CNP Baytown Area Load Addition – ERCOT Independent Review Status Update

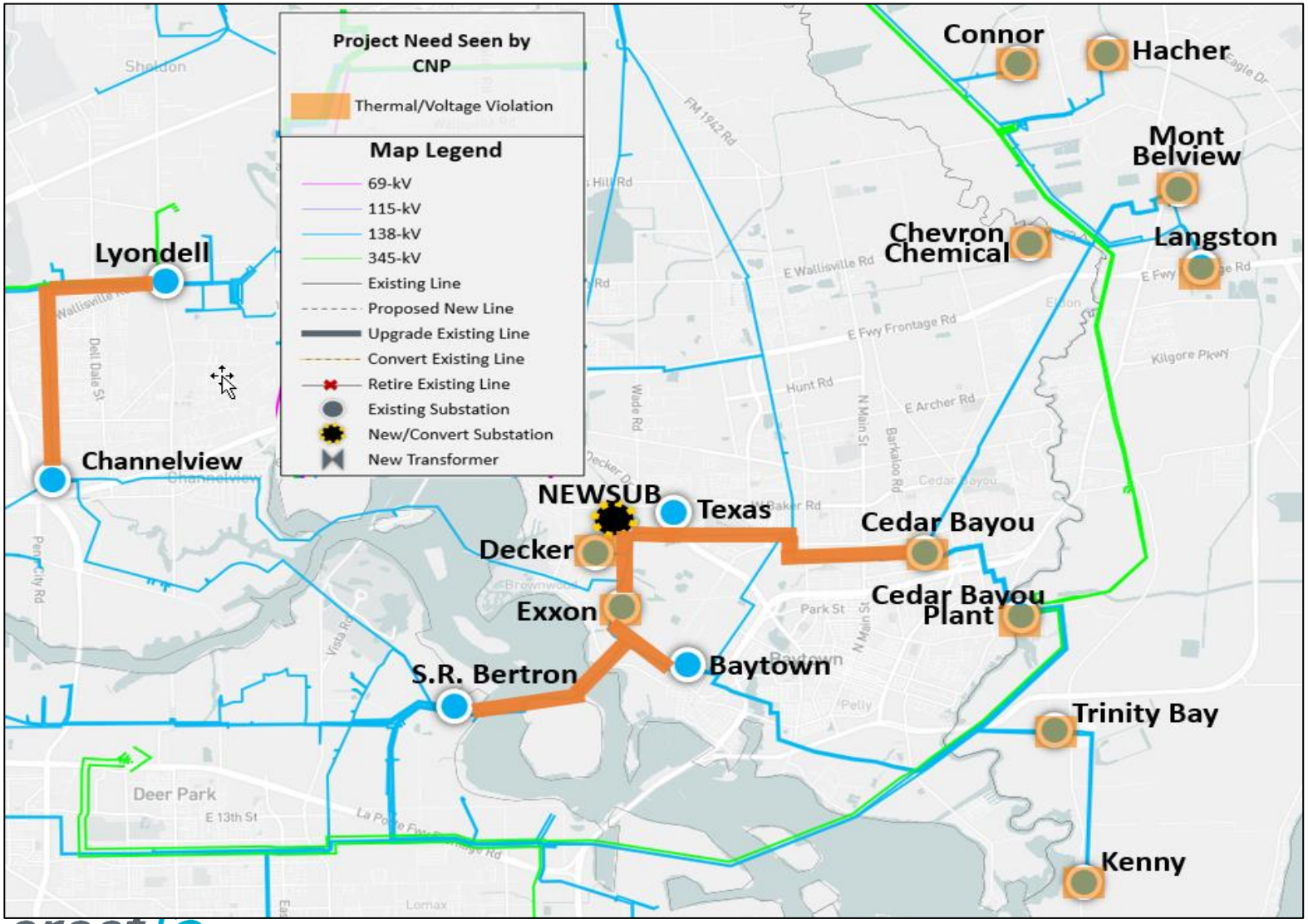
Ben Richardson

RPG Meeting
July 29, 2025

Recap – Introduction

- CNP submitted the Baytown Area Load Addition Project for Regional Planning Group (RPG) review in September 2024
  - This Tier 1 project is estimated to cost $141.65 million and will not require a Certificate of Convenience and Necessity (CCN)
  - Estimated in-service date (ISD) is January 2028
  - Addresses the thermal and voltage violations caused by the new 500.5 MVA load addition at the new customer-owned NEWSUB 138-kV substation.
- CNP presented a project overview and ERCOT provided a project scope at the November 2024 RPG Meeting
  - https://www.ercot.com/calendar/11122024-RPG-Meeting
- ERCOT presented status update at previous RPG Meetings:
  - November 2024: RPG Event Details
  - February 2025: RPG Event Details
  - March 2025: RPG Event Details
  - April 2025: RPG Event Details
  - May 2025: RPG Event Details

Recap – Study Area Map with Violations seen by CNP



Recap – Study Assumptions and Methodology

- Transmission Updates
  - Based on the October 2024 Transmission Project and Information Tracking (TPIT) posted on MIS, projects with in-service dates prior to June 1, 2028, within the study area, were added to the study base case if not already modeled:
    - TPIT Link: https://www.ercot.com/gridinfo/planning
    - See Appendix A for the updated list of transmission projects added
  - Transmission projects identified in the 2023 RTP in the study area that had not been approved by RPG were removed
    - See Appendix B for the updated list of transmission projects removed
- Generation update
  - Additional 6.9(1) generation was added to based on the September 2024 GIS report
    - See Appendix C for updated list of generation projects added
  - All generation were dispatched consistent with the 2024 RTP methodology

Recap – Study Assumptions – Load & Reserve

- Load in study area
  - The new confirmed load of 500.5 MVA at 0.95 power factor was added to a new substation near Baytown Texas
  - The interconnection configuration option selected by CNP was employed to interconnect the new substation
  - Both the existing Cedar Bayou East to Decker 138-kV transmission line (circuit 83) and the Texas to S.R. Bertron 138-kV transmission line (circuit 87) were looped into the new substation to interconnect the new substation
  - Remaining loads in the EC Weather Zone were maintained to be consistent with the 2023 RTP
- Reserve
  - Load outside of EC Weather Zone was adjusted to maintain reserve consistent with the 2023 RTP methodology

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-1 (P1, P2-1, P7)	None	1	None
G-1+N-1 (P3)*	None	2***	None
X-1+N-1 (P6-2)**	None	2***	None

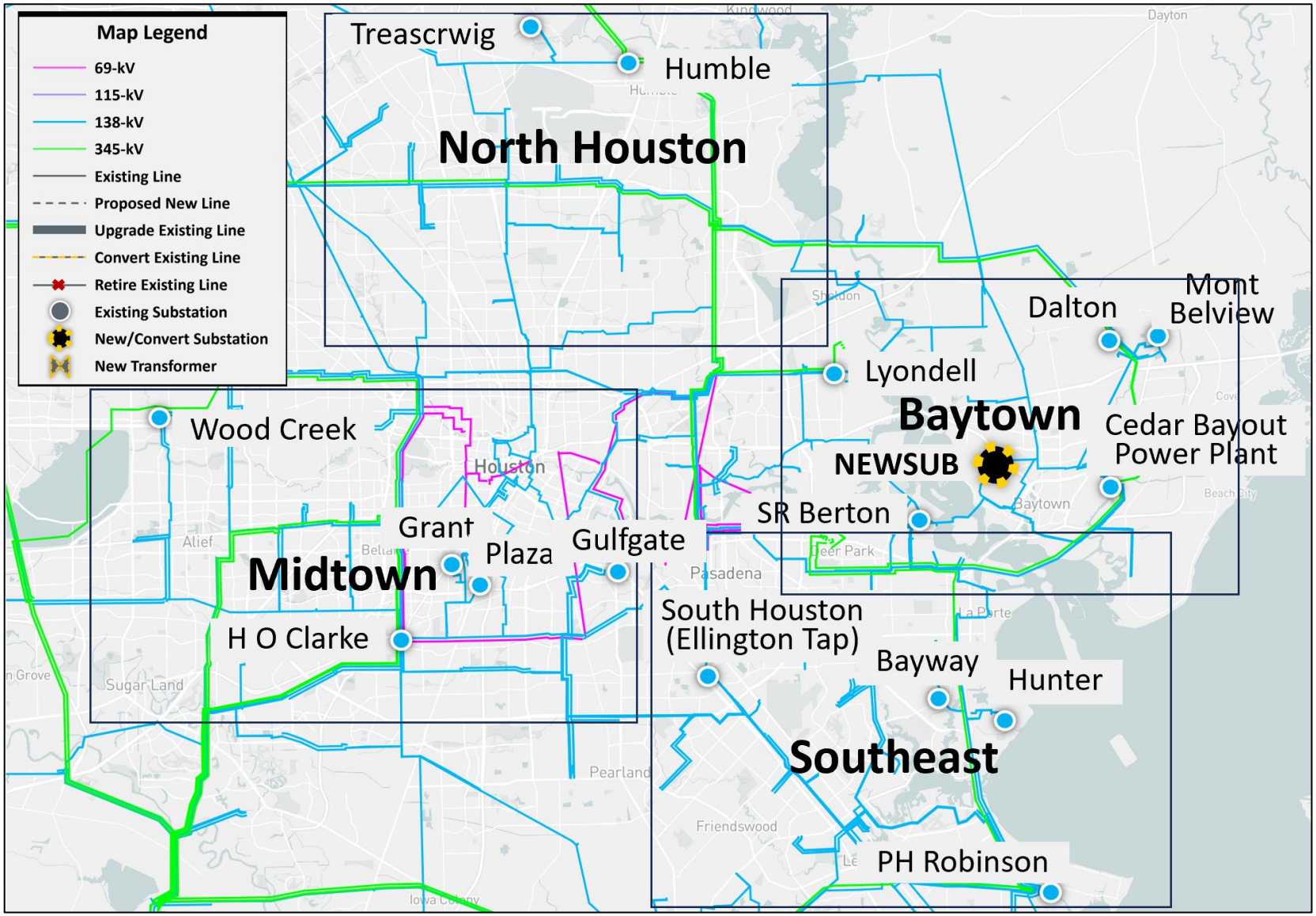
* G-1: Cedar Bayou, Exxon, Baytown Energy Center, Diamond Shamrock Battleground
** X-1: Cedar Bayou, Greens Bayou, Bellaire, PH Robinson, Jordan
***Violations seen in the basecase under P1 events were also seen under G-1 and X-1 events

