Rayburn Electric Cooperative Rand Area Loop - ERCOT Independent Review Study

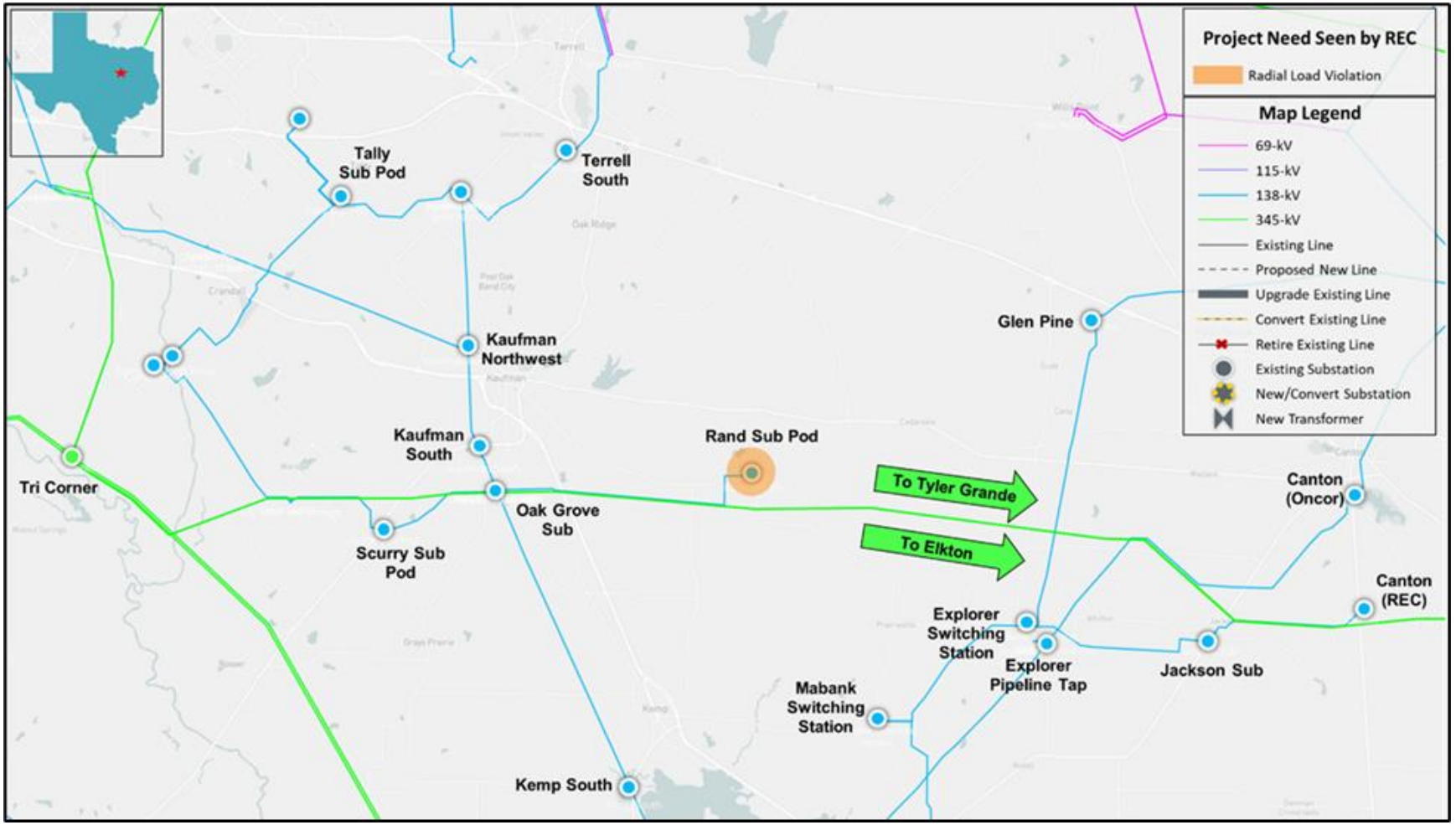
Abishek Penti

RPG Meeting
September 25, 2024

Recap - Introduction

- Rayburn Electric Cooperative (REC) submitted the Rand Area Loop Project for Reginal Planning Group (RPG) review in May 2024
  - This Tier 2 project is estimated at $32.2 million and will require a Certificate of Convenience and Necessity (CCN)
  - Estimated completion date is April 2027
  - To address REC planning criteria to limit radial load to less than 20 MW
  - Provide “Looped Service” for REC Rand Station
- ERCOT presented study scope and status update for this ERCOT Independent Review (EIR) at the June and August RPG Meeting:
  - https://www.ercot.com/calendar/06112024-RPG-Meeting
  - https://www.ercot.com/calendar/08132024-RPG-Meeting
- This project is currently under ERCOT Independent Review (EIR)

