Oncor Connell 345/138-kV Switch and Connell to Rockhound 345-kV Double-Circuit Line Project – ERCOT Independent Review Status Update

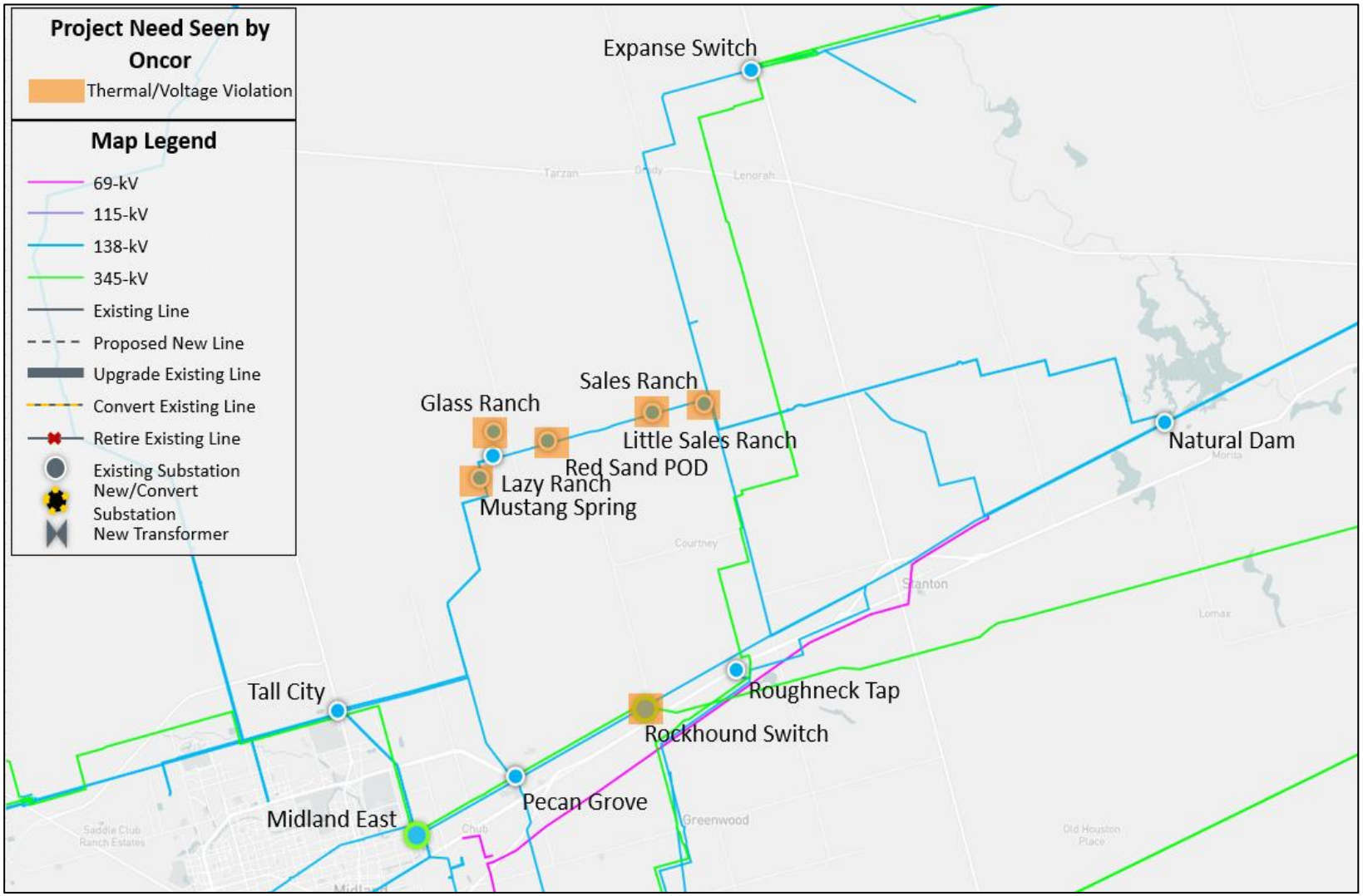
Ben Richardson

RPG Meeting
November 11, 2025

Introduction

- Oncor submitted the Connell 345/138-kV Switch and Connell to Rockhound 345-kV Double-Circuit Project for Regional Planning Group (RPG) review in June 2024
  - This Tier 1 project is estimated to cost $110.62 million and will require a Certificate of Convenience and Necessity (CCN)
  - Estimated in-service date (ISD) is December 2026
  - Addresses low voltages and thermal overloads expected as early as summer 2025 as a result of significant load growth primarily in oil and gas industry
- Oncor presented overview August 2024 RPG Meeting:
  - https://www.ercot.com/calendar/08132024-RPG-Meeting
- ERCOT provided status updates at previous RPG Meetings:
