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PROJECT NO. 55999

REPORTS OF THE ELECTRIC RELABILITY COUNCIL OF TEXAS	**§**	**PUBLIC UTILITY COMMISSION**
	§	
	§	**OF TEXAS**

ELECTRIC RELIABILITY COUNCIL OF TEXAS, INC.'S NOTICE OF ENDORSEMENT OF TWO TIER 1 TRANSMISSION PROJECTS

Pursuant to Protocol Section 3.11.4.9(1), Electric Reliability Council of Texas, Inc. (ERCOT) files this Notice of ERCOT's endorsement of two Tier 1 transmission projects titled the AEPSC Brownsville Area Improvements Transmission Project, as reflected in Attachments A and B; and the Oncor Delaware Basin Stages 3 and 4 Project, as reflected in Attachments C and D. American Electric Power and Oncor Electric Delivery Company, respectively, are the ERCOT-registered Transmission Service Providers (TSPs) responsible for the transmission projects. ERCOT is prepared to provide the Commission with any additional information it may request regarding this matter.

Dated: December 5, 2024

Respectfully Submitted,

/s/ Katherine Gross

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ATTORNEYS FOR ELECTRIC
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Attachment A

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December 5, 2024

Mr. Robert W. Bradish
Vice President, Planning & Engineering
American Electric Power
8500 Smiths Mill Road, 3rd floor
New Albany, OH 43054

Mr. Michael Quinn
President & CEO
Sharyland Utilities
1900 North Akard Street
Dallas, Texas 75201-2300

RE: AEPSC Brownsville Area Improvements Transmission Project

Dear Mr. Bradish and Mr. Quinn:

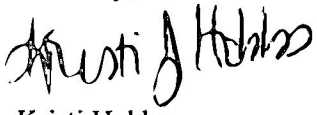
On December 03, 2024, the Electric Reliability Council of Texas (ERCOT) Board of Directors endorsed the following Tier 1 transmission project in accordance with ERCOT Protocol Section 3.11.4:

AEPSC Brownsville Area Improvements Transmission Project

- Expand the planned Chalybe 138-kV substation to install a new 345-kV ring-bus arrangement, with two 345/138-kV autotransformers with normal and emergency ratings of at least 675 MVA;
- Construct a new Chalybe to Kingfisher 345-kV double-circuit transmission line with normal and emergency ratings of 2668 MVA or greater per circuit, on a new right of way (ROW), approximately 22.0-mile;
- Construct a new Chalybe to Palmito 345-kV double-circuit transmission line with normal and emergency ratings of 2668 MVA or greater per circuit, on a new ROW, approximately 2.0-mile;
- Construct a new Chalybe to Stillman 138-kV single-circuit transmission line with normal and emergency of 987 MVA or greater, on a new ROW, approximately 2.0-mile;
- Rebuild the existing La Palma to Fresno 138-kV single-circuit transmission line with normal and emergency ratings of at least 535 MVA, approximately 10.3-mile;
- Rebuild the existing Fresno to Stillman 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 12.0-mile;
- Rebuild the existing Military to Villa Cavazos 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 10.0-mile;
- Rebuild the existing La Palma to Villa Cavazos 138-kV single-circuit transmission line with normal and emergency ratings of at least 535 MVA, approximately 12.2-mile; and
- Expand the planned Chalybe 138-kV substation to install two +/-150 MVAr STATCOMs.

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

Sincerely,



Kristi Hobbs
Vice President, System Planning and Weatherization
Electric Reliability Council of Texas

cc:

Pablo Vegas, ERCOT
Woody Rickerson, ERCOT
Prabhu Gnanam, ERCOT
Robert Golen, ERCOT
Brandon Gleason, ERCOT

ERCOT Independent Review of the AEPSC Brownsville Area Improvements Transmission Project

Document Revisions

Date	Version	Description	Author(s)
09/27/2024	1.0	Final Draft	Caleb Holland
		Reviewed by	Robert Golen, Prabhu Gnanam

Executive Summary

American Electric Power Service Corporation (AEPSC) submitted the Brownsville Area Improvements Transmission Project to the Regional Planning Group (RPG) in March 2024. AEPSC proposed this project to address thermal overloads and voltage violations in the Brownsville area upon addition of new large load. The project is located in Cameron County in the South Weather Zone.

The AEPSC proposed project was estimated to cost $387.7 Million and was classified as a Tier 1 project per ERCOT Protocol Section 3.11.4.3. The proposed project will require a Certificate of Convenience and Necessity (CCN) application.

ERCOT performed an Independent Review and confirmed a need for the project under P1 (N-1) conditions.

The ERCOT Independent Review (EIR) evaluated ten different transmission project options. Based on the study results described in the Section 5 and 6 of this report, ERCOT recommends the following option (Option 2A) to address the reliability issues mentioned above. Option 2A consists of the following:

- Expand the existing Chalybe 138-kV substation to install a new 345-kV ring-bus arrangement, with two 345/138-kV autotransformers with normal and emergency ratings of at least 675 MVA;
- Construct a new Chalybe to Kingfisher 345-kV double-circuit transmission line with normal and emergency ratings of at least 2668 MVA per circuit, on a new right of way (ROW), approximately 22.0-mile;
- Construct a new Chalybe to Palmito 345-kV double-circuit transmission line with normal and emergency ratings of at least 2668 MVA per circuit, on a new ROW, approximately 2.0-mile;
- Construct a new Chalybe to Stillman 138-kV single-circuit transmission line with normal and emergency ratings of at least 987 MVA, on a new ROW, approximately 2.0-mile;
- Rebuild the existing La Palma to Fresno 138-kV single-circuit transmission line with normal and emergency ratings of at least 535 MVA, approximately 10.3-mile;
- Rebuild the existing Fresno to Stillman 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 12.0-mile;
- Rebuild the existing Military to Villa Cavazos 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 10.0-mile;
- Rebuild the existing La Palma to Villa Cavazos 138-kV single-circuit transmission line with normal and emergency ratings of at least 535 MVA, approximately 12.2-mile; and
- Expand the existing Chalybe 138-kV substation to install two +/-150 MVAr STATCOMs.

ERCOT recommends that any STATCOM additions have grid-forming-like capabilities to operate reliably at weak grid conditions and support the system strength.

The cost estimate for this Tier 1 project is approximately $423.8 Million. A CCN application will be required for the construction of the new transmission lines due to approximately 26.0 miles of new ROW. The expected In-Service Date (ISD) of this project is May 2029.

AEPSC has advised that this date is subject to change based on customer changes and the CCN process. If any long-term issues are identified regarding the outages necessary to rebuild the 138-kV transmission lines, Constraint Management Plans (CMP) will be developed as needed.

Table of Contents

1 Introduction

In March 2024, American Electric Power Service Corporation (AEPSC) submitted the Brownsville Area Improvements Transmission Project to the Regional Planning Group (RPG) to address NERC TPL-001-5.1 and ERCOT Planning Guide criteria thermal overloads and voltage violations due to 650 MW of new load in the Brownsville area. This project is located in the South Weather Zone in Cameron County.

The AEPSC proposed project is classified as a Tier 1 project pursuant to ERCOT Protocol Section 3.11.4.3, with an estimated cost of $387.7 Million. One or more Certificate of Convenience and Necessity (CCN) applications will be required for the construction of the new 345-kV double-circuit transmission line from Chalybe to Kingfisher, the new 345-kV double-circuit transmission line from Chalybe to Palmito, and the new 138-kV transmission line from Chalybe to Stillman, due to approximately 26.0 miles of new right of way (ROW). The expected In-Service Date (ISD) of the proposed project is May 31, 2027.

ERCOT conducted an Independent Review for this RPG project to identify any reliability needs in the area and evaluate various transmission upgrade options. This report describes the study assumptions, methodology, and the results of the ERCOT Independent Review of the project.

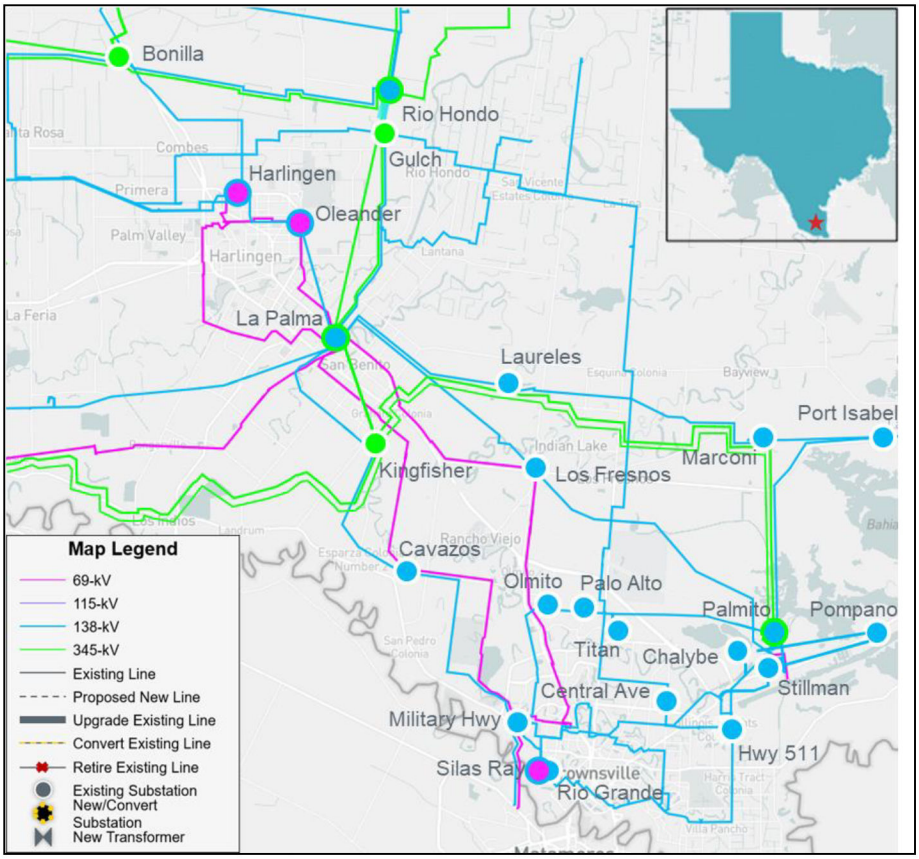


Figure 1.1: Map of Transmission System in The Brownsville Area

2 Study Assumptions and Methodology

ERCOT performed studies under various system conditions to identify any reliability issue and to determine transmission upgrades to support the proposed Brownsville Area Improvements Transmission Project if an upgrade was deemed necessary. This section describes the study assumptions and criteria used to conduct the independent study.

2.1 Study Assumptions for Reliability Analysis

This project is in the South Weather Zone in Cameron County. Willacy and Hidalgo Counties were also included in the study because of their electrical proximity to the proposed project.

2.1.1 Steady-State Study Base Case

The Final 2023 Regional Transmission Plan (RTP) cases, published on the Market Information System (MIS) on December 22, 2023, were used as reference cases in this study. Year 2028 Summer was selected for the long-term outlook. The steady-state study base case was constructed by updating transmission, generation, and loads of the following 2028 Summer Peak Load case for the South and South Central (SSC) Weather Zones:

- Case: 2023RTP_2028_SUM_SSC_12222023[1].

2.1.2 Transmission Topology

Transmission projects within the study area with an In-Service Date (ISD) prior to May 31, 2027, were added to the study base case. The ERCOT Transmission Project Information and Tracking (TPIT)[2] report posted in February 2024 was used as reference. The added TPIT projects are listed in Table 2.1.

Table 2.1: List of Transmission Projects Added to the Study Base Case

TPIT No	Project Name	Tier	Project ISD	County
69463	AEP_TCC_ArroyoInterconnection	Tier 4	Nov-24	Cameron
73061	Falfurrias to King Ranch: 138 kV Line Rebuild	Tier 4	Nov-26	Brooks
73359	Vertrees: Construct New Distribution Station	Tier 4	Feb-25	Hidalgo
73661	New transformer (T2) at BPUB Palo Alto Substation	Tier 4	Mar-24	Cameron
76082	Union Carbide: Rebuild 138 kV Station	Tier 4	Jun-26	Cameron
76214	North Edinburg: 345 kV Reconfigure	Tier 4	Oct-24	Hidalgo
76574	TexasAg Wind Interconnection	Tier 4	May-25	Hidalgo
77144	Pompano: New 138 kV Station	Tier 4	Jul-24	Cameron

[1] 2023 Regional Transmission Plan Postings: https://mis.ercot.com/secure/data-products/grid/regional-planning?id=PG3-3200-M
[2] TPIT Report: https://www.ercot.com/gridinfo/planning

2.1.3 Generation

Based on the February 2024 Generator Interconnection Status (GIS)[3] report posted on the ERCOT website on March 1, 2024, generators in the study area that met Planning Guide Section 6.9(1) conditions with a Commercial Operations Date (COD) prior to May 31, 2027, were added to the study base case. These generation additions are listed in Table 2.2. All new generation dispatches were consistent with the 2024 RTP methodology.

Table 2.2: List of Generation Added to the Study Base Case Based on the February 2024 GIS Report

GINR	Project Name	Fuel	Project COD	Capacity (~MW)	County
19INR0054	Monte Cristo 1 Wind	WIN	08/20/2025	234.5	Hidalgo
24INR0436	Carambola BESS	OTH	05/31/2026	97.4	Hidalgo

The status of each unit that was projected to be either indefinitely mothballed or retired at the time of the study was reviewed. The units listed in Table 2.3 were opened (turned off) in the study base case to reflect their mothballed/retired status.

Table 2.3: List of Generation Opened to Reflect Mothballed/Retired/Forced Outage Status

Bus No	Unit Name	Capacity (~MW)	Weather Zone
110941	SL_SL_G1	65.0	Coast
110942	SL_SL_G2	65.0	Coast
110943	SL_SL_G3	30.0	Coast
110944	SL_SL_G4	30.0	Coast
140042	WFCOGEN_UNIT4	17.0	North
130121	SGMTN_SIGNALM2	6.6	Far West
132931	TOSBATT_UNIT1	2.0	Far West

Generation listed in Table 2.4 were closed (turned on) in the study base case to reflect the change in their Generation Resource as these resources are returning to year-round service.

Table 2.4: List of Generation Closed to Reflect Returning to Service Status

Bus No	Unit Name	Max Capacity (~MW)	Weather Zone
110020	WAP_GT2	71.0	Coast
150023	MCSES_UNIT8	568.0	North-Central
110261	TGF_TGFGT_1	78.0	Coast

2.1.4 Loads

Loads in the South Weather Zone were updated based on the new confirmed loads in the study area. Minimum reserve requirements were maintained consistent with the 2023 RTP.

[3] GIS Report: https://www.ercot.com/misapp/GetReports.do?reportTypeId=15933

2.2 Long-Term Load-Serving Capability Assessment

ERCOT performed a long-term load-serving capability assessment on the options with higher load conditions to compare the performance of the study options.

In the higher load condition evaluation, the conforming loads in the study area were increased (non-scalable loads were not increased), and conforming loads outside the South Weather Zone were decreased to balance power.

2.3 Maintenance Outage Scenario

ERCOT developed an off-peak maintenance season scenario to further evaluate the study options.

The load level in the South Weather Zone was reduced to 90.1% of its summer peak load level in the study base case. This scaling is meant to reflect assumed off-peak season loads based on ERCOT load forecast for future years as well as historical load in the South Weather Zone.

2.4 Study Assumptions for Congestion Analysis

Congestion analysis was conducted to identify any new congestion in the study area with the addition of the preferred transmission upgrade option.

The 2023 RTP 2028 economic case was updated based on the April 2024 GIS[4] report and the February 2024 TPIT[5] for generation and transmission updates to conduct congestion analysis. New confirmed load in Cameron County was also added to the study base case. The 2028 study year was selected based on the proposed ISD of the project.

New transmission projects additions are listed in Table A.1 in Appendix A of this document.

New generation additions listed in Table A.2 in Appendix A of this document were added to the economic base case and all generation listed in Table 2.3 were opened (turned off) in the study base case to reflect their mothballed/retired status. Generation listed in Table 2.4 were removed from seasonal settings in the study base case as these resources are returned to year-round service.

2.5 Methodology

This section lists the Contingencies and Criteria used for project review along with tools used to perform the various analyses.

2.5.1 Contingencies and Criteria

The reliability assessments were performed based on NERC Reliability Standard TPL-001-5.1, ERCOT Protocol, and ERCOT Planning Criteria[6].

[4] GIS Report: https://www.ercot.com/mp/data-products/data-product-details?id=PG7-200-ER
[5] TPIT Report: https://www.ercot.com/gridinfo/planning
[6] ERCOT Planning Criteria: http://www.ercot.com/mktrules/guides/planning/current

Contingencies[7] were updated based on the changes made to the topology as described in Section 2.1 of this document. The following steady-state contingencies were simulated for the study region:

- P0 (System Intact);
- P1, P2-1, P7 (N-1 conditions);
- P2-2, P2-3, P4, and P5 (345-kV only);
- P3: G-1 + N-1 (G-1: generation outages) {Silas Ray Unit C9, Cameron Wind Unit 1, San Roman Wind Unit 1, and North Edinburg Unit 1 – Partial Steam}; and
- P6-2: X-1 + N-1 (X-1: 345/138-kV transformers only) {Palmito – Ckt 1, La Palma – Ckt 1, Rio Hondo – Ckt 1}.

All 69-kV and above buses, transmission lines, and transformers in the study region were monitored (excluding generator step-up transformers) and the following thermal and voltage limits were enforced:

- Thermal
  - Rate A (normal rating) for pre-contingency conditions; and
  - Rate B (emergency rating) for post-contingency conditions.
- Voltages
  - Voltages exceeding pre-contingency and post-contingency limits; and
  - Voltage deviations exceeding 8% on non-radial load buses.

2.5.2 Study Tool

ERCOT utilized the following software tools to perform this independent study:

- PowerWorld Simulator version 23 for Security Constrained Optimal Power Flow (SCOPF) and steady-state contingency analysis; and
- UPLAN version 12.3.0.29978 to perform congestion analysis.

3 Project Need

Steady-state reliability analysis was performed in accordance with NERC TPL-001-5.1 and ERCOT Planning Criteria described in Section 2.5 of this document. This analysis indicated thermal overloads and a voltage violation in the Brownsville area as seen in the AEPSC project submission. These issues are summarized in Table 3.1 and visually illustrated in Figure 3.1. Detailed thermal overloads and voltage violations are listed in Table 3.2 and Table 3.3 respectively. No unsolved power flow was observed.

[7] Details of each event and contingency category is defined in the NERC reliability standard TPL-001-5.1

Table 3.1: Reliability Issues Seen Under NERC TPL-001-5.1 and ERCOT Planning Criteria in the Study Area

NERC Contingency Category	Voltage Violations	Thermal Overloads	Unsolved Power Flow
P0: N-0	None	None	None
P1, P2-1, P7: N-1	1	13	None
P3: G-1+N-1	None	1	None
P6-2: X-1+N-1	None	3	None

Table 3.2: Thermal Overloads Observed in the Brownsville Area

NERC Contingency Category	Overloaded Element	Voltage Level (kV)	Length (~miles)	Loading %
P1: N-1	CNTRLAVESUB8 (5766) -> COFFPORT4A (8914) CKT 1	138	2.4	109.3
P1: N-1	COFFPORT4A (8914) -> HIWAY511SUB8 (5767) CKT 1	138	1.1	105.3
P1: N-1	LA_PALMA4A (8314) -> LAURELESSUB8 (5756) CKT 1	138	9.4	102.9
P1: N-1	MARCONI4A (8266) -> P_ISABEL4A (8338) CKT 1	138	6.2	122.4
P1: N-1	MILITARY4D (8275) -> OLMITO4A (8950) CKT 1	138	5.5	151.3
P1: N-1	OLMITO4A (8950) -> PALOALTO (5965) CKT 1	138	0.4	145.0
P1: N-1	P_ISABEL4A (8338) -> CHALYBE4A (8735) CKT 1	138	12.9	117.7
P1: N-1	PALOALTO (5965) -> TITAN (5963) CKT 1	138	2.5	138.7
P1: N-1	TITAN (5963) -> CHALYBE4A (8735) CKT 1	138	7.3	124.0
P3: G-1+N-1	LAURELESSUB8 (5756) -> MARCONI4A (8266) CKT 1	138	8.4	116.0
P6-2: X-1+N-1	HIWAY511SUB8 (5767) -> CHALYBE4A (8735) CKT 1	138	4.5	101.5
P6-2: X-1+N-1	PALMITO345 (79500) -> PALMITO138 (79600) CKT 1	345/138	-	108.7
P6-2: X-1+N-1	PALMITO138_2 (79606) -> STILLMAN (79601) CKT 2	138	0.4	104.6
P7: N-1	CAVAZOS4A (80229) -> MILITARY4A (8339) CKT 1	138	10.0	121.6
P7: N-1	L_FRESNO4A (8333) -> STILLMAN (79601) CKT 1	138	12.0	146.5
P7: N-1	LA_PALMA4A (8314) -> CAVAZOS4A (80229) CKT 1	138	12.2	129.3
P7: N-1	LA_PALMA4A (8314) -> L_FRESNO4A (8333) CKT 1	138	10.3	149.3

Table 3.3: Voltage Violation Observed in the Brownsville Area

NERC Contingency Category	Violating Bus	Voltage Level (kV)	Base Loading (pu)	Max Loading (pu)
P1: N-1	POMPANO4A (8535)	138	0.89	-

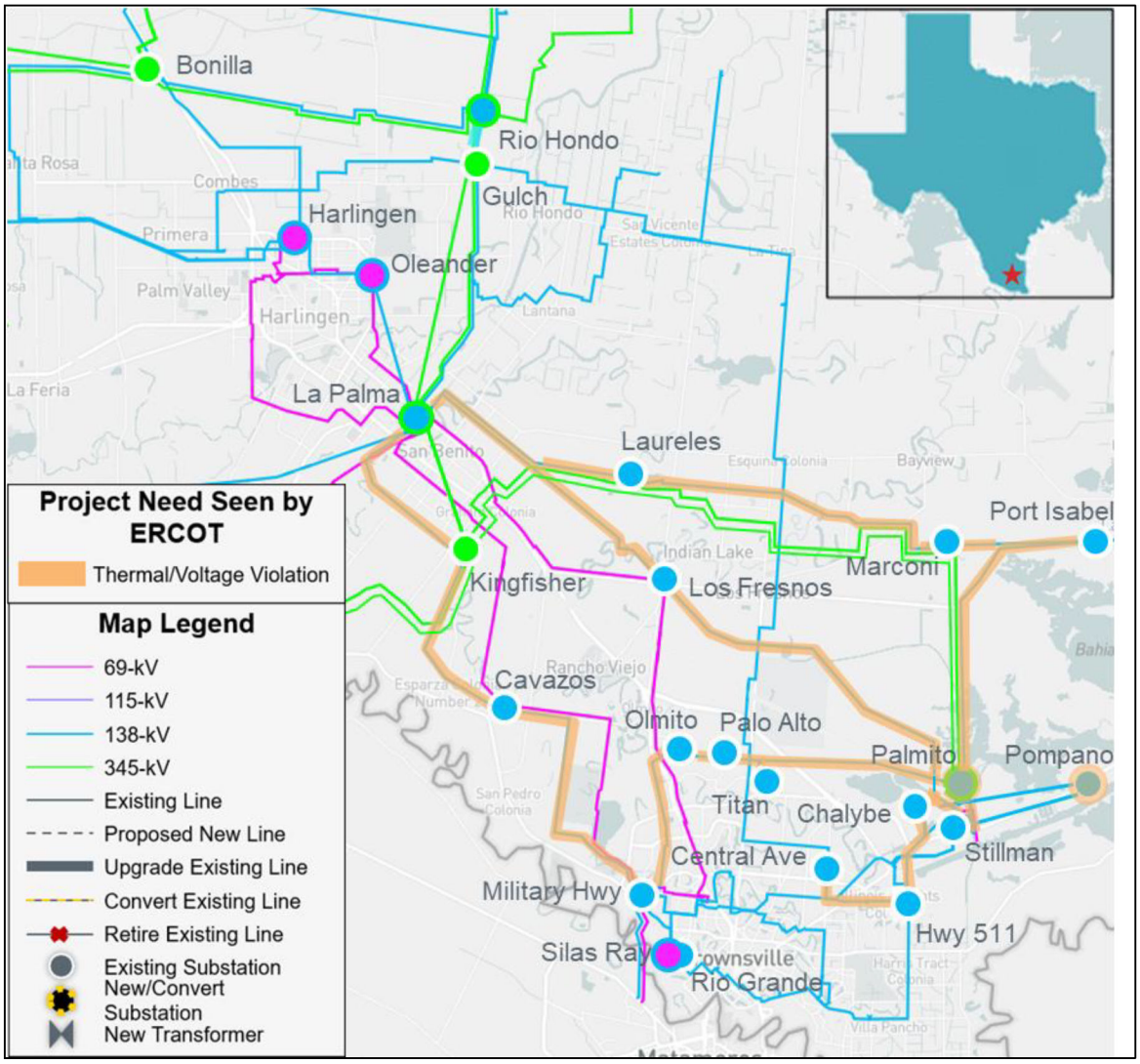


Figure 3.1: Study Area Map Showing Project Need Seen by ERCOT

4 Description of Project Options

ERCOT evaluated ten system improvement options to address the thermal overloads and voltage violation that were observed in the study base case. All ten options resolved the thermal overloads and voltage violation in the study area. Detailed maps of each option are provided in Appendix B. ERCOT recommends that any STATCOM additions have grid-forming-like capabilities to operate reliably at weak grid conditions and support the system strength.

