



**WETT Bearkat Area Transmission Improvements  
Project-ERCOT Independent Review**

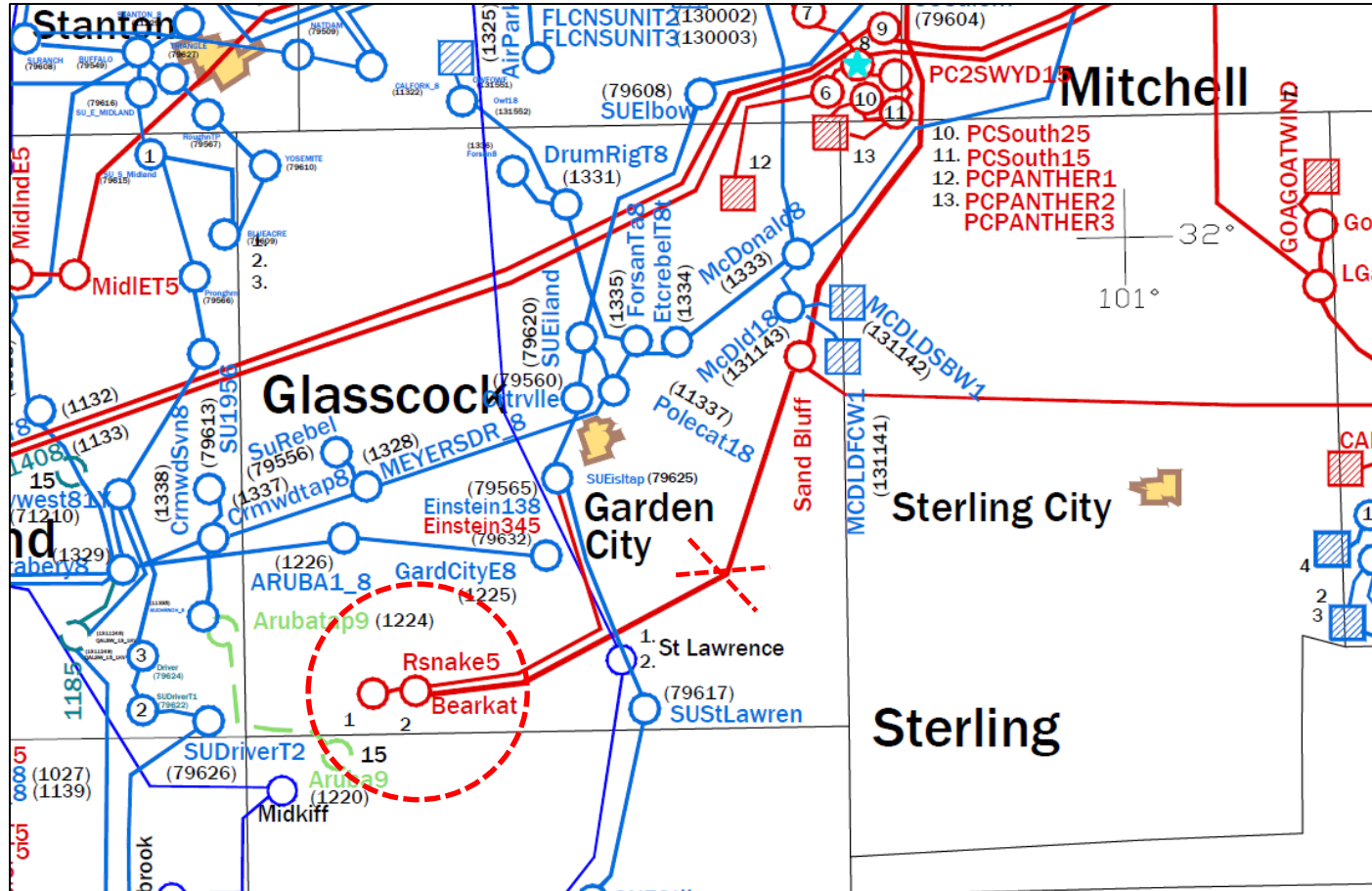
ERCOT Transmission Planning

Regional Planning Group  
September 18, 2018

# Summary of Timeline

- August 15, 2017 - Wind Energy Transmission Texas, LLC (WETT) submitted the Bearkat Area Transmission Improvements Project to the Regional RPG
- October, 2017 - ERCOT began the independent review of this project with initial generation assumptions
  - 404 MW of wind generation in operation
  - 454 MW of wind generation had met the Planning Guide Section 6.9 conditions for inclusion in the planning models in the Bearkat area
- The independent review was on hold for several months per WETT's request
- Significant system changes occurred in 2018
  - Additional 510 MW wind generation met the Planning Guide 6.9 conditions for inclusion in the planning models in the Bearkat area in May, 2018
  - The Far West Transmission Project 2 was endorsed by ERCOT Board in June, 2018
  - The Lubbock integration into ERCOT was approved by the PUCT in March, 2018

# Bearkat - Topology



# Result of Initial Economic Analysis of Options

Please refer to Appendix for project option descriptions

Alternatives	Capital Cost (\$M) <sup>(1)</sup>	ROW (Mileage)	Annual PC Savings (\$M) <sup>(2)</sup>	Annual PC Savings to Capital Cost Ratio	Meets Economic Criteria (15%) ?
Option 1	54.95	18.2	25.58	47 %	YES
Option 2	55.61	22.84	31.75	57 %	YES
Option 3	58.06	26.98	33.86	58 %	YES
Option 4	69.87	30.76	35.15	50 %	YES
Option 5	80.54	39.47	35.57	44 %	YES
Option 6	93.47	33.93	36.78	39 %	YES
Option 7	102.15	51.47	33.46	33 %	YES
Option 8	106.50	53.89	35.93	34 %	YES
Option 9	162.00	90	34.56	21 %	YES

Note:

- (1). Based on initial capital cost estimate provided by WETT except Option 9 which was estimated by ERCOT.
- (2). This economic analysis did not include the Lubbock Integration project.

# Stability Analysis for Option 9

- ERCOT performed a stability analysis to determine if the upgrades mentioned under Option 9 might be able to solve not only the Bearkat export constraints but also serve as an exit strategy for the McCamey GTC.