  - https://www.ercot.com/calendar/09252024-RPG-Meeting
  - https://www.ercot.com/calendar/07292025-RPG-Meeting
  - https://www.ercot.com/calendar/09252025-RPG-Meeting
  - https://www.ercot.com/calendar/10282025-RPG-Meeting
- This project is currently under ERCOT Independent Review (EIR)

Study Area Map with Violations seen by Oncor



Study Assumptions – Update (Cont.)

- Load in study area
  - Loads in the WFW Weather Zones have been updated to be consistent with the 2024 RTP Assumptions
  - Oil & Gas loads in the FW Weather Zone were updated based the S&P Global Load Forecast
  - New confirmed loads were added to the study base case
- Study Region focused on transmission elements in the Martin and Midland Counties resulting from confirmed load updates

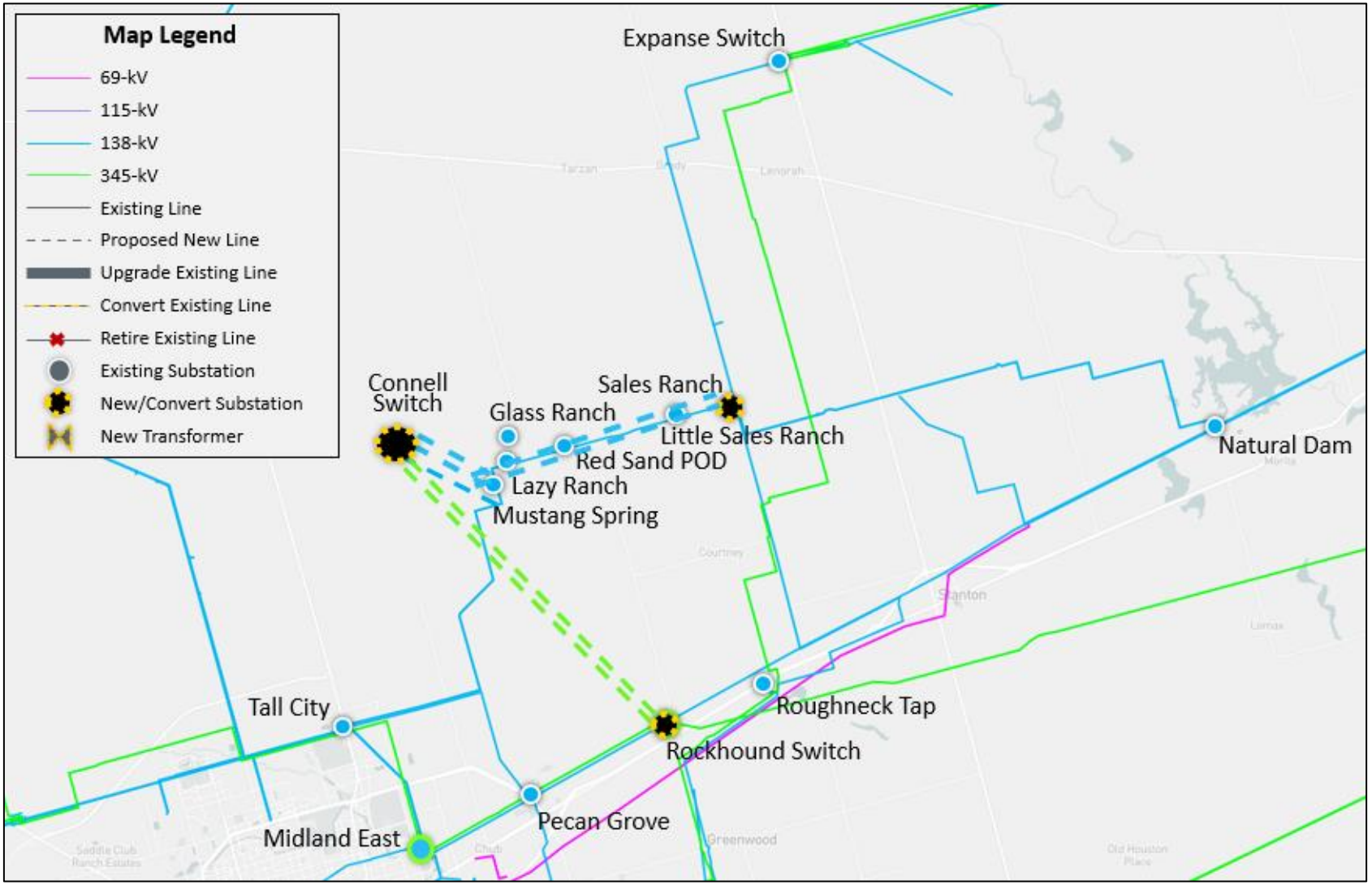
Preliminary Results of Reliability Assessment – Need Analysis