Option 1 consists of the following:

- Rebuild the existing Laureles to Marconi 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 8.4-mile;

- Rebuild the existing Laureles to La Palma 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 9.4-mile;
- Rebuild the existing Central Ave to Coffeeport 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 2.4-mile;
- Rebuild the existing Highway 511 to Chalybe 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 4.5-mile;
- Rebuild the existing Highway 511 to Coffeeport 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 1.1-mile;
- Rebuild the existing Titan to Palo Alto 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 2.5-mile;
- Rebuild the existing Titan to Chalybe 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 7.3-mile;
- Replace two existing Military Hwy 138-kV bus ties with ones with normal and emergency ratings of at least 717 MVA;
- Rebuild the existing Palo Alto to Olmito 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 0.4-mile;
- Rebuild the existing Marconi to Port Isabel 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 6.2-mile;
- Rebuild the existing Military to Olmito 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 5.5-mile;
- Rebuild the existing La Palma to Fresno 138-kV single-circuit transmission line with normal and emergency ratings of at least 535 MVA, approximately 10.3-mile;
- Rebuild the existing La Palma to Villa Cavazos 138-kV single-circuit transmission line with normal and emergency ratings of at least 535 MVA, approximately 12.2-mile;
- Rebuild the existing Harlingen to Oleander 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 3.3-mile;
- Rebuild the existing Fresno to Stillman 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 12.0-mile;
- Rebuild the existing Port Isabel to Chalybe 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 12.9-mile;
- Rebuild the existing Military to Villa Cavazos 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 10.0-mile;
- Rebuild the existing Weslaco to Vertrees 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 6.0-mile;
- Rebuild the existing Vertrees to Stewart 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 6.9-mile;
- Rebuild the existing Palmito to Stillman 138-kV double-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 0.43-mile;
- Replace both 345/138-kV 3-winding autotransformers at Palmito with ones with normal and emergency ratings of at least 675-MVA; and

- Expand the existing Chalybe 138-kV substation to install two +/-150 MVAr STATCOMs.

Option 2 (AEPSC Proposed Solution) consists of the following:

- Expand the existing Chalybe 138-kV substation to install a new 345-kV ring-bus arrangement, with two 345/138-kV autotransformers with normal and emergency ratings of at least 675 MVA;
- Construct a new Chalybe to Kingfisher 345-kV double-circuit transmission line with normal and emergency ratings of at least at least 2668 MVA per circuit, on a new ROW, approximately 22.0-mile;
- Construct a new Chalybe to Palmito 345-kV double-circuit transmission line with normal and emergency ratings of at least 2668 MVA per circuit, on a new ROW, approximately 2.0-mile;
- Construct a new Chalybe to Stillman 138-kV single-circuit transmission line with normal and emergency ratings of at least 987 MVA, on a new ROW, approximately 2.0-mile;
- Rebuild the existing La Palma to Fresno 138-kV single-circuit transmission line with normal and emergency ratings of at least 535 MVA, approximately 10.3-mile;
- Rebuild the existing Fresno to Stillman 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 12.0-mile; and
- Expand the existing Chalybe 138-kV substation to install two +/-150 MVAr STATCOMs.

Option 2A consists of the following:

- Expand the existing Chalybe 138-kV substation to install a new 345-kV ring-bus arrangement, with two 345/138-kV autotransformers with normal and emergency ratings of at least 675 MVA;
- Construct a new Chalybe to Kingfisher 345-kV double-circuit transmission line with normal and emergency ratings of at least 2668 MVA per circuit, on a new ROW, approximately 22.0-mile;
- Construct a new Chalybe to Palmito 345-kV double-circuit transmission line with normal and emergency ratings of at least 2668 MVA per circuit, on a new ROW, approximately 2.0-mile;
- Construct a new Chalybe to Stillman 138-kV single-circuit transmission line with normal and emergency ratings of at least 987 MVA, on a new ROW, approximately 2.0-mile;
- Rebuild the existing La Palma to Fresno 138-kV single-circuit transmission line with normal and emergency ratings of at least 535 MVA, approximately 10.3-mile;
- Rebuild the existing Fresno to Stillman 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 12.0-mile;
- Rebuild the existing Military to Villa Cavazos 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 10.0-mile;
- Rebuild the existing La Palma to Villa Cavazos 138-kV single-circuit transmission line with normal and emergency ratings of at least 535 MVA, approximately 12.2-mile; and

- Expand the existing Chalybe 138-kV substation to install two +/-150 MVAr STATCOMs.

Option 3 consists of the following:

- Expand the existing Chalybe 138-kV substation to install a new 345-kV ring-bus arrangement, with two 345/138-kV autotransformers with normal and emergency ratings of at least 675 MVA;
- Replace both 345/138-kV 3-winding autotransformers at Palmito with ones with normal and emergency ratings of at least 675-MVA;
- Construct a new Chalybe to Kingfisher 345-kV double-circuit transmission line with normal and emergency ratings of at least 2668 MVA per circuit, on a new ROW, approximately 22.0-mile;
- Rebuild the existing La Palma to Fresno 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 10.3-mile;
- Rebuild the existing Fresno to Stillman 12.0-mile 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 12.0-mile;
- Rebuild the existing Military to Olmito 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 5.5-mile;
- Rebuild the existing Palo Alto to Olmito 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 0.4-mile;
- Rebuild the existing Titan to Palo Alto 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 2.5-mile;
- Rebuild the existing Titan to Chalybe 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 7.3-mile; and
- Expand the existing Chalybe 138-kV substation to install two +/-150 MVAr STATCOMs.

Option 4 consists of the following:

- Install two additional 345/138-kV 3-winding autotransformers with normal and emergency ratings of at least 450 MVA at Palmito;
- Construct a new Palmito to Rio Hondo 345-kV double-circuit transmission line with normal and emergency ratings of at least 2668 MVA per circuit, on a new ROW, approximately 29.8-mile;
- Construct a new Chalybe to Palmito 138-kV single-circuit transmission line with normal and emergency ratings of at least 956 MVA, on a new ROW, approximately 2.0-mile;
- Construct a new Palmito to Stillman 138-kV single-circuit transmission line with normal and emergency ratings of at least 516 MVA, on a new ROW, approximately 0.4-mile; and
- Expand the existing Chalybe 138-kV substation to install two +/-150 MVAr STATCOMs.

Option 5 consists of the following:

- Install two additional 345/138-kV 3-winding autotransformers with normal and emergency ratings of at least 450 MVA at Palmito;

- Construct a new Palmito to Bonilla 345-kV double-circuit transmission line with normal and emergency ratings of at least 2668 MVA per circuit, on a new ROW, approximately 39.0-mile;
- Construct a new Chalybe to Palmito 138-kV single-circuit transmission line with normal and emergency ratings of at least 956 MVA, on a new ROW, approximately 2.0-mile;
- Construct a new Palmito to Stillman 138-kV single-circuit transmission line with normal and emergency ratings of at least 516 MVA, on a new ROW, approximately 0.4-mile; and
- Expand the existing Chalybe 138-kV substation to install two +/-150 MVAr STATCOMs.

Option 5A consists of the following:

- Install two additional 345/138-kV 3-winding autotransformers with normal and emergency ratings of at least 450 MVA at Palmito;
- Construct a new Palmito to Bonilla 345-kV double-circuit transmission line with normal and emergency ratings of at least 2668 MVA per circuit, on a new ROW, approximately 39.0-mile;
- Construct a new Chalybe to Palmito 138-kV single-circuit transmission line with normal and emergency ratings of at least 956 MVA, on a new ROW, approximately 2.0-mile;
- Construct a new Palmito to Stillman 138-kV single-circuit transmission line with normal and emergency ratings of at least 516 MVA, on a new ROW, approximately 0.4-mile;
- Construct a new Chalybe to Stillman 138-kV single-circuit transmission line with normal and emergency ratings of at least 987 MVA, on a new ROW, approximately 2.0-mile;
- Rebuild the existing Military to Villa Cavazos 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 10.0-mile;
- Rebuild the existing Fresno to Stillman 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 12.0-mile;
- Rebuild the existing La Palma to Fresno 138-kV single-circuit transmission line with normal and emergency ratings of at least 535 MVA, approximately 10.3-mile;
- Rebuild the existing La Palma to Villa Cavazos 138-kV single-circuit transmission line with normal and emergency ratings of at least 535 MVA, approximately 12.2-mile; and
- Expand the existing Chalybe 138-kV substation to install two +/-150 MVAr STATCOMs.

Option 6 consists of the following:

- Install two 345/138-kV autotransformers with normal and emergency ratings of at least 675 MVA at Military Hwy;
- Install one additional 345/138-kV 3-winding autotransformer with normal and emergency ratings of at least 450 MVA at Palmito;
- Add a 345-kV substation named Landrum on the North Edinburg to Kingfisher 345-kV double-circuit transmission line;

- Construct a new Landrum to Military Hwy 345-kV double-circuit transmission line with normal and emergency ratings of at least 2668 MVA per circuit, on a new ROW, approximately 16.0-mile;
- Construct a new Chalybe to Palmito 138-kV single-circuit transmission line with normal and emergency ratings of at least 956 MVA, on a new ROW, approximately 2.0-mile;
- Construct a new Chalybe to Stillman 138-kV single-circuit transmission line with normal and emergency ratings of at least 987 MVA, on a new ROW, approximately 2.0-mile;
- Replace two existing Military Hwy 138-kV bus ties with ones with normal and emergency ratings of at least 717 MVA;
- Rebuild the existing Military to Olmito 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 5.5-mile;
- Rebuild the existing Palo Alto to Olmito 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 0.4-mile;
- Rebuild the existing Titan to Palo Alto 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 2.5-mile;
- Rebuild the existing Titan to Chalybe 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 7.3-mile;
- Rebuild the existing Military Hwy to Silas Ray 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 2.3-mile;
- Rebuild the existing Silas Ray to Rio Grande 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 0.6-mile; and
- Expand the existing Chalybe 138-kV substation to install two +/-150 MVAr STATCOMs.

Option 7 consists of the following:

- Install two additional 345/138-kV 3-winding autotransformers with normal and emergency ratings of at least 450 MVA at Palmito;
- Construct a new Palmito to Rio Hondo 345-kV double-circuit transmission line with normal and emergency ratings of at least 2668 MVA per circuit, on a new ROW, approximately 29.8-mile;
- Rebuild the existing Rio Hondo to Gulch 345-kV single-circuit transmission line with normal and emergency ratings of at least 2668 MVA, on a new ROW, approximately 1.0-mile;
- Construct a new Chalybe to Palmito 138-kV single-circuit transmission line with normal and emergency ratings of at least 956 MVA, on a new ROW, approximately 2.0-mile;
- Construct a new Palmito to Stillman 138-kV single-circuit transmission line with normal and emergency ratings of at least 516 MVA, on a new ROW, approximately 0.4-mile;
- Construct a new Chalybe to Stillman 138-kV single-circuit transmission line with normal and emergency ratings of at least 987 MVA, on a new ROW, approximately 2.0-mile;
- Rebuild the existing Military to Villa Cavazos 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 10.0-mile;

- Rebuild the existing Fresno to Stillman 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 12.0-mile;
- Rebuild the existing La Palma to Fresno 138-kV single-circuit transmission line with normal and emergency ratings of at least 535 MVA, approximately 10.3-mile;
- Rebuild the existing La Palma to Villa Cavazos 138-kV single-circuit transmission line with normal and emergency ratings of at least 535 MVA, approximately 12.2-mile; and
- Expand the existing Chalybe 138-kV substation to install two +/-150 MVAr STATCOMs.

Option 8 consists of the following:

- Add a 345-kV and 138-kV substation named Olmito West between Cavazos and Olmito;
- Install two 345/138-kV autotransformers with normal and emergency ratings of at least 675 MVA at Olmito West;
- Install one additional 345/138-kV 3-winding autotransformer with normal and emergency ratings of at least 450 MVA at Palmito;
- Add a 345-kV substation named Palmer on the North Edinburg to Kingfisher 345-kV double-circuit transmission line;
- Construct a new Palmer to Olmito West 345-kV double-circuit transmission line with normal and emergency ratings of at least 2668 MVA per circuit, on a new ROW, approximately 8.1-mile;
- Construct a new Olmito West to Olmito 138-kV single-circuit transmission line with normal and emergency ratings of at least 956 MVA, on a new ROW, approximately 2.7-mile;
- Construct a new Olmito West to Cavazos 138-kV single-circuit transmission line with normal and emergency ratings of at least 956 MVA, on a new ROW, approximately 4.0-mile;
- Construct a new Chalybe to Palmito 138-kV single-circuit transmission line with normal and emergency ratings of at least 956 MVA, on a new ROW, approximately 2.0-mile;
- Construct a new Chalybe to Stillman 138-kV single-circuit transmission line with normal and emergency ratings of at least 987 MVA, on a new ROW, approximately 2.0-mile;
- Rebuild the existing Military to Olmito 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 5.5-mile;
- Rebuild the existing Palo Alto to Olmito 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 0.4-mile;
- Rebuild the existing Titan to Palo Alto 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 2.5-mile;
- Rebuild the existing Titan to Chalybe 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 7.3-mile;
- Rebuild the existing Military to Villa Cavazos 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 10.0-mile;
- Rebuild the existing Fresno to Stillman 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 12.0-mile;

- Rebuild the existing La Palma to Fresno 138-kV single-circuit transmission line with normal and emergency ratings of at least 535 MVA, approximately 10.3-mile;
- Rebuild the existing La Palma to Villa Cavazos 138-kV single-circuit transmission line with normal and emergency ratings of at least 535 MVA, approximately 12.2-mile; and
- Expand the existing Chalybe 138-kV substation to install two +/-150 MVAr STATCOMs.

5 Option Evaluations

ERCOT performed reliability analysis, planned maintenance outage evaluation, and long-term load-serving capability analysis to evaluate the options and to identify any reliability impact of the options in the study area. Based on the results of these analyses, short-listed options were selected for further evaluations. This section details these studies and their results and compares the short-listed options.

5.1 Results of Reliability Analysis

All ten options were evaluated based on the contingencies described in the methodology section of the report, and no reliability criteria violations were identified for any option as shown in Table 5.1.

Table 5.1: Results of Initial Reliability Assessment of All Ten Options

		N-1		X-1 + N-1		G-1 + N-1	
Option	Unsolved Power Flow	Thermal Overload	Voltage Violation	Thermal Overload	Voltage Violation	Thermal Overload	Voltage Violation
1	None	None	None	None	None	None	None
2	None	None	None	None	None	None	None
2A	None	None	None	None	None	None	None
3	None	None	None	None	None	None	None
4	None	None	None	None	None	None	None
5	None	None	None	None	None	None	None
5A	None	None	None	None	None	None	None
6	None	None	None	None	None	None	None
7	None	None	None	None	None	None	None
8	None	None	None	None	None	None	None

5.2 Planned Maintenance Outage Evaluation

Based on a review of the system topology of the area, ERCOT conducted an N-2 contingency analysis for each feasible option to represent system element outage(s) under planned maintenance condition (N-1-1) in the area. Then, each N-2 violation was run as an N-1-1 contingency scenario, with system adjustments between the contingencies. The transmission elements in the local area of the Brownsville Area Improvements Project were monitored in the maintenance outage evaluation.

As shown in Table 5.2, the results of this maintenance assessment indicated that Option 2 and Option 5 both needed modifications to perform satisfactorily.

Table 5.2: Results of Planned Maintenance Outage Evaluation for All Feasible Options

Option	Voltage Violations	Thermal Overloads	Unsolved Power Flow
1	7	3	6
2	None	2	None
2A	None	None	None
3	1	2	None
5	None	5	None
5A	None	None	None
7	None	None	None
8	None	None	None

5.3 Short-listed Options

Preliminary feasibility evaluations performed by AEPSC indicated that Option 4 and Option 6 were infeasible. Based on the review of the results shown in Sections 5.1 and 5.2, Option 2A, Option 5A, Option 7, and Option 8 were selected as short-listed options for further evaluations. These four options are illustrated in Figures 5.1, 5.2, 5.3, and 5.4.

