



Oncor Southern DFW Load Interconnection and General Grid Strengthening Project – ERCOT Independent Review Status Update

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RPG Meeting
January 16, 2026

Introduction

- Oncor submitted the Southern Dallas Fort Worth (DFW) Load Interconnection and General Grid Strengthening Project for Regional Planning Group (RPG) review in February 2025
 - This Tier 1 project is estimated to cost \$1.219 billion and will require a Certificate of Convenience and Necessity (CCN) filing
 - Expected in-service date (ISD) is December 2028
 - Addresses the thermal overloads and voltage violations due to proposed load additions in the Southern DFW in the North, North Central and East Weather Zones
- Oncor presented project overview and ERCOT presented EIR Scope at the April RPG meeting
 - <https://www.ercot.com/calendar/04292025-RPG-Meeting>
- ERCOT presented EIR status update at the July and August RPG meetings
 - <https://www.ercot.com/calendar/07292025-RPG-Meeting>
 - <https://www.ercot.com/calendar/08262025-RPG-Meeting>
- This project is currently under ERCOT Independent Review (EIR)

Recap – Study Assumptions

- Final 2024 Regional Transmission Planning (RTP) 2029 summer peak load case was used as the start case
- Transmission updates
 - List of new transmission projects added to the base case are in [Appendix B.1](#)
 - List of placeholder projects from the 2024 RTP that were removed from the study base case are in [Appendix B.2](#)
 - Additional updates based on feedback from Oncor were also applied to the study base case
- Generation updates
 - List of new generation added to the study base case are in [Appendix C](#)
 - All new generation were dispatched consistent with the 2024 RTP methodology
 - GenHubs in North and North Central (NNC) Weather Zones were opened (turned off) to balance power
- Load updates
 - All 2024 RTP Officer Letter Loads (OLLs) in the study area were removed from the study base case
 - Large Loads including OLLs (approximately 4,046 MW) relevant to the project, provided by Oncor, in the study area were added to the study base case
 - Additional load updates (approximately 50 MW) in the study area were applied based on feedback from Brazos Electric
- Reserve was maintained consistent with the 2024 RTP

Status Update

- Re-ran Reliability Need Analysis, develop and evaluate alternatives
 - N-1
 - G-1+N-1
 - X-1+N-1
 - See [Appendix D](#) for list of G-1 generators and X-1 transformers tested

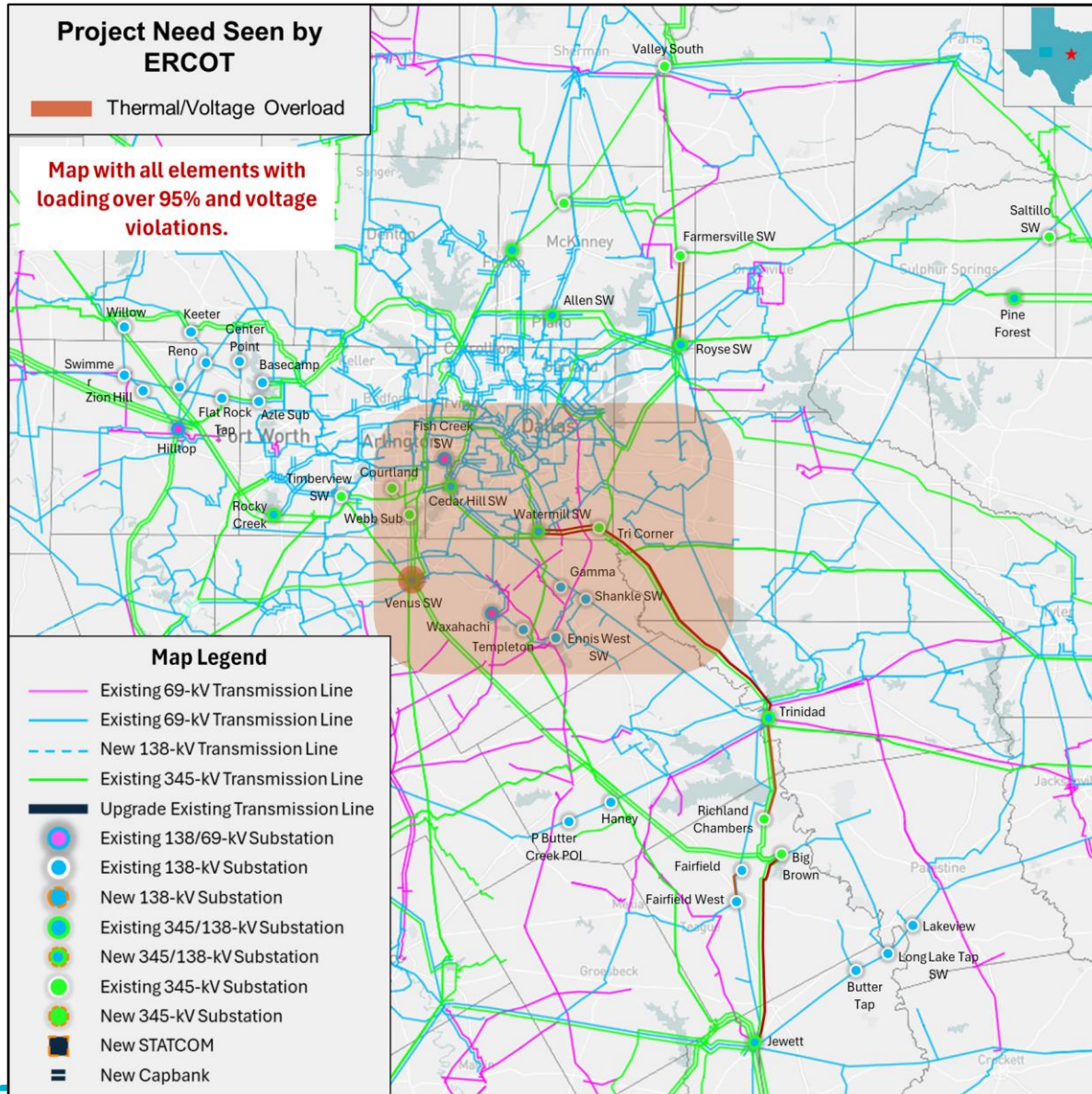
Preliminary Results of Reliability Assessment – Need Analysis

- ERCOT conducted steady-state load flow analysis for the study base case according to the NERC TPL-001-5.1 and ERCOT Planning Criteria to identify the project need

Contingency Category	Voltage Violations	Thermal Overloads	Unsolved Power Flow
N-0 (P0)	None	4	None
N-1 (P1, P2-1, P7)	6	18	None
G-1*+N-1 (P3)	8	19	None
X-1*+N-1 (P6-2)	31	36	3
Total	45	77	3