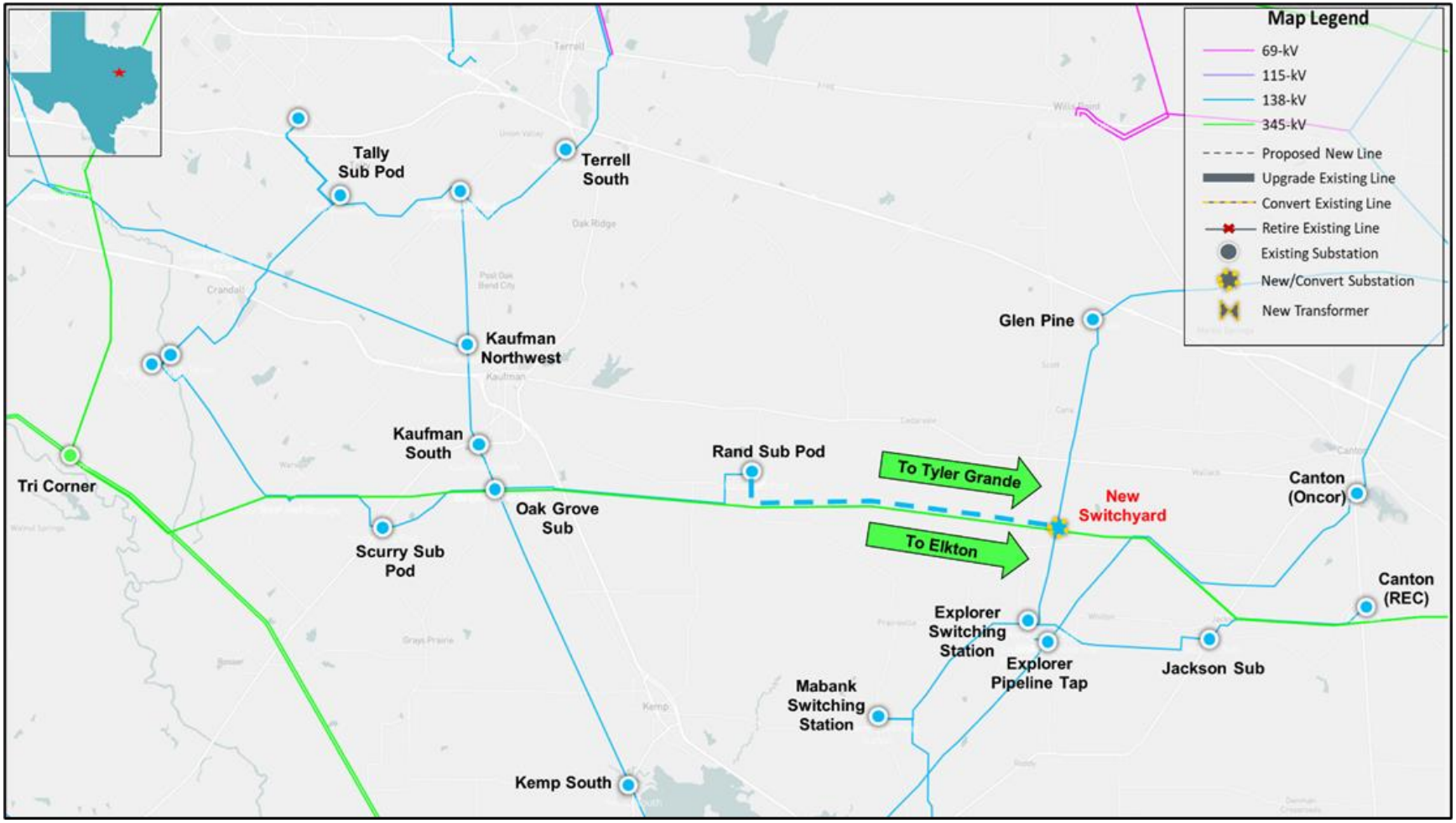
Recap - Study Area Map with Project Need Seen by REC



Recap - Project Proposed by REC

- Construct a new 138-kV Switchyard, with 3-breaker ring bus configuration, at a tap point between Explorer and Glen Pine
- Upgrade Rand 138-kV Switchyard to 3-breaker ring bus configuration
- Construct a new Rand to new Switchyard 138-kV transmission line with normal and emergency ratings of at least 669 MVA and 752 MVA, respectively, on new Right of Way (ROW), approximately 12.35-mile

Recap - Project Proposed by REC



Recap - 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 project need

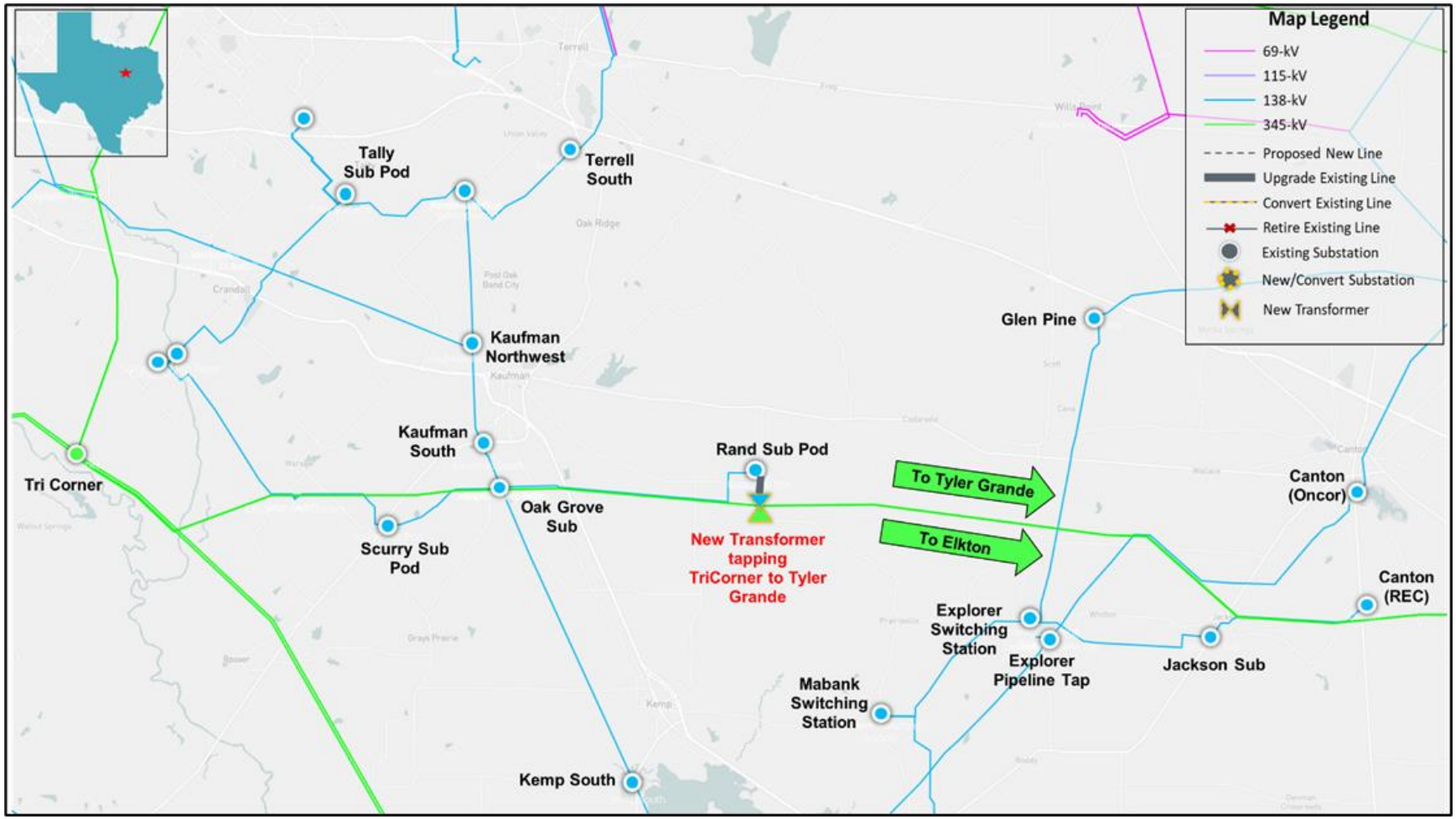
Contingency Category	Voltage Violations	Thermal Violations	Unsolved Power Flow
N-0 (P0)	None	None	None
N-1 (P1, P2-1, P7)	None	None	None
G-1+N-1 (P3)*	None	None	None
X-1+N-1 (P6-2)**	None	None	None

