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June 18, 2014

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RE: Leander-Parmer-Round Rock project

On June 10, 2014 the Electric Reliability Council of Texas (ERCOT) Board of Directors recommended the following Tier 1 transmission project as needed to support the reliability of the ERCOT Regional transmission system:

Leander-Parmer-Round Rock project:

- Construct a new Parmer 138 kV Substation
- Construct a new single circuit 138 kV line (approximately 12.6 miles) on a double circuit capable structure that connects the existing Leander and Round Rock substations to the new Parmer Substation with an emergency rating of approximately 446 MVA
- Add terminal equipment at the Leander and Round Rock substations for the new transmission line
- Upgrade the 138 kV bus at the Leander Substation

Additional details on this project are included in the Attachment A to this letter.

This project was supported throughout the ERCOT planning process, which included participation of all market segments through the ERCOT RPG. ERCOT's recommendation to the Board was reviewed by the ERCOT Regional Planning Group and the ERCOT Technical Advisory Committee (TAC). ERCOT staff looks forward to the successful completion of the work and is ready to assist you with any planning and operations related activities.

Should you have any questions please contact me at any time.

Sincerely,

Warren Lasher
Director System Planning

cc:
Shawnee Claiborn-Pinto, PUCT
Trip Doggett, ERCOT
Ken MyIntyre, ERCOT
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ERCOT Independent Review of the Leander – Parmer – Round Rock Project

Version 1.0

Document Revisions

Date	Version	Description	Author(s)
05/22/2014	1.0	Final	Ying Li
		Reviewed by	Prabhu Gnanam, Jeff Billo

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1. Introduction

Electric load in western Williamson County, that includes the cities of Leander and Cedar Park, is projected to experience significant growth. From 2002 to 2012, the summer peak load in the area has grown from approximately 183 MW to 360 MW. The summer peak load is forecasted to be 575 MW in 2022 which is an increase of 59% from the actual 2012 load. According to Pedernales Electric Cooperative (PEC) assessments, the existing distribution system cannot serve the forecasted load growth in the area since substation transformers and feeders will overload and distribution-only upgrades are not feasible solutions to address this reliability of service problem. PEC has identified a need to create two new transmission-to-distribution substations to serve the growing load in the area. One substation, which is needed by 2019, is to be located near the intersection of Parmer Lane and Highway 1431 and is referred to as Parmer substation in this report. The other substation, which is needed by 2020, is to be located near the intersection of East Crystal Falls Parkway and Ronald Reagan Boulevard. The existing transmission system surrounding the locations of these two load areas consist of a 138 kV transmission line that parallels Highway 183, a 138 kV line that parallels Highway 45, and a 138 kV line that parallel Interstate 35. There are no transmission sources near these locations to serve the new substations needed in this area. Figure 1 shows the map of the existing transmission system in the study area.

