Date: August 13, 2024
To: Board of Directors
From: Bob Flexon, Reliability and Markets (R&M) Committee Chair
Subject: Oncor Temple Area Regional Planning Group (RPG) Project

Issue for the ERCOT Board of Directors

ERCOT Board of Directors Meeting Date: August 20, 2024
Item No.: 10.2

Issue:
Whether the Board of Directors (Board) of Electric Reliability Council of Texas, Inc. (ERCOT) should accept the recommendation of ERCOT staff to: (1) endorse the need for the Tier 1 Oncor Temple Area Regional Planning Group (RPG) Project in order to meet the reliability requirements for the ERCOT System and address thermal overloads in the Temple Area of Bell County, which ERCOT staff has independently reviewed and which the Technical Advisory Committee (TAC) has voted unanimously to endorse.

Background/History:
Oncor proposed the Temple Area Project in January 2024, a $120.7 million, Tier 1 project with the expected in-service date of May 2026, to meet reliability planning criteria in the Temple Area of Bell County. Protocol Section 3.11.4.7, Processing of Tier 1 Projects, requires ERCOT to independently review submitted projects. ERCOT performed an independent review of the Oncor Temple Area Project and identified additional violations in the Killeen area and the rest of Bell County, not addressed in the initial Oncor submission. The ERCOT project recommendation (Option 5A), a $272.6 million, Tier 1 project with the expected in-service date of December 2028 addresses the need for a project under North American Electric Reliability Corporation (NERC) and ERCOT Planning Criteria to address thermal overloads on 18 miles of 138-kV transmission lines, two 345/138-kV transformers and 31 voltage violations in Bell County with the following ERCOT System improvements:

- Install a second 345/138-kV transformer with a normal and emergency ratings of 600 MVA at Temple Pecan Creek Switch and loop the existing Bellfalls Switch – Temple Switch 345-kV transmission line into the Temple Pecan Creek 345-kV Switch by installing three new 345-kV circuit breakers in the existing 345-kV ring bus arrangement and three new 138-kV circuit breakers in the existing 138-kV breaker-and-a-half arrangement. Replace all existing 40 kA, 138-kV circuit breakers at Temple Pecan Creek Switch with 63 kA circuit breakers
- Install a second 345/138-kV transformer with a normal and emergency ratings of 600 MVA at Temple Switch and rebuild the Temple 345/138-kV Switch with eleven 345-kV circuit breakers in a breaker-and-a-half arrangement and sixteen 138-kV circuit breakers in a breaker-and-a-half arrangement

- Replace nine of the existing 40 kA, 138-kV circuit breakers at Temple Elm Creek Switch with 63 kA circuit breakers
- Upgrade the existing Temple Pecan Creek Switch – Temple Elm Creek Switch 138-kV double-circuit transmission line with a normal and emergency ratings of 493 MVA or greater, approximately 5.0-mile, per circuit
- Install a second circuit on the vacant position of the existing Temple Switch – Temple Pecan Creek Switch 138-kV double-circuit capable line with a normal and emergency ratings of 486 MVA or greater, approximately 4.4-mile
- Construct a new Boggy Creek 138/69-kV Switch approximately 3.6 miles south of the existing Temple 138-kV Substation. Install seven 138-kV breakers in breaker-and-a-half arrangement and two 69-kV breakers in single bus arrangement. Install one 138/69-kV transformer with a normal and emergency ratings of 50 MVA or greater to the new Boggy Creek Switch
- Boggy Creek 138-kV Switch to be interconnected as follows:
    - Install a new 69-kV transmission line on the vacant sides of the existing double-circuit capable structures of Taylor Switch – Temple Switch and Bob Poage – Seaton 69-kV transmission lines and connect the new 69-kV line to Minerva Switch at STR 3/5 to establish the Boggy Creek Switch – Minerva Switch 69-kV transmission line
    - Establish the new normally open Boggy Creek Switch – Temple Substation 138-kV transmission line section, by converting the 69-kV line between Boggy Creek Switch and Temple Substation to 138-kV operational with a normally open disconnect switch at Temple Substation, with a normal and emergency ratings of 197 MVA or greater, approximately 5.0-mile
    - Disconnect the existing Temple Switch – Minerva Switch 69-kV transmission line at STR 3/5
- Construct a New Bell County 138-kV Switch with four 138-kV breakers in a ring bus arrangement near the existing Bell County Switch and establish a tie to the existing Bell County Switch substation
- New Bell County 138-kV Switch to be interconnected as follows:
    - Keep the existing 345-kV double-circuit and the existing 345-kV line from Salado Switch – Knob Creek – Temple Switch but remove the existing 138-kV circuits from the existing 345-kV structures
    - Construct a New Bell County Switch – Boggy Creek Switch – Temple Switch 138-kV transmission lines on new double-circuit structure with one circuit in place, utilizing the existing Right of Way (ROW) with a normal and emergency ratings of 614 MVA or greater, approximately 7.7-mile
    - Construct a New Bell County Switch – Salado Switch 138-kV transmission line on new double-circuit structure with one circuit in place, utilizing the existing ROW, with a normal and emergency ratings of 614 MVA or greater, approximately 7.8-mile
    - Establish a new Bell County Switch – New Bell County Switch connection

- Upgrade the existing Temple Switch – Temple Southeast – Scott & White – Temple South – Belton 138-kV transmission lines with a normal and emergency ratings of 486 MVA or greater, approximately 9.6-mile
- Upgrade the existing Belton – Belton Southwest – Harker Heights South – Killeen Switch 138-kV transmission lines with a normal and emergency ratings of 486 MVA or greater, approximately 17.2-mile
- Upgrade the existing Belton – Nolanville – Harker Heights – Killeen Taft – Killeen Elms Rd – Killeen Switch 138-kV transmission lines with a normal and emergency ratings of 486 MVA or greater, approximately 19.9-mile
- Upgrade the existing Temple North – Pepper Creek Switch 138-kV double-circuit transmission line with a normal and emergency ratings of 486 MVA or greater, approximately 2.2-mile per-circuit
- Upgrade the existing Temple Elm Creek Switch – Temple North 138-kV double-circuit transmission line with a normal and emergency ratings of 486 MVA or greater, approximately 0.6-mile per-circuit
- Construct the new Watercrest 138-kV Switch substation near Killeen Ft. Hood Switch in a 4-breaker ring bus arrangement and install one capacitor bank consisting of 110.4 MVAr in three 36.8 MVAr stages
- Close the normally open Killeen Ft. Hood – Battalion 138-kV transmission line section
- Upgrade the existing Watercrest Switch – Killeen Taft 138-kV transmission lines with a normal and emergency ratings of 614 MVA or greater, approximately 7.9-mile
- Upgrade the existing Watercrest Switch – Killeen Switch 138-kV transmission lines with a normal and emergency ratings of 493 MVA or greater, approximately 7.5-mile
- Upgrade the existing Temple Switch – Seaton 138-kV transmission line with a normal and emergency ratings of 486 MVA or greater, approximately 2.7-mile
- Expand and convert the existing Bob Poage 69-kV substation to 138/69-kV Switch substation and install a new 100 MVA 138/69-kV transformer
- Convert the existing Temple Taylor Valley 69-kV substation to 138-kV substation
- Convert the existing Seaton – Bob Poage – Temple Taylor Valley – Bell County Switch 69-kV transmission lines to 138-kV operational with a normal and emergency ratings of 214 MVA or greater, approximately 17.7-mile
- Install two new 600 MVA 345/138-kV transformers at the existing Salado Switch and connect the 138-kV and 345-kV at Salado Switch

For construction to meet the December 2028 in-service date, the Oncor Temple Area Project (Option 5A) requires Public Utility Commission of Texas (PUCT, Commission) approval of a Certificate of Convenience and Necessity. Oncor will work with ERCOT as early as practical to develop outage plans needed for construction and implement Constraint Management Plans (CMP) based on expected operational conditions for the time period when construction outages are planned.

ERCOT's independent review verified the reliability need for the Oncor Temple Area Project to satisfy ERCOT Planning Guide Section 4.1.1.2(1)(d), Reliability Performance Criteria, contingencies are the loss of a single 345/138-kV transformer followed by a single transmission element or common tower outage.

RPG considered project overviews during meetings in February 2024 and July 2024. Between February 2024 and July 2024, ERCOT staff presented scope and status updates at RPG meetings in February, March, May, and June. Pursuant to paragraph (2) of Protocol Section 3.11.4.9, Regional Planning Group Acceptance and ERCOT Endorsement, ERCOT presented the Tier 1 project to the Technical Advisory Committee (TAC) for review and comment, and on July 31, 2024, TAC unanimously endorsed the project as recommended by ERCOT. Pursuant to paragraph (1)(a) of Protocol Section 3.11.4.3, Categorization of Proposed Transmission Projects, projects with an estimated capital cost of $100 million or greater are Tier 1 projects, for which Protocol Section 3.11.4.7(2) requires endorsement by the Board. Pursuant to Section 3.11.4.9, ERCOT's endorsement of a Tier 1 project is obtained upon affirmative vote of the Board. Section IV(B)(2)(a) of the R&M Committee Charter requires the R&M Committee to review and make a recommendation to the Board regarding any Tier 1 project.

ERCOT's assessment of the Sub-Synchronous Resonance (SSR) of existing facilities in Bell, Falls, McLennan, Milam, Williamson Counties in the North Central and South Central Weather Zones, conducted pursuant to Protocol Section 3.22.1.3, Transmission Project Assessment, yielded no adverse SSR impacts to the existing and planned generation resources at the time of the study. Results of the congestion analysis ERCOT conducted pursuant to Planning Guide Section 3.1.3, Project Evaluation, indicate no additional congestion in the area with the addition of the Temple Area Project (Option 5A).

The project completion date may change depending on requirements for various approvals, ROW acquisition and construction progress. The estimated cost accounts for the expectation that some construction activities may occur using energized (hot) work process.

The report describing the ERCOT Independent Review of the Oncor Temple Area Project (Option 5A), including ERCOT staff's recommendation, is attached as ***Attachment A***.

Key Factors Influencing Issue:

1. ERCOT System improvements are needed to meet reliability planning criteria for Bell County in the North Central Weather Zone.

2. ERCOT staff found the recommended set of improvements to be the most efficient solution for meeting the planning reliability criteria and addressing thermal overloads and voltage violations.
3. Protocol Section 3.11.4.7 requires Board endorsement of a Tier 1 project, which is a project with an estimated capital cost of $100 million or greater pursuant to Protocol Section 3.11.4.3(1)(a).
4. TAC voted unanimously to endorse the Tier 1 Temple Area Regional Planning Group (RPG) Project (Option 5A), as recommended by ERCOT, on July 31, 2024.

Conclusion/Recommendation:

ERCOT staff recommends, and the R&M Committee is expected to recommend, that the Board: (1) endorse the need for the Tier 1 Oncor Temple Area RPG Project (Option 5A), which ERCOT staff has independently reviewed, and which TAC has voted unanimously to endorse based on NERC and ERCOT reliability planning criteria.

ELECTRIC RELIABILITY COUNCIL OF TEXAS, INC.
BOARD OF DIRECTORS RESOLUTION

WHEREAS, pursuant to Section 3.11.4.3(1)(a) of the Electric Reliability Council of Texas, Inc. (ERCOT) Protocols, projects with an estimated capital cost of $100 million or greater are Tier 1 projects, for which Section 3.11.4.7 requires endorsement by the ERCOT Board of Directors (Board); and

WHEREAS, after due consideration of the alternatives, the Board deems it desirable and in the best interest of ERCOT to accept ERCOT staff's and the and Reliability and Markets (R&M) Committee's recommendations to (1) endorse the need for the Tier 1 Oncor Temple Area Regional Planning Group Project (Option 5A), which ERCOT staff has independently reviewed and which the Technical Advisory Committee (TAC) has voted to endorse based on North American Electric Reliability Corporation (NERC) and ERCOT reliability planning criteria;

THEREFORE, BE IT RESOLVED, that the Board hereby (1) endorses the need for the Tier 1 Oncor Temple Area Regional Planning Group Project (Option 5A), which ERCOT staff has independently reviewed and which TAC has voted to endorse based on NERC and ERCOT reliability planning criteria.

CORPORATE SECRETARY'S CERTIFICATE

I, Chad V. Seely, Corporate Secretary of ERCOT, do hereby certify that, at its August 20, 2024 meeting, the Board passed a motion approving the above Resolution by _____.

IN WITNESS WHEREOF, I have hereunto set my hand this ___ day of August, 2024.

_____
Chad V. Seely
Corporate Secretary

ERCOT Independent Review of the Oncor Temple Area Project

Document Revisions

Date	Version	Description	Author(s)
7/26/2024	1.0	Final Draft	Tanzila Ahmed
		Reviewed by	Robert Golen, Prabhu Gnanam

Executive Summary

Oncor Electric Delivery Company LLC (Oncor) submitted the Temple Area Project to the Regional Planning Group (RPG) in January 2024. Oncor proposed this project to address NERC TPL-001-5.1 and ERCOT Planning Guide criteria thermal overloads due to load growth in the Bell County and surrounding area in the North Central (NC) Weather Zone.

The Oncor proposed project is estimated to cost approximately $120.7 million and is classified as a Tier 1 project per ERCOT Protocol Section 3.11.4.3 and the proposed project will not require a Certificate of Convenience and Necessity (CCN) application.

ERCOT performed an Independent Review, identified reliability issues (thermal overloads identified in the Temple area in Oncor's project submission in the Bell County, along with additional voltage violations in the Killeen area and thermal overloads in rest of Bell County) and evaluated 11 different transmission project options.

Among the 11 different transmission project options evaluated in the Independent Review, ERCOT recommends Option 5A to address the reliability violations based on the study results described in Sections 5 and 6 of this report. Option 5A consists of the following:

- Install a second 345/138-kV transformer with a normal and emergency ratings of 600 MVA at Temple Pecan Creek Switch and loop the existing Bellfalls Switch – Temple Switch 345-kV transmission line into the Temple Pecan Creek 345-kV Switch by installing three new 345-kV circuit breakers in the existing 345-kV ring bus arrangement and three new 138-kV circuit breakers in the existing 138-kV breaker-and-a-half arrangement. Replace all existing 40 kA, 138-kV circuit breakers at Temple Pecan Creek Switch with 63 kA circuit breakers.
- Install a second 345/138-kV transformer with a normal and emergency ratings of 600 MVA at Temple Switch and rebuild the Temple 345/138-kV Switch with eleven 345-kV circuit breakers in a breaker-and-a-half arrangement and sixteen 138-kV circuit breakers in a breaker-and-a-half arrangement.
- Replace nine of the existing 40 kA, 138-kV circuit breakers at Temple Elm Creek Switch with 63 kA circuit breakers.
- Upgrade the existing Temple Pecan Creek Switch – Temple Elm Creek Switch 138-kV double-circuit transmission line with a normal and emergency ratings of 493 MVA or greater, approximately 5.0-mile, per circuit.
- Install a second circuit on the vacant position of the existing Temple Switch – Temple Pecan Creek Switch 138-kV double-circuit capable line with a normal and emergency ratings of 486 MVA or greater, approximately 4.4-mile.
- Construct a new Boggy Creek 138/69-kV Switch approximately 3.6 miles south of the existing Temple 138-kV Substation. Install seven 138-kV breakers in breaker-and-a-half arrangement and two 69-kV breakers in single bus arrangement. Install one 138/69-kV transformer with a normal and emergency ratings of 50 MVA or greater to the new Boggy Creek Switch.