- Study results showed no dynamic stability issues with the ERCOT Board-endorsed Far West Transmission Project 2 implemented in the study case.
- Option 9 was determined to not be needed at this time to mitigate constraints associated with the McCamey Area GTC.

# Results of Additional Studies

- Economic Analysis:
  - High, medium, and low natural gas price scenarios were evaluated for each option
  - Net Present Value (NPV) analysis was performed to estimate net societal benefits for each option
- Transfer analysis was also performed to identify the maximum power export limit (MW) out of Bearkat that each option could provide

Option	Capital Cost (\$M) <sup>(1)</sup>	Export Limit Out of Bearkat (MW)	ROW (Miles)	Annual Production Cost Savings (\$M) <sup>(2)</sup>			Net Societal Benefit (HOG = \$3.32)		Net Societal Benefit ( Low Gas = \$2.99)		Net Societal Benefit ( Reference = \$4.42)	
				HOG (\$3.32)	Low Gas (\$2.988)	High Gas (\$4.42)	15 Year Net Savings (\$M)	30 Year Net Savings (\$M)	15 Year Net Savings (\$M)	30 Year Net Savings (\$M)	15 Year Net Savings (\$M)	30 Year Net Savings (\$M)
Option 1	54.95	1015	18.2	25.58	22.46	36.05	190.6	306.0	159.7	261.1	294.0	456.7
Option 2	55.61	1619	22.84	31.75	25.77	40.75	250.8	394.0	191.7	308.0	339.7	523.5
Option 3	58.06	1618	26.98	33.86	26.84	44.86	268.9	421.6	199.5	320.6	377.6	579.9
Option 4	69.87	1528	30.76	35.15	27.56	52	268.3	426.8	193.3	317.6	434.7	669.3
Option 5	80.54	1359	39.47	35.57	27.88	49.31	260.3	420.8	184.3	310.1	396.1	618.5
Option 6	93.47	1659	33.93	36.78	29.47	52.12	257.7	423.6	185.4	318.4	409.2	644.3
Option 7	102.15	1594	51.47	33.46	26.95	48.6	215.0	366.0	150.7	272.3	364.6	583.9
Option 8	106.5	1402	53.89	35.93	29.97	51.8	234.5	396.6	175.6	310.8	391.3	625.0
Option 9	162	1388	90	34.56	31	51.98	158.2	314.1	123.0	262.9	330.3	564.8

(1). Based on initial capital cost estimate provided by WETT except Option 9 which was estimated by ERCOT.