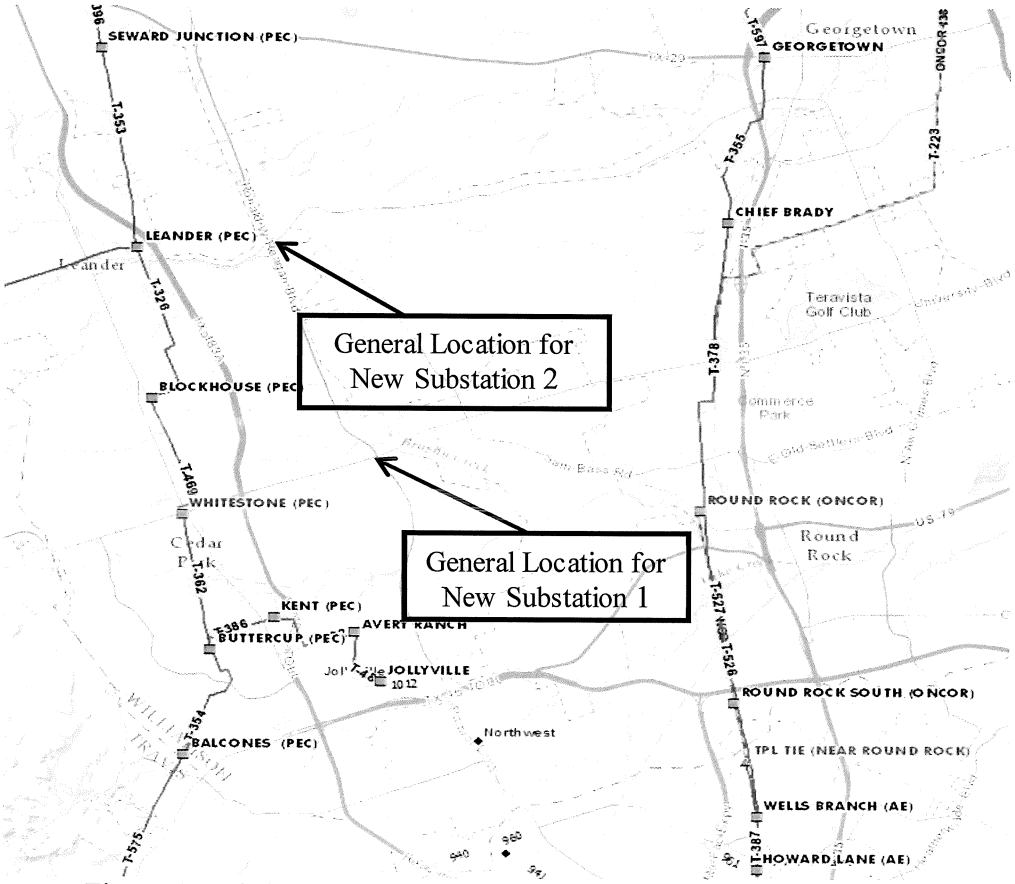

Figure 1: Existing transmission system in Western Williamson County

To meet the significant load growth in the area, Parmer Substation needs to be created by 2019. Accordingly, new transmission lines have to be added to serve the load at Parmer Substation by 2019. Additionally, the LCRA Transmission Services Corporation (LCRA) identified thermal overload and voltage criteria violations on the existing transmission system in the area.

In an effort to serve the new substations and relieve the reliability criteria violations in the western Williamson County area, LCRA and PEC proposed the following transmission improvements:

- Construct a new Parmer Substation.
- Construct a 138 kV transmission line (approximately 12.6 miles) with an emergency rating of approximately 440 MVA connecting the existing Leander and Round Rock substations to the new Parmer Substation.
- Add terminal equipment at the existing Leander and Round Rock substations for the new transmission line.
- Upgrade the 138 kV bus at the Leander Substation.

This project was submitted as a Tier 1 project with an estimated cost of $50.9 million. ERCOT analyzed the system needs and reviewed the proposed project along with several other alternative projects. The need for the addition of a new load serving substation in an area near the intersection of East Crystal Falls Parkway and Ronald Reagan Boulevard was not analyzed in this review since the decision to proceed with the construction of this facility does not need to be made at this time.

2. Study Approach

2.1 Study Base Case

ERCOT used the 2018 SE summer peak case built for the 2013 Regional Transmission Plan (RTP) in order to create a study base case for 2019. The 2019 load forecast from LCRA for the substations in the study area was applied to the case. Based on the result of the 2013 RTP, two new Tier 4 transmission upgrades in the study area were modeled to create the study case:

- Avery Ranch – Jollyville 138 kV transmission line upgrade
- Marshall Ford – Lago Vista 138 kV transmission line upgrade

ERCOT also analyzed 2022 conditions in the study area. For the 2022 load level study, ERCOT used the latest 2020 SSC summer peak case built for the 2014 RTP. The 2022 load forecast from LCRA for the substations in the study area was applied to the case. Table 1 summarizes the area substation loads.

