work.

There would be slight differences in the site development and grading scope of work on the western parcel, but all other project elements would be the same as the Proposed Project (refer to Section 3.0). The GIS design would include the installation of two bays of 230kV, like the Proposed Project's configuration, but would include space for a total of three bays of 230kV which would allow for an ultimate of six positions (elements) within the 230kV yard.

230kV Gas Insulated Substation Design

The size (footprint) of the 230kV GIS substation yard would be the approximately the same as for the AIS design included with the Proposed Project (approximately 3 acres). The 230kV bus and bays would be housed within the GIS structure, which would be approximately 50 feet tall with a footprint of 155 feet by 85 feet with a control shelter approximately 32 feet wide by 85 feet long attached to the north side of the GIS building. The 230kV transmission lines would enter the building overhead from 230kV deadend structures and would exit the building to 230kV transformer deadend structures.

230kV Substation Getaway

The 230kV connection would be very similar to the design of the Proposed Project[3]. Two new, approximately 130-foot 230kV engineered drop-down poles (tubular steel poles) would create a

[3] While SDG&E has not completed a preliminary design of this alternative, the 230kV getaway could also be via a new underground connection, with two new approximately 160-foot 230kV cable poles.

loop-in from the existing 230kV transmission line located immediately adjacent to the Artesian Substation site.

4.3.4 Alternative 3 – Chicarita 69kV Conversion

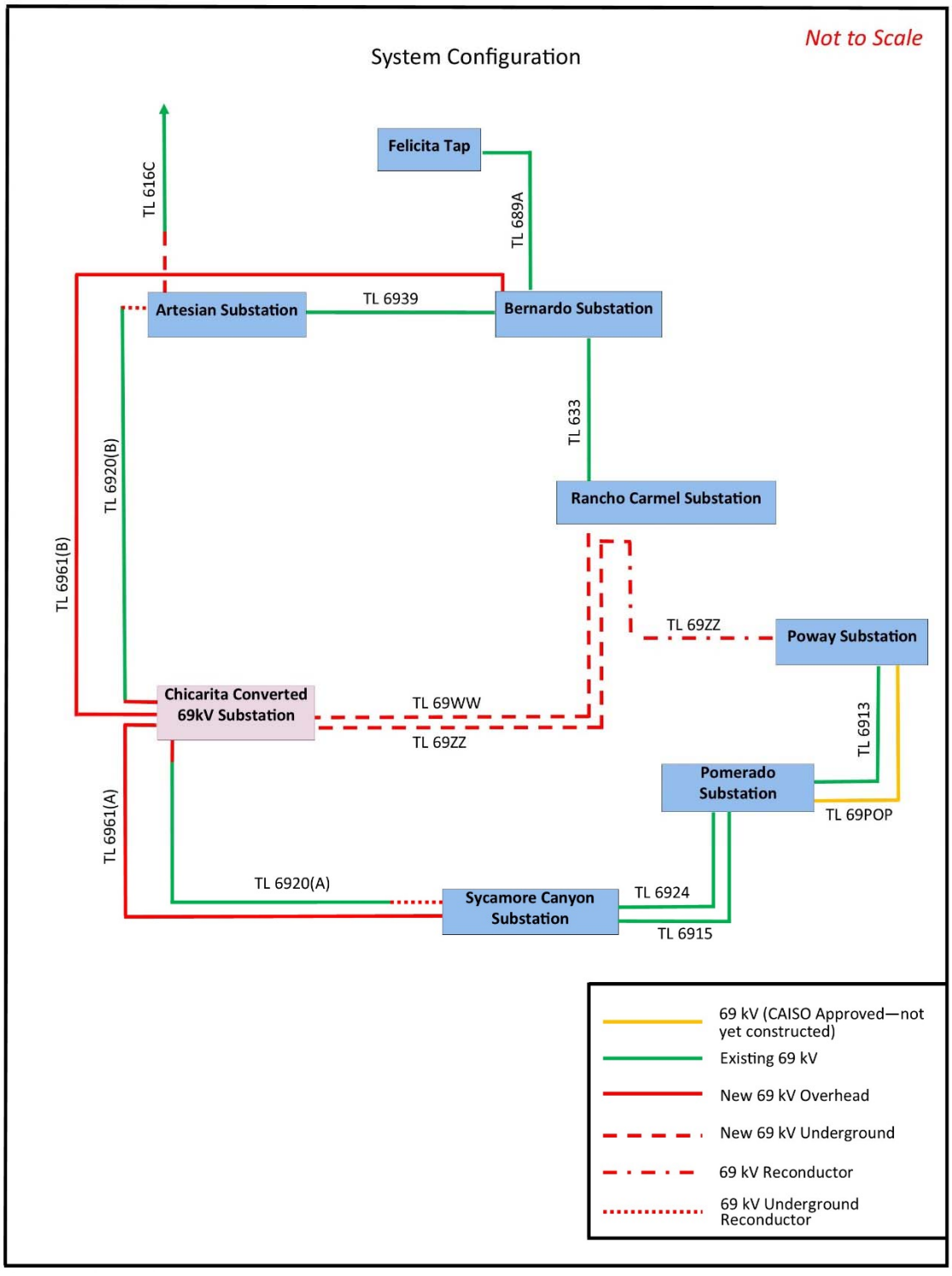
The main component of Alternative 3 would be the conversion of the existing Chicarita 138/12kV Substation to a 69/12kV substation. In order to convert the existing Chicarita 138/12kV substation to a 69/12kV substation, the substation yard must be expanded onto adjoining SDG&E property and the new 69kV substation equipment would replace the existing 138kV equipment, as needed. The Chicarita substation currently connects to two 138kV power lines. The converted Chicarita 69/12kV substation would connect to six 69kV power lines [TL6920(a), TL6920(b), TL6961(a), TL6961(b), TL 69WW, and TL69ZZ – see Figure 4-2, Alternative 3 System Overview] and would include three 69/12kV transformers.