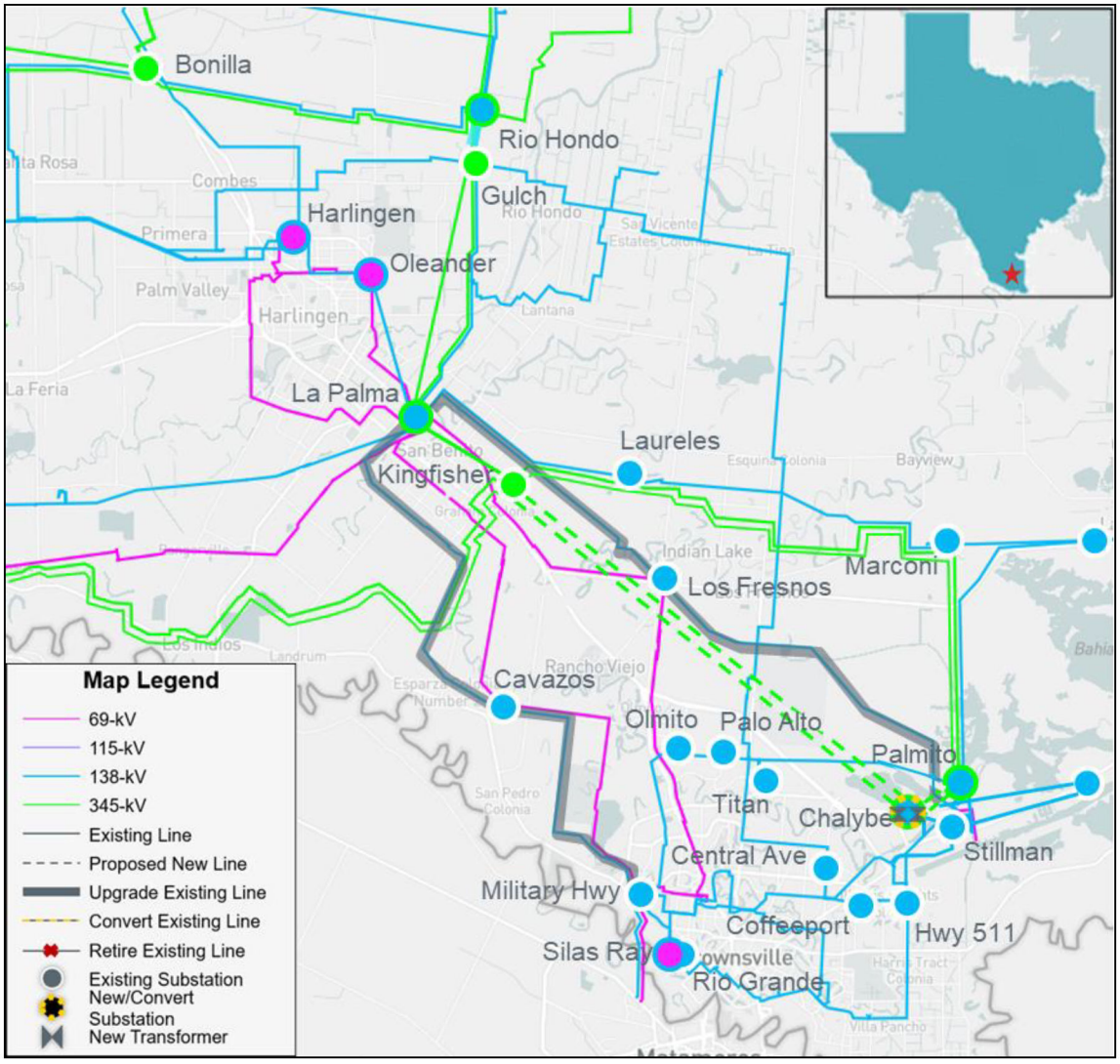


Figure 5.1: Map of Option 2A

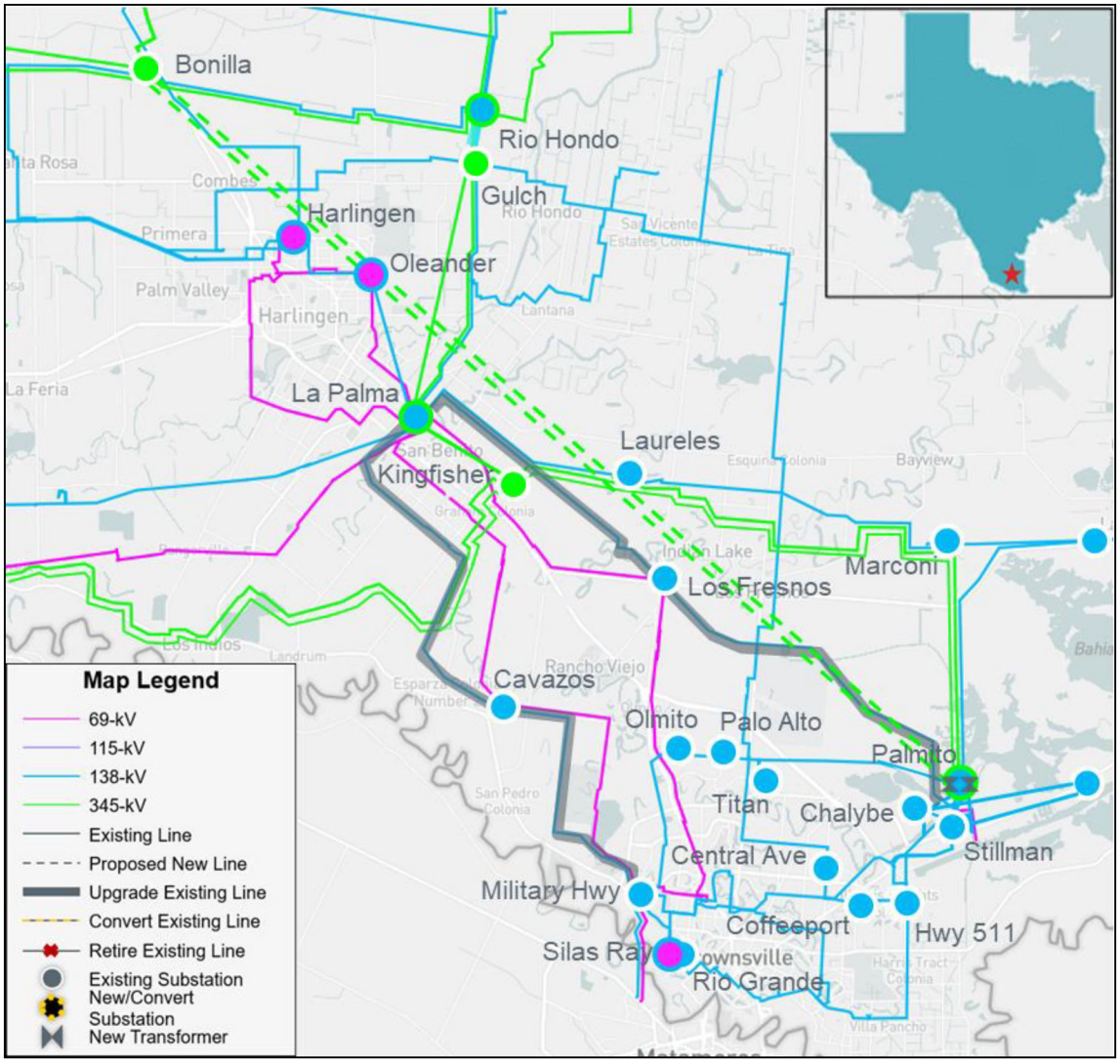


Figure 5.2: Map of Option 5A

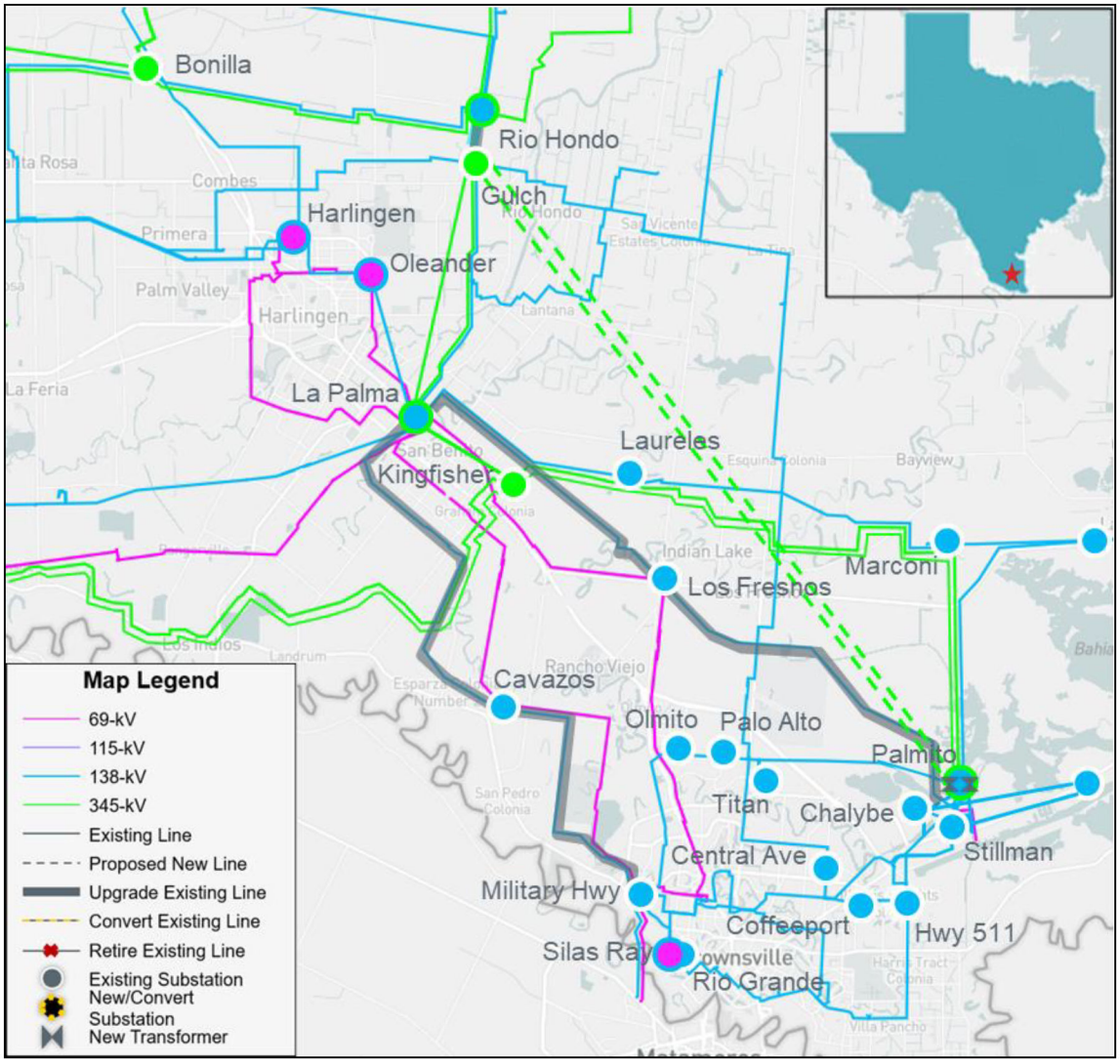


Figure 5.3: Map of Option 7

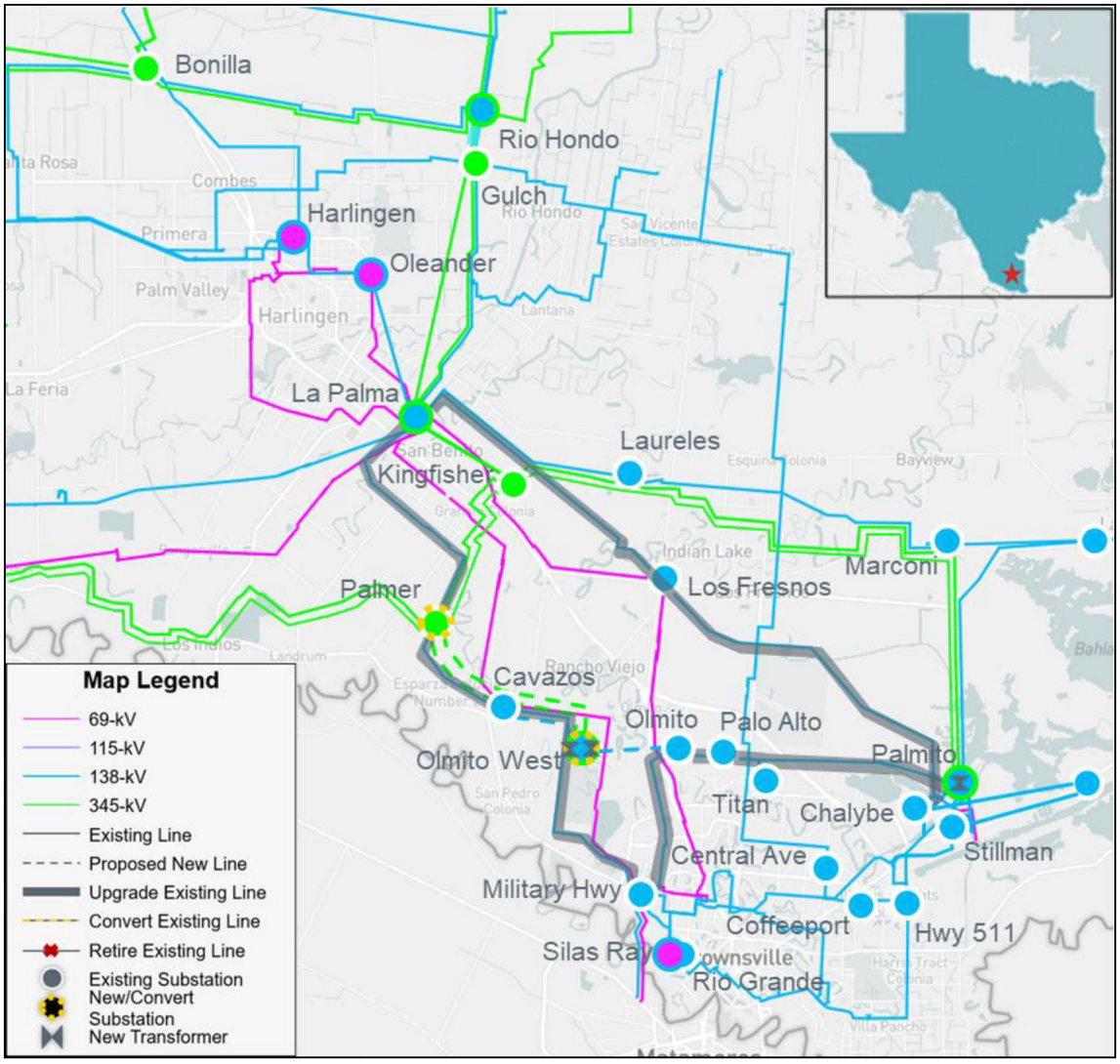


Figure 5.4: Map of Option 8

5.4 Long-Term Load-Serving Capability Analysis

ERCOT performed a long-term load-serving capability assessment to compare the performance of the study options. ERCOT increased load at substations within the Brownsville area and decreased conforming load outside of the South Weather Zone to balance power. The results of the long-term load-serving capability assessment are shown in Table 5.4.

The results show all short-listed options have similar performance.

Table 5.4: Results of Long-Term Load-Serving Capability Assessment of All Short-Listed Options

Option	Incremental Load-Serving Capability (~MW)
2A	637
5A	651
7	650
8	615

5.5 Cost Estimate and Feasibility Assessment

AEPSC, along with Sharyland Utilities (Sharyland) and Brownsville Public Utilities Board (BPUB) performed feasibility assessments and provided cost estimates for the four short-listed options. Table 5.5 summarizes the cost estimate, estimated mileage of CCN required, and option feasibility for the four short-listed options.

Table 5.5: Cost Estimates and Feasibility for the Short-Listed Options

Option	Cost Estimates (~$M)	CCN Required (~Miles)	Feasible
2A	423.8	Yes (26.0)	Feasible
5A	458.3	Yes (43.4)	Feasible
7	427.0	Yes (33.3)	Feasible
8	501.6	Yes (18.8)	Feasible

6 Comparison of Short-listed Options

The comparison of Options 2A, 5A, 7, and 8 with corresponding cost estimates provided by AEPSC, Sharyland, and BPUB are summarized in Table 6.1.

Table 6.1: Comparison of the Short-Listed Options

	Option 2A	Option 5A	Option 7	Option 8
Meets ERCOT and NERC Reliability Criteria	Yes	Yes	Yes	Yes
Improves Long-Term Load-Serving Capability	Yes	Yes	Yes	Yes
Improves Operational Flexibility	Yes	Yes	Yes	Yes
Requires CCN (~miles)	Yes (26.0)	Yes (43.4)	Yes (33.3)	Yes (18.8)
Project Feasibility	Yes	Yes	Yes	Yes
Cost Estimate (~$M)	423.8	458.3	427.0	501.6

ERCOT recommends Option 2A as the preferred option to address the reliability needs in the Brownsville area based on the following considerations:

- Addresses the reliability violations;
- Is the least expensive option;
- Requires less CCN mileage than Option 5A or Option 7;
- Provides additional operational flexibility; and

- Improves long-term load-serving capability.

7 Additional Analysis and Assessment

The preferred option (Option 2A, approximately $423.8 Million) is categorized as a Tier 1 project, pursuant to ERCOT Protocol 3.11.4.3(1)(a). ERCOT performed generation and load sensitivity studies to identify the preferred option performance, as required under Planning Guide Section 3.1.3(4). Additionally, a Sub-synchronous Resonance (SSR) Assessment was performed.

7.1 Generation Addition Sensitivity Analysis

ERCOT performed a generation addition sensitivity analysis based on Planning Guide Section 3.1.3(4)(a).

Based on a review of the July 2024 GIS[8] report, eight units were found within the Brownsville area which could have an impact on the identified reliability issues. The generators listed in Table 7.1 were added to the Option 2A case and were modeled following the 2024 RTP methodology.

Table 7.1: List of Units that Could have an Impact on the Identified Reliability Issues

GINR	Unit Name	Fuel Type	Capacity (~MW)	County
19INR0022	Monte Alto I	WIN	141.5	Willacy
19INR0023	Monte Alto 2 Wind	WIN	307.9	Willacy
20INR0086	Arroyo Solar	SOL	180.0	Cameron
22INR0401	Eval Storage	OTH	255.0	Cameron
22INR0468	Lower Rio BESS	OTH	60.4	Hidalgo
24INR0294	Citrus Flatts BESS	OTH	100.8	Cameron
24INR0306	Arroyo Storage	OTH	183.8	Cameron
24INR0491	Gunnar BESS	OTH	203.0	Hidalgo

After the addition of the units to the Option 2A case, no new thermal or voltage violations were identified.

7.2 Load Scaling Sensitivity Analysis

Planning Guide Section 3.1.3(4)(b) requires evaluation of the potential impact of load scaling on the criteria violations seen in this EIR. ERCOT concluded that the load scaling would not have a material impact on the project need because the Brownsville area is at the extreme Southeastern portion of the ERCOT system. Further, this project is local in nature and the need is based upon new large load in the area. The load scaling outside the South and South Central Weather Zones would not have a material impact on the need of the recommended project.

[8] GIS Report: https://www.ercot.com/mp/data-products/data-product-details?id=PG7-200-ER

7.3 Sub-synchronous Resonance (SSR) Assessment

Pursuant to Nodal Protocol Section 3.22.1.3(2), ERCOT conducted a sub-synchronous-resonance (SSR) screening for the preferred option (Option 2A) and found no adverse SSR impacts to the existing and planned generation resources in the study area.

8 Congestion Analysis

ERCOT conducted a congestion analysis to identify any potential impact on system congestion related to the addition of the recommend project, Option 2A, using the 2023 RTP 2028 economic study case.

The results of congestion analysis indicated Option 2A would cause one new congestion as shown in Table 8.1.

Table 8.1: List of New Congestion Due to Transmission Upgrade of Option 2A

Monitored Line	% Time of Congestion	New / Existing
Lon Hill to White Point 345-kV single-circuit transmission line	6.0	New

An additional test was conducted by upgrading the 345-kV single-circuit transmission line from Lon Hill to White Point to see if this alleviated the new congestion. Based on the results summarized in Table 8.2, the additional upgrade did not yield sufficient economic benefit. Therefore, no upgrades will be recommended to solve this new congestion as part of Option 2A.

Table 8.2: Test Results with Lon Hill to White Point 345-kV Line Upgrade

Upgrade Tested	Mileage (~mi)	Passed Production Cost Savings Test	Passed Generation Revenue Reduction Test
Lon Hill to White Point 345-kV single-circuit transmission line	20.5	No	No

9 Conclusion

ERCOT evaluated ten transmission upgrade options to resolve the thermal overloads and voltage violation in the Brownsville area. Based on the results of the independent review, ERCOT recommends Option 2A as the preferred solution because it addresses the thermal overloads and voltage violation with no reliability issues, is the least expensive option, and requires less CCN mileage than Option 5A or Option 7. Option 2A also provides additional operational flexibility and improves long-term load-serving capability.

Option 2A consists of the following upgrades and is estimated to cost $423.8 Million:

- Expand the existing Chalybe 138-kV substation to install a new 345-kV ring-bus arrangement, with two 345/138-kV autotransformers with normal and emergency ratings of at least 675 MVA;

- Construct a new Chalybe to Kingfisher 345-kV double-circuit transmission line with normal and emergency ratings of at least 2668 MVA per circuit, on a new ROW, approximately 22.0-mile;
- Construct a new Chalybe to Palmito 345-kV double-circuit transmission line with normal and emergency ratings of at least 2668 MVA per circuit, on a new ROW, approximately 2.0-mile;
- Construct a new Chalybe to Stillman 138-kV single-circuit transmission line with normal and emergency ratings of at least 987 MVA, on a new ROW, approximately 2.0-mile;
- Rebuild the existing La Palma to Fresno 138-kV single-circuit transmission line with normal and emergency ratings of at least 535 MVA, approximately 10.3-mile;
- Rebuild the existing Fresno to Stillman 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 12.0-mile;
- Rebuild the existing Military to Villa Cavazos 138-kV single-circuit transmission line with normal and emergency ratings of at least 717 MVA, approximately 10.0-mile;
- Rebuild the existing La Palma to Villa Cavazos 138-kV single-circuit transmission line with normal and emergency ratings of at least 535 MVA, approximately 12.2-mile; and
- Expand the existing Chalybe 138-kV substation to install two +/-150 MVAr STATCOMs.

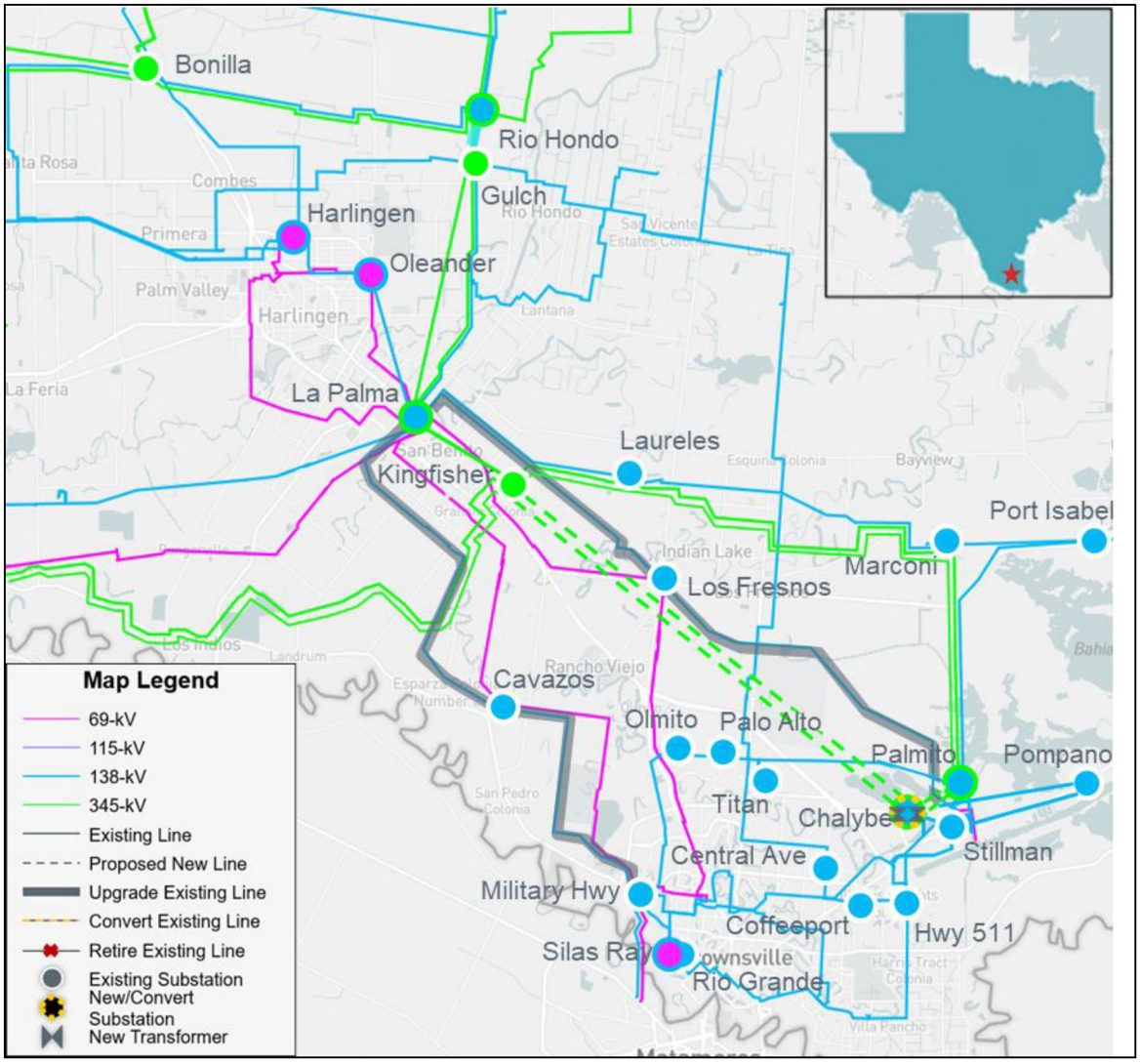


Figure 9.1: Map of Option 2A

ERCOT recommends that any STATCOM additions have grid-forming-like capabilities to operate reliably at weak grid conditions and support the system strength.

The cost estimate for the project is approximately $423.8 Million and the project is classified as a Tier 1 project per ERCOT Protocol Section 3.11.4.3(1)(a). The project is recommended for construction to meet a May 2029 ISD. AEPSC has advised that this date is subject to change based on customer changes and the CCN process.

A CCN application will be required for the new 345-kV double-circuit transmission line from Chalybe to Kingfisher, the new 345-kV double-circuit transmission line from Chalybe to Palmito, and the new 138-kV transmission line from Chalybe to Stillman. If any long-term issues are identified regarding the outages necessary to rebuild the 138-kV transmission lines, Constraint Management Plans (CMP) will be developed as needed.