(2). This economic analysis did not include the Lubbock Integration project.

# Short-Listed Options

- Based on the results of the NPV analysis and the transfer capability analysis, ERCOT short-listed Options 2, 3, 4, and 6 for the following reasons:
  - Both Option 3 and Option 4 provide the best overall net societal benefits while providing relatively high transfer limits
  - Option 6 was selected as it also provides an overall net societal benefit better than other options and is estimated to provide the best transfer capability among all options
  - Option 2 was selected because it is one of the least cost 345 kV options and provides a high transfer limit, while providing relatively good overall net societal benefits

# Sensitivity Analyses

- Additional sensitivity analyses were conducted with the following assumptions
  - Lubbock integration project was modeled for each of the selected options, and study assumptions were updated appropriately
  - Updated capital cost estimates provided by TSPs after further review (refer to Appendix for details)
- Table below compares the net societal benefits of the selected options with LP&L and updated capital costs

Option	Original Capital Cost from RPG Submittal (\$M)	Updated Capital Cost (\$M)	Export Limit Out of Bearkat (MW)	ROW (Miles)	Annual Production Cost Savings with LP&L (\$M)	Net Societal Benefit with Original Costs and LP&L (HOG = \$3.32)		Net Societal Benefit with Updated Costs and LP&L (HOG = \$3.32)	
					HOG (\$3.32)	15 Year Net Savings (\$M)	30 Year Net Savings (\$M)	15 Year Net Savings (\$M)	30 Year Net Savings (\$M)
Option 2	55.61	53.11	1619	22.84	30.94	242.79	382.36	245.62	385.19
Option 3	58.06	53.26	1618	26.98	31.70	247.53	390.53	252.97	395.97
Option 4	69.87	68.62	1528	30.76	32.44	241.48	387.82	242.89	389.24
Option 6	93.47	103.32	1659	33.93	33.04	220.70	369.75	209.56	358.61



## Other Studies

- According to Protocol Section 3.22.1.3(2), ERCOT performed a SSR vulnerability assessment with Option 3 and the results showed no SSR vulnerability for any existing Generation Resources or Generation Resources satisfying Planning Guide Section 6.9 conditions for inclusion in the planning models at the time of this study.
- ERCOT determined that generation addition sensitivity analysis per PG 3.1.3(4)(a) and load scale impact sensitivity analysis PG 3.1.3.(4)(b) are not necessary because of the following reasons:
  - There are no new generation with signed Interconnection Agreement that did not meet PG 6.9 requirements in the Bearkat area.
  - Any new generation to the existing system in the Bearkat area will aggravate the congestion issues.
  - Load scaling was not used to create the economic cases used in the study

# ERCOT Recommendation

- Based on the ERCOT Independent Review, ERCOT recommends Option 3 as the preferred option. Option 3 involves
  - Adding a new 345-kV bay at the Longshore 345-kV station,
  - Adding a new 345-kV bay at the Bearkat 345-kV station, and
  - Constructing a new 345-kV single-circuit line on a double-circuit capable structure (~ 27 mile) from Bearkat station to Longshore station
- Estimated Capital Cost: \$53.26 million