* See [Appendix D](#) for list of G-1 generators and X-1 transformers tested

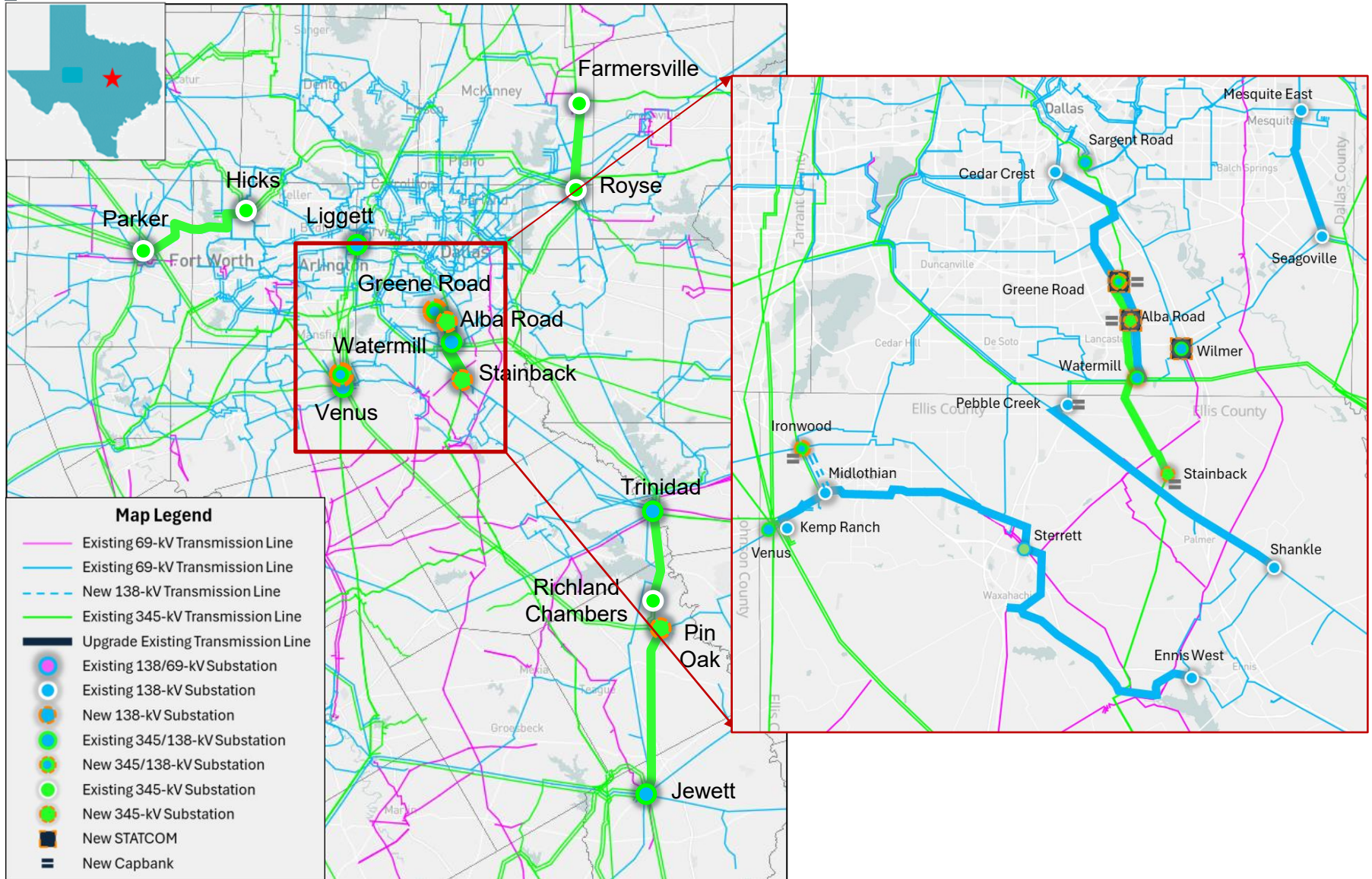
Recap – Map with All Violations Seen by ERCOT



Option 1 – Oncor Proposed Project Components Summary

- Four new Switch stations
 - Greene Road 345/138-kV Switch
 - Ironwood 345/138-kV Switch
 - Stainback 345-kV Switch
 - Alba Road 345-kV Switch
- One 345-kV switch station rebuild
- Four new 138-kV lines, approximately 8.0 circuit-mile
- Upgrade of existing 345-kV and 138-kV lines
 - Approximately 169.8 circuit-mile of existing 345-kV lines
 - Approximately 73.1 circuit-mile of existing 138-kV lines
- Nine reactive devices
 - Three 345-kV Static Synchronous Compensator (STATCOMs)
 - Three 345-kV capacitor banks
 - Three 138-kV capacitor banks
- Full project details in [Appendix E](#)

Option 1 – Oncor Proposed Project



Option 2 – Modified Oncor Proposed Option Components Summary

- In addition to Option 1
 - Two new stations
 - Goatheard 138-kV Substation
 - Goatpad 138-kV Substation
 - Six new 138-kV lines, approximately 14.4 circuit-miles
 - Upgrade existing 138-kV lines, approximately 0.7 circuit-miles
- Full project details in [Appendix F](#)

Option 3 – Modified Option 2 Components Summary

- In addition to Option 2
 - Two new 345-kV lines, approximately 218.0 circuit-miles
 - Upgrade of existing 345-kV lines, approximately 225.0 circuit-miles
- Full project details in [Appendix G](#)

Preliminary Results of Reliability Assessments

- ERCOT conducted steady-state load flow analysis for the study base case according to the NERC TPL-001-5.1 and ERCOT Planning Criteria to identify project need and to evaluate the proposed option and alternatives

Option	N-1		G-1*+N-1		X-1*+N-1		Unsolved Powerflow
	Thermal Violations	Voltage Violations	Thermal Violations	Voltage Violations	Thermal Violations	Voltage Violations	
1	11	3	3	None	2	None	None
2	2	None	4	None	2	None	None
3	None	None	None	None	None	None	None

* See [Appendix D](#) for list of G-1 generators and X-1 transformers tested

Next Steps and Tentative Timeline

- ERCOT will continue to evaluate options to resolve violations in the study area and provide updates at the future RPG meetings
 - Maintenance outage evaluation
 - Long-term load-serving capability assessment
 - Cost estimates and feasibility assessment
- Additional analyses to be performed on the preferred option
 - May conduct a Dynamic Analysis
 - Congestion Analysis to ensure that the identified transmission upgrades do not result in new congestion within the study area
 - Generation Addition and Load Scaling Sensitivity Analyses
 - Planning Guide Section 3.1.3(4)
 - Subsynchronous Oscillations (SSO) Assessment
 - Nodal Protocol Section 3.22.1.3(2)
- Tentative timeline
 - Final recommendation – Q1 2026

Thank you!