Preliminary Results of Planned Maintenance Outage Evaluation

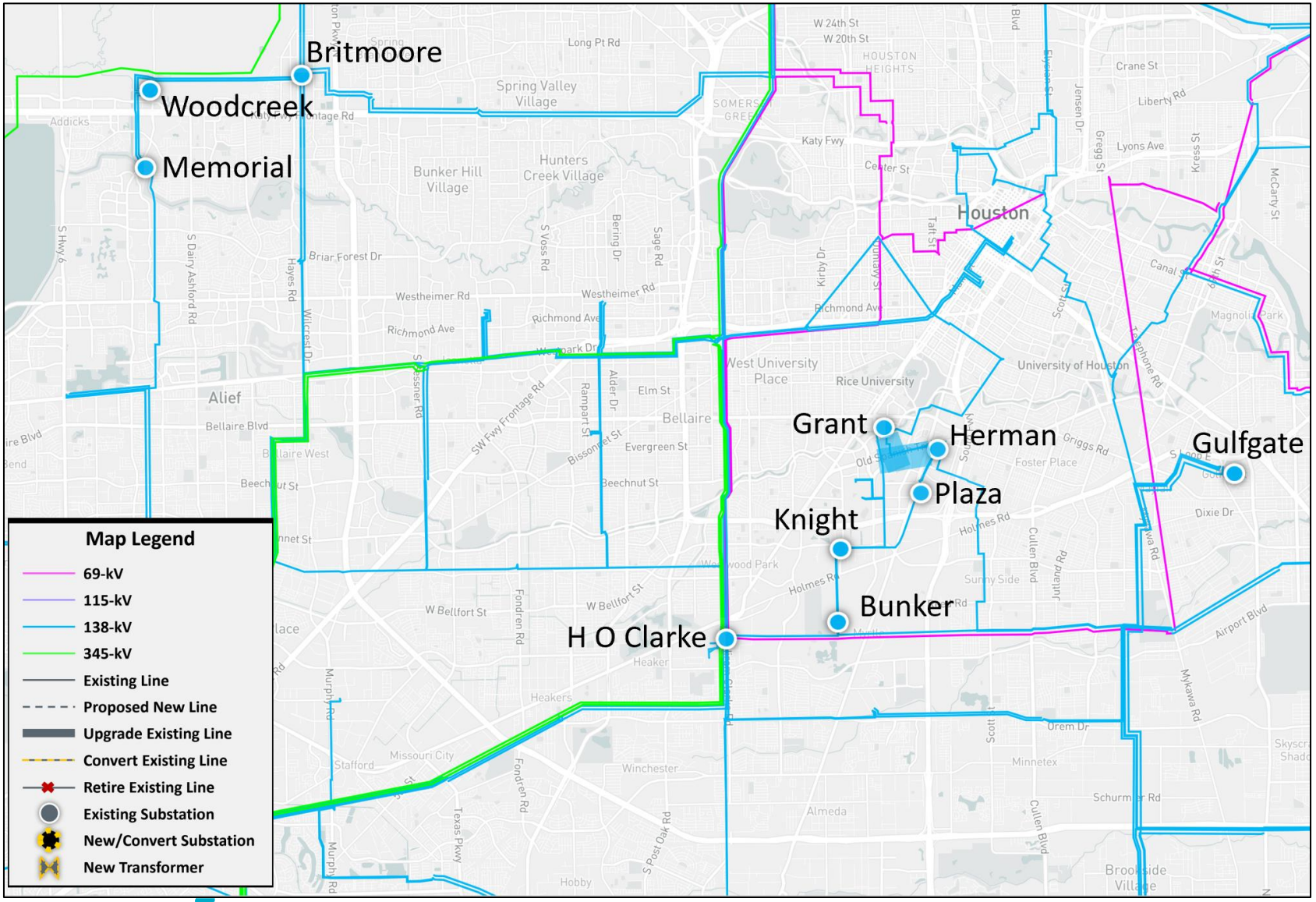
- ERCOT conducted planned maintenance outage evaluation on the study base case
  - Load level in the East Coast was scaled down to 85.0% of their summer peak loads in the study base case, respectively based on ERCOT load forecast and historical load, in order to mimic the off- peak load condition
  - 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 local area of the Baytown Area Load Addition Project were monitored in the maintenance outage evaluation
- Planned maintenance outage analysis results