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

Contingency Category*	# of Unsolved Contingencies	# of Thermal Overloads	# of Bus Voltage Violations
N-0 (P0)	None	None	None
N-1 (P1, P2-1, P7)	None	0	0
G-1+N-1 (P3)*	None	0	0
X-1+N-1 (P6-2)**	None	2***	0

*G-1 Generator tested: Odessa Ector CC1
**X-1 Transformers tested: Midland East T1, Morgan Creek T3, Rockhound T1
*** Violations seen in the basecase under P1 events were also seen under G-1 and X-1 events

Option 1 (Oncor proposed project)



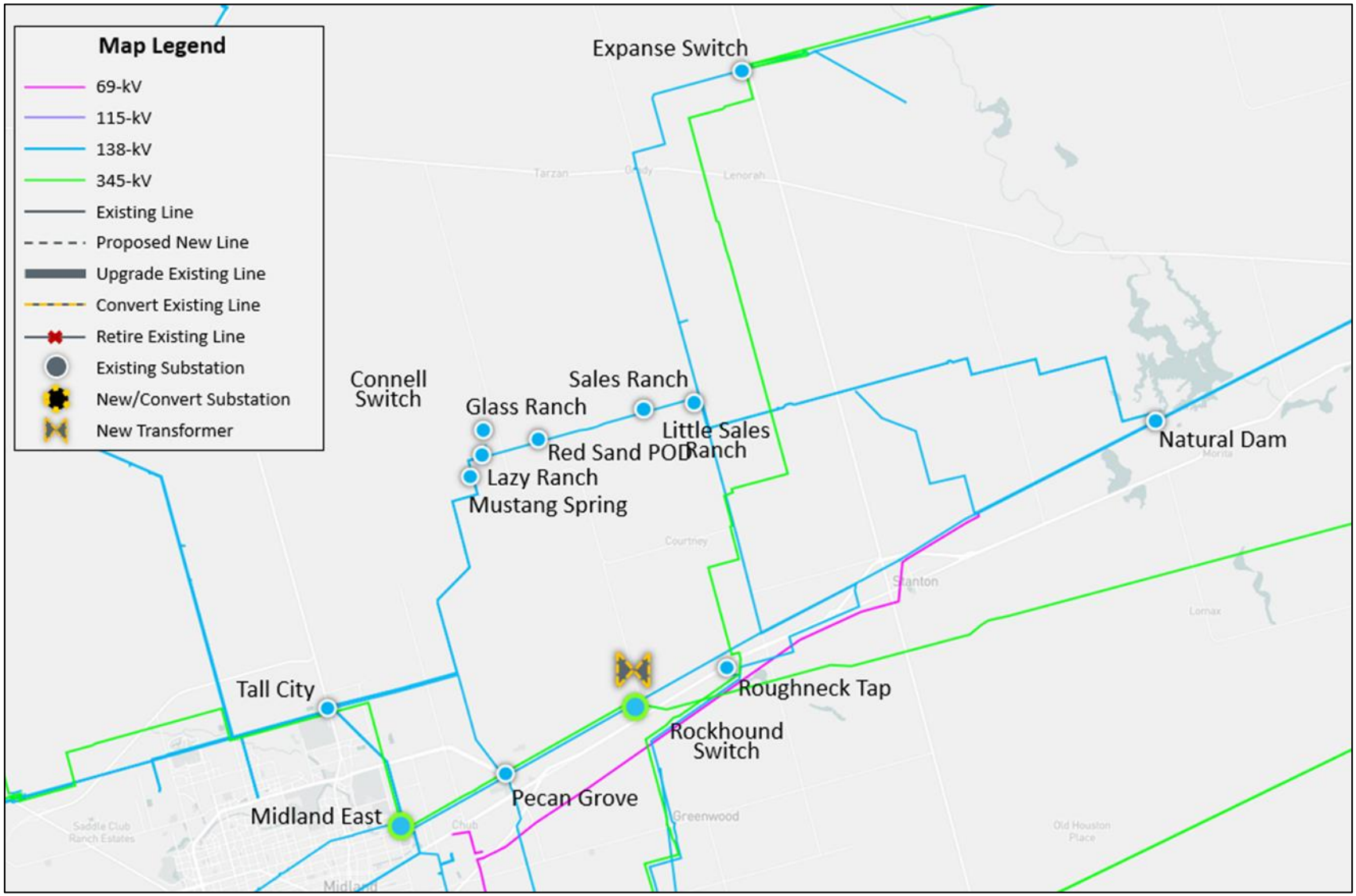
Option 1 (Oncor proposed project)