* G-1: Trinidad Unit 6 and Glenpine Solar
** X-1: Elkton, Tyler Grande, Forest Grove, and Sulphur Springs 345/138-kV autotransformers

Option 1

- Upgrade Rand 138-kV Switchyard to 3-breaker ring bus configuration
- Construct a new 345/138-kV Switchyard, at a tap point on the Tri Corner to Tyler Grande 345-kV line
- Construct a new 345/138-kV transformer between the new 345/138-kV Switchyard and Rand 138-kV Switchyard with normal and emergency ratings of at least 360 MVA and 480 MVA, respectively

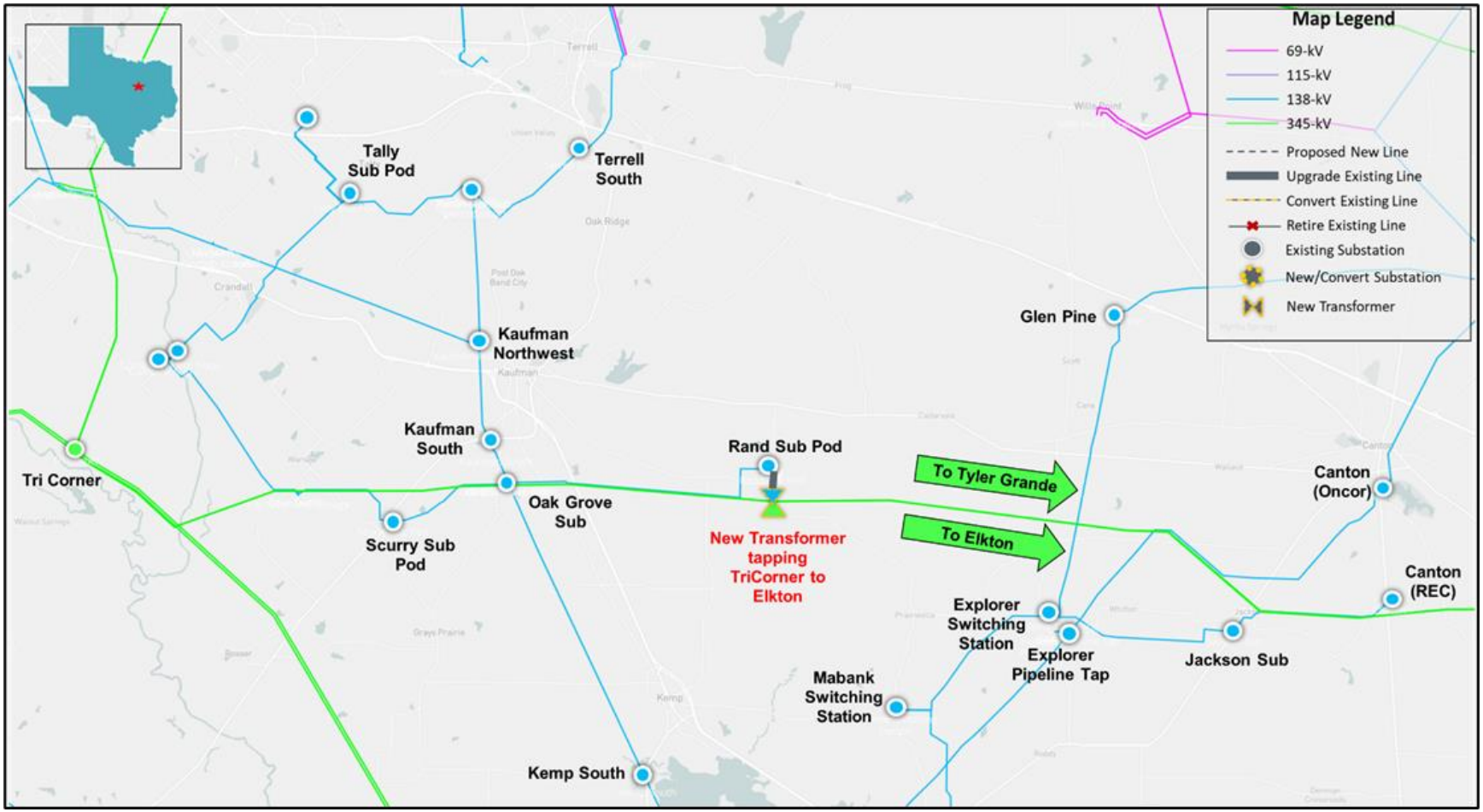
Option 1


Map Legend
69-kV
115-kV
138-kV
345-kV
Proposed New Line
Upgrade Existing Line
Convert Existing Line
Retire Existing Line
Existing Substation
New/Convert Substation
New Transformer
Tally Sub Pod
Terrell South
Kaufman Northwest
Kaufman South
Tri Corner
Scurry Sub Pod
Oak Grove Sub
Rand Sub Pod
New Transformer tapping TriCorner to Tyler Grande
To Tyler Grande
To Elkton
Glen Pine
Canton (Oncor)
Canton (REC)
Explorer Switching Station
Explorer Pipeline Tap
Jackson Sub
Mabank Switching Station
Kemp South