Voltage Violations	Thermal Overloads	Unsolved Power Flow
20+	13	0

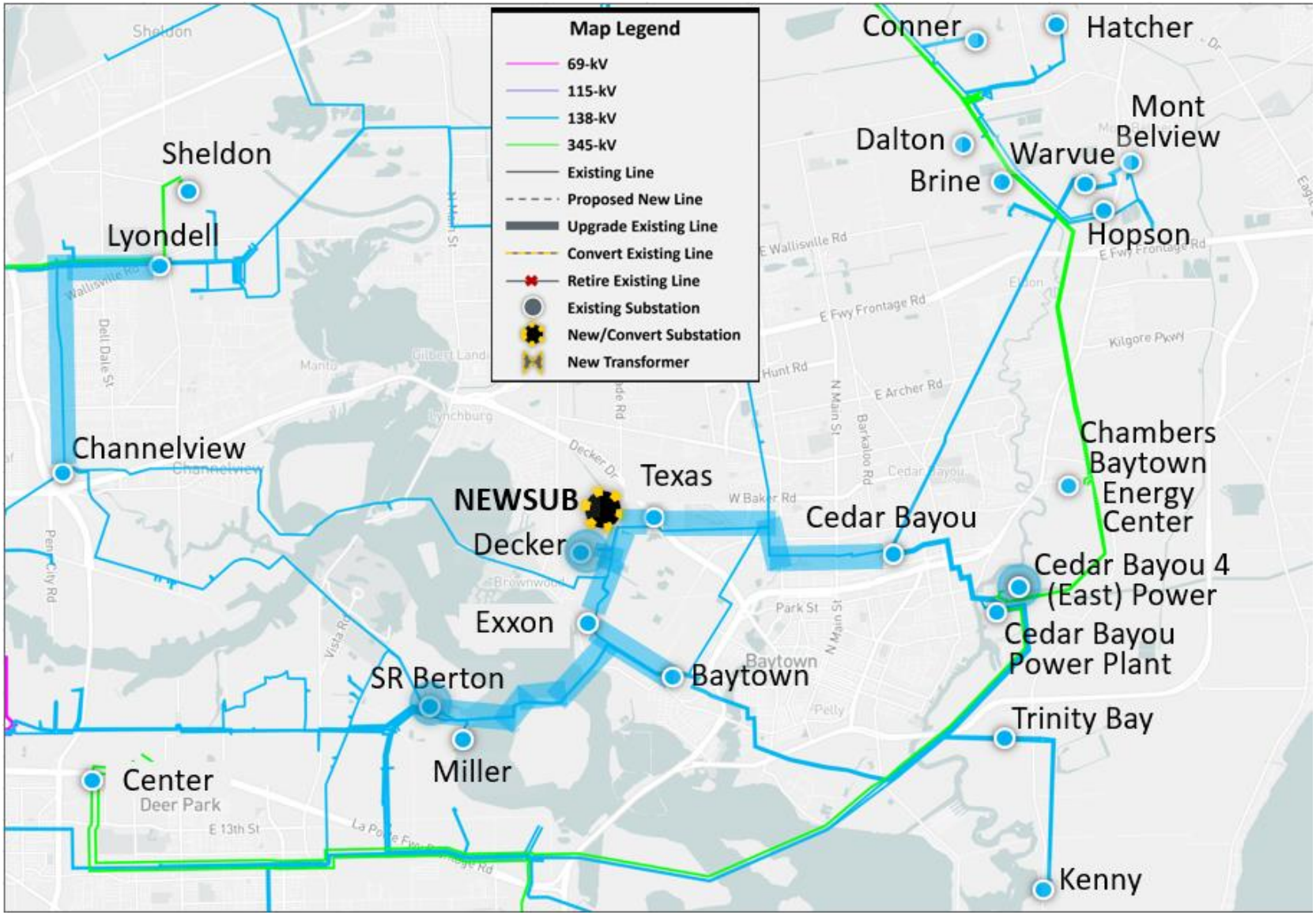
Overview Map of Study Area



Option 1 – Midtown



Option 1 – Baytown



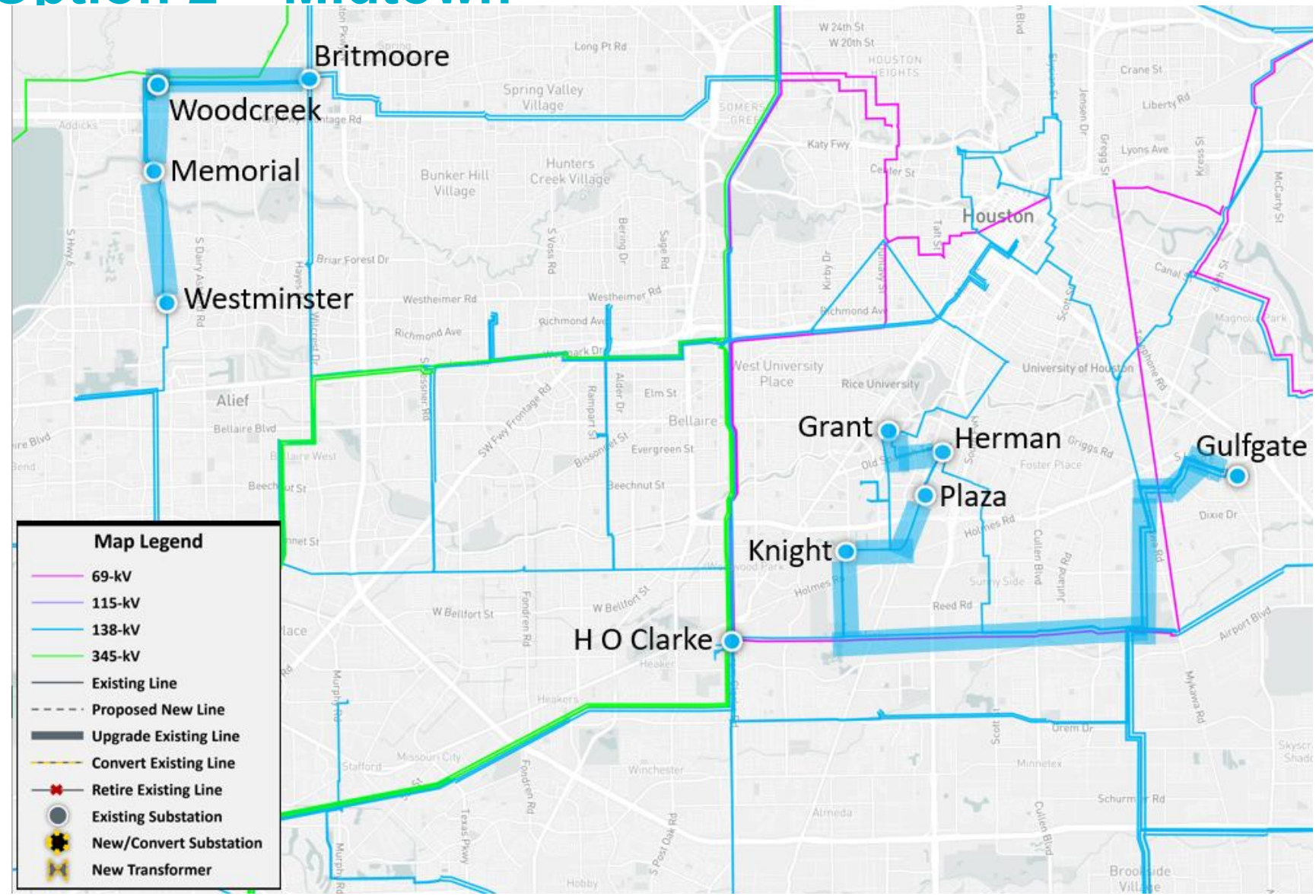
Option 1 (CNP Proposed Project)

- Re-build existing Herman to Grant 138-kV transmission line, upgrade with conductors rated to at least 478 MVA Normal / 525 MVA Emergency, approximately 0.7 miles
- Upgrade existing substation equipment for Channelview to Lyondell 138-kV transmission line, upgrade with equipment rated to at least 440 MVA Normal / 561 MVA Emergency
- Re-build existing S.R. Bertron to NEWSUB to Texas 138-kV transmission line, upgrade with conductors rated to at least 600 MVA Normal / 600 MVA Emergency, approximately 2.88 miles
- Re-build existing Texas to Cedar Bayou 138-kV transmission line, upgrade with conductors rated to at least 838 MVA Normal / 893 MVA Emergency, approximately 3.91 miles
- Re-build existing Decker to Exxon 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 0.72 miles
- Re-build existing Decker to NEWSUB 138-kV transmission line, upgrade with conductors rated to at least 838 MVA Normal / 893 MVA Emergency, approximately 0.27 miles
- Re-build existing Decker to CAPE MUTUAL BUS (DKRCM01) 138-kV transmission line, upgrade with conductors rated to at least 567 MVA Normal / 626 MVA Emergency, approximately 0.27 miles
- Re-build existing Baytown to Exxon 138-kV transmission line, upgrade with conductors rated to at least 838 MVA Normal / 893 MVA Emergency, approximately 1.93 miles
- Install 100 MVAr capacitor bant at Cedar Bayou 4 (East) Power Plant
- Upgrade S.R. Bertron 138-kV bus to 80 kA fault duty rating

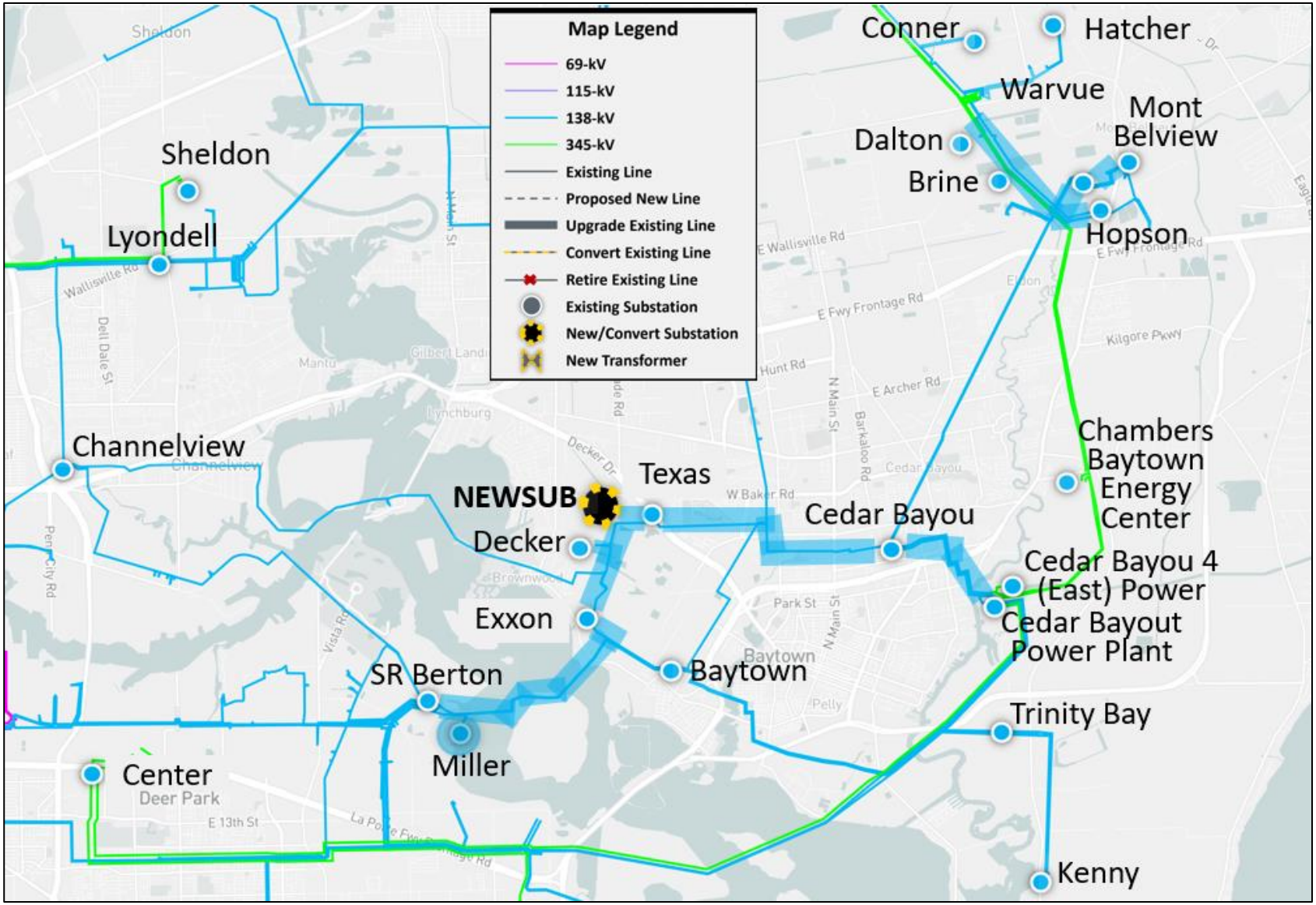
Option 1 (CNP Proposed Project)