- Boggy Creek 138-kV Switch to be interconnected as follows:
    - Install a new 69-kV transmission line on the vacant sides of the existing double-circuit capable structures of Taylor Switch – Temple Switch and Bob Poage – Seaton 69-kV transmission lines and connect the new 69-kV line to Minerva Switch at STR 3/5 to establish the Boggy Creek Switch – Minerva Switch 69-kV transmission line.
    - Establish the new normally open Boggy Creek Switch – Temple Substation 138-kV transmission line section, by converting the 69-kV line between Boggy Creek Switch and Temple Substation to 138-kV operational with a normally open disconnect switch at Temple Substation, with a normal and emergency ratings of 197 MVA or greater, approximately 5.0-mile.
    - Disconnect the existing Temple Switch – Minerva Switch 69-kV transmission line at STR 3/5.
- Construct a New Bell County 138-kV Switch with four 138-kV breakers in a ring bus arrangement near the existing Bell County Switch and establish a tie to the existing Bell County Switch substation.
- New Bell County 138-kV Switch to be interconnected as follows:
    - Keep the existing 345-kV double-circuit and the existing 345-kV line from Salado Switch – Knob Creek – Temple Switch but remove the existing 138-kV circuits from the existing 345-kV structures.
    - Construct a New Bell County Switch – Boggy Creek Switch – Temple Switch 138-kV transmission lines on new double-circuit structure with one circuit in place, utilizing the existing Right of Way (ROW) with a normal and emergency ratings of 614 MVA or greater, approximately 7.7-mile.
    - Construct a New Bell County Switch – Salado Switch 138-kV transmission line on new double-circuit structure with one circuit in place, utilizing the existing ROW, with a normal and emergency ratings of 614 MVA or greater, approximately 7.8-mile.
    - Establish a new Bell County Switch – New Bell County Switch connection.
- Upgrade the existing Temple Switch – Temple Southeast – Scott & White – Temple South – Belton 138-kV transmission lines with a normal and emergency ratings of 486 MVA or greater, approximately 9.6-mile.
- Upgrade the existing Belton – Belton Southwest – Harker Heights South – Killeen Switch 138-kV transmission lines with a normal and emergency ratings of 486 MVA or greater, approximately 17.2-mile.
- Upgrade the existing Belton – Nolanville – Harker Heights – Killeen Taft – Killeen Elms Rd – Killeen Switch 138-kV transmission lines with a normal and emergency ratings of 486 MVA or greater, approximately 19.9-mile.
- Upgrade the existing Temple North – Pepper Creek Switch 138-kV double-circuit transmission line with a normal and emergency ratings of 486 MVA or greater, approximately 2.2-mile per-circuit.

- Upgrade the existing Temple Elm Creek Switch – Temple North 138-kV double-circuit transmission line with a normal and emergency ratings of 486 MVA or greater, approximately 0.6-mile per-circuit.
- Construct the new Watercrest 138-kV Switch substation near Killeen Ft. Hood Switch in a 4-breaker ring bus arrangement and install one capacitor bank consisting of 110.4 MVAr in three 36.8 MVAr stages.
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- Expand and convert the existing Bob Poage 69-kV substation to 138/69-kV Switch substation and install a new 100 MVA 138/69-kV transformer.
- Convert the existing Temple Taylor Valley 69-kV substation to 138-kV substation.
- Convert the existing Seaton – Bob Poage – Temple Taylor Valley – Bell County Switch 69-kV transmission lines to 138-kV operational with a normal and emergency ratings of 214 MVA or greater, approximately 17.7-mile.
- Install two new 600 MVA 345/138-kV transformers at the existing Salado Switch and connect the 138-kV and 345-kV at Salado Switch.

The cost estimate for this project is approximately $272.6 million and accounts for the expectation that some construction activities may occur using energized (hot) work process. This project is classified as Tier 1 project per ERCOT Protocol Section 3.11.4.3(1)(a) and recommended for construction to meet a December 2028 In-Service-Date (ISD). However, Oncor has advised that the projected ISD may change based on requirements for various approvals, ROW acquisition and construction progress.

A CCN application will be required for the new 138-kV transmission lines from Temple Switch – Boggy Creek Switch – Bell County Switch – Salado Switch. Oncor will work with ERCOT as early as practical to develop outage plans needed for construction and implement Constraint Management Plans (CMP) based on expected operational conditions for the time period when construction outages are planned.

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1 Introduction

In January 2024, Oncor Electric Delivery Company LLC (Oncor) submitted the Temple Area Project to the Regional Planning Group (RPG) to address NERC TPL-001-5.1 and ERCOT Planning Guide criteria thermal overloads in the Temple area due to load growth. This proposed project is located in the North Central (NC) Weather Zone in Bell County.

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 $120.7 million. The expected In-Service Date (ISD) of the project is May 2026. 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 ERCOT Independent Review of the project.

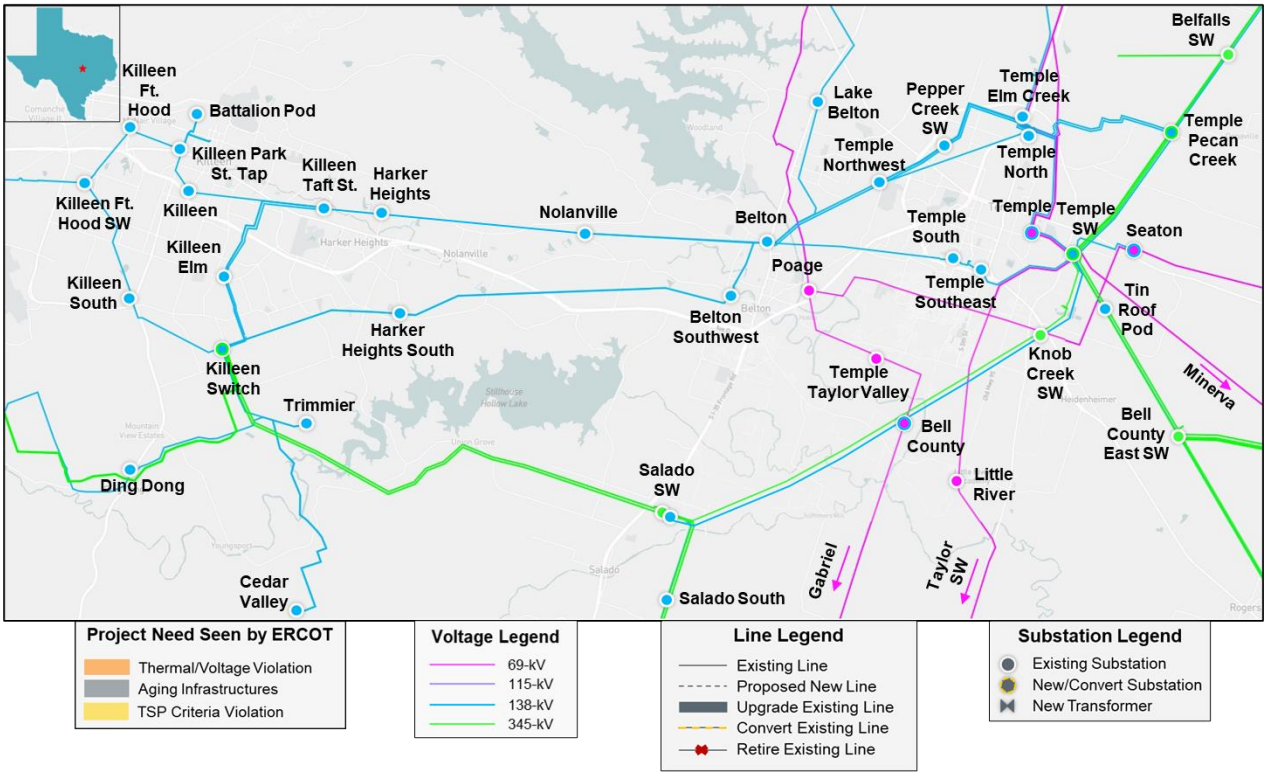

Figure 1.1: Map of Transmission System in San Antonio Area

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 Temple Area Project if an upgrade is 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 NC Weather Zone in Bell County and bordering South Central (SC) Weather Zone. Falls, McLennan, Milam, Williamson 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 23, 2023, were used as reference cases in this study. Year 2026 Summer was selected for the long-term outlook. The steady-state study base case for North, North Central and South Central (NNCSC) was constructed by updating transmission, generation, and loads of the following 2026 Summer peak load case for the North and North Central (NNC) Weather Zones:

- Case: 2023RTP_2026_SUM_NNC_12232023[1].

2.1.2 Transmission Topology

Transmission projects within the study area with ISDs by June 2026 were added to the study base case. The ERCOT Transmission Project Information and Tracking (TPIT)[2] report posted in January 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	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
75524	This converts Bell County to Gabriel to 138 KV	Tier 4	12/12/2026	Bell

Transmission projects, listed in Table 2.2, identified in the 2023 RTP as placeholder projects in the Bell County and are not approved by RPG were removed from study base case.

Table 2.2: List of Transmission Projects Removed from the Study Base Case

RTP Project ID	Project Name	County
2023-NC5	Temple Switch (3415) to Temple Southeast (3612) 138-kV Line Upgrade	Bell
2023-NC17	Temple Southeast (3612) to Scott and White (3602) to Temple South (3611) 138-kV Line Upgrades	Bell
2023-NC22	Nolanville (3617) to Harker Heights (3618) 138-kV Line Upgrade	Bell
2023-NC34	Temple Pecan Creek (3412) – Temple Switch (3414) 345-kV Line Upgrade	Bell
2023-NC36	Temple Belton 138-kV Line Upgrades	Bell
2023-NC50	Harker Heights (3618) to Killeen Taft Street (3616) to Killeen Elm (13427) 138-kV Line Upgrades	Bell
2023-NC51	Temple Area 138-kV Upgrades	Bell
2023-NC57	Killeen Area 138-kV Capacitor Bank Additions	Bell

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

RTP Project ID	Project Name	County
2023-NC60	Temple Switch and Temple Pecan 345/138-kV Transformer Additions	Bell
2023-NC61	Temple Pecan Area 138-kV Upgrades	Bell

2.1.3 Generation

Based on the January 2024 Generator Interconnection Status (GIS)[3] report posted on the ERCOT website on February 1, 2024, generators in the study area that met Planning Guide Section 6.9(1) conditions with Commercial Operations Date (COD) prior to June 2026 were added to the study base case. These generation additions are listed in Table 2.3. All generation dispatches were consistent with the 2024 RTP methodology.

Table 2.3: List of Generation Added to the Study Base Case Based on the January 2024 GIS Report

GINR	Project Name	Fuel	Project COD	Max Capacity (~MW)	County
20INR0208	Signal Solar	SOL	3/15/2025	51.8	Hunt
21INR0304	Halo Solar	SOL	6/20/2024	254.0	Bell
21INR0325	Sheep Creek Wind	WIN	1/31/2024	153.0	Callahan
21INR0368	Eliza Solar	SOL	11/1/2024	151.6	Kaufman
21INR0492	Stockyard Grid Batt	OTH	3/29/2024	150.6	Tarrant
21INR0515	Roadrunner Crossing Wind II SLF	WIN	1/20/2025	126.7	Eastland
22INR0260	Eliza Storage	OTH	11/1/2024	100.2	Kaufman
22INR0261	Dorado Solar	SOL	12/31/2025	406.3	Callahan
22INR0552	Sowers Storage	OTH	12/1/2025	206.1	Kaufman
22INR0555	Guevara Storage	OTH	7/15/2025	125.4	Rockwall
23INR0114	True North Solar	SOL	6/30/2024	238.3	Falls
23INR0124	Coral Storage	OTH	3/31/2024	99.0	Falls
23INR0159	Five Wells Storage	OTH	12/30/2023	220.8	Bell
23INR0349	Tokio Solar	SOL	8/25/2025	177.6	McLennan
23INR0367	Fewell Solar	SOL	9/9/2025	203.5	Limestone
24INR0010	Pinnington Solar	SOL	10/15/2025	666.1	Jack
24INR0015	Five Wells Solar	SOL	12/29/2023	322.8	Bell
24INR0038	SP Jaguar Solar	SOL	6/30/2025	300.0	McLennan
24INR0039	SP Jaguar BESS	OTH	6/30/2025	300.0	McLennan
24INR0100	Sheep Creek Storage	OTH	7/1/2024	142.1	Callahan
24INR0138	Midpoint Storage	OTH	8/30/2025	52.2	Hill
24INR0139	Midpoint Solar	SOL	8/30/2025	103.8	Hill
24INR0140	Gaia Storage	OTH	7/31/2025	76.8	Navarro
24INR0141	Gaia Solar	SOL	7/31/2025	152.7	Navarro
24INR0295	Lucky Bluff BESS	OTH	5/31/2025	100.8	Erath
24INR0312	Wigeon Whistle BESS	OTH	9/1/2024	122.9	Collin
21INR0302	Aureola Solar	SOL	6/28/2024	203.0	Milam
21INR0303	Mandorla Solar	SOL	11/29/2024	254.0	Milam

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

GINR	Project Name	Fuel	Project COD	Max Capacity (~MW)	County
21INR0240	La Casa Wind	WIN	6/10/2025	148.4	Stephens
21INR0379	Ash Creek Solar	SOL	1/31/2025	417.7	Hill
23INR0070	Chillingham Solar	SOL	12/15/2024	352.4	Bell

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 2.4 were opened (turned off) in the study base case to reflect their mothballed/retired status.

Table 2.4: List of Generation Opened to Reflect Mothballed/Retired/Forced Outage Status

Bus No	Unit Name	Max 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_UNIT2	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 2.5 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 2.5: 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 SC Weather Zone were updated on a bus level based on the following final 2023 RTP 2026 summer peak case to develop the NNCSC study base case.

- Case: 2023RTP_2026_SUM_SSC_12232023[4].

The minimum reserve requirements were maintained consistent with the 2023 RTP.

2.2 Long-Term Load-Serving Capability Assessment

ERCOT performed long-term load serving capability assessment under base case and higher load conditions to compare the performance of the study options.

[4] 2023 Regional Transmission Plan Postings: https://mis.ercot.com/secure/data-products/grid/regional-planning

In the higher load condition evaluation, the loads in the study area were increased (customer designated as non-scalable remained at the same level as in the base case), and conforming loads outside of NC and SC Weather Zones 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 NC Weather Zone was reduced to 81.3% of its summer peak load level and the load level in the SC Weather Zone was reduced to 89.1% 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 NC and SC Weather Zones.

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[5] report for generation updates and the February 2024 TPIT[6] 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 the Appendix A of this document. RTP projects shown in Table 2.2, that were used as placeholder projects in the study area, were removed from the economic base case.

New generation additions listed in Table A.2 in the Appendix A of this document were added to the economic base case and all generation listed in Table 2.4 were opened (turned off) in the study base case to reflect their mothballed/retired status. Furthermore, generation listed in Table 2.5 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 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.[7]

Contingencies[8] 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:

[5] GIS Report: https://www.ercot.com/mp/data-products/data-product-details?id=PG7-200-ER
[6] TPIT Report: https://www.ercot.com/gridinfo/planning
[7] ERCOT Planning Criteria: http://www.ercot.com/mktrules/guides/planning/current
[8] Details of each event and contingency category is defined in the NERC reliability standard TPL-001-5.1

- P0 (System Intact);
- P1, P2-1, P7 (N-1 conditions);
- P2-2, P2-3, P4, and P5 (Extra High Voltage (EHV) only);
- P3: G-1 + N-1 (G-1: generation outages) {Comanche Peak Unit 1 and Panda CC Train 1}; and
- P6-2: X-1 + N-1 (X-1: 345/138-kV transformer only) {Temple Switch, Temple Pecan Creek Switch, Killeen}.