Option 2

- Upgrade Rand 138-kV Switchyard to 3-breaker ring bus configuration
- Construct a new 345/138-kV Switchyard, at a tap point on the Tri Corner to Elkton 345-kV line
- Construct a new 345/138-kV transformer between the new 345/138-kV Switchyard and Rand 138-kV Switchyard with normal and emergency ratings of at least 360 MVA and 480 MVA, respectively

Option 2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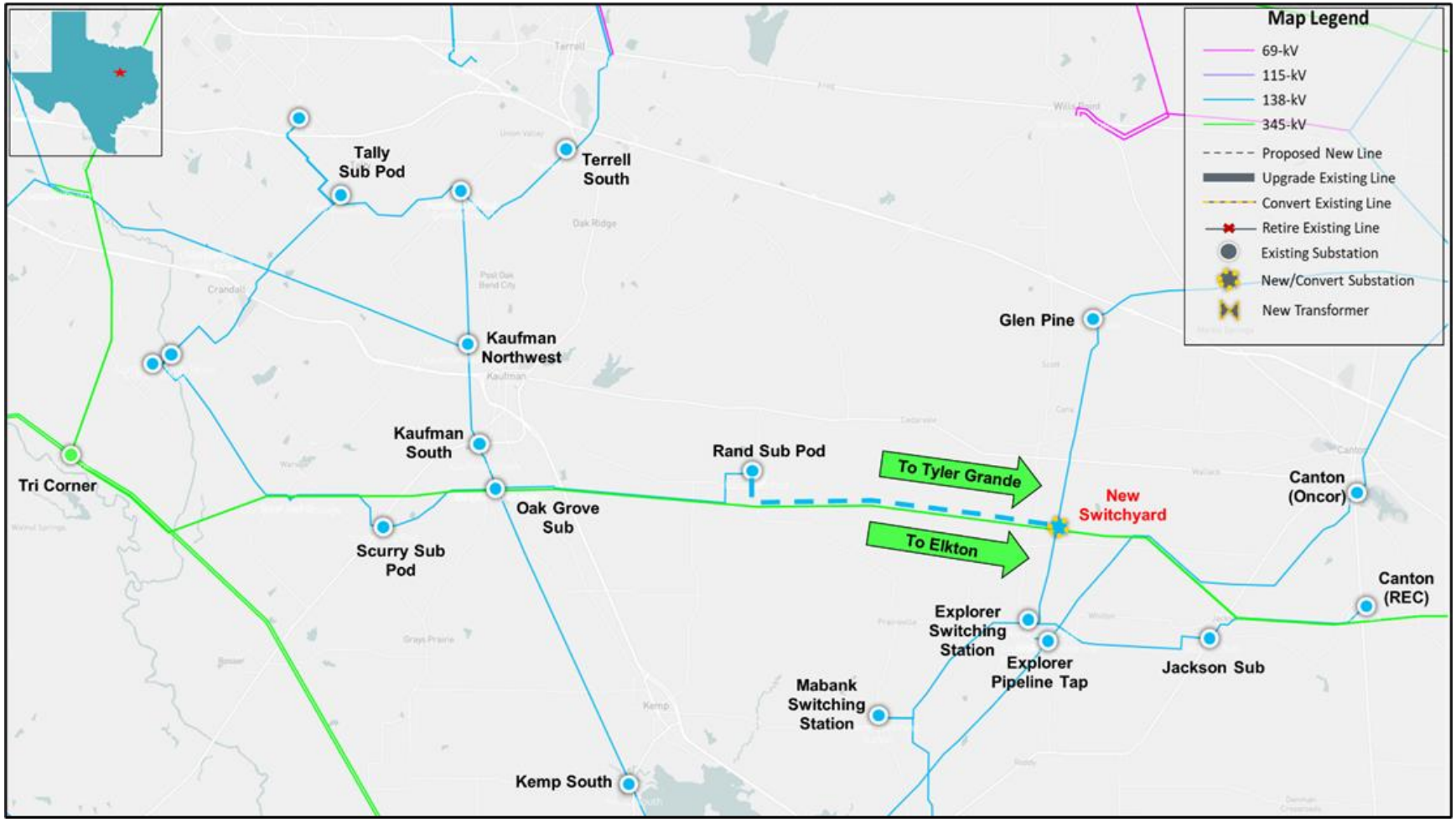
New Transformer tapping TriCorner to Elkton
To Tyler Grande
To Elkton
Glen Pine
Canton (Oncor)
Canton (REC)
Explorer Switching Station
Explorer Pipeline Tap
Jackson Sub
Mabank Switching Station
Kemp South

Option 3 – REC Preferred Option

- Construct a new 138-kV Switchyard, with 3-breaker ring bus configuration, at a tap point between Explorer and Glen Pine
- Upgrade Rand 138-kV Switchyard to 3-breaker ring bus configuration
- Construct a new Rand to new Switchyard 138-kV transmission line with normal and emergency ratings of at least 669 MVA and 752 MVA, respectively, on new ROW, approximately 12.35-mile