Stakeholder comments also welcomed through:

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Appendix B.1 – Transmission Projects Added

- List of recently approved RPG transmission projects added to study base case

RPG/TPIT No	Project Name	Tier	Project ISD	From County
24RPG016	Rand Area Loop Project	Tier 2	4/1/2027	Kaufman
24RPG017	Venus SW to Sam Switch 345-kV Line Project	Tier 1	5/1/2026	Ellis, Hill
24RPG022	Wilmer 345/138-kV Switch Project	Tier 1	5/1/2026	Dallas
24RPG025	Gunter 345/138-kV Switch Project	Tier 3	12/1/2025	Ellis, Hill

Appendix B.2 – Transmission Projects Removed

- List of placeholder transmission projects that are directly related to proposed project were removed from the study base case

Project ID	Project Name	County(s)
2024-E3	Big Brown SES West (3381) to Jewett (3391) 345-kV Line Upgrade and Substation Rebuilds	Henderson, Freestone
2024-E12	Trinidad SES (3124) to Richland Chambers (3134) 345-kV Line Upgrade	Freestone, Leon
2024-E18	Big Brown SES West (3381) to Jewett (3391) 345-kV Line Upgrade	Freestone, Leon
2024-NC13	Pebble Creek (2229) to Trumbull (221) to Gamma (12344) to Shankle Switch (12329) 138-kV Line Upgrades	Ellis
2024-NC14	Green Road (3069) to Ten Mile (2126) to Watermill (2429) to Reindeer (3065) 138-kV Line Upgrades	Dallas
2024-NC18	Ennis West Switch (2241) to Templeton (12320) to Waxahachie (2321) 138-kV Line Upgrades	Ellis, Waxahachie
2024-NC31	Royse Area 345-kV Line Upgrades and Substation Rebuilds	Collin, Hopkins, Rockwall, Fannin, Lamar
2024-NC63	Watermill Area 345-kV Line Additions and Reactive Support	Dallas, Navarro, Hill, Leon
2024-NC68	Batchler Road (2217) to Watermill (2427) 345-kV Line Upgrades	Dallas
2024-NC70	Miller Road (2632) 345/138-kV Substation Addition and 345-kV Lines Re-Termination	Dallas, Ellis
2024-NC85	Miller Road (2635) to Kemp Ranch Switch (2303) 138-kV double-circuit transmission line Upgrade	Ellis
2024-NC86	Greene Road (3063/3069) New 138-kV and 345-kV Line Additions and Substation Rebuilds	Dallas

Appendix B.2 – Transmission Projects Removed (cont.)

- List of additional placeholder transmission projects in the study area that have not been approved by RPG were removed

Project ID	Project Name	County(s)
2024-E2	Shamburger (3103) to Elkton (3105) 345-kV Double Circuit Line Addition	Smith
2024-N11	Alla Hubbard (1757) to Epco POI (12468) 138-kV Line Upgrade	Collin, Grayson
2024-NC01	Glen Heights (217) to Sterett Road (2237) 138-kV Line Upgrade	Ellis
2024-NC04	Railport (442) Area 138-kV Rebuild	Ellis, Johnson
2024-NC06	Miller (824) to Newman (849) 138-kV Line Upgrade	Dallas
2024-NC07	Walnut (823) to Naaman (825) 138-kV Line Upgrade	Dallas
2024-NC08	Centerville (810) to Miller (824) 138-kV Line Upgrade	Dallas
2024-NC09	Walnut (823) to Newman (849) 138-kV Line Upgrade	Dallas
2024-NC10	Glen Heights (217) to Desoto Switch 8 (2424) 138-kV Line Upgrade	Ellis, Dallas
2024-NC11	Watermill (2427) to Tricorner (2432) to Trinidad (3123/3124) 345-kV Line Upgrades	Dallas, Henderson
2024-NC15	Waxahachie (2321) to Waxahachie North (2320) 138-kV Line Upgrade and Waxahachie (2335) to Waxahachie OCF (2343) 69-kV Line Upgrades	Ellis
2024-NC19	Climax TNP (37280) to Bridge Point RC (37245) 69-kV Line Upgrade	Collin
2024-NC21	Carrollton Northwest (2363) to South TNP (37100) to TI TNP (37080) 138-kV Line Upgrades	Dallas, Denton
2024-NC22	Waxahachie Pump 2 (2315) to Waxahachie North (2320) 138-kV Line Upgrade	Ellis

Appendix B.2 – Transmission Projects Removed (cont.)

- List of additional placeholder transmission projects in the study area that have not been approved by RPG were removed

Project ID	Project Name	County(s)
2024-NC25	LTV Sub (2259) to Grand Prairie (2262) 138-kV Line Upgrade	Dallas
2024-NC27	Navarro (3478) to Haney (213) to Payne Battle Creek POI (888876) to Hubbard (3515) 138-kV Line Upgrades	Navarro, Hill
2024-NC28	Olympus Switch (3723) to Montfort Switch (3454) to Chatfield (200) 138-kV Line Upgrade	Henderson, Navarro
2024-NC29	Allen Switch (2514) to Pine Forest POI (888854) 345-kV Line Upgrade	Collin, Hopkins
2024-NC34	Trinidad SES (3127) to Nipak Tap (3260) to Mankin Switch (3265) 138-kV Line Upgrade	Henderson, Navarro
2024-NC35	Firewheel (821) to Wylie Switch (833) 138-kV Line Upgrade	Dallas, Collin
2024-NC38	Seagoville Area Upgrades	Dallas
2024-NC41	Ben Davis (968) to GOBLN_8 (2497) 138-kV Line Upgrade	Dallas
2024-NC44	Cedar Creek 138-kV Area Line Upgrades	Henderson
2024-NC51	Waxahachie-Sterrett Area Upgrades	Ellis
2024-NC59	Lavon Switch 345/138-kV Switch Substation Expansion and Lavon Switch (2475) to Allen Switch (2511) 138-kV Line Addition	Collin, Rockwall
2024-NC64	Calmont Switch (1955) to Benbrook Switch (1874) 138-kV Line Upgrade	Tarrant
2024-NC66	Tri Corner (2432) to Forney Switch (2437) 345-kV Line Upgrade	Dallas, Kaufman

Appendix B.2 – Transmission Projects Removed (cont.)

- List of additional placeholder transmission projects in the study area that have not been approved by RPG were removed

Project ID	Project Name	County(s)
2024-NC67	Elkton (3105) to Tri Corner (2432) 345-kV Line Additions and Upgrades	Dallas, Kaufman, Smith, Van Zandt
2024-NC71	Mitchell Bend Switch (1895) to Carmichael Bend Switch (2285) to Benbrook Switch (1873) 345-kV Line Upgrades	Tarrant, Hood, Grayson
2024-NC74	Midlothian TXI (2307) to Waxahachie Northwest (2309) 138-kV Line Upgrades	Ellis
2024-NC75	Primrose Fort Worth (2196) to Rocky Creek (1881) to Primrose Fort Worth (2197) 138-kV Line Upgrades	Tarrant
2024-NC76	Gunter 345/138-kV Switch Addition and Gunter (2236) to Collin (2370) 138-kV Line Addition	Cooke, Denton, Collin, Grayson
2024-NC77	Skyview 345/138-kV Switch Addition and Area Upgrade	Dallas, Tarrant
2024-NC79	Upgrade Benbrook Switch 345/138-kV (1869/18741) and (1870/18751) Transformers	Tarrant
2024-NC80	Desoto Switch 345/138-kV Transformer Addition (2431/2424) and Desoto Switch (2424) to Loop9 (2848) 138-kV Line Addition	Dallas
2024-NC82	Rocky Creek 345/138-kV Transformer Addition (1880/1881)	Tarrant
2024-NC83	Hempill (2164) to Mistletoe Heights (2173) 138-kV Line Upgrade	Tarrant
2024-NC84	Wedgewood Switch (2184) to Bryant Irvin (2182) 138-kV Line Upgrade	Tarrant