Based on comments received from Brazos, following the following 138/69-kV transformer outages were also be considered:

- P6-2: X-1 + N-1 (X-1: 138/69-kV transformer outage only) {Seaton and Bell County}.

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 2.1 of this document. This analysis indicated thermal overloads in the Temple area as seen in the Oncor project submission and additional violations in the Killeen area and the rest of Bell County under the NERC P6-2 (X-1 + N-1) contingency conditions. These issues are summarized in Table 3.1 and visually illustrated in the 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.

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	None	None	None
P3: G-1+N-1	None	None	None

NERC Contingency Category	Voltage Violations	Thermal Overloads	Unsolved Power Flow
P6-2: X-1+N-1	31	8	None

Table 3.2: Thermal Overloads Observed in the Study Area

NERC Contingency Category	Overloaded Element	Voltage Level (kV)	Length (~miles)	Max Loading (%)
P6-2: X-1 + N-1	Temple Pecan Creek Switch – Temple Switch Line	138	4.4	129.9
P6-2: X-1 + N-1	Belton – Belton Southwest Line	138	2.0	115.8
P6-2: X-1 + N-1	Temple Pecan Creek Switch Transformer	345/138	0.0	111.8
P6-2: X-1 + N-1	Temple Switch Transformer	345/138	0.0	111.0
P6-2: X-1 + N-1	Temple Switch – Temple Southeast Line	138	2.2	110.6
P6-2: X-1 + N-1	Belton Southwest – Harker Heights South Line	138	5.1	104.2
P6-2: X-1 + N-1	Belton – Nolanville Line	138	2.1	102.1
P6-2: X-1 + N-1	Temple North 2 – Pepper Creek Switch Line	138	2.2	101.6

Table 3.3: Voltage Violation Observed in the Study Area

NERC Contingency Category	Bus Name	Voltage Level (kV)	Voltage (pu)
P6-2: X-1 + N-1	Battalion POD	138	0.87
P6-2: X-1 + N-1	Cedar Valley	138	0.90
P6-2: X-1 + N-1	Chapparal	138	0.89
P6-2: X-1 + N-1	Ding Dong	138	0.91
P6-2: X-1 + N-1	Harker Heights	138	0.90
P6-2: X-1 + N-1	Harker Heights South	138	0.90
P6-2: X-1 + N-1	Killeen Fenders	138	0.88
P6-2: X-1 + N-1	Killeen Clark Road POI	138	0.87
P6-2: X-1 + N-1	Killeen Clark Road POI	138	0.87
P6-2: X-1 + N-1	Killeen Elm 1	138	0.89
P6-2: X-1 + N-1	Killeen Elm 1 Tap	138	0.88
P6-2: X-1 + N-1	Killeen Elm 2	138	0.89
P6-2: X-1 + N-1	Killeen Elm 2 Tap	138	0.89
P6-2: X-1 + N-1	Killeen Ft. Hood West	138	0.87
P6-2: X-1 + N-1	Killeen South	138	0.88
P6-2: X-1 + N-1	Killeen Switch	138	0.89
P6-2: X-1 + N-1	Killeen 1	138	0.87
P6-2: X-1 + N-1	Killeen Ft. Hood Switch	138	0.87
P6-2: X-1 + N-1	Killeen Park Street	138	0.87
P6-2: X-1 + N-1	Killeen Park Street Tap	138	0.87
P6-2: X-1 + N-1	Killeen Park 2	138	0.87
P6-2: X-1 + N-1	Stagecoach 1	138	0.89
P6-2: X-1 + N-1	Stagecoach 2	138	0.89
P6-2: X-1 + N-1	Killeen Taft Street	138	0.90
P6-2: X-1 + N-1	Killeen Taft Street Tap	138	0.88

NERC Contingency Category	Bus Name	Voltage Level (kV)	Voltage (pu)
P6-2: X-1 + N-1	Killeen Fort Hood	138	0.87
P6-2: X-1 + N-1	Killeen Clear Creek	138	0.87
P6-2: X-1 + N-1	SODG_3426	138	0.89
P6-2: X-1 + N-1	SODG_3428	138	0.88
P6-2: X-1 + N-1	SODG_3618	138	0.90
P6-2: X-1 + N-1	Trimmier	138	0.89

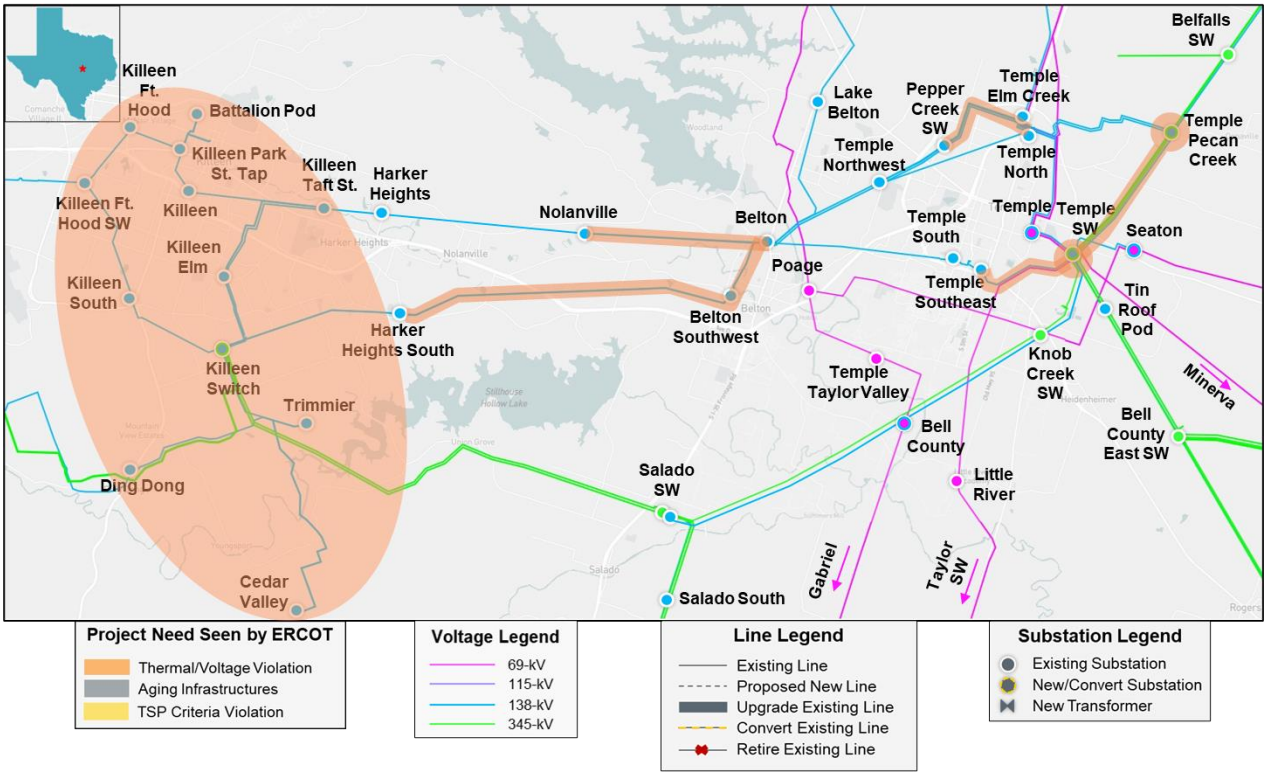

Figure 3.1: Study Area Map Showing Project Need Seen by ERCOT

4 Description of Project Options

ERCOT initially evaluated seven system improvement options and one sensitivity options to address the thermal overloads and voltage violations observed in the study base case in the study area.

4.1.1 Option 1

Option 1 (Oncor proposed solution) consists of the following:

- Install a second 345/138-kV transformer with a normal and emergency ratings of 600 MVA at Temple Pecan Creek Switch and loop the existing Bellfalls Switch – Temple Switch 345-kV transmission line into the Temple Pecan Creek 345-kV Switch by installing three new 345-kV circuit breakers in the existing 345-kV ring bus arrangement and three new 138-kV circuit

breakers in the existing 138-kV breaker-and-a-half arrangement. Replace all existing 40 kA, 138-kV circuit breakers at Temple Pecan Creek Switch with 63 kA circuit breakers.

- Install a second 345/138-kV transformer with a normal and emergency ratings of 600 MVA at Temple Switch and rebuild the Temple 345/138-kV Switch with eleven 345-kV circuit breakers in a breaker-and-a-half arrangement and sixteen 138-kV circuit breakers in a breaker-and-a-half arrangement.
- Replace nine of the existing 40 kA, 138-kV circuit breakers at Temple Elm Creek Switch with 63 kA circuit breakers.
- Upgrade the existing Temple Pecan Creek Switch – Temple Elm Creek Switch 138-kV double-circuit transmission line with a normal and emergency ratings of 493 MVA or greater, approximately 5.0-mile.
- Install a second circuit on the vacant position of the existing Temple Switch – Temple Pecan Creek Switch 138-kV double-circuit capable line with a normal and emergency ratings of 486 MVA or greater, approximately 4.4-mile.
- Construct a new Boggy Creek 138/69-kV Switch approximately 3.6 miles south of the existing Temple 138-kV Substation. Install seven 138-kV breakers in breaker-and-a-half arrangement and two 69-kV breakers in single bus arrangement. Install one 138/69-kV transformer with a normal and emergency ratings of 50 MVA or greater to the new Boggy Creek Switch.
- Boggy Creek 138-kV Switch to be interconnected as follows:
    - Install a new 69-kV transmission line on the vacant sides of the existing double-circuit capable structures of Taylor Switch – Temple Substation and Bob Poage – Seaton 69-kV transmission lines and connect the new 69-kV line to Minerva Switch at STR 3/5 to establish the Boggy Creek Switch – Minerva Switch 69-kV transmission line.
    - Establish the new normally open Boggy Creek Switch – Temple Substation 138-kV transmission line section, by converting the 69-kV line between Boggy Creek Switch and Temple Substation to 138-kV operational with a normally open disconnect switch at Temple Substation, with a normal and emergency ratings of 197 MVA or greater, approximately 5.0-mile.
    - Disconnect the existing Temple Switch – Minerva Switch 69-kV transmission line at STR 3/5.

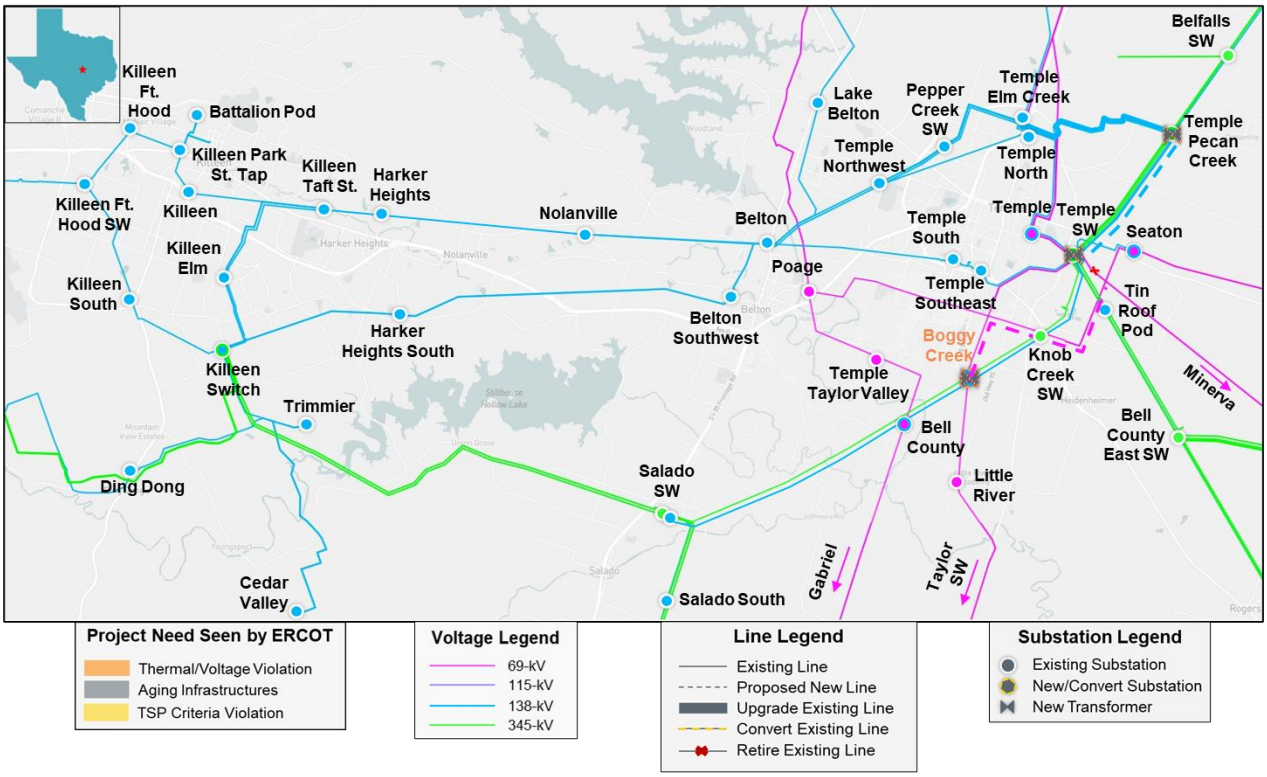

Figure 4.1: Map of Option 1

4.1.2 Option 2

Option 2 consists of the following:

- Install a second 345/138-kV transformer with normal and emergency ratings of 600 MVA at Temple Pecan Creek Switch and loop the existing Bellfalls Switch – Temple Switch 345-kV transmission line into the Temple Pecan Creek 345-kV Switch by installing three new 345-kV circuit breakers in the existing 345-kV ring bus arrangement and three new 138-kV circuit breakers in the existing 138-kV breaker-and-a-half arrangement. Replace all existing 40 kA, 138-kV circuit breakers at Temple Pecan Creek Switch with 63 kA circuit breakers.
- Install a second 345/138-kV transformer with normal and emergency ratings of 600 MVA at Temple Switch and rebuild the Temple 345/138-kV Switch with eleven 345-kV circuit breakers in a breaker-and-a-half arrangement and sixteen 138-kV circuit breakers in a breaker-and-a-half arrangement.
- Replace nine of the existing 40 kA, 138-kV circuit breakers at Temple Elm Creek Switch with 63 kA circuit breakers.
- Upgrade the existing Temple Pecan Creek Switch – Temple Elm Creek Switch 138-kV double-circuit transmission line with a normal and emergency ratings of 493 MVA or greater, approximately 5.0-mile.
- Install a second circuit on the vacant position of the existing Temple Switch – Temple Pecan Creek Switch 138-kV double-circuit capable line with a normal and emergency ratings of 486 MVA or greater, approximately 4.4-mile.

