



Appendix: Previously Reviewed Baseline Upgrade Recommendations for the April 2020 PJM Board Review



Dominion Transmission Zone: Baseline Line #72 (Chesterfield-Plaza)

Process Stage: Second Review

Previously Presented: 12/16/2019

Criteria: Dominion’s FERC 715 Planning Criteria (C.2.7 – Limitations on Direct Connect Loads)

Assumption Reference: Dominion Energy’s Facility Interconnection Requirements

Model Used for Analysis: 2024 RTEP Summer

Proposal Window Exclusion: Below 200kV, FERC 715 (TO Criteria)

Problem Statement: 115kV Line #72 (Chesterfield to Plaza) exceeds the Company’s limitation of serving 4 tapped facilities on one transmission line. The line serves 5 tap stations: National Cylinder Gas, Bellwood, Brown Boveri, Kingsland, and Reymet. Also, the tap line serving Brown Boveri, built in the 1970’s with a length of 1.1 miles, does not meet the company’s requirement of a terminal station for tap lines longer than one mile.

Existing & Preliminary Facility Rating: 176 MVA (summer - Normal)

Proposed Solution:

- Split Line #72 by rebuilding the Brown Boveri tap line as double circuit loop in-and-out of the station. **(b3161.1)**

Estimated Cost: \$3.0M

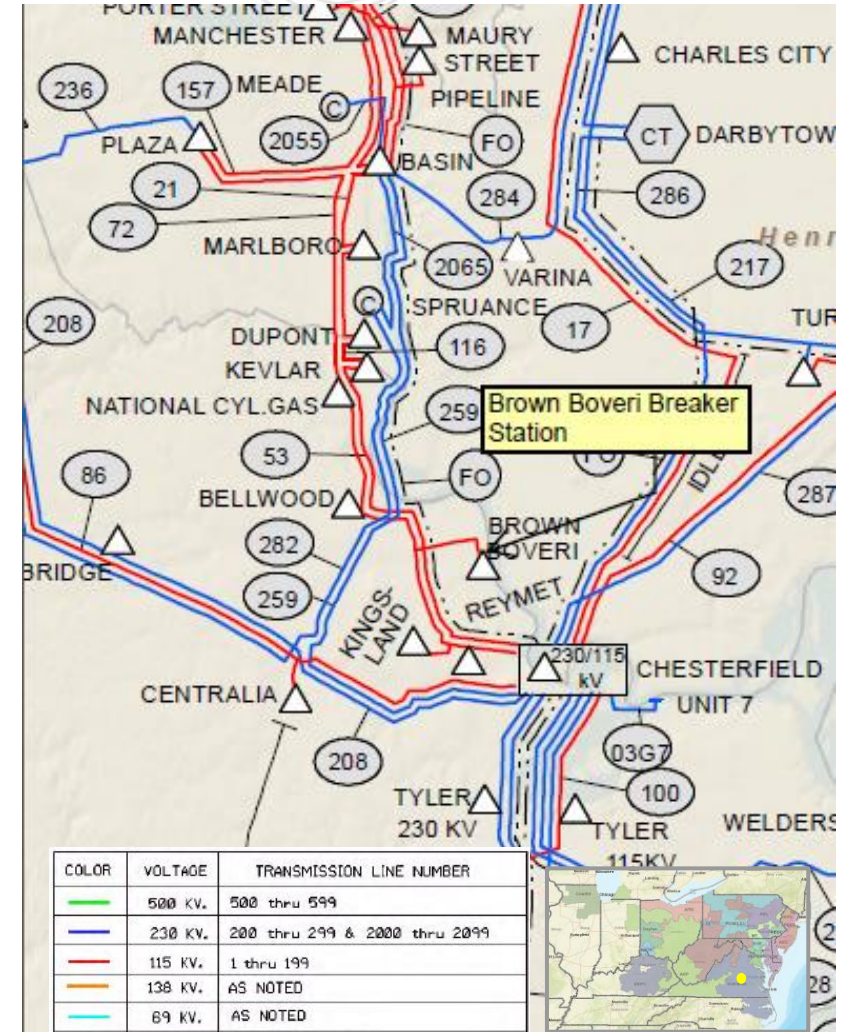
- Install a 115kV breaker at the station. Site expansion is required to accommodate the new layout. **(b3161.2)**

Estimated Cost: \$2.3M

Total Estimated Baseline Cost: \$5.3M

Required In-service Date: 6/1/2024

Projected In-service Date: 12/31/2023





Dominion Transmission Zone: Baseline Line #153 (Spotsylvania-Oak Green) and Culpeper 115kV Delivery