The existing 1.8 acre substation yard at the Chicarita substation site is not sufficient to install the necessary substation equipment to connect to the five 69kV power lines. Therefore, the Chicarita Substation site would need to be further developed and expanded by approximately 3.3 acres (the converted 69/12kV substation yard would be a total of approximately 5.1 acres). The Chicarita substation currently is located on an approximately 6.77 acre property that is owned by SDG&E.

In addition, SDG&E anticipates that the 69kV substation would be designed with an AIS structure approximately 45 feet tall and 300 feet long. If this structure could not fit on the property then a GIS design would be used. Alternative 3 would also include the following system upgrades and new facilities (refer to Figure 4-2):

- Construction of a new 69kV power line with a minimum rating of 137 MVA between the existing Sycamore Canyon Substation and the converted Chicarita Substation previously approved TL6961 to be looped in as TL6961A and TL6961B. The new TL6961A and 6961B would be approximately 5.8 and 6.2 miles in length, respectively, and would be located within existing SDG&E ROW in a predominately overhead position.
- Construction of a new 69kV power line with a minimum rating of 180 MVA between the converted Chicarita Substation and the existing Rancho Carmel Substation (TL69WW). TL69WW could potentially be installed in an underground position (within franchise position in city streets) or potentially within new or existing ROW in a predominantly overhead position. The new TL69WW would be approximately 3 – 5 miles in length, depending on the potential route(s).

Figure 4-2: Alternative 3 System Overview



- Construction of a new 69kV power line with a minimum rating of 180 MVA between the converted Chicarita Substation and the existing Poway Substation (TL69ZZ). TL69ZZ would likely follow TL69WW between the Chicarita and Rancho Carmel Substations. The Chicarita to Rancho Carmel segment of TL69ZZ could be either underground or overhead, within new or existing ROW, or franchise position (as described above for TL69WW). The new TL69ZZ power line would then utilize existing ROW and support structures located between the Rancho Carmel and Poway Substations (approximately 3.7 miles) to complete the new Chicarita to Poway 69 kV connection. In order to achieve the required line rating, the existing conductor between Rancho Carmel and Poway Substations would be reconductored.
- Reconductor portions of existing 69kV power line TL6920 to achieve a minimum rating of 137 MVA between the existing Sycamore Canyon Substation and the converted Chicarita Substation and between the Chicarita and Artesian Substations.[4] The TL6920 reconductor would be conducted utilizing existing ROW, underground trench, and overhead support structures[5].
- Existing power line 6920 would be split (into TL6920A and 6920B) at the Chicarita Substation and would then be looped into the new 69/12kV Chicarita Substation.
- As part of the Chicarita 69kV conversion, two existing 138kV power lines (TL13820 and TL13811) would be disconnected from the Chicarita Substation and would be "connected" to each other adjacent to the Chicarita Substation to form a single 138kV power line circuit from Sycamore Canyon to a three terminal tap (the North County Metering Tap) and ultimately terminating at the existing Shadowridge Substation.