Table 1: Summary of Loads in the study area

Bus Number	Substation	2019 Load (MW)	2022 Load (MW)
7524	Seward Junction	28.8	33.1
7525	Leander	61.8	58.0
7527	Blockhouse	54.9	62.4
7529	Whitestone	67.0	77.0
7530	Kent street	35.3	40.5
7531	Buttercup	66.3	75.4
7533	Balcones	90.7	102.4
7534	Avery Ranch	69.0	80.1
7367	Parmer	28.4	45.8
	Total Load	**502**	**575**

2.2 Study Criteria

The criteria applied for the AC power flow analyses are consistent with the ERCOT Planning Guide 4.1.1.2 and the 2013 RTP. For the reliability analysis, the following limits were enforced:

- Rate A under pre-contingency conditions for 60 kV and above transmission lines and transformers with a low side voltage of 60 kV and above
- Rate B under post-contingency conditions for 60 kV and above transmission lines and transformers with a low side voltage of 60 kV and above
- 0.95 pu voltage under pre-contingency conditions for 100 kV and above transmission lines and transformers with a low side voltage of 100 kV and above
- 0.90 pu voltage under post-contingency conditions for 100 kV and above transmission lines and transformers with a low side voltage of 100 kV and above

2.3 Tools

ERCOT utilized the following software tools for the independent review of the Leander - Parmer project:

- PowerWorld version 17 with SCOPF was used for AC power flow analysis
- VSAT and PSAT version 11 were used to perform power transfer analysis
- UPLAN version 8.12.0.9073 was used to perform security-constrained economic analysis

2.4 Base Case Study Results

Both thermal and voltage analyses were performed using the 2019 and 2022 study cases. No reliability issues were identified in 2019. Both thermal overloads and low voltages were identified in 2022 under G-1+N-1 contingency conditions as shown in table 2 and table 3 (under the G-1+N-1 condition for the loss of the largest Ferguson unit).

Table 2: Thermal overloads in 2022 forecasted peak load under G-1+N-1

Branch	Contingency	Loading in 2022
Lago Vista – Nameless 138 kV	Whitestone – Buttercup 138 kV	106.7%
Hutto – Round Rock NE 138 kV ckt 2	Techridge – Howard Lane 138 kV	103.4%

Table 3: Low voltages in 2022 forecasted peak load under G-1+N-1

Bus Name	Contingency	Bus Voltage in 2022
Whitestone 138 kV	Whitestone – Buttercup 138 kV	0.89 pu
Blockhouse 138 kV	Whitestone – Buttercup 138 kV	0.89 pu
Leander 138 kV	Whitestone – Buttercup 138 kV	0.89 pu
Seward Junction 138 kV	Whitestone – Buttercup 138 kV	0.89 pu
Round Rock NE 138 kV	Hutto – Round Rock NE 138kV ckt 1	0.89 pu

3. Description of Project Alternatives

To address the load growth and the reliability need in the area, thirteen project alternatives were studied, these options are discussed below.

A 32 MVar of capacitor bank was added at Seward Junction to during the evaluation of each study option to address the low voltage issues along the Andice, Seward Junction and Parmer substations.

Option 1 - Chief Brady - Parmer - Whitestone 138 kV transmission line

- Construct a new Parmer 138 kV Substation in Williamson County.
- Construct a new single circuit 138 kV line (approximately 14.8 miles) on a double circuit capable structure that connects the existing Chief Brady and Whitestone substations to the new Parmer Substation with an emergency rating of at least 446 MVA.
- Add terminal equipment at the Chief Brady and Whitestone substations for new transmission line.
- Upgrade the existing Round Rock to Chief Brady 138 kV transmission line to achieve an emergency rating of at least 446 MVA.

The estimated cost for Option 1 is $ 62.3 million.

Option 2 – Chief Brady - Parmer - Avery Ranch 138 kV transmission line

- Construct a new Parmer 138 kV Substation in Williamson County.
- Construct a new single circuit 138 kV line (approximately 14.8 miles) on a double circuit capable structure that connects the existing Chief Brady and Avery Ranch substations to the new Parmer Substation with an emergency rating of at least 446 MVA.
- Add terminal equipment at the Chief Brady and Avery Ranch substations for new transmission line.