Appendix

A: Transmission and Generation Projects Added to the Economic Base Case

Table A.1: List of Transmission Projects Added to the Economic Base Case

TPIT No	Project Name	Tier	Project ISD	County
62666	Upgrade and convert McGregor – Waco West Line	Tier 4	12/15/2024	McLennan
66216	Upgrade and convert Waco West – Temple 69 kV Line to 138 kV	Tier 4	6/15/2024	McLennan
71912A	Rebuild the Killeen Fort Hood – Killeen Taft 138 kV Line	Tier 4	5/15/2026	Bell
67992	CPSE_345KV_Howard_Switching_Station_ALL	Tier 3	2/1/2024	Bexar
71871	CPSE_Cagnon to Shepherd Rd Rebuild Phase A	Tier 4	5/1/2023	Bexar
67329	STEC_67329_Cruce-SanMiguel	Tier 1	6/1/2027	Bexar, Atascosa
23RPG024	Big Foot to Dilley Switch 138-kV Conversion Project	Tier 4	8/30/2026	Frio
73063	AEP_TCC_BigFoot_LytleConversion	Tier 4	9/20/2025	Medina, Frio
67915	AEP_TCC_Asherton-West Batesville138kVLineRebuild	Tier 3	12/30/2028	Dimmit, Zavala
22RPG026	Wimberley Loop project	Tier 2	5/1/2027	Blanco, Hays
23RPG013	Silverleaf and Cowpen 345/138-kV Stations Project	Tier 1	6/1/2027	Reeves, Ward
23RPG018	Arlington Reliability Enhancement Project	Tier 2	5/1/2026	Tarrant, Dallas
23RPG023	Pecos County Transmission Improvement Project	Tier 1	8/31/2026	Pecos
23RPG028	Rio Medina Project	Tier 2	1/1/2027	Medina
23RPG002	Hamlin to Roby 69 kV Line Rebuild Project	Tier 4	11/1/2026	Jones, Fisher
23RPG008	Fort Stockton Plant to Lynx 138-kV Line Rebuild Project	Tier 4	5/31/2025	Pecos
23RPG009	Spraberry to Polecat 138-kV Line Rebuild Project	Tier 3	Summer 2024	Midland, Glasscock
23RPG010	Big Spring West to Stanton East 138-kV Line Rebuild Project	Tier 3	Summer 2024	Martin, Howard
23RPG014	Lamesa to Jim Payne POI to Paul Davis Tap 138-kV Line Rebuild Project	Tier 3	Summer 2024	Dawson, Martin
23RPG016	Tributary Switch – Vincent Rebuild Project	Tier 3	12/31/2024	Howard
23RPG001	Bessel to Falfurrias 138 kV Line Rebuild Project	Tier 4	4/30/2026 11/30/2026	Nueces, Kleberg, Brooks, Jim Wells
23RPG003	Eagle Ford Large Load Interconnection Project	Tier 3	12/4/2025	DeWitt
23RPG004	Lockhart to Luling 69-kV Transmission Line Overhaul Project	Tier 4	6/30/2025	Caldwell
23RPG012	Stone Lake Area Upgrades Project	Tier 3	Summer 2024 Summer 2025	Harris
23RPG015	Cuero Substation Upgrade Project	Tier 4	5/15/2024	DeWitt
23RPG017	Watermill 345/138-kV Switch Project	Tier 3	5/1/2025	Dallas
23RPG020	Hackberry Switch to DFW D East 2 138-kV Double-Circuit Line Section Project	Tier 3	12/1/2025	Dallas
23RPG021	West Columbia to Big Creek ckt 89 Reconductor Project	Tier 4	Summer 2026	Fort Bend, Brazoria

TPIT No	Project Name	Tier	Project ISD	County
23RPG025	Britmoore to Bellaire Ckt 24 Upgrade Project	Tier 3	Summer 2025	Harris
23RPG030	Walleye Creek 345/138-kV Switch Project	Tier 3	5/1/2025	Milam
23RPG031	345 kV Jeanetta Autotransformer Upgrades Project	Tier 3	Summer 2025	Harris
23RPG033	Watermill to Seagoville 138 kV Line Project	Tier 3	12/1/2025	Dallas
24RPG002	Rockhound 345/138-kV Switch and Grey Well Draw to Buffalo 2nd 138-kV Circuit Project	Tier 3	12/1/2024	Martin, Midland
24RPG005	Montfort Switch to Shankle Switch 138-kV Line Project	Tier 3	12/1/2025	Ellis, Navarro

Table A.2: List of Generation Added to the Economic Base Case

GINR	Project Name	Fuel	Project COD	Capacity (~MW)	County
14INR0033	Goodnight Wind	Wind	2/14/2024	258.1	Armstrong
19INR0054	Monte Cristo 1 Wind	Wind	9/30/2025	236.9	Hidalgo
19INR0134	Cottonwood Bayou Solar	Solar	8/13/2024	351.4	Brazoria
19INR0203	Angelo Solar	Solar	8/12/2024	195.4	Tom Green
20INR0040	Montgomery Ranch Wind	Wind	9/1/2024	200.2	Foard
20INR0208	Signal Solar	SOL	3/15/2025	51.8	Hunt
20INR0210	Hopkins Solar	Solar	12/30/2023	253.1	Hopkins
20INR0248	Second Division Solar	Solar	9/17/2024	100.3	Brazoria
21INR0302	Aureola Solar	Solar	6/28/2024	203.0	Milam
21INR0303	Mandorla Solar	Solar	11/29/2024	254.0	Milam
21INR0304	Halo Solar	Solar	6/20/2024	254.0	Bell
21INR0325	Sheep Creek Wind	Wind	1/31/2024	153.0	Callahan
21INR0368	Eliza Solar	Solar	11/1/2024	151.6	Kaufman
21INR0389	Hollywood Solar	Solar	6/30/2024	353.4	Wharton
21INR0424	Tierra Bonita Solar	Solar	10/29/2024	306.9	Pecos
21INR0450	Danish Fields Storage	Battery	3/6/2024	152.4	Wharton
21INR0505	Ramsey Storage	Battery	12/31/2025	510.4	Wharton
21INR0511	Wolf Ridge Repower	Wind	4/2/2024	9.0	Cooke
21INR0515	Roadrunner Crossing Wind II SLF	Wind	1/20/2025	126.7	Eastland
22INR0251	Shaula I Solar	Solar	10/30/2025	205.2	DeWitt
22INR0260	Eliza Storage	Battery	11/1/2024	100.2	Kaufman
22INR0261	Dorado Solar	Solar	12/31/2025	406.3	Callahan
22INR0267	Shaula II Solar	Solar	5/30/2026	205.2	DeWitt
22INR0353	BRP Carina BESS	Battery	12/31/2024	151.9	Nueces
22INR0354	XE MURAT Solar	Solar	5/13/2024	60.4	Harris
22INR0366	LIBRA BESS	Battery	1/26/2024	206.2	Guadalupe
22INR0422	Ferdinand Grid BESS	Battery	5/31/2026	202.7	Bexar
22INR0502	Shamrock	Wind	4/19/2024	223.9	Crockett
22INR0555	Guevara Storage	Battery	7/15/2025	125.4	Rockwall
23INR0026	Baker Branch Solar	Solar	8/1/2024	469.4	Lamar
23INR0054	Tanglewood Solar	Solar	1/16/2025	257.0	Brazoria

GINR	Project Name	Fuel	Project COD	Capacity (~MW)	County
23INR0062	Noria Storage	Battery	9/1/2025	75.0	Nueces
23INR0091	Cascade Solar	Solar	12/31/2024	254.2	Brazoria
23INR0114	True North Solar	Solar	6/30/2024	238.3	Falls
23INR0154	Ebony Energy Storage	Battery	5/6/2024	203.5	Comal
23INR0159	Five Wells Storage	Battery	12/30/2023	220.8	Bell
23INR0219	Dogfish BESS	Battery	12/31/2024	75.0	Pecos
23INR0239	Giga Texas Energy Storage	Battery	1/31/2024	131.1	Travis
23INR0296	Trojan Solar	Solar	2/28/2026	151.3	Cooke
23INR0331	Talitha BESS	Battery	6/30/2024	61.4	Jim Wells
23INR0349	Tokio Solar	Solar	8/25/2025	177.6	McLennan
23INR0367	Fewell Solar	Solar	9/9/2025	203.5	Limestone
23INR0381	Soportar ESS	Battery	3/15/2025	102.1	Bexar
23INR0387	Pioneer DJ Wind	WIN	5/3/2024	140.3	Midland
23INR0408	TECO GTG2	GAS	1/30/2024	50.0	Harris
23INR0418	Angelo Storage	Battery	5/3/2024	103.0	Tom Green
23INR0460	GULF STAR STORAGE	Battery	6/25/2024	301.0	Wharton
23INR0470	BoCo BESS	Battery	6/22/2024	155.5	Borden
23INR0525	Pyron Wind Repower	WIN	2/1/2024	19.9	Nolan
23INR0637	Goodnight Wind II	WIN	12/30/2024	258.3	Armstrong
24INR0010	Pinnington Solar	Solar	10/15/2025	666.1	Jack
24INR0015	Five Wells Solar	Solar	12/29/2023	322.8	Bell
24INR0038	SP Jaguar Solar	Solar	6/30/2025	300.0	McLennan
24INR0039	SP Jaguar BESS	Battery	6/30/2025	300.0	McLennan
24INR0070	Sypert Branch Solar Project	Solar	6/1/2025	261.8	Milam
24INR0100	Sheep Creek Storage	Battery	7/1/2024	142.1	Callahan
24INR0109	Oriana BESS	Battery	7/2/2025	60.3	Victoria
24INR0138	Midpoint Storage	Battery	8/30/2025	52.2	Hill
24INR0139	Midpoint Solar	Solar	8/30/2025	103.8	Hill
24INR0140	Gaia Storage	Battery	7/31/2025	76.8	Navarro
24INR0141	Gaia Solar	Solar	7/31/2025	152.7	Navarro
24INR0265	Ironman BESS	Battery	11/1/2024	304.2	Brazoria
24INR0273	Al Pastor BESS	Battery	8/16/2024	103.1	Dawson
24INR0281	Red Egret BESS	Battery	6/1/2025	310.6	Galveston
24INR0295	Lucky Bluff BESS	Battery	5/31/2025	100.8	Erath
24INR0312	Wigeon Whistle BESS	Battery	9/1/2024	122.9	Collin
24INR0337	Eldora Solar	Solar	6/30/2026	200.9	Matagorda
24INR0338	Eldora BESS	Battery	6/30/2026	201.3	Matagorda
24INR0436	Carambola BESS	Battery	5/31/2026	97.4	Hidalgo
25INR0105	Diver Solar	Solar	6/30/2026	228.2	Limestone
25INR0162	SOHO II BESS	Battery	1/1/2025	206.3	Brazoria
25INR0223	Uhland Maxwell	GAS	4/15/2025	188.4	Caldwell
25INR0232	Isaac Solar	Solar	3/31/2026	51.6	Matagorda

GINR	Project Name	Fuel	Project COD	Capacity (~MW)	County
25INR0328	Longbow BESS	Battery	11/13/2024	180.8	Brazoria
23INR0403	Connolly Storage	Battery	8/18/2023	125.4	Wise
24INR0147	Holy ESS	Battery	1/19/2023	209.3	Harris
24INR0397	Destiny Storage	Battery	9/21/2023	201.1	Harris
20INR0217	CAROL wind	Wind	1/31/2024	165.4	Potter
21INR0240	La Casa Wind	Wind	1/4/2024	148.4	Stephens
21INR0379	Ash Creek Solar	Solar	1/17/2024	417.7	Hill
23INR0030	Langer Solar	Solar	1/5/2024	249.8	Bosque
23INR0070	Chillingham Solar	Solar	1/30/2024	352.4	Bell
23INR0336	Bypass Battery Storage	Battery	1/9/2024	206.9	Fort Bend
24INR0632	Cedro Hill Wind Repower	Wind	1/30/2024	9.93	Webb
26INR0042	Valhalla Solar	Solar	1/5/2024	306.8	Brazoria
23INR0044	Parliament Solar U1	Solar	12/31/2024	250.4	Waller
23INR0044	Parliament Solar U2	Solar	12/31/2024	234.2	Waller
24INR0023	Compadre Solar U1	Solar	12/25/2024	194.7	Hill
24INR0023	Compadre Solar U2	Solar	12/25/2024	211.5	Hill
24INR0208	Eastbell Milam Solar II	Solar	12/20/2024	151.0	Milam
24INR0329	XE Murat Storage	Battery	12/14/2024	60.1	Harris
24INR0605	TEXAS GULF SULPHUR REPOWER	NG	6/25/2024	94.0	Wharton
16INR0049	Nazareth Solar	Solar	3/24/2025	204.0	Castro
21INR0428	Nabatoto Solar North U1	Solar	2/1/2026	224.8	Leon
21INR0428	Nabatoto Solar North U2	Solar	2/1/2026	140.9	Leon
24INR0395	Berkman Storage	Battery	4/30/2026	150.9	Galveston