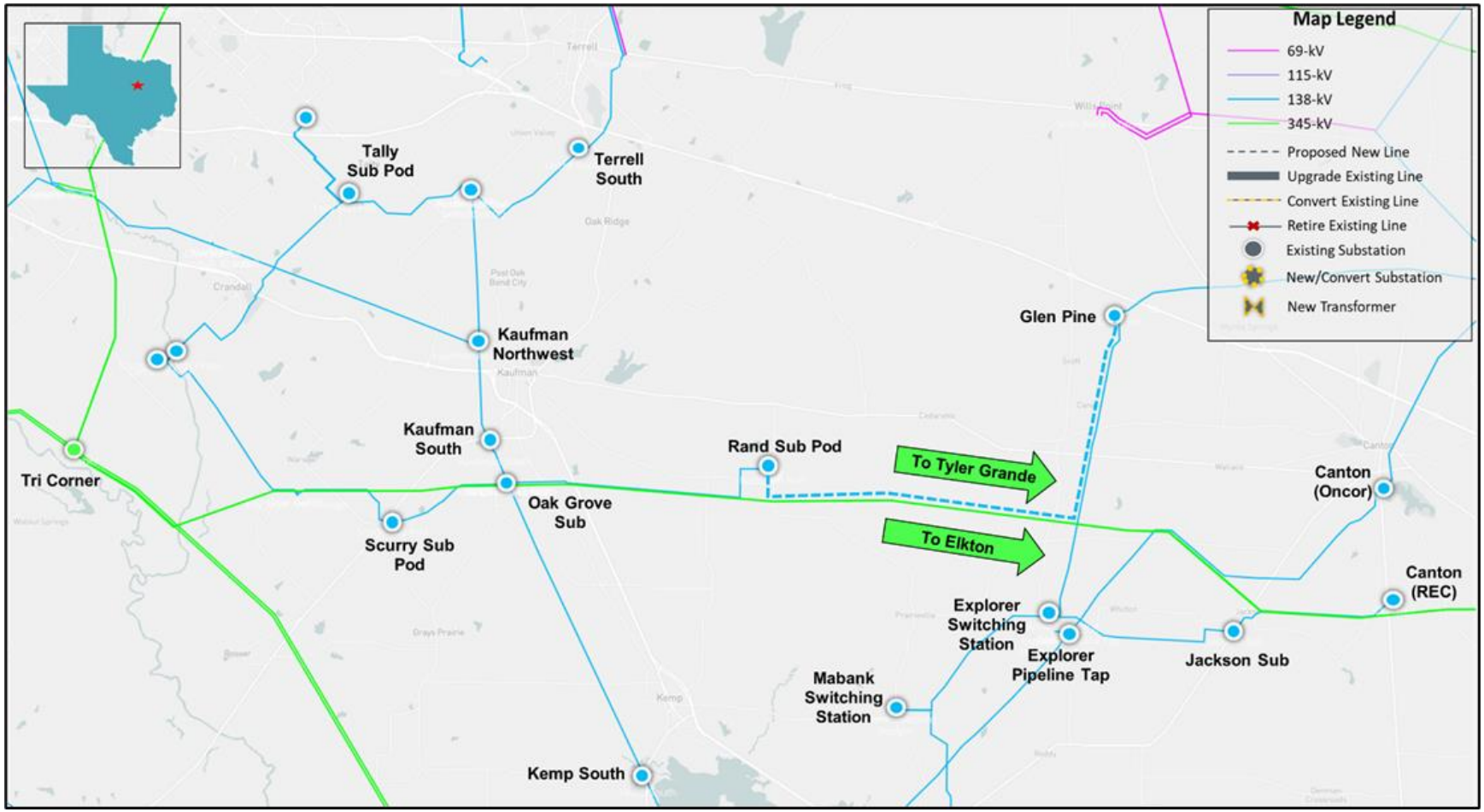
Option 3 - REC Preferred Option



Option 4

- Upgrade Rand 138-kV Switchyard to 3-breaker ring bus configuration
- Construct a new Rand 138-kV Switchyard to Glen Pine138-kV transmission line with normal and emergency ratings of at least 669 MVA and 752 MVA, respectively, on new ROW, approximately 20-mile

Option 4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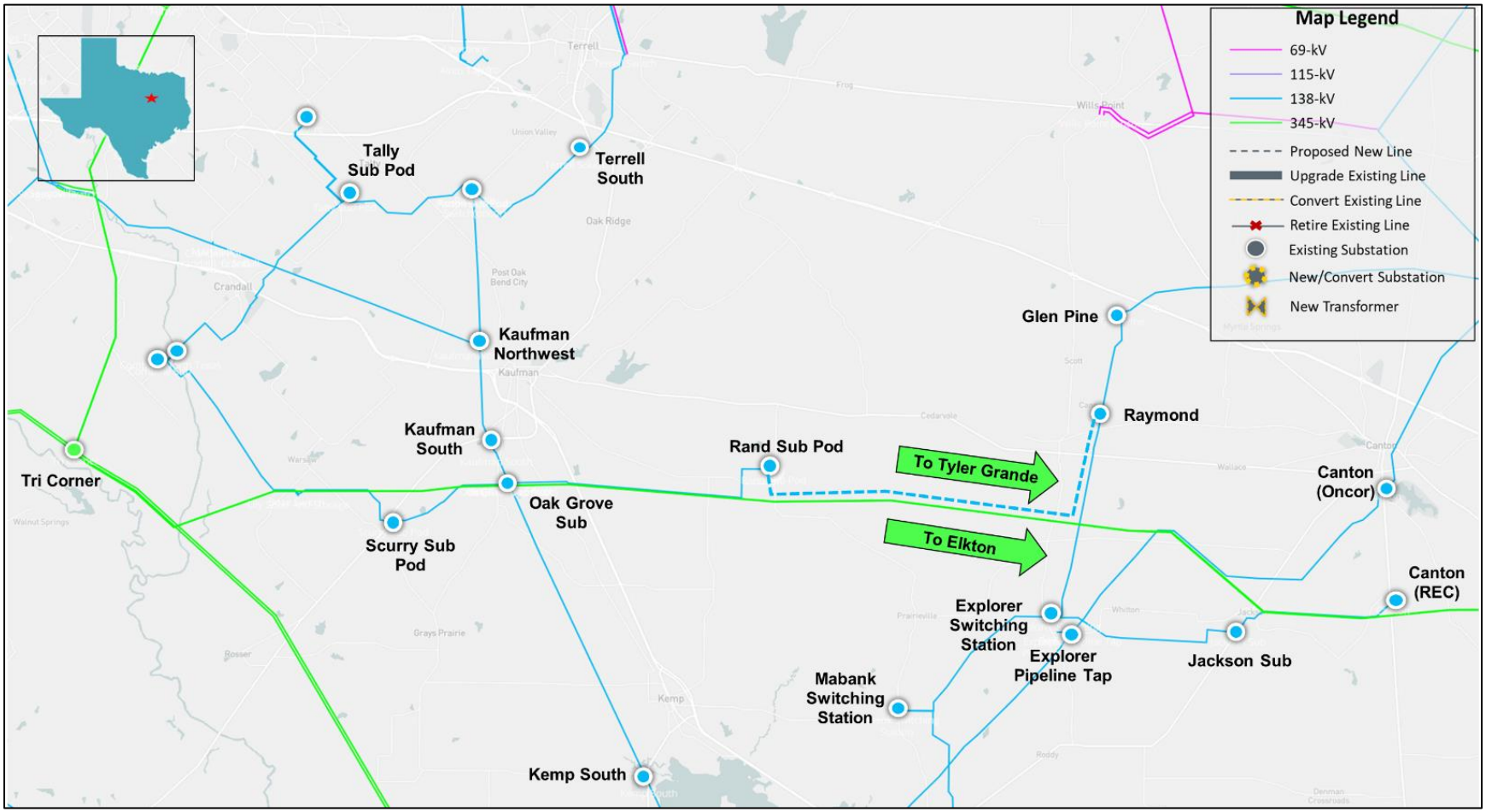
Option 4A