- Upgrade the existing Round Rock to Chief Brady 138 kV transmission line to achieve an emergency rating of at least 446 MVA.

The estimated cost for Option 2 is $60.9 million.

Option 3 – Chief Brady - Parmer - Jollyville 138 kV transmission line

- Construct a new Parmer Substation in Williamson County.
- Construct a new single circuit 138 kV line (approximately 15.8 miles) on a double circuit capable structure that connects the existing Chief Brady and Jollyville substations to the new Parmer Substation with an emergency rating of at least 446 MVA.
- Add terminal equipment at the Chief Brady and Jollyville substations for new transmission line.

The estimated cost for Option 3 is $63.6 million.

Option 4 – Seward Junction - Parmer - Avery Ranch 138 kV transmission line

- Construct a new Parmer Substation in Williamson County.
- Construct a new single circuit 138 kV line (approximately 14.1 miles) on a double circuit capable structure that connects the existing Seward Junction and Avery Ranch substations to the new Parmer Substation with an emergency rating of at least 446 MVA.
- Add terminal equipment at the Seward Junction and Avery Ranch substations for new transmission line.

The estimated cost for Option 4 is $54.0 million.

Option 5 – Seward Junction - Parmer - Jollyville 138 kV transmission line

- Construct a new Parmer Substation in Williamson County.
- Construct a new single circuit 138 kV line (approximately 15.1 miles) on a double circuit capable structure that connects the existing Seward Junction and Jollyville substations to the new Parmer Substation with an emergency rating of at least 446 MVA.
- Add terminal equipment at the Seward Junction and Jollyville substations for new transmission line.

The estimated cost for Option 5 is $56.8 million.

Option 6 – Seward Junction - Parmer - Round Rock 138 kV transmission line

- Construct a new Parmer Substation in Williamson County.
- Construct a new single circuit 138 kV line (approximately 16.5 miles) on a double circuit capable structure that connects the existing Seward Junction and Round Rock substations to the new Parmer Substation with an emergency rating of at least 446 MVA.
- Add terminal equipment at the Seward Junction and Round Rock substations for new transmission line.

The estimated cost for Option 6 is $61.9 million.

Option 7 – Leander - Parmer - Avery Ranch 138 kV transmission line

- Construct a new Parmer Substation in Williamson County.
- Construct a new single circuit 138 kV line (approximately 10.3 miles) on a double circuit capable structure that connects the existing Leander and Avery Ranch substations to the new Parmer Substation with an emergency rating of at least 446 MVA.
- Add terminal equipment at the Leander and Avery Ranch substations for new transmission line.

The estimated cost for Option 7 is $43.1 million.

Option 8 – Leander - Parmer - Jollyville 138 kV transmission line

- Construct a new Parmer Substation in Williamson County.
- Construct a new single circuit 138 kV line (approximately 11.4 miles) on a double circuit capable structure that connects the existing Leander and Jollyville substations to the new Parmer Substation with an emergency rating of at least 446 MVA.
- Add terminal equipment at the Leander and Jollyville substations for new transmission line.

The estimated cost for Option 8 is $46.2 million.

Option 9 – Leander - Parmer - Chandler 138 kV transmission line

- Construct a new Parmer Substation in Williamson County.
- Construct a new Chandler Substation along the existing Chief Brady to Round Rock 138 kV transmission line.
- Construct a new single circuit 138 kV line (approximately 13.5 miles) on a double circuit capable structure that connects the existing Leander Substation and new Chandler Substation to the new Parmer Substation with an emergency rating of at least 446 MVA.
- Add terminal equipment at the Leander Substation for new transmission line.
- Upgrade the existing Round Rock to Chief Brady 138 kV transmission line between Round Rock and the new Chandler Substation to achieve an emergency rating of at least 446 MVA.

The estimated cost for Option 9 is $54.4 million.

