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SOAH DOCKET NO. 473-21-0247
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APPLICATION OF THE CITY OF SAN ANTONIO TO AMEND ITS CERTIFICATE OF CONVENIENCE AND NECESSITY FOR THE SCENIC LOOP 138 KV TRANSMISSION LINE IN BEXAR COUNTY	§ § § § § §	BEFORE THE PUBLIC UTILITY COMMISSION OF TEXAS

CPS ENERGY'S REFERENCE TO RECORD EVIDENCE AND MOTION TO ADMIT INFORMATION <u>REQUESTED BY COMMISSIONERS</u>

November 8, 2021

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TO THE HONORABLE COMMISSIONERS OF THE PUBLIC UTILITY COMMISSION:

The City of San Antonio, acting by and through the City Public Service Board (CPS Energy) files this motion, consistent with the directive of the Commissioners of the Public Utility Commission of Texas (Commission) at the open meeting on October 28, 2021, and memorialized in the November 2, 2021 Order Remanding to Docket Management. As set forth below, CPS Energy provides reference to record evidence and requests that the supplemental documents attached to this motion be admitted for purposes of the record.

I. INTRODUCTION

On October 28, 2021, the Commission considered this docket at its regularly scheduled open meeting. At that time, the Commission heard public statements from intervenors to this case and non-party landowners.[1] Prior and subsequent to the open meeting, numerous letters generally styled as letters in lieu of oral argument have been filed at the Commission. While some of the filings are from intervening parties, most are letters are from non-party landowners in the area who have not participated in the case to this point. While CPS Energy appreciates the opportunity for the public to file comments regarding the project, the Commission should be aware that many statements in the letters are inconsistent with the record evidence.

[1] Although reference was made at times during the meeting to statements being "testimony," it is CPS Energy's understanding that no persons were sworn in and no evidentiary testimony was taken. Rather, the Commissioners heard non-evidentiary oral argument and public comments regarding this case. CPS Energy notes that many statements made at the open meeting are not consistent with the record evidence, including statements regarding the distance of Segment 42a to school buildings and playgrounds (on right of way donated by the Dreiss Interests off of school property, approximately 280 feet from the nearest corner of a playground), the existence of school facilities (e.g., a potential future middle school), the characteristics of a substation facility on Substation Site 7 outside of the floodplain, a communication tower on Toutant Beauregard Road, and the manner in which CPS Energy interacted with the Dreiss Interests. CPS Energy refers the Commission to its Reply Brief and Reply to Exceptions previously filed in this case for citations to the record evidence regarding these and other matters referenced in statements at the open meeting.

At the conclusion of the Commission's consideration of this matter, the Commissioners requested that CPS Energy provide additional information to assist the Commissioners in their evaluation of this project, and memorialized their request in an Order Remanding to Docket Management so that the additional information may be admitted into the record. This filing provides the information requested by the Commissioners.

II. NEED

As presented in CPS Energy's application,[2] the direct and rebuttal testimony of Mr. George Tamez,[3] addressed in CPS Energy's Initial Brief[4] and Reply to Exceptions,[5] and detailed in the proposal for decision,[6] the uncontroverted evidence in this case shows that the need for this project is predicated on two critical considerations: (1) significant load growth in the project area; and (2) the need for reliability enhancements in the project area. This is not a case where need is based solely upon load growth. Therefore, simply considering need from the perspective of load growth would ignore one of the primary underpinnings for the need for the project. While load growth alone supports the need for the project, reliability concerns must also be considered. Accordingly, CPS Energy discusses both load growth and reliability concerns below.

A. Load Growth

Load growth data clearly demonstrates the project's need. The load in the northwest region of Bexar County, including the study area for this project, is currently served by the existing La Sierra and Fair Oaks Ranch substations. As described on pages 12-13 of the application (CPS Energy Ex. 1), the total substation capacity between the La Sierra and Fair Oaks Ranch substations serving the project area is 210 MVA. The load forecast in the application (as filed in July 2020) showed the La Sierra and Fair Oaks Ranch substation capacity would be exceeded by 2025. Historical and forecasted load growth for the area are shown in Tables 14-1 and 14-2 below, taken from CPS Energy's application (CPS Energy Ex. 1) and supplemented with updated data.[7]

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2 *See* CPS Energy Ex. 1 at 10-28, Attachment 4, and Attachment 13.

3 CPS Energy Exs. 10 and 13, respectively.

4 *See* Interchange Filing No. 864.

5 *See* Interchange Filing No. 894.

6 *See* pages 11-22.

7 The Affidavit of George J. Tamez, P.E., attached hereto as Attachment 1, establishes the accuracy and reliability of this updated data.

Table 14-1 – Scenic Loop area substations historical load growth (KW)[8]

Location	**2014**	**2015**	**2016**	**2017**	**2018**	***2019***[9]	**2019**	***2020***[10]	**2020**	***2021***[11]	**2021**
La Sierra	80056	95378	105197	104395	105524	*119005*	121040	*122382*	102630	*129481*	97440
Fair Oaks Ranch	37140	39767	41193	41907	44428	*44806*	45780	*47980*	57160	*49228*	84040
Subtotal	117196	135144	146390	146302	149952	*163811*	166820[12]	*170363*	159790[13]	*178708*	181480[14]

Table 14-2 – Scenic Loop area substations forecasted load growth (KW)[15]

Location	***2022***	**2022**	***2023***	**2023**	***2024***	**2024**	***2025***	**2025**	***2026***	**2026**
La Sierra	*136991*	112526	*144936*	119052	*153342*	125957	*159476*	130995	*165855*	136235
Fair Oaks Ranch	*50508*	77881	*51821*	80756	*53168*	83756	*54550*	86350	*55969*	89029
Subtotal	*187498*	190406	*196757*	199808	*206510*	209712	***214026***	**217345**	***221824***	**225264**

Location	***2027***	**2027**	***2028***	**2028**	***2029***	**2029**	***2030***	**2030**	***2031***	**2031**
La Sierra	*172489*	141684	*177664*	145935	*182994*	150313	*188484*	154823	*194138*	159467
Fair Oaks Ranch	*57088*	91453	*58230*	93617	*59394*	95833	*60582*	98105	*61794*	100434
Subtotal	***229577***	**233137**	***235894***	**239552**	***242388***	**246146**	***249066***	**252928**	***255932***	**259900**

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8 Data for years 2019, 2020, and 2021 (year to date) is a supplement to the data contained in CPS Energy's application in this proceeding. Table 14-1 above includes the forecasted data from Table 14-2 for the years 2019-2021 of the application for comparison to the actual data that is now available and also included in Table 14-1 above.

9 Forecast data from Table 14-2 of the application.

10 Forecast data from Table 14-2 of the application.

11 Forecast data from Table 14-2 of the application.

12 Exceeded forecast.

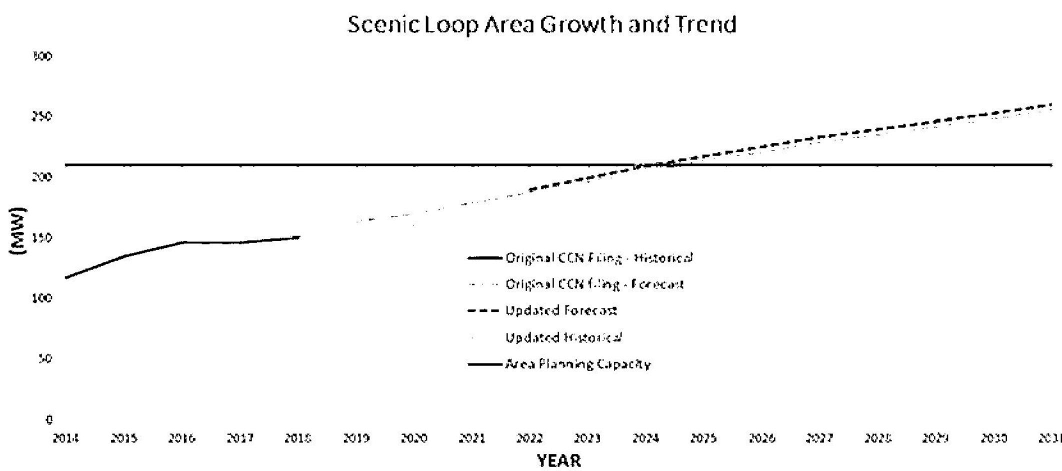
13 Not a typical year. Note that 2020 load numbers represent a significant decrease in load in general because of unforeseen changes in load usage due to the COVID-19 pandemic. However, 2021 has demonstrated a return to prior growth trends.

14 Exceeded forecast. Note that CPS Energy shifted load from La Sierra to Fair Oaks Ranch during 2020.

15 Data for all of the years has been updated. The italicized data is from the original application Table 14-2.

The information above demonstrates consistent, significant load growth annually in the study area, and the forecasted load growth for the La Sierra and Fair Oaks Ranch substations will soon exceed the current ability of distribution circuits to support the load; specifically, the demand on the current system is expected to exceed the planning capacity for the area by 2025.[16] As can be seen in the data presented above, the load forecast data presented in the application, updated with the most recent data through 2021 (year to date), demonstrates load growth **above** the original application forecasts. An update of Figure 14-3 from the application, visually demonstrates the continued load growth supporting the need for the project.

Figure 14-3 – Scenic Loop area substations historic and forecasted load growth



CPS Energy commissioned a detailed need study by the consulting firm of Burns McDonnell. The study was included as Attachment 13 to the CPS Energy application and is part of the record evidence in this proceeding. For the benefit of the Commission, CPS Energy is attaching a copy of the study to this filing as Attachment 2.[17] As explained on page 11 of the CPS Energy application (CPS Energy Ex. 1), the load growth in the area is driven by the explosive population growth and development in the area, and that growth is reflected in the City of San Antonio's Comprehensive SA Tomorrow Plan, an exhaustive plan designed to study and address the growth throughout the San Antonio area. Because the Comprehensive SA Tomorrow Plan is voluminous, at 330 pages, CPS Energy is not attaching it to this filing, but rather is providing the webpage link to the document. Specifically, the SA Tomorrow Plan may be found at this link: https://www.sacompplan.com/new_docs/SA_CompPlan_FULLDoc_Final_9-26-16_lowres.pdf.

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16 CPS Energy Ex. 1 at 13.

17 *Also* CPS Energy Ex. 1, Attachment 13.

In addition, future load from the University of Texas at San Antonio (UTSA) Main Campus Master Plant (presented in February 2020) will significantly drive growth in the northwest region of Bexar County. The 124-page UTSA Main Campus Master Plan is also lengthy and may be found at this link: https://www.utsa.edu/masterplan/documents/UTSA_Master_Plan1.pdf. Although not physically attached to the application, both the SA Tomorrow Plan and UTSA Main Campus Master Plan are public documents and both were specifically referenced in the CPS Energy application.[18]

Given the consistent year-over-year load growth in the area, the absence of a substation in the vicinity, and the projection that the demand will exceed available capacity by 2025, the area load growth forecasted in the application (and confirmed with the most recent actual load data) demonstrates the need for the project.

B. Reliability Enhancement

As discussed above, the need for the project is not just predicated upon load growth but also upon the need to enhance reliability in the area. In addition to the significant load growth that CPS Energy is experiencing in the northwest Bexar County area, the existing distribution circuits within the La Sierra Substation and some of the circuits originating at the Fair Oaks Ranch Substation are exceptionally long (up to eight times longer than the average distribution circuit within CPS Energy's system) and serve thousands of customers.[19] These long, heavily loaded circuits have resulted in significant reliability concerns for the area. Even with recently completed system reconfiguration improvements on the existing distribution facilities, a new substation in northwest Bexar County is needed to provide the CPS Energy customers served from the La Sierra and Fair Oaks Ranch substations reliability comparable to CPS Energy's system averages.[20]

The reliability statistics on the La Sierra and Fair Oaks Ranch circuits from 2013 through 2019 indicate that the customer minutes of interruption from these circuits have accounted on average for approximately 11.2 percent of CPS Energy's total minutes of interruptions (as high as 20 percent in 2017), even though these circuits serve only approximately three percent of

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[18] If the Commission prefers that these voluminous documents be filed in this docket, CPS Energy will do so. But, as public records, the Commission also may take official notice of them if it so desires.

[19] CPS Energy Ex. 1 at 14.

[20] CPS Energy Ex. 1 at 14.

CPS Energy's entire load.[21] This indicates a lower reliability for the loads served by these substations.

Notably, from 2013 to 2019 the System Average Interruption Duration Index (SAIDI) and System Average Interruption Frequency Index (SAIFI) indices have steadily risen (indicating declining reliability). This increase in the frequency and duration of interruptions experienced by customers served in the Scenic Loop area clearly evidences a steady decline in reliability and power quality. For comparative purposes, Table 14-3 from the CPS Energy application (CPS Energy Exhibit 1) presents the CPS Energy-wide SAIDI, SAIFI, customer minutes of interruption (CMI), and customers affected (CA).

Table 14-3 – CPS Energy system-wide average reliability indices

YEAR	CMI	SAIDI	SAIFI	CA
2013	37,465,050	51.39	0.79	575,726
2014	35,449,090	47.55	0.73	547,023
2015	41,562,265	54.62	0.76	580,576
2016	44,120,730	57.4	0.8	616,000
2017	42,443,090	53.97	0.83	654,000
2018	44,311,290	54.49	0.84	686,000
2019	42,464,750	61	0.86	603,000
Total	**287,816,265**			**4,262,325**

Table 14-4 from the CPS Energy application (CPS Energy Exhibit 1) presents the same reliability indices over the same period of time for the circuits served from the La Sierra and Fair Oaks Ranch substations. All of the reliability metrics measured show a significant decrease in reliability for the customers served from the La Sierra and Fair Oaks Ranch substations compared to the CPS Energy system. And, as stated above, in 2017 the interruptions on these circuits contributed nearly 20 percent of the total CMI for the entire CPS Energy system. Based on the outage data presented, the customers served from the La Sierra and Fair Oaks Ranch circuits have experienced approximately 8-10 times more outages compared to the entire CPS Energy system average.

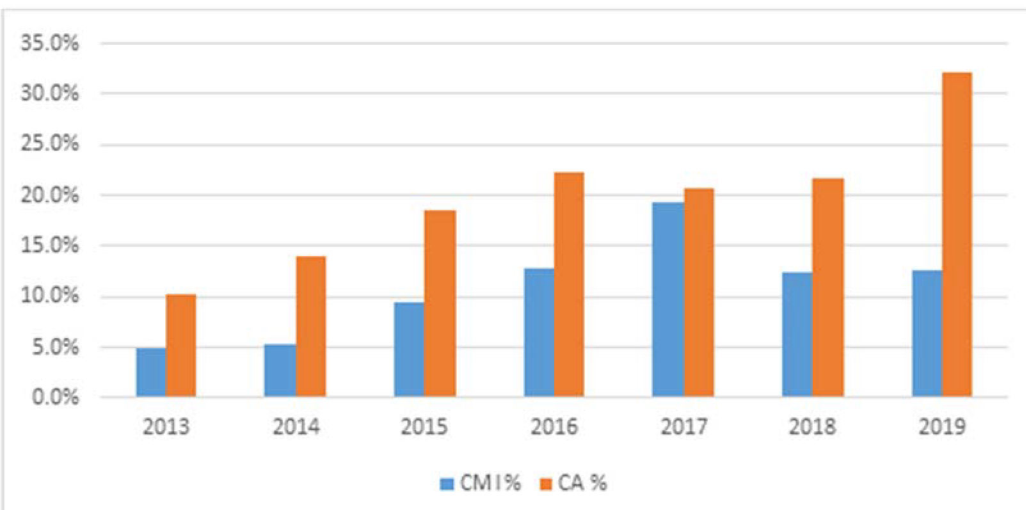
[21] CPS Energy Ex. 1 at 15.

Table 14-4 - La Sierra and Fair Oaks Ranch substation circuits reliability indices

YEAR	CMI	CMI %	SAIDI	SAIFI	CA	CA%
2013	1,842,904	4.90%	83.77	2.67	58,633	10.2%
2014	1,868,883	5.30%	83.06	3.39	76,259	13.9%
2015	3,900,198	9.40%	169.57	4.67	107,463	18.5%
2016	5,614,911	12.70%	238.93	5.85	137,513	22.3%
2017	8,219,320	19.40%	342.47	5.65	135,583	20.7%
2018	5,483,364	12.40%	223.81	6.05	148,185	21.6%
2019	5,345,088	12.60%	215.53	7.82	194,027	32.2%
Total	**32,274,667**	**11.20%**			**857,663**	**20.1%**

Figure 14-4 below shows the degree to which the low reliability on the La Sierra and Fair Oaks Ranch circuits (comprising approximately 3 percent of the CPS Energy overall load) contribute to the CPS Energy metrics for reliability in terms of CMI and CA. The number of customers affected for the year 2019 on the loads served on La Sierra and Fair Oaks Ranch circuits is more than 30 percent of the customers affected for the whole CPS Energy system.

Figure 14-4 Fair Oaks Ranch and La Sierra load contribution to CPS Energy reliability metrics from 2013-2019



Between 2010 and 2018, some of the La Sierra and Fair Oaks Ranch circuits have made CPS Energy's poor performing circuits (PPC) list for five different years (based on standards established by the Commission), and a total of six of the 11 circuits have been on the list since 2010. Additionally, five circuits from La Sierra and Fair Oaks Ranch were on the PPC list in 2018, the most of any year within the past 10 years.

The average length of the eight distribution circuits primarily serving the Scenic Loop area from the La Sierra and Fair Oaks Ranch substations is approximately 36.13 miles.[22] When two very short circuits (U111 and U113) are removed from the average, the remaining six circuits average 47.48 miles in length, with the longest circuit (R014) at 97.13 miles in length.[23] For comparison, the average circuit length of the 34.5 kV circuits in the CPS Energy system is approximately 20 miles in length.[24] The length and loading on these La Sierra and Fair Oaks Ranch circuits have equated to lower reliability to the customers served by these circuits.[25] Following the construction of the proposed Scenic Loop Substation, the length of the circuits connected to La Sierra, Fair Oaks Ranch, and Scenic Loop will decrease to an average of about 24 miles.[26]

C. Alternatives to the Project

The Commission has inquired whether there are other options to address these load growth and reliability issues. Both CPS Energy and its outside consultant determined that there were no better options to address these concerns than the project. The Administrative Law Judges agreed, and no parties, including Commission Staff, have disputed these findings. Therefore, the record clearly and uncontrovertibly supports the need for the project. For the benefit of the Commissioners, however, CPS Energy discusses below the various options considered and the reasons the alternative options do not adequately address the need for the project.

Overall, CPS Energy considered six options to meet the need for the project: (1) Option A involves shifting load from existing circuits identified as overloaded; (2) Option B involves the construction of a new Scenic Loop Substation (the option selected and presented in the Application); (3) Option C involves adding a distributed generation power source as a non-wire solution for the area; (4) Option D describes an alternative with inclusion of a simple cycle gas generating station within the footprint to relieve loadings on the transformers; (5) Option E involves adding new circuits into the Fair Oaks Ranch Substation to pick up additional loads in the Scenic Loop region; and (6) Option F describes rebuilding existing low reliable circuits as underground circuits.[27] These six options were considered and analyzed fully. Of these six options,

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22 CPS Energy Ex. 1 at 14.

23 CPS Energy Ex. 1 at 14.

24 CPS Energy Ex. 10 (Direct Testimony of George Tamez) at 6.

25 CPS Energy Ex. 1 at 14.

26 CPS Energy Ex. 1 at 14.

27 CPS Energy Ex. 1 at 19-20.

three are distribution-only alternatives: Options A, E, and F. As discussed below, the evidence establishes that distribution alternatives are not adequate to resolve the need for the project.

1. Distribution-Only Alternatives

The first distribution-only alternative, Option A, involves designing tie points and shifting load from the La Sierra Substation to surrounding available circuits to create greater capacity on the La Sierra circuits to pick up growing loads in the Scenic Loop area.[28] Because of the geographic relief and the existing CPS Energy service territory boundary, the Fair Oaks Ranch circuits can shift load only with La Sierra circuits, which would not enhance the capacity in the Scenic Loop area. Option A would involve shifting approximately 14.24 MW of load from La Sierra circuit Ul14 and Fair Oaks Ranch circuit R034 onto Fair Oaks Ranch circuit R014 to provide loading relief on those circuits.[29] This would result in 13.22 MW of additional capacity on circuits Ul14 and R034.[30] Of this additional capacity that is available, only 2.7 MW can be useful for planning purposes in accordance with the CPS Energy Distribution Planning Manual criteria of maintaining circuit loadings under 80 percent of their nominal rating.[31] After the potential load shifts, circuit R014 would have a loading of 62 percent and can additionally accommodate 4 MW to keep the circuit loading under 80 percent.[32] Thus, Option A would result in approximately 6.7 MW of additional capacity available for future load growth in the Scenic Loop area. Based on current load forecasts, Option A would provide sufficient capacity for the area only through approximately 2021, and would not provide the needed capacity to meet the load forecast beyond this year.[33]

Moreover, Option A would not significantly improve the reliability issues experienced in the Scenic Loop area over the longer planning horizon. Under the Option A scenario, the circuit lengths originating from the La Sierra and Fair Oaks Ranch substations will be the same or, in some cases, lengthened based on load shifts chosen.[34] The La Sierra circuits currently serving the

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28 CPS Energy Ex. 1 at 20.

29 CPS Energy Ex. 1 at 20.

30 CPS Energy Ex. 1 at 20.

31 CPS Energy Ex. 1 at 20.

32 CPS Energy Ex. 1 at 20.

33 CPS Energy Ex. 1 at 20. As reflected on Table 14-1 and in footnote 14, CPS Energy has already shifted some load from La Sierra to Fair Oaks Ranch during 2020. While such provided some immediate relief during the pendency of this docket, it has not provided any overall relief for the need for the project.

34 CPS Energy Ex. 1 at 20.

Scenic Loop area loads (the U114 circuit is an example) are already extremely long and heavily loaded. The length and loading configuration of these circuits have resulted in decreasing reliability performance. Option A would only temporarily decrease some of the circuit loading in the area and would not notably reduce circuit line length.[35] Within a short period of time, Option A would exacerbate the poor reliability performance of the CPS Energy distribution system in the Scenic Loop area and would not be able to accommodate load growth beyond a couple of years. Option A is not a viable alternative to address the significant reliability and capacity problems CPS Energy is experiencing in northwest Bexar County.[36]

The second distribution-only alternative, Option E, would involve upgrading the existing transformers at the Fair Oaks Ranch Substation for 100 MVA operation and constructing two new distribution circuits from that substation. Consideration was also given to potential upgrade of the transformation at the Ranchtown Substation, but because of its further location from the Scenic Loop area through difficult terrain to the west, the better alternative for consideration was a transformation upgrade at the Fair Oaks Ranch Substation. The Fair Oaks Ranch Substation is located on the east side of I-10 with more than a mile of underground conduit to terminate cables into the station. The distribution corridor in the Scenic Loop area is very limited and an upgrade would require converting the existing single circuit structures to double circuit structures and terminating the new circuits into Fair Oaks Ranch with additional undergrounding and utilizing existing trenching. The length of a new circuit would be anticipated to be 30 miles long to pick up portions of the Scenic Loop area load.[37]

Expansion of the capacity of the Fair Oaks Ranch Substation would provide some additional capacity for the distribution system in the Scenic Loop area. However, expansion of transformation capacity at Fair Oaks Ranch would still leave the Scenic Loop area served by long distribution circuits several miles from the Fair Oaks Ranch and La Sierra substations.[38] While there would be some benefit in the short term to reliability and capacity from upgrading the Fair Oaks Ranch transformers, the reliability to the Scenic Loop area would continue to deteriorate due

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35 CPS Energy Ex. 1 at 20.

36 CPS Energy Ex. 1 at 20.

37 CPS Energy Ex. 1 at 21.

38 CPS Energy Ex. 1 at 21.

to the distance from a strong substation in the vicinity.[39] Further, Option E has a total estimated cost of $45 million (based on the construction of two distribution circuits with transformer and station upgrades),[40] which is as costly as the Scenic Loop Substation alternative with significantly less improvement to the reliability and capacity flexibility for the area.