- Construct a new Boggy Creek 138/69-kV Switch approximately 3.6 miles south of the existing Temple 138-kV Substation. Install seven 138-kV breakers in breaker-and-a-half arrangement and two 69-kV breakers in single bus arrangement. Install one 138/69-kV transformer with a normal and emergency ratings of 50 MVA or greater to the new Boggy Creek Switch.
- Boggy Creek 138-kV Switch to be interconnected as follows:
    - Install a new 69-kV transmission line on the vacant sides of the existing double-circuit capable structures of Taylor Switch – Temple Switch and Bob Poage – Seaton 69-kV transmission lines and connect the new 69-kV line to Minerva Switch at STR 3/5 to establish the Boggy Creek Switch – Minerva Switch 69-kV transmission line.
    - Establish the new normally open Boggy Creek Switch – Temple Substation 138-kV transmission line section, by converting the 69-kV line between Boggy Creek Switch and Temple Substation to 138-kV operational with a normally open disconnect switch at Temple Substation, with a normal and emergency ratings of 197 MVA or greater, approximately 5.0-mile.
    - Disconnect the existing Temple Switch – Minerva Switch 69-kV transmission line at STR 3/5.
- Upgrade the existing Temple Switch – Temple Southeast – Scott & White – Temple South – Belton 138-kV transmission lines with a normal and emergency ratings of 486 MVA or greater, approximately 9.6-mile.
- Upgrade the existing Belton – Belton Southwest – Harker Heights South 138-kV transmission lines with a normal and emergency ratings of 486 MVA or greater, approximately 13.4-mile.
- Upgrade the existing Belton – Nolanville 138-kV transmission lines with a normal and emergency ratings of 486 MVA or greater, approximately 2.1-mile.
- Upgrade the existing Temple North – Pepper Creek Switch 138-kV double-circuit transmission line with a normal and emergency ratings of 486 MVA or greater, approximately 2.2-mile, per circuit.
- Upgrade the existing Temple Elm Creek Switch – Temple North 138-kV double-circuit transmission line with a normal and emergency ratings of 486 MVA or greater, approximately 0.6-mile, per circuit.
- Install two blocks of 18.4 MVAr capacitor banks at each of the existing Killeen Taft St., Killeen, and Killeen Ft. Hood 138-kV substations.

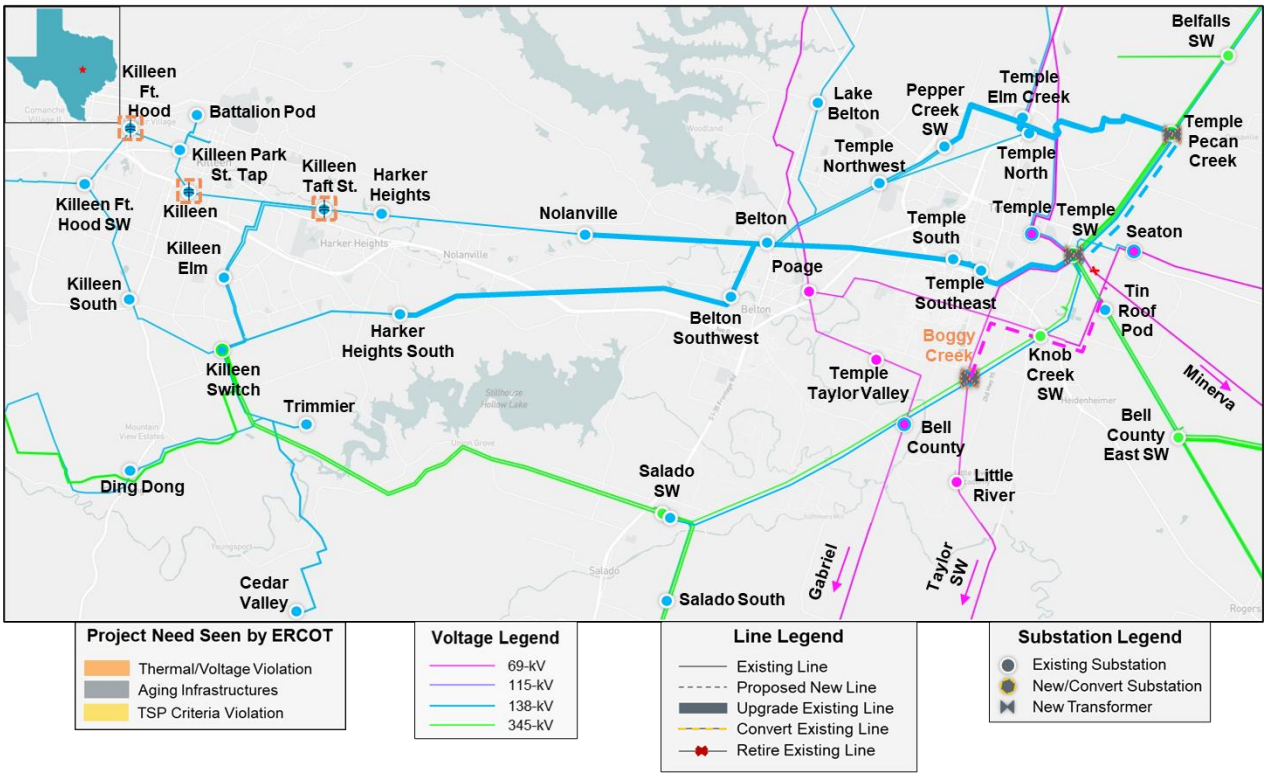

Figure 4.2: Map of Option 2

4.1.3 Option 3

Option 3 consists of the following:

- Install a second 345/138-kV transformer with a normal and emergency ratings of 600 MVA at Temple Pecan Creek Switch and loop the existing Bellfalls Switch – Temple Switch 345-kV transmission line into the Temple Pecan Creek 345-kV Switch by installing three new 345-kV circuit breakers in the existing 345-kV ring bus arrangement and three new 138-kV circuit breakers in the existing 138-kV breaker-and-a-half arrangement. Replace all existing 40 kA, 138-kV circuit breakers at Temple Pecan Creek Switch with 63 kA circuit breakers.
- Install a second 345/138-kV transformer with a normal and emergency ratings of 600 MVA at Temple Switch and rebuild the Temple 345/138-kV Switch with eleven 345-kV circuit breakers in a breaker-and-a-half arrangement and sixteen 138-kV circuit breakers in a breaker-and-a-half arrangement.
- Replace nine of the existing 40 kA, 138-kV circuit breakers at Temple Elm Creek Switch with 63 kA circuit breakers.
- Upgrade the existing Temple Pecan Creek Switch – Temple Elm Creek Switch 138-kV double-circuit transmission line with a normal and emergency ratings of 493 MVA or greater, 5.0-mile.
- Install a second circuit on the vacant position of the existing Temple Switch – Temple Pecan Creek Switch 138-kV double-circuit capable line with a normal and emergency ratings of 486 MVA or greater, approximately 4.4-mile.

- Construct a new Boggy Creek 138/69-kV Switch approximately 3.6 miles south of the existing Temple 138-kV Substation. Install seven 138-kV breakers in breaker-and-a-half arrangement and two 69-kV breakers in single bus arrangement. Install one 138/69-kV transformer with a normal and emergency a nameplate ratings of 50 MVA or greater to the new Boggy Creek Switch.
- Boggy Creek 138-kV Switch to be interconnected as follows:
    - Install a new 69-kV transmission line on the vacant sides of the existing double-circuit capable structures of Taylor Switch – Temple Switch and Bob Poage – Seaton 69-kV transmission lines and connect the new 69-kV line to Minerva Switch at STR 3/5 to establish the Boggy Creek Switch – Minerva Switch 69-kV transmission line.
    - Establish the new normally open Boggy Creek Switch – Temple Substation 138-kV transmission line section, by converting the 69-kV line between Boggy Creek Switch and Temple Substation to 138-kV operational with a normally open disconnect switch at Temple Substation, with a normal and emergency ratings of 197 MVA or greater, approximately 5.0-mile.
    - Disconnect the existing Temple Switch – Minerva Switch 69-kV transmission line at STR 3/5.
- Upgrade the existing Temple Switch – Temple Southeast – Scott & White – Temple South – Belton 138-kV transmission lines with a normal and emergency ratings of 486 MVA or greater, approximately 9.6-mile.
- Upgrade the existing Belton – Belton Southwest – Harker Heights South 138-kV transmission lines with a normal and emergency ratings of 486 MVA or greater, approximately 13.4-mile.
- Upgrade the existing Belton – Nolanville – Harker Heights – Killeen Taft Street – Killeen Elm 138-kV transmission lines with a normal and emergency ratings of 486 MVA or greater, approximately 2.1-mile.
- Upgrade the existing Temple North – Pepper Creek Switch 138-kV double-circuit transmission line with a normal and emergency ratings of 486 MVA or greater, approximately 2.2-mile, per circuit.
- Upgrade the existing Temple Elm Creek Switch – Temple North 138-kV double-circuit transmission line with a normal and emergency ratings of 486 MVA or greater, approximately 0.6-mile, per circuit.
- Install two blocks of 18.4 MVAr capacitor banks at each of the existing Killeen Taft St., Killeen, and Killeen Ft. Hood 138-kV substations.
- Install a second 138/69-kV transformer with a normal and emergency ratings of 100 MVA at the existing Seaton 138/69-kV substation.
- Upgrade the existing Seaton – Bob Poage – Temple Taylor Valley – Bell County 69-kV transmission lines, 138-kV capable but operational at 69-kV, with a normal and emergency ratings of 197 MVA or greater, approximately 3.4-mile.

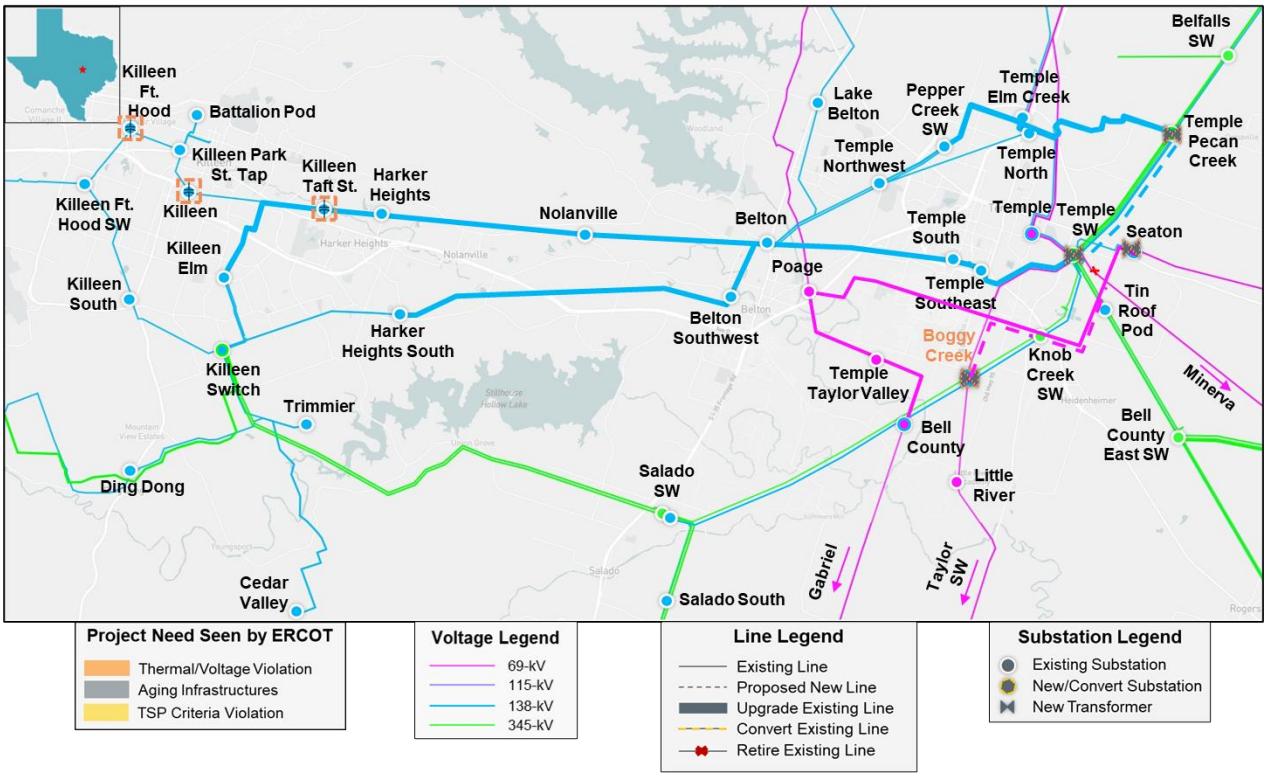

Figure 4.3: Map of Option 3

4.1.4 Option 3 – Sensitivity

A sensitivity was tested on Option 3 which included an additional component as follows:

- Construction of a new second circuit to the existing Knob Creek Switch – Salado Switch 345-kV transmission line with a normal and emergency ratings of 1,912 MVA or greater, approximately 13.8-mile.

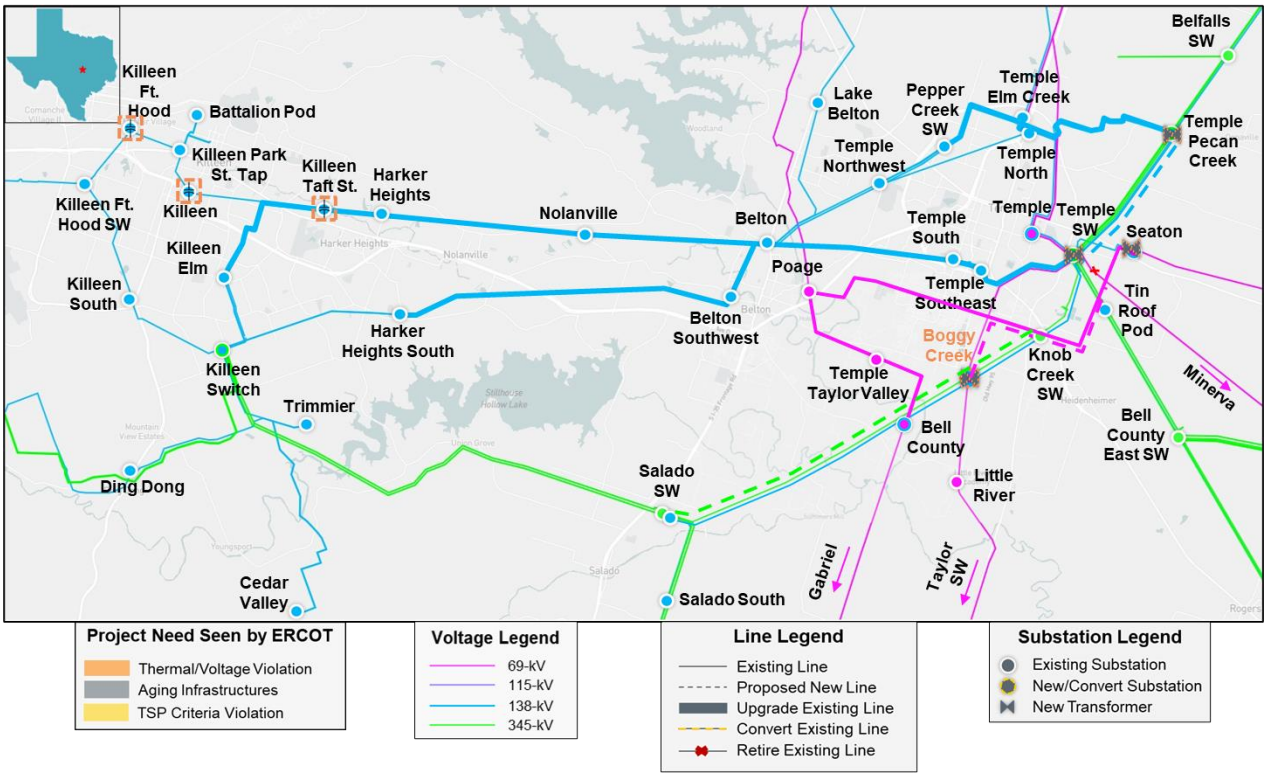

Figure 4.4: Map of Option 3 – Sensitivity with 345-kV Second Circuit

4.1.5 Option 4

Option 4 consists of the following:

- Install a second 345/138-kV transformer with normal and emergency ratings of 600 MVA at Temple Pecan Creek Switch and loop the existing Bellfalls Switch – Temple Switch 345-kV transmission line into the Temple Pecan Creek 345-kV Switch by installing three new 345-kV circuit breakers in the existing 345-kV ring bus arrangement and three new 138-kV circuit breakers in the existing 138-kV breaker-and-a-half arrangement. Replace all existing 40 kA, 138-kV circuit breakers at Temple Pecan Creek Switch with 63 kA circuit breakers.
- Install a second 345/138-kV transformer with normal and emergency ratings of 600 MVA at Temple Switch and rebuild the Temple 345/138-kV Switch with eleven 345-kV circuit breakers in a breaker-and-a-half arrangement and sixteen 138-kV circuit breakers in a breaker-and-a-half arrangement.
- Replace nine of the existing 40 kA, 138-kV circuit breakers at Temple Elm Creek Switch with 63 kA circuit breakers.
- Upgrade the existing Temple Pecan Creek Switch – Temple Elm Creek Switch 138-kV double-circuit transmission line with a normal and emergency ratings of 493 MVA or greater, approximately 5.0-mile.