- Southeast Houston - No Upgrades
- North Houston - No Upgrades

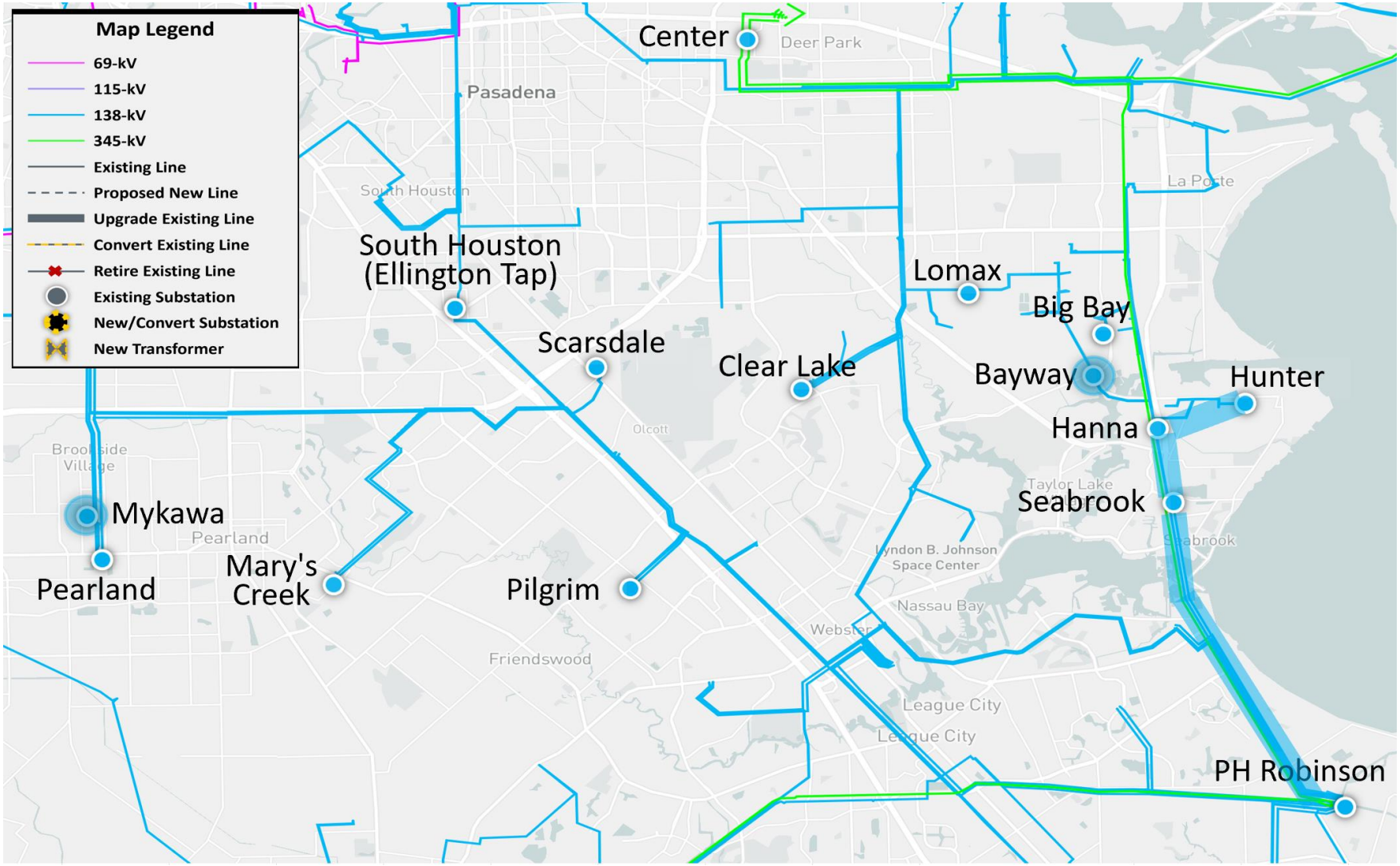
Option 2 – Midtown



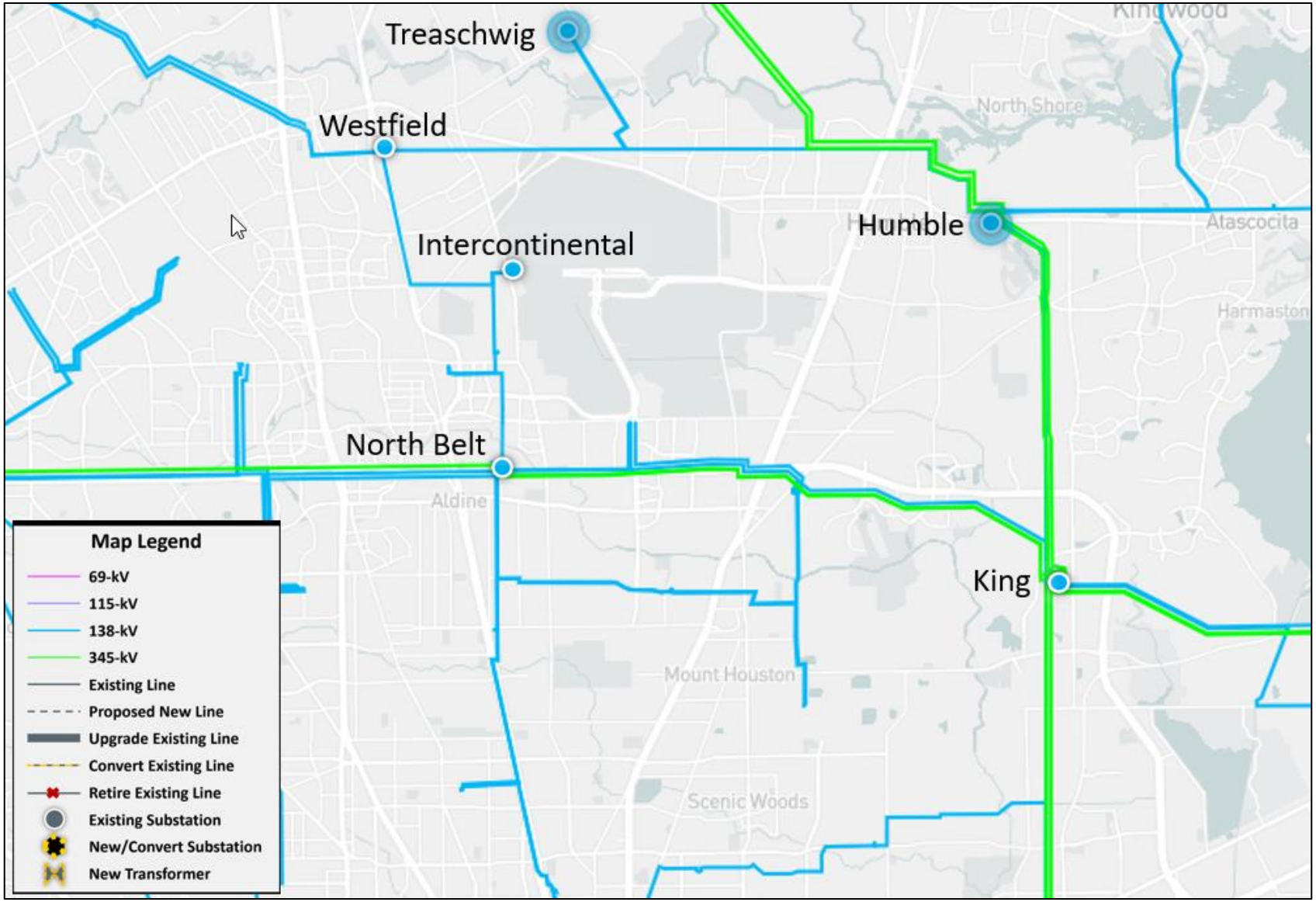
Option 2 – Baytown



Option 2 – Southeast



Option 2 – North Houston



Option 2

- Re-build existing Herman to Grant 138-kV transmission line, upgrade with conductors rated to at least 478 MVA Normal / 525 MVA Emergency, approximately 0.7 miles
- Re-build existing Gulfgate to Knight to Plaza 138-kV transmission line, upgrade with conductors rated to at least 478 MVA Normal / 525 MVA Emergency, approximately 9.03 miles
- Re-build existing Memorial to WoodCreek to Britmoore 138-kV transmission line, upgrade with conductors rated to at least 440 MVA Normal / 561 MVA Emergency, approximately 4.75 miles
- Re-build existing S.R. Bertron to NEWSUB 138-kV transmission line, upgrade with conductors rated to at least 600 MVA Normal / 600 MVA Emergency, approximately 2.88 miles
- Re-build existing Cedar Bayou Plant to NEWSUB 138-kV transmission line, upgrade with conductors rated to at least 567 MVA Normal / 626 MVA Emergency, approximately 7.67 miles

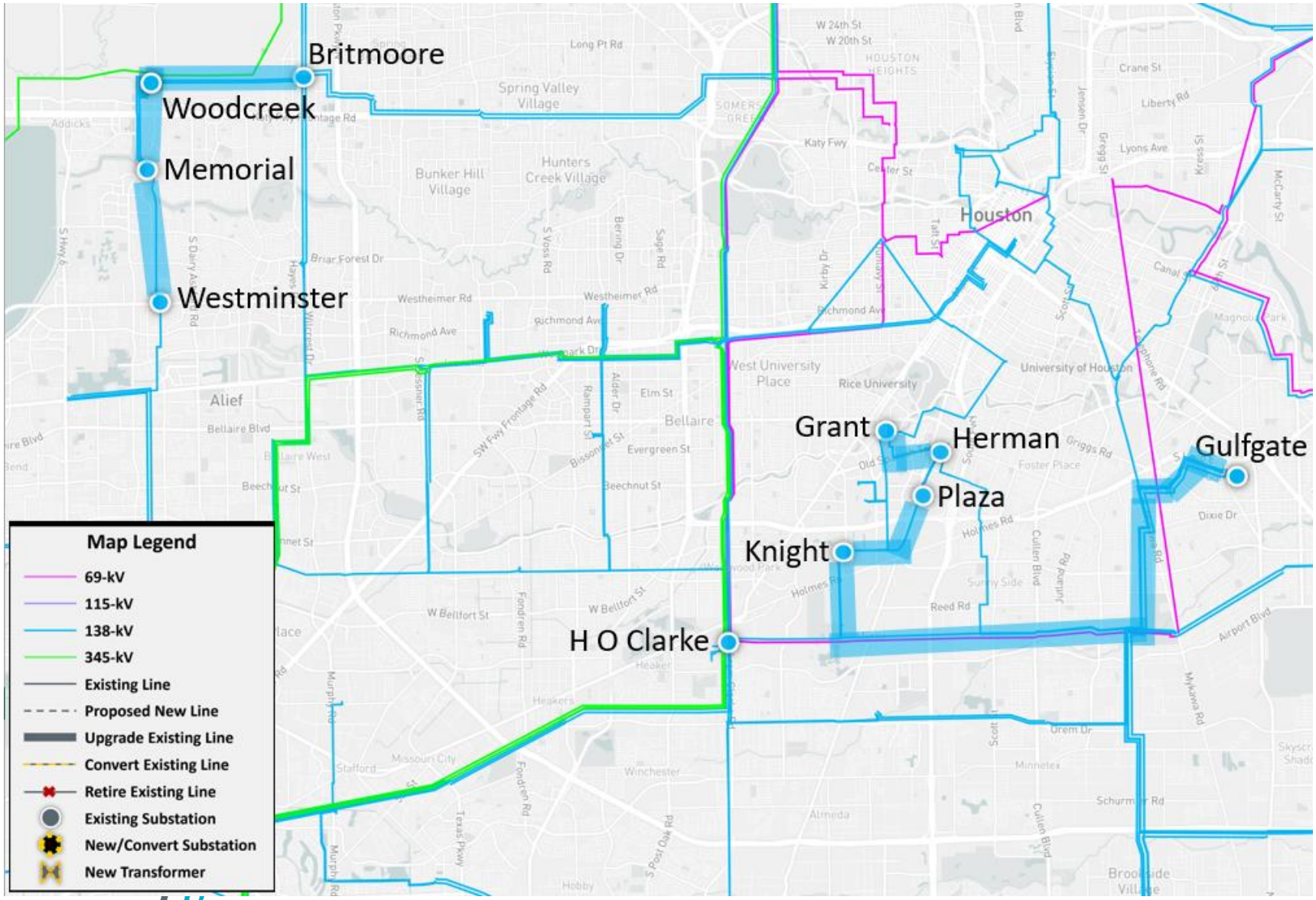
Option 2 – Cont.