B: Detailed Maps of Project Options

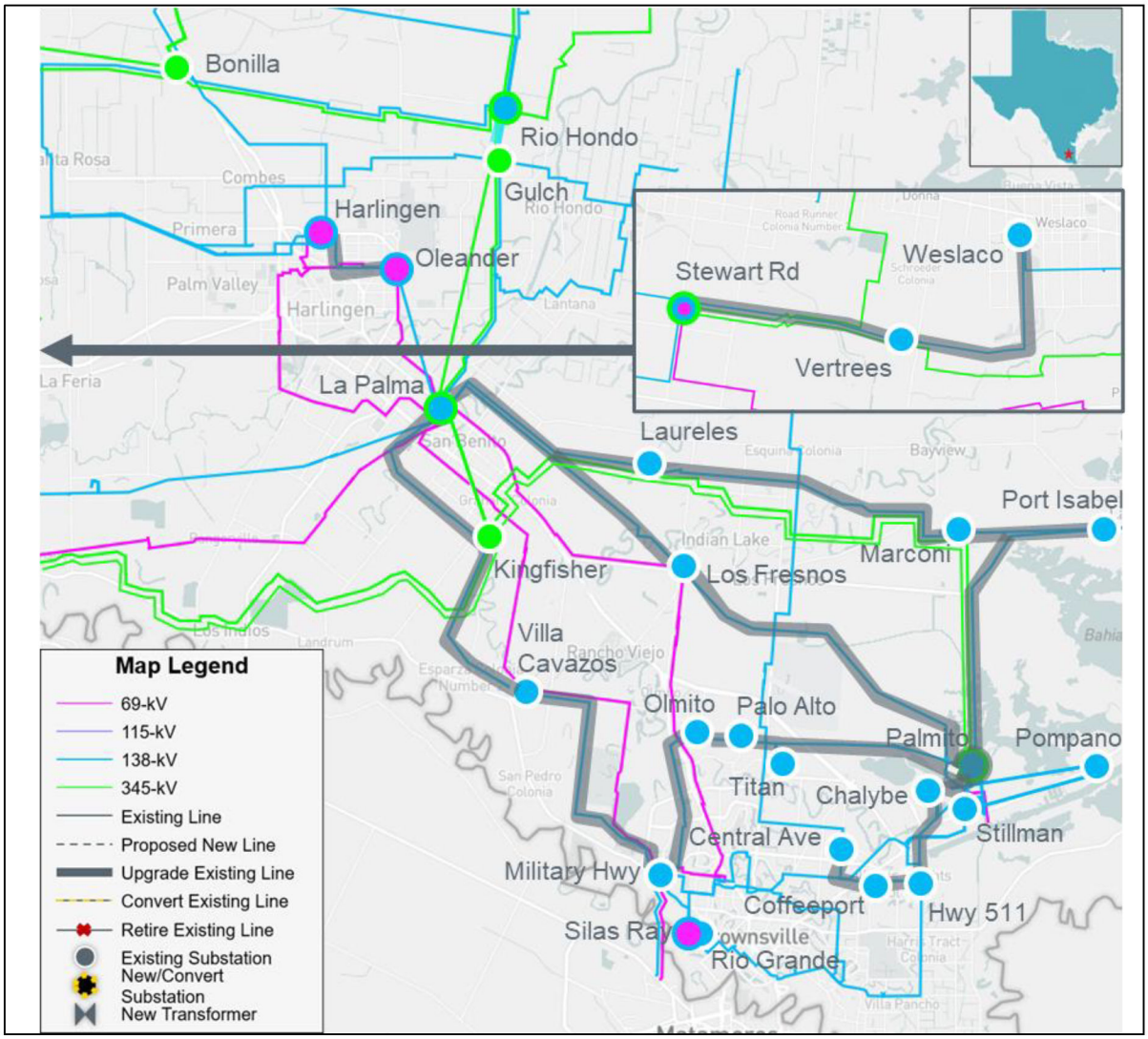


Figure B.1: Map of Option 1

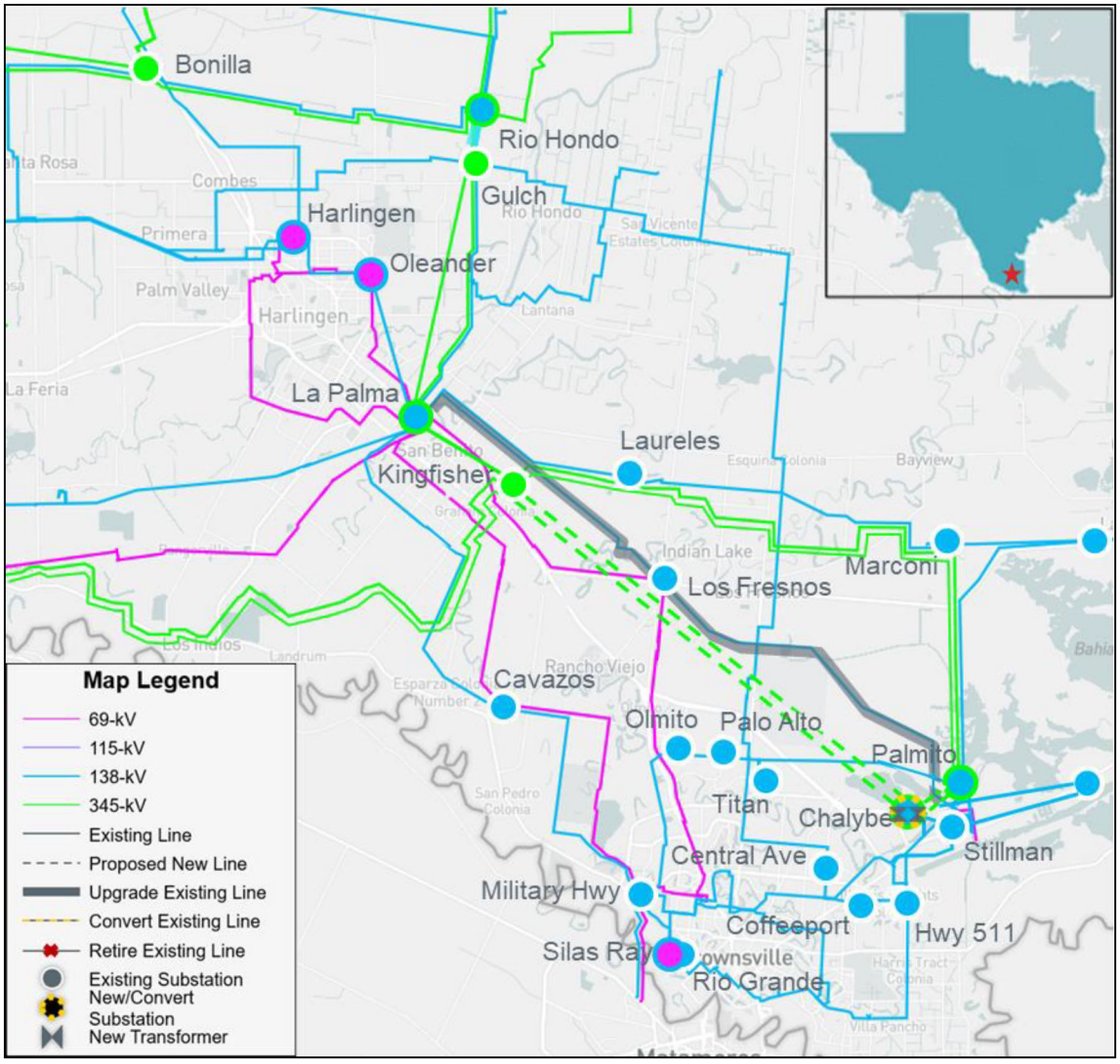


Figure B.2: Map of Option 2

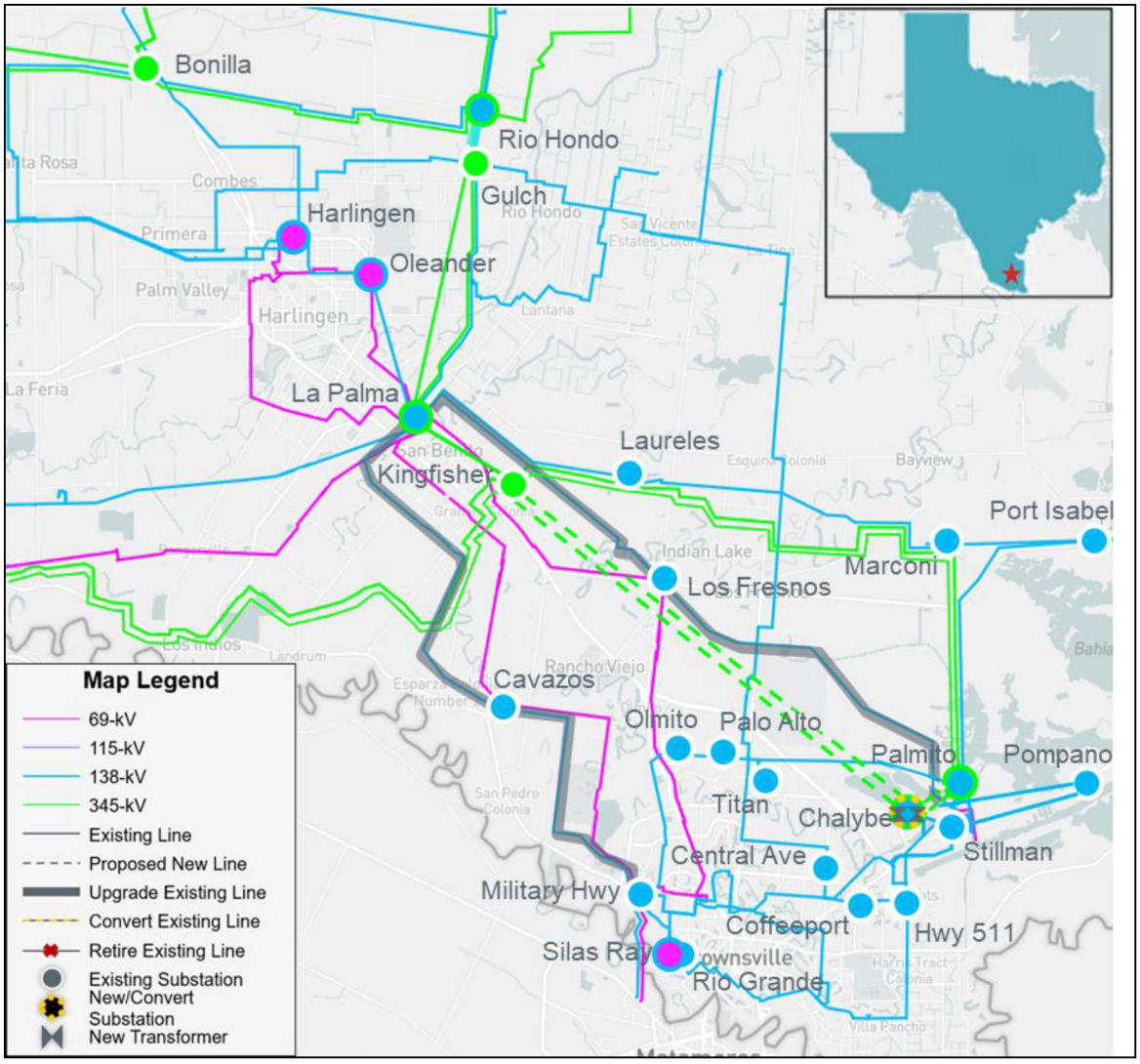


Figure B.2A: Map of Option 2A

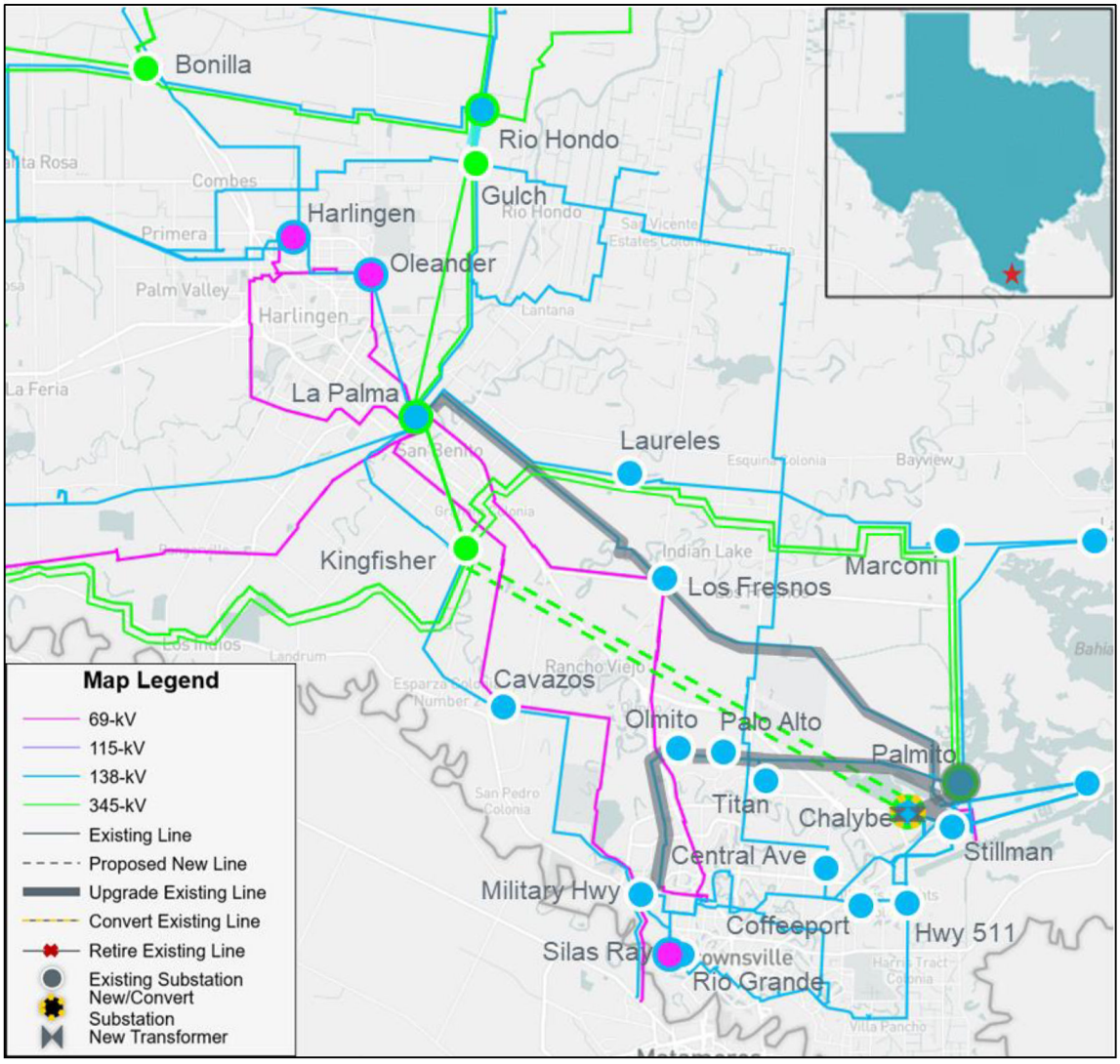


Figure B.3: Map of Option 3

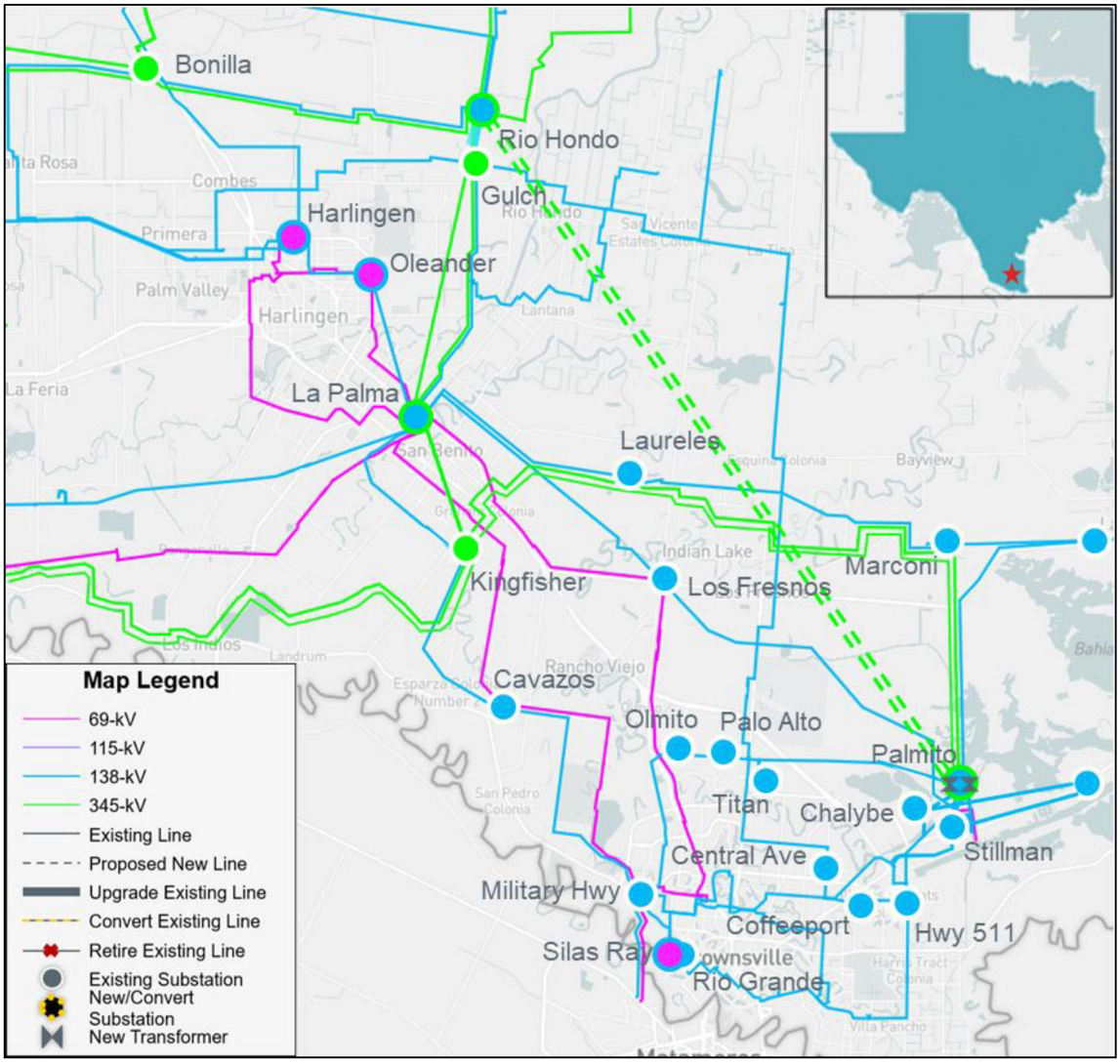


Figure B.4: Map of Option 4

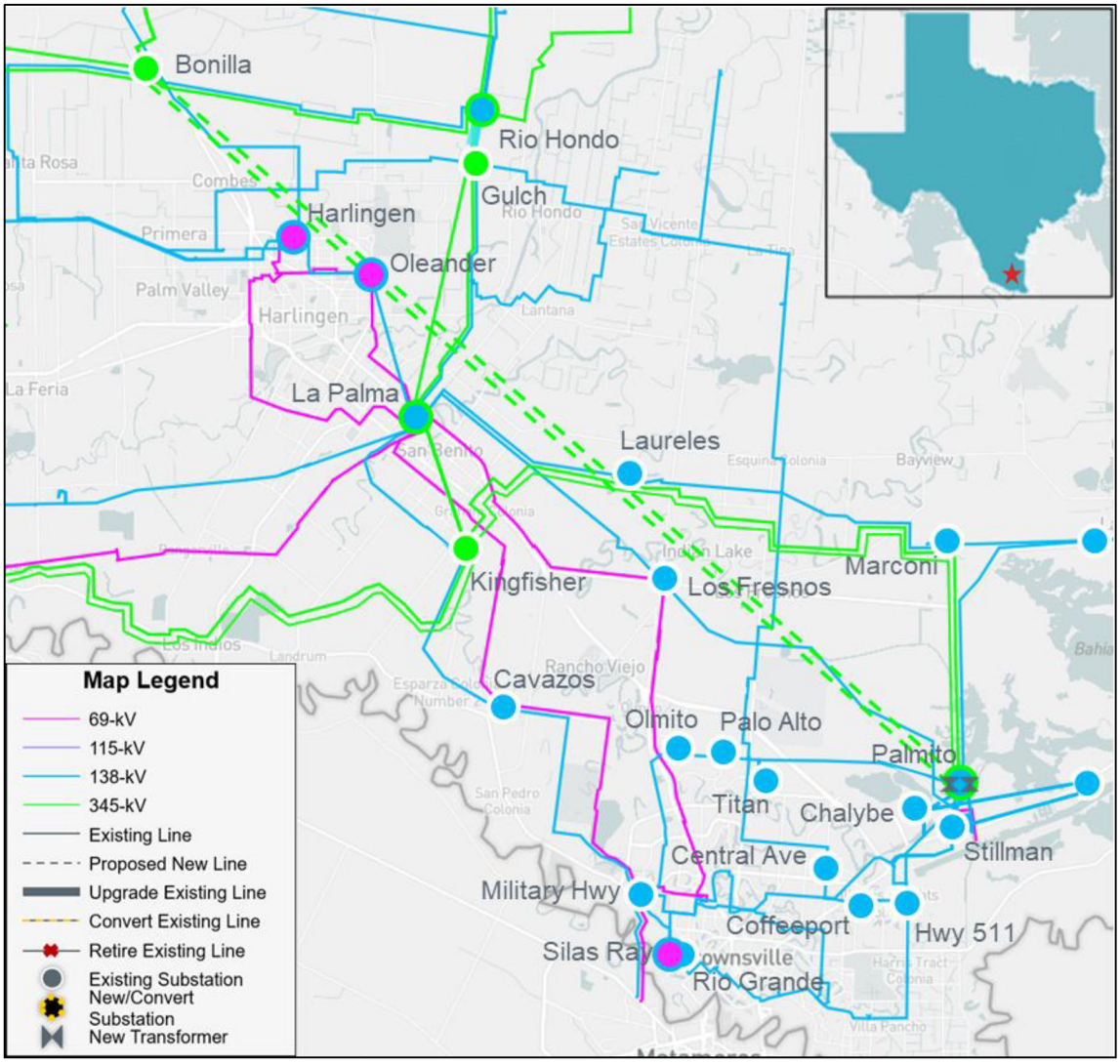


Figure B.5: Map of Option 5

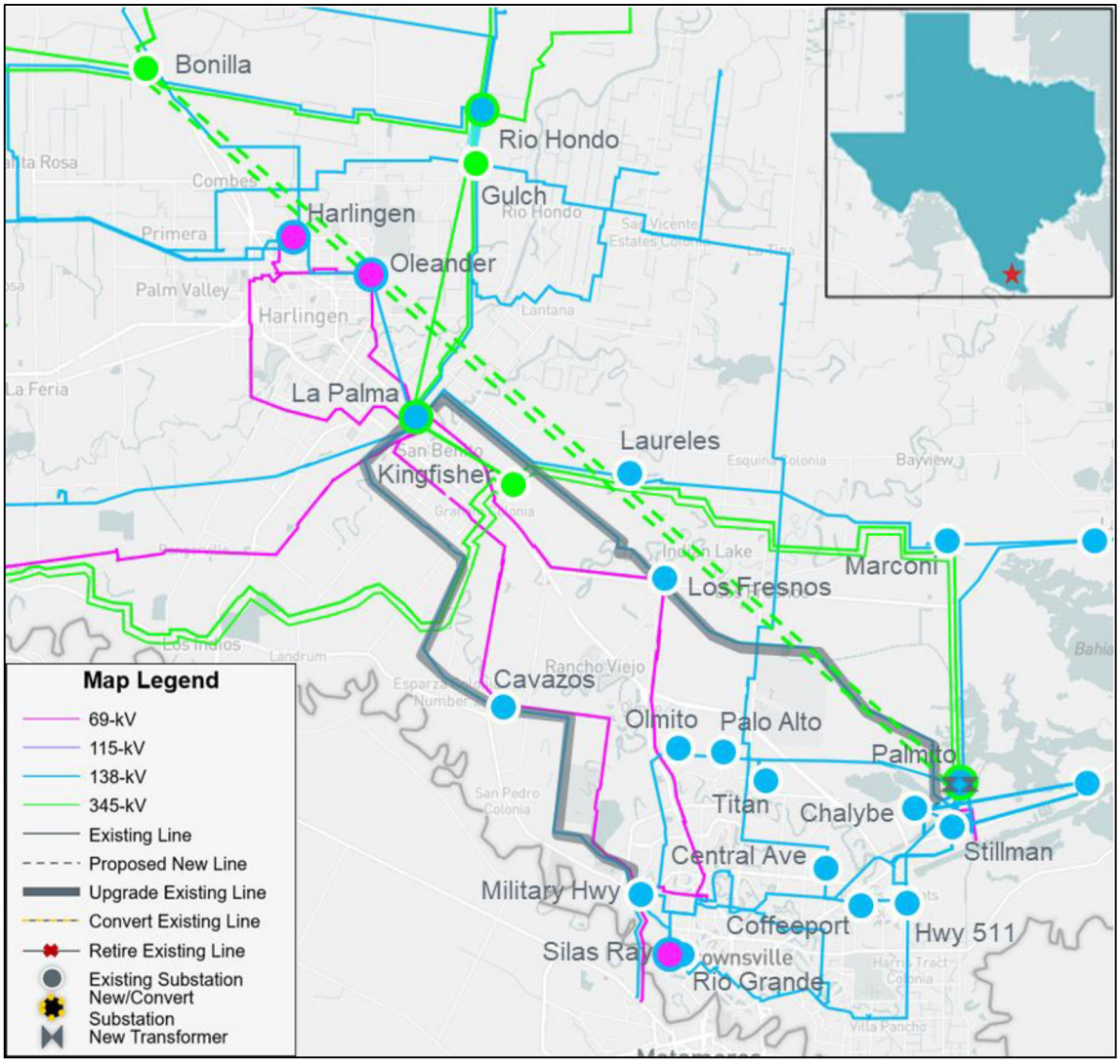


Figure B.5A: Map of Option 5A

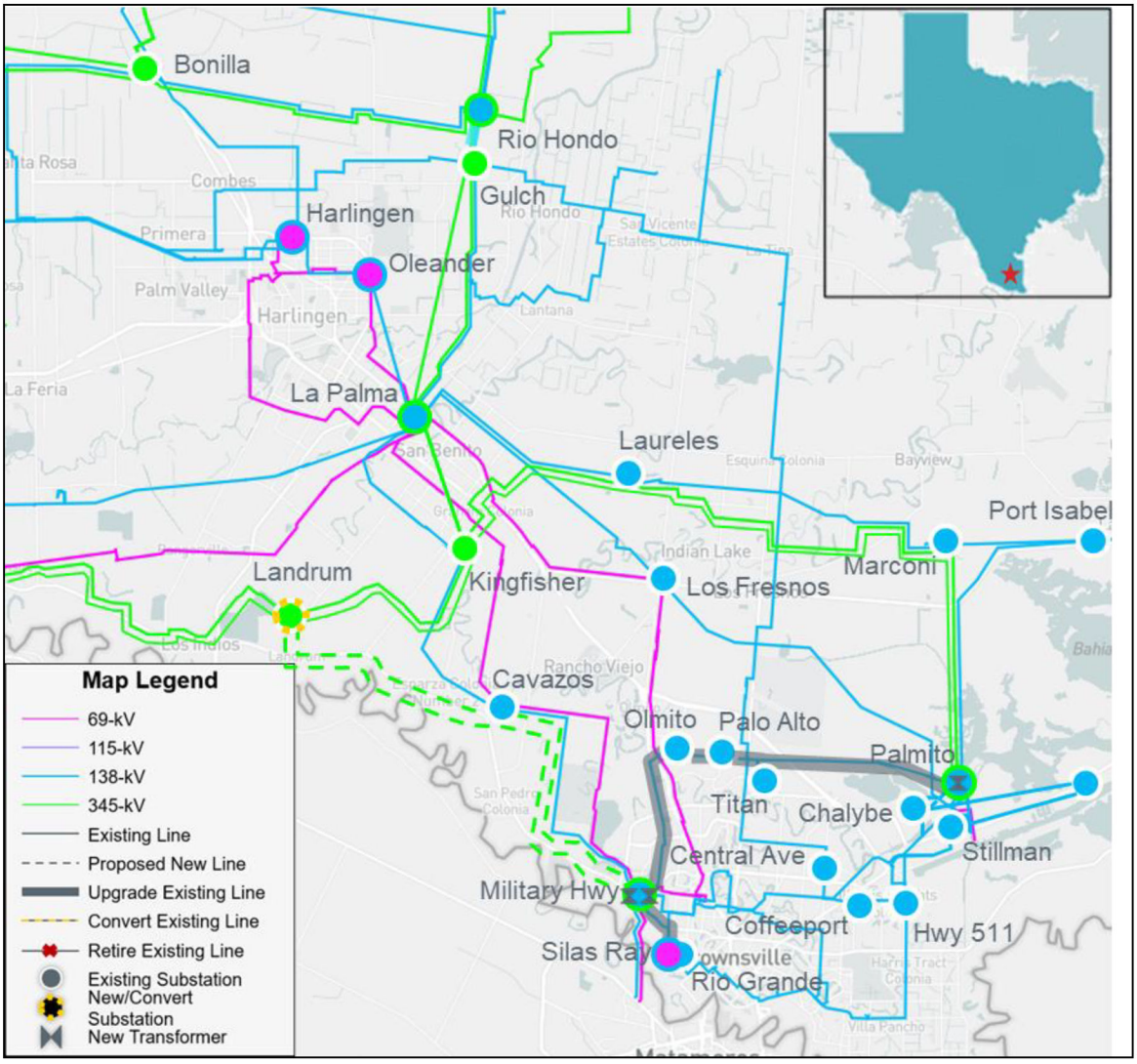


Figure B.6: Map of Option 6

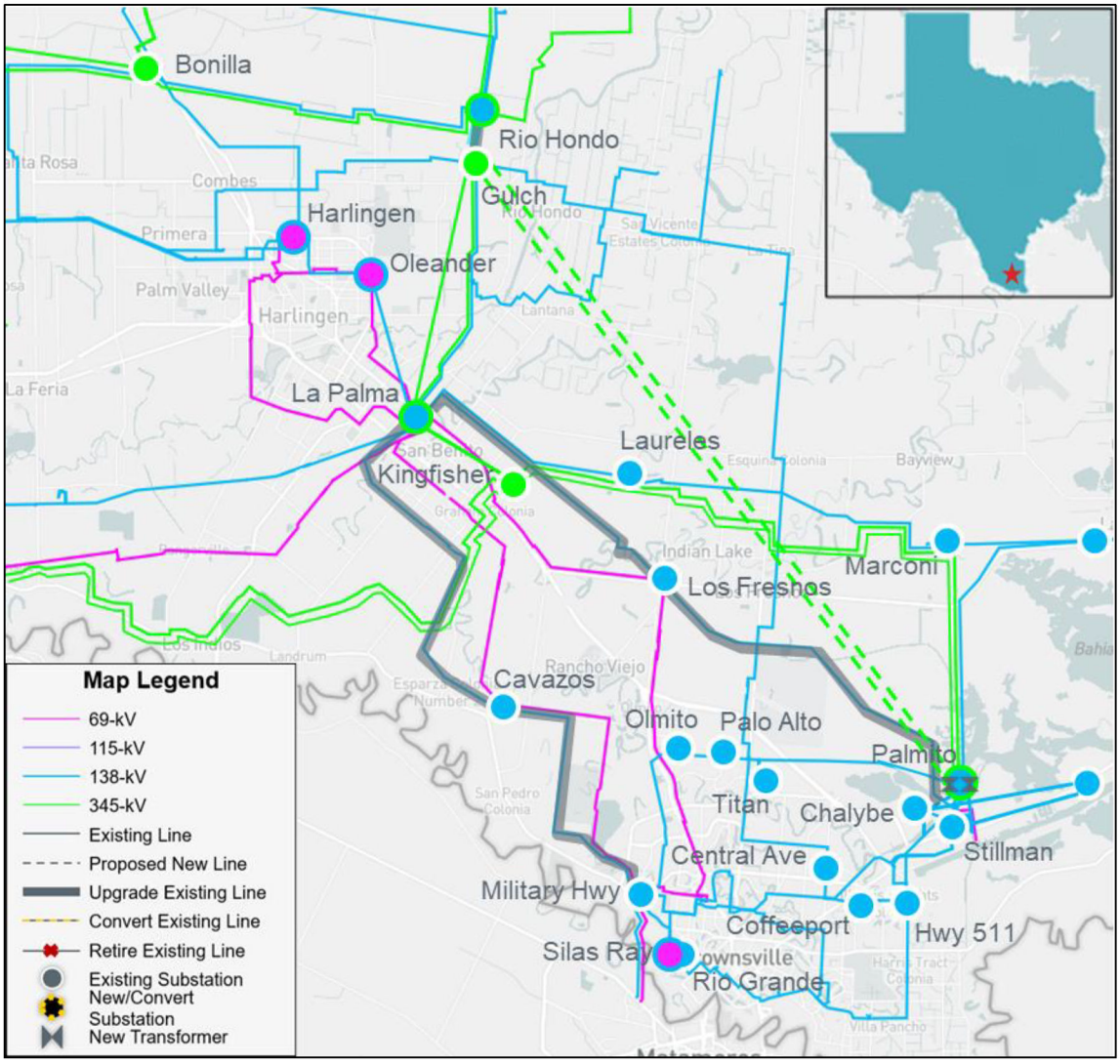


Figure B.7: Map of Option 7

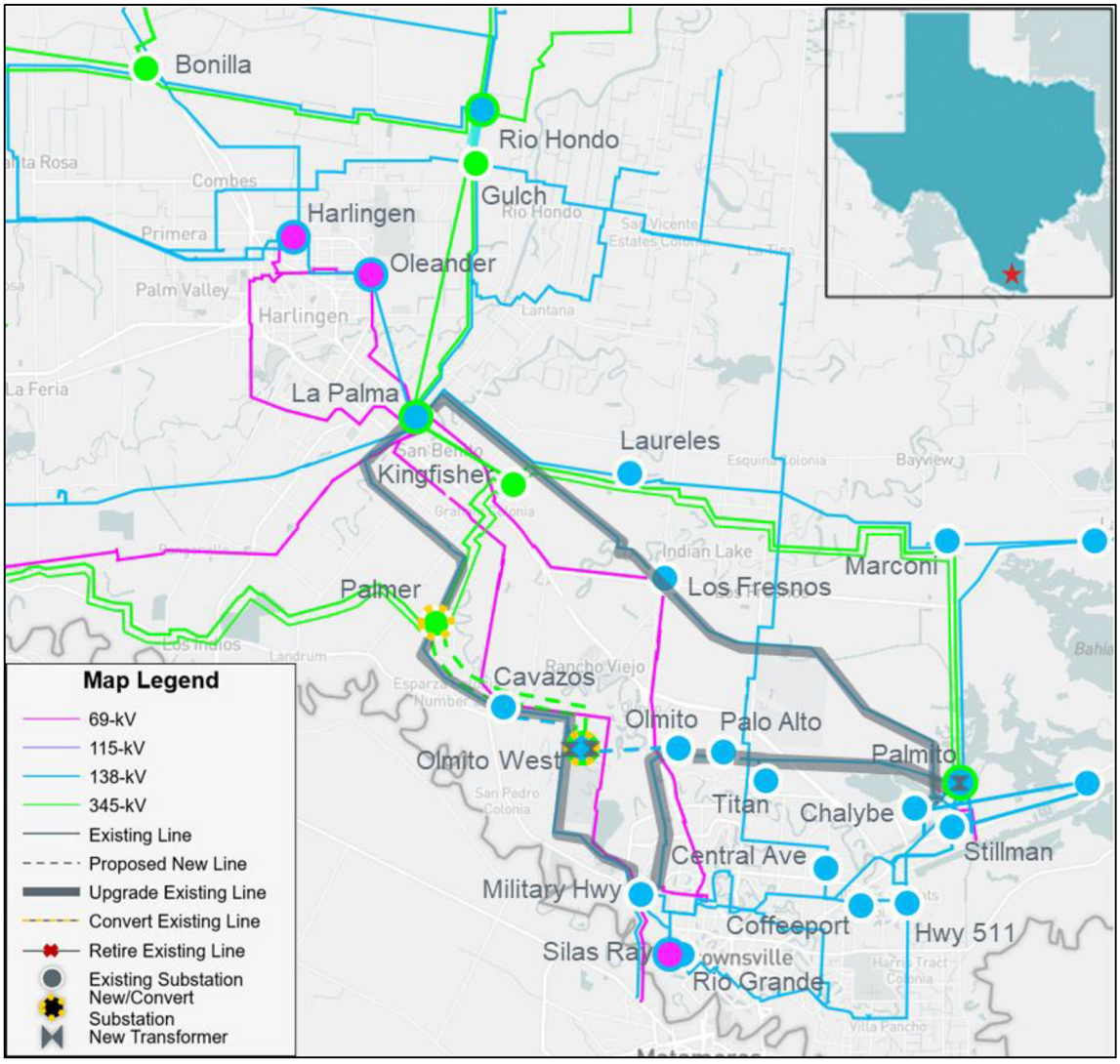


Figure B.8: Map of Option 8

C: Attachments

Table C.1: Project Related Document

No	Document Name	Attachment
1	Brownsville Area Improvements Project	AEPSC Brownsville Area Improvements

ercot
Your Power. Our Promise.

