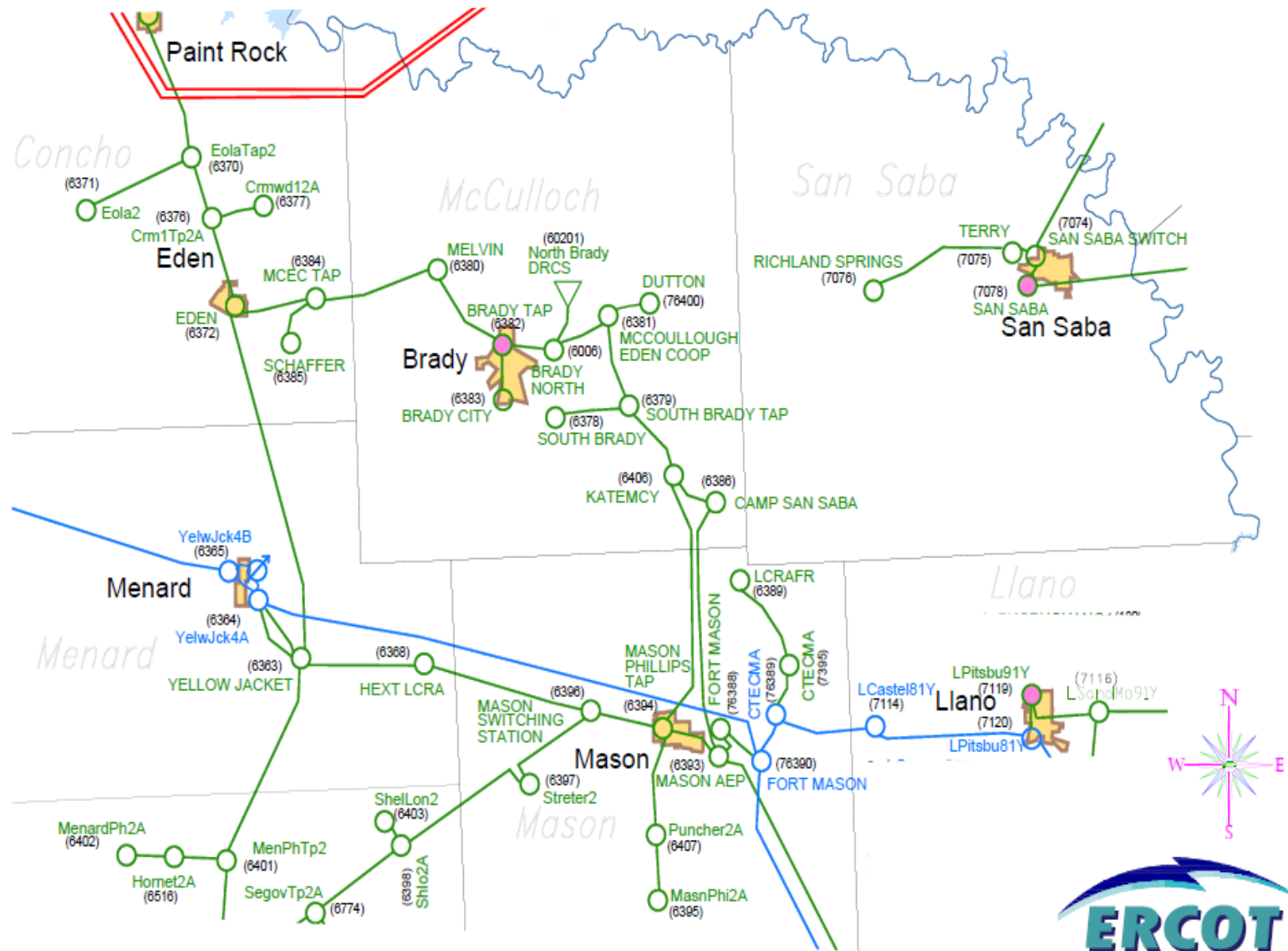

Brady Area Upgrade Project – ERCOT Independent Review

**RPG Meeting
October 21, 2014**

Area of Concern



Base Case Model

- **Base Case**

- The 2014 Dataset B for 2017 Summer Peak Case, posted on May 15, 2014.