- Re-build existing Hopson to Warvue 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 1.31 miles
- Re-build existing Mont Belvieu to Brine to Dalton 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 3.46 miles

- Re-build existing PH Robinson to Seabrook to Hanna to Hunter 138-kV transmission lines, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 9.9 miles
- Install two capacitor bank (60 MVAr) at Mykawa 138-kV substation
- Install three capacitor banks (7.2 MVAr each) at Bayway 138-kV substation

- Install two capacitor banks (14.4 MVAr each) at Treaschwig 138-kV substation
- Install on3 capacitor bank (60 MVAr) at Humble 138-kV substation

Option 2A – Midtown



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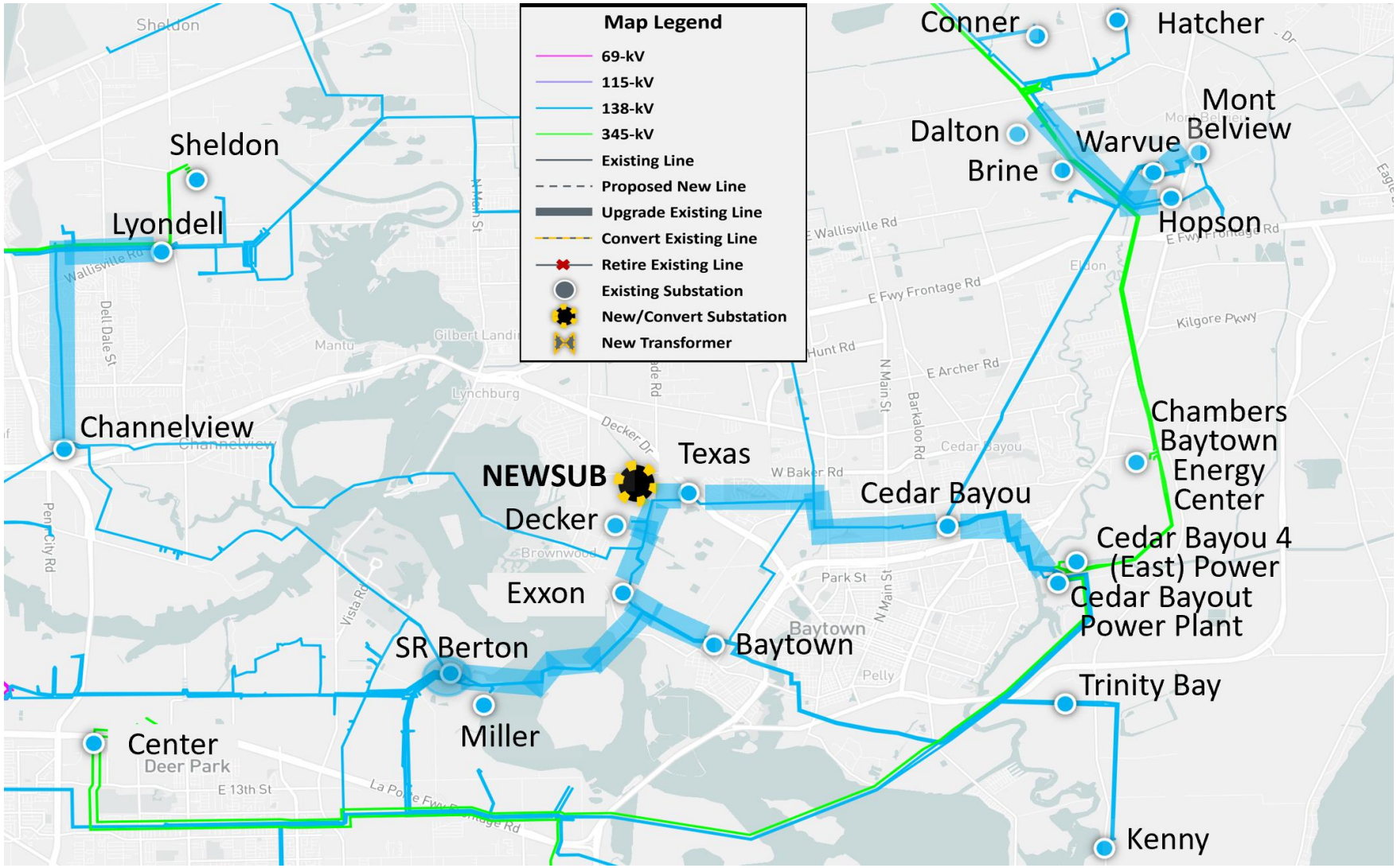

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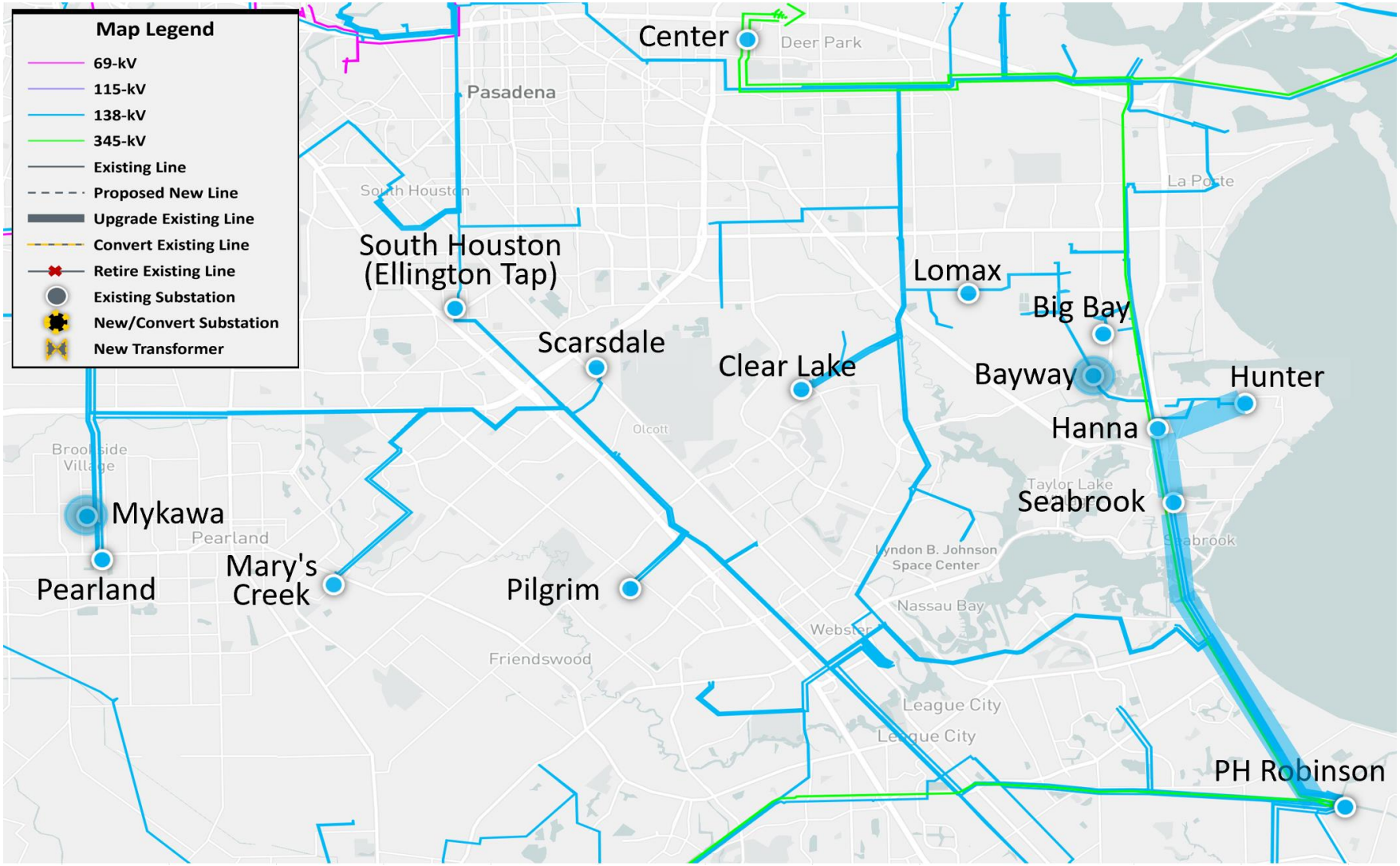
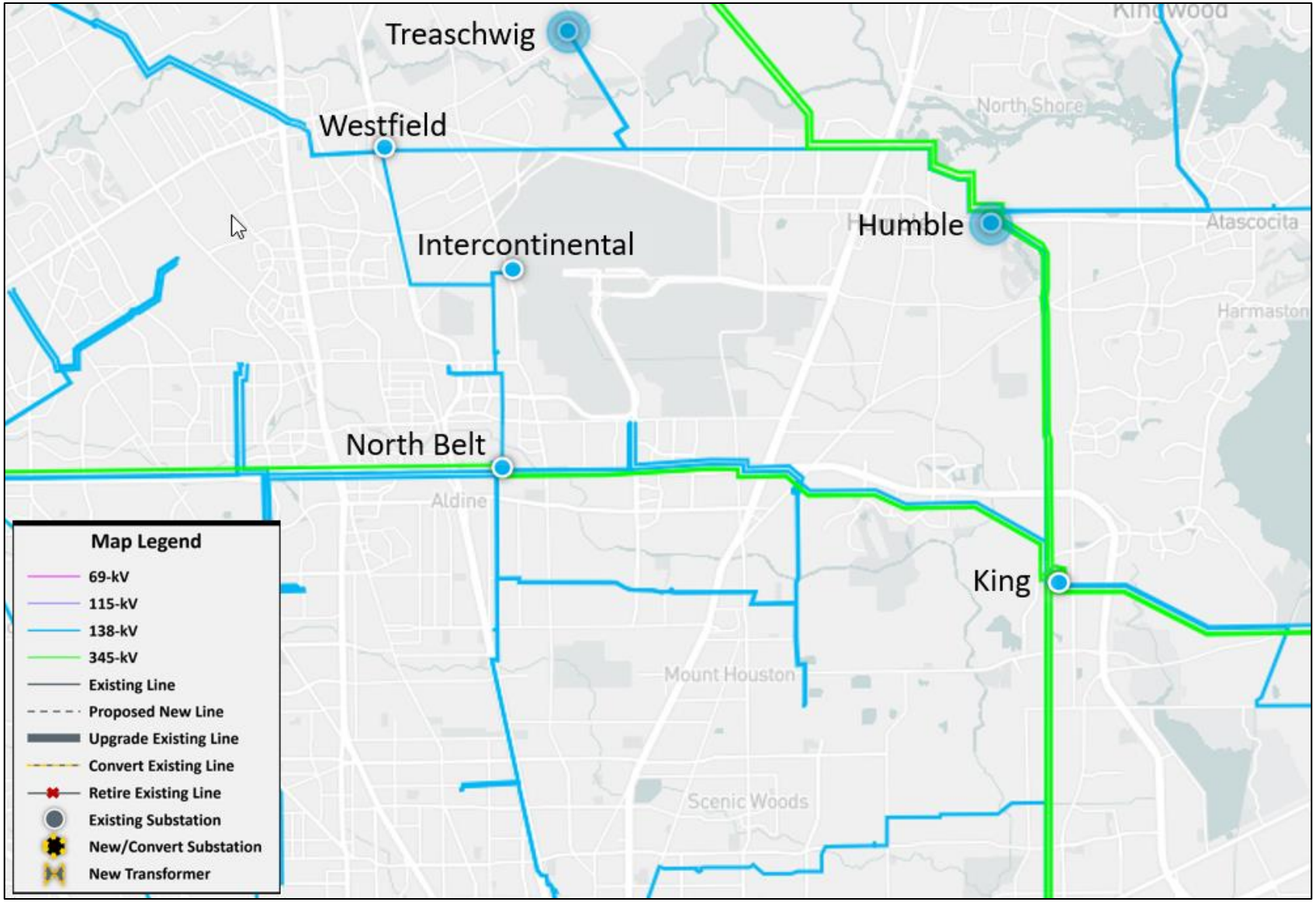