The third distribution-only alternative, Option F, would involve relocating existing poor performing circuits from overhead to underground. While undergrounding distribution circuits can significantly improve reliability, the cost to underground an entire circuit is typically 8-10 times more expensive than overhead circuits.[41] At least two of the existing circuits from the La Sierra and Fair Oaks Ranch substations (Ul14 and R034) would need to be relocated underground to achieve the reliability benefits anticipated from construction of the proposed Scenic Loop Substation. The cost of such undergrounding is estimated to be approximately $80 million, which far exceeds the anticipated cost of the project.[42]

In addition, the engineering and maintenance for underground distribution circuits is more complex and expensive and would take many years to complete (resulting in further decreasing reliability in the interim of the conversion).[43] Also, the expanded capacity on the new underground distribution circuits would result in further needed upgrades to equipment at the Fair Oaks Ranch and La Sierra substations, resulting in additional costs for this alternative.[44] To achieve the same reliability and capacity benefits of the Scenic Loop Substation alternative, the undergrounding alternative would likely cost more than double the cost of a new substation and would not provide the same operational flexibility as a third substation (Scenic Loop) would for the region.[45]

A distribution-only alternative would only delay the need for the project by a few years at most or would cost significantly more than the project. Also, other than the very expensive option of undergrounding, a distribution-only alternative would not address the reliability concerns of the very lengthy circuits currently existing in the area because of the lack of a substation in the vicinity.

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39 CPS Energy Ex. 1 at 21.

40 CPS Energy Ex. 1 at 21.

41 CPS Energy Ex. 1 at 21.

42 CPS Energy Ex. 1 at 21.

43 CPS Energy Ex. 1 at 21-22.

44 CPS Energy Ex. 1 at 22.

45 CPS Energy Ex. 1 at 22.

No party has argued that a distribution alternative would resolve the need for the project, and Commission Staff agrees the project is the best option for meeting the needs in the project area.[46]

2. Distributed Generation

CPS Energy also considered and evaluated two distributed generation options, Options C and D, and both were found to be inadequate for meeting the need for the project.

Option C would involve non-wire alternatives to traditional transmission and distribution facility investments. CPS considered solar photovoltaic (Solar PV) generation operated in conjunction with battery storage (BESS) in comparison to the CPS Energy La Sierra substation facilities as a potential solution to reduce peak loading and relieve capacity on circuits. CPS Energy conducted an analysis involving the August 2019 peak day demand of a transformer at the La Sierra substation and one of the circuits (Ul14) to determine the benefits and costs associated with using Solar PV and BESS as potential means to reduce circuit loadings.[47] CPS Energy's analysis demonstrated the output of a 6.64 MW solar site and how including a 40 MWh BESS on one of the circuits could reduce peak load on the transformer and provide demand reduction.[48]

In the analysis, Solar PV provided 40 MWh of energy during the day to reduce the demand on the station.[49] The estimated cost for single axis tracking solar panels with the inverters necessary to produce 40 MWh <u>on a sunny day</u> is approximately $7.5 million.[50] However, to reliably replace the 20-25 MW initial capacity of the Scenic Loop Substation would cost approximately three times that amount (to account for fluctuations in sunlight availability).[51] In addition, using a conservative estimate of 2.5 acres per MW for solar, such a facility would require approximately 50-60 acres of available property for operation of the Solar PV facility.[52] Thus, the total cost of the installation of a 25 MW Solar PV resource would be approximately $25 million to $30 million and would require at least ten times the acreage of the proposed substation.[53]

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46 Staff Ex. 1 at 12, 20-21.

47 CPS Energy Ex. 1 at 25-26.

48 CPS Energy Ex. 1 at 26.

49 CPS Energy Ex. 1 at 26.

50 CPS Energy Ex. 1 at 26.

51 CPS Energy Ex. 1 at 26.

52 CPS Energy Ex. 1 at 26.

53 CPS Energy Ex. 1 at 26.

Because Solar PV generates energy in the afternoon rather than at evening peak, energy storage—BESS—is required to shift the power to the evening when demand is the highest.[54] CPS Energy's analysis demonstrated that the BESS cost of providing a demand reduction of 8.3 MW is $15.2 million.[55] As noted, the Scenic Loop Substation is anticipated to provide a system capacity benefit of 20 to 25 MW initially. Thus, the cost of BESS to provide a similar benefit of 25 MW would be approximately $45 million.[56] In addition, the typical functional lifespan of BESS is currently limited to about 15 years (compared to the much longer lifespan of a substation and associated transmission facilities).[57]

Therefore, considering the use of Solar PV with BESS as a distributed generation option would result in a total cost of $65 to $75 million, which far exceeds the anticipated costs for the project. Further, this option would require additional station costs to interconnect the Solar PV and BESS resources to the distribution system. This option also would not alleviate existing reliability issues that are directly associated with the extended circuit lengths, as this option does not change those circuit lengths.

The other distributed generation option considered, Option D, involves construction and operation of gas-fired generation within the project area to replace the capacity of the proposed Scenic Loop Substation.[58] The nearest available gas pipeline to the Scenic Loop area capable of serving a gas-fired generating station is approximately five miles away.[59] In addition, any new fossil-fueled generation would require significant water usage and environmental permits.[60] Based on the review of the load growth in the region, a new substation is needed in the Scenic Loop area by 2025. It is highly unlikely that any new fossil-fueled generation could be permitted and constructed in order to address the need for the area within this time frame.[61]

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54 CPS Energy Ex. 1 at 26.

55 CPS Energy Ex. 1 at 26.

56 CPS Energy Ex. 1 at 26.

57 CPS Energy Ex. 1 at 26.

58 CPS Energy Ex. 1 at 27.

59 CPS Energy Ex. 1 at 27.

60 CPS Energy Ex. 1 at 27.

61 CPS Energy Ex. 1 at 27.

Also, adding a generation resource to the existing circuits will still require additional switchgear and transformers (in addition to the cost of the generation facility itself), similar to the cost of developing a new Scenic Loop Substation.[62] The cost to develop a new approximately 50 MW peaking plant (aeroderivative engine) would be approximately $60 million, without considering the costs to construct approximately five miles of natural gas pipeline to the plant and the costs to mitigate other constraints to make this option a viable alternative to the Scenic Loop Substation.[63] In addition to the approximately $60 million to construct the generation facility, plus the additional cost to construct the pipeline and the interconnection to the distribution system, it is also important to note that this solution would not fully alleviate existing reliability issues directly associated with distribution circuit line length and overhead line length through significant terrain and vegetation since the existing distribution circuits would remain significantly unchanged.[64]

The distributed generation options are far more expensive than the project and do not provide the same level of benefits the project does. Accordingly, distributed generation options are not an appropriate alternative for addressing the need for the project. Commission Staff agrees with this conclusion.[65]

Therefore, as seen above, there is no alternative option that adequately addresses both components of the need for the project: load growth and reliability enhancement. Rather, the project is the best option for addressing these well-documented need concerns. Now CPS Energy turns to the other matters for which the Commissioners requested information.

III. ROUTE Y DATA

At the open meeting, Mr. Patrick Cleveland asserted that Route Y is a compromise route that would satisfy most parties. Mr. Raul Figueroa also stated that he was not opposed to Route Y. In response, the Commission requested further information from CPS Energy regarding Route Y.

While Route Y is a route that satisfies the need for the project, contrary to the public statement by Mr. Cleveland, it is opposed by a wide number of intervening parties. For example, Roy Barrera, Sr., Carmen Ramirez, Steven Herrera, Roy Barrera III, and Robert J. Barrera all filed

62 CPS Energy Ex. 1 at 27.

63 CPS Energy Ex. 1 at 27.

64 CPS Energy Ex. 1 at 27.

65 Staff Ex. 1 at 12, 20-21.

testimony or statements of position opposing the use of Segment 35 (which is used by Route Y).[66] Similarly, Brian Andrews filed testimony on behalf of Lisa Chandler, Clinton R. Chandler, and Chip and Pamela Putnam, opposing the use of Segments 34 and 35 (which are utilized by Route Y) over Segment 42a (used by Route Z2), because of the impacts of Segment 35 on a habitable structure (located across the street in front of the Dr. Sara McAndrew Elementary school) and Segment 34 (with an angle structure on the property the school district may utilize in the future for a middle school facility).[67] The Northside Independent School District opposes the use of Segments 35 and 34 as well.[68]

Route Y was not a route that was strongly supported by any parties during the hearing, hence it did not receive discussion by the Administrative Law Judges (ALJs) or the parties in their exceptions. It does not appear that Route Y addresses any of the concerns raised by the parties that oppose a route along Toutant Beauregard Road, as it follows the roadway and uses Substation Site 7 in much the same manner as Route Z2. In fact, the San Antonio Rose Palace, Inc., Strait Promotions, Inc., Brad Jauer, and BVJ Properties, L.L.C., have collectively filed a pleading opposing the selection of Route Y (*see* Interchange Filing No. 919). So, while Route Y satisfies the need for the project and is acceptable to CPS Energy, it does not appear to be a compromise route that would address the concerns of many intervening parties to this matter.

As discussed at the open meeting, Route Y costs approximately $5 million more and has eight more habitable structures than Route Z2, which was recommended by the ALJs. The remainder of the criteria for Route Y is reflected on Attachment 3 to this filing, which is a spreadsheet showing the various criteria of the routes addressed primarily by the intervening parties at the hearing compared with Route Y. Attachment 4 to this filing is a map showing Route Y along with the "focus" routes discussed most significantly by the intervening parties at the hearing. The information in these two attachments is wholly in the record, taken from CPS Energy Exhibits 1, 6, 16, and 17.

IV. MAP OF UTILITY BOUNDARIES AND FACILITIES

At the open meeting, the Commissioners requested that CPS Energy provide a map showing all utility certificated service boundaries and facilities in the area of the project.

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66 *See, e.g.*, Interchange Filing Nos. 561, 562, 574, 583, 586.

67 Chadlers & Putnams Ex. 1 (direct testimony of Brian C. Andrews) at 29.

68 NISD Ex. 1 (direct testimony of Jacob Villareal) at 6-7.

CPS Energy would note that the study area is entirely within CPS Energy's certificated service area. There are no other utilities having electric transmission facilities within the service area. However, LCRA Transmission Services Corporation (LCRA TSC) owns the northern portion of the Ranchtown to Menger Creek 138 kV transmission line to which the project is proposed to connect, as well as other transmission facilities to the north of the project study area. However, LCRA TSC's facilities are outside of the study area. LCRA TSC is aware of this project and has expressed no opposition to it. Consistent with the Commission's request, CPS Energy attaches to this filing a map depicting the electric utility facilities in the area of the project. This document is marked as Attachment 5 to this filing, and is similar to Attachment 4 to CPS Energy's application in this proceeding (CPS Energy Ex. 1).[69]

V. MOTION

In accordance with the Order Remanding to Docket Management dated November 2, 2021, CPS Energy requests the Commission admit into evidence in this proceeding the documents attached to this pleading.

VI. CONCLUSION

CPS Energy presented significant uncontroverted evidence regarding the need for the project, which was supported by Staff and experts for some parties, and was not controverted by any parties. No party has challenged the need for the project. In total, 33 alternative routes have been identified for possible consideration in this proceeding. These 33 routes connect the existing Ranchtown to Menger Creek 138 kV transmission line with alternative site options for a new substation to be built (the new Scenic Loop Substation).

All 33 routes address the need for the project and are viable and constructible, including Routes Z2, P, and Y. All 33 routes comply with PURA § 37.056 and 16 TAC § 25.101(b)(3)(B), including the Commission's policy of prudent avoidance. Accordingly, CPS Energy requests that the Commission admit the documents attached to this pleading and grant CPS Energy's application to amend its CCN to construct the project along whichever route the Commission deems most appropriate.

69 However, Attachment 5 to this filing includes updates to reflect more detail about the utility facilities in the area, consistent with the Commission's directive at the open meeting.

Respectfully submitted,

/s/ Kirk D. Rasmussen

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ATTORNEYS FOR CPS ENERGY

CERTIFICATE OF SERVICE

I certify that a copy of this document was served on all parties of record on this date via the Commission's Interchange in accordance with SOAH Order No. 3.

/s/ Kirk D. Rasmussen
Kirk D. Rasmussen

SOAH DOCKET NO. 473-21-0247
PUC DOCKET NO. 51023

APPLICATION OF THE CITY OF	§	BEFORE THE
SAN ANTONIO TO AMEND ITS	§	
CERTIFICATE OF CONVENIENCE	§	PUBLIC UTILITY COMMISSION
AND NECESSITY FOR THE	§	
SCENIC LOOP 138 KV TRANSMISSION	§	OF TEXAS
LINE IN BEXAR COUNTY	§	

CPS ENERGY'S REFERENCE TO RECORD EVIDENCE AND
MOTION TO ADMIT INFORMATION REQUESTED BY COMMISSIONERS

Attachment 1

SOAH DOCKET NO. 473-21-0247
PUC DOCKET NO. 51023

APPLICATION OF THE CITY OF SAN ANTONIO TO AMEND ITS CERTIFICATE OF CONVENIENCE AND NECESSITY FOR THE SCENIC LOOP 138 KV TRANSMISSION LINE IN BEXAR COUNTY	§ § § § § §	**BEFORE THE** **PUBLIC UTILITY COMMISSION** **OF TEXAS**

AFFIDAVIT OF GEORGE J. TAMEZ, PE

STATE OF TEXAS § § §

Before me, the undersigned authority, George J. Tamez, P.E., being first duly sworn, deposes and states:

"My name is George J. Tamez, P.E. I am a professional electrical engineer employed by the City of San Antonio, acting by and through the City Public Service Board (CPS Energy), as Director of Grid Transformation and Planning. My business address is 500 McCullough Ave, San Antonio, Texas 78215. I am over the age of twenty-one, and am competent to make this affidavit. On behalf of CPS Energy and in my capacity as Director of Grid Transformation and Planning, I am sponsoring and providing the attached document, labeled "Updated Data Tables 14-1 and 14-2 and Figure 14-3" reflecting updated load growth data through year to date 2021. The data reflected on these tables and figure were prepared and compiled under my direction and are true and correct."

George J. Tamez, PE
Affiant

SUBSCRIBED AND SWORN TO BEFORE ME, a Notary Public in and for the State of Texas, this 5th day of November 2021.

NOTARY PUBLIC STATE OF TEXAS
BRENDA MARTINEZ
Notary ID # 1217965-2
My Commission Expires
February 26, 2025

Notary Public

CPS ENERGY'S UPDATED DATA TABLES 14-1 AND 14-2 AND FIGURE 14-3

Table 14-1 – Scenic Loop area substations historical load growth (KW)[1]

Location	**2014**	**2015**	**2016**	**2017**	**2018**	***2019***[2]	**2019**	***2020***[3]	**2020**	***2021***[4]	**2021**
La Sierra	80056	95378	105197	104395	105524	*119005*	121040	*122382*	102630	*129481*	97440
Fair Oaks Ranch	37140	39767	41193	41907	44428	*44806*	45780	*47980*	57160	*49228*	84040
Subtotal	117196	135144	146390	146302	149952	*163811*	166820[5]	*170363*	159790[6]	*178708*	181480[7]

Table 14-2 – Scenic Loop area substations forecasted load growth (KW)[8]

Location	***2022***	**2022**	***2023***	**2023**	***2024***	**2024**	***2025***	**2025**	***2026***	**2026**
La Sierra	*136991*	112526	*144936*	119052	*153342*	125957	*159476*	130995	*165855*	136235
Fair Oaks Ranch	*50508*	77881	*51821*	80756	*53168*	83756	*54550*	86350	*55969*	89029
Subtotal	*187498*	190406	*196757*	199808	*206510*	209712	*214026*	217345	*221824*	225264

Location	***2027***	**2027**	***2028***	**2028**	***2029***	**2029**	***2030***	**2030**	***2031***	**2031**
La Sierra	*172489*	141684	*177664*	145935	*182994*	150313	*188484*	154823	*194138*	159467
Fair Oaks Ranch	*57088*	91453	*58230*	93617	*59394*	95833	*60582*	98105	*61794*	100434
Subtotal	*229577*	233137	*235894*	239552	*242388*	246146	*249066*	252928	*255932*	259900

---

1 Data for years 2019, 2020, and 2021 (year to date), is a supplement to the data contained in CPS Energy's application in this proceeding. Table 14-1, above, includes the forecasted data from Table 14-2 for the years 2019-2021 of the application to compare to the actual data that is now available.

2 Forecast data from Table 14-2 of the application.

3 Forecast data from Table 14-2 of the application.

4 Forecast data from Table 14-2 of the application.

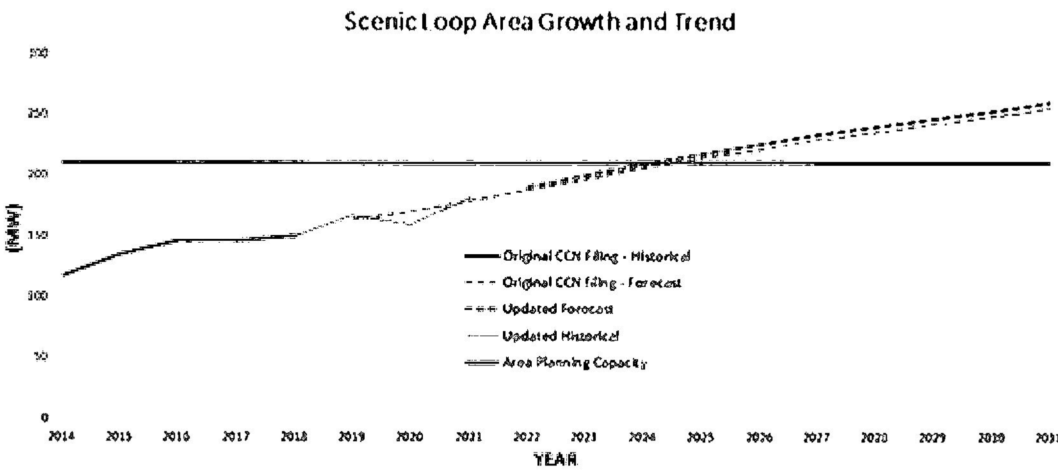
5 Exceeded forecast.

6 Not a typical year. Note that 2020 load numbers represent a significant decrease in load in general because of unforeseen changes in load usage due to the Covid 19 pandemic. However, 2021 has demonstrated a return to prior growth trends.

7 Exceeded forecast. Note that CPS Energy shifted load from La Sierra to Fair Oaks Ranch during 2020.

8 Data for all of the years has been updated. The italicized data is from the original application Table 14-2.

Figure 14-3 – Scenic Loop area substations historic and forecasted load growth



SOAH DOCKET NO. 473-21-0247
PUC DOCKET NO. 51023

APPLICATION OF THE CITY OF SAN ANTONIO TO AMEND ITS CERTIFICATE OF CONVENIENCE AND NECESSITY FOR THE SCENIC LOOP 138 KV TRANSMISSION LINE IN BEXAR COUNTY	§ § § § § §	**BEFORE THE PUBLIC UTILITY COMMISSION OF TEXAS**

CPS ENERGY'S REFERENCE TO RECORD EVIDENCE AND
MOTION TO ADMIT INFORMATION REQUESTED BY COMMISSIONERS

Attachment 2

Scenic Loop Substation Analysis Report

CPS Energy

7/14/2020

Scenic Loop Substation Analysis Report

prepared for

CPS Energy
San Antonio, TX

Project No. 123099

Final
7/14/2020

prepared by

Burns & McDonnell Engineering Company, Inc.
Kansas City, Missouri

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1. Executive Summary

CPS Energy is experiencing significant load growth in the northwest region of Bexar County, in some areas as high as 4-7 percent annually. Limitations on the existing electrical infrastructure in that area will be challenged by increasing load along the IH-10 corridor north of Loop 1604, including La Cantera, Camp Bullis, and the Rim multiuse shopping development area. Future load from the University of Texas at San Antonio (UTSA) associated with its Main Campus Master Plan (presented in February 2020) will essentially double the current UTSA load. In addition, the UTSA Area is targeted as a regional development center in the City of San Antonio's (City) SA Tomorrow Comprehensive Plan (Comprehensive Plan) and is one of the fastest growing areas of the City.

In conjunction with the significant load growth CPS Energy is experiencing in the northwest Bexar County area, the existing distribution circuits within La Sierra Substation and some of the circuits originating at the Fair Oaks Ranch Substation are very long (up to nearly seven times longer than the average distribution circuit within CPS Energy's system) and serve thousands of customers. These long, heavily loaded circuits have resulted in significant reliability concerns for the area.

Even with planned improvements to the existing distribution system, without a new substation in northwest Bexar County, the existing distribution system will reach its reliability limit within five years.

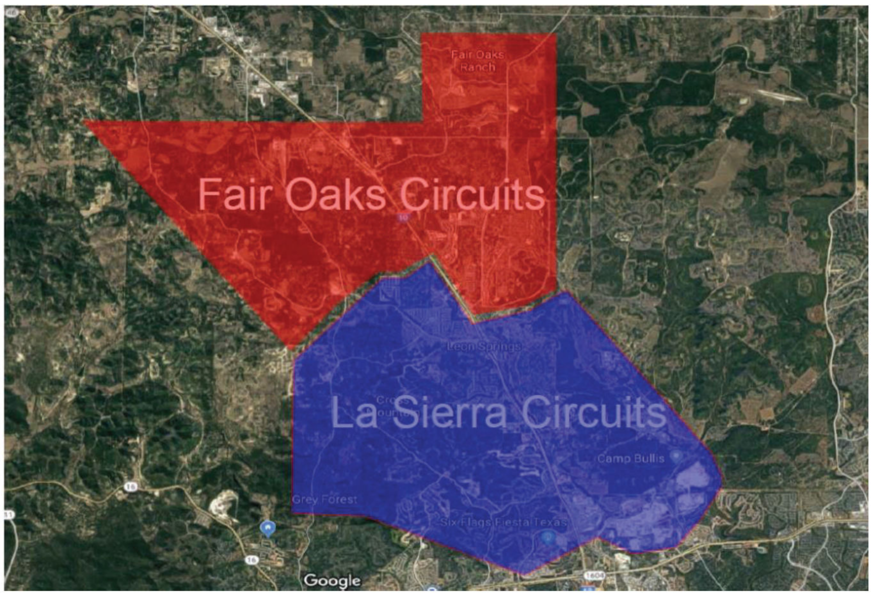
A new proposed Scenic Loop Substation will provide CPS Energy with the infrastructure that it needs to reliably serve the northwest area of Bexar County for many years to come. The new substation will offload existing circuits, thereby enhancing reliability to customers, and enabling additional load growth capability within the region.

2. Existing System Assessment

2.1 Background of System

The load in the northwest region of Bexar County is currently served by long circuits from the La Sierra and Fair Oaks Ranch substations. The long circuits serving a large number of customers have created significant impacts on power reliability in the area. The reliability concerns will increase as load continues to grow in the area.

Figure 1: Geographic area served by Fair Oaks Ranch and La Sierra 35-kV stations



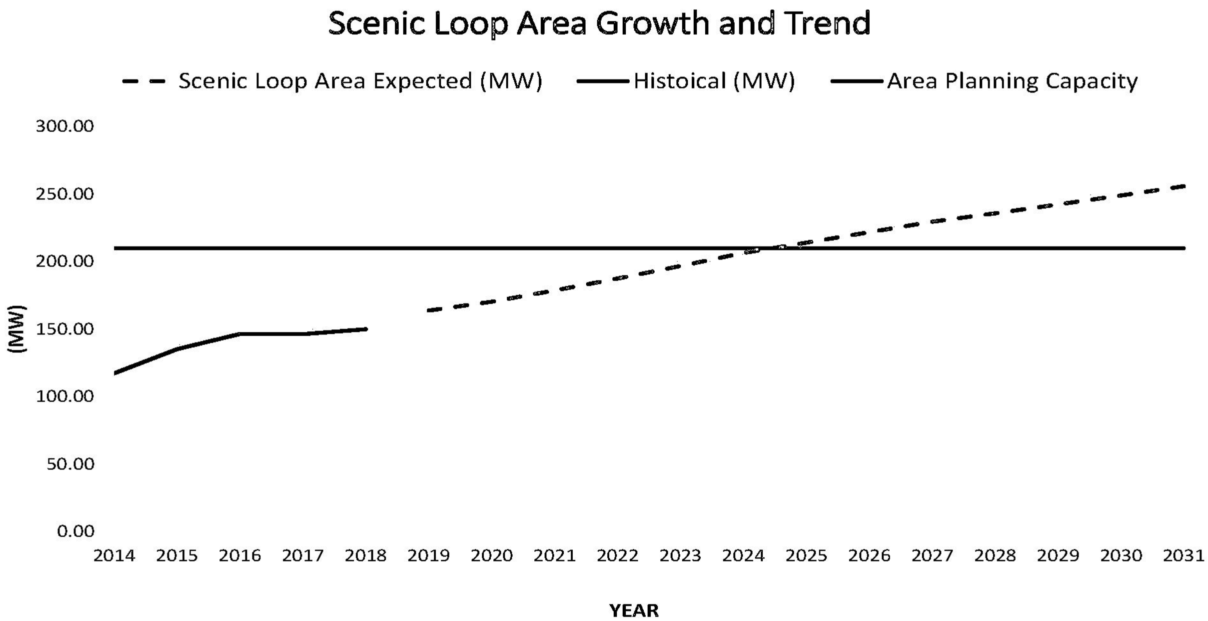
The La Sierra Substation has a total transformer capacity of 200 MVA that includes two 100 MVA transformers. There are three other substations in the vicinity (Hill Country Substation to the East, DeZavala Substation to the South, and Ranchtown Substation to the West) that can help with serving load in the event of the loss of one of the 100 MVA transformers. According to CPS Energy's established planning practice, the total planning capacity of the La Sierra Substation is 75 percent of the nameplate capacity (i.e., 150 MVA). This planning capacity is based on the ability of CPS Energy to shift load to other substations in the event of the loss of one of the two La Sierra transformers.