Option 10 – Leander - Parmer - Round Rock South 138 kV line

- Construct a new Parmer Substation in Williamson County.
- Construct a new single circuit 138 kV line (approximately 15.4 miles) on a double circuit capable structure that connects the existing Leander and Round Rock South substations to the new Parmer Substation with an emergency rating of at least 446 MVA.

- Add terminal equipment at the Leander and Round Rock South substations for new transmission line.

The estimated cost for Option 10 is $77.5 million.

Option 11 – Leander - Parmer - Round Rock 138 kV line (LCRA proposed Option)

- Construct a new Parmer Substation in Williamson County.
- Construct a new single circuit 138 kV line (approximately 12.6 miles) on a double circuit capable structure that connects the existing Leander and Round Rock substations to the new Parmer Substation with an emergency rating of at least 446 MVA.
- Add terminal equipment at the Leander and Round Rock substations for new transmission line.

The estimated cost for Option 11 is $50.9 million.

Option 12 – Leander - Parmer - Chief Brady 138 kV transmission line

- Construct a new Parmer Substation in Williamson County.
- Construct a new single circuit 138 kV line (approximately 14.8 miles) on a double circuit capable structure that connects the existing Leander and Chief Brady substations to the new Parmer Substation with an emergency rating of at least 446 MVA.
- Add terminal equipment at the Leander and Chief Brady substations for new transmission line.
- Upgrade the existing Round Rock to Chief Brady 138 kV transmission line to achieve an emergency rating of at least 446 MVA.

The estimated cost for Option 12 is $63.7 million.

Option 13 – Leander - Parmer - Westinghouse South 138 kV transmission line

- Construct a new Parmer Substation in Williamson County.
- Construct a new Westinghouse South Substation along the existing Westinghouse to Westinghouse Tap 138 kV transmission line.
- Construct a new single circuit 138 kV line (approximately 13.5 miles) on a double circuit capable structure that connects the existing Leander Substation and new Westinghouse South Substation to the new Parmer Substation with an emergency rating of at least 446 MVA.
- Add terminal equipment at the Leander Substation for new transmission line.

The estimated cost for Option 13 is $52.4 million.

Table 4: Summary of the Options studied

Option	From Bus of New Line	To Bus of New Line	Project Cost ($ Million)	Approximate Length (miles)
1	Chief Brady	Whitestone	62.3	14.8
2	Chief Brady	Avery Ranch	60.9	14.8
3	Chief Brady	Jollyville	63.6	15.8
4	Avery Ranch	Seward Junction	54.0	14.1
5	Jollyville	Seward Junction	56.8	15.1
6	Round Rock	Seward Junction	61.9	16.5
7	Avery Ranch	Leander	43.1	10.3
8	Jollyville	Leander	46.2	11.4
9	Chandler	Leander	54.4	13.5
10	Round Rock S	Leander	77.5	15.4
11	Round Rock	Leander	50.9	12.6
12	Chief Brady	Leander	63.7	14.8
13	Westinghouse S	Leander	52.4	13.5

4. Evaluation of Study Options

4.1 Reliability Analysis

All the analysis was performed under the G-1+N-1 contingency conditions. The loss of a Ferguson unit constitutes to the most limiting G-1 contingency condition in the study area. Table 5 and Table 6 show the transmission line loadings in 2019 and 2022. The full contingency analysis results for 2019 and 2022 are provided in Appendix A and B respectively.

Table 5: Top Transmission Line Loadings in 2019 under G-1+N-1

Option	From Bus of New Line	To Bus of New Line	Hutto – Round Rock NE 138 kV	Lago Vista – Nameless 138 kV
Base Case			< 92%	92.7%
1	Chief Brady	Whitestone	< 92%	< 92%
2	Chief Brady	Avery Ranch	< 92%	< 92%
3	Chief Brady	Jollyville	93.3%	< 92%
4	Avery Ranch	Seward Junction	< 92%	< 92%
5	Jollyville	Seward Junction	< 92%	< 92%
6	Round Rock	Seward Junction	96.8%	< 92%
7	Avery Ranch	Leander	< 92%	< 92%
8	Jollyville	Leander	< 92%	< 92%
9	Chandler	Leander	96.9%	< 92%
10	Round Rock S	Leander	93.9%	< 92%
11	Round Rock	Leander	98.9%	< 92%
12	Chief Brady	Leander	95.0%	< 92%
13	Westinghouse S	Leander	94.2%	< 92%