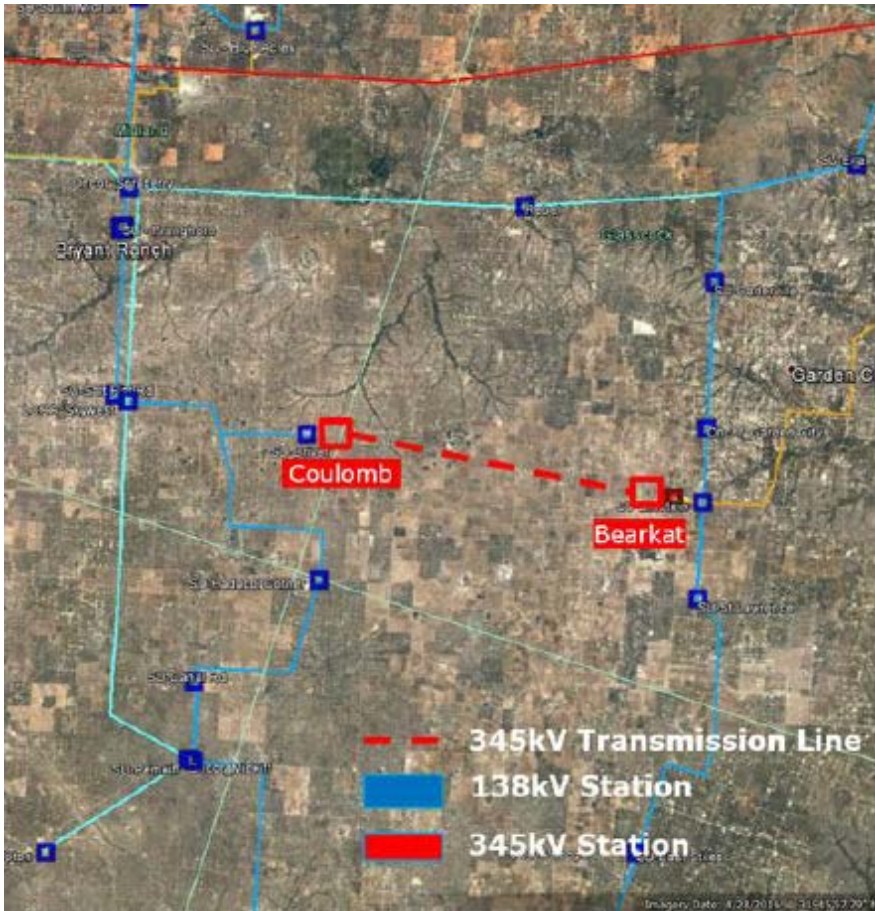
- **Timeline**

- EIR Report to be posted in the MIS – Sep 19, 2018
- EIR recommendation to TAC – Sep 26, 2018
- BOD Endorsement – Oct 09, 2018