- Construct a new Connell 345/138-kV switching station approximately 1.0 mile west of existing Oncor Glass Ranch Switch, with two new 600 MVA (nameplate) 345/138-kV transformers, in a 6-breaker 345-kV breaker-and-a-half bus arrangement and a 10-breaker 138-kV breaker-and-a-half bus arrangement, with all 345-kV equipment will be rating at least 2988 MVA and 138-kV at least 765 MVA;
- Construct two new Connell to Rockhound 345-kV lines, with conductors rated to at least 2988 MVA, in a new (estimated 13.0 mile) right of way (ROW), installed on new, common double-circuit towers;
- Install two new 345-kV circuit breakers at Oncor's existing Rockhound 345-kV Switch, rated at least 2988 MVA;
- Install two new 138-kV circuit breakers at Oncor's existing Sale Ranch 138-kV Switch, rated at least 765 MVA;
- Disconnect Oncor's existing Tall City to Sale Ranch 138-kV line at structure 1/9;

Option 1 (Oncor proposed project) – cont.

- Rebuild 9.0-mile portion of Oncor's existing single circuit 19.2-mile Sale Ranch to Glass Ranch to Tall City 138-kV line from Sale Ranch to existing 1/9 Structure and replace 9.0-mile portion with two new conductors, rated to at least 614 MVA, installed on new, common double-circuit towers;
- Construct two new Connell Switch to 1/9 structure 138-kV lines, with conductors rated to at least 614 MVA, in a new (estimated 0.1-mile) ROW, installed on new, common double-circuit towers configured to create a Connell Switch to Sale Ranch 138-kV double-circuit line;
- Construct a new single Connell Switch to 1/9 structure 138-kV line, with conductor rated to at least 614 MVA, in a new (estimated 0.1-mile) ROW, installed in one position on new double-circuit towers leaving one position vacant and configured to create a new Connell Switch to Tall City 138-kV line; and
- Reconfigure Oncor's existing Red Sand 138-kV POD to be connected to the south circuit on the new Connell to Sale Ranch 138-kV double circuit line.