4.4 EVALUATION OF ALTERNATIVES

SDG&E evaluated several alternatives based upon feasibility and ability to fulfill the Proposed Project objectives. The alternatives discussed below, except for the No Project Alternative, achieve Objective No. 1. Alternatives 1 and 3 do not fully achieve objectives 2 and 3. In addition, some alternatives were judged to have potentially greater adverse environmental impacts than the Proposed Project, or other undesirable factors that resulted in their removal from further consideration, as further explained below.

[4] Note that following the conversion of the Chicarita Substation to 69/12kV, existing TL6920 would be looped into the Chicarita Substation thus splitting TL6920 into two circuits: 6920(a) [from Sycamore Canyon to Chicarita]; and 6920(b) from Chicarita to Artesian.

[5] While SDG&E anticipates that the existing TL6920 structures could be utilized for the reconductor, SDG&E has not conducted a review of the structural adequacy of the existing structures, and structure modifications or replacements could be required in order to complete the TL6920 reconductor.

4.4.1 Proposed Project Objectives

As outlined in Section 2.0, Proposed Project Purpose and Need, the objectives for the Proposed Project are:

1. Meet mandatory NERC reliability criteria and avoid existing NERC thermal violations identified in the Poway Area Load Pocket;
2. Alleviate existing 69kV congestion at the Sycamore Canyon 230/138/69kV Substation;
3. Locate proposed facilities within existing transmission corridors, SDG&E ROW, and utility owned property.

4.4.2 No Project Alternative

As stated above, the No Project Alternative assumes the Artesian Substation would not be expanded and that none of the other system upgrades included within the Proposed Project would be implemented.

4.4.2.1 Attainment of Project Objectives by the No Project Alternative

SDG&E would not be able to achieve the Proposed Project's Objectives Nos. 1 and 2 if the No Project Alternative was selected. The No Project Alternative would result in adverse effects on the operation of the existing electrical system, including NERC Category P1 overload violations and continuing congestion of the existing 69kV system from Sycamore Canyon to the Poway Area Load Pocket. As shown in Section 2.1.1, Existing and Projected Electric System Constraints, the current system configuration creates P1 NERC thermal violations on the existing 69kV power lines that feed the Poway Area Load Pocket (which is forecasted to grow by as much as 15 percent over the next ten years[6]).

Proposed Project Objective No. 3 would not apply to the No Project Alternative because no new facilities or upgrades would be constructed.

4.4.2.2 Avoidance or Reduction of Potentially Significant Adverse Impacts

The Proposed Project would result in only less than significant adverse impacts (following implementation of APMs) to all resources areas, as outlined in PEA Sections 5.1 through 5.18. Therefore, the No Project Alternative would not avoid or reduce any significant impacts.

4.4.2.3 Conclusion

The No Project Alternative does not meet the objectives of the Proposed Project and fails to address the identified NERC violations and 69kV congestion concerns. The No Project Alternative would not reduce or avoid any significant impacts because the Proposed Project would not result in any such impacts. Therefore, SDG&E rejected the No Project Alternative.

[6] Based on the SDG&E Individual Non-Coincident Substation Load Forecast Published in March 2013.

4.4.3 Alternative 1 – 3rd Sycamore Canyon to Pomerado 69kV Power Line

The 3rd Sycamore Canyon to Pomerado 69kV Power Line alternative was part of the Proposed Project review conducted by the CAISO; however, the CAISO ultimately approved the Artesian 230kV Substation Expansion project (Proposed Project). The following subsections discuss how Alternative 1 achieves the Proposed Project Objectives and how it would compare to the Proposed Project in terms of adverse effects on the environment.

4.4.3.1 Attainment of Project Objectives by Alternative 1

Objective No. 1

Under current conditions as described in Section 2.1.1, loss of either TL6915 or TL6924 results in a NERC Category P1 violation of the other line. Alternative 1 would provide a third 69kV power line between Sycamore Canyon and Pomerado. Therefore, if either TL6915 or TL6924 is lost, the new system configuration will be sufficient to avoid the NERC Category P1 thermal violation. As a result, Alternative 1 would achieve Objective 1.