The Fair Oaks Ranch Substation has a total transformer capacity of 100 MVA that includes two 50 MVA transformers. Fair Oaks Ranch has less support from other nearby stations because of the terrain in the area and the CPS Energy service territory boundary. Thus, it is only capable of being supported after a loss of one of the existing transformers from two circuits of the La Sierra Substation. As a result, the total planning capacity of the Fair Oaks Ranch Substation is 60 percent of the nameplate capacity (i.e., 60 MVA).

Thus, the total planning capacity for the area served by the La Sierra and Fair Oaks Ranch substations is 60 percent of 100 MVA from Fair Oaks Ranch and 75 percent of 200 MVA from La Sierra for a total of 210 MVA for the overall area.

The area served by the La Sierra and Fair Oaks Ranch substations has seen significant load growth over the last ten years, which is anticipated to be sustained in the foreseeable future. The following plot describes expected load growth within the region along with the planning capacity based on the current ability of distribution circuits to support load. The demand on the current system is expected to exceed capacity within the next few years. The area needs an additional substation by 2024 to serve the area demand in a reliable manner.

Figure 2: Historical Load growth and expected load growth for next 10 years[1].



Evidence supporting CPS Energy's projected future load growth for the area is contained in the City's SA Tomorrow Comprehensive Plan. As set forth in the plan, the UTSA Area is one of the fastest growing areas of the City. Appendix A of this document describes the 2010-2040 Forecast for Residential Dwelling Units and Jobs and shows the plan's 30-year forecasts for housing unit and employment growth under two scenarios, (1) the Alamo Area Metropolitan Planning Organization (AAMPO) Baseline, and (2) the Targeted Growth Scenario that assumes investment and market shift that results in denser development patterns supported by high-frequency transit.

The tables in Appendix A describe future land use (acreage) including a forecast of dwelling units, jobs, and commercial/industrial square footage. The data in the Comprehensive Plan compiles information from several different economic and planning system models showing the number of acres designated to each land use category in the adopted UTSA Area Regional Center Plan. The land use map included in Appendix A describes the overall UTSA Area land capacity estimates for residential and commercial/industrial uses (by land use category, and based upon several assumptions and factors that are shown in the table) and the 2040 forecasts for net new (from 2018/2019 levels) residential dwelling units, commercial/industrial jobs, and commercial/industrial building square footage.

[1] The CPS Energy DP Design Manual 2019 (section 3.3 process 8-11) describes the steps followed in the demand forecast. The process includes load normalization to reduce annual variation. Actual recorded demands are statistically adjusted by temperature index relative to 5 year average to find an equivalent base each year. Forecasting individual substation growth is based on information known about the area (Large loads, data centers and other customer load growth) and apply to the base demand calculated for each circuit.
Average temperature and not forecast future weather are used for the base demand a single expected average is displayed. Variations in the expected demand for Individual substation growth is based on information known about the area (Large loads, data centers and other customer load growth) that is applied to the base demand.
Erratic growth rates in some years reflect load switching between stations that are outside the study with temporary excess capacity while investments from contractors is expected to fund local distribution system expansion.

The Comprehensive Plan designated the UTSA Area as one of the fastest growing areas of the City. The amount of forecasted economic activity, jobs, residential/commercial and industrial development equates to a significant increase in load demand on the CPS Energy distribution system and supports and validates the assumptions of load growth included in this study for the circuits originating from the La Sierra and Fair Oaks Ranch substations.

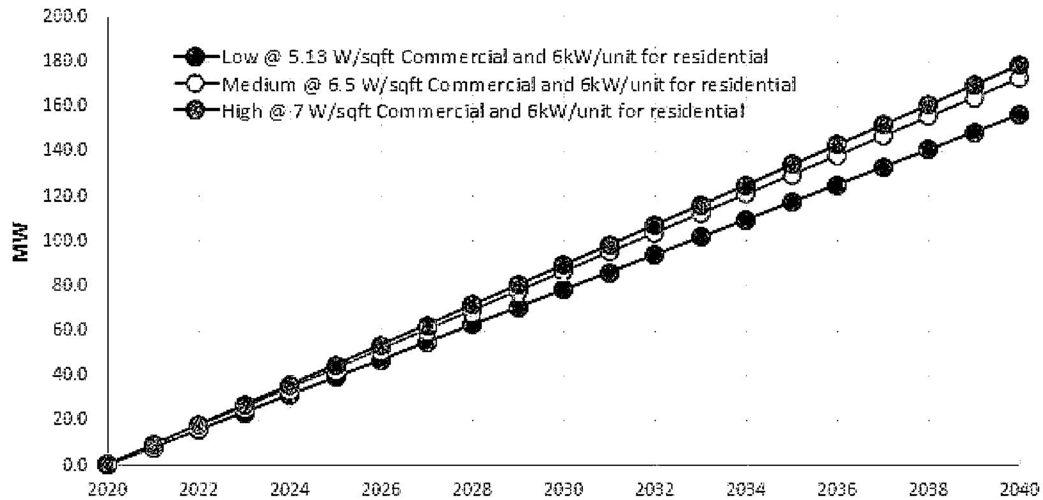
Based on the growth experienced by CPS Energy in the area over the last 10 years and information on the total anticipated residential dwelling units and the amount of square footage of commercial/industrial development from the Comprehensive Plan report, the total additional electrical load reasonably projects to approximately 8-9 MW/year of load growth in the region. Considering the targeted growth scenario, by 2040 this additional load equates to approximately 160-180 MW using the Baseline forecast scenario and could be as high as approximately 300 MW using the Targeted forecast scenario.

- The CPS Energy Distribution Planning Manual describes the electrical load of residential dwelling units at 6 kW for each new dwelling unit. The Comprehensive Plan indicates 15,900 new dwelling units (~95 MW) in this region under the Baseline scenario and 37,500 new residential units (~225 MW) under the Targeted scenario by the year 2040. This additional load growth could very easily be higher considering all the essential service loads that would be necessary to support that level of new residential development in the region. The additional load on the system cannot be accommodated reliably from the existing circuits originating from the La Sierra and Fair Oaks Ranch substations.
- According to the Department of Energy (DOE)[2], the average number of kilowatt hours per square foot for a commercial building is approximately 22.5 kWh. Some types of commercial loads, such as food service facilities, consume approximately 56 kWh/ft^2. Retail malls consume approximately 23 kWh/ft^2 on average. Other loads such as a public assembly buildings and warehouses consume approximately 15 kWh/ft^2 and 9kWh/ft^2, respectively. Assuming an average energy use of 22.5 kWh/ft^2 and a load factor of 0.5, this amounts to approximately 5.13 $Watts/ft^2$ for load calculations. A Review of CPS Energy's commercial/industrial load statistics indicates an average of approximately 6.5 $Watts/ft^2$.

The following Figure 3 describes the anticipated load growth using the Baseline (minimum) scenario projections in the UTSA Area described in the Comprehensive Plan report. The high, medium, and low growth scenarios are based on assumed load per square foot values described above.

[2] https://www.energy.gov/eere/analysis/energy-intensity-indicators
https://www.eia.gov/totalenergy/data/annual/

Figure 3: Load Growth based on SA Tomorrow's forecasted customers – Baseline forecast only.



2.2 Planning Criteria

Distribution planning analysis was conducted on various system conditions to determine the reliability need for the area and to find a robust and cost-effective solution from both near-term and long-term perspectives. The study criteria, assumptions, methodology, and findings from the analysis are presented in this section and are consistent with the CPS Energy Distribution Planning Manual.

According to CPS Energy's long-standing Distribution Planning Manual, the electric distribution supply to the CPS Energy service territory is deemed adequate when the following criteria are met:

- No substation transformer is loaded above 80% of its Normal Rating during expected peak energy usage conditions.
- No backbone distribution feeder is loaded above 80% of its Normal Rating during expected peak energy usage conditions. A backbone distribution feeder is one within the three phase primary distribution system characterized by having large conductor and most direct path(s) to adjacent substations.
- For the extended outage of any substation transformer, no facility will be loaded in excess of its Emergency Rating.
- Voltages are within the ANSI 84.1 voltage range A limits for normal conditions and range B for emergency conditions on primary distribution lines.
- Power Factors, or the ratio of the real power absorbed by the load to the apparent power flowing in the circuit, are greater than 97% at the secondary breakers on each substation transformer under normal conditions.

In addition to the provisions established in the CPS energy planning manual, and in accordance prudent utility practice, the total transformer capacity of an individual substation is limited by the ability of CPS Energy to sustain the loss of one substation transformer by shifting load to other transformers in that or nearby substations.

2.3 Existing Distribution Circuit Performance

The existing distribution system served out of the La Sierra and Fair Oaks Ranch substations served a peak summer load of approximately 165 MW in 2019. The La Sierra substation has two 100 MVA transformers and currently serves approximately 110 MW (peak summer load in 2019) via seven circuits. The transformers at the substation were peak loaded to 71% and 42% of their capacity rating in 2019. The peak load on one of the transformers was more than 80% in 2018 and near 80% in the other recent years. Thus, the loss of one of the transformers within the station will load the other transformer to near 120% of its emergency rating. The Fair Oaks Ranch Substation has two 50 MVA transformers and serves load connected to four circuits split between the two transformers, with a total peak load of approximately 50 MW served in 2019.

The La Sierra and Fair Oaks Ranch substations have no spare transformers and the circuits served from these stations have only a limited ability to support load growth as the limit is defined by circuit capacity and on how one of the substation transformers gets loaded if the other one is lost as a part of an outage.

The following
Table 2 and
Table 3 show the loading on the circuits and the length of the circuits originating from the La Sierra and Fair Oaks Ranch substations. As can be seen in the tables, the loadings on the circuit R034 from Fair Oaks Ranch and U114 from La Sierra exceeded CPS Energy's Distribution Planning Criteria in 2019. The projected 2020 summer peak loads on circuits U112 and U114 will exceed CPS Energy's Distribution Planning Criteria of 80% loading on the U114 circuit (98%) and U112 circuit (80%) this summer.

Of importance to note for this study, CPS Energy reconfigured the circuits out of Fair Oaks Ranch with two on each 35-kV switchgear within the substation in the summer of 2020. As a result of the reconfiguration, the load and circuit R011 moved to the other switchgear and is named circuit R033. A portion of the U114 and R034 circuits shifted to a new circuit R014. Table 1: Scenic Loop Area 34.5kV Distribution Circuits describes the details of the existing circuit lengths connected to La Sierra and Fair Oaks Ranch along with a scenario following the energization of circuit R014. This table also provides details on the final circuit lengths after inclusion of the Scenic Loop Substation (estimated for 2024). As can also be seen in Tables 2 and 3, some of the La Sierra and Fair Oaks Ranch circuits are very long compared to an average CPS Energy distribution circuit (which is approximately 12.8 miles long). The length and loading on these circuits equate to lower reliability to the customers served by these feeders, as will be seen in the reliability metrics presented in the following discussion.

Table 1: Scenic Loop Area 34.5kV Distribution Circuits

Circuit Lengths in Miles				
Circuit Number		Existing Configuration	Existing Configuration +R014 (2020)	Existing Configuration +R014 + Scenic Loop (2024)
La Sierra	U111	2.66	2.66	2.66
	U112	46.37	46.37	46.37
	U113	1.51	1.51	1.51
	U114	85	32.95	8.07
	U132	45.43	45.43	4.58
	U134	34.81	34.81	34.81
Fair Oaks Ranch	R014	-	97.13	31.31
	R034	73.27	28.19	28.19
Scenic Loop Rd	V611	-	-	41.58
	V612	-	-	24.28
	V613	-	-	34.84
	V614	-	-	30.66
	TOTAL	**289.06**	**289.06**	**288.87**

Table 2: Fair Oaks Ranch Substation Circuits

Xfrmr #1	Length	Customers	2019 Loads		2020 Loads	
50MVA	(miles)		Load (kW)	% of Nominal	Load (kW)	% of Nominal
R011	27.3	-	9639	36	Not Utilized	-
R012	-	2	Not Utilized	-	Not Utilized	-
R013	25.9	1660	12933	49	11900	45
R014	54.8	3021	New	-	9461	41
Xfrmr #3	**Length**	**Customers**	**2019 Loads**		**2020 Loads**	
50MVA	**(miles)**		**Load (kVA)**	**% of Nominal**	**Load (kVA)**	**% of Nominal**
R031	-	-	Not Utilized	-	Not Utilized	-
R032	-	-	Not Utilized	-	Not Utilized	-
R033	27.3	1256	New	-	9736	44
R034	13.3	3140	22812	105	16807	77

Table 3: La Sierra Substation Circuits

Xfrmr #1	Length	Customers	2019 Loads		2020 Loads	
100MVA	(miles)		load (kW)	% of Nominal	load (kW)	% of Nominal
U111	2.7	1659	18774	60	20488	66
U112	46.4	3222	24250	78	24736	80
U113	1.5	88	8374	28	830	3
U114	85.0*	4095	28514	91	30577	98
Xfrmr #3	**Length**	**Customers**	**2019 Loads**		**2020 Loads**	
100MVA	**(miles)**		**load (kW)**	**% of Nominal**	**load (kW)**	**% of Nominal**
U131	-	-	Not Utilized	-	Not Utilized	-
U132	45.5	2617	13531	39	14644	42
U133	2.0	553	6409	21	14770	48
U134	34.7	3288	15647	50	15990	51

* Circuit will be reduced by approximately 50 miles after the load is being picked up by R014.

Reliability of a distribution system can be evaluated by considering SAIDI (system average interruption duration index), SAIFI (system average interruption frequency index), and CMI (customer minutes of interruption). The Customers Affected (CA) include the number of customers whose outages are included in the calculation of the reliability indices presented in this report. The reliability metrics for the La Sierra and Fair Oaks Ranch substation circuits for the past seven years indicate a much lower reliability as compared to the averages of the CPS Energy system. The La Sierra and Fair Oaks Ranch circuits have 4-6 times higher SAIDI and SAIFI values in comparison to the system average interruption indices for CPS Energy as a whole.

The reliability statistics on the La Sierra and Fair Oaks Ranch circuits indicate that the CMI from these circuits have accounted on average for approximately 11.2 percent of CPS Energy's total minutes of interruptions (as high as 20% in 2017), even though these circuits serve only approximately 3% of CPS Energy's entire load. This indicates a much lower reliability for the loads served by these substations.

Notably, from 2013 to 2019 the SAIDI and SAIFI indices have steadily risen (indicating declining reliability). This increase in the frequency and duration of interruptions experienced by customers clearly evidences a steady decline in the reliability and power quality in the area. Table 4: CPS Energy System-wide Average Reliability Indices presents the CPS Energy-wide SAIDI, SAIFI, and CMI in addition to number of customers affected.

Table 4: CPS Energy System-wide Average Reliability Indices

YEAR	CMI	SAIDI	SAIFI	CA
2013	37,465,050	51.39	0.79	575,726
2014	35,449,090	47.55	0.73	547,023
2015	41,562,265	54.62	0.76	580,576
2016	44,120,730	57.4	0.8	616,000
2017	42,443,090	53.97	0.83	654,000
2018	44,311,290	54.49	0.84	686,000
2019	42,464,750	61	0.86	603,000
Total	**287,816,265**			**4,262,325**

Table 5 presents the reliability indices for the circuits served from the La Sierra and Fair Oaks Ranch substations. The data clearly show a high CMI. As stated above, in 2017 the interruptions on these circuits contributed nearly 20% of the total CMI for the entire CPS Energy system. Based on the outage data presented below, the customers served from the La Sierra and Fair Oaks Ranch circuits have experienced approximately 8-10 times more outages compared to the entire CPS Energy system average.

Table 5: La Sierra and Fair Oaks Ranch Circuits Reliability Indices

YEAR	CMI	CMI %	SAIDI	SAIFI	CA
2013	1,842,904	4.90%	83.77	2.67	58,633
2014	1,868,883	5.30%	83.06	3.39	76,259
2015	3,900,198	9.40%	169.57	4.67	107,463
2016	5,614,911	12.70%	238.93	5.85	137,513
2017	8,219,320	19.40%	342.47	5.65	135,583
2018	5,483,364	12.40%	223.81	6.05	148,185
2019	5,345,088	12.60%	215.53	7.82	194,027

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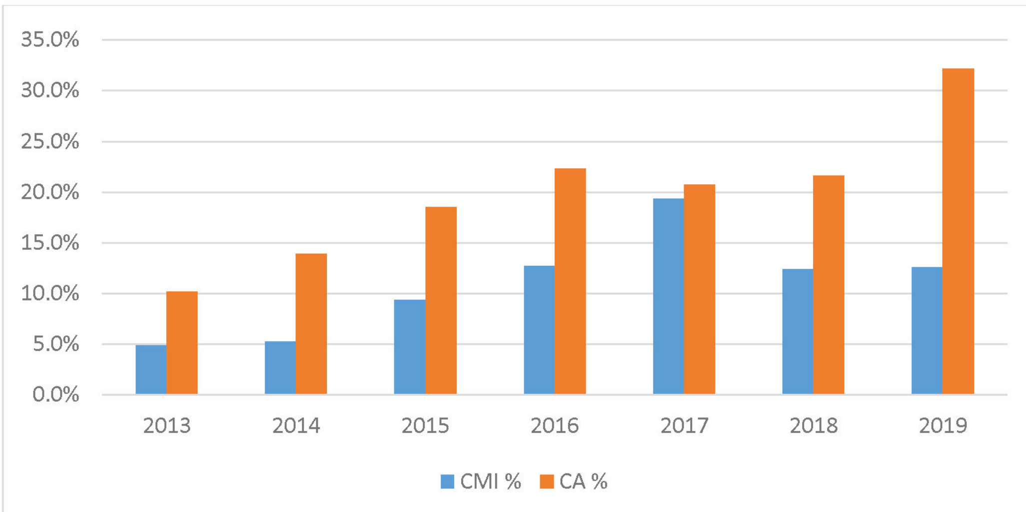
Total	**32,274,667**	**11.20%**			**857,663**

Figure 4 shows the degree to which the low reliability on the La Sierra and Fair Oaks Ranch circuits (comprising approximately 3% of the CPS Energy overall load) contribute to the CPS Energy metrics for reliability in terms of CMI and customers affected (CA). The number of CA for the year 2019 on the loads served on La Sierra and Fair Oaks Ranch circuits is more than 30% of the CA for the whole CPS Energy system.

Figure 4: Fair Oaks Ranch and La Sierra Load Contribution to CPS Reliability Metrics from 2013-2019



The reliability issue with the La Sierra and Fair Oaks Ranch circuits is self-evident. Between 2010 and 2018, some of the La Sierra and Fair Oaks Ranch circuits have made CPS Energy's poor performing circuits (PPC) list for five different years (based on standards established by the Public Utility Commission of Texas), and a total of 6 of the 11 circuits have been on the list since 2010. Additionally, five circuits from La Sierra and Fair Oaks Ranch were on the PPC list in 2018, the most of any year within the past 10 years. This increase in the number of PPC is shown in Table 6**Error! Reference source not found.**.

Table 6: La Sierra and Fair Oaks Ranch Poor-Performing Circuits

Station	Circuit	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Fair Oaks	R011										
Fair Oaks	R012			PPC						PPC	
Fair Oaks	R013	PPC								PPC	
Fair Oaks	R034			PPC						PPC	
La Sierra	U111									PPC	
La Sierra	U112										
La Sierra	U113										
La Sierra	U114			PPC	PPC				PPC		
La Sierra	U133										
La Sierra	U134										
La Sierra	U132									PPC	PPC

Table 7 and Table 8 demonstrate the severe reliability issues that are occurring on circuits served from the La Sierra and Fair Oaks Ranch substations. As can be seen in the information presented in the tables, in the past year, La Sierra circuit U134 has the most affected customers experiencing momentary operations,[3] high frequency interruptions at 593% of system SAIFI, and is ranked one of the PPCs in 2019. Fair Oaks Ranch circuit R012 has high SAIDI and SAIFI values at 240.59 (which exceeds the 300% threshold) and 2.76, respectively. These statistics reveal the urgent need to remediate the reliability issues across La Sierra and Fair Oaks Ranch circuits. In addition to the objective declining reliability metrics presented above, CPS Energy has experienced subjective reliability complaints from customers in the Scenic Loop area. On two occasions in 2019 alone, CPS Energy representatives met with groups of customers in the area to address the frequent and sustained outages.

Table 7: La Sierra and Fair Oaks Frequent Device Operations Sustained & Momentary

(Apr 1, 2019 to Mar 31, 2020)

Circuit	Device	# of Sustained Operations	# of Momentary Operations	Customers Affected	CMI
U114	R3696	6	-	1027	96,502.88
R013	S5106	4	-	150	18,537.30
U132	CBU132	-	7	19344	8930.5
U134	CBU134	-	6	28316	7939.32
U114	CBU114	-	4	21176	30901.67

Table 8: SAIFI Poorest Performing Circuits

Circuit Number	Customers Served as of Last Outage	Last Outage Month	SAIDI	SAIFI	Compared to System SAIFI	Also Exceeds SAIDI 300% Threshold
U134	3288	1-Mar-20	18.33	1	593.37%	NO
R012	1085	1-Jun-19	240.59	2.76	460.03%	YES

One root cause for increased number of outages and duration of the outages on the La Sierra and Fair Oaks Ranch circuits are due to the length of the circuits. As shown above, some of the circuits from these substations are approximately 6-8 times longer than an average circuit length within CPS Energy's service territory. The length and poor reliability of these circuits today, coupled with the additional load growth these circuits will experience in the next several years, will continue to further erode the reliability on these circuits through an increase in the number and duration of outages along with the number of customers experiencing these outages. Installation and maintenance of adequate numbers of reclosers to detect and interrupt momentary faults will help with reliability but cannot fully address the reliability issues associated with the length and loading of the circuits. Specifically, the La Sierra and Fair Oaks Ranch circuits have adequate automation and sectionalization, but due to the nature of the circuit topology related to the terrain, length, and number of customers, reliability is still an underlying issue to be resolved.

Circuit	# of Reclosers
R014	5
R034	3
U111	1
U114	4
U132	1
U134	5

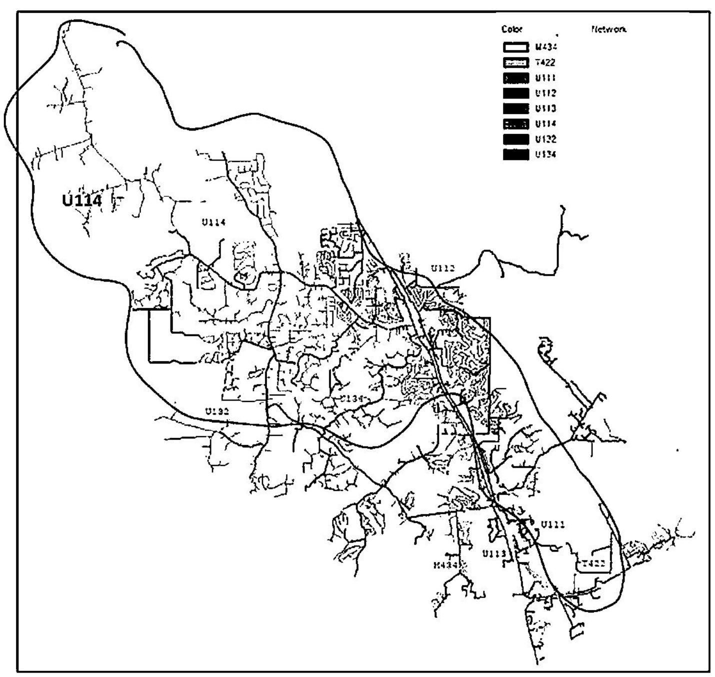
[3] A momentary operation is a brief loss of power delivery (less than 5 minutes) caused by the opening and closing operation of an interrupting device (e.g., a circuit breaker or recloser). These momentary operations and the number of customers impacted typically increase with line length, number of customers served.

For example, the longest circuit in the region is La Sierra circuit U114 that serves approximately 30 MW of load and over 4,000 customers. The circuit has four reclosers to help improve reliability, but it traverses heavily wooded areas and a canyon, which greatly impacts reliability. The circuit was flagged as a worst performing circuit more than three times in the last 10 years based on a large number of customer minutes of interruption.