- Upgrade Rand 138-kV Switchyard to 3-breaker ring bus configuration
- Construct a new Rand 138-kV Switchyard to Raymond 138-kV transmission line with normal and emergency ratings of at least 669 MVA and 752 MVA, respectively, on new ROW, approximately 17-mile

Option 4A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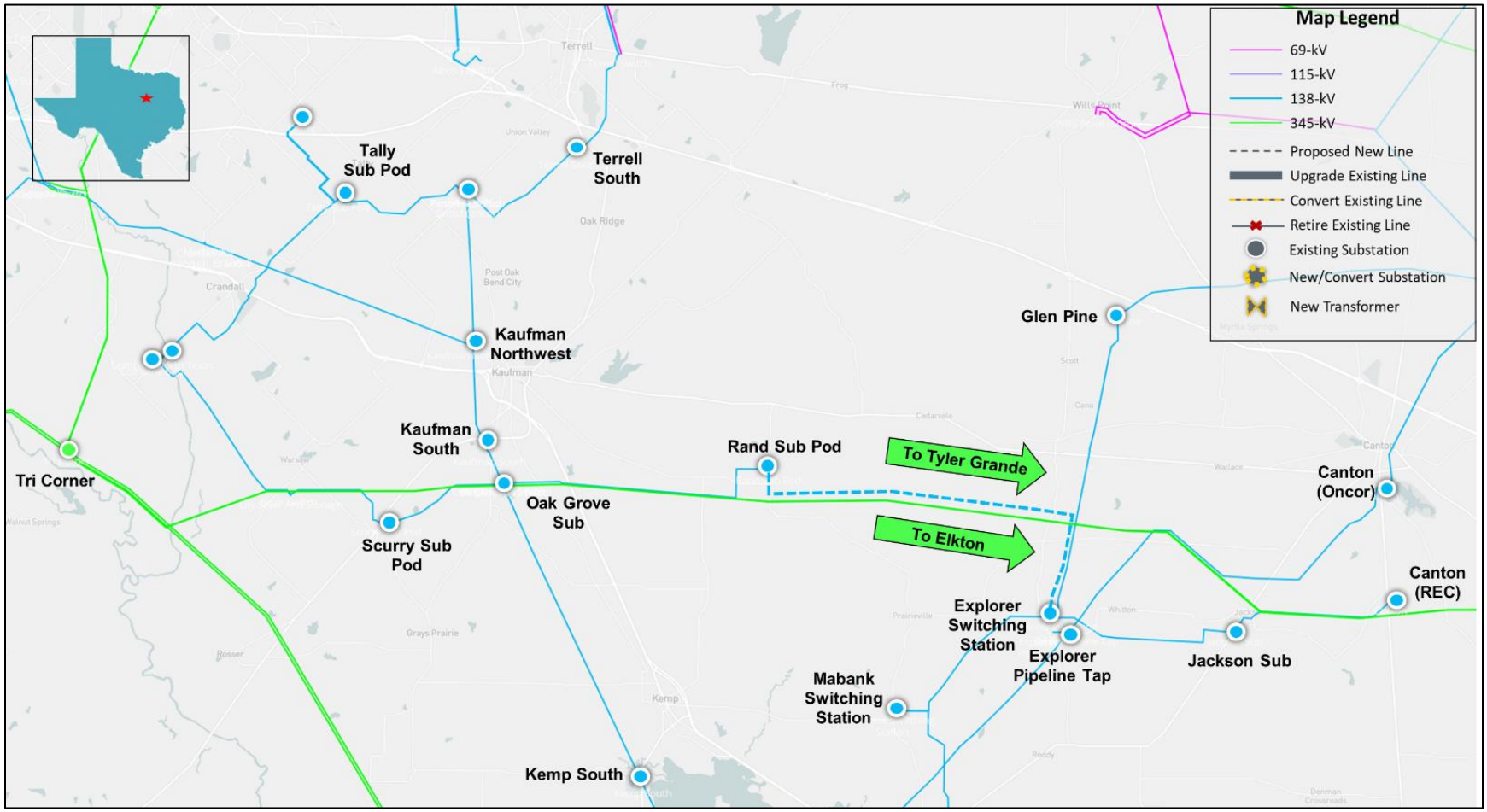
Kaufman South
Tri Corner
Scurry Sub Pod
Oak Grove Sub
Rand Sub Pod
To Tyler Grande
To Elkton
Glen Pine
Raymond
Canton (Oncor)
Canton (REC)
Explorer Switching Station
Explorer Pipeline Tap
Jackson Sub
Mabank Switching Station
Kemp South

Option 5

- Upgrade Rand 138-kV Switchyard to 3-breaker ring bus configuration
- Construct a new Rand 138-kV Switchyard to Explorer 138-kV transmission line with normal and emergency ratings of at least 669 MVA and 752 MVA, respectively, on new ROW, approximately 13.5-mile

Option 5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Option 6

- Upgrade Rand 138-kV Switchyard to 3-breaker ring bus configuration
- Construct a new Rand 138-kV Switchyard to Kauffman South 138-kV transmission line with normal and emergency ratings of at least 669 MVA and 752 MVA, respectively, with a new ROW, approximately 10-mile