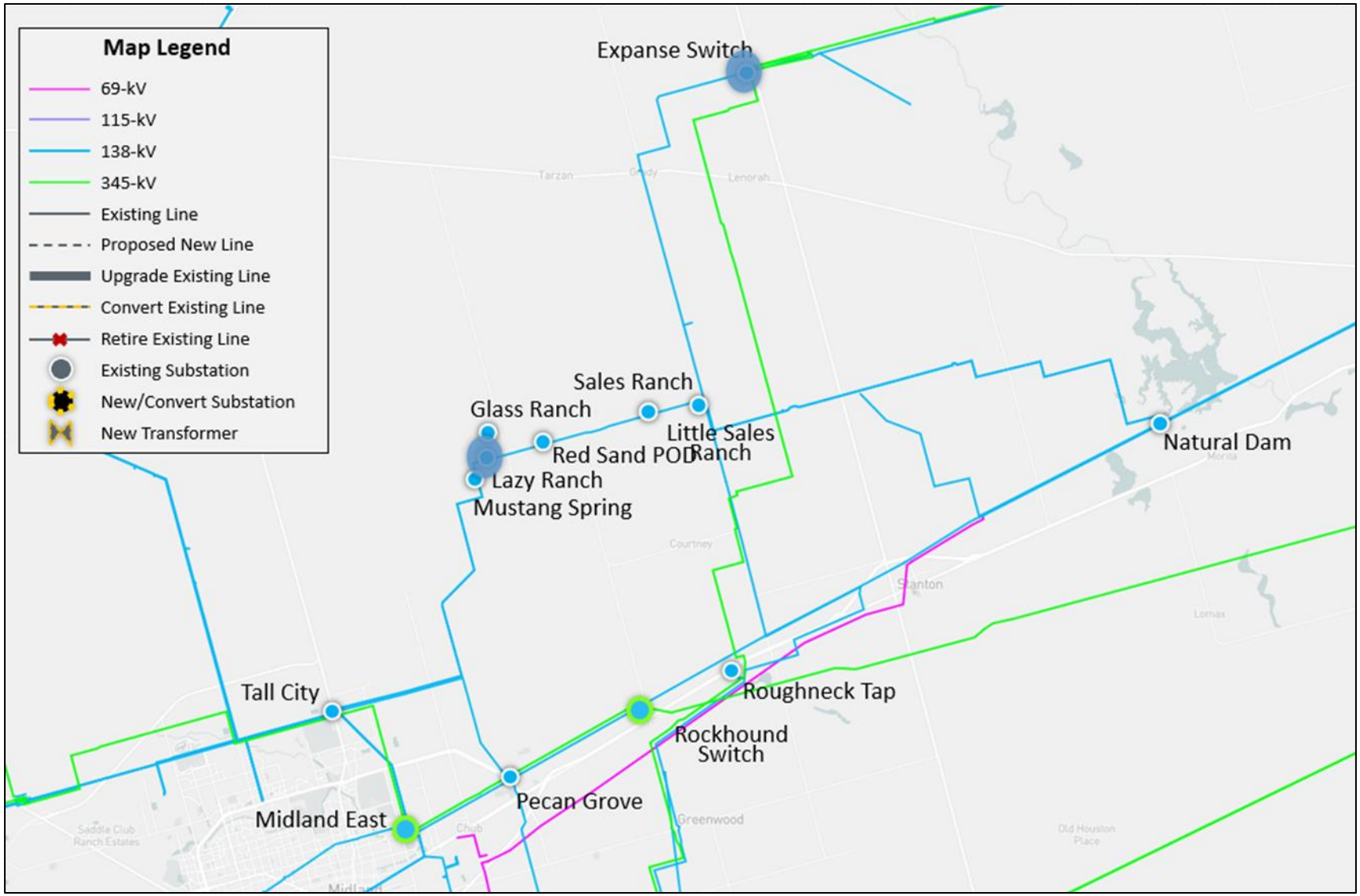
Option 2


Map Legend
69-kV
115-kV
138-kV
345-kV
Existing Line
Proposed New Line
Upgrade Existing Line
Convert Existing Line
Retire Existing Line
Existing Substation
New/Convert Substation
New Transformer
Expanse Switch
Connell Switch
Sales Ranch
Glass Ranch
Little Sales Ranch
Red Sand POD
Lazy Ranch
Mustang Spring
Natural Dam
Tall City
Roughneck Tap
Rockhound Switch
Pecan Grove
Midland East

Option 2

- Add a new 600 MVA (nameplate) 345/138-kV transformers to the existing Rockhound substation.