Objective No. 2

As explained in Section 2.1.1, the Poway Area Load Pocket is primarily supported by three 69kV power lines sourced from Sycamore Canyon Substation (230kV source). In the year 2020, SDG&E forecasts that approximately 82 percent of the Poway Area Load Pocket load will be supplied by the three 69kV power lines out of the Sycamore Canyon Substation (TL6920, TL6915, and TL6924). While Alternative 1 would create two (2) additional 69kV power lines that would help supply power to the Poway Area Load Pocket, the Sycamore Canyon substation would remain the primary (230kV) source feeding the Poway Area Load Pocket. Therefore, while Alternative 1 would reduce the usage of the three existing 69kV power lines out of Sycamore Canyon, Alternative 1 would not create a 2nd 230kV source and as such would not reduce the overall congestion at the Sycamore Canyon Substation. Therefore, Alternative 1 would not achieve Objective No. 2.

Objective No. 3

As explained above, construction of a new Sycamore Canyon to Pomerado 69kV power line would require new ROW. Therefore, Alternative 1 does not achieve Objective No. 3.

4.4.3.2 Avoidance or Reduction of Impacts

As a result of the larger footprint and scope of work associated with Alternative 1 when compared to the Proposed Project, Alternative 1 is anticipated to have greater adverse effects on the environment when compared to the Proposed Project. Specific resource areas are discussed below in further detail.

Air Quality and Greenhouse Gases

Emissions of criteria pollutants from electric utility projects primarily result from the utilization of diesel powered off-road construction equipment. Emissions are directly proportional to the

size, number, and usage rate of such equipment. Emissions of particulate matter are also greatly affected by the amount of soil disturbance (e.g. grading). Therefore, emissions of criteria pollutants can generally be expected to increase the larger[7] a project gets. However, the type, size, and intensity of equipment usage are not always directly correlated to the size of a project. For example, a project with a smaller physical footprint and shorter construction schedule could require the usage of larger equipment (i.e. larger engine[8]) and a higher usage rate[9]. Because Alternative 1 would involve similar activities as the Proposed Project (e.g. above and below grade substation construction, grading, stringing activities, structure installation and removal, etc.) the equipment type, size, and usage rates are assumed to be similar between Alternative 1 and the Proposed Project. However, as described above, Alternative 1 is larger (larger footprint and additional construction elements) than the Proposed Project. Therefore, Alternative 1 would be anticipated to have greater emissions of criteria pollutants that the Proposed Project. Therefore, Alternative 1 can be reasonably anticipated to have greater overall emissions due to its size relative to the Proposed Project.

Aesthetics

The aesthetic impacts of the Proposed Project would mainly be derived from expansion of the Artesian Substation, new structures for the connection to the existing 230kV transmission line, and structure replacements along the existing 69kV power line reconductor between the Artesian and Bernardo Substations. Similarly, Alternative 1 would result in impacts to aesthetic resources from the construction of two new 69kV power lines as well as the reconductor of one existing 69kV power line between the Rancho Carmel and Poway Substations (refer to Figure 4-1). Because the scope of work for Alternative 1 would result in greater visual change (i.e. significantly more new overhead structures when compared to the Proposed Project), impacts to aesthetics from Alternative 1 are anticipated to be greater than those identified for the Proposed Project.

Biological Resources

In general, impacts to biological resources result from direct removal of habitat. For most linear electric utility projects, these effects occur where habitat is temporarily or permanently removed in order to construct and maintain new substations and overhead line support structures (i.e. towers and poles), and to construct associated access roads. Impacts generally increase as the amount of affected habitat increases. Therefore, larger projects (i.e. projects with a larger physical footprint) will typically have greater adverse effects on biological resources than smaller projects, assuming the type of affected habitat is similar.

[7] In this case, larger can refer to physical size, or the duration of construction. Both the physical size of a project and the duration of construction have a direct correlation on the usage of equipment, which directly governs the emission of criteria pollutants.

[8] With respect to emissions of criteria pollutants, larger engines (i.e. higher horsepower) result in higher emissions factors when compare to similar, smaller engines. For example, a 100 horsepower generator would have higher emissions than a 50 horsepower generator.

[9] Total emissions from one piece of equipment have two main factors; engine size and duration of use. With respect to usage rate, daily emissions from a single piece of equipment will increase the longer that piece of equipment is used during the day (i.e. number of hours per day in use).