Option 2A – North Houston



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- Re-build existing Westminster to Memorial to WoodCreek to Britmoore 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 4.75 miles

Option 2A – cont.

- Re-build existing Cedar Bayou Plant to NEWSUB 138-kV transmission line, upgrade with conductors rated to at least 838 MVA Normal / 893 MVA Emergency, approximately 7.67 miles
- Re-build existing Cedar Bayou Plant to Cedar Bayou Tap 138-kV transmission line, upgrade with conductors rated to at least 838 MVA Normal / 893 MVA Emergency, approximately 2.4 miles
- Re-build existing Texas to Cedar Bayou Tap 138-kV transmission line, upgrade with conductors rated to at least 838 MVA Normal / 893 MVA Emergency, approximately 3.91 miles
- Re-build existing Decker to NEWSUB 138-kV transmission line, upgrade with conductors rated to at least 567 MVA Normal / 636 MVA Emergency, approximately 0.27 miles
- Upgrade existing Decker to CAPE MUTUAL BUS (DKRCM01) 138-kV transmission line, upgrade with conductors rated to at least 567 MVA Normal / 626 MVA Emergency, approximately 0.27 miles
- Re-build existing Decker to Exxon 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 0.72 miles
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- Re-build existing Channelview to Lyondell Tap 138-kV transmission line, upgrade rating to at least 440 MVA Normal / 561 MVA Emergency, approximately 4.73 miles

Option 2A – cont.

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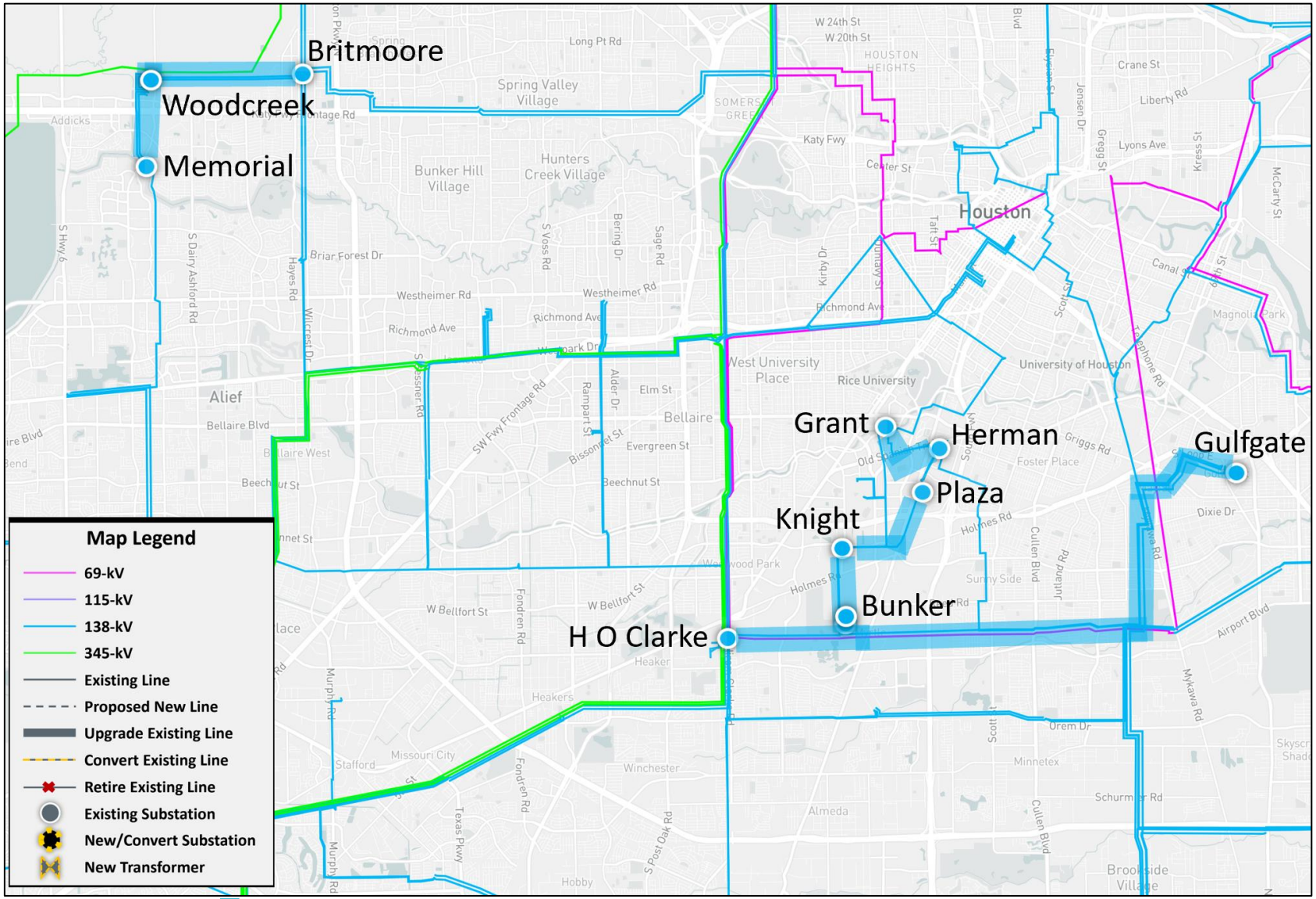
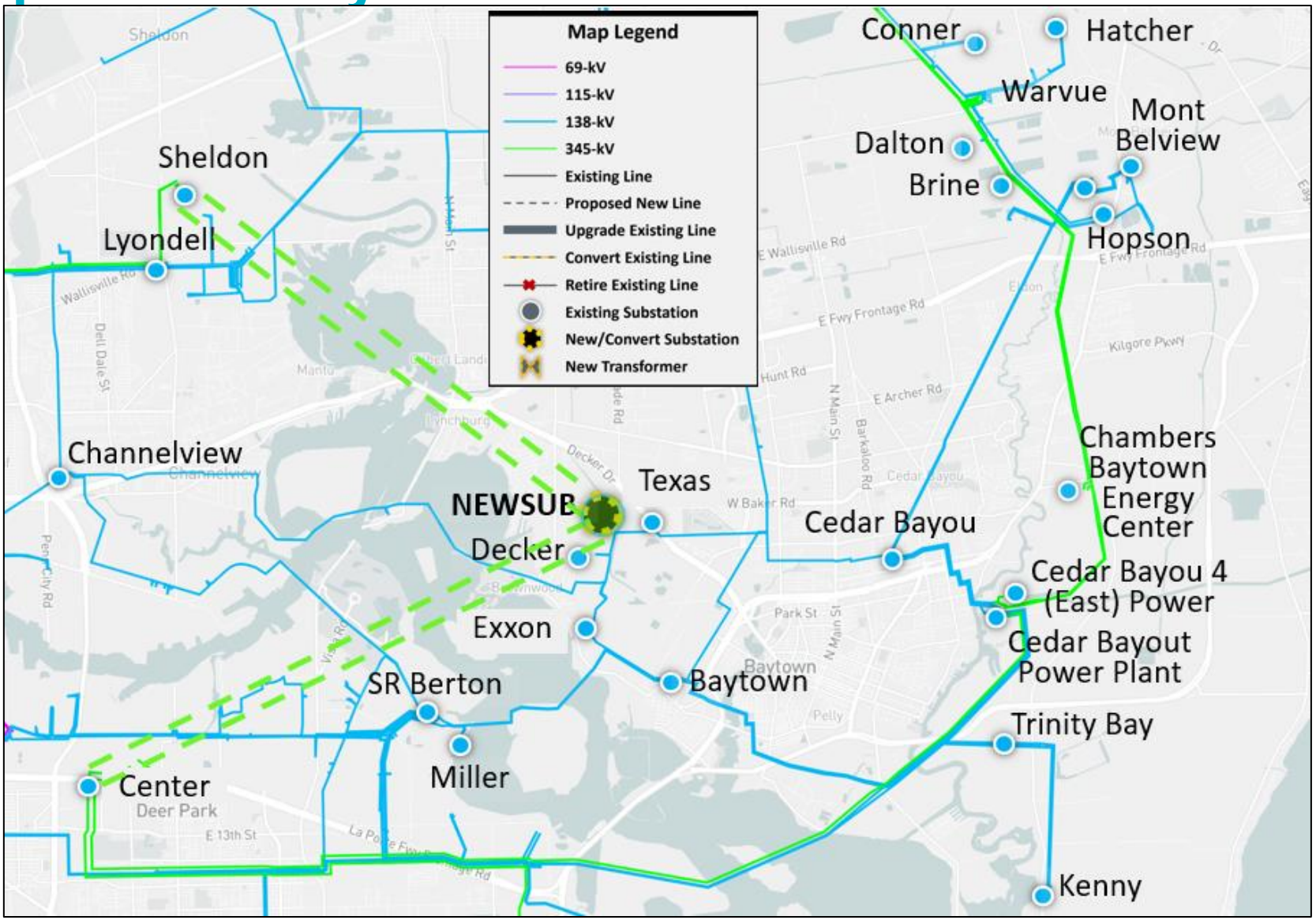
- Re-build existing PH Robinson to Seabrook to Hanna to Hunter 138-kV transmission lines, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 9.9 miles
- Install two capacitor bank (60 MVAr) at Mykawa 138-kV substation
- Install three capacitor banks (7.2 MVAr each) at Bayway 138-kV substation