Option 3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Tall City
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Pecan Grove
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Option 3

- Install 6 capacitor banks (18.4 MVAr each) to a feasible location near the Expanse 138-kV substation; and
- Install 6 capacitor banks (18.4 MVAr each) to a feasible location near the Lazy Ranch 138-kV substation.

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	None	None	None	None	None	None
2	None	None	None	None	None	None
3	None	None	None	None	2	None

*G-1 Generator tested: Odessa Ector CC1
**X-1 Transformers tested: Midland East T1, Morgan Creek T3, Rockhound T1

Long-Term Load-Serving Capability Assessment

- Assumptions
  - Adjusted load up in the study area, excluding Flexible Loads in the area
  - Adjusted conforming load down outside of the West and Far-West Weather Zones to balance power
  - Based on N-1 contingency
- Findings:

Option	Incremental Load-Serving Capability(~MW)
1	80
2	43

Cost Estimate and Feasibility Assessment

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

Option	Cost Estimates (~$M)	CCN Required (~miles)	Feasibility
1	$110.62	Yes (13.2)	Yes
2	N/A	N/A	No

  - Based on inputs from Oncor, Option 2 is deemed infeasible due to Oncor policy to limit 345/138-kV transformers in substation to 2

Results of Planned Maintenance Outage Evaluation

- ERCOT conducted planned maintenance outage evaluation on the study base case
  - Load level in the West was scaled down to 88.4% of the summer peak loads in the study base case based on ERCOT load forecast and historical load, in order to the study off-peak load condition
- Planned maintenance outage analysis results

Voltage Violations	Thermal Overloads	Unsolved Power Flow
0	0	0

Comparison of Options

	Option		
	1	2	3
Meets ERCOT and NERC Reliability Criteria	Yes	Yes	No
Improves Operational Flexibility	Yes	Yes	Yes
Improves Long-Term Load-Serving Capability	Yes	Yes	Yes
Require CCN (~miles)	Yes (13.2)	No	No
Cost Estimate* (~$M)	$110.62	N/A*	N/A*
Feasible	Yes	No	Yes

* The cost estimates were not provided because the option was deemed infeasible by Oncor

- Based on feedback from Oncor, Option 2 was deemed as not feasible
- Option 3 does not address the reliability need

ERCOT Preferred Option

- Option 1 was selected as the preferred option because it:
  - Addresses the project need in the study area
  - Meets both ERCOT and NERC reliability criteria
  - Improves long-term load-serving capability
  - Is a feasible option

Sensitivity Analyses

- Generation Addition Sensitivity Analysis
  - Planning Guide Section 3.1.3(4)(a)

GINR	Unit Name	Fuel Type	Projected COD	Capacity (~MW)	County
None	None	None	None	None	None

- Load Scaling Sensitivity Analysis
  - ERCOT performed a load scaling sensitivity per Planning Guide Section 3.1.3(4)(b) and concluded that the load scaling did not have a material impact on project need