Appendix C – New Generation Projects Added

- List of new generation, that met the Planning Guide 6.9(1) condition, added to the study base case

GINR	Project Name	Fuel	Projected COD	Capacity (~MW)	County
21INR0359	Hickerson Solar	SOL	3/1/2026	316.3	Bosque
22INR0437	TORMES SOLAR	SOL	3/31/2027	382.1	Navarro
24INR0126	High Noon Storage	OTH	12/1/2027	94.0	Hill
24INR0188	Tehuacana Creek Solar SLF	SOL	3/10/2027	505.5	Navarro
24INR0189	Tehuacana Creek BESS SLF	OTH	3/10/2027	419.0	Navarro
24INR0355	Anatole Renewable Energy Storage	OTH	1/11/2026	207.8	Henderson
24INR0364	Pitts Dudik II	SOL	1/29/2026	30.2	Hill
24INR0498	Fort Watt Storage	OTH	4/20/2027	205.4	Tarrant
24INR0631	Radian Storage SLF	OTH	4/22/2025	160.3	Brown
25INR0018	Yellow Cat Wind	WIN	9/30/2026	301.2	Navarro
25INR0046	Blue Skies BESS	OTH	12/31/2027	306.3	Hill
25INR0231	Apache Hill BESS	OTH	11/15/2026	200.9	Hood
25INR0391	Purple Sage BESS 1	OTH	5/30/2027	156.0	Collin
25INR0392	Purple Sage BESS 2	OTH	5/30/2027	156.0	Collin
26INR0543	Three Canes Solar SLF	SOL	12/31/2026	333.0	Navarro

Appendix D – G-1 Generators and X-1 Transformers

G-1 Generators	X-1 Transformers
Comanche Peak	Desoto Switch 345/138-kV
Forney Combine Cycle Train	Monticello SES 345/138-kV
Martain Lake	Sargent Road Switch 345/138-kV
Mt. Creek SES	Seagoville Switch 345/138-kV
Midlothian	Trinidad SES Switch 345/138-kV
	Venus Kemp Ranch Switch 345/138-kV
	Watermill Switch 345/138-kV
	West Levee Switch 345/138-kV
	Wilmer Switch 345/138-kV

Appendix E – Option 1 – Oncor Proposed Option Details

- Construct a new Greene Road 345/138-kV Switch (SW) by installing fourteen 345-kV, 5,000 A and ten 138-kV, 3,200 A breakers in a breaker-and-a-half bus arrangement:
 - Install two new 345/138-kV autotransformers with a normal rating of 700 MVA and an emergency rating of 750 MVA;
 - Re-terminate the existing Watermill SW to Sargent Road SW/West Levee SW 345-kV double-circuit transmission line into the new Greene Road 345-kV SW, which creates the new Watermill SW to Greene Road SW and the new Greene Road SW to Sargent Road SW/West Levee SW 345-kV double-circuit transmission lines;
 - Re-terminate the existing Wilson SW to Cedar Hill SW/Cedar Crest SW 138-kV double-circuit transmission line into the new Greene Road 138-kV SW, which creates the new Wilson SW to Greene Road SW and the new Greene Road SW to Cedar Hill SW/Cedar Crest SW 138-kV double-circuit transmission line;
- Rebuild the new Greene Road SW to Watermill SW 345-kV double-circuit transmission line on double-circuit structures with both circuits in place, with normal and emergency ratings of at least 2,987 MVA, approximately 3.6-mile;
- Rebuild the new Wilson SW to Greene Road SW 138-kV double-circuit transmission line on double-circuit structures with both circuits in place, with normal and emergency ratings of at least 764 MVA, approximately 2.0-mile;
- Rebuild the new Greene Road SW to Cedar Crest 138-kV single-circuit transmission line on double-circuit structures with one circuit in place, with normal and emergency ratings of at least 764 MVA, approximately 10.9-mile;

Appendix E – Option 1 – Oncor Proposed Option Details (cont.)

- Construct a new Alba Road 345-kV SW by installing eleven 345-kV, 5,000 breakers in a breaker-and-a-half bus arrangement:
 - Re-terminate the new Watermill SW to Greene Road SW 345-kV double-circuit transmission line into the new Alba Road 345-kV SW, which creates the new Watermill SW to Alba Road SW and the new Alba Road SW to Greene Road SW 345-kV double-circuit transmission lines;
- Construct a new Stainback 345-kV SW by installing fourteen 345-kV, 5,000 breakers in a breaker-and-a-half bus arrangement:
 - Re-terminate the existing Watermill SW to Elrod SW/Big Onion SW 345-kV double-circuit transmission line into the new Stainback 345-kV SW, which creates the new Watermill SW to Stainback SW and the new Stainback SW to Elrod SW/Big Onion SW 345-kV double-circuit transmission lines;
- Rebuild the new Watermill SW to Stainback SW 345-kV double-circuit transmission line on double-circuit structures with both circuits in place, with normal and emergency ratings of at least 2,987 MVA, approximately 3.0-mile;
- Rebuild the existing Watermill SW to Wilson SW 138-kV double-circuit transmission line on double-circuit structures with both circuit in place, with normal and emergency ratings of at least 764 MVA, approximately 0.8-mile;

Appendix E – Option 1 – Oncor Proposed Option Details (cont.)

- Construct a new Ironwood 345/138-kV SW by installing seventeen 345-kV, 5,000 A and ten 138-kV, 3,200 A breakers in a breaker-and-a-half bus arrangement:
 - Install two 345/138-kV autotransformers with normal and emergency ratings of 700 MVA and 750 MVA, respectively;
 - Re-terminate the existing Liggett SW to Endeavor SW 345-kV Line at the new Ironwood 345-kV SW, which creates the new Liggett SW to Venus SW (north bus)/Ironwood SW 345-kV double-circuit transmission line;
 - Disconnect the existing Endeavor SW to Venus SW (south bus) and Midlothian ANP #2 to Venus SW (south bus) 345-kV Lines from Venus SW (south bus) and connect the Midlothian ANP to Endeavor 345-kV SW. This will create Midlothian ANP #1 to Venus SW (north bus) and Midlothian ANP #2 to Endeavor SW 345-kV double-circuit transmission line;
 - Re-terminate the existing Timberview SW to Venus SW (south bus) at the new Ironwood 345-kV SW, which creates the new Everman SW to Venus SW (north bus) and the new Timberview SW to Ironwood SW 345-kV double-circuit transmission line;
 - Re-terminate the existing Cedar Hill SW to Venus SW (south bus) at the new Ironwood 345-kV SW, which creates the new Sherry SW to Venus SW (north bus) and the new Cedar Hill SW to Ironwood SW 345-kV double-circuit transmission line;
 - Re-terminate the existing Sam SW to Venus SW (south bus) at the new Ironwood 345-kV SW, which creates the new Fort Smith SW to Venus SW (north bus) and the new Sam SW to Ironwood SW 345-kV double-circuit transmission line;
 - Re-terminate the existing Navarro SW to Venus SW (south bus) at the new Ironwood 345-kV SW, which creates the new Navarro SW to Venus SW (north bus)/Ironwood SW 345-kV double-circuit transmission line;
 - Re-terminate the existing Cottonwood Creek 345/138-kV Autotransformer #2 at the north bus of Venus 345-kV SW by installing one 345-kV, 5,000 A breaker;

Appendix E – Option 1 – Oncor Proposed Option Details (cont.)