- Install two capacitor banks (14.4 MVAr each) at Treaschwig 138-kV substation
- Install on3 capacitor bank (60 MVAr) at Humble 138-kV substation

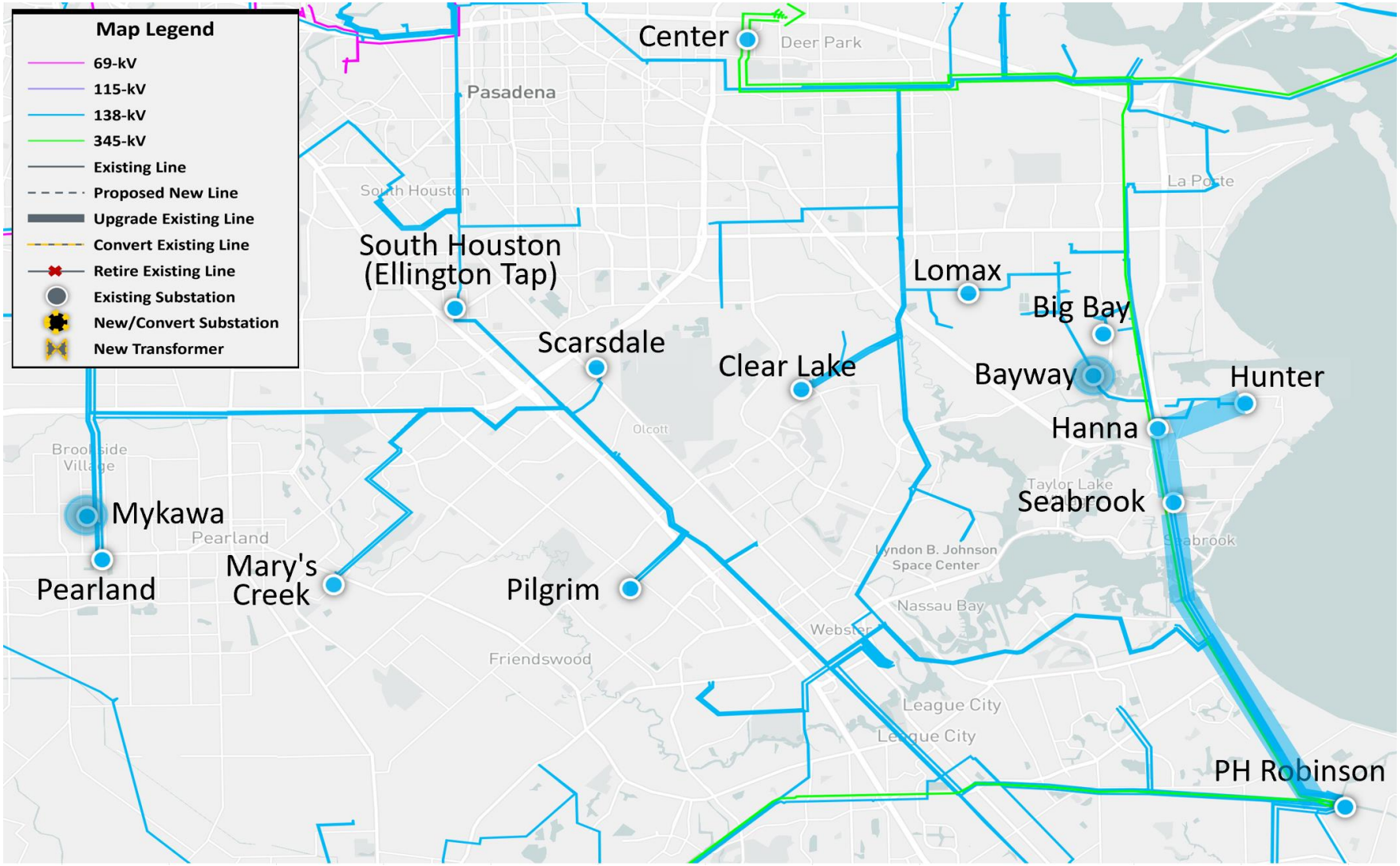
Option 3 (same as Option 2) – Midtown



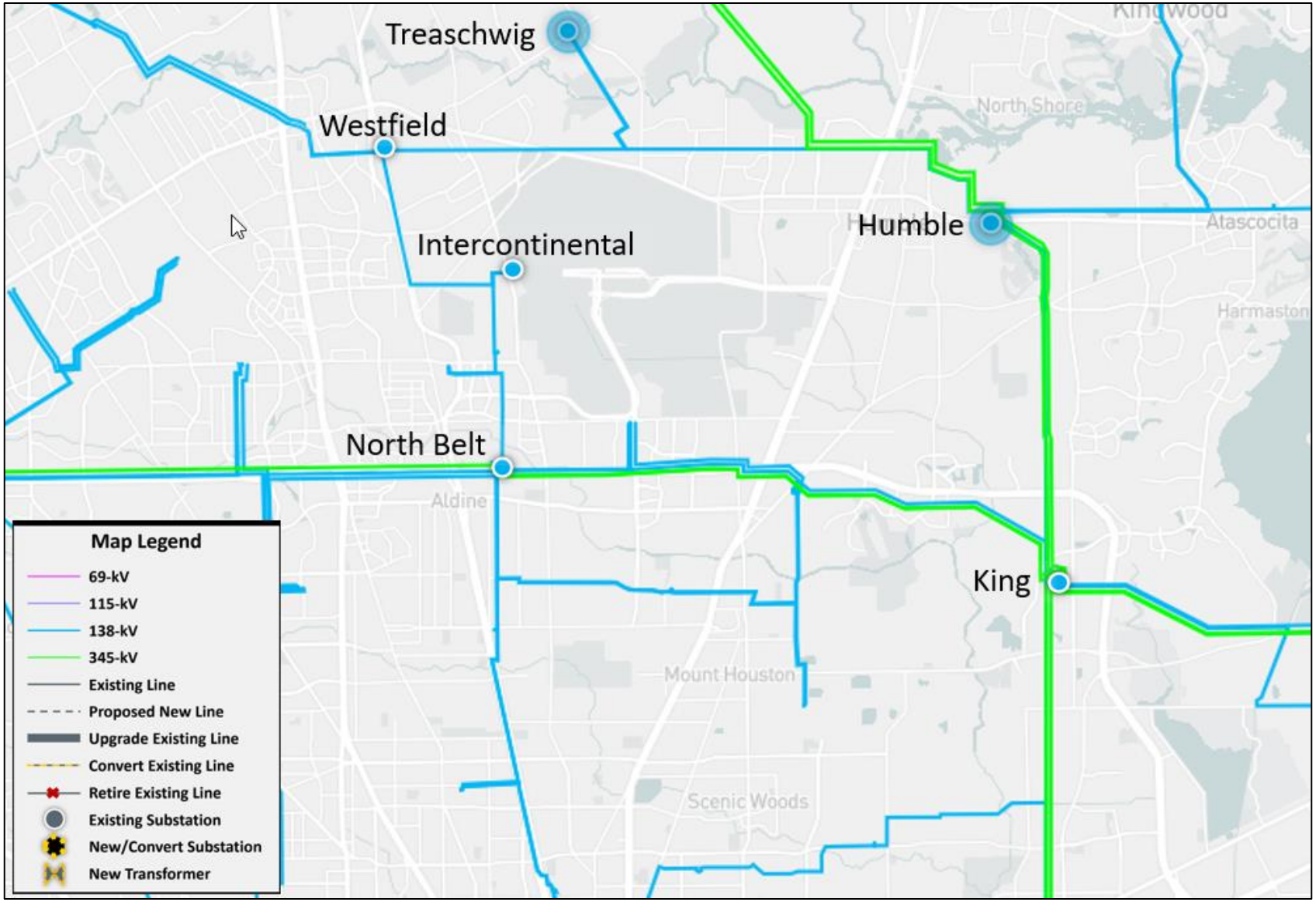
Option 3 – Baytown



Option 3 (same as Option 2) – Southeast



Option 3 (same as Option 2) – North Houston



Option 3

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- Re-build existing Gulfgate to Knight to Plaza 138-kV transmission line, upgrade with conductors rated to at least 478 MVA Normal / 525 MVA Emergency, approximately 9.03 miles
- Re-build existing H O Clarke to Bunker 138-kV transmission line, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 2.54 miles

- Construct NEWSUB to include a new NEWSUB 345/138-kV switchyard
- Install two 345/138-kV transformers at NEWSUB 345/138-kV switchyard with at least 800 MVA Normal / 1,000 MVA Emergency for each transformer
- Construct a new Sheldon to NEWSUB 345-kV double-circuit transmission line on double-circuit capable structures with both circuits in place with normal and emergency rating of at least 2987 MVA for each circuit, approximately 12 miles
- Construct a new NEWSUB to Center 345-kV double-circuit transmission line on double-circuit capable structures with both circuits in place with normal and emergency rating of at least 2987 MVA for each circuit, approximately 6 miles

Option 3 – Cont.