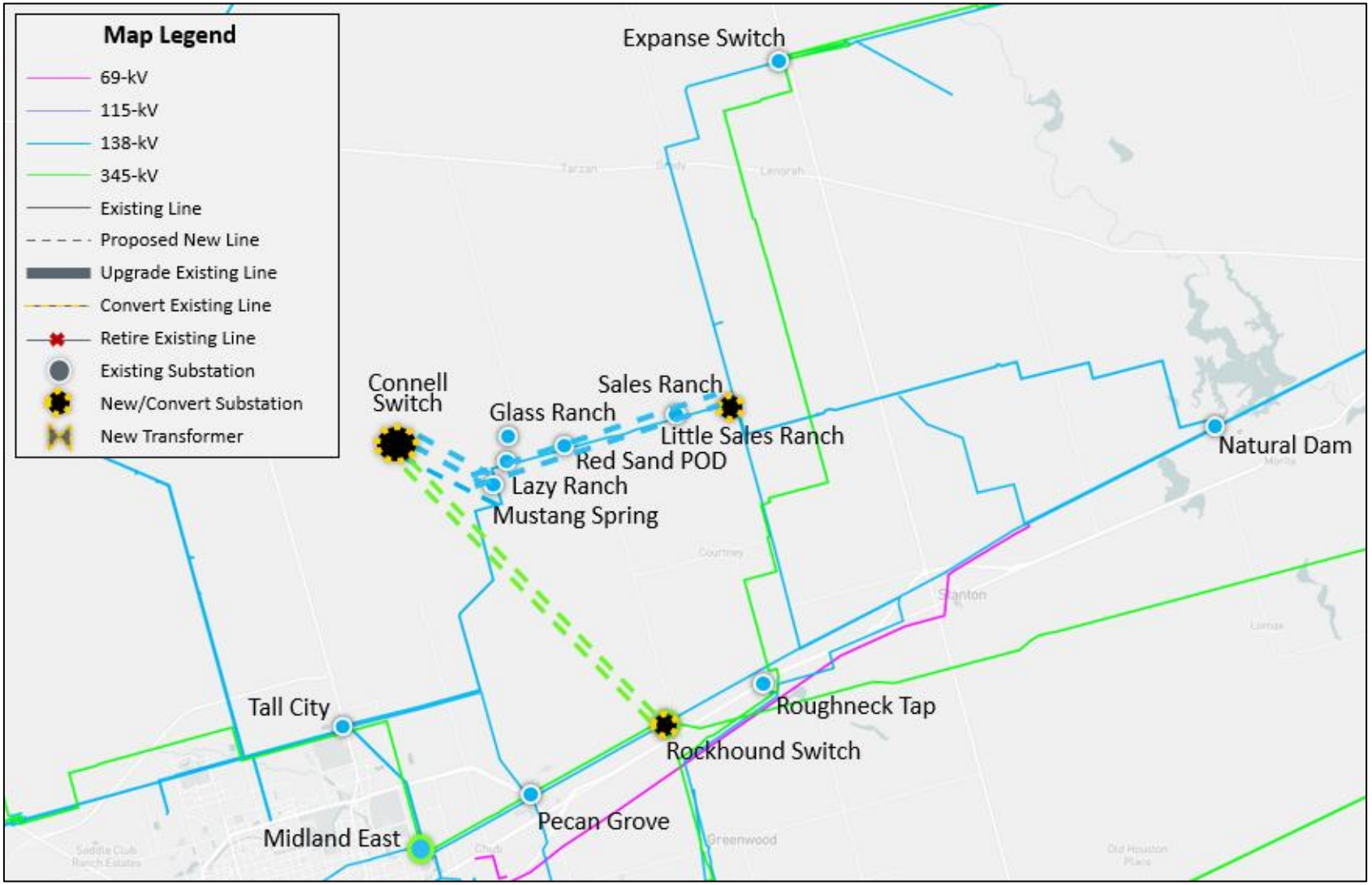
Additional Analyses

- 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 significant congestion within the study area
- Subsynchronous Resonance (SSR) Assessment
  - Subsynchronous Resonance (SSR) Assessment was conducted for the preferred option
  - ERCOT found no significant SSR impacts to the existing and planned generation resources at the time of this study

ERCOT Recommendation

- ERCOT recommends Option 1
  - Estimated Cost: approximately $110.62 million
  - Expected ISD: December 2026
    - The completion date may change depending on material acquisition, outage coordination, construction, or other project related requirements.
  - CCN filling will be required to
    - Construct the new 345-kV double-circuit line from Connell to Rockhound, requiring approximately 13-mile new ROW;

Map of ERCOT Recommended Option



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ERCOT Recommendation

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- Reconfigure Oncor's existing Red Sand 138-kV POD to be connected to the south circuit on the new Connell to Sale Ranch 138-kV double circuit line.

Next Steps and Tentative Timeline

- Tentative timeline
  - EIR report to be posted in the MIS in November 2025
  - EIR recommendation to TAC in November 2025
  - Seek ERCOT Board of Directors endorsement in December 2025

Thank you!