As discussed previously, CPS Energy is not waiting until the construction of a new substation to improve reliability to the region. In order to increase capacity in the region and improve the reliability of circuit U114, during the early summer of 2020 CPS Energy moved a portion of the downstream load of U114 (approximately 6 MW) so it is picked up by another circuit (Fair Oaks Ranch R014). This reduces the length of the U114 circuit and provides some capacity for load growth on it. However, following the transfer, the R014 circuit increased from 52.05 miles to approximately 97 miles in length (which will likely result in decreased reliability on that circuit for those customers). Furthermore, shifting approximately 6 MW from U114 to R014 is only a temporary fix to create a small increase in capacity on the La Sierra circuits to help facilitate load interconnections and load growth around the IH-10 corridor. Capacity on the La Sierra circuits is very much needed to serve load growth around the UTSA area, La Cantera, and loads around IH-10, but the circuits also need to also be able to shift loads between the Hill Country and DeZavala substations. The Hill Country Substation has a single 50 MVA transformer that is expected to have a loading of 50% in 2020. The DeZavala Substation has three 100 MVA transformers and the peak loading on those transformers is expected to be 42%, 61% and 83% in the summer of 2020. Load increases and outages at these stations will need additional capacity from La Sierra to pick up load and to restore service in certain outage conditions.

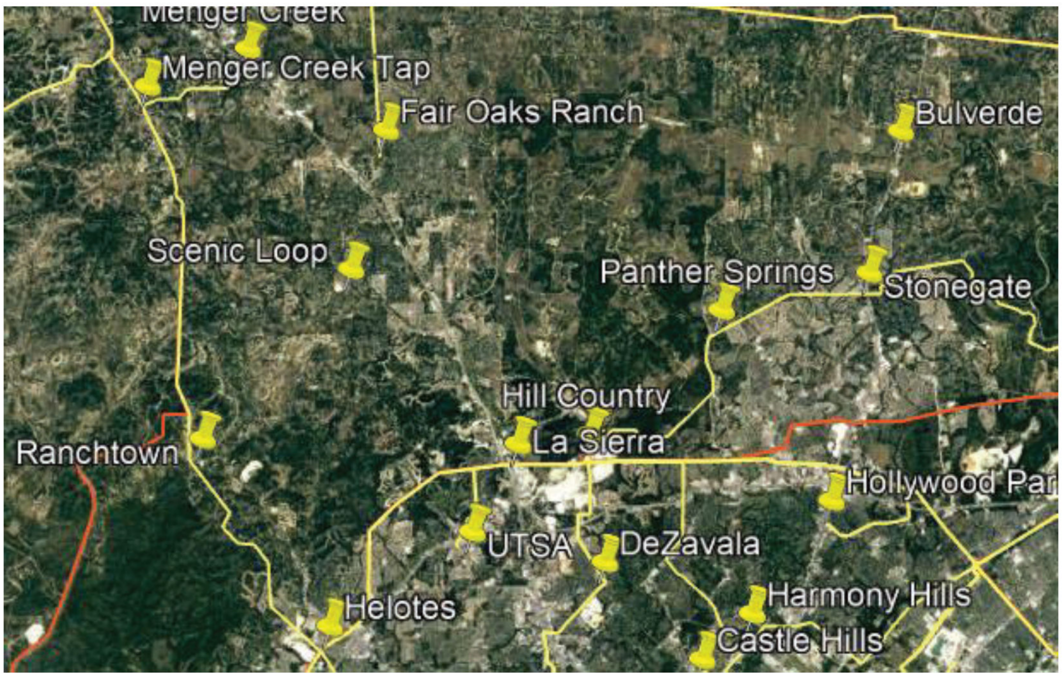
Finally, shifting load to R014 will only reduce the circuit length of U114 by 25 miles. After the transfer, U114 will still be around 60 miles in length, which is still almost 5 times longer than the system average circuit length (resulting in continued reliability challenges for that circuit).

Figure 5: Existing System Configuration of Circuits Served from La Sierra Substation, (U114 is the Longest Circuit)



The aerial image in Figure 6 shows the locations of the distribution substations owned and operated by CPS Energy in this area. The La Sierra, Hill Country, De Zavala, and UTSA substations are all within three miles of each other. Similarly, the Stonegate, Panther Springs, and Bulverde substations are within three to six miles of each other and the circuits between these stations are not very long. In contrast, the La Sierra and Fair Oaks Ranch substations are approximately 11 miles apart and some of the circuits served by these substations are extremely long. Because of the distances, the loads at the downstream portions of the La Sierra and Fair Oaks Ranch circuits (such as U114) cannot be served by any other substations without building significant additional infrastructure from more than 10 miles away through hilly and wooded terrain, which further increases the length of the lines, resulting in a continued possibility of lower reliability to the downstream loads.

Figure 6: CPS Energy Substations in Northwest Region of Bexar County



2.3.1 La Sierra Distribution Circuits Current Configuration – Power Flow Analysis

To evaluate the capacity and reliability of the current system in northwestern Bexar County, a power flow analysis was performed. This initial analysis did not include the load shift from circuit U114 to circuit R014. That configuration is shown in the second modelling provided below. The current CPS Energy distribution system shows loading on the U114 and U112 circuits was higher than CPS Energy planning criteria of 80% of their nominal rating in 2019. The 100 MVA transformers at the La Sierra Substation were loaded beyond 70% and 40% of their nominal rating in 2019. At this loading level, the loss of one of the transformers would result in a shortage of capacity to serve all the feeders out of the substation. In 2019, heavy loading on distribution circuits U114, results in voltage problems on downstream circuits and loads.

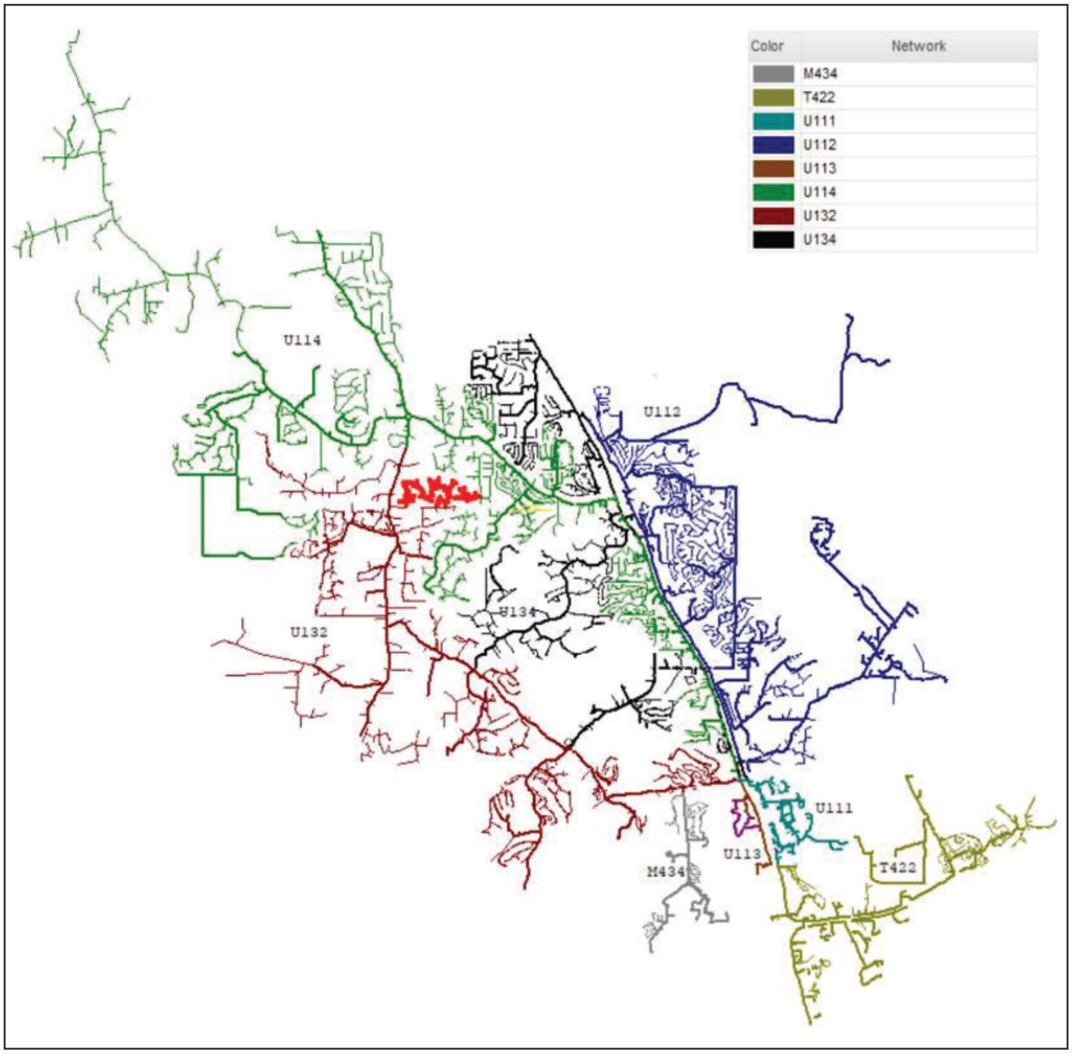
Figure 7 shows the La Sierra circuits with overloads and low voltages on a few portions of the U114 circuit.

Table 9: La Sierra Distribution Circuit Loadings

La Sierra Distribution Circuits	Loading	Total Load		
	%	kW	kVAr	kVA
U111	59.06	18331.07	6702.41	19517.95
U112	79.83*	24682.79	4667.76	25120.27
U113	31.78	8792.21	5324.65	10278.85
U114	87.91*	27428.49	4684.55	27825.65
Total		**79234.55**	**21379.36**	**82068.21**
La Sierra Distribution Circuits	**Loading**	**Total Load**		
	%	**kW**	**kVAr**	**kVA**
U132	37.79	13178.12	1317.49	13243.81
U134	50.75	15911.63	1727.68	16005.15
Total		**29089.75**	**3045.17**	**29248.7**

* CPS Distribution Planning Criteria violations

Figure 7: N-0 Model of La Sierra Circuits with Peak Loading (Actual FY 2019) Included in the Model



As discussed above, this part of the CPS Energy system has been experiencing above average (4-7%) load growth for the last five years. A model has been simulated to include additional loads to represent the year 2025 assuming a conservative load growth of 4% each year.

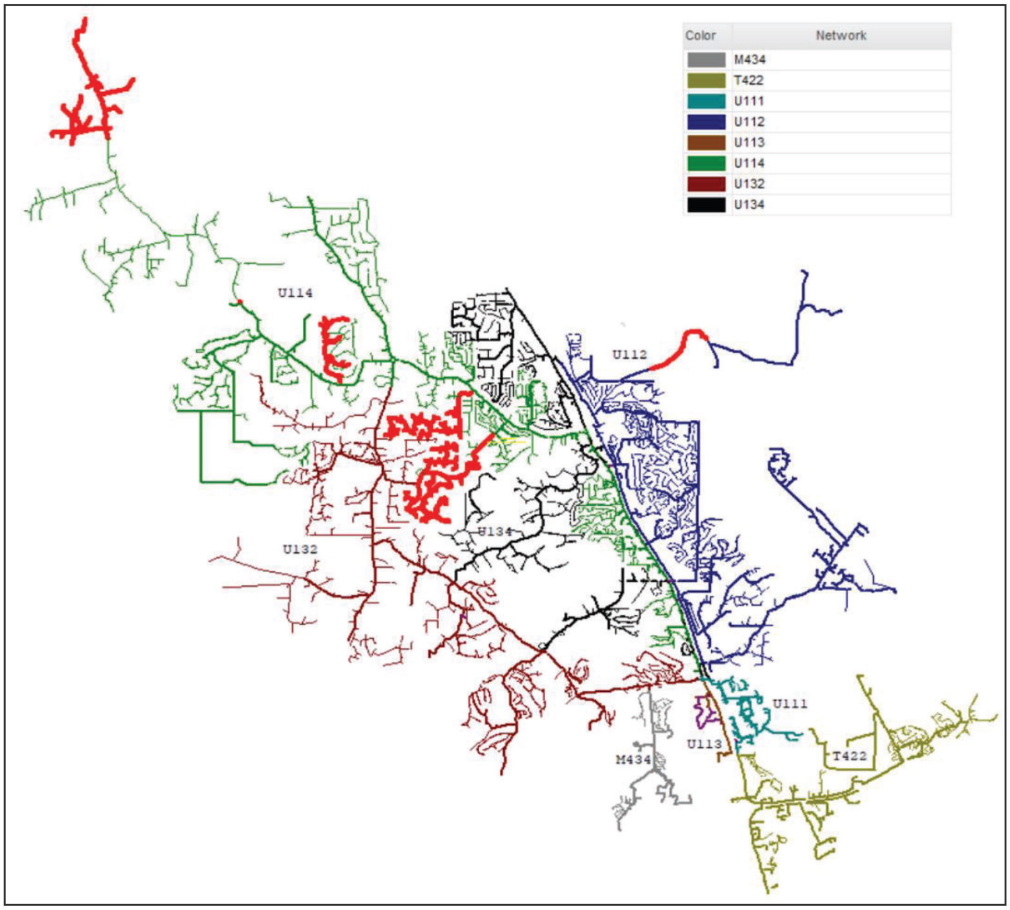
Table 10: La Sierra Distribution Circuit Loadings (FY 2025)

La Sierra Distribution Circuits	Loading	Total Load		
	%	kW	kVAr	kVA
U111	77.34	24007.96	10423.74	26173.2
U112	101.28*	31315.61	8081.35	32341.55
U113	43.54	12047.04	7445.16	14161.97
U114	112.23*	35015.09	8658.51	36069.74
Total		**102385.7**	**34608.76**	**108076.81**
La Sierra Distribution Circuits	**Loading**	**Total Load**		
	%	**kW**	**kVAr**	**kVA**
U132	49.82	17371.29	3324.67	17686.58
U134	64.37	20180.17	4073.32	20587.16
Total		**37551.46**	**7397.99**	**38273.25**

* CPS Distribution Planning Criteria violations

The modelling results indicate that the system problems in the area are exacerbated and voltage issues can be seen on multiple circuits in the region by 2024. Specifically, circuit U114 does not have adequate capacity to support the load and results in thermal and voltage violations as depicted in Figure 8.

Figure 8: N-0 Model of La Sierra Circuits with Peak Loading (Forecast FY 2025 with 4% Growth)



As discussed above, circuit U114 is currently greater than 85 miles long, which decreases reliability. As a result, CPS Energy has planned to shift a portion of the downstream network and load from circuit U114 to circuit R014 that is served from the Fair Oaks Ranch Substation.

2.3.2 La Sierra Distribution Circuits with R014 Energized – Power Flow Analysis

The forecasted peak load on circuit R014 in 2020 is estimated to be approximately 9.46 MW (41% loading of nominal rating). This circuit is served off the Fair Oaks Ranch Substation and serves load on the west side of IH-10. As discussed above, CPS Energy shifted approximately 6 MW of load from circuit U114 to circuit R014 in June of 2020 to reduce the length and loading on circuit U114. The following Table 11 provides the loads on the circuits in the area under this modelling scenario.

Figure 9 describes the R014 circuit along with other circuits in the region.

Table 11: La Sierra Distribution Circuit Loadings with R014

La Sierra Distribution Circuits	Loading	Total Load		
	%	kW	kVAr	kVA
U111	59.06	18331.07	6702.41	19517.95
U112	79.83*	24682.79	4667.76	25120.27
U113	31.78	8792.21	5324.65	10278.85
U114	66.35	20701.81	3878.69	21062.03
Total		**72507.86**	**20573.49**	**75370.15**
La Sierra Distribution Circuits	**Loading**	**Total Load**		
	%	**kW**	**kVAr**	**kVA**
U132	37.79	13178.12	1317.49	13243.81
U134	50.75	15911.63	1727.68	16005.15
Total		**29089.75**	**3045.17**	**29248.7**
Fair Oaks Ranch Distribution Circuits	**Loading**	**Total Load**		
Network ID	**%**	**kW**	**kVAr**	**kVA**
R014	61.67	14234.66	1791.57	14346.96

* Nearing CPS Distribution Planning Criteria violations

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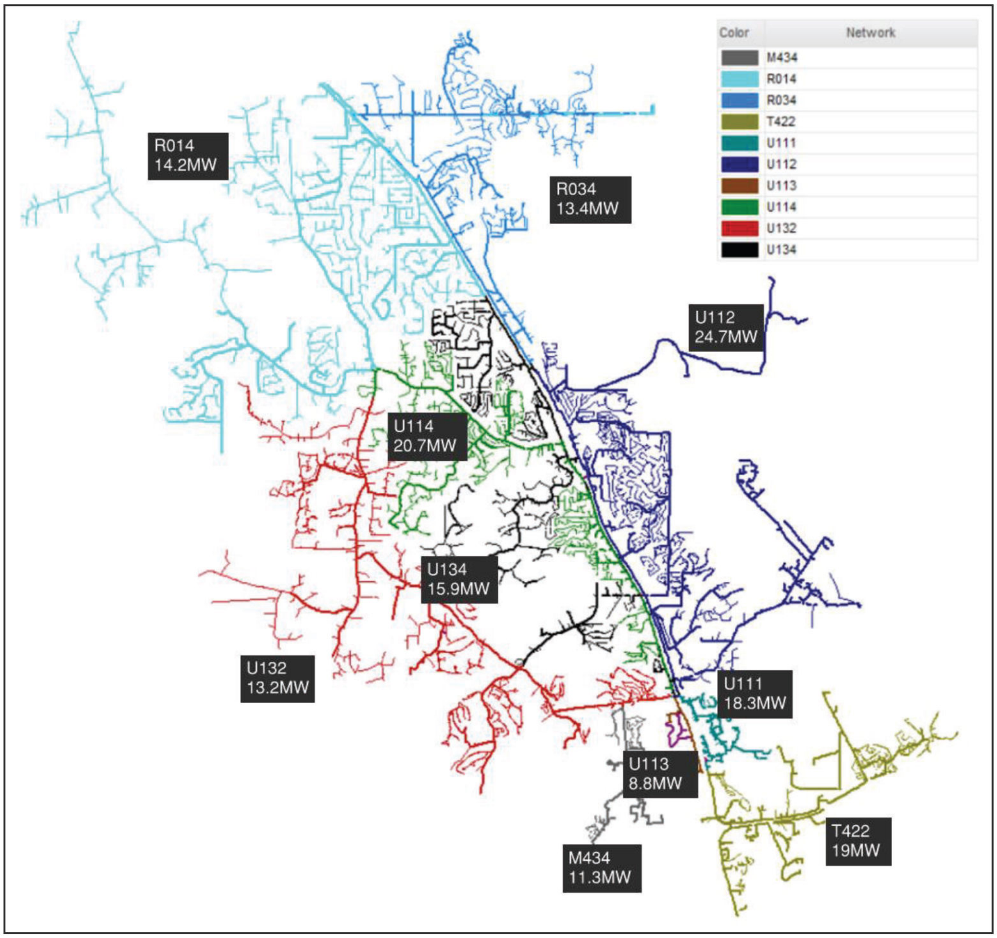
Figure 9: N-0 Model of La Sierra Circuits + Fair Oaks Circuit R014 with Peak Loads (Forecast FY 2020) Included in the Model



As can be seen in the modelling results, shifting a portion of the load from circuit U114 to circuit R014 improves the power flow in the area. Due to the significant lengths of several of the circuits (including reconfigured circuits R014 and U114, the loads will still be subject to reliability concerns resulting from the circuit lengths. After the load shift to R014, an outage of the main feeder of U114 is simulated with the entire load being picked up by R014. Under that scenario, the loading on R014 will violate its ratings in 2020, which will result in an infeasible solution considering future load growth through 2024 and beyond.

Table 12: La Sierra Distribution Circuit Loadings with R014 (FY 2020 & N-1)

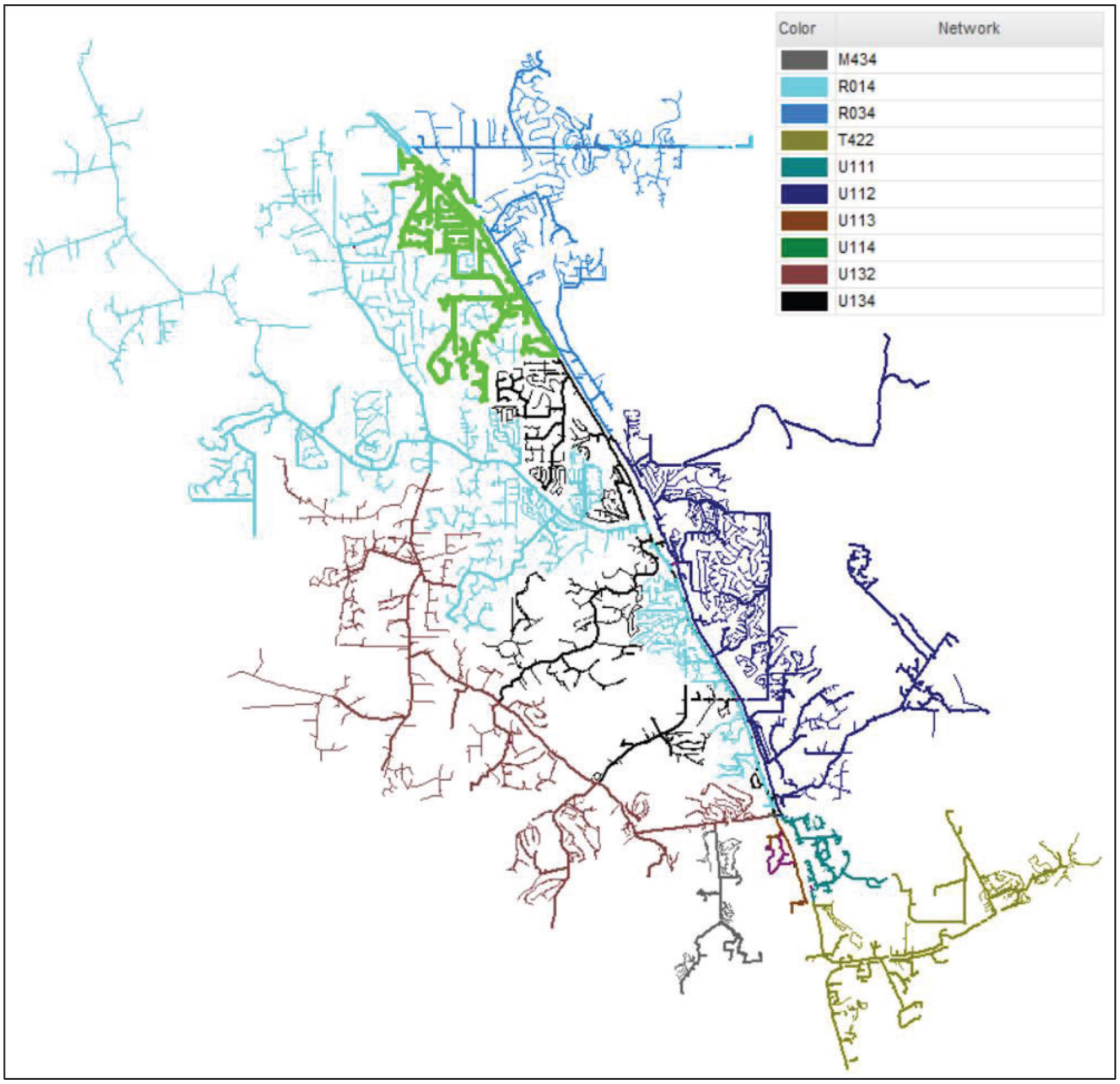
La Sierra	Loading	Total Load		
Distribution Circuits	%	kW	kVAr	kVA
U111	59.06	18331.07	6702.41	19517.95
U112	79.82	24682.79	4667.76	25120.27
U113	31.78	8792.21	5324.65	10278.85
U114	0.037	11.59	-9.94	15.27
Total		**51817.65**	**16684.87**	**54437.61**
La Sierra	**Loading**	**Total Load**		
Distribution Circuits	**%**	**kW**	**kVAr**	**kVA**
U132	37.79	13178.12	1317.49	13243.81
U134	50.75	15911.63	1727.68	16005.15

Total	**29089.75**	**3045.17**	**29248.7**

Fair Oaks Ranch Distribution Circuits	Loading	Total Load		
Network ID	%	kW	kVAr	kVA
R014	155.34*	35861.26	8834.26	36933.37

* CPS Distribution Planning Criteria Violation

Figure 10: Outage of Circuit U114, R014 Included in the Model with Peak Loads (FY 2020)



The reconfigured circuit case (without any outages) was also run to include additional loads to represent the year 2025 (assuming a reasonable average load growth of 4% each year). The following are the modelled loadings on the circuits.