Option 6


Map Legend
69-kV
115-kV
138-kV
345-kV
Proposed New Line
Upgrade Existing Line
Convert Existing Line
Retire Existing Line
Existing Substation
New/Convert Substation
New Transformer
Tally Sub Pod
Terrell South
Kaufman Northwest
Kaufman South
Rand Sub Pod
Tri Corner
Oak Grove Sub
Scurry Sub Pod
To Tyler Grande
To Elkton
Glen Pine
Canton (Oncor)
Canton (REC)
Explorer Switching Station
Explorer Pipeline Tap
Jackson Sub
Mabank Switching Station
Kemp South

Preliminary Results of Reliability Assessment – Options

Option	N-1		G-1 + N-1		X-1 + N-1	
	Thermal Violations	Voltage Violations	Thermal Violations	Voltage Violations	Thermal Violations	Voltage Violations
1	2	None	None	None	None	None
2	2	None	None	None	None	None
3	None	None	None	None	None	None
4	None	None	None	None	None	None
4A	None	None	None	None	None	None
5	None	None	None	None	None	None
6	None	None	None	None	None	None

* G-1: Trinidad Unit 6 and Glenpine Solar
** X-1: Elkton, Tyler Grande, Forest Grove, and Sulphur Springs 345/138-kV autotransformers

- Options 3, 4, 4A, 5 and 6 are selected for further evaluation.

Preliminary Cost Estimate and Feasibility Assessment

- Transmission Service Providers (TSPs) performed feasibility assessments and provided preliminary cost estimates for the five options

Option	Cost Estimates (~$M)	CCN Required (~Miles)	Feasibility
3	32.20	12.35	Yes
4	38.20	20.00	Yes
4A	33.70	17.00	Yes
5	26.45	13.50	No
6	36.20	10.00	Yes

- Options 3, 4, 4A and 6 are shortlisted for further evaluation.

Preliminary Results of Planned Maintenance Outage Evaluation

- ERCOT conducted planned maintenance outage evaluation on the shortlisted options
  - Load level in the North-Central and East Weather Zones were scaled down to 81.3 and 84.2% of their summer peak loads in the study base case, respectively based on ERCOT load forecast and historical load, in order to mimic the off- peak load condition
  - N-2 contingencies were tested as a proxy for N-1-1. Any applicable violating contingencies were further tested with system adjustments
  - The transmission elements in the Dallas, Rockwall, Van Zandt, Hunt, Smith, Kaufman, and Henderson Counties were monitored in the maintenance outage evaluation
- Planned maintenance outage analysis results

Option	Voltage Violations	Thermal Overloads	Unsolved Power Flow
3	None	None	None
4	None	None	None
4A	None	None	None
6	None	None	None

Long-Term Load-Serving Capability Assessment

- Adjusted load up in substations in the Study Area
- Adjusted conforming load down outside of the North Central and East Weather Zones to balance power
- Based on N-1 contingency limits

Option	Incremental Load-Serving Capability (~MW)
3	160
4	157
4A	159
6	41

Comparison of Shortlisted Options

	Option 3	Option 4	Option 4A	Option 6
Meets ERCOT and NERC Reliability Criteria	Yes	Yes	Yes	Yes
Meets REC's Planning Criteria Requirement	Yes	Yes	Yes	Yes
Improves Long-Term Load-Serving Capability	Yes(Best)	Yes(Best)	Yes(Best)	Yes
Requires CCN (~miles)	Yes (12.35)	Yes (20.00)	Yes (17.00)	Yes (10.00)
Project Feasibility	Yes	Yes	Yes	Yes
Cost Estimate* (~$M)	32.20	38.20	33.70	36.20

*Cost estimates were provided by the TSPs

ERCOT Preferred Option

- Option 3 is selected as the preferred option because it
  - Is the least expensive option that fully addresses REC's Planning criteria with no reliability issues
  - Provides operational flexibility
  - Improves Long-Term Load-Serving Capability

Additional Analyses

- Congestion Analysis
  - Congestion analysis was performed for the preferred option using the 2023 RTP 2028 economic case
  - The preferred option did not result in any new congestion within the study area

ERCOT Recommendation Option

- ERCOT recommends Option 3
  - Estimated Cost: approximately $32.2 million
  - Expected ISD: April 2027
  - CCN filling will be required to
    - Construct a new 138-kV Switchyard, at a tap point between Explorer and Glen Pine
    - Construct a new Rand to new Switchyard 138-kV transmission line with normal and emergency ratings of at least 669 MVA and 752 MVA, respectively, on new ROW, approximately 12.35-mile