Stakeholder comments also welcomed through:

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Appendix A – Transmission Projects

- List of transmission projects added to study base case

TPIT No	Project Name	Tier	Project ISD	County
72007	Ranger Camp 345/138/69 kV Switch	Tier 1	In-service	Mitchell
78374	Rockhound 345/138 kV Switch	Tier 3	In-service	Midland Martin
73368	Grey Well Draw – Buffalo 138 kV Second Circuit	Tier 3	In-service	Midland Martin
76705	Prairieland 345/138 kV Switch and 138 kV Line	Tier 2	In-service	Glasscock
80913	Sloan 138 kV Switch	Tier 4	5/1/2025	Midland
71960	Upgrade Grady – Expanse 138 kV Line	Tier 4	12/1/2024	Martin
81223	Range Rider 138 kV Switch	Tier 1	12/1/2025	Mitchell
72009	Cattleman 345/138 kV Switch	Tier 1	12/1/2025	Mitchell
87861	Range Rider – Ranger Camp 138 kV Double-Circuit Line	Tier 1	12/1/2025	Mitchell
81274	Ranger Camp – Cattleman 345 kV Double-Circuit Line	Tier 1	12/1/2025	Mitchell
81270	Construct the new Prong Moss 345 kV switch	Tier 1	12/1/2025	Howard

Appendix A – Transmission Projects (Cont.)

- List of transmission projects added to study base case

TPIT No	Project Name	Tier	Project ISD	County
81232	Cattleman – Bitter Creek/Champion Creek 345 kV Reroute	Tier 1	12/1/2026	Mitchell
81410	Reiter Switch Synchronous Condenser	Tier 1	1/1/2027	Ector
81415	Tonkawa Switch Synchronous Condenser	Tier 1	1/1/2027	Scurry
80870	Bakersfield Dynamic Reactive Substation Upgrade	Tier 1	5/1/2027	Pecos
81299	Ranger Camp – Prong Moss 345 kV Line Rebuild	Tier 1	5/1/2027	Mitchell Howard
81227	Cattleman – Gascondades 345 kV Reroute	Tier 1	6/1/2027	Mitchell
87633	WETT Buck Canyon Synchronous Condenser	Tier 1	7/1/2027	Borden
87635	WETT Pitchfork Synchronous Condenser	Tier 1	9/1/2027	Dickens
87629	WETT Binturong Synchronous Condenser	Tier 1	11/1/2027	Glasscock
72011	Tonkawa – Ranger Camp 345 kV Line Rebuild	Tier 1	12/1/2027	Mitchell Scurry
81296	Prong Moss – Rockhound 345 kV Line Rebuild	Tier 1	12/1/2027	Midland Howard

Appendix A – Transmission Projects (Cont.)

- List of transmission projects added to study base case

TPIT No	Project Name	Tier	Project ISD	County
81175	Salt Flat Road 138 kV Switch and Salt Flat Road - Barr Ranch - Reiter 138 kV Second Circuit	Tier 3	12/1/2025	Ector, Midland
81305	Expanse - Vealmoor 138 kV Line Rebuild (Tredway 138-kV Switch and Expanse to Tredway 138-kV 2nd Circuit)	Tier 1	12/1/2025	Borden, Howard, Martin

Appendix B – Transmission Projects - Updated

- List of transmission projects removed from the study base case

TPIT No	Project Name	County
2021-FW4	Rio Pecos – Rankin – Texon Tap – Atlantic Best Tap – Kemper Tap – Big Lake 69-kV to 138-kV Line Conversion	Pecos, Upton, Reagan
2021-FW19	Morgan Creek SES - Longshore Switch 345-kV Line Upgrade	Mitchell, Howard
2021-FW20	Lamesa – Key Sub – Gail Sub – Willow Valley Switch 138-kV Line Upgrade	Dawson, Borden
2023-FW4	Buzzard Draw Switch – Koch Tap – Vealmoor 138-kV Line Upgrade	Howard
2023-FW9	East Stiles 138-kV Cap Bank Addition	Reagon
2023-FW13	Bulldog – Elbow – Eiland – Einstein – Carterville 138-kV Line Upgrade	Howard, Midland
2022-WFW1	Twin Buttes – Hargrove – Pumpjack – Jerry – Russek Street – Big Lake 138-kV line Upgrade	Tom Green, Irion, Reagan

Appendix C – Generation Projects

- List of generation projects added to study base case

GINR	Project Name	Fuel	Project COD	Capacity (~MW)	County
None	None	None	None	None	None