- Re-build existing PH Robinson to Seabrook to Hanna to Hunter 138-kV transmission lines, upgrade with conductors rated to at least 636 MVA Normal / 636 MVA Emergency, approximately 9.9 miles
- Install two capacitor bank (60 MVAr) at Mykawa 138-kV substation
- Install three capacitor banks (7.2 MVAr each) at Bayway 138-kV substation

- Install two capacitor banks (14.4 MVAr each) at Treaschwig 138-kV substation
- Install on3 capacitor bank (60 MVAr) at Humble 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
2A	None	None	None	None	None	None
3	1	None	1	None	1	None

* G-1: Cedar Bayou, Exxon, Baytown Energy Center, Diamond Shamrock Battleground
** X-1: Cedar Bayou, Greens Bayou, Bellaire, PH Robinson, Jordan
***Violations seen in the base case under P1 events were also seen under G-1 and X-1 events

Preliminary Results of Planned Maintenance Outage Evaluation

- ERCOT conducted planned maintenance outage evaluation on the short-listed options
  - Load level in the East Coast was scaled down to 85.0% 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 local area of the Baytown Area Load Addition Project were monitored in the maintenance outage evaluation
- Planned maintenance outage analysis results

Option	Voltage Violations	Thermal Overloads	Unsolved Power Flow
1	20+	18	None
2	0	7	None
2A	None	None	None
3	20+	28	None

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 East and Cost Weather Zones to balance power
  - Based on N-1 contingency
- Findings:

Option	Incremental Load-Serving Capability(~MW)
1	212
2	214
2A	240
3	260

Cost Estimate and Feasibility Assessment

- Transmission Service Providers (TSPs) performed feasibility assessments and provided cost estimates for the options
  - Based on inputs from CNP, Option 2 is deemed infeasible due to physical space limitations

Option	Cost Estimates* (~$M)	CCN Required (~miles)	Feasibility
1	$163.1	0	Yes
2	$417.5	0	No
2A	$545.3	0	Yes
3	$758.4	18	Yes

Comparison of Options

	Option			
	1	2	2A	3
Meets ERCOT and NERC Reliability Criteria	Yes	Yes	Yes	No
Improves Operational Flexibility	Yes	Yes	Yes	No
Improves Long-Term Load-Serving Capability	Yes	Yes	Yes	No
Require CCN (~miles)	No	No	No	Yes
Cost Estimate* (~$M)	$163.1	$417.5	$545.3	$758.4
Feasible	Yes	No	Yes	No

ERCOT Preferred Option

- Option 2A was selected as the preferred option because it:
  - Addresses reliability violations
  - Is the least cost option that addresses maintenance issue
  - Improves long-term load-serving capability better than other options

Sensitivity Analyses

- Generation Addition Sensitivity Analysis
  - ERCOT performed a generation addition sensitivity by adding new the generation listed below to the preferred option case. The additional resources were modeled following the 2024 RTP methodology. ERCOT determined relevant generators do not impact the preferred option

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

Additional Analyses

- Congestion Analysis
  - Preliminary congestion analysis was performed for the preferred option using the 2023 RTP 2028 economic case
  - The preferred option did not increase congestion
- Subsynchronous Resonance (SSR) Assessment
  - Subsynchronous Resonance (SSR) Assessment was conducted for the preferred option
  - ERCOT found no SSR risks

ERCOT Recommendation

- ERCOT recommends Option 2A
  - Estimated Cost: approximately $545
  - Expected ISD: January 2028
    - The completion date may change depending on material acquisition, outage coordination, construction, or other project related requirements.

Next Steps and Tentative Timeline

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

Thank you!

Stakeholder comments also welcomed through:

Ben.Richardson@ercot.com

Robert.Golen@ercot.com

Appendix A – Transmission Projects

- List of transmission projects added to study base case

TPIT No	Project Name	Tier	Project ISD	County
73371A	BP24 Sub Upgrades	Tier 4	Oct-24	Harris
73371B	BP24 Sub Upgrades	Tier 4	Oct-24	Harris
73371H	BP24 Sub Upgrades	Tier 4	Nov-24	Harris
69892	Deer Park Tap to NOBEL Ckt.21C Upgrades	Tier 4	Dec-24	Harris
73371C	BP24 Sub Upgrades	Tier 4	Dec-24	Harris
86009	Expand ADLONG substation for XE Murat Storage (24INR0329)	Tier 4	Dec-24	Harris
69902B	New 345kV Mission (MSS) substation for generator interconnection to Parliament Solar.	Tier 4	Jan-25	Harris

Appendix A – Transmission Projects

- List of transmission projects added to study base case – cont.

TPIT No	Project Name	Tier	Project ISD	County
70660	Plaza to Grant Ckt.08I Upgrade	Tier 4	Feb-25	Harris
75856B	Rebuild and reconductor portions of Ckt.28A to prepare for ETHYL 138kV conversion. Loop into Ckt.06E to create new Ckt.06 Jefferson to ETHYL 138kV to South Channel. Retire ETHYL 69kV substation and remaining portions of 69kV Ckt.16D and Ckt.28A.	Tier 4	May-25	Harris
78485B	Britmoore to Bellaire Ckt.24B Upgrades	Tier 3	May-25	Harris
78490C	Jeanetta Auto Upgrades	Tier 3	May-25	Harris
73578C	Heights 138kV Loop Conversion	Tier 4	May-25	Harris
73578H	Heights 138kV Loop Conversion	Tier 4	May-25	Harris
73578I	Heights 138kV Loop Conversion	Tier 4	May-25	Harris
87479I	Upgrade to increase thermal limits as part of FRM upgrades	Tier 4	Jul-25	Harris
87479F	Upgrade to increase thermal limits as part of FRM upgrades	Tier 4	Jul-25	Harris

Appendix A – Transmission Projects

- List of transmission projects added to study base case – cont.

TPIT No	Project Name	Tier	Project ISD	County
87479H	Upgrade to increase thermal limits as part of FRM upgrades	Tier 4	Jul-25	Harris
87479C	Upgrade to increase thermal limits as part of FRM upgrades	Tier 4	Jul-25	Harris
87479A	Upgrade to increase thermal limits as part of FRM upgrades	Tier 4	Jul-25	Harris
78427A	Bohemian (BOH) 138kV CEHE Substation for Destiny Storage (24INR0397)	Tier 4	Oct-25	Harris
78427B	Bohemian (BOH) 138kV CEHE Substation for Destiny Storage (24INR0397)	Tier 4	Oct-25	Harris
73332	Install Hermann (HER) Distribution Substation	Tier 4	Dec-25	Harris
76350	Install new TARGA 138kV customer substation as Ckt.86 Jordan to TARGA to CITIES.	Tier 4	Dec-25	Chambers
73352C	PH Robinson Area 138kV Upgrades	Tier 4	Dec-25	Harris
87640	New load customer interconnection RAOULT connecting on ckt 86 between DALTON and BRINE.	Tier 4	Jan-26	Harris
80632	Install Kilgore 35kV Distribution Substation. Loop on Ckt.86B to create new Ckt.86 CHEVRON to Kilgore to LANGSTON	Tier 4	May-26	Chambers

Appendix A – Transmission Projects

- List of transmission projects added to study base case – cont.

TPIT No	Project Name	Tier	Project ISD	County
87346	Upgrade Ckt 25 Jeanetta to Westwood to increase thermal limits	Tier 4	May-26	Harris
78490D	Jeanetta Auto Upgrades	Tier 3	May-26	Harris
78485A	Britmoore to Bellaire Ckt.24B Upgrades	Tier 3	May-26	Harris
78485C	Britmoore to Bellaire Ckt.24B Upgrades	Tier 3	May-26	Harris
73578D	Heights 138kV Loop Conversion	Tier 4	May-26	Harris
73578E	Heights 138kV Loop Conversion	Tier 4	May-26	Harris
75835A	Upgrade Ckt.66B Stone Lake to Tomball to increase thermal limits. Install 40 MVAR cap bank at Hockley substation and tapped on Ckt.66B Hockley to Stone Lake.	Tier 3	Oct-26	Harris
86022	Jordan 138kV Substation Expansion for Coneflower Storage (23INR0425)	Tier 4	Oct-26	Chambers
87344	Upgrade 345kV Ckt 71 Addick's-White Oak to increase thermal limits	Tier 4	Oct-26	Harris

Appendix B – Transmission Projects

- List of transmission projects removed from the study base case

TPIT No	Project Name	County
None	None	None

Appendix C – Generation Projects

- List of generation projects added to study base case

GINR	Project Name	Fuel	Project COD	Max Capacity (~MW)	County
23INR0408	TECO GTG2	GAS	10/15/2024	50.0	Harris
22INR0546	Enchanted Rock NEWPP	GAS	11/16/2024	30.0	Harris
22INR0354	XE Murat [Adlong] Solar	SOL	12/30/2024	60.4	Harris
24INR0329	XE Murat Storage	OTH	03/01/2025	60.1	Harris
24INR0397	Destiny Storage	OTH	01/31/2026	205.6	Harris
23INR0425	Coneflower Storage Project	OTH	02/03/2027	178.9	Chambers