- Loop the existing Kemp Ranch SW to Sardis SW/Soap Creek 138-kV double-circuit transmission line into the new Ironwood 138-kV SW by disconnecting the double-circuit line at structure #1/2 (Midlothian Tap) and constructing four circuits from Midlothian Tap to the new Ironwood 138-kV SW on separate structures, with normal and emergency ratings of at least 764 MVA, approximately 2.0-mile each circuit;
- Rebuild the two Kemp Ranch SW to Midlothian Tap 138-kV single-circuit transmission line sections using two separate structures, with normal and emergency ratings of at least 764 MVA, approximately 0.5-mile each circuit;
- Rebuild the existing Sterrett SW to Midlothian TXI 138-kV single-circuit transmission line sections, with normal and emergency ratings of at least 764 MVA, approximately 11.8-mile;
- Rebuild the existing Ennis West SW to Sterrett SW 138-kV single-circuit transmission line, with normal and emergency ratings of at least 614 MVA, approximately 21.0-mile;

Appendix E – Option 1 – Oncor Proposed Option Details (cont.)

- Rebuild the existing Big Brown 345-kV SW by installing twelve 345-kV, 5,000 A breakers in a breaker-and-a-half bus arrangement. Upon completion, Big Brown SW will be renamed as Pin Oak SW:
 - Re-terminate the existing Big Brown SW to Jewett SW 345-kV double-circuit transmission line at the new Pin Oak 345-kV SW, which creates the new Pin Oak SW to Jewett SW 345-kV double-circuit transmission line;
 - Re-terminate the existing Big Brown SW to Navarro SW 345-kV double-circuit transmission line at the new Pin Oak 345-kV SW, which creates the new Pin Oak SW – Navarro SW 345-kV double-circuit transmission line;
 - Re-terminate the existing Big Brown SW to Richland Chamber SW 345-kV double-circuit transmission line at the new Pin Oak 345-kV SW, which creates the new Pin Oak SW to Richland Chambers SW 345-kV double-circuit transmission line;
- Rebuild the new Jewett SW to Pin Oak SW 345-kV double-circuit transmission line on double-circuit structures with both circuits in place, with normal and emergency ratings of at least 1,792 MVA and with a conductor rating of at least 2,987 MVA, approximately 32.8-mile;
- Rebuild the existing Richland Chambers SW to Trinidad SW 345-kV double-circuit transmission line on double-circuit structures with both circuits in place with normal and emergency ratings of at least 1,792 MVA and a with conductor rating of at least 2,987 MVA, approximately 18.7-mile;

Appendix E – Option 1 – Oncor Proposed Option Details (cont.)

- Rebuild the existing Parker SW to Hicks SW 345-kV transmission line, with normal and emergency ratings of at least 1,912 MVA and with a conductor rating of at least 2,987 MVA, approximately 23.0-mile;
- Rebuild the existing Pebble Creek SW to Shankle SW 138-kV transmission line, with normal and emergency ratings of at least 764 MVA, approximately 15.5-mile;
- Rebuild the existing Mesquite East SW to Seagoville SW 138-kV transmission line, with normal and emergency ratings of at least 764 MVA, approximately 7.4-mile;
- Rebuild the existing Farmersville SW to Royse SW 345-kV double-circuit transmission line on double-circuit structures with both circuits in place, with normal and emergency ratings of at least 1,792 MVA and with a conductor rating of at least 2,987 MVA, approximately 15.3-mile;
- Install one +250/-250 MVar Grid-forming STATCOM at each of the following:
 - Alba Road 345-kVSW;
 - Greene Road 345-kVSW;
 - Wilmer 345kV SW;

Appendix E – Option 1 – Oncor Proposed Option Details (cont.)

- Install 240 MVAR 345-kV capacitor banks (3-80 MVAR each):
 - One at Greene Road 345-kV SW;
 - Two at Alba Road 345-kV SW;
 - Two at Stainback 345-kV SW;
- Install 110.4 MVAR 138-kV capacitor banks (3-36.8 MVAR each) at:
 - One at Greene Road 138-kVSW;
 - Two at Ironwood 138-kVSW;
 - Two at Pebble Creek 138-kVSW;
- For terminal equipment:
 - The existing 345 kV terminal equipment, ensure they meet or exceed a rating of 3000 A (1792 MVA);
 - The new 345-kV terminal equipment, ensure they meet or exceed a rating of 5,000 A if the station is 5,000 A capable. Otherwise ensure the new 345-kV terminal equipment meets or exceeds a rating of 3,200 A; and
 - The 138-kV terminal equipment, ensure they meet or exceed a rating of 3,000 A.

Appendix F – Option 2 (Addition to Option 1)

Details

- Construct a new Greene Road 345/138-kV Switch (SW) by installing fourteen 345-kV, 5,000 A and ten 138-kV, 3,200 A breakers in a breaker-and-a-half bus arrangement:
 - Install two new 345/138-kV autotransformers with a normal rating of 700 MVA and an emergency rating of 750 MVA;
 - Re-terminate the existing Watermill SW to Sargent Road SW/West Levee SW 345-kV double-circuit transmission line into the new Greene Road 345-kV SW, which creates the new Watermill SW to Greene Road SW and the new Greene Road SW to Sargent Road SW/West Levee SW 345-kV double-circuit transmission lines;
 - Re-terminate the existing Wilson SW to Cedar Hill SW/Cedar Crest SW 138-kV double-circuit transmission line into the new Greene Road 138-kV SW, which creates the new Wilson SW to Greene Road SW and the new Greene Road SW to Cedar Hill SW/Cedar Crest SW 138-kV double-circuit transmission line;
- Rebuild the new Greene Road SW to Watermill SW 345-kV double-circuit transmission line on double-circuit structures with both circuits in place, with normal and emergency ratings of at least 2,987 MVA, approximately 3.6-mile;
- Rebuild the new Wilson SW to Greene Road SW 138-kV double-circuit transmission line on double-circuit structures with both circuits in place, with normal and emergency ratings of at least 764 MVA, approximately 2.0-mile;
- Rebuild the new Greene Road SW to Cedar Crest 138-kV single-circuit transmission line on double-circuit structures with one circuit in place, with normal and emergency ratings of at least 764 MVA, approximately 10.9-mile;

Appendix F – Option 2 (Addition to Option 1)

Details (cont.)

- Construct a new Alba Road 345-kV SW by installing eleven 345-kV, 5,000 breakers in a breaker-and-a-half bus arrangement:
 - Re-terminate the new Watermill SW to Greene Road SW 345-kV double-circuit transmission line into the new Alba Road 345-kV SW, which creates the new Watermill SW to Alba Road SW and the new Alba Road SW to Greene Road SW 345-kV double-circuit transmission lines;
- Construct a new Stainback 345-kV SW by installing fourteen 345-kV, 5,000 breakers in a breaker-and-a-half bus arrangement:
 - Re-terminate the existing Watermill SW to Elrod SW/Big Onion SW 345-kV double-circuit transmission line into the new Stainback 345-kV SW, which creates the new Watermill SW to Stainback SW and the new Stainback SW to Elrod SW/Big Onion SW 345-kV double-circuit transmission lines;
- Rebuild the new Watermill SW to Stainback SW 345-kV double-circuit transmission line on double-circuit structures with both circuits in place, with normal and emergency ratings of at least 2,987 MVA, approximately 3.0-mile;
- Rebuild the existing Watermill SW to Wilson SW 138-kV double-circuit transmission line on double-circuit structures with both circuit in place, with normal and emergency ratings of at least 764 MVA, approximately 0.8-mile;

Appendix F – Option 2 (Addition to Option 1)

Details (cont.)