- **Project options from submittals**

- Thirteen study cases were identified based on the RPG submittals. Eleven of the options based on AEP and Sharyland Utilities proposal and two based on LCRA's comments.

Reliability Analysis

- **N-1 Contingency Analysis**

- Contingency definitions in 2013 5YTP's 2018 Reliability Case

Lines of Interest	Under the Worst Contingency
Yellow Jacket – Eden 69 kV	156%
Mason – Katemcy 138 kV	119%

- **Selected N-1-1 Contingency Analysis**

- Modelled 630 contingency pairs for Brady Area.

- **High Load Sensitivity Analysis**

- ERCOT modelled 17 MW more in the Brady area based on the load forecast provided by AEP to study year 2027.
- Followed by N-1 contingency analysis

Project Options – Common Upgrades

- **Total 15 project options (A-C) were studied (13 from AEP, Sharyland, LCRA and 2 ERCOT options)**
- **Upgrades common to all options**
 - Most of the lines terminating at North Brady, City of Brady Tap and South Brady.
- **The detail on the project Options are discussed in following slides**

Project Options Studied

- Option 1: Rebuild the existing Yellow Jacket – Eden and Mason – Katemcy 69 kV lines
- Option 2: Build a new 69 kV line from Mason to North Brady (~22 miles)
- Option 3: Build a new 69 kV line from Richland Springs to North Brady (~25 miles)
- Option 3A: Build a new “New South Brady” 69 kV substation, connect the two City of Brady, and Katemcy stations via the new substation and build a new line from Richland Springs to the New South Brady Station (~36 miles)
- Option 4: Build a new 69 kV line from Yellow Jacket to North Brady (~32 miles)
- Option 4A: Build a new “New South Brady” 69 kV substation, connect the two City of Brady, and Katemcy stations via the new substation and build a new 69 kV line from Yellow Jacket to “New South Brady” (~39 miles)
- Option 5: Build a new 69 kV line from LCRA Fredonia to North Brady (~25.2 miles)

Project Options Studied (Contd.)

- Option 5A: Build a new “New South Brady” 69 kV substation, connect the two City of Brady, and Katemcy stations via the new substation and build a new 69 kV line from LCRA Fredonia to “New South Brady” (~32 miles)
- Option 6: Build a new 69 kV line from Richland Springs to Brady Tap Switching Station (~27 miles)
- Option 7: Build a new 69 kV line from Richland Springs to Camp San Saba Switching Station (~31 miles)
- Option 8: Build a new 69 kV line from Richland Springs to Dutton (~25 miles)
- Option 9: Build a new 69 kV line from LCRA Fredonia to City of Brady (~22 miles)
- Option 10: Build a new 69 kV line from LCRA Fredonia to South Brady (~22 miles)
- Option 11: Build a new 69 kV line from Yellow Jacket – South Brady (~34 miles)
- Option 12: Build a new 69 kV line from Richland Springs – South Brady (~27 miles)

Overall Comparison

- **N-1 Analysis**
 - All the options performed comparably in N-1 Analysis except Option 1.
- **N-1-1 Analysis**
 - Options 3A resolved all the N-1-1 non-convergence issues. Options 4, 4A and 11 also resolved the N-1-1 non-convergence issues with some added reactive support in the area.
- **High Load Sensitivity Analysis**
 - Overall Options 4,4A, 9 and 11 performed better than other options to meet the future load growth.
- **Cost Analysis**
 - Option 11 is the least cost option to meet the reliability and future growth taking City of Brady and AEP's comments into consideration.

Comparison of Cost Estimates

Option	Option 3A	Option 4	Option 4A	Option 11
Line Cost (In Millions)	29.5	26.2	32.0	27.9
Substation Cost (In Millions)	9.2	2.1	6.2	6.2
Approx. Total Cost (In Millions)	38.7	28.3	40.2	34.1

ERCOT Preferred Option

- **Option 11 Upgrades**
 - Construct approximately 36 miles of single circuit 69 kV line from the Yellow Jacket station to the Brady South station with 959.6 ACSR/TW and OPGW
 - Build a new 69 kV substation near South Brady station
 - Expand Yellow Jacket station to terminate the new 69 kV line
- **Total cost estimate : \$ ~36 million**