Impacts to biological resources from the Proposed Project would mainly result from expansion of the Artesian Substation and reconductor of the existing 69kV power lines between the Artesian and Bernardo Substations. Similarly, Alternative 1 would be anticipated to result in impacts to habitat from the construction of two new 69kV power lines (from Sycamore Canyon Substation to Bernardo and Pomerado Substation), and the reconductoring of one existing 69kV power line from Rancho Carmel to Poway Substations (refer to Figure 4-1). Because Alternative 1 would require significantly more work that would be anticipated to have adverse impacts to habitat[10], impacts to biological resources are anticipated to be greater for Alternative 1 when compared to the Proposed Project.

Cultural and Paleontological Resources

Impacts to cultural and paleontological resources occur when project-related activities disturb or otherwise damage a cultural, historical, or paleontological resource. Because of the nature of overhead utility lines, known resources locations can often be avoided through project design. However, impacts can occur from unanticipated discovery when project-related activities impact undocumented resources. The relative probability for impacts from unanticipated discovery increases with the amount (area) of project ground-disturbing impacts within previously undisturbed areas[11]. Therefore, Alternative 1 is anticipated to have greater potential for impacts resulting from unanticipated discovery than the Proposed Project due to the greater amount of ground disturbing activities required to construct Alternative 1.

Recreational Resources and Public Services

Impacts to existing recreational facilities would be greater for Alternative 1 when compared to the Proposed Project. The Proposed Project would have no impact on public service and recreational resources[12] (refer to PEA Sections 5.14 and 5.15); however, construction of Alternative 1 would require work within and through (over) numerous existing recreational facilities, including the Sycamore Canyon Park, Black Mountain Ranch Community Park, Black Mountain Open Space Park, Hilltop Community Park, and the San Diego Trans-County Trail, within Cypress Canyon. These construction activities would require temporarily, partial closure of all or portions of these facilities during construction. The Proposed Project would not have such impacts. Therefore, Alternative 1 would have greater impacts to recreational resources and public services that the Proposed Project would not have.

Other Resource Areas

The larger project footprint and significantly greater amount of construction activities and ground disturbance associated with Alternative 1 would be anticipated to result in greater impacts to resource areas such as noise, greenhouse gases, geologic hazards, and water quality than the Proposed Project would have.

[10] Alternative 1 would require approximately 14 to 16 miles of new 69kV power line.

[11] Ground disturbing impacts within previously disturbed areas (such as trenching within existing paved roadways) generally do not have the potential for impacts from unanticipated discovery.

[12] Recreational resources include parks, sports fields, hiking and biking trails, and dedicated open space preserves.

4.4.3.3 Other Considerations

Due to the significantly different scope of work and effect on the electrical system within the Poway Area Load Pocket, Alternative 1 would require review and approval by the CAISO before it could be constructed. Obtaining CAISO approval would add 6 to 12 months to the permitting schedule of the Proposed Project, and would result in a delay to the in-service date for the Proposed Project. Alternative 1 would also involve work (including new structures and potentially new ROW) within the Jurisdictional Boundaries of Marine Corps Air Station (MCAS) Miramar. Construction of the portion of Alternative 1 on MCAS Miramar would require approval from the MCAS Miramar, as well as potential review under the National Environmental Policy Act (NEPA). Similar to CAISO review and approval, the MCAS Miramar approval would add to the Proposed Project's permitting schedule and would further delay project in-service date. Both the additional approval from CAISO and MCAS Miramar add uncertainty to the overall Project approval process.

4.4.3.4 Conclusion

Alternative 1 was ultimately not selected by SDG&E because it does fully achieve the project objectives and because the Proposed Project (Artesian 230kV Substation Expansion with 69kV upgrades) was ultimately approved by CAISO. In addition, Alternative 1 would reasonably be expected to have greater impacts to the public and the environment and would require additional regulatory review and approval. Therefore, Alternative 1 was not selected by SDG&E.

4.4.4 Alternative 2 – Proposed Project with 230kV GIS Substation Yard Design

The Artesian Substation Gas Insulated Substation Yard Alternative was not part of the Proposed Project review conducted by the CAISO; however the use of a gas insulated substation technology would be electrically equivalent to the Proposed Project's air insulated design. The following subsections discuss how Alternative 2 achieves the Proposed Project Objectives and how it would compare to the Proposed Project in terms of adverse effects on the environment.