- Construct a new Ironwood 345/138-kV SW by installing seventeen 345-kV, 5,000 A and ten 138-kV, 3,200 A breakers in a breaker-and-a-half bus arrangement:
 - Install two 345/138-kV autotransformers with normal and emergency ratings of 700 MVA and 750 MVA, respectively;
 - Re-terminate the existing Liggett SW to Endeavor SW 345-kV Line at the new Ironwood 345-kV SW, which creates the new Liggett SW to Venus SW (north bus)/Ironwood SW 345-kV double-circuit transmission line;
 - Disconnect the existing Endeavor SW to Venus SW (south bus) and Midlothian ANP #2 to Venus SW (south bus) 345-kV Lines from Venus SW (south bus) and connect the Midlothian ANP to Endeavor 345-kV SW. This will create Midlothian ANP #1 to Venus SW (north bus) and Midlothian ANP #2 to Endeavor SW 345-kV double-circuit transmission line;
 - Re-terminate the existing Timberview SW to Venus SW (south bus) at the new Ironwood 345-kV SW, which creates the new Everman SW to Venus SW (north bus) and the new Timberview SW to Ironwood SW 345-kV double-circuit transmission line;
 - Re-terminate the existing Cedar Hill SW to Venus SW (south bus) at the new Ironwood 345-kV SW, which creates the new Sherry SW to Venus SW (north bus) and the new Cedar Hill SW to Ironwood SW 345-kV double-circuit transmission line;
 - Re-terminate the existing Sam SW to Venus SW (south bus) at the new Ironwood 345-kV SW, which creates the new Fort Smith SW to Venus SW (north bus) and the new Sam SW to Ironwood SW 345-kV double-circuit transmission line;
 - Re-terminate the existing Navarro SW to Venus SW (south bus) at the new Ironwood 345-kV SW, which creates the new Navarro SW to Venus SW (north bus)/Ironwood SW 345-kV double-circuit transmission line;
 - Re-terminate the existing Cottonwood Creek 345/138-kV Autotransformer #2 at the north bus of Venus 345-kV SW by installing one 345-kV, 5,000 A breaker;

Appendix F – Option 2 (Addition to Option 1)

Details (cont.)

- Loop the existing Kemp Ranch SW to Sardis SW/Soap Creek 138-kV double-circuit transmission line into the new Ironwood 138-kV SW by disconnecting the double-circuit line at structure #1/2 (Midlothian Tap) and constructing four circuits from Midlothian Tap to the new Ironwood 138-kV SW on separate structures, with normal and emergency ratings of at least 764 MVA, approximately 2.0-mile each circuit;
- Rebuild the two Kemp Ranch SW to Midlothian Tap 138-kV single-circuit transmission line sections using two separate structures, with normal and emergency ratings of at least 764 MVA, approximately 0.5-mile each circuit;
- Rebuild the existing Sterrett SW to Midlothian TXI 138-kV single-circuit transmission line sections, with normal and emergency ratings of at least 764 MVA, approximately 11.8-mile;
- Rebuild the existing Ennis West SW to Sterrett SW 138-kV single-circuit transmission line, with normal and emergency ratings of at least 614 MVA, approximately 21.0-mile;

Appendix F – Option 1 – Oncor Proposed Option Details (cont.)

- Rebuild the existing Big Brown 345-kV SW by installing twelve 345-kV, 5,000 A breakers in a breaker-and-a-half bus arrangement. Upon completion, Big Brown SW will be renamed as Pin Oak SW:
 - Re-terminate the existing Big Brown SW to Jewett SW 345-kV double-circuit transmission line at the new Pin Oak 345-kV SW, which creates the new Pin Oak SW to Jewett SW 345-kV double-circuit transmission line;
 - Re-terminate the existing Big Brown SW to Navarro SW 345-kV double-circuit transmission line at the new Pin Oak 345-kV SW, which creates the new Pin Oak SW – Navarro SW 345-kV double-circuit transmission line;
 - Re-terminate the existing Big Brown SW to Richland Chamber SW 345-kV double-circuit transmission line at the new Pin Oak 345-kV SW, which creates the new Pin Oak SW to Richland Chambers SW 345-kV double-circuit transmission line;
- Rebuild the new Jewett SW to Pin Oak SW 345-kV double-circuit transmission line on double-circuit structures with both circuits in place, with normal and emergency ratings of at least 1,792 MVA and with a conductor rating of at least 2,987 MVA, approximately 32.8-mile;
- Rebuild the existing Richland Chambers SW to Trinidad SW 345-kV double-circuit transmission line on double-circuit structures with both circuits in place with normal and emergency ratings of at least 1,792 MVA and a with conductor rating of at least 2,987 MVA, approximately 18.7-mile;

Appendix F – Option 2 (Addition to Option 1)

Details (cont.)

- Rebuild the existing Parker SW to Hicks SW 345-kV transmission line, with normal and emergency ratings of at least 1,912 MVA and with a conductor rating of at least 2,987 MVA, approximately 23.0-mile;
- Rebuild the existing Pebble Creek SW to Shankle SW 138-kV transmission line, with normal and emergency ratings of at least 764 MVA, approximately 15.5-mile;
- Rebuild the existing Mesquite East SW to Seagoville SW 138-kV transmission line, with normal and emergency ratings of at least 764 MVA, approximately 7.4-mile;
- Rebuild the existing Farmersville SW to Royse SW 345-kV double-circuit transmission line on double-circuit structures with both circuits in place, with normal and emergency ratings of at least 1,792 MVA and with a conductor rating of at least 2,987 MVA, approximately 15.3-mile;
- Install one +250/-250 MVar Grid-forming STATCOM at each of the following:
 - Alba Road 345-kVSW;
 - Greene Road 345-kVSW;
 - Wilmer 345kV SW;

Appendix F – Option 2 (Addition to Option 1) Details (cont.)

- Install 240 MVAR 345-kV capacitor banks (3-80 MVAR each):
 - One at Greene Road 345-kV SW;
 - Two at Alba Road 345-kV SW;
 - Two at Stainback 345-kV SW;
- Install 110.4 MVAR 138-kV capacitor banks (3-36.8 MVAR each) at:
 - One at Greene Road 138-kVSW;
 - Two at Ironwood 138-kVSW;
 - Two at Pebble Creek 138-kVSW;
- For terminal equipment:
 - The existing 345 kV terminal equipment, ensure they meet or exceed a rating of 3000 A (1792 MVA);
 - The new 345-kV terminal equipment, ensure they meet or exceed a rating of 5,000 A if the station is 5,000 A capable. Otherwise ensure the new 345-kV terminal equipment meets or exceeds a rating of 3,200 A; and
 - The 138-kV terminal equipment, ensure they meet or exceed a rating of 3,000 A.