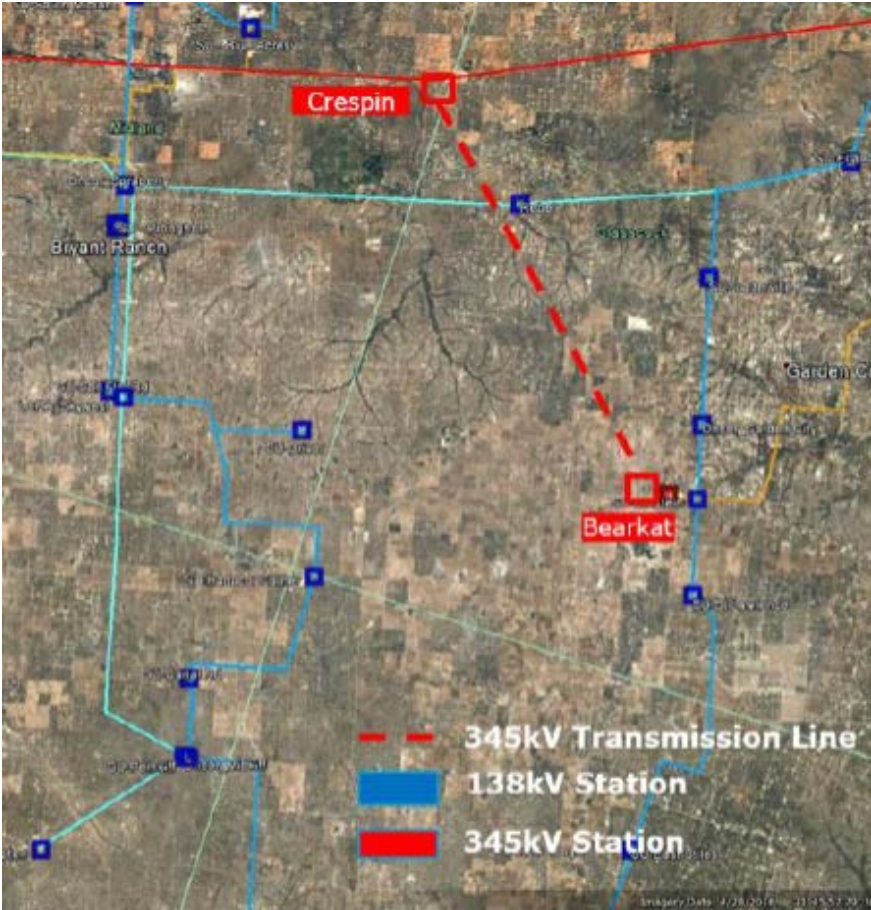


Stakeholder Comments Also Welcomed to Sun Wook Kang:  
SunWook.Kang@ercot.com

# Appendix – Transmission Option 1 (Presented by WETT at 08/22/2017 RPG)



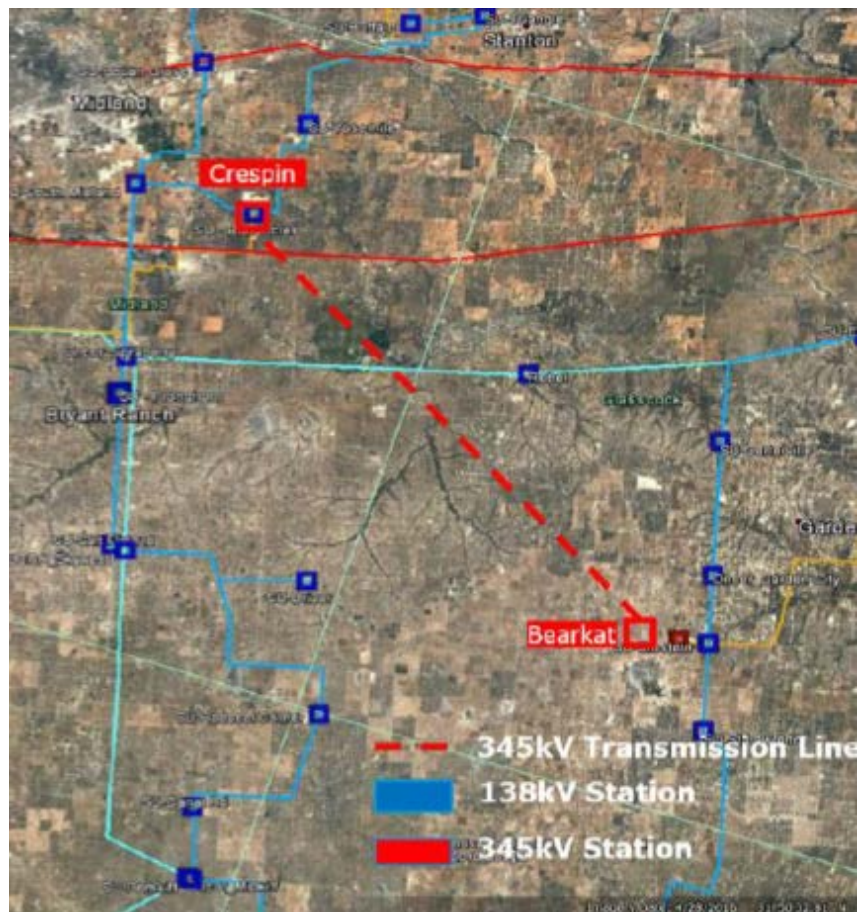
# Appendix – Transmission Option 2 (Presented by WETT at 08/22/2017 RPG)