- Install a second circuit on the vacant position of the existing Temple Switch – Temple Pecan Creek Switch 138-kV double-circuit capable line with a normal and emergency ratings of 486 MVA or greater, approximately 4.4-mile.
- Construct a new Boggy Creek 138/69-kV Switch approximately 3.6 miles south of the existing Temple 138-kV Substation. Install seven 138-kV breakers in breaker-and-a-half arrangement and two 69-kV breakers in single bus arrangement. Install one 138/69-kV transformer with a normal and emergency a nameplate ratings of 50 MVA or greater to the new Boggy Creek Switch.
- Boggy Creek 138-kV Switch to be interconnected as follows:
    - Install a new 69-kV transmission line on the vacant sides of the existing double-circuit capable structures of Taylor Switch – Temple Switch and Bob Poage – Seaton 69-kV transmission lines and connect the new 69-kV line to Minerva Switch at STR 3/5 to establish the Boggy Creek Switch – Minerva Switch 69-kV transmission line.
    - Establish the new normally open Boggy Creek Switch – Temple Substation 138-kV transmission line section, by converting the 69-kV line between Boggy Creek Switch and Temple Substation to 138-kV operational with a normally open disconnect switch at Temple Substation, with a normal and emergency ratings of 197 MVA or greater, approximately 5.0-mile.
    - Disconnect the existing Temple Switch – Minerva Switch 69-kV transmission line at STR 3/5.
- Upgrade the existing Temple Switch – Temple Southeast – Scott & White – Temple South – Belton 138-kV transmission lines with a normal and emergency ratings of 486 MVA or greater, approximately 9.6-mile.
- Upgrade the existing Belton – Belton Southwest – Harker Heights South 138-kV transmission lines with a normal and emergency ratings of 486 MVA or greater, approximately 13.4-mile.
- Upgrade the existing Belton – Nolanville – Harker Heights – Killeen Taft Street – Killeen Elm 138-kV transmission lines with a normal and emergency ratings of 486 MVA or greater, approximately 2.1-mile.
- Upgrade the existing Temple North – Pepper Creek Switch 138-kV double-circuit transmission line with a normal and emergency ratings of 486 MVA or greater, approximately 2.2-mile, per circuit.
- Upgrade the existing Temple Elm Creek Switch – Temple North 138-kV double-circuit transmission line with a normal and emergency ratings of 486 MVA or greater, approximately 0.6-mile, per circuit.
- Install two blocks of 18.4 MVAr capacitor banks at each of the existing Killeen Taft St., Killeen, and Killeen Ft. Hood 138-kV substations.
- Bell County 138-kV Switch to be interconnected as follows:
    - Keep the existing 345-kV double-circuit and the existing 345-kV line from Salado Switch - Knob Creek – Temple Switch but remove the existing 138-kV circuits from the existing 345-kV structures.

- Construct a new Bell County Switch - Boggy Creek Switch - Temple Switch 138-kV transmission lines on new double-circuit structure with one circuit in place, utilizing the existing Right-of-Way (ROW) with a normal and emergency ratings of 614 MVA or greater, approximately 7.7-mile.
- Construct a new Bell County Switch - Salado Switch 138-kV transmission line on new double-circuit structure with one circuit in place, utilizing the existing ROW, with a normal and emergency ratings of 614 MVA or greater, approximately 7.8-mile.

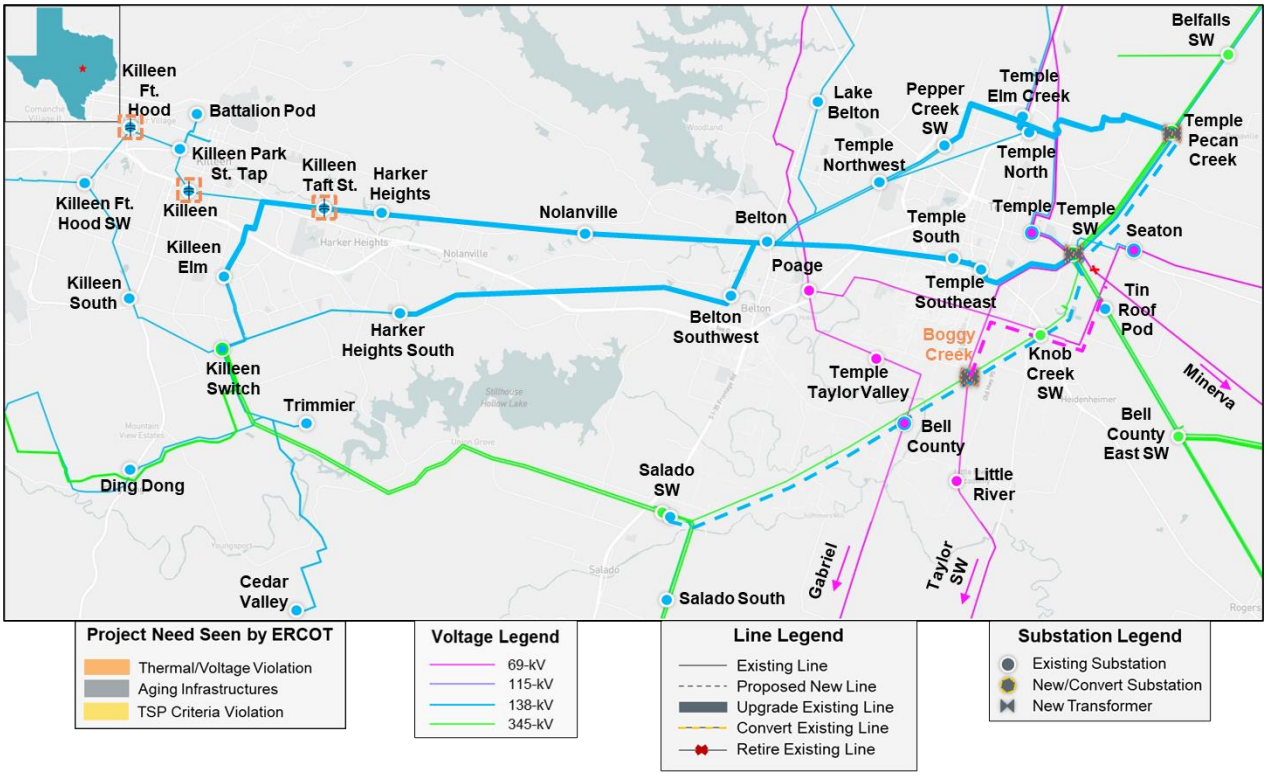

Figure 4.5: Map of Option 4

4.1.6 Option 5

Option 5 consists of the following:

- Install a second 345/138-kV transformer with normal and emergency ratings of 600 MVA at Temple Pecan Creek Switch and loop the existing Bellfalls Switch – Temple Switch 345-kV transmission line into the Temple Pecan Creek 345-kV Switch by installing three new 345-kV circuit breakers in the existing 345-kV ring bus arrangement and three new 138-kV circuit breakers in the existing 138-kV breaker-and-a-half arrangement. Replace all existing 40 kA, 138-kV circuit breakers at Temple Pecan Creek Switch with 63 kA circuit breakers.
- Install a second 345/138-kV transformer with normal and emergency ratings of 600 MVA at Temple Switch and rebuild the Temple 345/138-kV Switch with eleven 345-kV circuit breakers in a breaker-and-a-half arrangement and sixteen 138-kV circuit breakers in a breaker-and-a-half arrangement.

- Replace nine of the existing 40 kA, 138-kV circuit breakers at Temple Elm Creek Switch with 63 kA circuit breakers.
- Upgrade the existing Temple Pecan Creek Switch – Temple Elm Creek Switch 138-kV double-circuit transmission line with a normal and emergency ratings of 493 MVA or greater, approximately 5.0-mile.
- Install a second circuit on the vacant position of the existing Temple Switch – Temple Pecan Creek Switch 138-kV double-circuit capable line with a normal and emergency ratings of 486 MVA or greater, approximately 4.4-mile.
- Construct a new Boggy Creek 138/69-kV Switch approximately 3.6 miles south of the existing Temple 138-kV Substation. Install seven 138-kV breakers in breaker-and-a-half arrangement and two 69-kV breakers in single bus arrangement. Install one 138/69-kV transformer with a normal and emergency a nameplate ratings of 50 MVA or greater to the new Boggy Creek Switch.
- Boggy Creek 138-kV Switch to be interconnected as follows:
    - Install a new 69-kV transmission line on the vacant sides of the existing double-circuit capable structures of Taylor Switch – Temple Switch and Bob Poage – Seaton 69-kV transmission lines and connect the new 69-kV line to Minerva Switch at STR 3/5 to establish the Boggy Creek Switch – Minerva Switch 69-kV transmission line.
    - Establish the new normally open Boggy Creek Switch – Temple Substation 138-kV transmission line section, by converting the 69-kV line between Boggy Creek Switch and Temple Substation to 138-kV operational with a normally open disconnect switch at Temple Substation, with a normal and emergency ratings of 197 MVA or greater, approximately 5.0-mile.
    - Disconnect the existing Temple Switch – Minerva Switch 69-kV transmission line at STR 3/5.
- Upgrade the existing Temple Switch – Temple Southeast – Scott & White – Temple South – Belton 138-kV transmission lines with a normal and emergency ratings of 486 MVA or greater, approximately 9.6-mile.
- Upgrade the existing Belton – Belton Southwest – Harker Heights South 138-kV transmission lines with a normal and emergency ratings of 486 MVA or greater, approximately 13.4-mile.
- Upgrade the existing Belton – Nolanville – Harker Heights – Killeen Taft Street – Killeen Elm 138-kV transmission lines with a normal and emergency ratings of 486 MVA or greater, approximately 2.1-mile.
- Upgrade the existing Temple North – Pepper Creek Switch 138-kV double-circuit transmission line with a normal and emergency ratings of 486 MVA or greater, approximately 2.2-mile, per circuit.
- Upgrade the existing Temple Elm Creek Switch – Temple North 138-kV double-circuit transmission line with a normal and emergency ratings of 486 MVA or greater, approximately 0.6-mile, per circuit.

- Install two blocks of 18.4 MVAr capacitor banks at each of the existing Killeen Taft St., Killeen, and Killeen Ft. Hood 138-kV substations.
- Bell County 138-kV Switch to be interconnected as follows:
    - Keep the existing 345-kV double-circuit and the existing 345-kV line from Salado Switch - Knob Creek – Temple Switch but remove the existing 138-kV circuits from the existing 345-kV structures.
    - Construct a new Bell County Switch - Boggy Creek Switch - Temple Switch 138-kV transmission lines on new double-circuit structure with one circuit in place, utilizing the existing ROW with a normal and emergency ratings of 614 MVA or greater, approximately 7.7-mile.
    - Construct a new Bell County Switch - Salado Switch 138-kV transmission line on new double-circuit structure with one circuit in place, utilizing the existing ROW, with a normal and emergency ratings of 614 MVA or greater, approximately 7.8-mile.
- Upgrade the existing Temple Switch – Seaton 138-kV transmission line with a normal and emergency ratings of 486 MVA or greater, approximately 2.7-mile.
- Convert the existing Seaton – Bob Poage – Temple Taylor Valley – Bell County Switch 69-kV transmission lines to 138-kV operational with a normal and emergency ratings of 214 MVA or greater, approximately 17.7-mile.
    - Expand and convert the existing Bob Poage 69-kV substation to 138/69-kV Switch substation and install a new 100 MVA 138/69-kV transformer.
    - Convert the existing Temple Taylor Valley 69-kV substation to 138-kV substation.