Appendix F – Option 2 (Addition to Option 1)

Details (cont.)

- Construct a new Goatpad 138-kV Substation
 - Install a new Goatpad to Padera 138-kV single-circuit transmission line on double-circuit structures with only one circuits in place, with normal and emergency ratings of at least 287 MVA, approximately 2.6-mile
 - Install a new Goatpad to Midlothian 138-kV single-circuit transmission line on double-circuit structures with only one circuits in place, with normal and emergency ratings of at least 287 MVA, approximately 3.0-mile
 - Install a new Goatpad to Goatheard 138-kV single-circuit transmission line on double-circuit structures with only one circuits in place, with normal and emergency ratings of at least 524 MVA, approximately 0.1-mile
- Construct a new Goatheard 138-kV Substation
 - Re-terminate the existing Cedar Hill SW to Saint Paul SW 138-kV single-circuit transmission line into the new Goatheard 138-kV SW, which creates the new Goatheard SW to Cedar Hill SW and the new Goatheard SW to Saint Paul SW 138-kV single-circuit transmission line, and rebuild on double-circuit structures with only one circuits in place, with normal and emergency ratings of at least 237 MVA, approximately 0.7-mile

Appendix G – Option 3 (Addition to Option 2)

Details (cont.)

- Construct a new Greene Road 345/138-kV Switch (SW) by installing fourteen 345-kV, 5,000 A and ten 138-kV, 3,200 A breakers in a breaker-and-a-half bus arrangement:
 - Install two new 345/138-kV autotransformers with a normal rating of 700 MVA and an emergency rating of 750 MVA;
 - Re-terminate the existing Watermill SW to Sargent Road SW/West Levee SW 345-kV double-circuit transmission line into the new Greene Road 345-kV SW, which creates the new Watermill SW to Greene Road SW and the new Greene Road SW to Sargent Road SW/West Levee SW 345-kV double-circuit transmission lines;
 - Re-terminate the existing Wilson SW to Cedar Hill SW/Cedar Crest SW 138-kV double-circuit transmission line into the new Greene Road 138-kV SW, which creates the new Wilson SW to Greene Road SW and the new Greene Road SW to Cedar Hill SW/Cedar Crest SW 138-kV double-circuit transmission line;
- Rebuild the new Greene Road SW to Watermill SW 345-kV double-circuit transmission line on double-circuit structures with both circuits in place, with normal and emergency ratings of at least 2,987 MVA, approximately 3.6-mile;
- Rebuild the new Wilson SW to Greene Road SW 138-kV double-circuit transmission line on double-circuit structures with both circuits in place, with normal and emergency ratings of at least 764 MVA, approximately 2.0-mile;
- Rebuild the new Greene Road SW to Cedar Crest 138-kV single-circuit transmission line on double-circuit structures with one circuit in place, with normal and emergency ratings of at least 764 MVA, approximately 10.9-mile;

Appendix G – Option 3 (Addition to Option 2)

Details (cont.)

- Construct a new Alba Road 345-kV SW by installing eleven 345-kV, 5,000 breakers in a breaker-and-a-half bus arrangement:
 - Re-terminate the new Watermill SW to Greene Road SW 345-kV double-circuit transmission line into the new Alba Road 345-kV SW, which creates the new Watermill SW to Alba Road SW and the new Alba Road SW to Greene Road SW 345-kV double-circuit transmission lines;
- Construct a new Stainback 345-kV SW by installing fourteen 345-kV, 5,000 breakers in a breaker-and-a-half bus arrangement:
 - Re-terminate the existing Watermill SW to Elrod SW/Big Onion SW 345-kV double-circuit transmission line into the new Stainback 345-kV SW, which creates the new Watermill SW to Stainback SW and the new Stainback SW to Elrod SW/Big Onion SW 345-kV double-circuit transmission lines;
- Rebuild the new Watermill SW to Stainback SW 345-kV double-circuit transmission line on double-circuit structures with both circuits in place, with normal and emergency ratings of at least 2,987 MVA, approximately 3.0-mile;
- Rebuild the existing Watermill SW to Wilson SW 138-kV double-circuit transmission line on double-circuit structures with both circuit in place, with normal and emergency ratings of at least 764 MVA, approximately 0.8-mile;

Appendix G – Option 3 (Addition to Option 2)

Details (cont.)

- Construct a new Ironwood 345/138-kV SW by installing seventeen 345-kV, 5,000 A and ten 138-kV, 3,200 A breakers in a breaker-and-a-half bus arrangement:
 - Install two 345/138-kV autotransformers with normal and emergency ratings of 700 MVA and 750 MVA, respectively;
 - Re-terminate the existing Liggett SW to Endeavor SW 345-kV Line at the new Ironwood 345-kV SW, which creates the new Liggett SW to Venus SW (north bus)/Ironwood SW 345-kV double-circuit transmission line;
 - Disconnect the existing Endeavor SW to Venus SW (south bus) and Midlothian ANP #2 to Venus SW (south bus) 345-kV Lines from Venus SW (south bus) and connect the Midlothian ANP to Endeavor 345-kV SW. This will create Midlothian ANP #1 to Venus SW (north bus) and Midlothian ANP #2 to Endeavor SW 345-kV double-circuit transmission line;
 - Re-terminate the existing Timberview SW to Venus SW (south bus) at the new Ironwood 345-kV SW, which creates the new Everman SW to Venus SW (north bus) and the new Timberview SW to Ironwood SW 345-kV double-circuit transmission line;
 - Re-terminate the existing Cedar Hill SW to Venus SW (south bus) at the new Ironwood 345-kV SW, which creates the new Sherry SW to Venus SW (north bus) and the new Cedar Hill SW to Ironwood SW 345-kV double-circuit transmission line;
 - Re-terminate the existing Sam SW to Venus SW (south bus) at the new Ironwood 345-kV SW, which creates the new Fort Smith SW to Venus SW (north bus) and the new Sam SW to Ironwood SW 345-kV double-circuit transmission line;
 - Re-terminate the existing Navarro SW to Venus SW (south bus) at the new Ironwood 345-kV SW, which creates the new Navarro SW to Venus SW (north bus)/Ironwood SW 345-kV double-circuit transmission line;
 - Re-terminate the existing Cottonwood Creek 345/138-kV Autotransformer #2 at the north bus of Venus 345-kV SW by installing one 345-kV, 5,000 A breaker;

Appendix G – Option 3 (Addition to Option 2)

Details (cont.)

- Loop the existing Kemp Ranch SW to Sardis SW/Soap Creek 138-kV double-circuit transmission line into the new Ironwood 138-kV SW by disconnecting the double-circuit line at structure #1/2 (Midlothian Tap) and constructing four circuits from Midlothian Tap to the new Ironwood 138-kV SW on separate structures, with normal and emergency ratings of at least 764 MVA, approximately 2.0-mile each circuit;
- Rebuild the two Kemp Ranch SW to Midlothian Tap 138-kV single-circuit transmission line sections using two separate structures, with normal and emergency ratings of at least 764 MVA, approximately 0.5-mile each circuit;
- Rebuild the existing Sterrett SW to Midlothian TXI 138-kV single-circuit transmission line sections, with normal and emergency ratings of at least 764 MVA, approximately 11.8-mile;
- Rebuild the existing Ennis West SW to Sterrett SW 138-kV single-circuit transmission line, with normal and emergency ratings of at least 614 MVA, approximately 21.0-mile;

Appendix G – Option 3 (Addition to Option 2)

Details (cont.)