# Appendix – Transmission Option 3 (Presented by WETT at 08/22/2017 RPG)

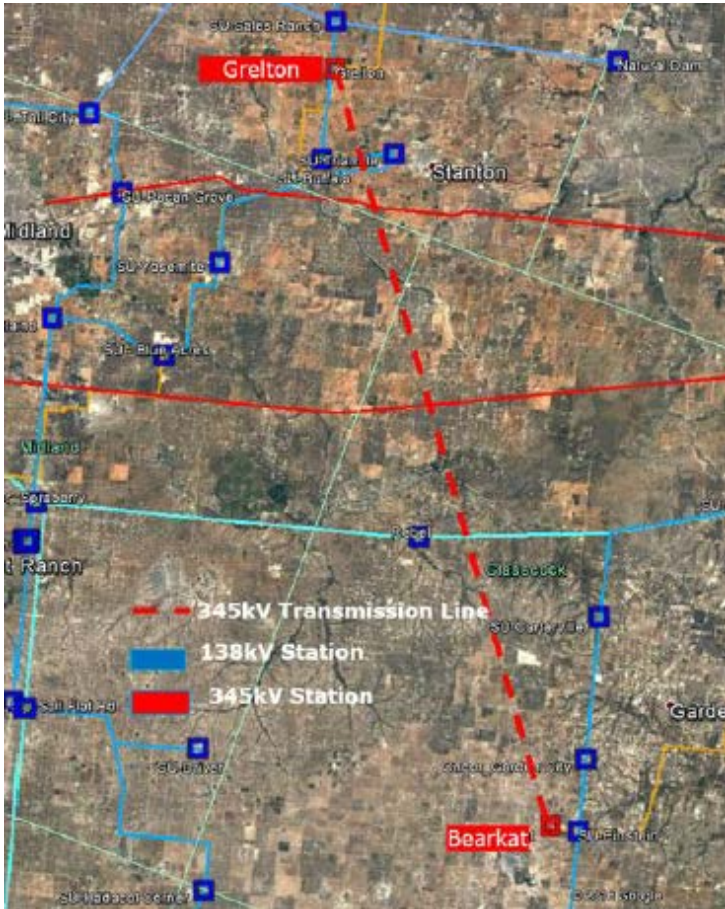


# Appendix – Transmission Option 4 (Presented by WETT at 08/22/2017 RPG)

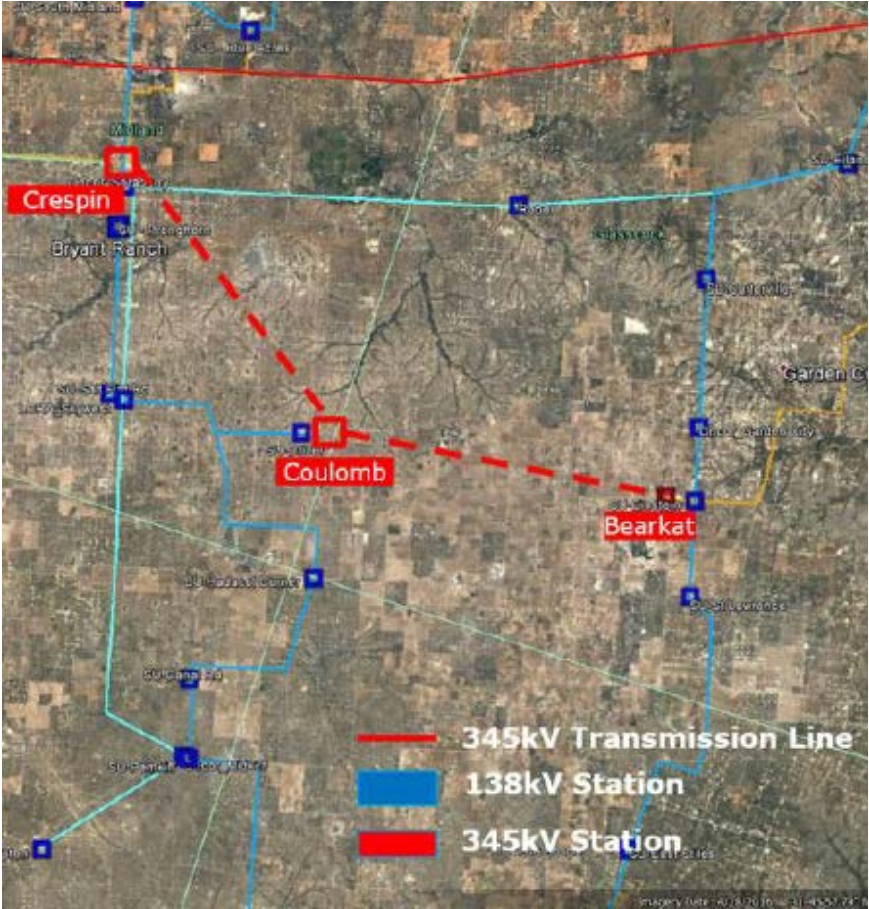