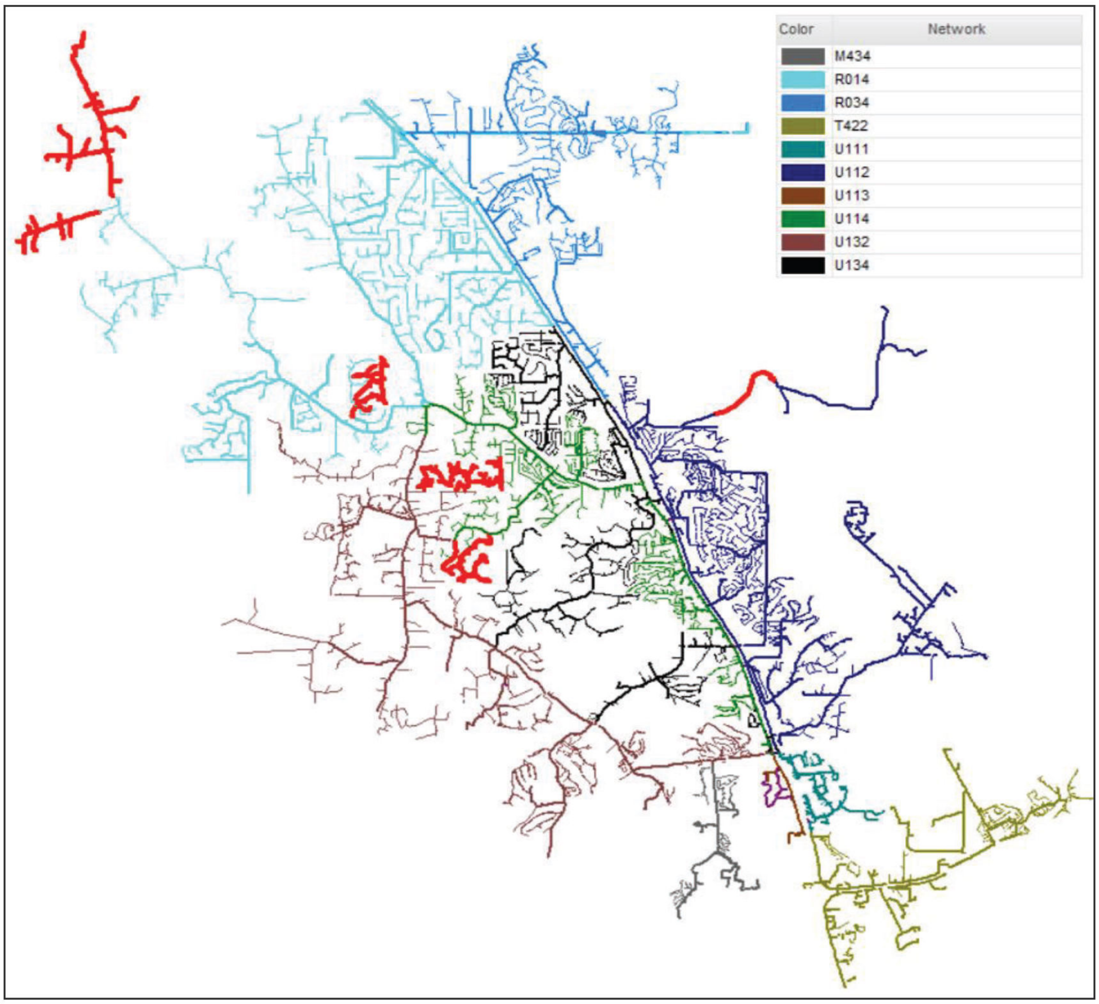
Table 13: La Sierra Distribution Circuit Loadings with R014 (FY 2025)

Substation U1-1	Loading	Total Load		
Network ID	%	kW	kVAr	kVA
U111	77.35	24007.96	10423.74	26173.2
U112	101.28*	31315.61	8081.35	32341.55

U113	43.54	12047.04	7445.16	14161.97
U114	84.41*	26336.08	6519.35	27131
Total		**93706.69**	**32469.6**	**99172.67**
Substation U1-3	**Loading**	**Total Load**		
Network ID	**%**	**kW**	**kVAr**	**kVA**
U132	49.832	17371.29	3324.67	17686.58
U134	64.37	20180.17	4073.32	20587.16
Total		**37551.46**	**7397.99**	**38273.25**
Substation R0-1	**Loading**	**Total Load**		
Network ID	**%**	**kW**	**kVAr**	**kVA**
R014	102.03*	23547.91	7689.13	24771.49

* CPS Distribution Planning Criteria violations

Figure 11: N-0 Model of La Sierra Circuits + Fair Oaks Circuit R014 with Peak Loads (Forecast FY 2025 with 4% Growth) Included in the Model.



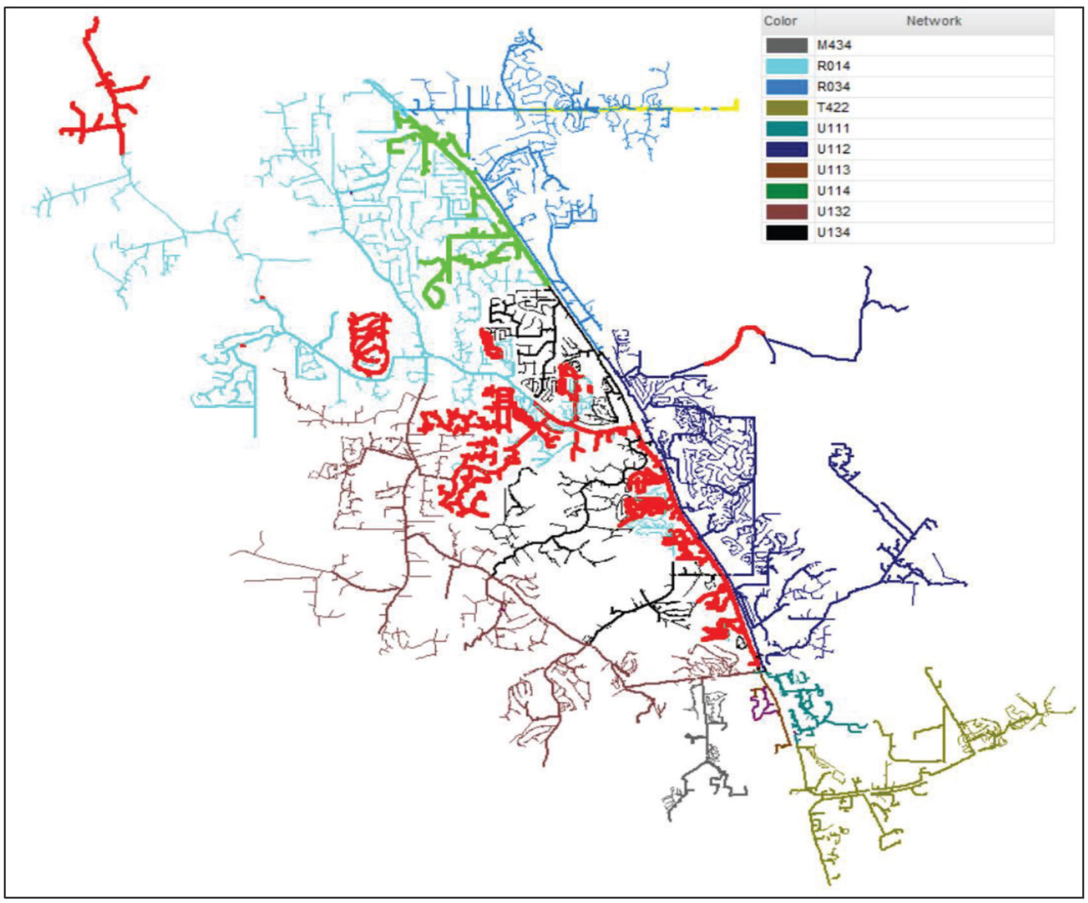
Next, the reconfigured circuit case was modelled with a loading scenario for year 2025 with the outage of circuit U114 where all its load is picked up by circuit R014. There is not adequate capacity available on other La Serra circuits and R014 to be able to pick up this load from U114.

Table 14: La Sierra Distribution Circuit Loadings with R014 (FY 2025 & N-1)

La Sierra Distribution Circuits	Loading	Total Load		
	%	kW	kVAr	kVA
U111	77.35	24007.96	10423.74	26173.2
U112	101.28*	31315.61	8081.35	32341.55
U113	43.54	12047.04	7445.16	14161.97
U114	0.047	14.67	-8.99	17.2
Total		**67385.28**	**25941.26**	**72206.12**
La Sierra Distribution Circuits	Loading	Total Load		
	%	kW	kVAr	kVA
U132	49.82	17371.29	3324.67	17686.58
U134	64.37	20180.17	4073.32	20587.16
Total		**37551.46**	**7397.99**	**38273.25**
Substation R0-1	Loading	Total Load		
Network ID	%	kW	kVAr	kVA
R014	224.87*	51900.61	21679.47	56246.54

* CPS Distribution Planning Criteria violations

Figure 12: Outage of Circuit U114 with 4% Load Growth to Simulate a 2025 Case with Circuit R014 Energized



Based on the reasonable growth and expected development described above, the current La Sierra and Fair Oaks substations will exceed capacity and cannot adequately serve the area by 2024.

The modelling reveals low voltages on portions of the system served by circuit U114. These low voltages are within the Scenic Loop Road area. In addition, a loss of circuit U114 results in a voltage collapse in the Scenic Loop Road area (and beyond) as there is not adequate capacity on adjacent feeders to pick the load from circuit U114. Under that circumstance, voltages at the loads drop to a point lower than what a regulator or a capacitor bank can do to push the voltage to a normal operating range. Shifting loads to adjacent circuits only provides additional operation flexibility or near term planning flexibility and would not improve system reliability or overall system capability to support additional load growth within this region.

Importantly, CPS Energy's Distribution Planning Criteria includes limiting the loading on a distribution circuit to 80% of its capacity in order to ensure safe and reliable operation of the circuit and maintain quality service to customers. Circuit U114 recorded a peak loading of approximately 30 MW in 2019, which is approximately 98% of its rating. Circuit R014, which will be energized in summer 2020 will offload circuit U114 to under 70% of the rated capacity for a short time. However, the historical load growth in the region, and especially on circuit U114, is reasonably forecasted to remain at 4% (or higher). Thus, the loading on circuit U114 will again reach its reliable loading limit of 80% within four years. In addition, the load growth on the other circuits (within the entire northwestern region of Bexar County) will reasonably experience similar load growth and will not have adequate capacity on existing circuits by 2024.

3. System Assessment with Scenic Loop Substation

As a result of the limitations on the existing system to reliably serve current and future load, CPS Energy considered reasonable alternatives, including the construction of a new substation near the intersection of Scenic Loop Road and Toutant Beauregard Road. A new Scenic Loop substation within the area will significantly improve reliability for the northwest region of Bexar County by reducing circuit length and loading on each circuit, which will reduce exposure for outages as well as the number of customers affected during an outage. The new circuits out of the proposed Scenic Loop Substation will also create strong backbones and sufficient field ties to adjacent substation circuits (La Sierra and Fair Oaks Ranch) that will prevent major loss of customer load in emergency conditions. The new substation will not create additional circuits initially, but rather will allow for portions of existing circuits in the area to terminate at the new station, essentially shortening circuits and providing a new source to meet load demand. The proposed configuration of the Scenic Loop Substation would connect portions of circuits U114, U132, and R014 to Scenic Loop, thereby creating circuits V611, V612, V613 and V614 as shown in Figure 13 and Figure 14 below.

The new substation will support the development and requirements of existing and future critical load customers. Initially, an estimated 20-25 MW of load will be served by this new substation. If the project is not completed, the distribution system capacity in the Scenic Loop area will be exceeded by 2024 and the La Sierra and Fair Oaks Ranch substations will have increased reliability concerns. Also, some contingency conditions may lead to customer load being at risk of lengthy outages due to exceeding emergency capacity limits.

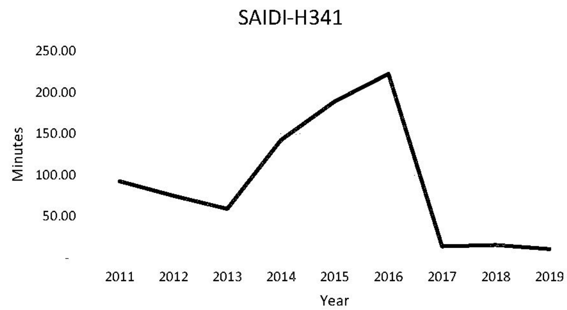
CPS Energy has designed new substations to help loads on circuits showing poor reliability very similar to the loads served from circuits connected to the La Sierra and Fair Oaks Ranch substations. As an example, H341 is a circuit in the nearby Helotes Substation that was serving approximately 4,000 customers and experienced poor reliability. In 2016 it was split into three circuits (K021, K022, K023) with 1,600 customers served off a new transformer in the Ranchtown Substation. When the load was moved onto the new circuits, the remaining customers served from the H341 circuit connected to the Helotes Substation experienced improved reliability and a reduction of CMI by 95% and CA by 97%. The SAIDI and SAIFI values on the circuit H341 shown in Table 15 indicate significant improvement in reliability achieved by splitting a portion of the load from H341 onto three shorter circuits beyond 2016.

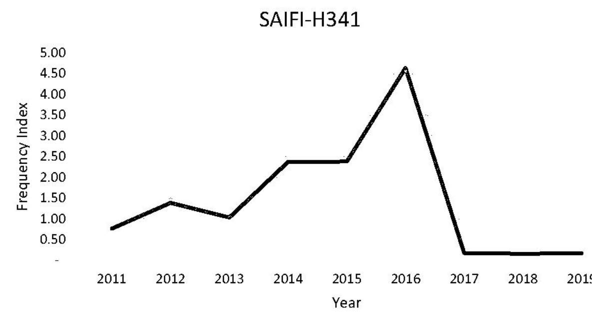
The circuit H341 is a good example of the reliability benefits that can be achieved with the Scenic Loop Substation project. H341 is located nearby the Scenic Loop Substation study area and traverses similar terrain. Prior to the reconfiguration that significantly shortened the circuit, for years customers served by H341 experienced outages and poor reliability similar to the circuits served off the La Sierra and Fair Oaks Ranch substations.

Table 15: Helotes H341 Substation Circuit

Year	Customers	CMI	SAIDI	SAIFI	CA
2011	3562	**329,619.53**	92.55	0.76	**2,708**
2012	3818	**286,261.77**	74.98	1.38	**5,279**
2013	4016	**237,979.13**	59.25	1.03	**4,136**
2014	3638	**517,724.22**	142.32	2.37	**8,631**
2015	3620	**683,906.21**	188.95	2.38	**8,611**
2016	2011	**447,157.68**	222.37	4.64	**9,335**
2017	1706	**23,537.00**	13.80	0.17	**298**
2018	1704	**26,470.12**	15.53	0.15	**262**
2019	1707	**18,032.17**	10.57	0.17	**290**

The following plots describe the SAIDI and SAIFI reliaiblity indices on the circuit H341 and it can be cleary seen that after the significant load shift to other circuits described above, there has been a dramatic improvement in reliability to the loads remaining connected to that circuit.





Following the reconfiguration of circuit H341, the reliability on the three new circuits K021, K022, K023 generally experienced reliability similar to the CPS system wide averages with a few exceptions due to extended outages during construction and other planned upgrades on these circuits. Table 16 lists the reliability values on these circuits for the past few years.

Table 16: Reliability values for circuits K021, K022 and K023 after shifting loads from H341

YEAR	K021		K022		K023	
	SAIDI	SAIFI	SAIDI	SAIFI	SAIDI	SAIFI
2016	22.06	2.22	-	-	-	-
2017	1.37	0.01	26.15	0.52	5.3	0.07
2018	490.46	2.34	83.29	2.41	29.88	0.23
2019	128.15	1.82	154.15	1.43	72.23	0.33

A planning analysis was conducted to identify system reliability based on assumed load forecast under no outage and selected outage conditions after inclusion of the Scenic Loop Substation. The analysis shows that a new substation in the Scenic Loop area will improve reliability within the northwestern region of Bexar County and will provide additional capacity for the significant forecasted load growth for the area. The proposed project configuration does not add additional circuits initially, but rather terminates existing circuits at the new substation, thereby directly contributing to improvement of reliability to the loads connected to the new substation as well as the shorter and less loaded circuits that remain connected to the La Sierra and Fair Oaks Ranch substations.

It is anticipated that by shifting portions of circuits U114, U132, and R014 to the Scenic Loop Substation (thereby creating four circuits V611, V612, V613 and V614), would provide an improvement on the reliability to the loads on the underlying circuits and would improve the overall reliability within this region.

The following circuit loadings described in the Table 17 represent a scenario that models the year 2024 in the region with Scenic Loop substation and inclusion of V611, V612, V613, and V614 circuits.

Table 17: Loading on Circuits in the Area after Including the New Scenic Loop Substation.

Scenic Loop Substation Circuits	Loading	Total Load		
	%	kW	kVAr	kVA
V611	30.80%	10925.01	-112.47	10925.59
V612	41.30%	12956.41	1945.47	13101.66
V613	19.62%	6516.88	1735.68	6744.06
V614	19.13%	6229.53	2104.14	6575.29
Total		**36627.83**	**5672.82**	**37064.53**
La Sierra Substation Circuits	**Loading**	**Total Load**		
	%	**kW**	**kVAr**	**kVA**
U111	74.10%	23076.39	9806.55	25073.66
U112	97.1%*	30089.77	7438.95	30995.68
U113	41.80%	11581.9	7140.82	13606.31
U114	38.70%	11844.05	3255.19	12283.23
Total		**76592.11**	**27641.52**	**81427.3**
La Sierra Substation Circuits	**Loading**	**Total Load**		
	%	**kW**	**kVAr**	**kVA**
U132	17.40%	5942.39	1697.92	6180.2
U134	61.70%	19393.11	3634.74	19730.79
Total		**25335.5**	**5332.65**	**25890.63**
Fair Oaks Ranch Substation Circuits	**Loading**	**Total Load**		
Network ID	**%**	**kW**	**kVAr**	**kVA**
R014	39.44	9572.99	2324.3	9851.12

* loads on this circuit can be easily switched on to other circuits on La Sierra and this is not considered a violation for this planning analysis

Figure 13: Ariel Imagery of Scenic Loop Region Indicating Boundaries of Circuits Serving Loads

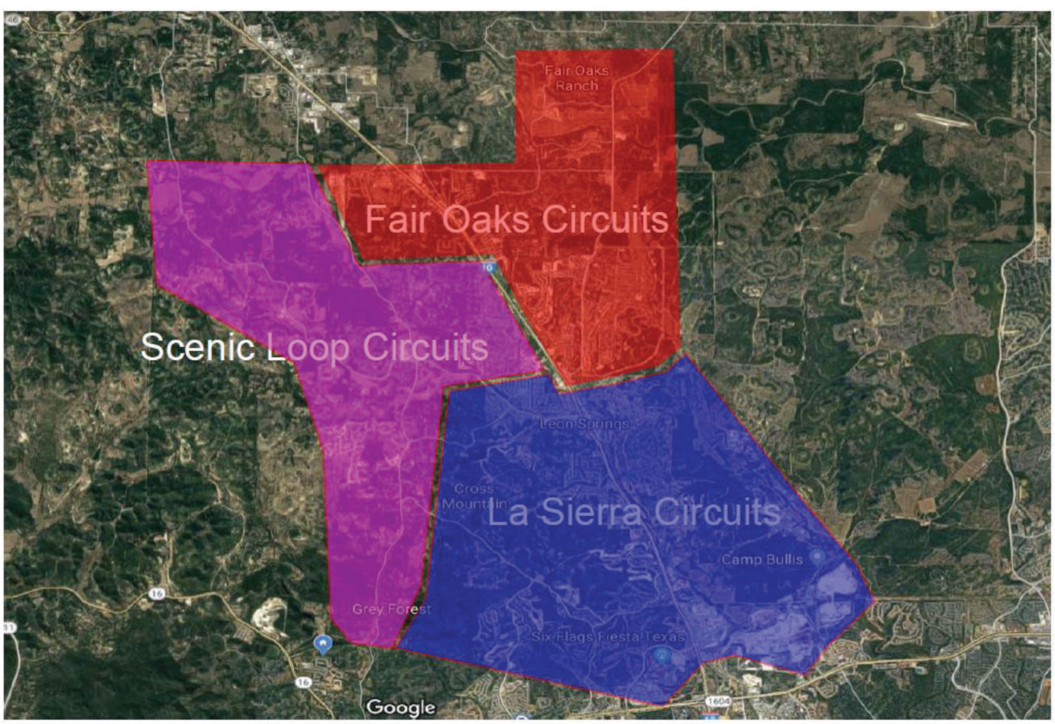
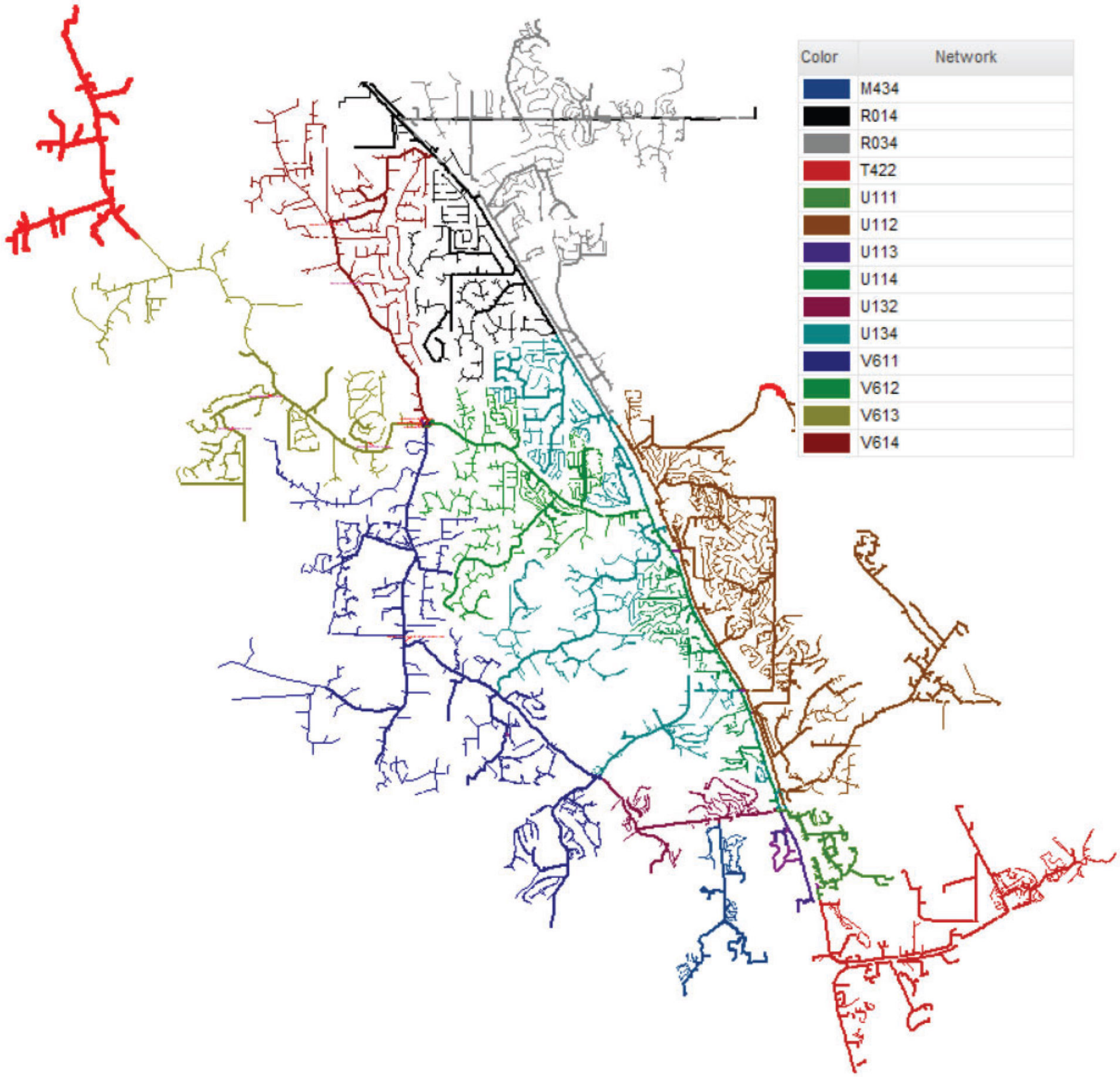


Figure 14 : Performance Under Peak Load (Forecast Summer 2024 Peak Loads with 4% Growth) – No Outage Conditions



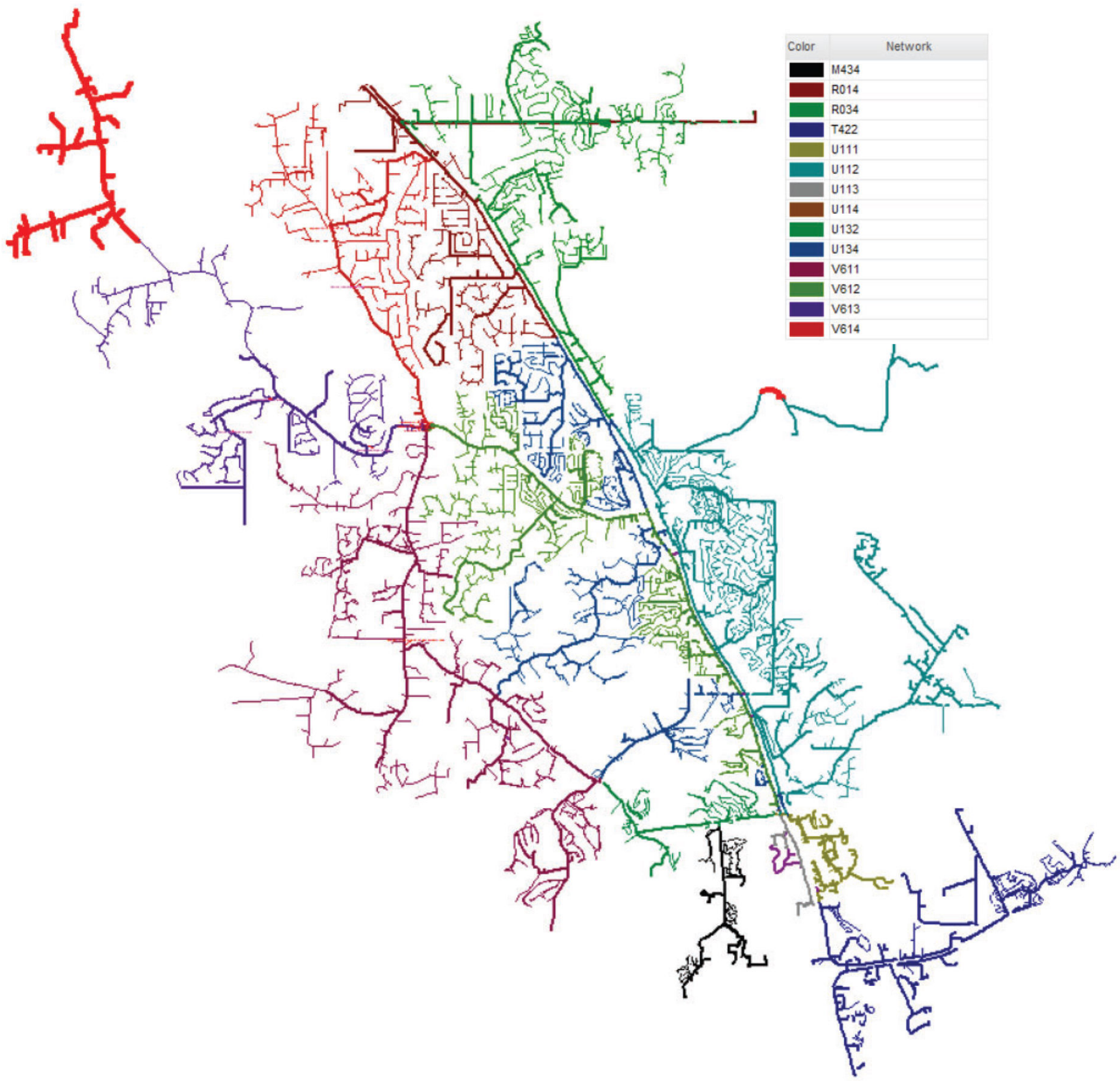
Additional analysis was conducted on the case with the Scenic Loop Substation in service under a severe outage that results in a loss of the main feed to circuit U114. The modelling tested the ability of Scenic Loop to pick up the service to loads connected to U114. The results indicate a feasible solution with acceptable thermal and voltage performance.