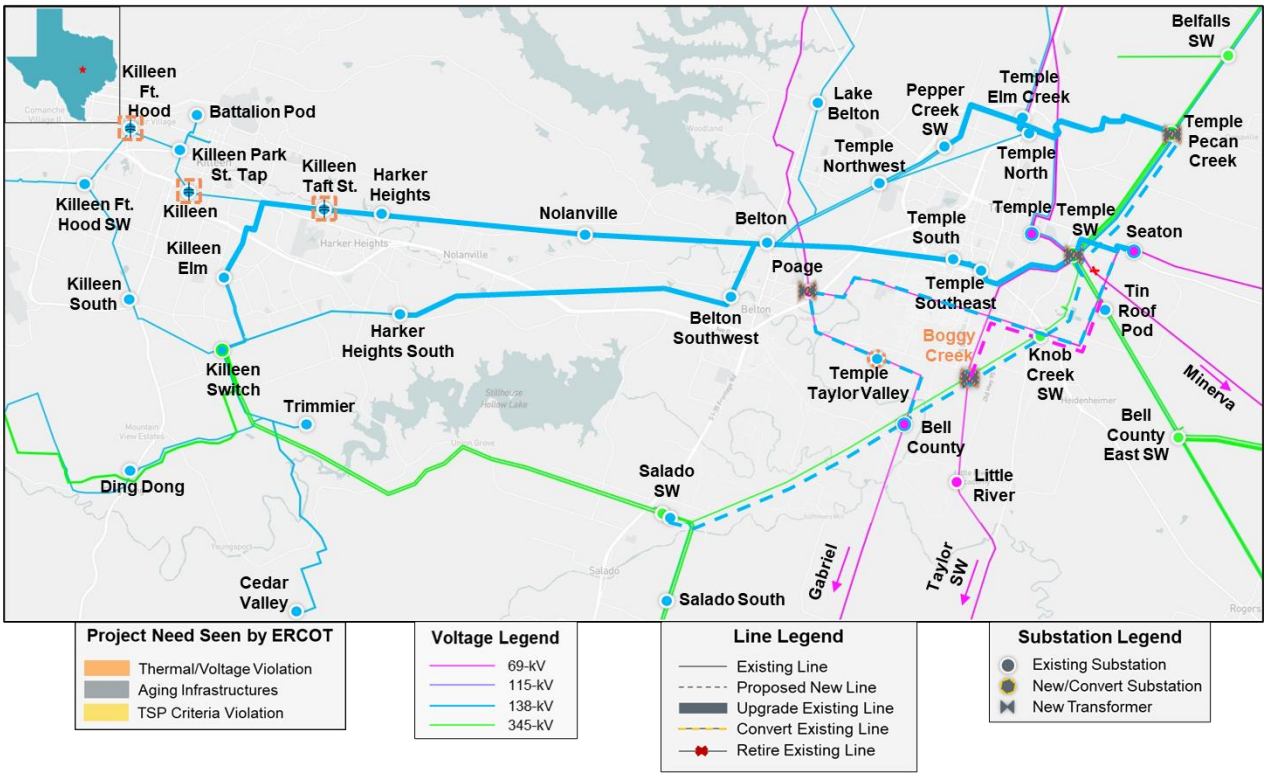

Figure 4.6: Map of Option 5

4.1.7 Option 6

Option 6 consists of the following:

- Install a second 345/138-kV transformer with normal and emergency ratings of 600 MVA at Temple Pecan Creek Switch and loop the existing Bellfalls Switch – Temple Switch 345-kV transmission line into the Temple Pecan Creek 345-kV Switch by installing three new 345-kV circuit breakers in the existing 345-kV ring bus arrangement and three new 138-kV circuit breakers in the existing 138-kV breaker-and-a-half arrangement. Replace all existing 40 kA, 138-kV circuit breakers at Temple Pecan Creek Switch with 63 kA circuit breakers.
- Install a second 345/138-kV transformer with normal and emergency ratings of 600 MVA at Temple Switch and rebuild the Temple 345/138-kV Switch with eleven 345-kV circuit breakers in a breaker-and-a-half arrangement and sixteen 138-kV circuit breakers in a breaker-and-a-half arrangement.
- Replace nine of the existing 40 kA, 138-kV circuit breakers at Temple Elm Creek Switch with 63 kA circuit breakers.
- Upgrade the existing Temple Pecan Creek Switch – Temple Elm Creek Switch 138-kV double-circuit transmission line with a normal and emergency ratings of 493 MVA or greater, approximately 5.0-mile.

- Install a second circuit on the vacant position of the existing Temple Switch – Temple Pecan Creek Switch 138-kV double-circuit capable line with a normal and emergency ratings of 486 MVA or greater, approximately 4.4-mile.
- Construct a new Boggy Creek 138/69-kV Switch approximately 3.6 miles south of the existing Temple 138-kV Substation. Install seven 138-kV breakers in breaker-and-a-half arrangement and two 69-kV breakers in single bus arrangement. Install one 138/69-kV transformer with a normal and emergency a nameplate ratings of 50 MVA or greater to the new Boggy Creek Switch.
- Boggy Creek 138-kV Switch to be interconnected as follows:
    - Install a new 69-kV transmission line on the vacant sides of the existing double-circuit capable structures of Taylor Switch – Temple Switch and Bob Poage – Seaton 69-kV transmission lines and connect the new 69-kV line to Minerva Switch at STR 3/5 to establish the Boggy Creek Switch – Minerva Switch 69-kV transmission line.
    - Establish the new normally open Boggy Creek Switch – Temple Substation 138-kV transmission line section, by converting the 69-kV line between Boggy Creek Switch and Temple Substation to 138-kV operational with a normally open disconnect switch at Temple Substation, with a normal and emergency ratings of 197 MVA or greater, approximately 5.0-mile.
    - Disconnect the existing Temple Switch – Minerva Switch 69-kV transmission line at STR 3/5.
- Upgrade the existing Temple Switch – Temple Southeast – Scott & White – Temple South – Belton 138-kV transmission lines with a normal and emergency ratings of 486 MVA or greater, approximately 9.6-mile.
- Upgrade the existing Belton – Belton Southwest – Harker Heights South 138-kV transmission lines with a normal and emergency ratings of 486 MVA or greater, approximately 13.4-mile.
- Upgrade the existing Belton – Nolanville – Harker Heights – Killeen Taft Street – Killeen Elm 138-kV transmission lines with a normal and emergency ratings of 486 MVA or greater, approximately 2.1-mile.
- Upgrade the existing Temple North – Pepper Creek Switch 138-kV double-circuit transmission line with a normal and emergency ratings of 486 MVA or greater, approximately 2.2-mile, per circuit.
- Upgrade the existing Temple Elm Creek Switch – Temple North 138-kV double-circuit transmission line with a normal and emergency ratings of 486 MVA or greater, approximately 0.6-mile, per circuit.
- Install two blocks of 18.4 MVAr capacitor banks at each of the existing Killeen Taft St., Killeen, and Killeen Ft. Hood 138-kV substations.
- Install a second 138/69-kV transformer with a normal and emergency ratings of 600 MVA at the existing Seaton 138/69-kV substation.

- Convert the existing Seaton – Bob Poage – Temple Taylor Valley – Bell County Switch 69-kV transmission lines to 138-kV operational with a normal and emergency ratings of 214 MVA or greater, approximately 17.7-mile.
    - Expand and convert the existing Bob Poage 69-kV substation to 138/69-kV Switch substation and install a new 100 MVA 138/69-kV transformer.
    - Convert the existing Temple Taylor Valley 69-kV substation to 138-kV substation.

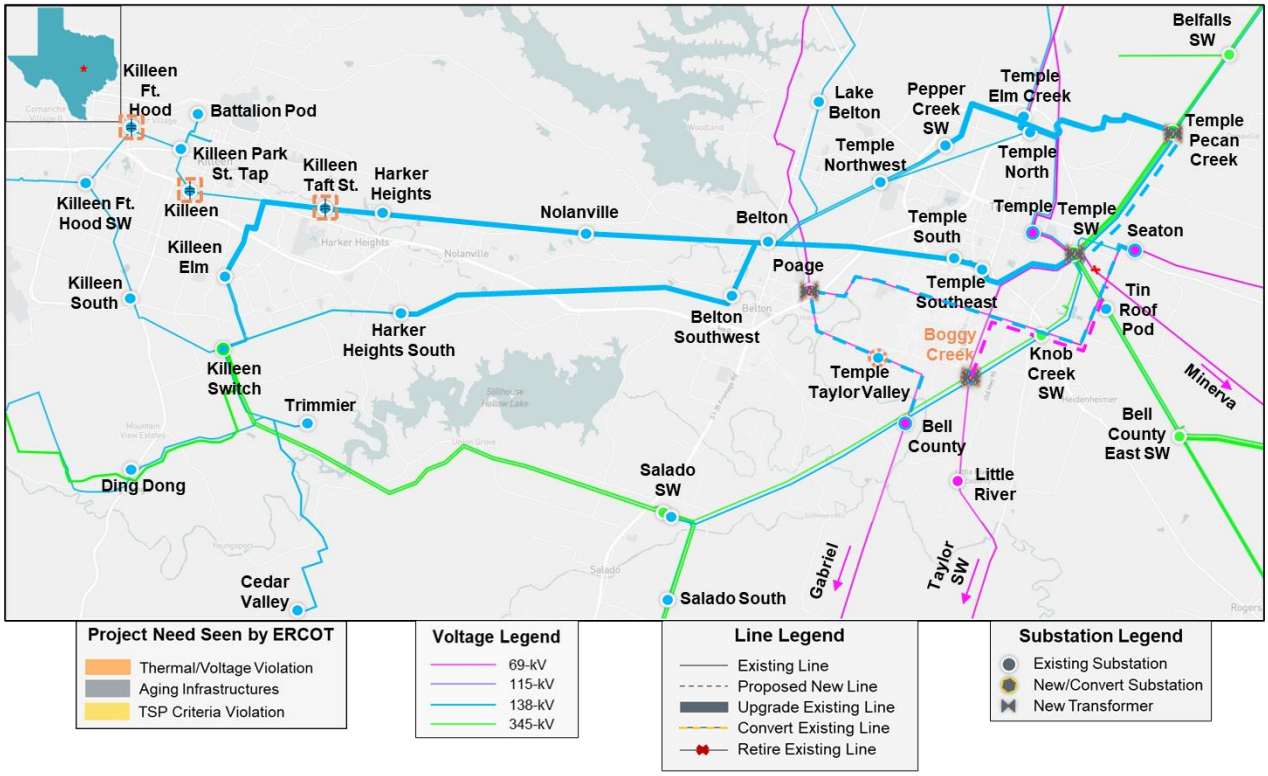

Figure 4.7: Map of Option 6

4.1.8 Option 7

Option 7 consists of the following:

- Install a second 345/138-kV transformer with a normal and emergency ratings of 600 MVA at Temple Pecan Creek Switch and loop the existing Bellfalls Switch – Temple Switch 345-kV transmission line into the Temple Pecan Creek 345-kV Switch by installing three new 345-kV circuit breakers in the existing 345-kV ring bus arrangement and three new 138-kV circuit breakers in the existing 138-kV breaker-and-a-half arrangement. Replace all existing 40 kA, 138-kV circuit breakers at Temple Pecan Creek Switch with 63 kA circuit breakers.
- Install a second 345/138-kV transformer with a normal and emergency ratings of 600 MVA at Temple Switch and rebuild the Temple 345/138-kV Switch with eleven 345-kV circuit breakers in a breaker-and-a-half arrangement and sixteen 138-kV circuit breakers in a breaker-and-a-half arrangement.

- Replace nine of the existing 40 kA, 138-kV circuit breakers at Temple Elm Creek Switch with 63 kA circuit breakers.
- Upgrade the existing Temple Pecan Creek Switch – Temple Elm Creek Switch 138-kV double-circuit transmission line with a normal and emergency ratings of 493 MVA or greater, approximately 5.0-mile.
- Install a second circuit on the vacant position of the existing Temple Switch – Temple Pecan Creek Switch 138-kV double-circuit capable line with a normal and emergency ratings of 486 MVA or greater, approximately 4.4-mile.
- Construct a new Boggy Creek 138/69-kV Switch approximately 3.6 miles south of the existing Temple 138-kV Substation. Install seven 138-kV breakers in breaker-and-a-half arrangement and two 69-kV breakers in single bus arrangement. Install one 138/69-kV transformer with a normal and emergency a nameplate ratings of 50 MVA or greater to the new Boggy Creek Switch.
- Boggy Creek 138-kV Switch to be interconnected as follows:
    - Install a new 69-kV transmission line on the vacant sides of the existing double-circuit capable structures of Taylor Switch – Temple Switch and Bob Poage – Seaton 69-kV transmission lines and connect the new 69-kV line to Minerva Switch at STR 3/5 to establish the Boggy Creek Switch – Minerva Switch 69-kV transmission line.
    - Establish the new normally open Boggy Creek Switch – Temple Substation 138-kV transmission line section, by converting the 69-kV line between Boggy Creek Switch and Temple Substation to 138-kV operational with a normally open disconnect switch at Temple Substation, with a normal and emergency ratings of 197 MVA or greater, approximately 5.0-mile.
    - Disconnect the existing Temple Switch – Minerva Switch 69-kV transmission line at STR 3/5.
- Upgrade the existing Temple Switch – Temple Southeast – Scott & White – Temple South – Belton 138-kV transmission lines with a normal and emergency ratings of 486 MVA or greater, approximately 9.6-mile.
- Upgrade the existing Belton – Belton Southwest – Harker Heights South 138-kV transmission lines with a normal and emergency ratings of 486 MVA or greater, approximately 13.4-mile.
- Upgrade the existing Belton – Nolanville – Harker Heights – Killeen Taft Street – Killeen Elm 138-kV transmission lines with a normal and emergency ratings of 486 MVA or greater, approximately 2.1-mile.
- Upgrade the existing Temple North – Pepper Creek Switch 138-kV double-circuit transmission line with a normal and emergency ratings of 486 MVA or greater, approximately 2.2-mile, per circuit.
- Upgrade the existing Temple Elm Creek Switch – Temple North 138-kV double-circuit transmission line with a normal and emergency ratings of 486 MVA or greater, approximately 0.6-mile, per circuit.

- Install two blocks of 18.4 MVAr capacitor banks at each of the existing Killeen Taft St., Killeen, and Killeen Ft. Hood 138-kV substations.
- Bell County 138-kV Switch to be interconnected as follows:
    - Keep the existing 345-kV double-circuit and the existing 345-kV line from Salado Switch - Knob Creek – Temple Switch but remove the existing 138-kV circuits from the existing 345-kV structures.
    - Construct a new Bell County Switch - Boggy Creek Switch - Temple Switch 138-kV transmission lines on new double-circuit structure with one circuit in place, utilizing the existing ROW with a normal and emergency ratings of 614 MVA or greater, approximately 7.7-mile.
    - Construct a new Bell County Switch - Salado Switch 138-kV transmission line on new double-circuit structure with one circuit in place, utilizing the existing ROW, with a normal and emergency ratings of 614 MVA or greater, approximately 7.8-mile.
- Construct a new second circuit to the existing Knob Creek – Salado Switch 345-kV transmission line on the existing ROW with a normal and emergency ratings of 1,912 MVA or greater, approximately 13.8-mile.
- Install two new 600 MVA 345/138-kV transformers at the existing Salado Switch and connect the 138-kV and 345-kV at Salado Switch.
- Upgrade the existing Temple Switch – Seaton 138-kV transmission line with a normal and emergency ratings of 486 MVA or greater, approximately 2.7-mile.