# Appendix – Transmission Option 5 (Presented by WETT at 08/22/2017 RPG)



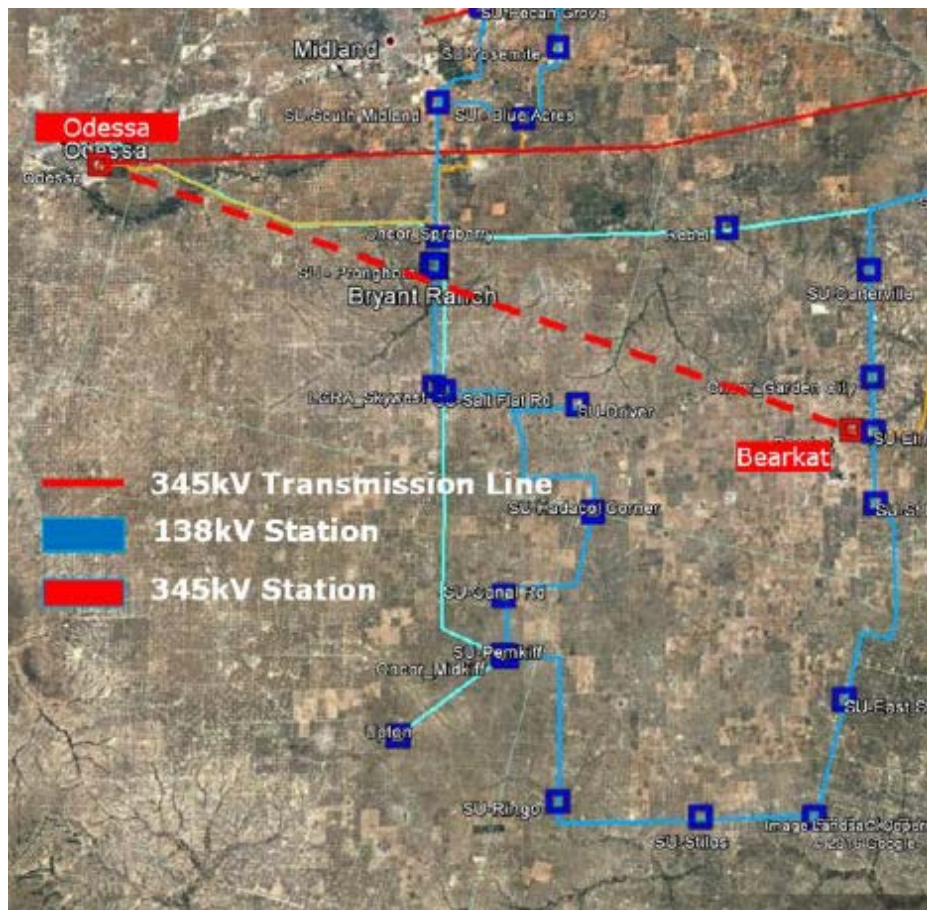
# Appendix – Transmission Option 6 (Presented by WETT at 08/22/2017 RPG)



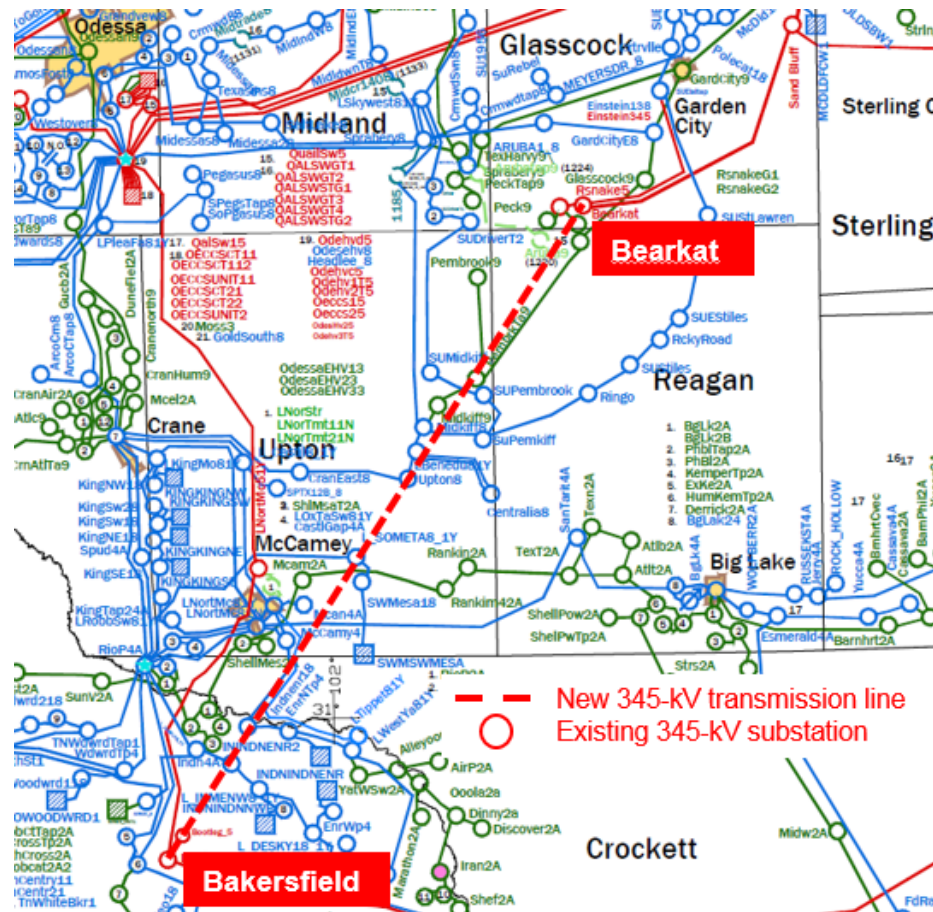
# Appendix – Transmission Option 7 (Presented by WETT at 08/22/2017 RPG)