Table 6: Top Transmission Line Loadings in 2022 under G-1+N-1

Option	From Bus of New Line	To Bus of New Line	Hutto – Round Rock NE 138 kV	Lago Vista – Nameless 138 kV	Howard Lane – Jollyville 138 kV	MarshallFord – Bullick Hollow138 kV
Base Case			103.4%	106.7%	88.7%	96.0%
1	Chief Brady	Whitestone	108.5%	< 92%	< 92%	< 92%
2	Chief Brady	Avery Ranch	108.6%	95.1%	< 92%	< 92%
3	Chief Brady	Jollyville	105.4%	94.7%	< 92%	< 92%
4	Avery Ranch	Seward Junction	105.2%	< 92%	92.9%	92.8%
5	Jollyville	Seward Junction	103.1%	< 92%	93.0%	< 92%
6	Round Rock	Seward Junction	111.4%	< 92%	< 92%	< 92%
7	Avery Ranch	Leander	103.8%	< 92%	92.1%	93.2%
8	Jollyville	Leander	103.1%	< 92%	93.8%	< 92%
9	Chandler	Leander	110.5%	< 92%	< 92%	< 92%
10	Round Rock S	Leander	107.9%	< 92%	< 92%	< 92%
11	Round Rock	Leander	113.7%	< 92%	< 92%	< 92%
12	Chief Brady	Leander	108.2%	< 92%	< 92%	< 92%
13	Westinghouse S	Leander	101.2%	< 92%	< 92%	< 92%

As shown in Table 6, Hutto – Round Rock NE 138 kV circuit # 2 overloads under the contingency loss of the Techridge – Howard Lane 138 kV line and Lago Vista – Nameless 138 kV overloads for the contingency loss of Whitestone – Buttercup 138 kV line in 2022 in the base case. None of the options studied would resolve the overload on the Hutto – Round Rock NE 138 kV circuit # 2 in 2022. Therefore, it was assumed that the Hutto – Round Rock NE 138 kV circuit # 2 needs to be upgraded by 2022 regardless of this project.

All the thirteen options effectively resolve the Lago Vista – Nameless 138 kV overload in 2022. Under Option 2 and Option 3, the loading on Lago Vista – Nameless 138 kV is relatively high (close to 95%) under the contingency loss of Whitestone – Buttercup 138 kV line in 2022 and any load increase in the area could overload the Lago Vista – Nameless 138 kV beyond 2022.

The study results also showed that the alternatives that terminate at Jollyville and Avery Ranch (Option 4, Option 5, Option 7 and Option 8) would result in an increase in the loading on the Howard Lane - Jollyville 138 kV line by about 4% under the contingency loss of Williamson – Northwest 138 kV line. While the alternatives that terminate near Round Rock would reduce the loading on the Howard Lane - Jollyville 138 kV line by about 15%.

Under Option 4 and Option 7, the Marshall Ford – Bullick Hollow 138 kV line would be overloaded under the contingency loss of Avery Ranch – Jollyville 138 kV line if the area loads increase to around 640 MW.

A power transfer analysis was conducted for each option to evaluate the capability to support the future load growth in the study area. For transfer analysis, load in the study area was incrementally scaled up to simulate the continued load growth in the region. Table 7 shows the power transfer analysis results at the point thermal overload observed.