Taylor
2705 West Lake Drive
Taylor, TX 76574
T 512.248.3000
F 512.225.7079

Austin
8000 Metropolis Drive (Building I), Suite 100
Austin, TX 78744
T 512.225.7000
F 512.225.7079

ercot.com

December 5, 2024

Mr. Eithar Nashawati
Senior Director, Asset Planning
Oncor Electric Delivery (Oncor)
2233-B Mountain Creek PKWY
Dallas, TX 75211-6716

RE: Oncor Delaware Basin Stages 3 and 4 Project

Dear Mr. Nashawati:

On December 3, 2024, the Electric Reliability Council of Texas (ERCOT) Board of Directors endorsed the following Tier 1 transmission project in accordance with ERCOT Protocol Section 3.11.4:

Oncor Delaware Basin Stages 3 and 4 Project:

- Expand the existing Drill Hole Capacitor station to include a 345/138-kV Switch, including two 600 MVA autotransformers. The Drill Hole 345/138-kV Switch will initially be constructed with an 8-breaker, 345-kV breaker-and-a-half bus arrangement, and a 10-breaker, 138-kV breaker-and-a-half bus arrangement. All terminal and associated equipment will meet or exceed 5000 A for 345-kV and 3200 A for 138-kV. The existing Drill Hole Capacitor station is currently owned by Oncor;
- Construct a loop of the existing Riverton – Owl Hills – Horseshoe Springs 138-kV Double-Circuit Line into the new Drill Hole 138-kV Switch using a conductor rated 2569 A or greater (normal and emergency rating of 614 MVA), approximately 0.1-mile. The existing Riverton, Owl Hills, and Horseshoe Springs substations are currently owned by Oncor;
- Connect the existing Drill Hole 138-kV Capacitors to the expanded Drill Hole 138-kV Switch;
- Construct a new Drill Hole – Riverton 345-kV Line on double-circuit structures, with both circuits in place, operated at 345-kV using a conductor rated 5000 A or greater (normal and emergency rating of 2988 MVA), approximately 18.0-mile;
- Install five 5000 A, 345-kV circuit breakers at the existing Riverton Switch. The existing Riverton Switch is currently owned by Oncor;
- Install one 5000 A, 345-kV circuit breaker at the existing Sand Lake Switch. The existing Sand Lake Switch is currently owned by Oncor;
- Convert the existing Riverton – Sand Lake 138-kV Line to 345-kV operation (normal and emergency rating of 2988 MVA) by terminating both endpoints into the existing 345-kV stations at Riverton and Sand Lake, 40.8-mile;

- Construct the new Riverton – Sand Lake 138-kV Line on 138-kV double-circuit structures, with one circuit in place operated at 138-kV, using a conductor rated 2569 A or greater (normal and emergency rating of 614 MVA), approximately 40.8-mile; and
- Construct a loop of the new Riverton – Sand Lake 138-kV Line into the existing Horsehead Draw 138-kV substation using a conductor rated 2569 A or greater (normal and emergency rating of 614 MVA), approximately 0.1-mile. The existing Horsehead Draw substation is currently owned by Oncor.

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

Sincerely,

Kristi Hobbs
Vice President, System Planning and Weatherization
Electric Reliability Council of Texas

cc:

Pablo Vegas, ERCOT
Woody Rickerson, ERCOT
Prabhu Gnanam, ERCOT
Robert Golen, ERCOT
Brandon Gleason, ERCOT

ERCOT Independent Review of the Delaware Basin Stages 3 and 4 Project

Document Revisions

Date	Version	Description	Author(s)
11/14/2024	1.0	Final Draft	Tanzila Ahmed
		Reviewed by	Robert Golen, Prabhu Gnanam

Executive Summary

Oncor Electric Delivery Company LLC (Oncor) submitted the Delaware Basin Stages 3 and 4 Project to the Regional Planning Group (RPG) in March 2024. Oncor proposed this project to address NERC TPL-001-5.1, ERCOT Planning and Oncor reliability criteria voltage violations in the Delaware Basin area in the Culberson, Loving, Reeves, and Ward Counties in the Far West (FW) Weather Zone.

ERCOT completed the Delaware Basin Load Integration Study[1] in December 2019, following review and input by the affected Transmission Service Providers (TSPs). This study, which identified the reliability needs of the region, provides a long lead time transmission improvement roadmap for the continued oil and gas load growth in the Delaware Basin area. This RPG project, as submitted by Oncor, aligns with the Stage 3 and Stage 4 upgrades identified in the Delaware Basin Load Integration Study. The study found that the addition of a new Riverton – Owl Hills 345-kV double-circuit line (Stage 3 upgrade) as well as the conversion of the existing Riverton – Sand Lake 138-kV Line to 345-kV operation and addition of a new Riverton – Sand Lake 138-kV line (Stage 4 upgrade) are the recommended options to reliably serve load once the peak demand level of the Delaware Basin area exceeds 4,582 MW and 5,032 MW, respectively. However, due to physical limitations of the Owl Hills substation, Oncor is recommending a slight modification to the original Stage 3 upgrade by locating the new 345-kV substation at Drill Hole instead, approximately one-quarter of a mile further from Riverton than the Owl Hills station.

In the 2024 ERCOT Permian Basin Reliability Plan Study[2], ERCOT identified the reliability needs in the Permian Basin region. In addition to import paths, local transmission upgrades were also identified to serve the Permian Basin region loads. The updated Stage 3 and Stage 5 upgrades as well as the original Stage 4 upgrade from 2019 Delaware Basin Load Integration Study were included in the base case of this study.

Additionally, ERCOT completed an updated study which confirmed the need for this project and that the Delaware Basin Stages 3 and 4 Project addresses the need.

Accordingly, based on ERCOT Independent Review (EIR), ERCOT recommends the following project as submitted by Oncor:

- Expand the existing Drill Hole Capacitor station to include a 345/138-kV Switch, including two 600 MVA autotransformers. The Drill Hole 345/138-kV Switch will initially be constructed with an 8-breaker, 345-kV breaker-and-a-half bus arrangement, and a 10-breaker, 138-kV breaker-and-a-half bus arrangement. All terminal and associated equipment will meet or exceed 5000 A for 345-kV and 3200 A for 138-kV;

[1] ERCOT Delaware Basin Load Integration Study Report: https://www.ercot.com/gridinfo/planning
[2] ERCOT Permian Basin Reliability Plan Study Report: https://www.ercot.com/gridinfo/planning

- Construct a loop of the existing Riverton – Owl Hills – Horseshoe Springs 138-kV double-circuit transmission line into the new Drill Hole 138-kV Switch, with normal and emergency rating of at least 614 MVA, approximately 0.1-mile;
- Connect the existing Drill Hole 138-kV capacitors to the expanded Drill Hole 138-kV Switch;
- Construct a new Drill Hole – Riverton 345-kV transmission line on double-circuit structures, with both circuits in place, operated at 345-kV with a normal and emergency rating of at least 2988 MVA, which will require new right of way (ROW), approximately 22.0-mile;
- Install five 5000 A, 345-kV circuit breakers at the existing Riverton 345-kV Switch;
- Install one 5000 A, 345-kV circuit breaker at the existing Sand Lake 345-kV Switch;
- Convert the existing Riverton – Sand Lake 138-kV transmission line to 345-kV operation with normal and emergency rating of at least 2988 MVA, by terminating both endpoints into the existing 345-kV stations at Riverton and Sand Lake, 40.8-mile;
- Construct a new Riverton – Sand Lake 138-kV transmission line on 138-kV double-circuit structures, with one circuit in place operated at 138-kV with normal and emergency rating of at least 614 MVA, on existing ROW, approximately 40.8-mile; and
- Construct a loop of the new Riverton – Sand Lake 138-kV line with normal and emergency rating of at least 614 MVA, into the existing Horsehead Draw 138-kV substation, approximately 0.1-mile.

The Oncor proposed project is estimated to cost approximately $202.2 million and is classified as a Tier 1 project per ERCOT Protocol Section 3.11.4.3(a). The cost estimate accounts for the expectation that construction activities may occur using energized (hot) work process.

The expected In-Service Date (ISD) of the project is June 1, 2027. However, Oncor has advised that the projected ISD may change based on requirements for various approvals, ROW acquisition and construction progress.

Certificate of Convenience and Necessity (CCN) filings will be required for the new Drill Hole – Riverton 345-kV transmission line and the new Riverton – Sand Lake 138-kV transmission line. If necessary, Oncor will work with ERCOT as early as practical to develop outage plans needed for construction and implement Constraint Management Plans (CMP) such as line sectionalizing or mobile equipment/capacitor installation based on summer 2025 and 2026 operational conditions.

Table of Contents

1 Introduction

Over the past ten years, the Far West Weather Zone, which includes significant portion of the Permian Basin, has experienced an average annual peak demand growth rate of approximately 11% driven by the significant growth in oil and natural gas industry demand. Due to the short-term planning horizons of the oil and gas industry resulting in lack of long-term load commitments, ensuring that necessary transmission improvements are in place in time to accommodate the rapid oil and gas development continues to be a challenge. Figure 1.1 shows the primary oil basin resources in the Permian area. As part of the efforts to address this challenge, significant amounts of transmission upgrades have been approved and completed in the Permian Basin region in recent years.

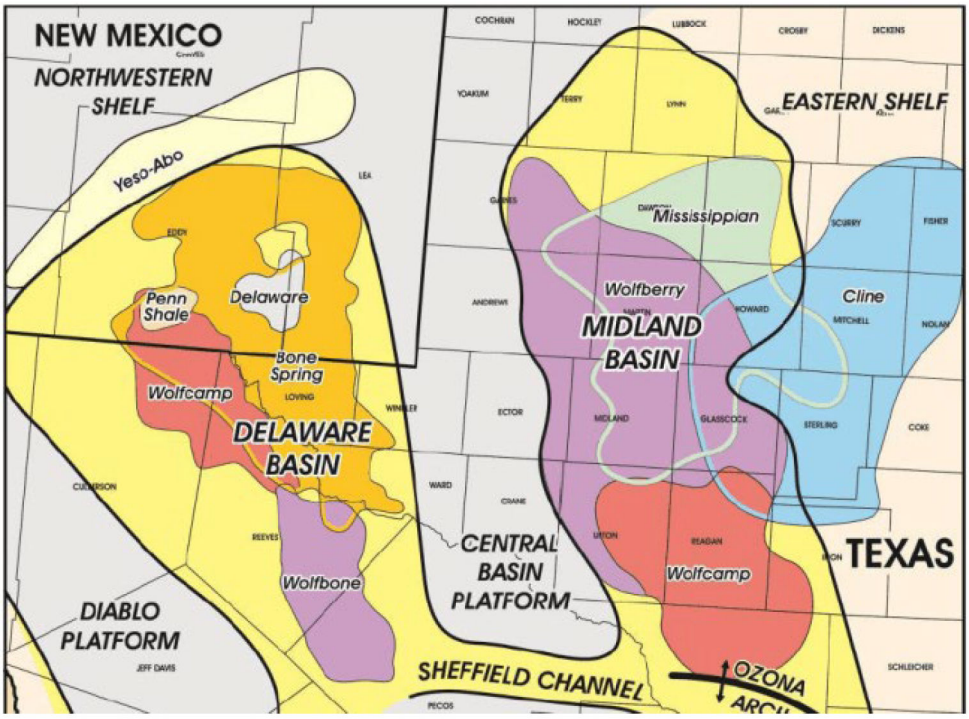


Figure 1.1: Map of Tectonic Subdivision of the Delaware Basin[3]

In addition, ERCOT performed two special studies, the Delaware Basin Load Integration Study in 2019 and the Permian Basin Load Interconnection Study in 2021, with significant support from the relevant TDSPs in order to accommodate the significant and rapid load growth and to address the transmission needs in the Permian Basin region. ERCOT completed the Delaware Basin Load Integration Study in December 2019 and developed a roadmap involving new 345-kV transmission lines to improve load serving capability to import power into the Delaware Basin area. Table 1.1 and Figure 1.2 show the roadmap of the five stages of transmission upgrades identified from the study. Among the upgrades in the roadmap, the Stage 1 upgrade was endorsed in June 2021 and has been constructed; the Stage 2 upgrade was endorsed by the ERCOT Board of Directors in August 2022 and is expected to be

[3] https://www.oilandgas360.com/ngl-energy-partners-adds-water-sources-for-oil-gas-operators-in-the-permian/

complete in 2026; and the Stage 5 upgrade with an expected in-service date (ISD) of December 2029 is currently under RPG evaluation.

Table 1.1: Delaware Basin Transmission Upgrade Roadmap

Stage	Estimated Delaware Basin Load Level (MW)	Upgrade Element	Trigger
1	3,052	Add a second circuit on the existing Big Hill – Bakersfield 345-kV line	Import Needs
2	4,022	A new Bearkat – North McCamey – Sand Lake double-circuit 345-kV line	Import Needs
3	4,582	A new Riverton – Owl Hills single-circuit 345-kV line	Culberson Loop Needs
4	5,032	Riverton – Sand Lake 138-kV to 345-kV conversion and a new Riverton – Sand Lake 138-kV line	Culberson Loop Needs
5	5,422	A new Faraday – Lamesa – Clearfork – Riverton double-circuit 345-kV line	Import Needs

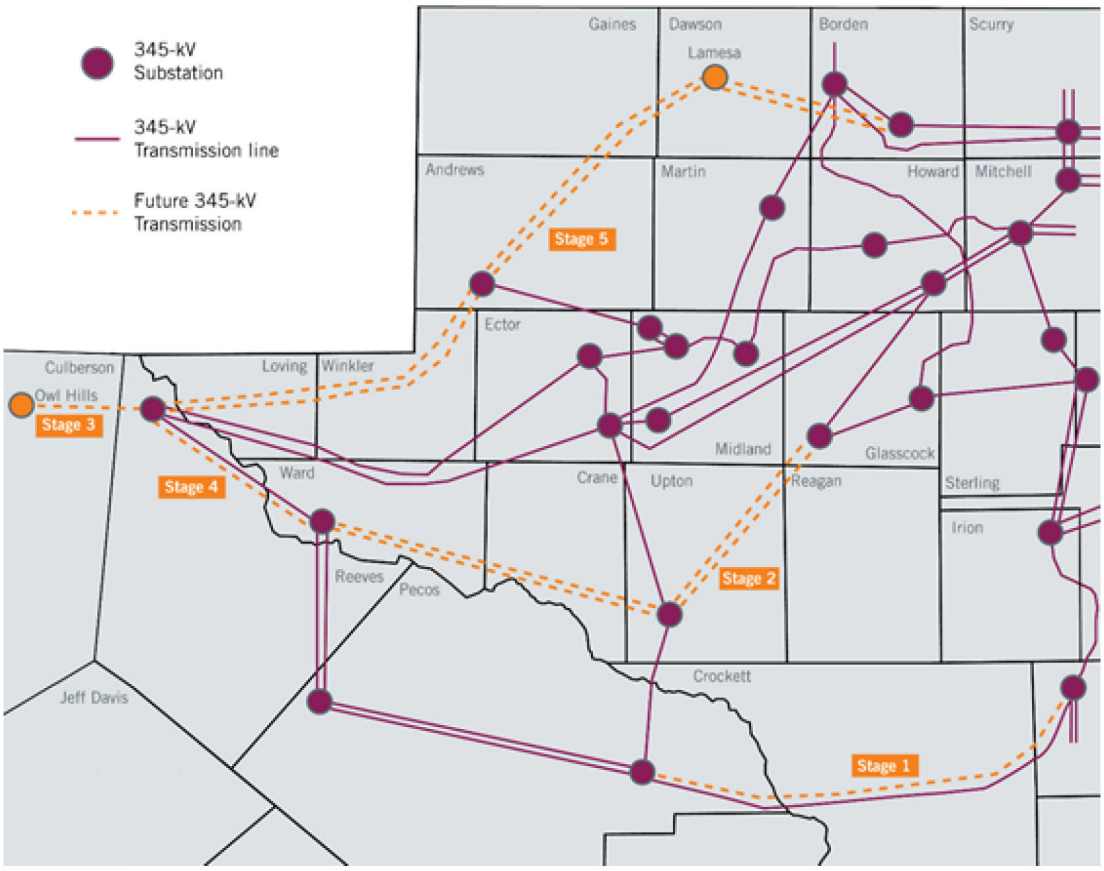


Figure 1.2: 345-kV Transmission System Map of Study Area with Stage 1 – Stage 5 Upgrades

ERCOT also completed the Permian Basin Load Interconnection Study[4] in December 2021 and proposed a set of preferred transmission upgrades to connect and reliably serve forecasted load in Permian Basin region, total approximately $1.5 billion.

[4] ERCOT Permian Basin Load Interconnection Study Report: https://www.ercot.com/gridinfo/planning

The TDSPs serving the load in the Permian Basin region have also made significant efforts to better understand the underlying dynamics of oil and gas development throughout the region. This effort led to the completion of two customer demand studies by IHS Markit in 2020[5] and S&P Global in 2022[6], which provided an in-depth analysis of the oil and gas industry and provided more granular and detailed electricity demand forecast in the Permian Basin region through 2040. The S&P Global Permian Basin load forecast is 11,964 MW in 2030 and 14,705 MW in 2038.

In addition to the rapid growth in oil and gas demand in the Permian Basin region, significant amounts of large loads are seeking interconnection in the area as well. The additional non-oil and gas load in the Permian Basin region included in this study is 11,695 MW for both 2030 and 2038. The total amount of additional non-oil and gas load is almost the same as the oil and gas load.

ERCOT with significant support from the relevant TDSPs completed this Permian Basin Reliability Plan Study in June 2024 utilizing the demand forecast from the S&P Global study as well as additional non-oil and gas load in the Permian Basin region to identify the reliability needs and developed a set of transmission upgrades to connect and reliably serve the forecasted loads in the Permian Basin region. Updated Stage 3 and Stage 5 upgrades as well as the original Stage 4 upgrade from 2019 Delaware Basin Load Integration Study were included in the base case for this study.

The Delaware Basin Load Integration Study identified the preferred transmission upgrades. Among the preferred transmission upgrades, the Stage 3 and Stage 4 upgrades were identified to maintain grid reliability under multiple P7 contingencies (i.e., N-1 conditions) in the 2030 study case. More details of the need for the Stage 3 and Stage 4 upgrades are described in Section 4 of this document.

In March 2024, Oncor submitted the Delaware Basin Stages 3 and 4 Project to the Regional Planning Group (RPG) to address thermal and voltage violations under the NERC TPL-001-5.1 reliability criteria due to rapid load growth. With the demand in the Delaware Basin area forecasted to exceed the Stage 3 and Stage 4 trigger points (4,582 MW and 5,032 MW, respectively) in both the 2023 RTP (year 2028) and June 2024 SSWG cases (year 2024), Oncor propose to implement the Stage 3 and Stage 4 upgrades. This proposed project is located in the Delaware Basin area in the Culberson, Loving, Reeves, and Ward Counties in the Far West (FW) Weather Zone.

This Oncor proposed project is classified as Tier 1 project pursuant to ERCOT Protocol Section 3.11.4.3, with an estimated cost of approximately $202.2 million. The expected In-Service Date (ISD) of the proposed project is Summer 2027.

Since the Stage 3 and Stage 4 upgrades have already been evaluated and proposed as part of the 2019 Delaware Basin Load Integration Study, and updated Stage 3 and Stage 5 upgrades along with original Stage 4 upgrade were included in the 2024 Permian Basin Reliability Plan Study, ERCOT conducted the independent review of this RPG project by reviewing these study results and assumptions to check if any recent system changes would potentially alter or modify the projects

[5] https://www.ercot.com/files/docs/2020/11/27/27706_ERCOT_Letter_to_Commissioners_-_Follow-up_Status_Update_on_Permian....pdf
[6] https://www.ercot.com/files/docs/2023/03/17/Presentation%20to%20ERCOT%20planning.pdf

recommended in these studies. In addition, ERCOT reviewed and compared the recent trends of demand growth in the Delaware Basin area. The subsequent sections describe the details of the study assumptions, methodology, and the results of the ERCOT Independent Review (EIR).

2 Study Assumptions and Methodology

ERCOT reviewed the RPG project submitted by Oncor and confirmed the submitted project aligns with the 2019 ERCOT Delaware Basin Load Integration Study 'Preferred' Projects IDs Stage 3 and Stage 4 upgrades. As such, for this independent review, ERCOT utilized the study results from the 2019 Delaware Basin Load Integration Study. Furthermore, ERCOT reviewed the 2023 RTP final reliability case to confirm the project need.

The following sections describe the study assumptions and methodology used for the review of the 2023 RTP final case.

2.1 Study Assumptions for Reliability Analysis

The Permian Basin region, including the Delaware Basin, Midland Basin, and Central Basin Platforms, spans most of the counties in the Far West Weather Zone plus ten adjacent counties in the West Weather Zone and two counties in the North Weather Zone. Figure 2.1 shows the counties in the Delaware Basin region. This study will be focusing on the Culberson, Loving, Reeves, and Ward Counties in the Delaware Basin region.

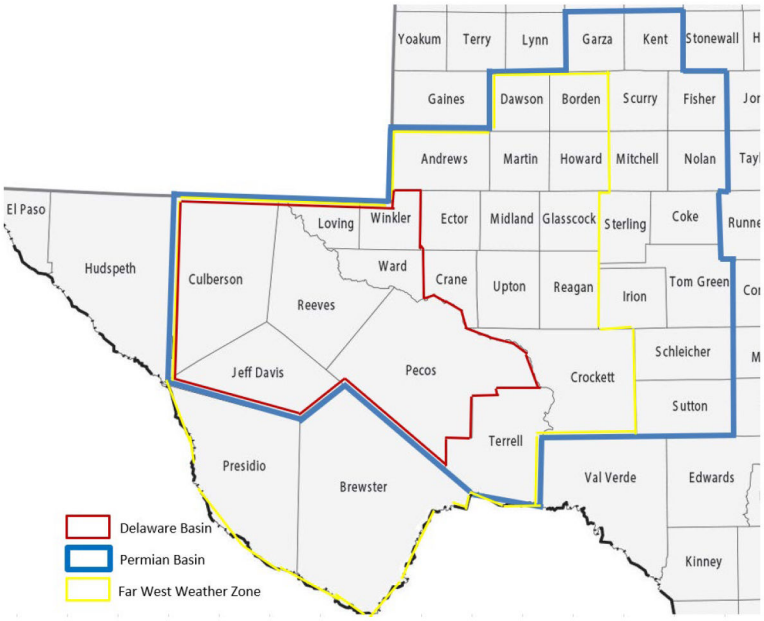


Figure 2.1: Counties in the Delaware Basin Region

2.1.1 Steady-State Study Base Case

The Final 2023 Regional Transmission Plan (RTP) cases, published on the Market Information System (MIS) on December 23, 2023, were used as reference cases in this study. Based on the project ISD,

2028 Summer was selected for the long-term outlook. The steady-state study base case for the West and Far West Weather Zones was constructed by updating transmission, generation, and loads and using the following 2028 Summer peak load case as reference:

- Case: 2023RTP_2028_SUM_WFW_12232023[7].