- Rebuild the existing Big Brown 345-kV SW by installing twelve 345-kV, 5,000 A breakers in a breaker-and-a-half bus arrangement. Upon completion, Big Brown SW will be renamed as Pin Oak SW:
 - Re-terminate the existing Big Brown SW to Jewett SW 345-kV double-circuit transmission line at the new Pin Oak 345-kV SW, which creates the new Pin Oak SW to Jewett SW 345-kV double-circuit transmission line;
 - Re-terminate the existing Big Brown SW to Navarro SW 345-kV double-circuit transmission line at the new Pin Oak 345-kV SW, which creates the new Pin Oak SW – Navarro SW 345-kV double-circuit transmission line;
 - Re-terminate the existing Big Brown SW to Richland Chamber SW 345-kV double-circuit transmission line at the new Pin Oak 345-kV SW, which creates the new Pin Oak SW to Richland Chambers SW 345-kV double-circuit transmission line;
- Rebuild the new Jewett SW to Pin Oak SW 345-kV double-circuit transmission line on double-circuit structures with both circuits in place, with normal and emergency ratings of at least 1,792 MVA and with a conductor rating of at least 2,987 MVA, approximately 32.8-mile;
- Rebuild the existing Richland Chambers SW to Trinidad SW 345-kV double-circuit transmission line on double-circuit structures with both circuits in place with normal and emergency ratings of at least 1,792 MVA and a with conductor rating of at least 2,987 MVA, approximately 18.7-mile;

Appendix G – Option 3 (Addition to Option 2)

Details (cont.)

- Rebuild the existing Parker SW to Hicks SW 345-kV transmission line, with normal and emergency ratings of at least 1,912 MVA and with a conductor rating of at least 2,987 MVA, approximately 23.0-mile;
- Rebuild the existing Pebble Creek SW to Shankle SW 138-kV transmission line, with normal and emergency ratings of at least 764 MVA, approximately 15.5-mile;
- Rebuild the existing Mesquite East SW to Seagoville SW 138-kV transmission line, with normal and emergency ratings of at least 764 MVA, approximately 7.4-mile;
- Rebuild the existing Farmersville SW to Royse SW 345-kV double-circuit transmission line on double-circuit structures with both circuits in place, with normal and emergency ratings of at least 1,792 MVA and with a conductor rating of at least 2,987 MVA, approximately 15.3-mile;
- Install one +250/-250 MVar Grid-forming STATCOM at each of the following:
 - Alba Road 345-kVSW;
 - Greene Road 345-kVSW;
 - Wilmer 345kV SW;

Appendix G – Option 3 (Addition to Option 2) Details (cont.)

- Install 240 MVAR 345-kV capacitor banks (3-80 MVAR each):
 - One at Greene Road 345-kV SW;
 - Two at Alba Road 345-kV SW;
 - Two at Stainback 345-kV SW;
- Install 110.4 MVAR 138-kV capacitor banks (3-36.8 MVAR each) at:
 - One at Greene Road 138-kVSW;
 - Two at Ironwood 138-kVSW;
 - Two at Pebble Creek 138-kVSW;
- For terminal equipment:
 - The existing 345 kV terminal equipment, ensure they meet or exceed a rating of 3000 A (1792 MVA);
 - The new 345-kV terminal equipment, ensure they meet or exceed a rating of 5,000 A if the station is 5,000 A capable. Otherwise ensure the new 345-kV terminal equipment meets or exceeds a rating of 3,200 A; and
 - The 138-kV terminal equipment, ensure they meet or exceed a rating of 3,000 A.

Appendix G – Option 3 (Addition to Option 2)

Details (cont.)

- Construct a new Goatpad 138-kV Substation
 - Install a new Goatpad to Padera 138-kV single-circuit transmission line on double-circuit structures with only one circuits in place, with normal and emergency ratings of at least 287 MVA, approximately 2.6-mile
 - Install a new Goatpad to Midlothian 138-kV single-circuit transmission line on double-circuit structures with only one circuits in place, with normal and emergency ratings of at least 287 MVA, approximately 3.0-mile
 - Install a new Goatpad to Goatheard 138-kV single-circuit transmission line on double-circuit structures with only one circuits in place, with normal and emergency ratings of at least 524 MVA, approximately 0.1-mile
- Construct a new Goatheard 138-kV Substation
 - Re-terminate the existing Cedar Hill SW to Saint Paul SW 138-kV single-circuit transmission line into the new Goatheard 138-kV SW, which creates the new Goatheard SW to Cedar Hill SW and the new Goatheard SW to Saint Paul SW 138-kV single-circuit transmission line, and rebuild on double-circuit structures with only one circuits in place, with normal and emergency ratings of at least 237 MVA, approximately 0.7-mile

Appendix G – Option 3 (Addition to Option 2)

Details (cont.)

- Upgrade the existing Navarro SW to Pin Oak SW 345-kV single-circuit transmission line on double-circuit structures with both circuits in place, with normal and emergency ratings of at least 2,987 MVA, approximately 27.6-mile
- Upgrade the existing Navarro SW to Brown Navarro Tap 345-kV single-circuit transmission line on double-circuit structures with both circuits in place, with normal and emergency ratings of at least 2,987 MVA, approximately 16.0-mile
- Upgrade the existing Pin Oak SW to Brown Navarro Tap 345-kV single-circuit transmission line on double-circuit structures with both circuits in place, with normal and emergency ratings of at least 2,987 MVA, approximately 12.5-mile
- Upgrade the existing Navarro SW to Outlaw SW 345-kV single-circuit transmission line on double-circuit structures with both/only one circuit(s) in place, with normal and emergency ratings of at least 2,987 MVA, approximately 5.0-mile
- Construct a new Desoto SW to Sam SW 345-kV double-circuit transmission line on double-circuit structures with both circuits in place, with normal and emergency ratings of at least 2,987 MVA, approximately 56.0-mile/circuit
- Construct a new Wilmer SW to Navarro SW 345-kV double-circuit transmission line on double-circuit structures with both circuits in place, with normal and emergency ratings of at least 2,987 MVA, approximately 53.0-mile/circuit

Appendix G – Option 3 (Addition to Option 2)

Details (cont.)

- Upgrade the existing Watermill SW to Tri Coner SW 345-kV double-circuit transmission line on double-circuit structures with both circuits in place, with normal and emergency ratings of at least 2,987 MVA, approximately 11.5-mile/circuit
- Upgrade the existing Tri Coner SW to Trinidad SW 345-kV double-circuit transmission line on double-circuit structures with both circuits in place, with normal and emergency ratings of at least 2,987 MVA, approximately 40.5-mile/circuit
- Upgrade the existing Farmerville SW to Saltillo SW 345-kV single-circuit transmission line on double-circuit structures with both circuits in place, with normal and emergency ratings of at least 2,987 MVA, approximately 59.9-mile/circuit