4.4.4.1 Attainment of Project Objectives by Alternative 2

Because Alternative 2 is electrically equivalent to the Proposed Project, it would meet all project objectives in a similar fashion as the Proposed Project (refer to Section 2.0). However, Alternative 2 would potentially provide added benefit beyond what is provided by the Proposed Project. This added benefit would be to allow room for a third bay of 230kV (two additional elements) which would allow for on-site expansion of substation capacity without significant construction, site expansion, or other expensive or impactful expansive development. Consideration of Alternative 2 would allow SDG&E to not only avoid current NERC violations but also to remain compliant with SDG&E's substation design standards by providing an additional spare position for potential long term future needs. Previous studies have shown a steady and continued growth in this area. The design of the Proposed Project as GIS will allow for an ultimate substation design that will allow future load demand to be delivered without major changes in the substation.

4.4.4.2 Potential Avoidance or Reduction of Impacts

Because Alternative 2 is very similar to the Proposed Project, including having the same physical footprint and impact area, adverse effects resulting from construction, operation, and maintenance of Alternative 2 would be very similar to those of the Proposed Project. Specific resource areas are discussed below in further detail.

Air Quality

Construction of Alternative 2 would involve similar types of equipment as well as a similar intensity and duration for construction activities. Therefore, emissions of criteria pollutants would be anticipated to be similar for Alternative 2 when compared to the Proposed Project[13]. Furthermore, Alternative 2 would have the same physical footprint as the Proposed Project, and therefore would affect the same set of sensitive receptors as the Proposed Project.

Aesthetics

Alternative 2 would include a relatively large, rectangle (GIS) building that would house some of 230kV substation equipment. The structure would be approximately 50 feet tall with a footprint of approximately 155 feet by 85 feet and would include a control shelter approximately 32 feet wide by 85 feet long attached to the north side of the GIS building. This structure would change the visual appearance of the expanded 230kV Artesian Substation[14] when compared to the Proposed Project. While the visual appearance of the expanded 230kV substation would be different comparison to the Proposed Project design, the gas insulated structure would be of a similar height to the structures included as part of the Proposed Project's air insulated design. The GIS building would be larger than any of the individual substation components included within the Proposed Project design; however, the GIS building can be designed to include some design elements of other nearby structures which can often soften the visual change. Therefore, even though different in appearance than the Proposed Project, Alternative 2 would be anticipated to have similar, less than significant impacts to aesthetic resources and overall visual character of the project area.

Other Natural and Spatially Located Resource Areas

Alternative 2 would have the same disturbance footprint as the Proposed Project. Therefore, impacts to spatially located resources (biological, cultural, paleontological, agriculture, recreational, mineral and geological) would be the same as the Proposed Project.

Greenhouse Gases

Gas insulated substations utilize sulfur hexafluoride (SF_6) to insulate the substation equipment that is housed within the GIS buildings. SF_6 is a stronger insulator that air, and as such the substation equipment can be installed and operated in closer proximity to one another. However,

[13] Note that without a specific defined construction scenario for Alternative 2, daily emissions cannot be known.

[14] Note that the 69/12kV (eastern) portion of the Artesian Substation site would be the same under Alternative 2. Only the 230kV substation yard (western parcel) would be altered when compared to the Proposed Project.

SF_6 is also a potent greenhouse gas, and therefore Alternative 2 would be expected to have higher emissions of GHGs than the Proposed Project, which would only use SF_6 within the circuit breaker equipment. While Alternative 2 would use higher quantities of GHGs (SF_6), and would therefore have higher GHG emissions due to SF_6 leakage[15], the actual emissions would still be anticipated to be well below GHG emissions significance thresholds.

Noise

While Alternative 2 would provide for many of the substation components to be located within enclosed structures, the 230/69kV transformers would be located outside, similar to the air insulated design associated with the Proposed Project. Because the transformers are the main source of noise associated from substation operation, impact to noise would be similar for Alternative 2 when compared to the Proposed Project.

Construction noise for Alternative 2 would also be similar to the Proposed Project as construction would occur in the same locations (same disturbance footprint), and would involve similar construction equipment and schedule. Therefore, Alternative 2 would affect the same set of Noise Sensitive Areas (NSAs) as the Proposed Project.