Table 18: Outage of Circuit U114 and Loads Getting Picked Up by Circuit V612

Scenic Loop Substation Circuits	Loading	Total Load		
	%	kW	kVAr	kVA
V611	30.86%	10925.01	-112.47	10925.59
V612	80.08%	24953.43	5839.71	25627.64
V613	19.66%	6516.88	1735.68	6744.06
V614	19.16%	6229.53	2104.14	6575.29
Total		48624.86	9567.06	49557.09
La Sierra Substation Circuits	**Loading**	**Total Load**		
	%	**kW**	**kVAr**	**kVA**
U111	74.10%	23076.39	9806.55	25073.66
U112	97.1%*	30089.77	7438.95	30995.68
U113	41.80%	11581.90	7140.82	13606.31
U114	-	14.10	-9.16	16.82
Total		64762.16	24377.16	69198.15
La Sierra Substation Circuits	**Loading**	**Total Load**		
	%	**kW**	**kVAr**	**kVA**
U132	17.40%	5942.39	1697.92	6180.2
U134	61.70%	19393.11	3634.74	19730.79
Total		**25335.5**	**5332.65**	**25890.63**
Fair Oaks Ranch Substation Circuits	**Loading**	**Total Load**		
Network ID	**%**	**kW**	**kVAr**	**kVA**
R014	9.44	9572.99	2324.3	9851.12

* loads on this circuit can be easily switched on to other circuits on La Sierra and this is not considered a violation for this planning analysis

Figure 15: Circuit Loadings on a Case that Models Outage of Circuit U114 in Forecast Summer 2024 with 4% Growth and Scenic Loop Substation in Service

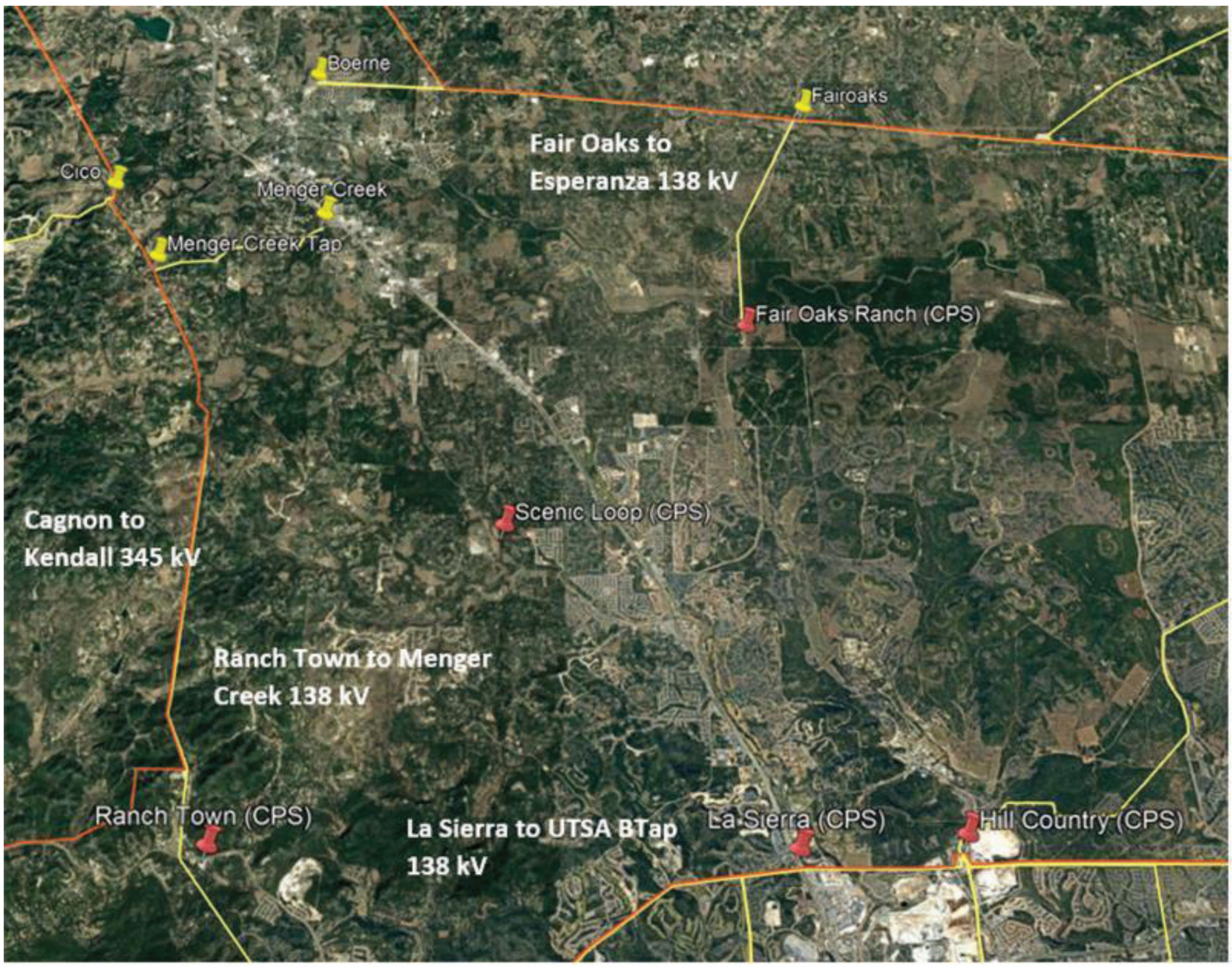


The distribution planning cases, and analysis indicate that the existing and planned system can be further optimized and circuit loadings can be well balanced by shifting loads onto other circuits such that the existing infrastructure will be well utilized under such outage conditions.

4. Transmission Interconnection

CPS Energy evaluated potential transmission options that are best capable to serve the proposed Scenic Loop Substation. CPS Energy's standard practice is to loop in 138-kV transmission lines for CPS Energy owned load serving stations and has arrived at three potential transmission options that connect the proposed Scenic Loop Substation to the existing interconnected transmission grid. Although there are 345-kV transmission lines in the vicinity of the proposed Scenic Loop Substation, because CPS Energy does not serve the distribution system load from 345 kV system, interconnection with such lines was not considered a viable alternative option. Figure 16 Transmission lines in the area surrounding the proposed Scenic Loop Substation provides an overview of the available transmission lines in the area, including substations within the region.

Figure 16 Transmission lines in the area surrounding the proposed Scenic Loop Substation



To determine the best option to serve and connect to the proposed Scenic Loop Substation, additional power flow analysis was conducted. This analysis coupled with the cost estimates to construct a looped 138-kV transmission circuit on mono pole structures determined the preferred transmission option. Figure 17 shows the three options considered and their possible connection to the area proposed for the Scenic Loop Substation. Table 19 provides the high level cost estimate considered in the analysis. To estimate the length of ROW, a straight line length with a 30% adder was used. For purposes of this analysis, CPS Energy's estimated cost per mile for double circuit 138-kV structure for the study area of $ 6.9 million/mile was assumed for this analysis.

The following are the three options considered for the analysis:

- Option 1: Looping the Ranchtown to Menger Creek 138-kV transmission line into the Scenic Loop Substation.
- Option 2: Looping the La Sierra to UTSA BTap 138-kV transmission line into Scenic Loop Substation.
- Option 3: Looping Fair Oaks to Esperanza 138-kV transmission line into Scenic Loop Substation.

Figure 17 Transmission Options considered for analysis.

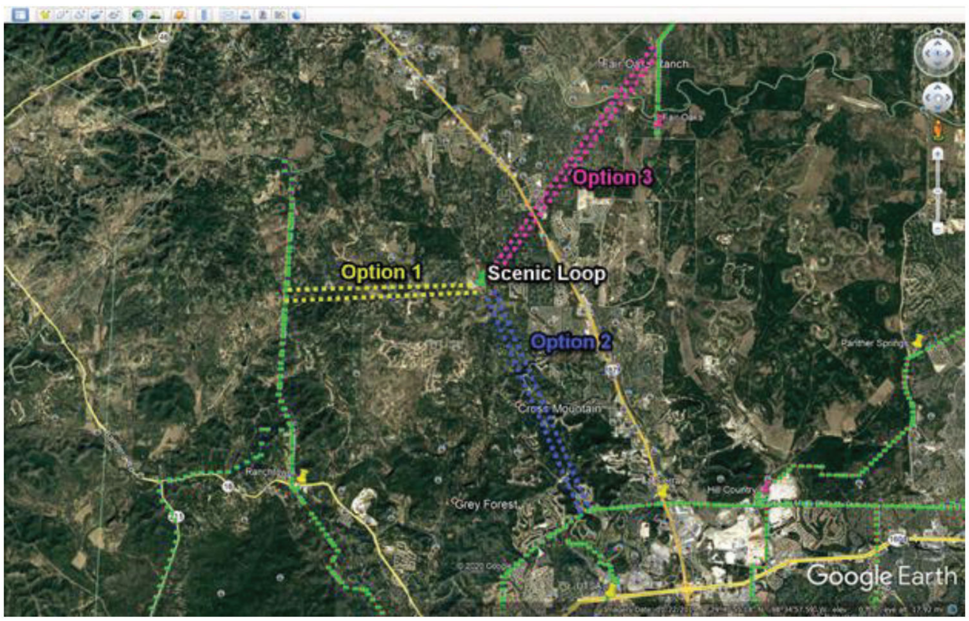


Table 19: Transmission options cost estimates

Study Options	Description	Conductor Type Modeled	Mileage (miles)	Substation ($M)	Transmission ($M)	Total ($M)
Option 1	Looping Ranchtown to Menger Creek transmission line into Scenic Loop	795 Drake ACSR (2-Bundled)	4.27 Straight line length+ 30% adder= 5.55	$ 8.0	$ 38.3	**$ 46.3**
Option 2	Looping La Sierra to UTSA B Tap transmission line into Scenic Loop	1272 Narcissus AAC (2-Bundled)	5.28 Straight line length+ 30% adder= 6.86	$ 8.0	$ 47.3	**$ 55.3**
Option 3	Looping Fair Oaks to Esperanza transmission line into Scenic Loop	795 Drake ACSR (Single)	6.65 Straight line length+ 30% adder= 8.65	$ 8.0	$ 59.7	**$ 67.7**

Power Flow Analysis:

To evaluate the performance of the considered transmission options, power flow analysis was conducted on a 2024 summer peak case published by ERCOT in March 2020. For this power flow case, the new Scenic Loop Substation was added along with the relevant transmission connections described above.

The following figures describe the power flows on the system based on the transmission options proposed.

Figure 18 Option 1: Looping Ranchtown to Menger Creek transmission line into Scenic Loop

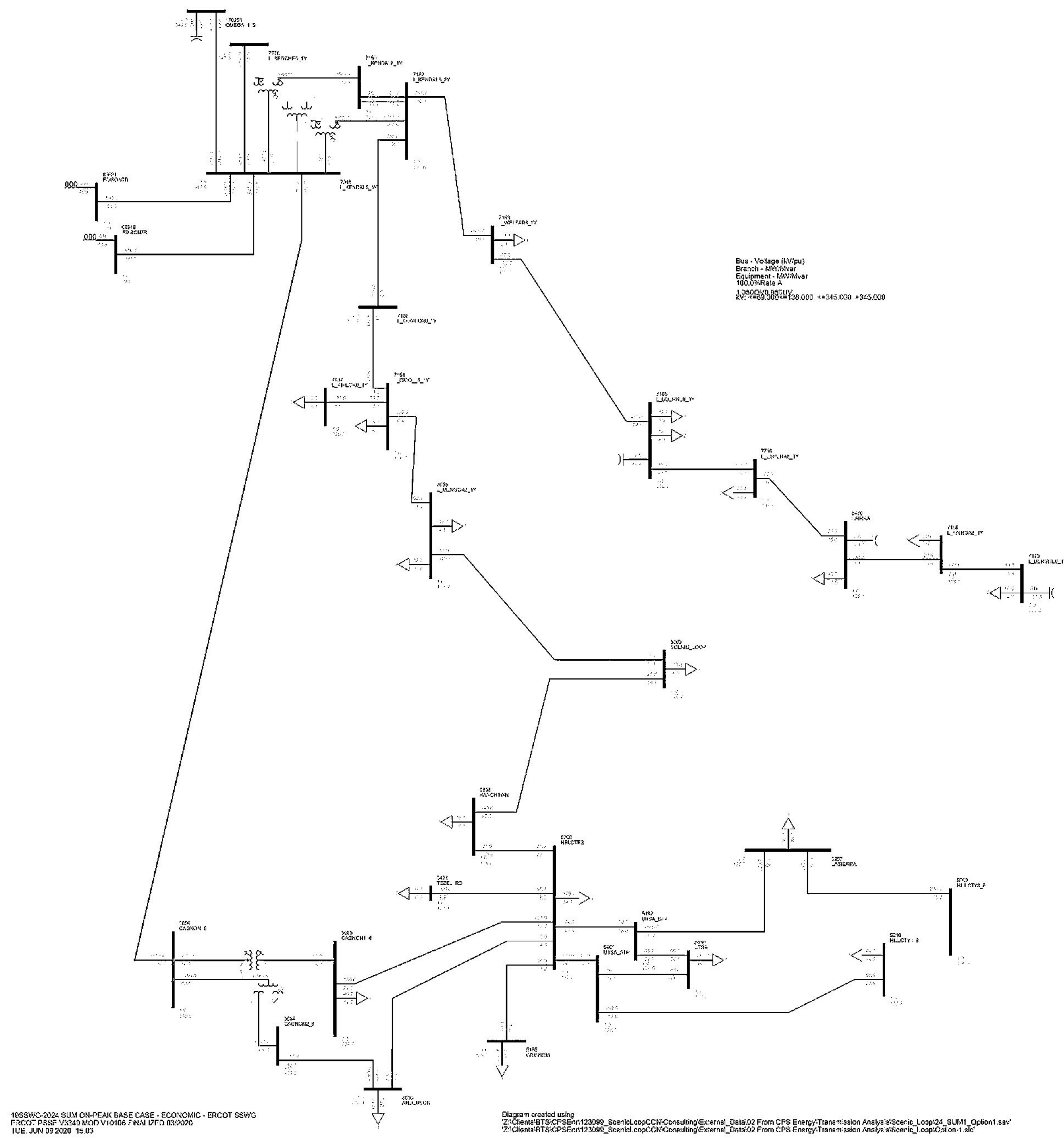


Figure 19 Option 2: Looping La Sierra to UTSA B Tap transmission line into Scenic Loop

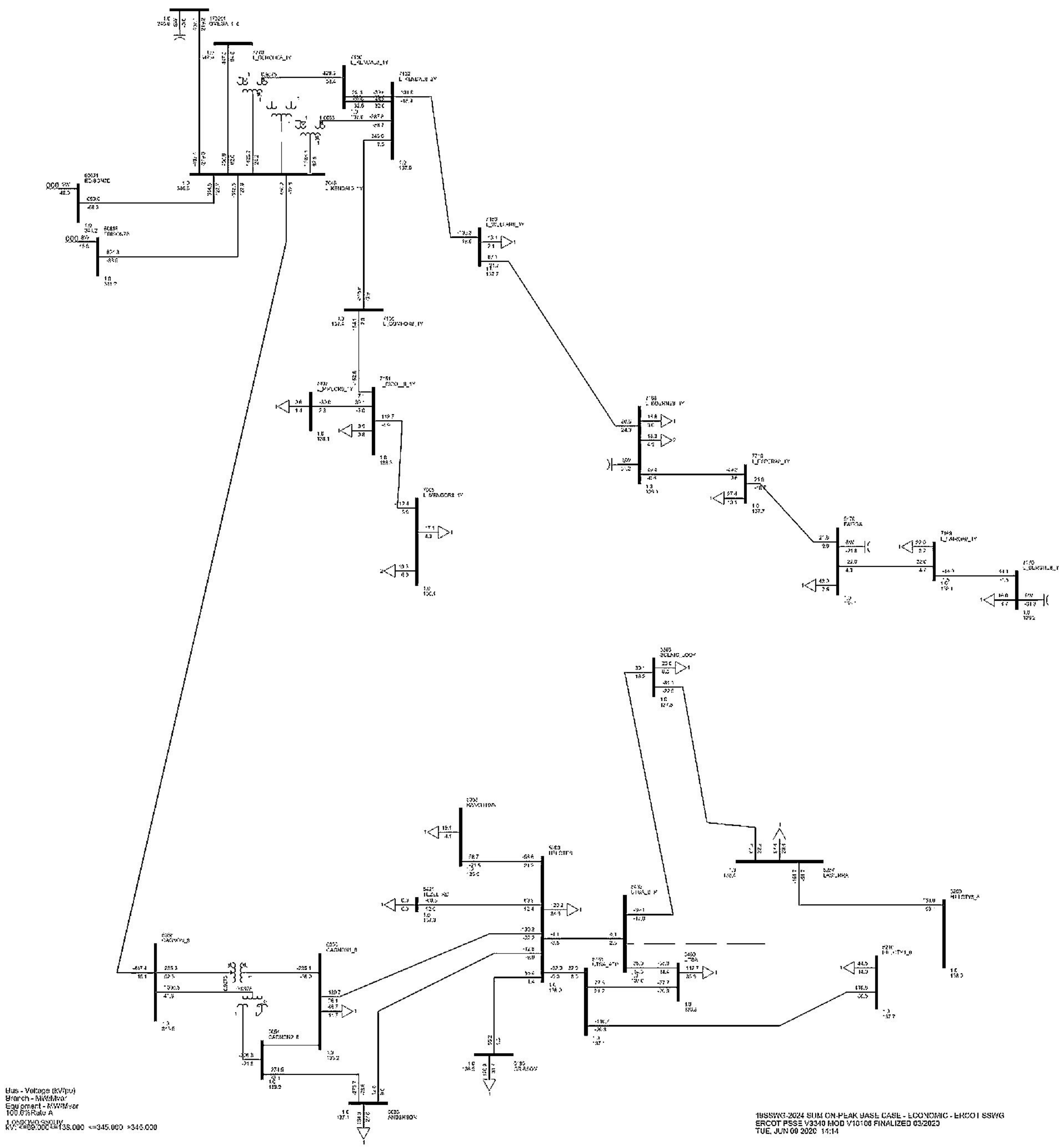
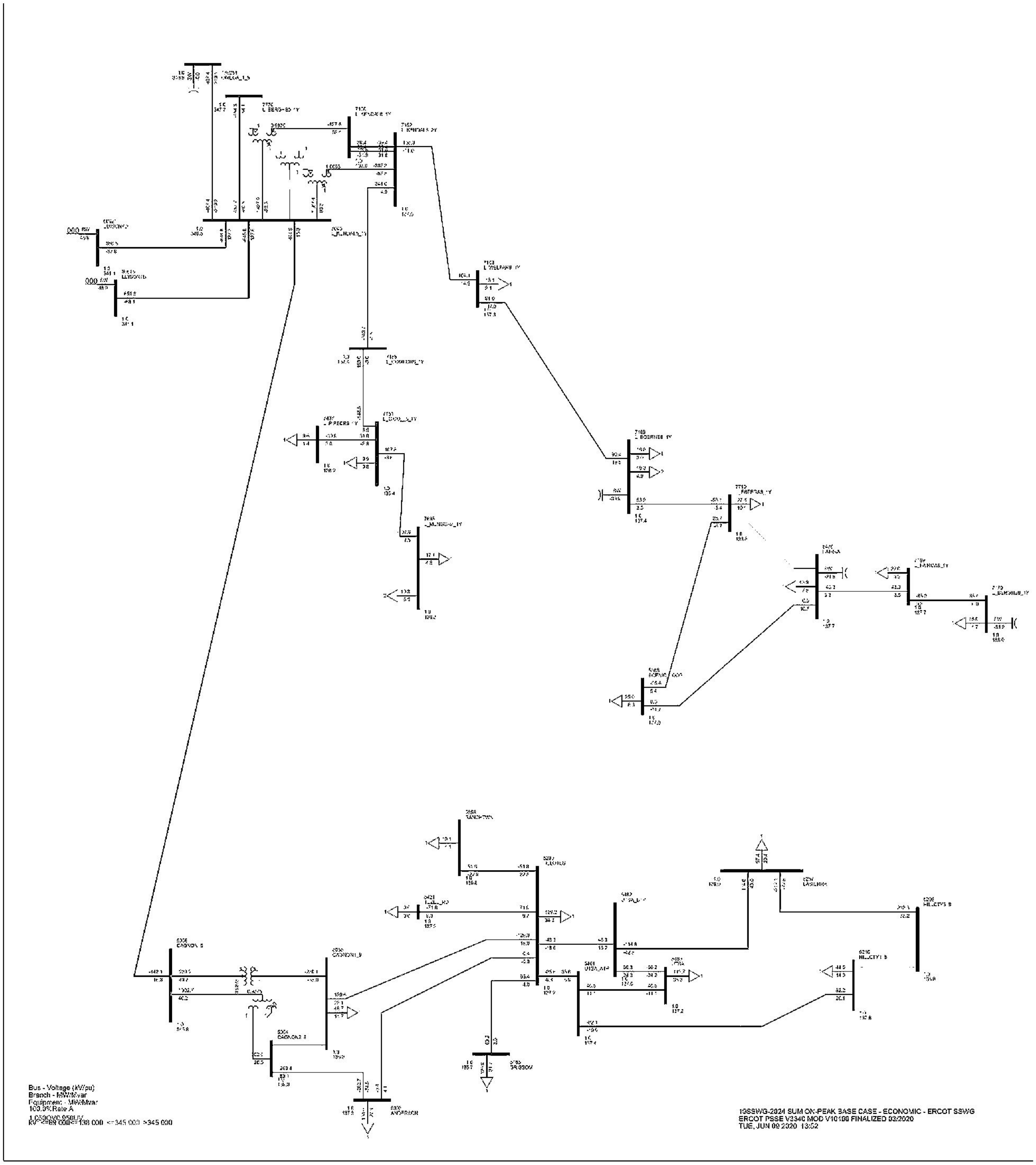


Figure 20 Option 3: Looping Fair Oaks to Esperanza transmission line into Scenic Loop


Bus - Voltage (kV/pu)
Branch - MW/Mvar
Equipment - MW/Mvar
100.0%Rate A
1.050OV0.950UV
kV: <=69.000 <=138.000 <=345.000 >345.000
19SSWG-2024 SUM ON-PEAK BASE CASE - ECONOMIC - ERCOT SSWG
ERCOT PSSE V3340 MOD V10100 FINALIZED 03/2020
TUE, JUN 09 2020 13:52

To evaluate the robustness of the transmission options, power flow contingency analysis was conducted to determine the impact of serving 25 MW from the Scenic Loop Substation. Contingency[4] analysis based on contingencies within Kendall Zone[5] for LCRA Transmission Services Corporation along with CPS Energy contingencies and standard single element outage and double element outages along with ERCOT specific outages were simulated for the analysis and compared against ERCOT planning criteria and CPS planning criteria.