# Appendix – Transmission Option 8 (Presented by WETT at 08/22/2017 RPG)



# Appendix – Transmission Option 9 (Additional Option Tested by ERCOT)



# Appendix – Updated Capital Cost Estimates

	Facilities	Cost Source	Cost Updated Per TSP inputs	Original Cost in the RPG submittal
OP2	Crespin Substation	Oncor	8.5	9.75
	Line	WETT/Oncor	41.11	41.11
	Bearkat substation	WETT	3.5	4.75
	<b>Total Cost</b>		<b>53.11</b>	<b>55.61</b>
OP3	Longshore Substation	Oncor	1.2	4.75
	Line	WETT/Oncor	48.56	48.56
	Bearkat substation	WETT	3.5	4.75
	<b>Total Cost</b>		<b>53.26</b>	<b>58.06</b>
OP4	Crespin Substation	WETT	9.75	9.75
	Line	WETT	55.37	55.37
	Bearkat substation	WETT	3.5	4.75
	<b>Total Cost</b>		<b>68.62</b>	<b>69.87</b>
OP6	Crespin Substation	WETT	9.75	9.75
	Line	WETT/Sharyland	61.07	61.07
	Driver	Sharyland 345	13.5	9.75
		Sharyland 138	9.5	2.15
		Sharyland XMFR	6	6
	Bearkat substation	WETT	3.5	4.75
	<b>Total Cost</b>		<b>103.32</b>	<b>93.47</b>

# Previous RPG presentations

- Wind Energy Transmission Texas (WETT) submitted Bearkat Area Transmission Improvements project for Regional Planning Group review. This is a Tier 1 project that is estimated to cost \$ 69.87 million.  
<http://www.ercot.com/calendar/2017/10/19/108887-RPG>
- ERCOT provided scope updates and study assumptions at the February RPG.  
<http://www.ercot.com/calendar/2018/2/27/138675-RPG>
- ERCOT presented preliminary results and future steps at the April RPG.  
[http://www.ercot.com/content/wcm/key\\_documents\\_lists/138684/Bearkat\\_Update\\_04\\_24\\_2018\\_RPG.pdf](http://www.ercot.com/content/wcm/key_documents_lists/138684/Bearkat_Update_04_24_2018_RPG.pdf)
- ERCOT presented results from weather sensitivity and outage probability analysis at the May RPG.  
[http://www.ercot.com/content/wcm/key\\_documents\\_lists/138688/Bearkat\\_Update\\_05\\_22\\_2018\\_RPG.pdf](http://www.ercot.com/content/wcm/key_documents_lists/138688/Bearkat_Update_05_22_2018_RPG.pdf)
- ERCOT presented an update on study results with Kontiki wind modeled in base cases.  
[http://www.ercot.com/content/wcm/key\\_documents\\_lists/159769/Bearkat\\_Update\\_07\\_25\\_2018\\_RPG.pdf](http://www.ercot.com/content/wcm/key_documents_lists/159769/Bearkat_Update_07_25_2018_RPG.pdf)