2.1.2 Transmission Topology

Transmission projects within the study area with ISDs by June 2027 were added to the study base case. The ERCOT Transmission Project Information and Tracking (TPIT)[8] report, posted on the ERCOT website on January 25, 2024, was used as reference. The added TPIT projects are listed in Table 2.1.

Table 2.1: List of Transmission Projects Added from the Study Base Case

TPIT	Project Name	Tier	Project ISD	County(s)
6719	Twelvemile Substation Addition	Tier 4	5/30/2025	Pecos
72863	Delaware River 138 kV Switch	Tier 4	5/15/2024	Culberson
72935	Saragosa: Install 2nd Bay	Tier 4	9/30/2024	Reeves
73381	TNMP_JACKRABBIT_CUTIN_AC_4-5-2023	Tier 4	8/2/2023	Pecos
73452	TNMP_WINK_FISHHOOK_RECONDUCTOR_AC_4-5-2023	Tier 4	1/31/2024	Pecos
73476	TNMP_KERMIT_RECONDUCTOR	Tier 4	12/31/2024	Pecos
76151	Gas Pad Tap: Replace CTVT	Tier 4	4/30/2024	Reeves
76174	Origin 138 kV Interconnection	Tier 4	6/30/2025	Reeves
76212	Model Coachwhip Sub	Tier 4	5/31/2024	Ward
76232	Reconductor Mivida-Coachwhip-Fishhook 2045 ACCC	Tier 4	5/31/2026	Ward
76291	Upgraded Cedarvale–BoneSpringsTap–Fishhook	Tier 4	5/31/2026	Ward
76293	Upgraded Cedvale-MiDiva138KV	Tier 4	5/31/2026	Ward
76348	Reconductor Foxtail-PIGCreek-1926ACSS-138KV	Tier 4	5/31/2026	Pecos
76696	Construct a new Border – Shifting Sands 138 kV Line	Tier 2	12/15/2026	Loving
76719	Establish Bull Moose 138 kV Switch	Tier 4	12/15/2024	Loving
77146	Reconducter WNK-AAT-MDT-FSH	Tier 4	1/31/2024	Winkler
77320	Add CapBANK in COYANOSA	Tier 4	6/1/2026	Ward
78044	ROCK DRAW 345 kV Switch	Tier 3	12/30/2026	Ward
78046	TOYAH CREEK 345 kV Switch	Tier 3	12/30/2026	Ward
22RPG045	Yucca to Moss 138 kV Line Project	Tier 4	5/1/2024	Ward
23RPG013	Silverleaf and Cowpen 345/138-kV Stations Project	Tier 1	5/31/2025	Ward, Reeves
23RPG023	Pecos County Transmission Improvement Project	Tier 1	6/1/2027	Pecos
23RPG027	Bakersfield Dynamic Reactive Substation Upgrade	Tier 1	8/31/2026	Pecos

[7] 2023 Regional Transmission Plan Postings: https://mis.ercot.com/secure/data-products/grid/regional-planning
[8] TPIT Report: https://www.ercot.com/gridinfo/planning

2.1.3 Generation

Based on the March 2024 Generator Interconnection Status (GIS)[9] report posted on the ERCOT website on April 1, 2024, generators in the study area that met Planning Guide Section 6.9(1) conditions with Commercial Operations Date (COD) prior to June 2027 were added to the study base case. These generation additions are listed in Table 2.2. All generation dispatches were consistent with the 2024 RTP methodology.

Table 2.2: List of Generation Added to the Study Base Case Based on the March 2024 GIS Report

GINR	Project Name	Fuel	Project COD	Capacity (~MW)	County(s)
19INR0203	Angelo Solar	SOL	8/1/2024	195.4	Tom Green
21INR0424	Tierra Bonita Solar	SOL	9/26/2024	306.9	Pecos
22INR0502	Shamrock Wind SLF	WIN	4/19/2024	223.9	Crockett
23INR0219	Dogfish BESS	OTH	4/16/2025	77.4	Pecos
23INR0387	Pioneer DJ Wind	WIN	9/15/2024	140.3	Midland
23INR0418	Angelo Storage	OTH	8/10/2024	103.0	Tom Green
23INR0470	BoCo BESS	OTH	7/17/2024	155.5	Borden
24INR0273	Al Pastor BESS	OTH	8/30/2024	103.1	Dawson

The status of each unit that was projected to be either indefinitely mothballed or retired at the time of the study were reviewed. The units listed in Table 2.3 were opened (turned off) in the study base case to reflect their mothballed/retired status.

Table 2.3: List of Generation Opened to Reflect Mothballed/Retired/Forced Outage Status

Bus No	Unit Name	Capacity (~MW)	Weather Zone
110941	SL_SL_G1	65.0	Coast
110942	SL_SL_G2	65.0	Coast
110943	SL_SL_G3	30.0	Coast
110944	SL_SL_G4	30.0	Coast
140042	WFCOGEN_UNIT4	17.0	North
130121	SGMTN_SIGNALM2	6.6	Far West
132931	TOSBATT_UNIT1	2.0	Far West
151361	CHISMGRD_BES1	101.7	North Central

Generation listed in Table 2.4 were closed (turned on) in the study base case to reflect the change in their Generation Resource as these resources are returning to year-round service.

Table 2.4: List of Generation Closed to Reflect Returning to Service Status

Bus No	Unit Name	Capacity (~MW)	Weather Zone
110020	WAP_GT2	71.0	Coast
150023	MCSES_UNIT8	568.0	North Central
110261	TGF_TGFGT_1	78.0	Coast

[9] GIS Report: https://www.ercot.com/misapp/GetReports.do?reportTypeId=15933

2.1.4 Loads

Oil and Gas loads in the FW Weather Zone will be updated based on the S&P Global Load Forecast. Large Loads with Singed Interconnection Agreement (IA) will also be added. Table 2.5 is showing the loads in various categories.

Table 2.5: Delaware Basin Area Load Counts

Load Type	Capacity (~MW)
Total S&P Global Forecasted Loads	5,312
Total Newly Added Large Loads	3,361
Total Delaware Basin Loads	8,587

Loads outside the study Weather Zones were adjusted to maintain the minimum reserve requirements to be consistent with the 2023 RTP.

2.2 Permian Basin Reliability Plan Study Consideration

ERCOT conducted the Permian Basin Reliability Plan Study in 2024. The existing and planned transmission system (which includes the updated Delaware Basin Stage 3 and Stage 5 upgrades, along with original Stage 4 upgrades) was not sufficient to serve the projected loads of 23,659 MW and 26,400 MW in 2030 and 2038, respectively, in the Permian Basin region. The voltage instability issue was identified in both 2030 and 2038 study base cases under system intact (i.e., N-0) condition. As such, the reliability need analysis and project evaluation were performed step by step by adding loads in areas gradually. The study added loads in each area incrementally and identified the transmission upgrades to resolve the local reliability violations, and repeated the process in other areas and identified the transmission upgrades. After all the loads were included in the study cases, the identified transmission upgrades were re-evaluated to ensure the proposed transmission upgrades are optimal.

Due to the high load level, significant amounts of local transmission upgrades, especially in the Delaware Basin area, are needed to serve the load. Two steps were taken to address the reliability need in this study. First, identify and evaluate the local transmission upgrades to serve the load with placeholder import paths included. Second, evaluate the import paths into the Permian Basin region and re-evaluate the need for local transmission upgrades.

Two study cases, 2030 and 2038, were evaluated in this study. The existing and planned generation and transmission are the same for both cases. ERCOT started with the 2038 case to identify the reliability needs and evaluate the transmission upgrades. The transmission upgrades for 2030 are a subset of the transmission upgrades for 2038.

Among the local transmission upgrades in the Permian Basin Reliability Plan Study for the Delaware Basin region, upgrades ID L1, L3, and L5 were added as part of the study base case for the Delaware Basin Stages 3 and 4 Project. The components for these local upgrades are listed in the Table 2.6.

Table 2.6: Delaware Basin Area Load Counts

Project ID	Upgrade Element
L1	Add Quarry Field – Border 138-kV second circuit
L1	Add Wink – Shifting Sands 138-kV second circuit
L1	Connect new load bus 900004 to Border and new load bus 900066 to Shifting Sands to form a 138-kV double-circuit loop
L1	Add Riverton – Border 138-kV second circuit
L3	Connect new load buses to 11610 and Faulkner and form a 138-kV double-circuit loop: 11610 – 900005 – 900111 – 900023 – 900012 – 900021 – 900038 – 38124
L5	Establish a new Culberson 345/138-kV substation at the existing Culberson Switch and install two new 345/138-kV transformers
L5	Establish a new ONC900005_TAP 345/138-kV substation and install two new 345/138-kV transformers
L5	Establish a new Faulkner 345/138-kV substation at Faulkner station and install two new 345/138-kV transformers
L5	Add a new Drill Hole – Culberson 345-kV double-circuit line
L5	Add a new Culberson – 900005Tap 345-kV double-circuit line
L5	Add a new 900005Tap – Faulkner 345-kV double-circuit line
L5	Add a new Solstice – Faulkner 345-kV double-circuit line

2.3 Maintenance Outage Scenario

ERCOT developed an off-peak maintenance season scenario to further evaluate the study options.

The load level in the FW Weather Zone was reduced to 96% of its summer peak load level in the study base case to perform the maintenance outage evaluation. This scaling is meant to reflect assumed off-peak season loads based on ERCOT load forecast for future years as well as historical load in the FW Weather Zone.

2.4 Study Assumptions for Congestion Analysis

Congestion analysis was conducted to identify any new congestion in the study area with the addition of the preferred transmission upgrade option.

The final 2023 RTP 2028 economic case was updated based on the March 2024 GIS[10] report for generation updates and the February 2024 TPIT[11] report for transmission updates to conduct congestion analysis. The 2028 study year was selected based on the proposed ISD of the project.

New transmission projects additions are listed in Table A.1 in Appendix A. New generation additions listed in Table B.1 in Appendix B were added to the economic base case and all generation listed in Table 2.3 were opened in the study base case to reflect their mothballed/retired status. Furthermore, generation listed in Table 2.4 were removed from seasonal settings in the study base case as these resources are returned to year-round service.

[10] GIS Report: https://www.ercot.com/mp/data-products/data-product-details?id=PG7-200-ER
[11] TPIT Report: https://www.ercot.com/gridinfo/planning

2.5 Methodology

This section lists the Contingencies and Criteria used for project review along with tool used to perform the various analyses.

2.5.1 Contingencies and Criteria

The reliability assessments were performed based on NERC Reliability Standard TPL-001-5.1, ERCOT Protocols, and ERCOT Planning Criteria.[12]

Contingencies[13] were updated based on the changes made to the topology as described in Section 2 of this document. The following steady-state contingencies were simulated for the study region:

- P0 (System Intact)
- P1, P2-1, P7 (N-1 conditions);
- P2-2, P2-3, P4, and P5 (345-kV only);
- P3: G-1 + N-1 (G-1: generation outages) {Permian Basin all five units, and Odessa Combined Cycle (CC) train}; and
- P6-2: X-1 + N-1 (X-1: 345/138-kV transformers only) {Riverton, Sand Lake, and Quarry Field}.

All 69-kV and above buses, transmission lines, and transformers in the study region were monitored (excluding generator step-up transformers) and the following thermal and voltage limits were enforced:

- Thermal
  - Rate A (normal rating) for pre-contingency conditions; and
  - Rate B (emergency rating) for post-contingency conditions.
- Voltages
  - Voltages exceeding pre-contingency and post-contingency limits; and
  - Voltage deviations exceeding 8% on non-radial load buses.

2.5.2 Study Tool

ERCOT utilized the following software tools to perform this independent study:

- PowerWorld Simulator version 23 for Security Constrained Optimal Power Flow (SCOPF) and steady-state contingency analysis; and
- UPLAN version 12.3.0.29978 to perform congestion analysis.

3 Project Need

ERCOT conducted the review of the Delaware Basin Load Integration Study, and the 2023 RTP summer peak final reliability case based on the study assumptions and methodologies described in the Section 2 of this document.

[12] ERCOT Planning Criteria: http://www.ercot.com/mktrules/guides/planning/current
[13] Details of each event and contingency category is defined in the NERC reliability standard TPL-001-5.1

3.1 Review of the 2023 Regional Transmission Plan (RTP) Case

ERCOT evaluated the 2023 RTP 2028 case based on the study assumptions and methodologies described in the Section 2 of this document.

The trigger points of the Stage 3 and Stage 4 upgrades in the Delaware Basin Load Integration Study were 4,582 MW and 5,032 MW of loads respectively. The Delaware Basin area load in the 2023 RTP 2025 case exceeds the trigger point of the Stage 3 and Stage 4 upgrades, as shown in the Table 3.1.

Table 3.1: Delaware Basin Area Load Forecast Comparison

Year	2019 Delaware Basin Load Integration Study (MW)	2023 RTP WFW Final Case (MW)
2024	5372.59	N/A
2025	N/A	5473.92
2026	N/A	7731.28
2028	N/A	7716.37
2029	N/A	7868.85

The study results show potential voltage instability under certain NERC Category P1, P3, and P6-2 contingencies (i.e., N-1, G-1+N-1, and X-1+N-1 conditions respectively), and confirmed the reliability need of Stage 3 and Stage 4 upgrade.

The results also confirmed that the Stage 3 and Stage 4 upgrades will address the potential voltage instability issues that may occur under certain NERC Category P1, P3, and P6-2 contingencies. Tables 3.2 summaries the total violations seen with and without the project and Figure 3.1 is showing the voltage violation in the map. Twenty low voltage violations were observed in the study base case and are listed in Table 3.3 and Table 3.4 respectively.

Table 3.2: Violations in the 2023 RTP Case with and without Project

NERC Contingency Category	Voltage Violations		Thermal Overloads		Unsolved Power Flow	
	Pre-Project	Post-Project	Pre-Project	Post-Project	Pre-Project	Post-Project
P0: N-0	None	None	None	None	None	None
P1, P2-1, P7: N-1	16	None	None	None	3	None
P3: G-1+N-1	2	None	None	None	1	None
P6-2: X-1+N-1	2	None	None	None	None	None
Total	**20**	**None**	**None**	**None**	**4**	**None**

Table 3.3: Thermal Violation Observed in the Study Area

NERC Contingency Category	Overloaded Element	Voltage Level (kV)	Voltage (pu)
P1: N-1	RDRUNNER_T8 (11199)	138	0.73
P1: N-1	TUNSTLL_8 (11183)	138	0.73
P1: N-1	BRECK_8 (11141)	138	0.74
P1: N-1	OWLHILLS2_8 (11267)	138	0.80
P1: N-1	OWLHILLS2_T8 (11269)	138	0.80
P1: N-1	DRLHOLES_8 (11272)	138	0.82

NERC Contingency Category	Overloaded Element	Voltage Level (kV)	Voltage (pu)
P7: N-1	CHIMWELL_8 (11112)	138	0.88
P7: N-1	DRLHOLEN_8 (11271)	138	0.89
P7: N-1	OWLHILLS_8 (11090)	138	0.89
P7: N-1	OWLHILLS1_T8 (11268)	138	0.89
P1: N1	LOVING_8 (1092)	138	0.89
P3: G-1+N-1, P6-2: X-1+N-2	ONC900002_TAP (1299)	138	0.89
P3: G-1+N-1	BLKPEARL_P8 (900125)	138	0.89
P1: N1	ANDRANCHT_8 (1081)	138	0.90
P7: N-1	CHERRYCR4A (60206)	138	0.91
P7: N-1	VERH4A (60207)	138	0.91
P7: N-1	SGSA4A (60716)	138	0.91
P7: N-1	CRYO4A (60721)	138	0.91
P3: G-1+N-1, P6-2: X-1+N-1	HOEFSROA4A (60808)	138	0.92
P3: G-1+N-2	COXDRAW4A (60209)	138	0.92

The four-voltage instability were observed under certain NERC Category P1 and P3 contingency:

- REDACTED
- REDACTED
- REDACTED
- REDACTED

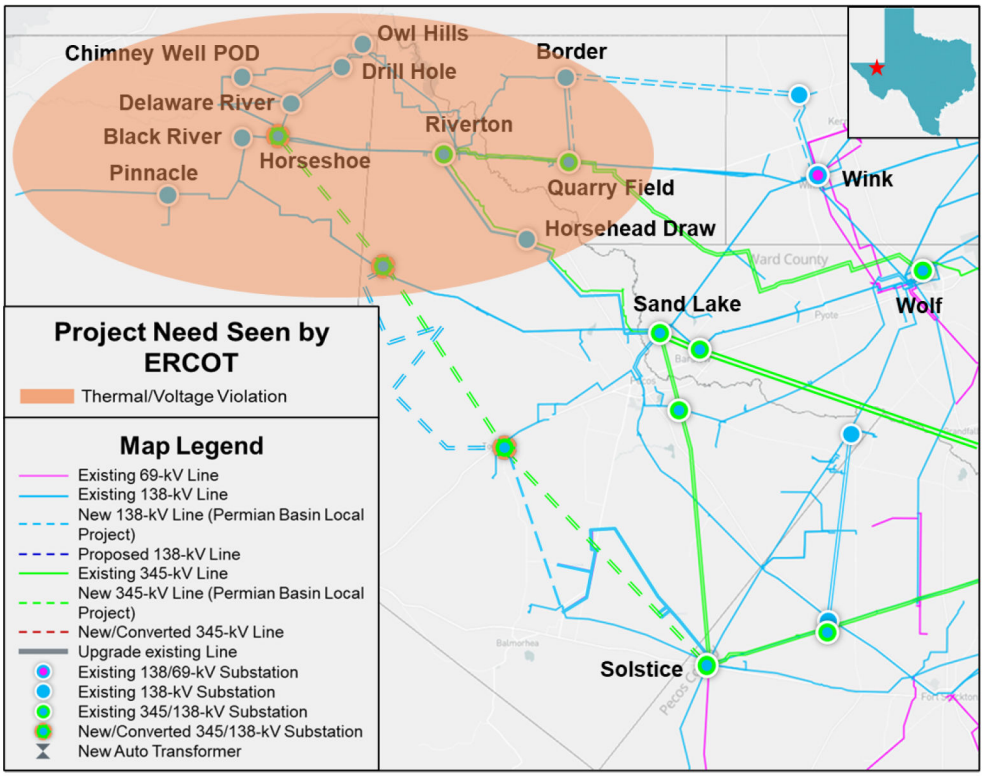


Figure 3.1: Study Area Map Showing Project Need Seen by ERCOT without the Project

The Stage 3 and Stage 4 upgrades will address the potential voltage instability issue that may occur under N-1, G-1+N-1, and X-1+N-1 conditions of certain NERC Category P1, P7, P3 and P6-2 contingency respectively.

3.2 Planned Maintenance Outage Evaluation

Based on a review of the system topology of the area, ERCOT conducted an N-2 contingency analysis for Stage 3 and Stage 4 upgrades to represent system element outage(s) under planned maintenance condition (N-1-1) in the area. Then, each N-2 violation was run as an N-1-1 contingency scenario, with system adjustments between the contingencies. The transmission elements in the study area were monitored in the maintenance outage evaluation.

As shown in Table 3.4, the results of this maintenance assessment indicate no reliability issues in the study area.

Table 3.4: Results of Planned Maintenance Outage Evaluation

Option	Voltage Violations	Thermal Violations	Unsolved Power Flow
Base case	52	3	34
Project	None	None	None

3.3 Review of Delaware Basin Load Integration Study Results

ERCOT evaluated a number of options (as part of the Delaware Basin Study) to improve the capability to import power into the Delaware Basin area to resolve the identified reliability issues, including adding a second circuit on the existing Big Hill – Bakersfield 345-kV transmission line (Stage 1 upgrade), a new Bearkat – North McCamey – Sand Lake double-circuit 345-kV transmission line (Stage 2 upgrade), and a new Faraday – Lamesa – Clearfork – Riverton double-circuit 345-kV transmission line (Stage 5 upgrade).

ERCOT identified the addition of a new Riverton - Owl Hills 345-kV single circuit transmission line as Stage 3 upgrade to address local voltage collapse, under N-1 contingency condition, observed when the Delaware Basin load reached 4,582 MW. ERCOT observed a different local voltage collapse under N-1-1 contingency conditions when the Delaware Basin load reached 5,032 MW. Stage 4 upgrade, which includes the conversion of the Riverton - Sand Lake 138-kV transmission line to 345-kV transmission line and the addition of a new Riverton – Sand 138-kV transmission line to address the additional violations observed and to serve the local load.

The results of the Delaware Basin Load Interconnection Study reconfirmed the need for the Delaware Basin Stages 3 & 4 Project to maintain grid reliability under N-1, G-1+N-1, X-1+N-1, and N-1-1 contingency conditions that match those identified by the ERCOT independent review referenced in Section 3.1 and Section 3.2 of this report as well as those identified in the Oncor submittal.

More details of the Delaware Basin Load Integration Study can be found in Appendix C.3 while the Oncor submittal can be found in Appendix C.1.

4 Recommended Project

Based on this independent review and the Delaware Basin Load Integration Study, ERCOT recommends the following project (Stage 3 and Stage 4 upgrades):

- Expand the existing Drill Hole Capacitor station to include a 345/138-kV Switch, including two 600 MVA autotransformers. The Drill Hole 345/138-kV Switch will initially be constructed with an 8-breaker, 345-kV breaker-and-a-half bus arrangement, and a 10-breaker, 138-kV breaker-and-a-half bus arrangement. All terminal and associated equipment will meet or exceed 5000 A for 345-kV and 3200 A for 138-kV;
- Construct a loop of the existing Riverton – Owl Hills – Horseshoe Springs 138-kV double-circuit transmission line into the new Drill Hole 138-kV Switch, with normal and emergency rating of at least 614 MVA, approximately 0.1-mile;
- Connect the existing Drill Hole 138-kV capacitors to the expanded Drill Hole 138-kV Switch;
- Construct a new Drill Hole – Riverton 345-kV transmission line on double-circuit structures, with both circuits in place, operated at 345-kV with a normal and emergency rating of at least 2988 MVA, which will require new ROW, approximately 22.0-mile;
- Install five 5000 A, 345-kV circuit breakers at the existing Riverton 345-kV Switch;
- Install one 5000 A, 345-kV circuit breaker at the existing Sand Lake 345-kV Switch;
- Convert the existing Riverton – Sand Lake 138-kV transmission line to 345-kV operation with normal and emergency rating of at least 2988 MVA, by terminating both endpoints into the existing 345-kV stations at Riverton and Sand Lake, 40.8-mile;
- Construct a new Riverton – Sand Lake 138-kV transmission line on 138-kV double-circuit structures, with one circuit in place operated at 138-kV with normal and emergency rating of at least 614 MVA, on existing ROW, approximately 40.8-mile; and
- Construct a loop of the new Riverton – Sand Lake 138-kV line with normal and emergency rating of at least 614 MVA, into the existing Horsehead Draw 138-kV substation, approximately 0.1-mile.