The results from the analysis indicate no thermal overloading problems for all the options analyzed. The screening of the voltages (Table 20) following contingency analysis indicate a few outages where Option 3 does not meet the planning criteria. Over all the analysis indicates that Option 1 is a better performing option.

Table 20: Voltage Performance of the Transmission Options

Contingency Type	Bus Number	Bus Name	KV	1st Con	Option1 V Init	Option1 V Con	Option2 V Init	Option2 V Con	Option3 V Init	Option3 V Con
P1	5363	SCENIC_LOOP	138	7169 L_FAIROA8_1Y - 7170 L_BERGHE8_1Y - 1*	0.987	0.986	0.997	0.996	0.993	**0.933**
	5470	FAIRRA	138	7169 L_FAIROA8_1Y - 7170 L_BERGHE8_1Y - 1*	1.001	0.977	1.001	0.978	0.997	**0.931**
P2	5363	SCENIC_LOOP	138	5470 - CAP* 5470 FAIRRA - 7169 L_FAIROA8_1Y - 1	0.987	0.986	0.997	0.996	0.993	**0.919**
	5470	FAIRRA	138	5470 - CAP* 5470 FAIRRA - 7169 L_FAIROA8_1Y - 1	1.001	0.957	1.001	0.957	0.997	**0.912**
ERCOT3	5363	SCENIC_LOOP	138	7770 L_BERGHE5_1Y - 7170 L_BERGHE8_1Y - 7771 L_BERGHE1_1Y – 1 Followed by 7152 L_KENDAL8_2Y - 7153 L_WELFAR8_1Y - 1 7770 L_BERGHE5_1Y - 7046 L_KENDAL5_1Y - 1	0.987	0.989	0.997	0.997	0.993	**0.879**
	5470	FAIRRA	138		1.001	0.935	1.001	0.935	0.997	**0.892**

Based on the cost and power flow analysis described above, connection of the Scenic Loop Substation to the existing interconnected transmission grid is most viable and less impacting to the community from a tie point on the Ranchtown to Menger Creek 138-kV transmission line located approximately five miles west of the area proposed for the Scenic Loop Substation.

[4] NERC TPL-001-4 P1 through P7 type contingencies
[5] submitted by LCRA published on 03/19/2020

5. Alternatives Considered

Six options were considered to address the reliability and capacity concerns associated with the CPS Energy distribution system in northwestern Bexar County. Option A involves shifting load from existing circuits identified as overloaded. Option B involves the construction of a new Scenic Loop Substation. Option C involves adding a distributed generation power source as a non-wire solution for the area. Option D describes an alternative with inclusion of a simple cycle gas generating station within the footprint to relieve loadings on the transformers. Option E involves adding new circuits into the Fair Oaks Ranch Substation to pick up additional loads in the Scenic Loop region. Option F describes rebuilding existing low reliable circuits as underground circuits. These six options are described and analyzed below.

• Option A

Option A involves designing tie points and shifting load from the La Sierra Substation to surrounding available circuits to create greater capacity on the La Sierra circuits to pick up growing loads in the Scenic Loop area. Because of the geographic relief and the existing CPS Energy service territory boundary, the Fair Oaks Ranch circuits can only shift load with La Sierra circuits, which would not enhance the capacity in the Scenic Loop area. Specifically, as shown in Table 21, Option A would involve shifting approximately 14.24 MW of load from La Sierra circuit U114 and Fair Oaks Ranch circuit R034 onto Fair Oaks Ranch R014 to provide loading relief on those circuits. This would result in 13.22 MW of capacity on circuits U114 and R034. Of this additional capacity that is available, only 2.7 MW can be useful for planning purposes as per the CPS Energy planning criteria to maintain circuit loadings under 80% of their nominal rating. After load shifts, the circuit R014 will have a loading of 62% and can additionally accommodate 4 MW to keep the circuit loading under 80%. Option A would result in approximately 6.7 MW of additional capacity available for future load growth in the Scenic Loop area. Based on CPS Energy's current load forecasts, Option A would provide sufficient capacity for the area until approximately 2021. The cost for Option A is minimal as no additional equipment upgrades are needed but will not provide the desired capacity to meet the load forecast beyond 2021. The R014 circuit has been energized in June of 2020 and the Table 21 describes the loading on circuits and the shift in loads on to R014 circuit.

Although Option A would provide some temporary additional load serving capacity from the La Sierra Substation and possibly some short term reliability improvement, it will not significantly improve the reliability issues experienced in the Scenic Loop area (described in Section 2.3) over the longer planning horizon. Under the Option A scenario, the circuit lengths originating from the La Sierra and Fair Oaks Ranch substations will be the same or in some cases lengthened based on load shifts chosen. Further, Option A would not add additional capacity to the Scenic Loop area and any benefit provided by this is only operational flexibility and has a minor benefit in short term planning.

The La Sierra circuits currently serving the Scenic Loop area loads (current U114 circuit is an example) are already extremely long and heavily loaded. The length and loading configuration of these circuits has resulted in decreasing reliability performance. Although Option A is a low cost alternative, it will only temporarily decrease some of the circuit loading in the area and will not notably reduce circuit line length. Within a short period of time, Option A will exacerbate the poor reliability performance of the CPS Energy distribution system in the Scenic Loop area and will not be able to accommodate load growth beyond the next few years. Regardless of cost, Option A is not a viable alternative to address the significant reliability and capacity problems CPS Energy is experiencing in northwest Bexar County.

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Table 21: Load Shift Design.

From				To				Load Shift				
CKT 1	CKT 1-kW	CKT 1-Nominal kW	CKT 1-%	CKT 2	CKT 2-kW	CKT 2-Nominal kW	CKT 2-%	Load Shift-kW	CKT 1 Adjusted-kW	CKT 1 New - %	CKT 2 Adjusted-kW	CKT 2 New - %
U114	28514	30577	93.25	R014	0	22806	0	7812	22765	74	14235	62
R034	22812	21799	110					6423	16389	75		

- ## Option B

Constructing a new Scenic Loop Substation will result in new transformer capacity (at the substation) directly connected to the existing transmission grid in an area where CPS Energy needs to significantly reduce distribution circuit length for reliability and increase overall system capacity (by more than 50 MW) for load growth. As proposed, locating a new substation geographically between the La Sierra and Fair Oaks Ranch substations significantly reduces the length and loading on many of the existing distribution circuits in the area. As discussed in greater detail above, shorter, less loaded distribution circuits will significantly decrease the exposure of the distribution system to potential outage events, which will directly relate to improved reliability. In contrast to Option A, which shifts some load, but cannot alter the distance of many of the distribution circuits in the area due to the geographic distance between La Sierra and Fair Oaks Ranch substations (approximately 11 miles), Option B places a new substation (with dual feed transmission service) geographically central to the area of increasing load growth (compare Figure 1 to Figure 13). Importantly, given the significant new load growth in the area generally, and specifically associated with the UTSA expansion and growth along the IH-10 corridor north of Loop 1604, a new substation in the in the Scenic Loop area will provide much needed operational flexibility that will allow CPS Energy to reliably serve capacity demands from the La Sierra, Fair Oaks Ranch, and Scenic Loop substations well into the future.

The customers connected downstream of the circuits from La Sierra will especially see a benefit from the new station in terms of improvements in reliability, as the additional station will offload circuits connected to La Sierra and Fair Oaks Ranch. The current estimated cost of the Scenic Loop Substation (including the transmission line project to connect the substation to the existing electric grid) is approximately $46.3M.

- ## Option C

Option C considers non-wire alternatives to traditional transmission and distribution facility investments. The concept behind Distributed Energy Resources (DER) is that these alternatives will ultimately result in savings for ratepayers as utilities are able to develop DER within communities to offset or relieve local grid needs at a potentially lower cost and lower impact to the community than installation of additional distribution or transmission infrastructure. Thus, for DER to be a viable alternative to the Scenic Loop Substation project, it will need to provide similar system improvements at a reasonably similar cost to ratepayers.

To assess the relative costs of DER as an alternative to the Scenic Loop Substation project, Solar photovoltaic (PV) generation operated in conjunction with battery storage (BESS) was compared to the CPS Energy La Sierra Substation facilities as a potential solution to reduce peak and relieve capacity on circuits.

Figure 21: Relative Plots of MWh Comparing Energy Supplied by Source

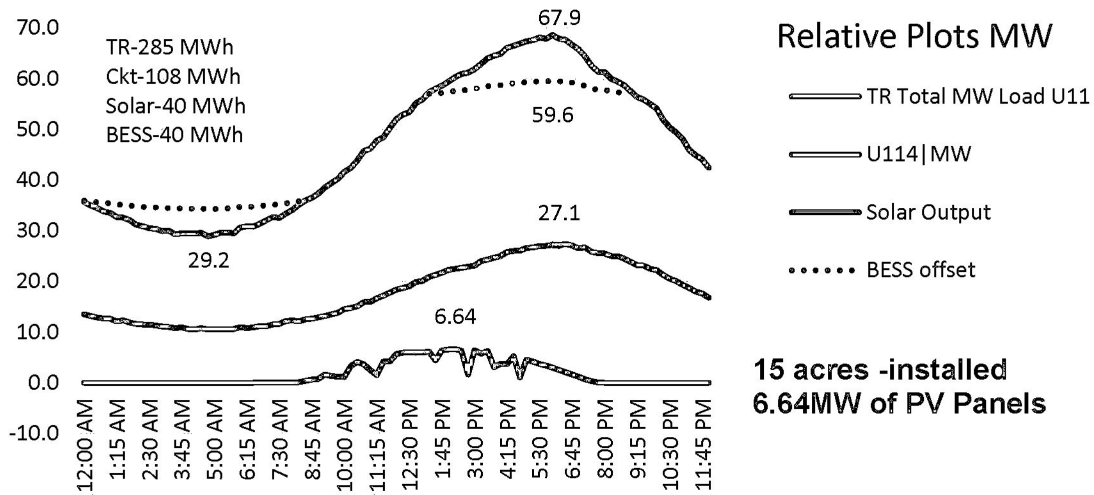


Figure 21 shows August 2019 Peak day demand of a transformer at La Sierra substation and one of the circuits (U114) to study the benefits and costs associated with a reduction of peak that is possible by including Solar PV and BESS as potential means to reduce circuit loadings. The plot shows an output of a 6.64 MW solar site and how including a 40MWh BESS on one of the circuits could perform in reduction of peak load on the transformer and provide adequate demand reduction. In this example, solar provided 40 MWh of energy during the day that is available to reduce the demand on the station. Because the solar PV generates energy in the afternoon rather than at evening peak, energy storage is required to shift the power to the evening when demand is the highest. Storage could perform the demand reduction without solar nearby if the energy is stored using the distribution system available capacity during low demand periods. The NREL study[6] is used to estimate battery capacity, solar power requirements and the costs. BESS offset illustrates a demand reduction of 8.3 MW with 40MWh of storage and the demand peak that may be flattened by applying a BESS.

Based on the example discussed above, the cost of providing a demand reduction of 8.3 MW is $15.2M ($0.38M/MWh (40MWh). The Scenic Loop Substation is anticipated to provide a system capacity benefit of 20-25 MW initially and the cost of BESS to provide a similar benefit would be approximately $45.0M. In addition, the typical functional life-span of BESS is currently limited to approximately 15 years (compared to the estimated 40 year lifespan of the proposed substation facilities). BESS also requires higher operating costs to maintain the BESS resource.

The estimated cost of single axis tracking solar panels with the inverters to produce 40MWh on a sunny day is approximately $7.5M. Replacing the 20-25MW initial capacity of the Scenic Loop Substation would cost approximately three times that amount. In addition, using a conservative estimate of 2.5 acres per MW of solar, such a facility would require approximately 50-60 acres of available property for operation of the solar PV facility. Thus, the total cost of the installation of a 25 MW PV resource would be approximately $25 - $30M and would require at least ten times the acreage of the proposed substation. In addition to the significant total cost of resources nearly $75M ($45M for BESS and $25M for PV), it is also important to note that this solution will require additional station costs to interconnect the DER

[6] https://www.nrel.gov/docs/fy19osti/71714.pdf

resources to the distribution system and will not fully alleviate existing reliability issues that are directly associated with line length and overhead line length through significant terrain and vegetation since the existing distribution circuits would remain unchanged.

- Option D

Another DER option considered was construction and operation of gas-fired generation within the project area to replace the capacity of the proposed Scenic Loop Substation. The nearest available gas pipeline to the Scenic Loop area capable of serving a gas-fired generating station is approximately 5.0 miles away. In addition, any new fossil-fueled generation would require significant water usage and environmental permits.

Based on the review of the load growth in the region, a new substation is needed in the Scenic Loop area by 2025. It is highly unlikely that any new fossil-fueled generation could be permitted and constructed in order to address the need for the area within this time frame.

Also, it should be noted that adding a generation resource to the existing circuits will still require additional switchgear and transformers and the cost would be considerably similar to the cost of developing a new Scenic Loop Substation (in addition to the cost of the generation facility).

The cost to develop a new 50 MW peaking plant (aeroderivative engine) would be approximately $60M without considering the costs to develop a pipeline to the plant and the costs to mitigate other constraints to make this option a viable alternative to the Scenic Loop Substation. In addition to the significant cost of more than $60M (plus the Pipeline costs and interconnection costs), and depending on the location of the generation facility, it is also important to note that this solution may not fully alleviate existing reliability issues that are directly associated with distribution circuit line length and overhead line length through significant terrain and vegetation since the existing distribution circuits would remain unchanged if the new generator is not constructed in the area proposed for the new Scenic Loop Substation.

- Option E

An alternative to construction of the Scenic Loop Substation that was evaluated involves upgrading the existing transformers at the Fair Oaks Ranch Substation for 100 MVA operation and the construction of two new distribution circuits from that substation. The Ranchtown Substation is further west to Scenic Loop area it was determined that building new circuits from that substation was not a reasonable alternative to the project.

The Fair Oaks Ranch Substation is located on the east side of the I-10 with more than a mile of underground conduit to terminate cables into the station. The distribution corridor in the Scenic Loop area is very limited and would require converting the existing single circuit structures to double circuit structures and terminating the new circuits into Fair Oaks Ranch with additional undergrounding and utilizing existing trenching. The length of a new circuit is anticipated to be 30 miles long to pick up portions of the Scenic Loop area load and is anticipated to have a cost of more than $20M. Expansion of the capacity of the Fair Oaks Ranch Substation will provide some additional capacity for the distribution system in the Scenic Loop area. However, as can be seen on Figures 1 and 13, expansion of Fair Oaks Ranch will still leave the Scenic Loop area served by long distribution circuits many miles from the substation transformers at Fair Oaks Ranch and La Sierra. Thus, while there may be some benefit in the short term to some aspects of reliability and capacity expansion, the reliability to the Scenic Loop area will continue to deteriorate due to the distance from a strong substation in the vicinity. Further, at a total estimated cost of $45M (2 circuits with transformer and station upgrades), this option is nearly as costly as the Scenic Loop Substation alterative with significantly less improvement to the reliability and capacity flexibility for the area.

- Option F

In order to address reliability of the existing distribution circuits serving the Scenic Loop area, an alternative was evaluated that involved relocation of existing poor performing circuits from overhead to underground. While undergrounding distribution circuits can have a significant improvement on reliability, the cost to underground an entire circuit is typically 8-10 times[7] more expensive than overhead circuits (approximately $40M[8]). At least two of the existing circuits from the La Sierra and Fair Oaks Ranch substations (U114, R034) would need to be relocated underground to achieve the reliability benefits anticipated from construction of the proposed Scenic Loop Substation. An estimated cost of such undergrounding is reasonably estimated at approximately $80M.

In addition, the engineering and maintenance for underground distribution circuits is more complex and expensive and would take many years to complete (resulting in further decreasing reliability in the interim of the conversion). In addition, the expanded capacity on the new underground ground distribution circuits would result in further needed upgrades to equipment at the Fair Oaks Ranch and La Sierra substations, resulting in additional costs for this alternative.

In order to achieve the same reliability and capacity benefits of the Scenic Loop Substation alternative, the undergrounding alternative would cost more than twice the cost of a new substation and will not provide the same operational flexibility as a third substation (Scenic Loop) for the region. This alternative was rejected based on the significant expense of the alternative.

[7] https://emp.lbl.gov/sites/all/files/lbnl-1006394_pre-publication.pdf

[8] https://emp.lbl.gov/sites/all/files/lbnl-1006394_pre-publication.pdf - EEI (2013) reported a minimum overhead-to-underground distribution line conversion cost range of $158,100–$1,000,000/mile and a maximum conversion cost range of $1,960,000–$5,000,000. EEI (2013) also reported that installing new underground distribution lines costs from $297,200-$1,141,300/mile (minimum) to $1,840,000–$4,500,000/mile (maximum).

6. Conclusion and Recommendation

As residential, commercial, and industrial development and associated electric demand increases in the northwestern region of Bexar County, CPS Energy has identified reliability violations in the Scenic Loop area today. Although few modifications of the existing distribution circuits will provide additional capacity and some short term improvements in reliability, the existing system will be inadequate to reliably serve the area by 2024 in accordance with CPS Energy's Distribution Planning Criteria. If additional capacity is not added to the system, it will become difficult for CPS Energy to provide reliable service, sufficient voltage support for normal summer load, and capacity for load shifts during maintenance or emergency conditions. By 2024 the distribution system will reach a point at which connection of new customers will lead to unacceptable levels of reliability. The addition of the Scenic Loop Substation will support existing, short-term, and long-term load growth in the region, increase system capacity and infrastructure support circuit ties, improve reliability, and decrease outage durations. The new substation will also reduce transformer loading at adjacent substations, providing for additional load growth in the regional area.

The reliability concerns, driven by continued load growth in the area, demonstrate the need for a new substation. Burns McDonnell conducted analysis that supports CPS Energy's recommendation that a new Scenic Loop Substation (Option B) is the preferred solution to address the short-term and long-term system needs of the northwestern Bexar County region.

The proposed new Scenic Loop Substation will meet the forecasted load growth and improve the reliability of the area with shorter circuits, strong backbones, and sufficient field circuit ties that will prevent major loss of customer load in faulted conditions (e.g. equipment failures, tree contact, lightning strikes, or vehicle incidents). The Scenic Loop Substation will be designed as a three unit site to accommodate two transformers and a spare position. An estimated 20-25 MW of load will be served by the new substation initially. The substation will be looped into the existing Ranchtown to Menger Creek 138 kV transmission line approximately five to seven miles to the west.

In addition to accommodating forecasted load growth, the Scenic Loop Substation will improve reliability in the northwestern region of Bexar County. Adding the proposed substation will reduce the total number of customer interruptions and duration of those interruptions.

7. Appendix A: UTSA 2010-2040 Forecast for Residential Dwelling Units and Jobs

SA Tomorrow UTSA Area Regional Center
2010-2040 Forecast for Residential Dwelling Units and Jobs

Forecast, 2010-2040	Baseline Scenario[1]	Targeted Growth Scenario[2]
Dwelling Units		
Forecast Total	15,900	37,500
Forecast Annual	530	1,250
Remaining Capacity[3]	27,544	5,944
Percent of Capacity[3]	37%	86%
Jobs		
Forecast Total	39,700	48,000
Forecast Annual	1,323	1,600
Remaining Capacity[3]	67,690	59,390
Percent of Capacity[3]	37%	45%

Source: Economic & Planning Systems; City of San Antonio Planning Department

[1] Based on Alamo Area Metropolitan Planning Organization (AAMPO) 2040 TAZ forecasts

[2] Estimates for future growth in the centers and corridors assuming that denser development patterns can be attracted and supported by high-frequency transit service. The Targeted-Growth numbers assume a significant market shift towards the Regional Centers based on associated infrastructure such as fixed guideway, frequent transit service that facilitates denser, mixed-use development.