ERCOT Recommendation Option 3

- Construct a new 138-kV Switchyard, with 3-breaker ring bus configuration, at a tap point between Explorer and Glen Pine
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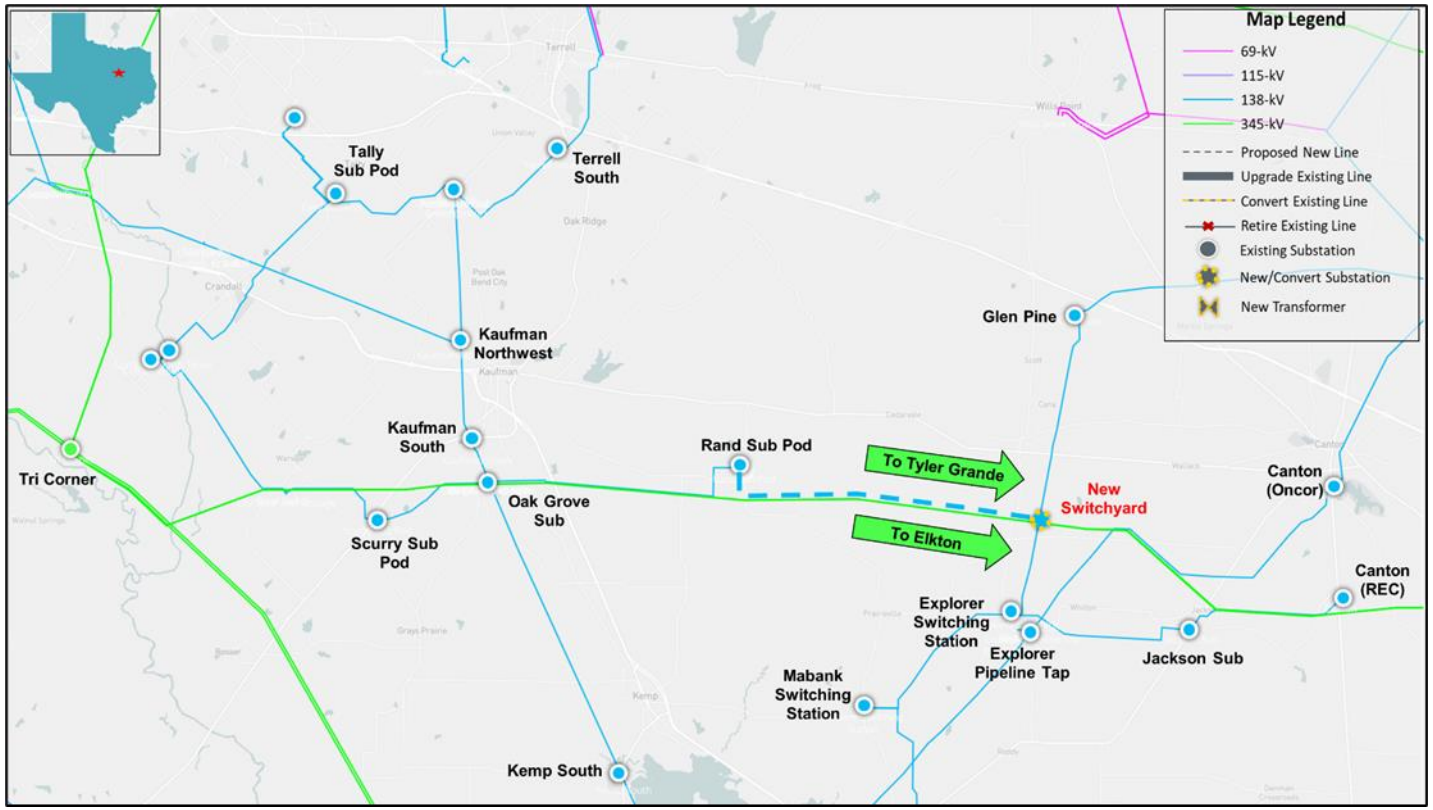

RPG Acceptance and ERCOT Endorsement

- ERCOT Protocol Section 3.11.4.9(4)

> (4) If a TSP asserts a need for a proposed Tier 1 or Tier 2 project based in part or in whole on its own planning criteria, then ERCOT's independent review shall also consider whether a reliability need exists under the TSP's criteria. If ERCOT identifies a reliability need under the TSP's criteria, then ERCOT shall recommend a project that would address that need as well as any reliability need identified under NERC or ERCOT criteria, but shall explicitly state in the independent review report that ERCOT has assumed the TSP's criteria are valid and that an assessment of the validity of the TSP's criteria is beyond the scope of ERCOT's responsibility. ERCOT or the ERCOT Board may provide a qualified endorsement of such a project if ERCOT determines that it is justified in part under ERCOT or NERC criteria, as described in paragraph (1) above. However, neither ERCOT nor the ERCOT Board shall endorse a project that is determined to be needed solely to meet a TSP's criteria.

- In accordance with Protocol Section 3.11.4.9(4), ERCOT will not endorse this project as it is needed solely to meet REC's Planning criteria

Next Step and Tentative Timeline

- Tentative Timelines
  - EIR Report will be posted in the MIS in October

Thank you!

Stakeholder comments also welcomed through:

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Robert.Golen@ercot.com

Appendix A – Transmission Projects Added

TPIT/RPG No	Project Name	Tier	Project ISD	County(s)
75628	Poetry 345 kV Switch	Tier 4	Oct-24	Kaufman
71976	Watermill 138 kV Switch	Tier 3	Dec-24	Dallas
78167	Add 2nd autotransformer at Trumbull	Tier 4	Nov-25	Ellis
71980	Watermill 345 kV Switch	Tier 3	Dec-25	Dallas
78367	Oncor_ME_Montfort-Shankle 138 kV Line	Tier 3	Dec-25	Navarro

Appendix B – Transmission Backed Out

RTP Project ID	Project Name	County(s)
2023-E2	Canton Switch (3174) to Edgewood (3181) 138-kV Line Upgrade	Van Zandt
2023-NC6	Telico Area Upgrades	Ellis
2023-NC18	Tri Corner (2432) to Seagoville Switch (2433) to Forney Switch (2437) 345-kV Line Upgrade	Dallas
2023-NC20	Kemp South (2726) to Seven Points (3264) to Will White POI (3287) 138-kV Line Upgrade	Henderson
2023-NC21	Cedar Creek Pump (3263) to Mankin SW (3265) 138-kV Line Upgrade	Henderson
2023-NC24	Southside POI (230) to MCCree (832) 69-kV Line Upgrade	Dallas
2023-NC38	Watermill 345/138-kV Transformer Upgrade	Dallas
2023-NC41	Watermill 138-kV Area Upgrades	Dallas
2023-NC42	Waxahachie Area 69-kV and 138-kV Line Upgrades	Ellis
2023-NC43	Wilmer 138/69-kV Transformer Upgrade	Dallas
2023-NC46	Desoto Switch (2424) to Parkerville Road (12425, 2425) 138-kV Line Upgrade	Dallas

Appendix C – Generation Added

GINR	Project Name	Fuel	Project COD	Capacity (~MW)	County
20INR0208	Signal Solar	SOL	3/15/2025	51.8	Hunt
21INR0368	Eliza Solar	SOL	11/01/2024	151.7	Kaufman
22INR0260	Eliza Storage	Other	09/27/2024	100.4	Kaufman
22INR0549	Tanzanite Storage	Other	12/31/2024	265.8	Henderson
22INR0552	Sowers Storage	Other	12/01/2025	206.1	Kaufman
22INR0555	TE Smith Storage	Other	07/15/2025	125.4	Rockwall