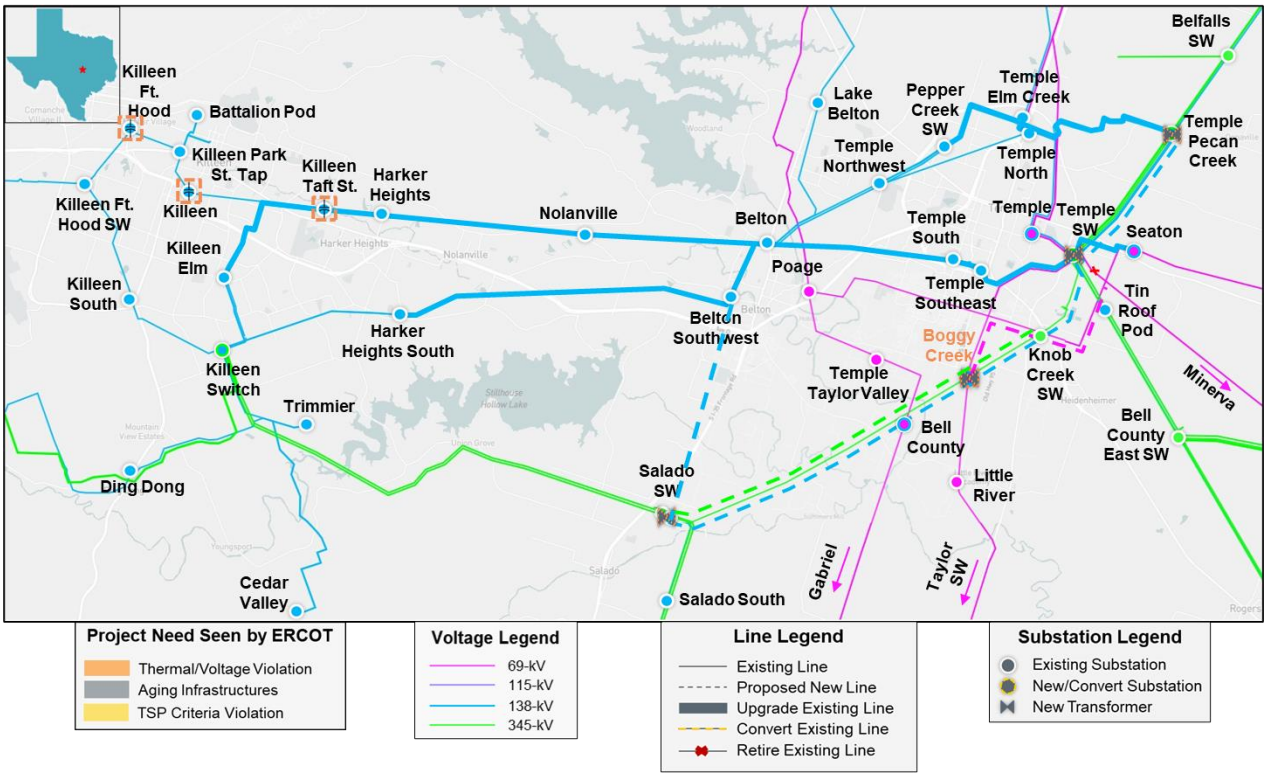

Figure 4.8: Map of Option 7

5 Option Evaluations

ERCOT performed reliability analysis, planned maintenance outage evaluation, and long-term load serving capability assessment to evaluate all initial 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 initial eight options were evaluated based on the contingencies described in the Section 2.1 of the report. Options 1, 2, 3, and 6 observed either thermal overloads, voltage violations, or both under various N-1, X-1+N-1, or G-1+N-1 contingency conditions. No reliability criteria violations were identified for Options 4, 5, and 7 as shown in Table 5.1.

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

Option		N-1		X-1 + N-1		G-1 + N-1	
	Unsolved Power Flow	Thermal Overload	Voltage Violation	Thermal Overload	Voltage Violation	Thermal Overload	Voltage Violation
1	None	None	None	6	19	None	None
2	None	2	None	2	None	None	None
3	None	3	None	None	None	None	None
3 - Sensitivity	None	2	None	None	None	1	None
4	None	None	None	None	None	None	None
5	None	None	None	None	None	None	None
6	None	1	None	None	None	1	None
7	None	None	None	None	None	None	None

5.2 Short-listed Options

Based on the results shown in Section 5.1, Options 4, 5, and 7 were selected as short-listed options for further evaluations.

Based on the feedback from the Transmission Service Providers (TSPs) in the area, all short-listed options were further tested with Tier 4 Bell County – Gabriel 69-kV line conversion to 138-kV Project (TPIT # 75524) with an ISD of November 2026, which is relatively close to the ISD of Oncor Temple Area Project.

All short-listed options were also modified further based on feedback from Oncor. The proposed locations for capacitor banks were deemed infeasible by Oncor due to substation constraints. Following new components were added to all short-listed options.

- Construct the new Watercrest 138-kV Switch substation near Killeen Ft. Hood Switch in a 4-breaker ring bus arrangement and install one capacitor bank consisting of 110.4 MVAr in three 36.8 MVAr stages.

- Close the normally open Killeen Ft. Hood – Battalion 138-kV transmission line section.
- Upgrade the existing Watercrest Switch – Killeen Taft 138-kV transmission lines with a normal and emergency ratings of 614 MVA or greater, approximately 7.9-mile.
- Upgrade the existing Watercrest Switch – Killeen Switch 138-kV transmission lines with a normal and emergency ratings of 493 MVA or greater, approximately 7.5-mile.
- Install two new 600 MVA 345/138-kV transformers at the existing Salado Switch and connect the 138-kV and 345-kV at Salado Switch.
- Construct a New Bell County 138-kV Switch with four 138-kV breakers in a ring bus arrangement near the existing Bell County Switch and establish a tie to the existing Bell County Switch substation.

Moving forward the three modified short-listed options will be redesignated as Option 4A, 5A, and 7A respectively and they are illustrated in Figures 5.1, 5.2, and 5.3.

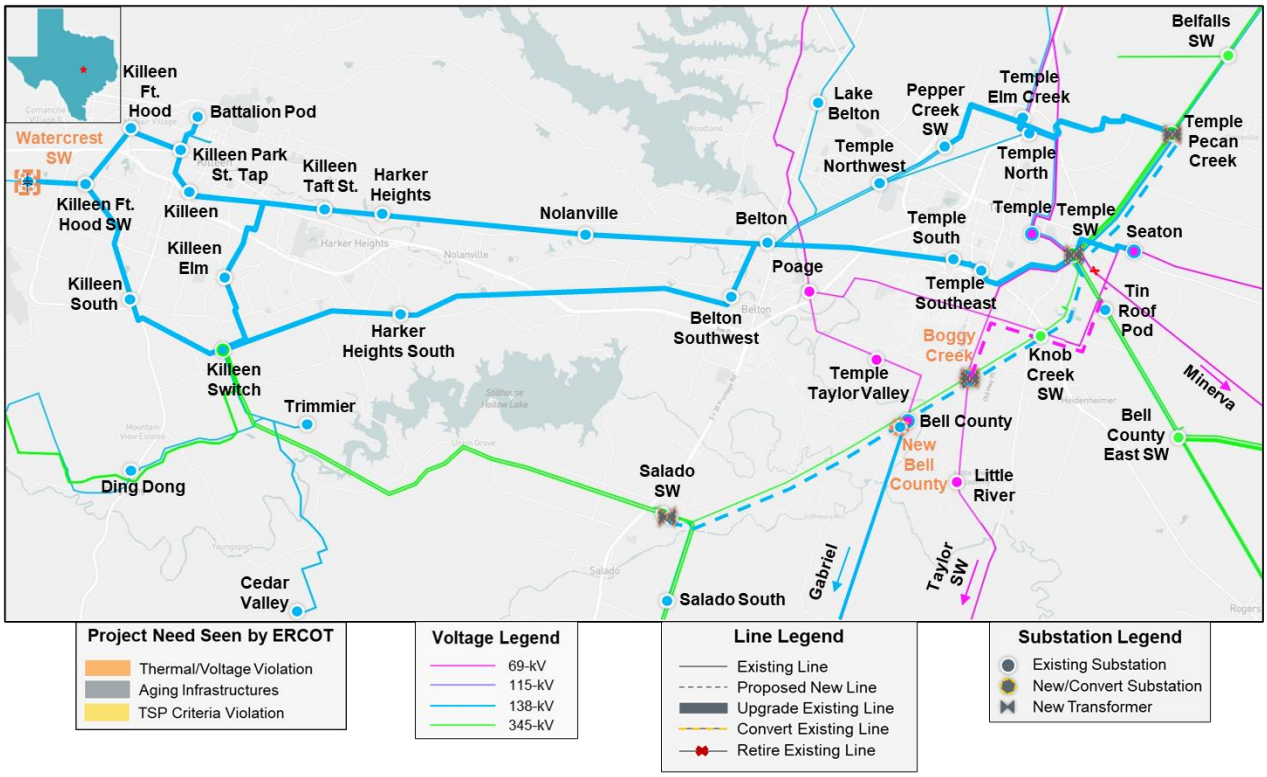

Figure 5.1: Map of Option 4A

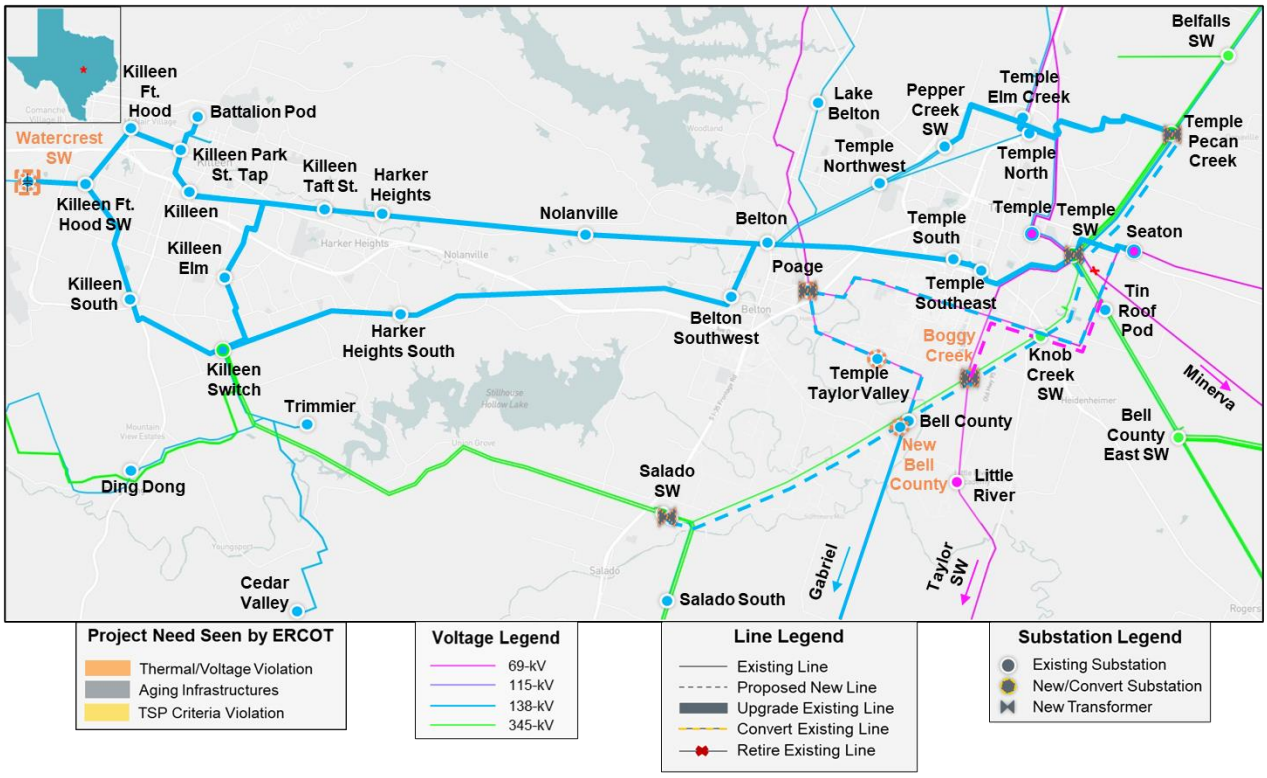

Figure 5.2: Map of Option 5A

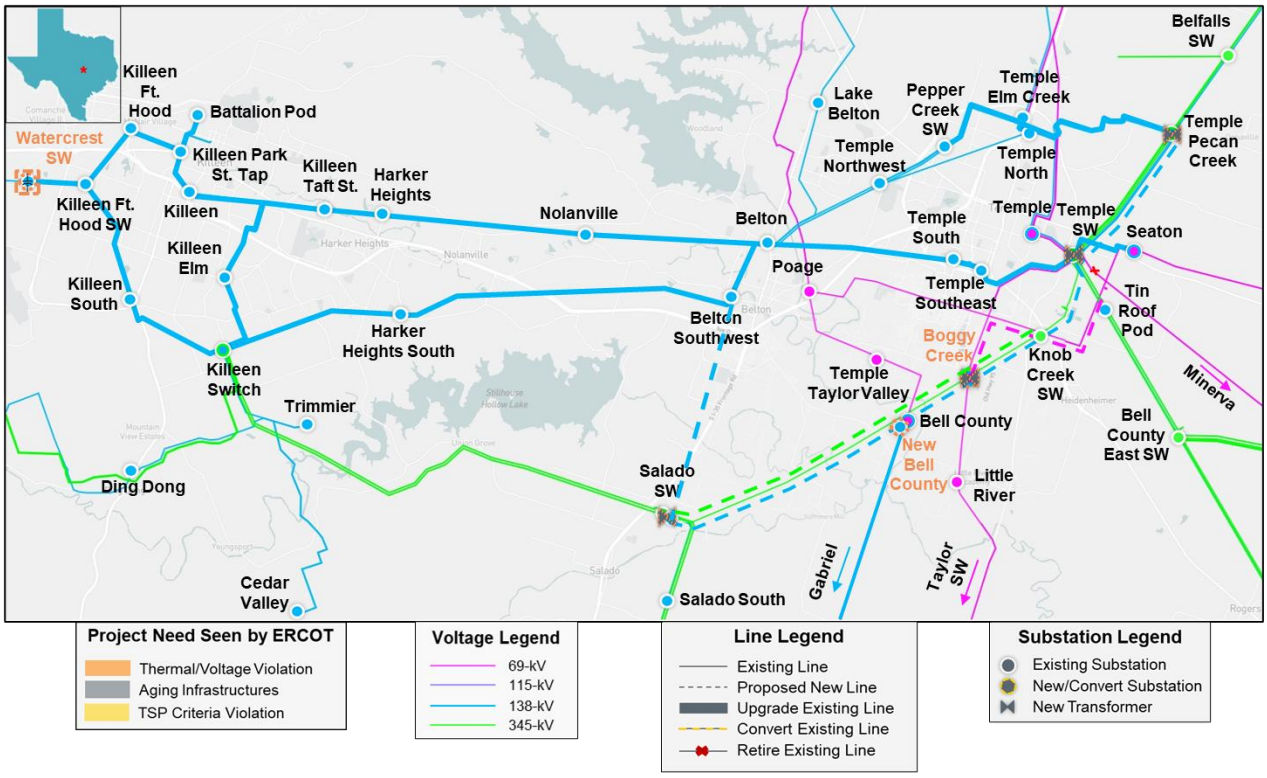

Figure 5.3: Map of Option 7A

5.3 Long-Term Load-Serving Capability Analysis

ERCOT performed a long-term load-serving capability assessment on the modified short-listed options to compare the relative performance between these three options. The NC Weather Zone, which includes the study area, has experienced a significant increases in the demand of Customers operating datacenters or virtual currency mining facilities are also forecasted in the study area for the future years. Due to the expected high load growth in this area, ERCOT performed a long-term load serving capability assessment on all three options.

The results show Options 4A and 5A to have similar performance while Option 7A has approximately 100 MW more incremental load-serving capability than Options 4A and 5A. These results are shown in Table 5.2.

Table 5.2: Results of Long-Term Load Serving Capability Assessment of the Short-Listed Options

Option	Incremental Load Serving Capability (~MW)
4A	415
5A	417
7A	519

5.4 Planned Maintenance Outage Evaluation

Using the P1, P2.1, and P7 contingencies based on the review of the system topology of the Bell County, ERCOT conducted an N-2 contingency analysis for each short-listed 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 study area were monitored in the maintenance outage evaluation.

As shown in Table 5.3, the results of this maintenance assessment indicates that all short-listed options did not result in any reliability violations.

Table 5.3: Results of Planned Maintenance Outage Evaluation for the Short-Listed Options

Option	Voltage Violations	Thermal Violations	Unsolved Power Flow
4A	None	None	None
5A	None	None	None
7A	None	None	None

5.5 Cost Estimate and Feasibility Assessment

Oncor and Brazos Electric Power Cooperative, Inc. (BEPC), performed feasibility assessments and provided final cost estimates for the three short-listed options. Table 5.4 summarizes the cost estimate, estimated mileage of Certificate of Convenience and Necessity (CCN) required, option feasibility, and expected year of complication for the three short-listed options.