Table 7: Power Transfer Analysis Results under G-1+N-1

Option	From Bus of New Line	To Bus of New Line	Max Transfer (MW)	Transfer Limit	
				Violation	Contingency
1	Chief Brady	Whitestone	730	Blockhouse – Whitestone 138 kV	Gabriel – Glasscock 138 kV
2	Chief Brady	Avery Ranch	635	Lago Vista – Nameless 138 kV	Buttercup – Whitestone 138 kV
3	Chief Brady	Jollyville	630	Lago Vista – Nameless 138 kV	Buttercup – Whitestone 138 kV
4	Avery Ranch	Seward Junction	640	Marshall Ford – Bullick Hollow 138 kV	Avery Ranch – Jollyville 138 kV
5	Jollyville	Seward Junction	668	Howard Lane – Jollyville 138 kV	Williamson - Northwest 138 kV
6	Round Rock	Seward Junction	750	Seward Junction – Leander 138 kV	Avery Ranch – Jollyville 138 kV
7	Avery Ranch	Leander	640	Marshall Ford – Bullick Hollow 138 kV	Avery Ranch – Jollyville 138 kV
8	Jollyville	Leander	666	Howard Lane – Jollyville 138 kV	Williamson - Northwest 138 kV
9	Chandler	Leander	702	Leander – Blockhouse 138 kV	Avery Ranch – Jollyville 138 kV
10	Round Rock S	Leander	690	Leander – Blockhouse 138 kV	Avery Ranch – Jollyville 138 kV
11	Round Rock	Leander	660	Leander – Blockhouse 138 kV	Avery Ranch – Jollyville 138 kV
12	Chief Brady	Leander	750	Leander – Blockhouse 138 kV	Avery Ranch – Jollyville 138 kV
13	Westinghouse	Leander	645	Round Rock – Round Rock WH 138 kV	Avery Ranch – Jollyville 138 kV

Based on the transfer capability analysis, it is concluded that all three least cost options (Option 7, Option 8, and Option 11) would provide similar transfer capability in the area under G-1+N-1 contingency conditions.

ERCOT also performed the system loss analysis using the 2019 study base case (summer peak case) to capture the benefit of transmission efficiency improvement for each option. The amount of loss reduction is shown in Table 8 indicating loss reduction realized for each of the select options during the peak hour.

Table 8: Transmission System loss reduction in 2019

Option	From Bus of New Line	To Bus of New Line	Transmission System Loss reduction (MW)
1	Chief Brady	Whitestone	20.9
2	Chief Brady	Avery Ranch	0.4
3	Chief Brady	Jollyville	20.0
4	Avery Ranch	Seward Junction	19.4
5	Jollyville	Seward Junction	1.4
6	Round Rock	Seward Junction	21.8
7	Avery Ranch	Leander	19.6
8	Jollyville	Leander	20.0
9	Chandler	Leander	2.8
10	Round Rock S	Leander	22.3
11	Round Rock	Leander	21.7
12	Chief Brady	Leander	21.2
13	Westinghouse S	Leander	20.6

4.2 Sensitivity Study

LCRA indicated that some of the options might need to consider the paralleling of the new transmission line with portions of existing 138 kV circuits in the area. This would create the potential for new double circuit contingencies; specifically for options 4, 5, 6, 7, 8 and 11. These options were further evaluated to determine the impact to system reliability resulting from the potential new double contingency conditions. The potential double circuit contingencies were as follows for each of these options:

- Option 4: Buttercup – Whitestone and Parmer – Avery Ranch 138 kV lines
- Option 5: Buttercup – Whitestone and Parmer – Jollyville 138 kV lines
- Option 6: Round Rock – Chief Brady and Round Rock – Parmer 138 kV lines
- Option 7: Buttercup – Whitestone and Parmer – Avery Ranch 138 kV lines
- Option 8: Buttercup – Whitestone and Parmer – Jollyville 138 kV lines
- Option 11: Round Rock – Chief Brady and Round Rock – Parmer 138 kV lines

Table 9 shows the reliability study results in 2022 for the evaluated options considering the new double circuit contingencies. For Option 5 and Option 8, Lago Vista – Nameless 138 kV line would overload under the contingency loss of Buttercup – Whitestone and Parmer – Jollyville 138 kV double circuit in 2022. For Option 4 and Option 7, Lago Vista – Nameless 138 kV line would overload under the contingency loss of Buttercup – Whitestone and Parmer – Avery Ranch 138 kV double circuit in 2022. The potential double circuit contingency loss of Round Rock – Chief Brady and Round Rock – Parmer 138 kV line did not impact the results of Option 6 and Option 11 in 2022.