[3] Based on UTSA Land Capacity Analysis totals in Table: *Future Land Use Acreage and Forecast Dwelling Units, Jobs, and Commercial/Industrial Square Feet*

SA Tomorrow UTSA Area Regional Center
Future Land Use Acreage and Forecast Dwelling Units, Jobs, and Commercial/Industrial Square Feet

		Percent by Use		Acres by Use		Factors			UTSA Land Capacity			Forecast (2040)[3]		
Future Land Use Category	Acres[1]	Residential	Non-Residential	Residential	Non-Residential	*FAR*	*DU/Acre*[2]	*Sq. Ft. per Job*	Residential Dwelling Units	Commercial / Industrial Bldg Area	Commercial / Industrial Jobs	Residential Dwelling Units	Commercial/ Industrial Jobs	Commercial/ Industrial Building Area (SF)
Low Density Residential	57.2	100%	0%	57	0	0	5	0	286	0	0	105	-	-
Urban Low Density Residential	135.3	100%	0%	135	0	0	10	0	1,353	0	0	495	-	-
Medium Density Residential	29.4	100%	0%	29	0	0	20	0	587	0	0	215	-	-
High Density Residential	0.0	100%	0%	0	0	0	35	0	0	0	0	-	-	-
Neighborhood Mixed-Use	16.7	25%	75%	4	13	0.5	20	300	83	272,770	909	31	308	92,315
Urban Mixed-Use	295.6	50%	50%	148	148	0.5	35	300	5,172	3,218,730	10,729	1,893	3,631	1,089,335
Regional Mixed-Use	1,369.6	50%	50%	685	685	0.75	50	300	34,241	22,372,880	74,576	12,532	25,239	7,571,796
Employment/Flex Mixed-Use	245.8	20%	80%	49	197	0.5	35	500	1,721	4,283,222	8,566	630	4,832	1,449,598
Business/Innovation Mixed-Use	0.0	20%	80%	0	0	0.5	35	500	0	0	0	-	-	-
Heavy Industrial	1,276.7	0%	0%	0	0	0.3	0	1,000	0	0	0	-	-	-
Community Commercial	323.2	0%	100%	0	323	0.3	0	400	0	4,224,116	10,560	-	4,765	1,429,595
Regional Commercial	62.7	0%	100%	0	63	0.3	0	400	0	819,535	2,049	-	925	277,360
City/State/Federal Government	692.1	0%	0%	0	0	0.3	0	300	0	0	0	-	-	-
Parks/Open Space	560.7	0%	100%	0	561	0	0	0	0	0	0	-	-	-
Agricultural	0	10%	90%	0	0	0	0	0	0	0	0	-	-	-
Total	**5,065.1**	**22%**	**39%**	**1,108**	**1,988**				**43,444**	**35,191,252**	**107,390**	**15,900**	**39,700**	**11,910,000**

Source: Economic & Planning Systems; City of San Antonio Planning Department

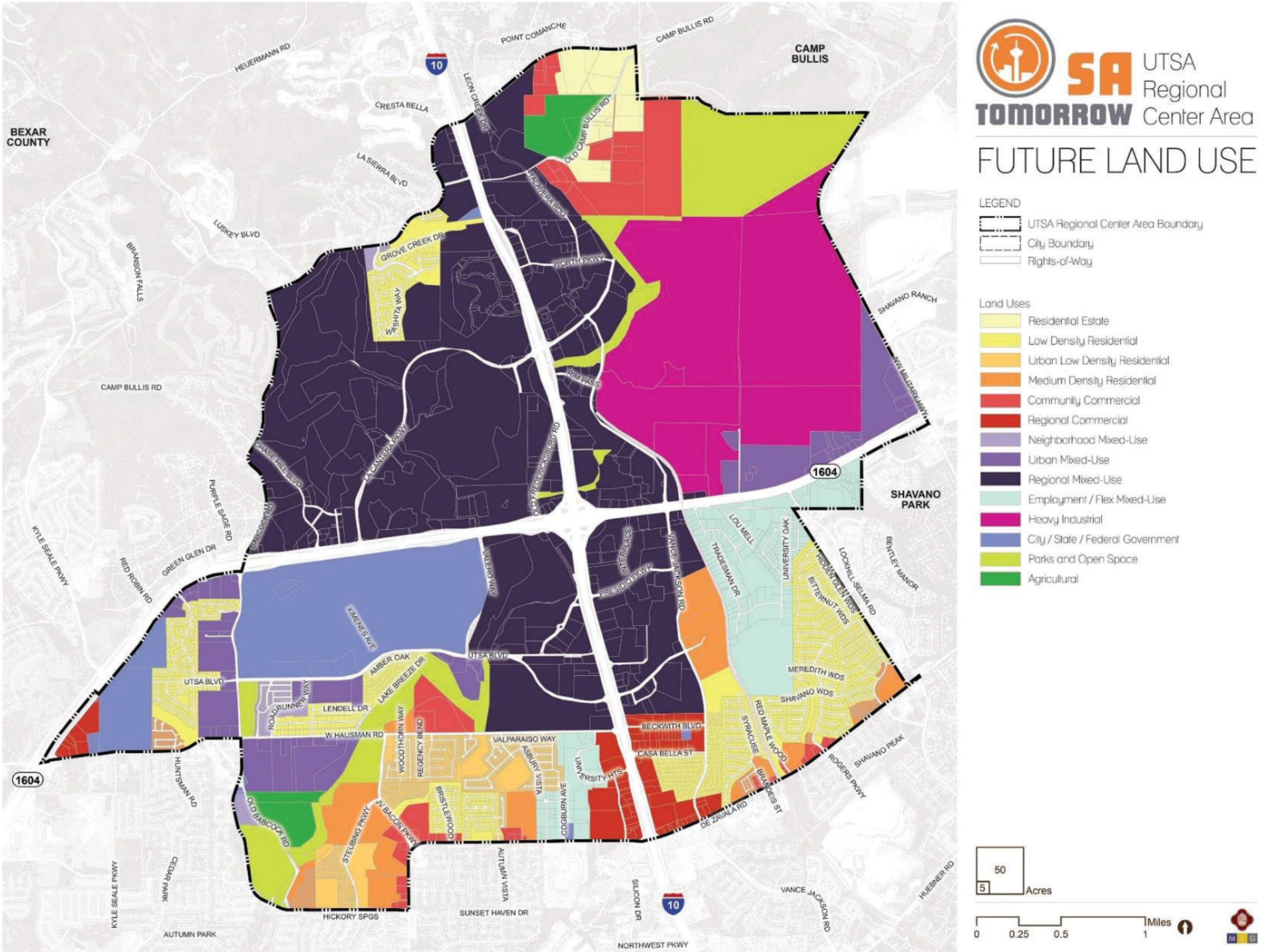
[1] Based on the adopted Future Land Use Map in the UTSA Area Regional Center Plan [https://utsa-area.sacompplan.com/en/plan-framework/land-use/]

[2] Based on the stated range of typcial densities for residential land use categories [*SA Tomorrow Land Use Classifications (Adopted October 11, 2018)* document found at https://www.sanantonio.gov/Planning/PlanningUrbanDesign/Future-Land-Use]

[3] The 2040 Forecast numbers should be considered "Net New" dwelling units, jobs, and building square footage beyond current levels

BURNS McDONNELL

UTSA Area Regional Center's adopted Future Land Use Map.



SOAH DOCKET NO. 473-21-0247
PUC DOCKET NO. 51023

APPLICATION OF THE CITY OF	§	BEFORE THE
SAN ANTONIO TO AMEND ITS	§	
CERTIFICATE OF CONVENIENCE	§	PUBLIC UTILITY COMMISSION
AND NECESSITY FOR THE	§	
SCENIC LOOP 138 KV TRANSMISSION	§	OF TEXAS
LINE IN BEXAR COUNTY	§	

CPS ENERGY'S REFERENCE TO RECORD EVIDENCE AND MOTION TO ADMIT INFORMATION REQUESTED BY COMMISSIONERS

Attachment 3

Exhibit 17

Scenic Loop Route Cost and Data Summary Table

Evaluation Criteria

	Land Use	P	R1	W	Y	Z1	Z2	AA1	AA2	DD
	Estimated Costs for Transmission Line and Substation Facilities (in millions)	43.41	43.52	52.87	42.72	38.48	37.64	38.30	39.05	39.00
1	Length of alternative route (miles)	4.89	4.76	6.25	5.23	4.53	4.46	4.82	4.89	4.64
2	Number of habitable structures[1] within 300 feet of the route centerline	17	13	29	40	31	32	31	30	33
3	Length of ROW using existing transmission line ROW	0	0	0	0	0	0	0	0	0
4	Length of ROW parallel and adjacent to existing transmission line ROW	0	0	0	0	0	0	0	0	0
5	Length of ROW parallel to other existing ROW (roadways, railways, canals, etc.)	0.85	0.85	2.60	3.01	1.60	1.60	1.85	1.85	1.88
6	Length of ROW parallel and adjacent to apparent property lines[2]	2.62	2.21	1.03	1.26	1.49	1.58	0.87	0.74	1.39
7	Sum of evaluation criteria 4, 5, and 6	3.47	3.06	3.63	4.27	3.09	3.18	2.72	2.59	3.27
8	Percent of evaluation criteria 4, 5, and 6	71%	64%	58%	82%	68%	71%	56%	53%	70%
9	Length of ROW across parks/recreational areas[3]	0	0	0	0	0	0	0	0	0
10	Number of additional parks/recreational areas[3] within 1,000 feet of ROW centerline and substation site	0	0	0	0	0	0	0	0	0
11	Length of ROW across cropland	0	0	0	0	0	0	0	0	0
12	Length of ROW across pasture/rangeland	0.36	0.36	0.08	0.93	0.54	0.54	0.54	0.54	1.05
13	Length of ROW across land irrigated by traveling systems (rolling or pivot type)	0	0	0	0	0	0	0	0	0
14	Length of route across conservation easements and/or mitigation banks (Special Management Area)	0	0	0	0	0	0	0	0	0
15	Length of route across gravel pits, mines, or quarries	0	0	0	0	0	0	0	0	0
16	Length of ROW parallel and adjacent to pipelines[4]	0	0	0	0	0	0	0	0	0
17	Number of pipeline crossings[4]	0	0	0	0	0	0	0	0	0
18	Number of transmission line crossings	0	0	0	0	0	0	0	0	0
19	Number of IH, US and state highway crossings	0	0	0	0	0	0	0	0	0
20	Number of FM or RM road crossings	0	0	0	0	0	0	0	0	0
21	Number of cemeteries within 1,000 feet of the ROW centerline and substation site	1	1	0	1	1	1	1	1	1
22	Number of FAA registered airports[5] with at least one runway more than 3,200 feet in length located within 20,000 feet of ROW centerline and substation site	1	1	1	1	1	1	1	1	1
23	Number of FAA registered airports[5] having no runway more than 3,200 feet in length located within 10,000 feet of ROW centerline and substation site	0	0	0	0	0	0	0	0	0
24	Number of private airstrips within 10,000 feet of the ROW centerline and substation site	0	0	0	0	0	0	0	0	0
25	Number of heliports within 5,000 feet of the ROW centerline and substation site	0	0	0	0	0	0	0	0	0
26	Number of commercial AM radio transmitters within 10,000 feet of the ROW centerline and substation site	0	0	0	0	0	0	0	0	0
27	Number of FM radio transmitters, microwave towers, and other electronic installations within 2,000 feet of ROW centerline and substation site	0	0	1	1	1	1	1	1	1
28	Number of identifiable existing water wells within 200 feet of the ROW centerline and substation site	4	5	2	1	2	2	2	2	1
29	Number of oil and gas wells within 200 feet of the ROW centerline (including dry or plugged wells) and substation site	0	0	0	0	0	0	0	0	0
Aesthetics										
30	Estimated length of ROW within foreground visual zone[6] of IH, US and state highways	0	0	0	0	0	0	0	0	0
31	Estimated length of ROW within foreground visual zone[6] of FM/RM roads	0	0	0	0	0	0	0	0	0
32	Estimated length of ROW within foreground visual zone[6][7] of parks/recreational areas[3]	0	0	0	0	0	0	0	0	0
Ecology										
33	Length of ROW across upland woodlands/brushlands	4.42	4.35	6.03	3.76	3.60	3.53	3.81	3.88	3.12
34	Length of ROW across bottomland/riparian woodlands	0	0	0	0	0	0	0	0	0
35	Length of ROW across NWI mapped wetlands	0	0	0	0	0	0	0	0	0
36	Length of ROW across critical habitat of federally listed endangered or threatened species	0	0	0	0	0	0	0	0	0
37	Area of ROW across golden-cheeked warbler modeled habitat designated as 3-Moderate High and 4-High Quality (acres)[8]	25.11	19.03	2.95	11.12	11.12	8.92	9.6	11.81	10.74
38	Area of ROW across golden-cheeked warbler modeled habitat designated as 1-Low and 2-Moderate Low Quality (acres)[8]	12.04	13.33	16.59	12.34	11.02	11.78	14.56	13.80	10.93
39	Length of ROW across open water (lakes, ponds)	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00
40	Number of stream and river crossings	4	8	9	6	8	8	9	9	6
41	Length of ROW parallel (within 100 feet) to streams or rivers	0.15	0.15	0.24	0.07	0.10	0.10	0.17	0.17	0.00
42	Length of ROW across Edwards Aquifer Contributing Zone	4.89	4.76	6.25	5.23	4.53	4.46	4.82	4.89	4.64
43	Length of ROW across FEMA mapped 100-year floodplain	0.09	0.16	0.00	0.38	1.03	1.03	1.00	1.00	0.28
Cultural Resources										
44	Number of recorded cultural resource sites crossed by ROW	1	2	1	0	0	0	0	0	0
45	Number of additional recorded cultural resource sites within 1,000 feet of ROW centerline	10	12	1	2	2	2	2	2	2
46	Number of NRHP listed properties crossed by ROW	1	1	1	0	0	0	0	0	0
47	Number of additional NRHP listed properties within 1,000 feet of ROW centerline	0	0	0	2	1	1	1	1	1
48	Length of ROW across areas of high archeological site potential	2.49	2.65	2.75	2.26	3.01	3.16	3.35	3.19	2.34

[1] Single-family and multi-family dwellings, and related structures, mobile homes, apartment buildings, commercial structures, industrial structures, business structures, churches, hospitals, nursing homes, schools, or other structures normally inhabited by humans or intended to be inhabited by humans on a daily or regular basis within 300 feet of the centerline of a transmission project of 230-kV or less.

[2] Apparent property boundaries created by existing roads, highways, or railroad ROWs are not "double-counted" in the length of ROW parallel to apparent property boundaries criteria.

[3] Defined as parks and recreational areas owned by a governmental body or an organized group, club, or church within 1,000 feet of the centerline of the project.

[4] Only steel pipelines six inches and greater in diameter carrying hydrocarbons were quantified in the pipeline crossing and paralleling calculations.

[5] As listed in the Chart Supplement South Central US (FAA 2019b formerly known as the Airport/Facility Directory South Central US) and FAA 2019a.

[6] One-half mile, unobstructed. Lengths of ROW within the visual foreground zone of interstates, US and state highway criteria are not "double-counted" in the length of ROW within the visual foreground zone of FM roads criteria.

[7] One-half mile, unobstructed. Lengths of ROW within the visual foreground zone of parks/recreational areas may overlap with the total length of ROW within the visual foreground zone of interstates, US and state highway criteria and/or with the total length of ROW within the visual foreground zone of FM roads criteria.

[8] From Model C by Diamond et al. 2010

All length measurements are shown in miles unless noted otherwise.

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CPS ENERGY'S REFERENCE TO RECORD EVIDENCE AND
<u>MOTION TO ADMIT INFORMATION REQUESTED BY COMMISSIONERS</u>

Attachment 4

CPS ENERGY
EXHIBIT # 16 - REVISED

Scenic Loop Project
Focus Routes

Showing Selected Routes

0 0.5 1
Miles

Legend

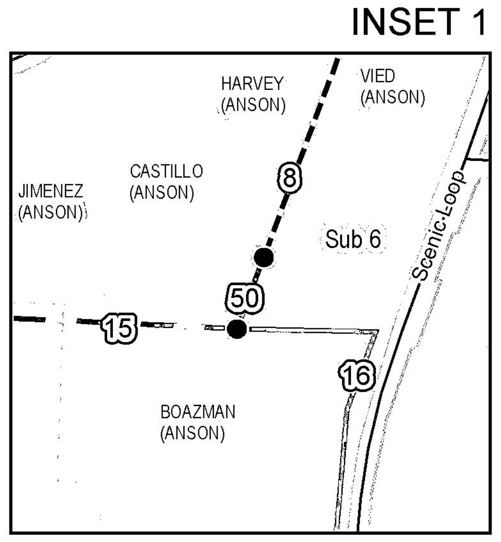
- Segment Node
- Route Segment and Label (49A)
- Proposed Substation Site
- Intervenor Parcel
- HOA Boundaries
- HOA Properties
- Parcel
- 138 kV Transmission Line
- 345 kV Transmission Line

Routes

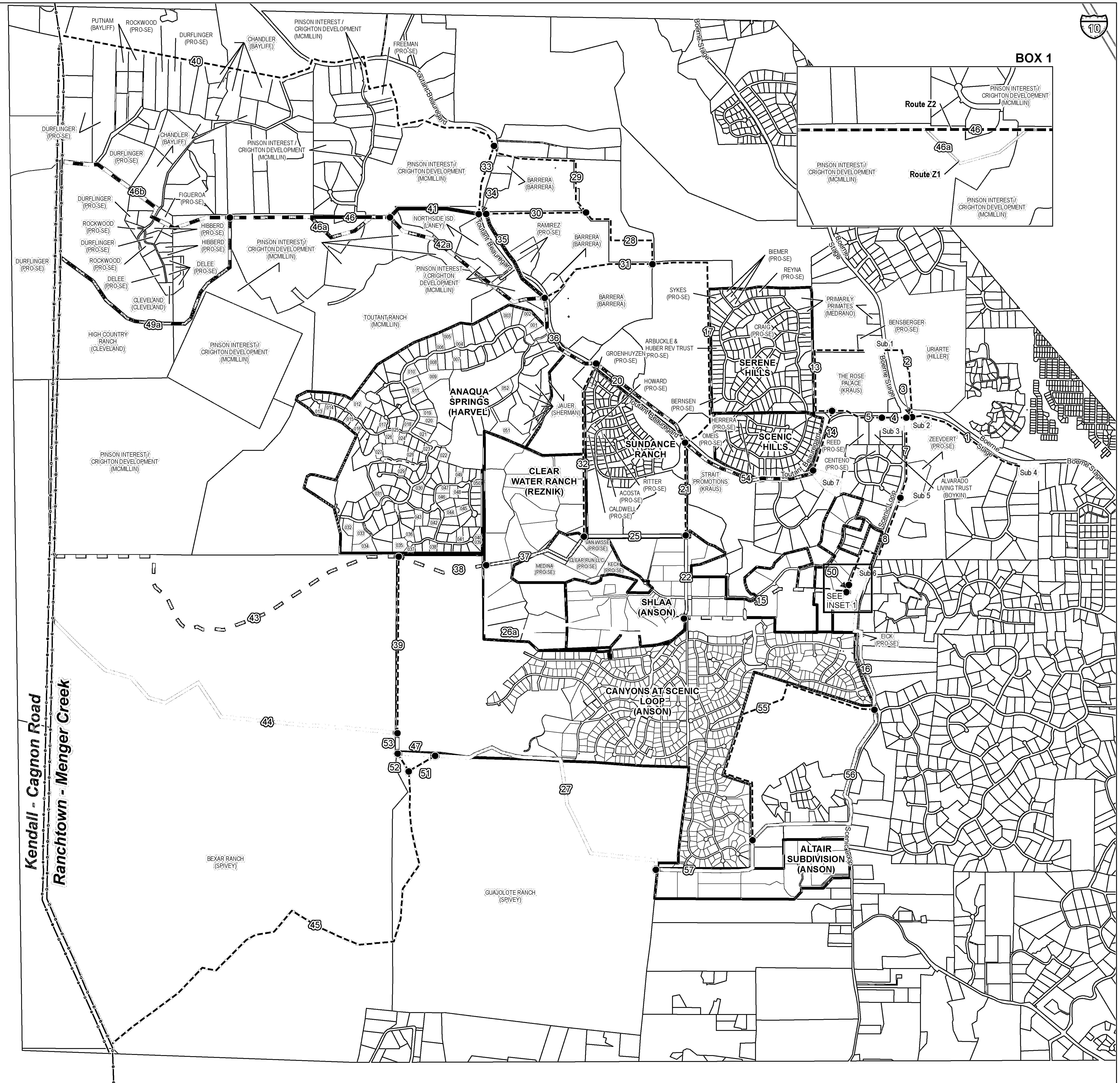
- P
- R1
- W
- Z1
- AA1
- AA2
- DD
- Y

Route P :	Sub 6-50-15-22-25-37-38-43
Route R1 :	Sub 6-50-15-26a-38-43
Route W :	Sub 6-50-16-56-57-27-47-53-44
Route Z1 :	Sub 7-54-20-36-42a-46a-46b
Route Z2 :	Sub 7-54-20-36-42a-46-46b (see BOX 1)
Route AA1 :	Sub 7-54-20-36-42a-46-49a
Route AA2 :	Sub 7-54-20-36-42a-46a-49a
Route DD :	Sub 7-54-20-36-35-34-41-46a-46b
Route Y :	Sub 7-54-20-36-35-34-33-40

INSET 1



ANAQUA SPRINGS PRO-SES	
FILING PARTY	MAP ID
RENDON	001
KUMAR	002
ALRAFATI	003
MEYER	004
COUCH	005
COUCH	006
HAUPTFLEISCH	007
MESA	008
KUPFERSCHMID	009
DOOLEY	010
SALINAS	011
MIDDLETON	012
WALTS	013
PAPARONE	014
HOPE-JONES	015
CASADY	016
MROSS	017
STREIFERT	018
WHITE	019
ALTEMORE	020
CORRAL	021
SPRUIELL & GONZALEZ	022
BOOTH	023
ODOM	024
LONERGAN	025
SANTOSCOY	026
PHIPPS	027
URY	028
STRATTON	029
BAROCAS	030
LIVELY	031
CHALUPA	032
CHALUPA	033
CICHOWSKI	034
DWIVEDI	035
SCHRAGE	036
ROSALES	037
CHAVEZ	038
VALENTI	039
VALENTI	040
LEE	041
GODWIN	042
SCHAPPAUGH	043
GILLINGHAM	044
BURKE	045
BERRY	046
LYNN	047
CATALON	048
STROUD	049
VILLARREAL	050
GRANT	051
FLORES	052



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CPS ENERGY'S REFERENCE TO RECORD EVIDENCE AND
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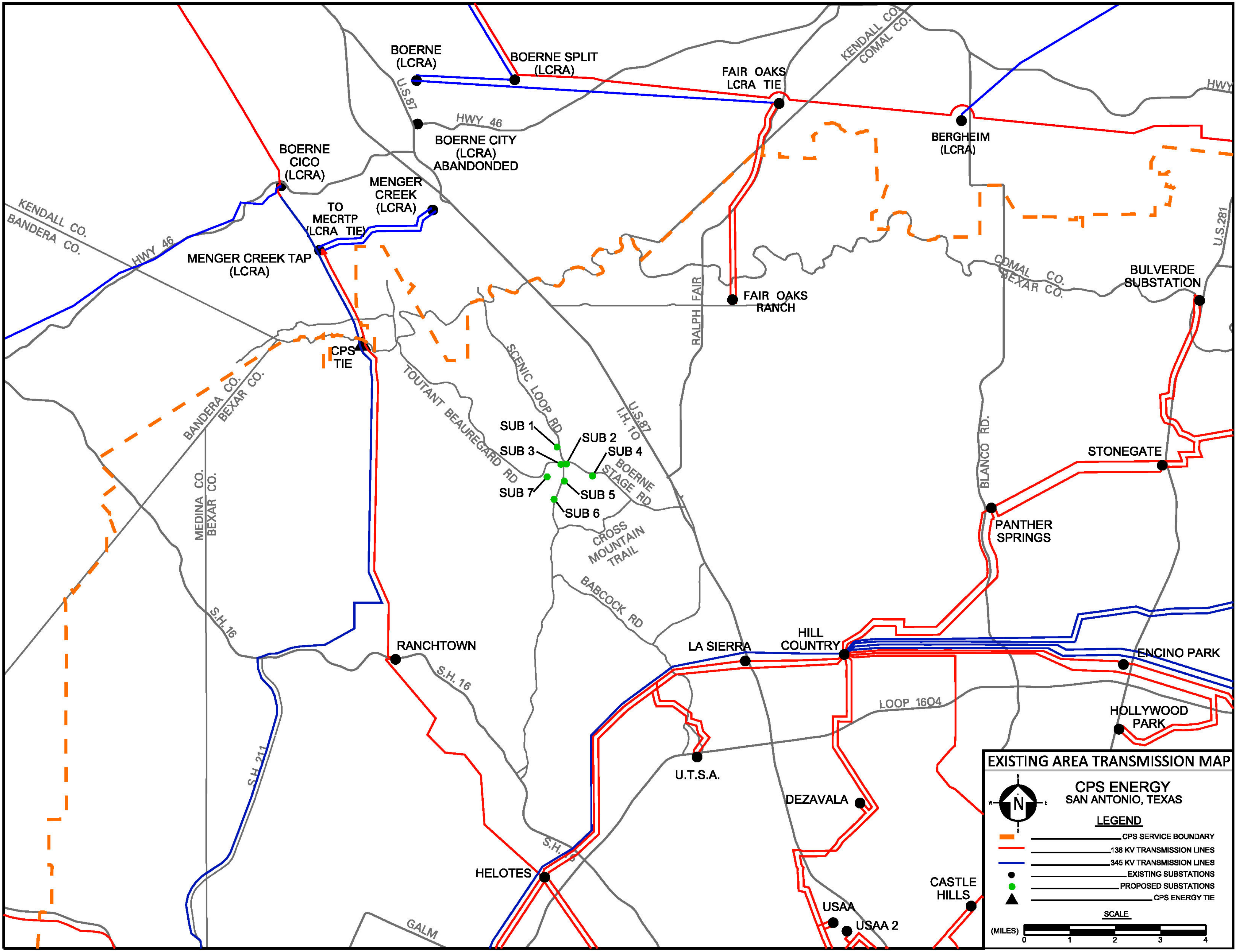
Attachment 5


EXISTING AREA TRANSMISSION MAP
CPS ENERGY
SAN ANTONIO, TEXAS
LEGEND
CPS SERVICE BOUNDARY
138 KV TRANSMISSION LINES
345 KV TRANSMISSION LINES
EXISTING SUBSTATIONS
PROPOSED SUBSTATIONS
CPS ENERGY TIE
SCALE
(MILES)
0
1
2
3
4
BOERNE (LCRA)
BOERNE SPLIT (LCRA)
FAIR OAKS LCRA TIE
BERGHEIM (LCRA)
BOERNE CITY (LCRA) ABANDONDED
BOERNE CICO (LCRA)
MENGER CREEK (LCRA)
TO MECRTP (LCRA TIE)
MENGER CREEK TAP (LCRA)
CPS TIE
FAIR OAKS RANCH
BULVERDE SUBSTATION
STONEGATE
PANTHER SPRINGS
SUB 1
SUB 2
SUB 3
SUB 4
SUB 5
SUB 6
SUB 7
RANCHTOWN
LA SIERRA
HILL COUNTRY
ENCINO PARK
HOLLYWOOD PARK
U.T.S.A.
DEZAVALA
HELOTES
CASTLE HILLS
USAA
USAA 2
KENDALL CO.
BANDERA CO.
KENDALL CO.
COMAL CO.
COMAL CO.
BEXAR CO.
BANDERA CO.
BEXAR CO.
MEDINA CO.
BEXAR CO.
U.S.87
HWY 46
HWY 46
HWY
U.S.281
RALPH FAIR
SCENIC LOOP RD
TOUTANT BEAUREGARD RD
U.S.87 I.H. 10
BOERNE STAGE RD
CROSS MOUNTAIN TRAIL
BABCOCK RD
BLANCO RD.
LOOP 1604
S.H. 16
S.H. 16
S.H. 16
S.H. 211
GALM