Table 5.4: Cost Estimates and Expected ISD for the Short-Listed Options

Option	Cost Estimates (~$M)	CCN Required (~miles)	Feasible	Expected ISD (Month Year)
4A	257.6	Yes (15.4)	Feasible	December 2028
5A	272.6	Yes (15.4)	Feasible	December 2028
7A	329.3[9]	Yes (23.4)	Not Feasible	N/A

Based on feedback from Oncor, Option 7A was deemed not feasible as construction of new 138-kV and new 345-kV circuits will require additional land acquisitions and time to complete.

6 Comparison of Short-listed Options

Based on the results from Option Evaluations in Section 5, all the short-listed Options 4A, 5A, and 7A are summarized in Table 6.1.

Table 6.1: Comparison of the Short-Listed Options

	Option 4A	Option 5A	Option 7A
Addresses the project needs	Yes	Yes	Yes
Meets ERCOT and NERC Reliability Criteria	No	Yes	Yes
Improves Long-term Load Serving Capability	Yes	Yes	Yes
CCN Required (~miles)	Yes (15.4)	Yes (15.4)	Yes (23.4)
Expected ISD (Month Year)	December 2028	December 2028	N/A
Construction Feasibility (Based on TSP assessment)	Yes	Yes	No
Capital Cost Estimates[10] (~$M)	257.6	272.6	329.3[9]

ERCOT selects Option 5A as the preferred option to address the reliability need in the study area based on the following considerations:

- Option 5A addresses project need in the Bell County;
- Option 5A improves long-term load serving capability for future load growth in the area; and
- Option 5A is the least cost solution and requires least amount of CCN mileages among the options that meet all of the ERCOT and NERC Reliability Criteria.

7 Additional Analysis and Assessment

The preferred option (Option 5A, approximately $272.6 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.

[9] The estimated cost does not include cost related to new CCN or land acquisition.
[10] The cost estimates were provided by the TSPs.

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 May 2024 GIS[11] report, 17 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 7.1, were added to the preferred option case following 2024 RTP Methodology. ERCOT determined addition of these generators do not impact the preferred option.

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

GINR	Unit Name	Fuel Type	Capacity (~MW)	County
24INR0031	Stoneridge Solar	Solar	201.6	Milam
25INR0389	Stoneridge BESS	Battery	101.9	Milam
23INR0118	Blevins Solar	Solar	271.6	Falls
23INR0119	Blevins Storage	Battery	181.3	Falls
23INR0070	Chillingham Solar	Solar	352.4	Bell
23INR0079	Chillingham Storage	Battery	153.9	Bell
23INR0344	XE Hermes Solar	Solar	100.4	Bell
24INR0365	XE Hermes Storage	Battery	100.4	Bell
24INR0166	Stillhouse Solar	Solar	212.5	Bell
24INR0042	Yaupon Solar SLF	Solar	204.1	Milam
24INR0169	Yaupon Storage SLF	Battery	0.0	Milam
24INR0208	Eastbell Milam Solar II	Solar	150.6	Milam
23INR0469	Big Elm Storage	Battery	100.8	Bell
23INR0249	Limewood Solar	Solar	204.6	Bell
22INR0511	Gransolar Texas One	Solar	50.0	Milam
22INR0356	Jungmann Solar	Solar	40.2	Milam
23INR0235	Hoyte Solar	Solar	206.8	Milam

7.2 Load Scaling Sensitivity Analysis

Planning Guide Section 3.1.3(4)(b) requires an evaluation of the potential impact of load scaling on the criteria violations seen in this ERCOT independent review. As stated in Section 2.1, ERCOT used the 2026 summer peak cases for the NNC and SSC from the 2023 RTP and adjusted the load to create the 2026 NCSC summer peak case to study the Bell County area. This study base case, which was created in accordance with the 2023 RTP Study Scope and Process document and Section 2.1 of this document, included load scaled down from the respective non-coincident peaks in the Coast, East, Far West, North, South, and West Weather Zones.

The Outage Transfer Distribution Factors (OTDFs) of overloaded elements with respect to the load transfer for each Weather Zone (excluding NC & SC) were calculated using PowerWorld Simulator.

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

The OTDFs were less than 1% for each of the overloaded elements, i.e., they were not significant enough to have an impact on the overloaded elements. ERCOT concluded that the load scaling used to develop the base case in this study did not have a material impact on the project need, which was primarily driven by reliability issues in the Bell County area.

7.3 Sub-synchronous Resonance (SSR) Assessment

Pursuant to Protocol Section 3.22.1.3(2), ERCOT conducted a sub-synchronous-resonance (SSR) screening for the preferred option, Option 5A, 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 preferred option, Option 5A, 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 of Option 5A.

9 Conclusion

ERCOT evaluated 11 transmission upgrade options to resolve the thermal overloads identified in the Temple area in Oncor's project submission and additional violations in Killeen area and rest of the Bell County. Based on the results of the independent review, ERCOT recommends Option 5A as the preferred solution because it addresses all project needs, is the least cost option with no reliability violations, and improves long-term load serving capability.

Option 5A consists of the following upgrades:

- Install a second 345/138-kV transformer with a normal and emergency ratings of 600 MVA at Temple Pecan Creek Switch and loop the existing Bellfalls Switch – Temple Switch 345-kV transmission line into the Temple Pecan Creek 345-kV Switch by installing three new 345-kV circuit breakers in the existing 345-kV ring bus arrangement and three new 138-kV circuit breakers in the existing 138-kV breaker-and-a-half arrangement. Replace all existing 40 kA, 138-kV circuit breakers at Temple Pecan Creek Switch with 63 kA circuit breakers.
- Install a second 345/138-kV transformer with a normal and emergency ratings of 600 MVA at Temple Switch and rebuild the Temple 345/138-kV Switch with eleven 345-kV circuit breakers in a breaker-and-a-half arrangement and sixteen 138-kV circuit breakers in a breaker-and-a-half arrangement.
- Replace nine of the existing 40 kA, 138-kV circuit breakers at Temple Elm Creek Switch with 63 kA circuit breakers.

- Upgrade the existing Temple Pecan Creek Switch – Temple Elm Creek Switch 138-kV double-circuit transmission line with a normal and emergency ratings of 493 MVA or greater, approximately 5.0-mile.
- Install a second circuit on the vacant position of the existing Temple Switch – Temple Pecan Creek Switch 138-kV double-circuit capable line with a normal and emergency ratings of 486 MVA or greater, approximately 4.4-mile.
- Construct a new Boggy Creek 138/69-kV Switch approximately 3.6 miles south of the existing Temple 138-kV Substation. Install seven 138-kV breakers in breaker-and-a-half arrangement and two 69-kV breakers in single bus arrangement. Install one 138/69-kV transformer with a normal and emergency ratings of 50 MVA or greater to the new Boggy Creek Switch.
- Boggy Creek 138-kV Switch to be interconnected as follows:
    - Install a new 69-kV transmission line on the vacant sides of the existing double-circuit capable structures of Taylor Switch – Temple Switch and Bob Poage – Seaton 69-kV transmission lines and connect the new 69-kV line to Minerva Switch at STR 3/5 to establish the Boggy Creek Switch – Minerva Switch 69-kV transmission line.
    - Establish the new normally open Boggy Creek Switch – Temple Substation 138-kV transmission line section, by converting the 69-kV line between Boggy Creek Switch and Temple Substation to 138-kV operational with a normally open disconnect switch at Temple Substation, with a normal and emergency ratings of 197 MVA or greater, approximately 5.0-mile.
    - Disconnect the existing Temple Switch – Minerva Switch 69-kV transmission line at STR 3/5.
- Construct a New Bell County 138-kV Switch with four 138-kV breakers in a ring bus arrangement near the existing Bell County Switch and establish a tie to the existing Bell County Switch substation.
- New Bell County 138-kV Switch to be interconnected as follows:
    - Keep the existing 345-kV double-circuit and the existing 345-kV line from Salado Switch – Knob Creek – Temple Switch but remove the existing 138-kV circuits from the existing 345-kV structures.
    - Construct a New Bell County Switch – Boggy Creek Switch – Temple Switch 138-kV transmission lines on new double-circuit structure with one circuit in place, utilizing the existing ROW with a normal and emergency ratings of 614 MVA or greater, approximately 7.7-mile.
    - Construct a New Bell County Switch – Salado Switch 138-kV transmission line on new double-circuit structure with one circuit in place, utilizing the existing ROW, with a normal and emergency ratings of 614 MVA or greater, approximately 7.8-mile.
    - Establish a new Bell County Switch – New Bell County Switch connection.
- Upgrade the existing Temple Switch – Temple Southeast – Scott & White – Temple South – Belton 138-kV transmission lines with a normal and emergency ratings of 486 MVA or greater, approximately 9.6-mile.

- Upgrade the existing Belton – Belton Southwest – Harker Heights South – Killeen Switch 138-kV transmission lines with a normal and emergency ratings of 486 MVA or greater, approximately 17.2-mile.
- Upgrade the existing Belton – Nolanville – Harker Heights – Killeen Taft – Killeen Elms Rd – Killeen Switch 138-kV transmission lines with a normal and emergency ratings of 486 MVA or greater, approximately 19.9-mile.
- Upgrade the existing Temple North – Pepper Creek Switch 138-kV double-circuit transmission line with a normal and emergency ratings of 486 MVA or greater, approximately 2.2-mile, per circuit.
- Upgrade the existing Temple Elm Creek Switch – Temple North 138-kV double-circuit transmission line with a normal and emergency ratings of 486 MVA or greater, approximately 0.6-mile, per circuit.
- Construct the new Watercrest 138-kV Switch substation near Killeen Ft. Hood Switch in a 4-breaker ring bus arrangement and install one capacitor bank consisting of 110.4 MVAr in three 36.8 MVAr stages.
- Close the normally open Killeen Ft. Hood – Battalion 138-kV transmission line section.
- Upgrade the existing Watercrest Switch – Killeen Taft 138-kV transmission lines with a normal and emergency ratings of 614 MVA or greater, approximately 7.9-mile.
- Upgrade the existing Watercrest Switch – Killeen Switch 138-kV transmission lines with a normal and emergency ratings of 493 MVA or greater approximately 7.5-mile.
- Upgrade the existing Temple Switch – Seaton 138-kV transmission line with a normal and emergency ratings of 486 MVA or greater, approximately 2.7-mile.
- Expand and convert the existing Bob Poage 69-kV substation to 138/69-kV Switch substation and install a new 100 MVA 138/69-kV transformer.
- Convert the existing Temple Taylor Valley 69-kV substation to 138-kV substation.
- Convert the existing Seaton – Bob Poage – Temple Taylor Valley – Bell County Switch 69-kV transmission lines to 138-kV operational with a normal and emergency ratings of 214 MVA or greater, approximately 17.7-mile.
- Install two new 600 MVA 345/138-kV transformers at the existing Salado Switch and connect the 138-kV and 345-kV at Salado Switch.

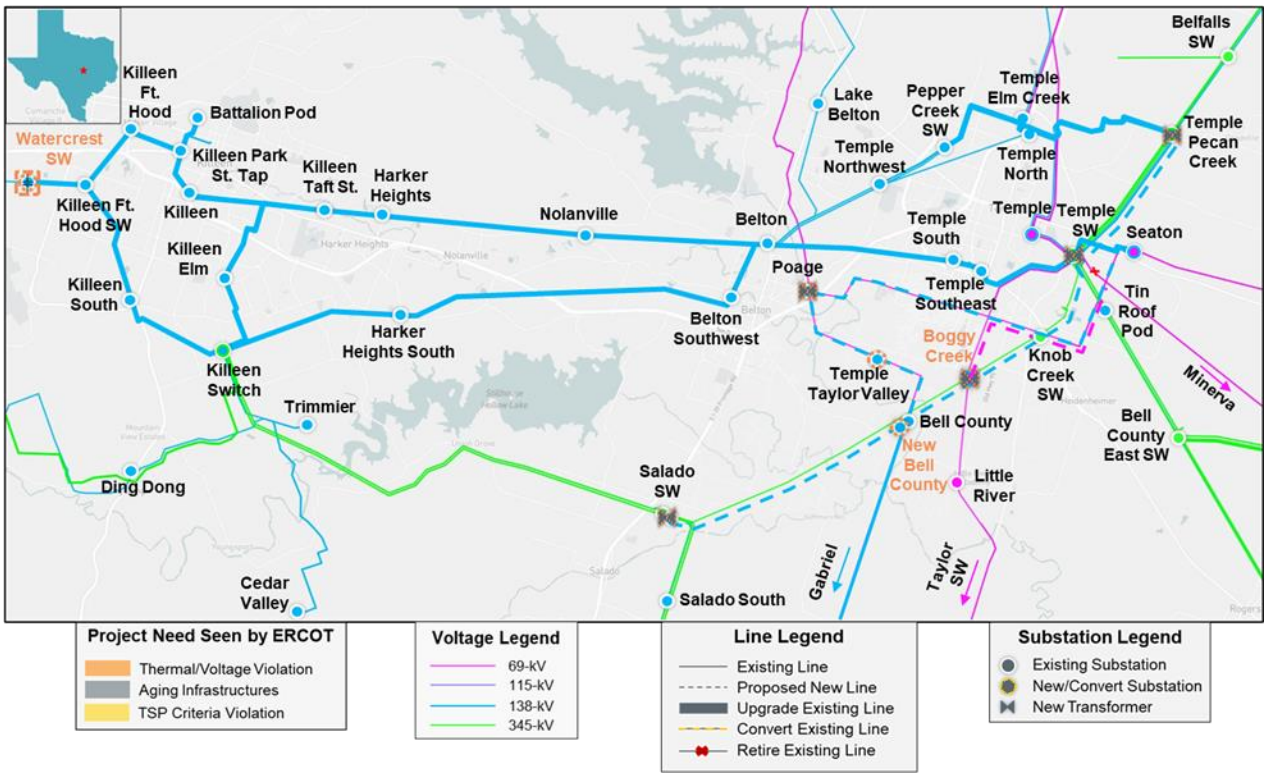

Figure 9.1: Map of Option 5A

The cost estimate for this project is approximately $272.6 million and is classified as Tier 1 project per ERCOT Protocol Section 3.11.4.3(1)(a). The cost estimate accounts for the expectation that some construction activities may occur using energized (hot) work process. The project is recommended for construction to meet a December 2028 ISD. However, Oncor has advised that the projected ISD may change based on requirements for various approvals, ROW acquisition and construction progress.

A CCN application will be required for the new 138-kV transmission lines from Temple Switch – Boggy Creek Switch – Bell County Switch – Salado Switch. Oncor will work with ERCOT as early as practical to develop outage plans needed for construction and implement Constraint Management Plans (CMP) based on expected operational conditions for the time period when construction outages are planned.

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Appendix A

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 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
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

TPIT	Project Name	Tier	Project ISD	County
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
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
75524	This converts Bell County to Gabriel to 138 KV	Tier 4	12/12/2026	Bell

Table A.2: 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

GINR	Project Name	Fuel	Project COD	Capacity (~MW)	County
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
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

GINR	Project Name	Fuel	Project COD	Capacity (~MW)	County
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
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

Table A.3: Project Related Document

No	Document Name	Attachment
1	Temple Area Project RPG 01022024.pdf	 Temple Area Project RPG 01022024.pdf