Table 9: Top Transmission Line Loadings in 2022 under G-1+N-1 for Sensitivity Study

Option	From Bus of New Line	To Bus of New Line	Hutto – Round Rock NE 138 kV	Lago Vista – Nameless 138 kV	Howard Lane – Jollyville 138 kV	Marshall Ford – Bullick Hollow 138 kV
Base Case			103.4%	106.7%	88.7%	96.0%
4	Avery Ranch	Seward Junction	105.2%	108.8%	92.9%	92.8%
5	Jollyville	Seward Junction	103.1%	109.0%	93.0%	< 92%
6	Round Rock	Seward Junction	111.4%	< 92%	< 92%	< 92%
7	Avery Ranch	Leander	103.8%	110.5%	92.1%	93.2%
8	Jollyville	Leander	103.1%	110.7%	93.8%	< 92%
11	Round Rock	Leander	113.7%	< 92%	< 92%	< 92%

4.3 Economic Analysis

Although the RPG project in this report is driven by a load-growth related reliability need, ERCOT also conducted an economic analysis to compare the relative performance of each selected option in terms of production cost savings.

Using the 2018 economic case built for the 2013 RTP, ERCOT modeled each selected option and performed production cost simulations for the year 2018 (the 2018 economic model was the latest year available at the time of the analysis). The annual production cost simulation results indicate that all the options would produce relatively similar production cost savings with no measurable impact on congestion.

5. Conclusion and Recommendation

Based on the review, ERCOT selected Option 11 as the preferred option to meet the projected load growth and reliability need in the area. Option 11 cost effectively met all of the reliability criteria and includes the following additional benefits:

- Provides a 138-kV transmission source into an area of Williamson County which has no transmission service and is forecasted to experience high load growth
- Will effectively reduce the east-to-west flows in the Austin Energy area as it is a direct parallel path for the Howard Lane – Jollyville line that also supports the area
- Allows for the flexibility of creating a Round Rock – Chief Brady, Round Rock – Parmer 138 kV double circuit if determined to be necessary for corridor utilization purposes

The following facilities constitute the preferred option:

- Construct a new Parmer Substation.
- Construct a new single circuit 138 kV line (approximately 12.6 miles) on a double circuit capable structure that connects the existing Leander and Round Rock substations to the new Parmer Substation with an emergency rating of approximately 446 MVA.
- Add terminal equipment at the Leander and Round Rock substations for the new transmission line.
- Upgrade the 138 kV bus at the Leander Substation.

6. Designated Provider of Transmission Facilities

In accordance with ERCOT Protocol Section 3.11.4.8, ERCOT staff is to designate transmission providers for projects reviewed in the RPG. The default providers will be those that own the end points of the new projects. These providers can agree to provide or delegate the new facilities or inform ERCOT if they do not elect to provide them. If different providers own the two ends of the recommended projects, ERCOT will designate them as co-providers and they can decide between themselves what parts of the recommended projects they will each provide.

PEC owns the Leander Substation and Oncor Electric Delivery owns the Round Rock Substation. PEC has delegated the 138 kV portion of the new Parmer Substation to LCRA Transmission Services Corporation. Therefore ERCOT designates PEC, LCRA Transmission Services Corporation and Oncor Electric Delivery as co-providers for the project scope recommended in this report.

7. Appendix

Appendix A: AC Contingency Analysis Result of 2019 Case (G-1+N-1 analysis)	 Contingency analysis results 2019.xlsx
Appendix B: AC Contingency Analysis Result of 2022 Case (G-1+N-1 analysis)	 Contingency analysis results 2022.xlsx