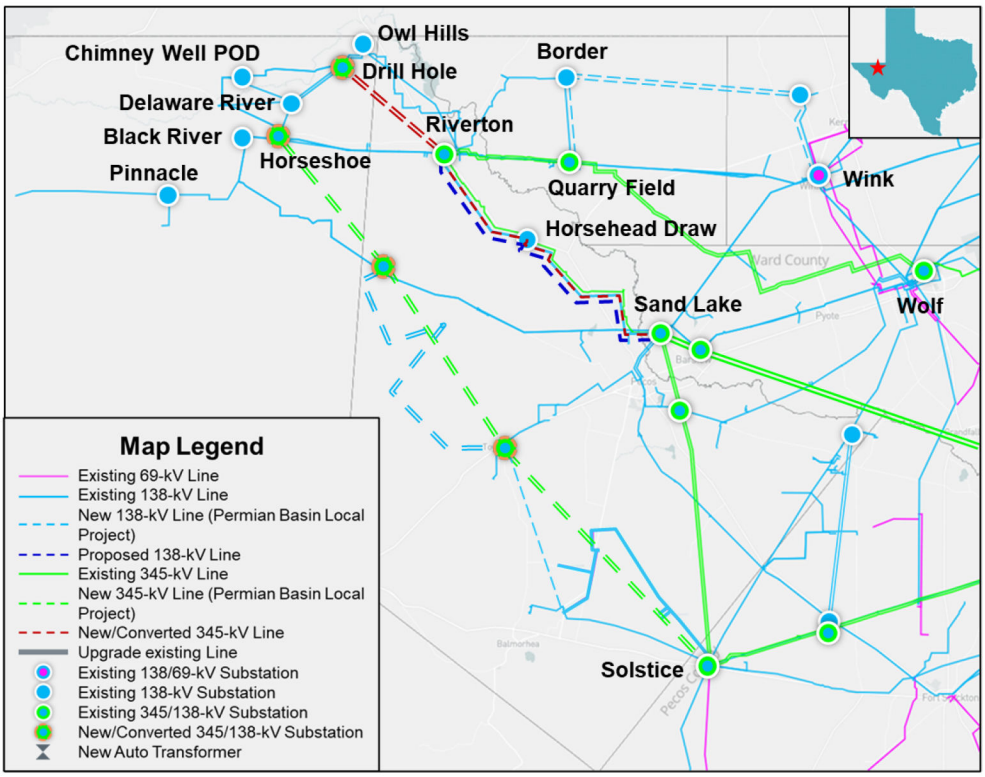


Figure 5.1: Map of Recommended Project

5 Additional Analyses and Assessment

The recommended project (approximately $202.2 million) is categorized as a Tier 1 project, pursuant to ERCOT Protocol 3.11.4.3(1)(a). As required by Planning Guide Section 3.1.3(4), ERCOT performed generation and load sensitivity studies to identify the preferred option performance, as required under Planning Guide Section 3.1.3(4). Additionally, a Sub-synchronous Resonance (SSR) Assessment was performed.

5.1 Generation Addition Sensitivity Analysis

ERCOT performed a generation addition sensitivity analysis based on Planning Guide Section 3.1.3(4)(a).

Based on a review of the August 2024 GIS[14] report, 27 units were found within the study area that could have an impact pocket which could have an impact on the identified reliability issues. These units, listed in the Table 5.1, were added to the preferred option case following 2024 RTP Methodology.

[14] GIS Report: https://www.ercot.com/mp/data-products/data-product-details?id=PG7-200-ER

Table 5.1: List of Units that Could Have Impact on the Identified Reliability Issues

GINR	Unit Name	Fuel Type	Project COD	Capacity (~MW)	County
16INR0104	Big Sampson Wind	WIN	10/4/2025	265.4	Crockett
18INR0073	Sweetwater 1 repower	WIN	9/30/2024	3.0	Nolan
20INR0242	Anson Solar Center, Phase II	SOL	12/1/2025	200.9	Jones
21INR0021	Green Holly Solar	SOL	5/30/2026	413.6	Dawson
21INR0022	Red Holly Solar	SOL	5/30/2026	260.0	Dawson
21INR0029	Green Holly Storage	OTH	5/30/2026	50.0	Dawson
21INR0031	Indigo Solar	SOL	8/17/2026	150.0	Fisher
21INR0033	Red Holly Storage	OTH	5/30/2026	50.0	Dawson
21INR0268	Greyhound Solar	SOL	3/31/2026	587.8	Ector
21INR0334	Nightfall Solar SLF	SOL	6/30/2026	181.2	Uvalde
22INR0274	Crowded Star Solar II	SOL	1/26/2026	190.2	Jones
22INR0457	Anson BAT	OTH	12/31/2025	156.9	Jones
23INR0086	Hanson Solar	SOL	4/17/2027	400.6	Coleman
23INR0287	Avila BESS	OTH	5/1/2025	164.3	Pecos
23INR0300	Greater Bryant G Solar	SOL	12/15/2025	17.7	Midland
23INR0340	Larkspur Energy Storage	OTH	5/5/2026	307.5	Upton
23INR0364	Tierra Seca BESS	OTH	10/01/2025	102.7	Val Verde
23INR0372	Cross Trails Storage	OTH	4/25/2025	58.3	Scurry
23INR0401	Headcamp BESS	OTH	6/16/2025	152.9	Pecos
23INR0501	Soda Lake BESS 1	OTH	6/17/2025	203.9	Crane
24INR0057	Hanson Storage	OTH	4/17/2027	101.4	Coleman
24INR0275	Picadillo BESS	OTH	7/6/2026	100.8	Martin
24INR0421	Swift Air Solar	SOL	3/31/2025	146.5	Ector
24INR0514	Rogers Draw BESS	OTH	5/10/2026	148.6	Gillespie
24INR0627	Champion Wind Repower	WIN	5/9/2025	0.3	Nolan
25INR0208	Iron Belt Energy Storage	OTH	7/31/2026	401.9	Borden
26INR0034	Bracero Pecan Storage	OTH	6/1/2026	232.0	Reeves

These future resources did not have a material impact on the need for the recommended project as no new thermal or voltage violations were identified.

5.2 Load Scaling Sensitivity Analysis

Planning Guide Section 3.1.3(4)(b) requires evaluation of the potential impact of load scaling on the criteria violations seen in this EIR. ERCOT concluded that the load scaling would not have a material impact on the project need because of the following reasons:

- The Delaware Basin area is remotely located at the western most part of the ERCOT system relying on three major 345-kV import paths (i.e., Odessa/Moss – Wolf – Riverton, Bakersfield – Solstice, and Bearkat – North McCamey – Sand Lake).

- Significant and rapid oil and gas load additions were observed and projected in the Delaware Basin area. The load scaling outside the Delaware Basin area is not expected to have a material impact on the need of the recommended project.

5.3 Sub-synchronous Resonance (SSR) Assessment

Pursuant to Nodal Protocol Section 3.22.1.3(2), ERCOT conducted a sub-synchronous-resonance (SSR) screening for the recommended project and found no adverse SSR impacts to the existing and planned generation resources in the study area.

5.4 Congestion Analysis

ERCOT conducted a congestion analysis to identify any potential impact on system congestion related to the addition of the recommended project using the 2023 RTP 2028 economic study case, using the study assumptions identified in Section 2.4 of this document.

The results of congestion analysis indicated no additional congestion in the study area due to the addition of the recommended project.

6 Conclusion

This report describes the ERCOT evaluation of the Delaware Basin Stages 3 and 4 Project submitted by Oncor. Based on the results of this independent review, ERCOT recommends this RPG project to address the reliability need to accommodate the significant and rapid load growth in the Delaware Basin area.

This project is estimated to cost approximately $202.2 million and consists of the following upgrades:

- Expand the existing Drill Hole Capacitor station to include a 345/138-kV Switch, including two 600 MVA autotransformers. The Drill Hole 345/138-kV Switch will initially be constructed with an 8-breaker, 345-kV breaker-and-a-half bus arrangement, and a 10-breaker, 138-kV breaker-and-a-half bus arrangement. All terminal and associated equipment will meet or exceed 5000 A for 345-kV and 3200 A for 138-kV;
- Construct a loop of the existing Riverton – Owl Hills – Horseshoe Springs 138-kV double-circuit transmission line into the new Drill Hole 138-kV Switch, with normal and emergency rating of at least 614 MVA, approximately 0.1-mile;
- Connect the existing Drill Hole 138-kV capacitors to the expanded Drill Hole 138-kV Switch;
- Construct a new Drill Hole – Riverton 345-kV transmission line on double-circuit structures, with both circuits in place, operated at 345-kV with a normal and emergency rating of at least 2988 MVA, which will require new ROW, approximately 22.0-mile;
- Install five 5000 A, 345-kV circuit breakers at the existing Riverton 345-kV Switch;
- Install one 5000 A, 345-kV circuit breaker at the existing Sand Lake 345-kV Switch;

- Convert the existing Riverton – Sand Lake 138-kV transmission line to 345-kV operation with normal and emergency rating of at least 2988 MVA, by terminating both endpoints into the existing 345-kV stations at Riverton and Sand Lake, 40.8-mile;
- Construct a new Riverton – Sand Lake 138-kV transmission line on 138-kV double-circuit structures, with one circuit in place operated at 138-kV with normal and emergency rating of at least 614 MVA, on existing ROW, approximately 40.8-mile; and
- Construct a loop of the new Riverton – Sand Lake 138-kV line with normal and emergency rating of at least 614 MVA, into the existing Horsehead Draw 138-kV substation, approximately 0.1-mile.

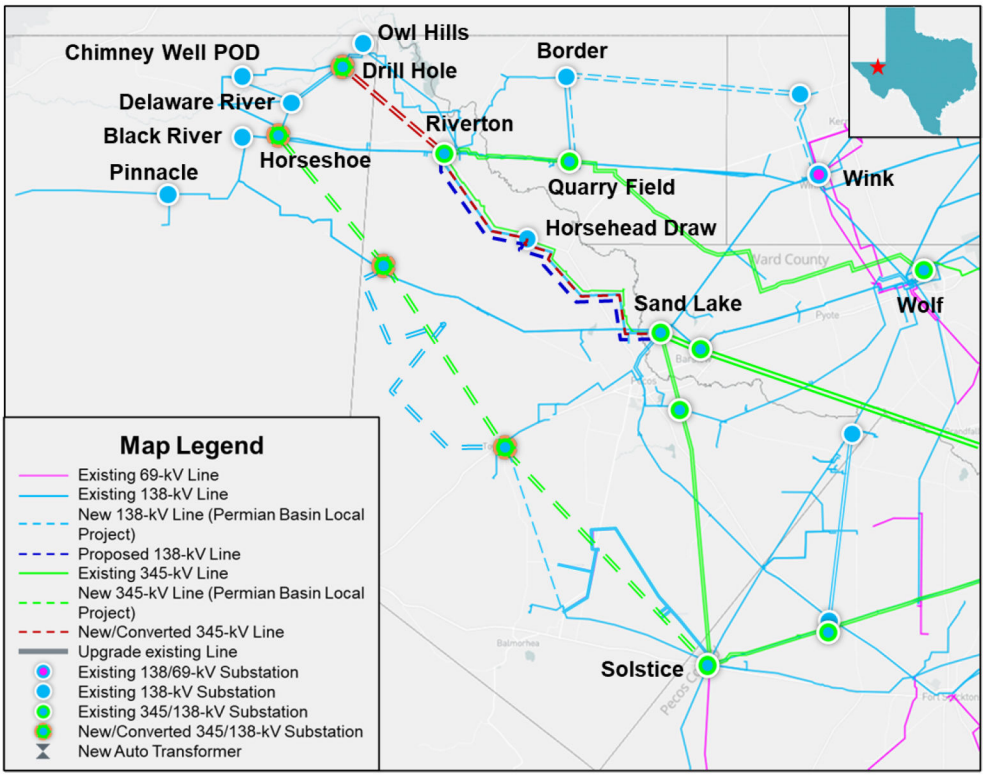


Figure 7.1: Map of Project

This project will require a CCN application for the new Drill Hole – Riverton 345-kV transmission line and the new Riverton – Sand Lake 138-kV transmission line, and the expected ISD of this project is June 1, 2027.

Appendix

A: Transmission Projects Added to the Economic Base Case

Table A.1: List of Transmission Projects Added to the Economic Base Case

TPIT	Project Name	Tier	Project ISD	County
62666	Upgrade and convert McGregor – Waco West Line	Tier 4	12/15/2024	McLennan
66216	Upgrade and convert Waco West – Temple 69 kV Line to 138 kV	Tier 4	6/15/2024	McLennan
71912A	Rebuild the Killeen Fort Hood – Killeen Taft 138 kV Line	Tier 4	5/15/2026	Bell
67992	CPSE_345KV_Howard_Switching_Station_ALL	Tier 3	2/1/2024	Bexar
71871	CPSE_Cagnon to Shepherd Rd Rebuild Phase A	Tier 4	5/1/2023	Bexar
67329	STEC_67329_Cruce-SanMiguel	Tier 1	6/1/2027	Bexar, Atascosa
23RPG024	Big Foot to Dilley Switch 138-kV Conversion Project	Tier 4	8/30/2026	Frio
73063	AEP_TCC_BigFoot_LytleConversion	Tier 4	9/20/2025	Medina, Frio
67915	AEP_TCC_Asherton-West Batesville138kVLineRebuild	Tier 3	12/30/2028	Dimmit, Zavala
22RPG026	Wimberley Loop project	Tier 2	5/1/2027	Blanco, Hays
23RPG013	Silverleaf and Cowpen 345/138-kV Stations Project	Tier 1	6/1/2027	Reeves, Ward
23RPG018	Arlington Reliability Enhancement Project	Tier 2	5/1/2026	Tarrant, Dallas
23RPG023	Pecos County Transmission Improvement Projet	Tier 1	8/31/2026	Pecos
23RPG028	Rio Medina Project	Tier 2	1/1/2027	Medina
23RPG002	Hamlin to Roby 69 kV Line Rebuild Project	Tier 4	11/1/2026	Jones, Fisher
23RPG008	Fort Stockton Plant to Lynx 138-kV Line Rebuild Project	Tier 4	5/31/2025	Pecos
23RPG009	Spraberry to Polecat 138-kV Line Rebuild Project	Tier 3	Summer 2024	Midland, Glasscock
23RPG010	Big Spring West to Stanton East 138-kV Line Rebuild Project	Tier 3	Summer 2024	Martin, Howard
23RPG014	Lamesa to Jim Payne POI to Paul Davis Tap 138-kV Line Rebuild Project	Tier 3	Summer 2024	Dawson, Martin
23RPG016	Tributary Switch – Vincent Rebuild Project	Tier 3	12/31/2024	Howard
23RPG001	Bessel to Falfurrias 138 kV Line Rebuild Project	Tier 4	4/30/2026 11/30/2026	Nueces, Kleberg, Brooks, Jim Wells
23RPG003	Eagle Ford Large Load Interconnection Project	Tier 3	12/4/2025	DeWitt
23RPG004	Lockhart to Luling 69-kV Transmission Line Overhaul Project	Tier 4	6/30/2025	Caldwell
23RPG012	Stone Lake Area Upgrades Project	Tier 3	Summer 2024 Summer 2025	Harris
23RPG015	Cuero Substation Upgrade Project	Tier 4	5/15/2024	DeWitt
23RPG017	Watermill 345/138-kV Switch Project	Tier 3	5/1/2025	Dallas

B: Generation Added to the Economic Base Case

Table B.1: List of Generation Added to the Economic Base Case Based on April 2024 GIS Report

GINR	Project Name	Fuel	Project COD	Capacity (~MW)	County
14INR0033	Goodnight Wind	Wind	2/14/2024	258.1	Armstrong
19INR0054	Monte Cristo 1 Wind	Wind	9/30/2025	236.9	Hidalgo
19INR0134	Cottonwood Bayou Solar	Solar	8/13/2024	351.4	Brazoria
19INR0203	Angelo Solar	Solar	8/12/2024	195.4	Tom Green
20INR0040	Montgomery Ranch Wind	Wind	9/1/2024	200.2	Foard
20INR0208	Signal Solar	SOL	3/15/2025	51.8	Hunt
20INR0210	Hopkins Solar	Solar	12/30/2023	253.1	Hopkins
20INR0248	Second Division Solar	Solar	9/17/2024	100.3	Brazoria
21INR0302	Aureola Solar	Solar	6/28/2024	203.0	Milam
21INR0303	Mandorla Solar	Solar	11/29/2024	254.0	Milam
21INR0304	Halo Solar	Solar	6/20/2024	254.0	Bell
21INR0325	Sheep Creek Wind	Wind	1/31/2024	153.0	Callahan
21INR0368	Eliza Solar	Solar	11/1/2024	151.6	Kaufman
21INR0389	Hollywood Solar	Solar	6/30/2024	353.4	Wharton
21INR0424	Tierra Bonita Solar	Solar	10/29/2024	306.9	Pecos
21INR0450	Danish Fields Storage	Battery	3/6/2024	152.4	Wharton
21INR0505	Ramsey Storage	Battery	12/31/2025	510.4	Wharton
21INR0511	Wolf Ridge Repower	Wind	4/2/2024	9.0	Cooke
21INR0515	Roadrunner Crossing Wind II SLF	Wind	1/20/2025	126.7	Eastland
22INR0251	Shaula I Solar	Solar	10/30/2025	205.2	DeWitt
22INR0260	Eliza Storage	Battery	11/1/2024	100.2	Kaufman
22INR0261	Dorado Solar	Solar	12/31/2025	406.3	Callahan
22INR0267	Shaula II Solar	Solar	5/30/2026	205.2	DeWitt
22INR0353	BRP Carina BESS	Battery	12/31/2024	151.9	Nueces
22INR0354	XE MURAT Solar	Solar	5/13/2024	60.4	Harris
22INR0366	LIBRA BESS	Battery	1/26/2024	206.2	Guadalupe
22INR0422	Ferdinand Grid BESS	Battery	5/31/2026	202.7	Bexar
22INR0502	Shamrock	Wind	4/19/2024	223.9	Crockett
22INR0555	Guevara Storage	Battery	7/15/2025	125.4	Rockwall
23INR0026	Baker Branch Solar	Solar	8/1/2024	469.4	Lamar
23INR0054	Tanglewood Solar	Solar	1/16/2025	257.0	Brazoria
23INR0062	Noria Storage	Battery	9/1/2025	75.0	Nueces
23INR0091	Cascade Solar	Solar	12/31/2024	254.2	Brazoria
23INR0114	True North Solar	Solar	6/30/2024	238.3	Falls
23INR0154	Ebony Energy Storage	Battery	5/6/2024	203.5	Comal
23INR0159	Five Wells Storage	Battery	12/30/2023	220.8	Bell
23INR0219	Dogfish BESS	Battery	12/31/2024	75.0	Pecos
23INR0239	Giga Texas Energy Storage	Battery	1/31/2024	131.1	Travis
23INR0296	Trojan Solar	Solar	2/28/2026	151.3	Cooke

GINR	Project Name	Fuel	Project COD	Capacity (~MW)	County
23INR0331	Talitha BESS	Battery	6/30/2024	61.4	Jim Wells
23INR0349	Tokio Solar	Solar	8/25/2025	177.6	McLennan
23INR0367	Fewell Solar	Solar	9/9/2025	203.5	Limestone
23INR0381	Soportar ESS	Battery	3/15/2025	102.1	Bexar
23INR0387	Pioneer DJ Wind	WIN	5/3/2024	140.3	Midland
23INR0408	TECO GTG2	GAS	1/30/2024	50.0	Harris
23INR0418	Angelo Storage	Battery	5/3/2024	103.0	Tom Green
23INR0460	GULF STAR STORAGE	Battery	6/25/2024	301.0	Wharton
23INR0470	BoCo BESS	Battery	6/22/2024	155.5	Borden
23INR0525	Pyron Wind Repower	WIN	2/1/2024	19.9	Nolan
23INR0637	Goodnight Wind II	WIN	12/30/2024	258.3	Armstrong
24INR0010	Pinnington Solar	Solar	10/15/2025	666.1	Jack
24INR0015	Five Wells Solar	Solar	12/29/2023	322.8	Bell
24INR0038	SP Jaguar Solar	Solar	6/30/2025	300.0	McLennan
24INR0039	SP Jaguar BESS	Battery	6/30/2025	300.0	McLennan
24INR0070	Sypert Branch Solar Project	Solar	6/1/2025	261.8	Milam
24INR0100	Sheep Creek Storage	Battery	7/1/2024	142.1	Callahan
24INR0109	Oriana BESS	Battery	7/2/2025	60.3	Victoria
24INR0138	Midpoint Storage	Battery	8/30/2025	52.2	Hill
24INR0139	Midpoint Solar	Solar	8/30/2025	103.8	Hill
24INR0140	Gaia Storage	Battery	7/31/2025	76.8	Navarro
24INR0141	Gaia Solar	Solar	7/31/2025	152.7	Navarro
24INR0265	Ironman BESS	Battery	11/1/2024	304.2	Brazoria
24INR0273	Al Pastor BESS	Battery	8/16/2024	103.1	Dawson
24INR0281	Red Egret BESS	Battery	6/1/2025	310.6	Galveston
24INR0295	Lucky Bluff BESS	Battery	5/31/2025	100.8	Erath
24INR0312	Wigeon Whistle BESS	Battery	9/1/2024	122.9	Collin
24INR0337	Eldora Solar	Solar	6/30/2026	200.9	Matagorda
24INR0338	Eldora BESS	Battery	6/30/2026	201.3	Matagorda
24INR0436	Carambola BESS	Battery	5/31/2026	97.4	Hidalgo
25INR0105	Diver Solar	Solar	6/30/2026	228.2	Limestone
25INR0162	SOHO II BESS	Battery	1/1/2025	206.3	Brazoria
25INR0223	Uhland Maxwell	GAS	4/15/2025	188.4	Caldwell
25INR0232	Isaac Solar	Solar	3/31/2026	51.6	Matagorda
25INR0328	Longbow BESS	Battery	11/13/2024	180.8	Brazoria
23INR0403	Connolly Storage	Battery	8/18/2023	125.4	Wise
24INR0147	Holy ESS	Battery	1/19/2023	209.3	Harris
24INR0397	Destiny Storage	Battery	9/21/2023	201.1	Harris
20INR0217	CAROL wind	Wind	1/31/2024	165.4	Potter
21INR0240	La Casa Wind	Wind	1/4/2024	148.4	Stephens
21INR0379	Ash Creek Solar	Solar	1/17/2024	417.7	Hill
23INR0030	Langer Solar	Solar	1/5/2024	249.8	Bosque

GINR	Project Name	Fuel	Project COD	Capacity (~MW)	County
23INR0070	Chillingham Solar	Solar	1/30/2024	352.4	Bell
23INR0336	Bypass Battery Storage	Battery	1/9/2024	206.9	Fort Bend
24INR0632	Cedro Hill Wind Repower	Wind	1/30/2024	9.93	Webb
26INR0042	Valhalla Solar	Solar	1/5/2024	306.8	Brazoria
23INR0044	Parliament Solar U1	Solar	12/31/2024	250.4	Waller
23INR0044	Parliament Solar U2	Solar	12/31/2024	234.2	Waller
24INR0023	Compadre Solar U1	Solar	12/25/2024	194.7	Hill
24INR0023	Compadre Solar U2	Solar	12/25/2024	211.5	Hill
24INR0208	Eastbell Milam Solar II	Solar	12/20/2024	151.0	Milam
24INR0329	XE Murat Storage	Battery	12/14/2024	60.1	Harris
24INR0605	TEXAS GULF SULPHUR REPOWER	NG	6/25/2024	94.0	Wharton
16INR0049	Nazareth Solar	Solar	3/24/2025	204.0	Castro
21INR0428	Nabatoto Solar North U1	Solar	2/1/2026	224.8	Leon
21INR0428	Nabatoto Solar North U2	Solar	2/1/2026	140.9	Leon
24INR0395	Berkman Storage	Battery	4/30/2026	150.9	Galveston

C: Attachments

Table C.1: Project Related Document

No	Document Name	Attachment
1	Delaware Basin Stages 3 and 4 Project Submittal	Oncor Delaware Basin Stage 3 and 4 R
2	2019 Delaware Basin Load Integration Study Report	ERCOT_Delaware_Basin_Load_Integration_Study_Public_Version.zip
3	2024 Permian Basin Reliability Plan Study Report	ERCOT_Permian_Basin_Load_Interconnectio