4.4.4.3 Other Considerations

While Alternative 2 would equally achieve the Proposed Project Objectives, and would result in very similar adverse effects on the public and the environment, the gas insulated substation technology is significantly more expensive than the air insulated equipment. In addition, the CAISO approved the expanded Artesian Substation as an air insulated design and has not considered the use of gas insulated equipment of substation design.

4.4.4.4 Conclusion

Ultimately, Alternative 2 was not selected by SDG&E because a gas insulated substation would have noticeably higher overall project cost without providing other benefits sufficient to offset the increased cost. In addition, Alternative 2 would not reduce or avoid any significant adverse effects when compare to the Proposed Project.

4.4.5 Alternative 3 – Chicarita 69kV Conversion

The Chicarita 69kV Conversion alternative was part of the Proposed Project review conducted by the CAISO; however, the CAISO ultimately approved the Artesian 230kV Substation Expansion project (Proposed Project). The following subsections discuss how Alternative 3 achieves the Proposed Project Objectives and how it would compare to the Proposed Project in terms of adverse effects on the environment.

[15] Note that the typical SF_6 leakage rate for new equipment (0.1 percent annually) is extremely low, and is below applicable regulatory standards (1 percent annually by year 2020).

4.4.5.1 Attainment of Project Objectives by Alternative 3

Objective No. 1

Under current conditions as described in Section 2.1.1, loss of either TL6915 or TL6924 power line results in a NERC Category P1 violation of the other line. Alternative 3 would provide additional 69kV power lines to Rancho Carmel and Poway Substations by way of the converted Chicarita 69/12kV Substation. Therefore, if either TL6915 or TL6924 is lost, the Poway Area Load Pocket could be fed through the Chicarita Substation, thereby eliminating the NERC thermal violation on the Sycamore to Pomerado 69kV power lines. As a result, Alternative 3 would achieve Objective 1.

Objective No. 2

As explained in Section 2.1.1, the Poway Area Load Pocket is primarily supported by three 69kV power lines sourced from Sycamore Canyon Substation (230kV source). In year 2020, SDG&E forecasts that approximately 82 percent of the Poway Area Load Pocket load will be supplied by the three 69kV power lines out of the Sycamore Canyon Substation (TL6920, TL6915, and TL6924). While Alternative 3 would create a new 69kV source in the Poway Area Load Pocket, the Sycamore Canyon Substation would remain the primary (230kV) source feeding the Poway Area Load Pocket. Therefore, while Alternative 3 would reduce the usage of the three existing 69kV power lines out of Sycamore Canyon, Alternative 3 would not create a second 230kV source and as such would not reduce the overall congestion at the Sycamore Canyon Substation to the same degree that the Proposed Project would[16]. Therefore, Alternative 3 would not achieve Objective No. 2 as well as the Proposed Project.

Objective No. 3

While SDG&E has not performed a detailed engineering or feasibility review of the various components of Alternative No. 3; a preliminary review indicates that there is potential for the Alternative 3 to be constructed entirely within existing ROW, franchise position, and existing utility-owned property. Specifically, the Chicarita Substation is located on an approximately 6-acre parcel that could potentially be sufficient to support the converted Chicarita 69kV substation. This property is currently owned by SDG&E. The new 69kV power lines required under Alternative 3 (6961, 69WW, and 69ZZ) could all potentially be constructed within a combination of existing SDG&E ROW and existing franchise position (city streets). Therefore, Alternative 3 could potentially achieve Objective No. 3.

4.4.5.2 Avoidance or Reduction of Impacts

Mainly as a result of the relatively larger footprint and scope of work associated with Alternative 3 when compared to the Proposed Project, Alternative 3 is anticipated to have greater adverse effects on the environment when compared to the Proposed Project. Specific resource areas are discussed below in further detail.

[16] Alternative 3 would reduce congestion at the Sycamore Canyon Substation by approximately 20 percent.

Air Quality and Greenhouse Gases

Because Alternative 3 would involve similar activities as the Proposed Project (e.g. above and below grade substation construction, grading, stringing activities, structure installation and removal, etc.) the equipment type, size, and usage rates are assumed to be similar between Alternative 3 and the Proposed Project. As described above, Alternative 3 is much larger (larger footprint and additional construction elements) than the Proposed Project. Therefore, Alternative 3 would be anticipated to have greater emissions of criteria pollutants than the Proposed Project. Alternative 3 can be reasonably anticipated to have greater overall emissions due to its size relative to the Proposed Project.

Aesthetics

The aesthetic impacts of the Proposed Project would mainly be derived from expansion of the Artesian Substation, new structures for the connection to the existing 230kV transmission line, and structure replacements along the existing 69kV power line reconductor between the Artesian and Bernardo Substations. Similarly, Alternative 3 would result in impacts to aesthetic resources from the expansion of the Chicarita Substation as well as construction of one new 69kV power line between the Sycamore Canyon and Chicarita Substations and reconductor of numerous 69kV power lines (refer to Figure 4-2). Because the scope of work for Alternative 3 would result in greater visual change (i.e. significantly more new overhead structures when compared to the Proposed Project), impacts to aesthetics from Alternative 3 are anticipated to be greater than those identified for the Proposed Project.

Biological Resources

Impacts to biological resources from the Proposed Project would mainly result from expansion of the Artesian Substation and reconductor of the existing 69kV power lines between the Artesian and Bernardo Substations. Similarly, Alternative 3 would be anticipated to result in impacts to habitat from the expansion of the Chicarita Substation, construction of the new 69kV power line from Sycamore Canyon to Chicarita, and reconductoring of numerous existing 69kV power lines (refer to Figure 4-2). Because Alternative 3 would require significantly more work that would be anticipated to have adverse impacts to habitat[17], impacts to biological resources are anticipated to be greater for Alternative 3 when compared to the Proposed Project.

Cultural and Paleontological Resources

Impacts to cultural and paleontological resources occur when project-related activities disturb or otherwise damage a cultural, historical, or paleontological resource. Because of the nature of overhead utility lines, known resources locations can often be avoided through project design. However, impacts can occur from unanticipated discovery when project-related activities impact undocumented resources. The relative probability for impacts from unanticipated discovery increases with the amount (area) of project ground-disturbing impacts within previously

[17] Alternative 3 would require approximately 18 - 20 miles of new 69kV power line and approximately 5 miles of 69kV reconductoring.

undisturbed areas. Therefore, Alternative 3 is anticipated to have greater potential for impacts resulting from unanticipated discovery than the Proposed Project due to the significantly greater amount of ground disturbing activities required to construct Alternative 3.

Recreational Resources and Public Services

Impacts to existing recreational facilities would be greater for Alternative 3 when compared to the Proposed Project. The Proposed Project would have no impact on recreational resources (refer to PEA Sections 5.14 and 5.15); however, construction of Alternative 3 would require work through (over) numerous existing recreational facilities, including the Sycamore Canyon Park and the San Diego Trans-County Trail. These construction activities would require temporarily, partial closer of all or portions of these facilities during construction. Proposed Project would not cause such impacts. Therefore, Alternative 3 would have greater impacts to recreational resources and public services than the Proposed Project.

Other Resource Areas

The larger project footprint and significantly greater amount of construction activities and ground disturbance associated with Alternative 3 would be anticipated to result in greater impacts to resource areas such as noise, greenhouse gases, geologic hazards, and water quality when compared to the Proposed Project.

4.4.5.3 Other Considerations

Due to the significantly different scope of work and effect on the electrical system within the Poway Area Load Pocket, Alternative 3 would require review and approval by the CAISO before it could be constructed. Obtaining CAISO approval would add 6 to 12 months to the permitting schedule of the Proposed Project, and would this result in a delay to the in-service date for the Proposed Project. Alternative 3 would also involve work (including new structures) within the Jurisdictional Boundaries of MCAS Miramar. Construction of the portion of Alternative 3 on MCAS Miramar would require approval from MCAS Miramar, as well as potential review under NEPA. Similar to CAISO review and approval, MCAS Miramar would add to the Proposed Project's permitting schedule and would further delay project in-service date. Both the additional approval from CAISO and MCAS Miramar add uncertainty to the overall Project approval process.

4.4.5.4 Conclusion

Alternative 3 was ultimately not selected by SDG&E because it does fully achieve the project objectives and because the Proposed Project (Artesian 230kV Substation Expansion with 69kV upgrades) was ultimately approved by CAISO. In addition, Alternative 3 would reasonably be expected to have greater impacts to the public and the environment and would require additional regulatory review and approval. Therefore, Alternative 3 was not selected by SDG&E.