Process Stage: Second Review

Previously Presented: 12/16/2019

Criteria: Dominion’s FERC 715 Planning Criteria (Post-Contingency Radial - Thermal and Voltage)

Assumption Reference: Dominion Energy’s Facility Interconnection Requirements

Model Used for Analysis: 2024 RTEP Summer

Proposal Window Exclusion: Below 200kV, FERC 715 (TO Criteria)

Problem Statement:

- 115kV Line #153 (Spotsylvania-Oak Green) exceeds 100% of its emergency rating for the N-1-1 loss of 115kV Line #11 (Gordonsville-Somerset) and 115kV Line #70 (Remington-Mt. Run).
- Voltage at Culpeper drops below 85% for the N-1-1 loss 115kV Line #153 (Spotsylvania-Oak Green) and 115kV Line #70 (Remington-Mt. Run).

Existing & Preliminary Facility Rating:

Spotsylvania-Paytes Tap = 226 MVA (summer – Normal and Emergency)

Locust Grove-Unionville = 204 MVA (summer – Normal and Emergency)

Proposed Solution:

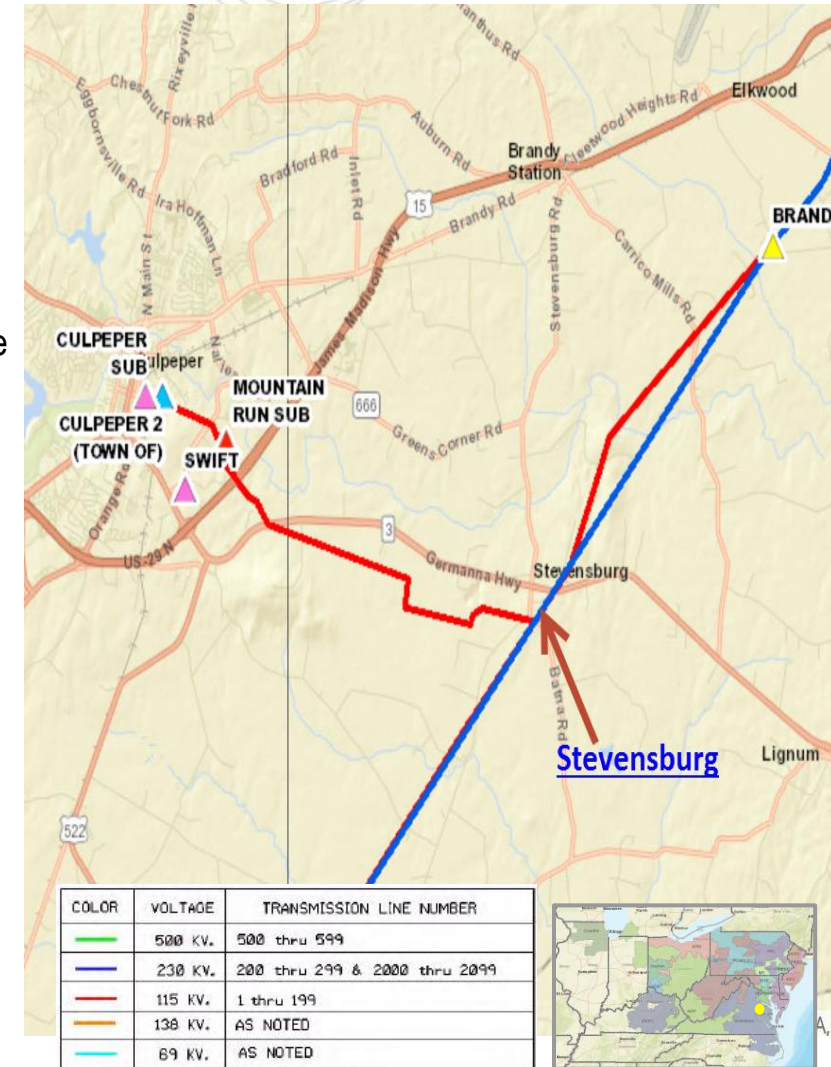
- Acquire land and build a new 230kV switching station (Stevensburg) with a 224MVA, 230-115kV transformer. 230kV Line #2199 (Gordonsville-Remington) will be cut and connected to the new station. 115kV Line #70 (Remington-Mt. Run) and 115kV Line #2 (Mt. Run-Oak Green) will also be cut and connected to the new station. This will provide Culpeper another source to support voltage in the area as well as eliminating the thermal issue.

(b3162)

Total Estimated Baseline Cost: \$22M

Required In-service Date: 6/1/2024

Projected In-service Date: 12/31/2023





AEP Transmission Zone: Baseline Niles Area

Process Stage: Recommended Solution

Criteria: TO Planning Criteria

Assumption Reference: FERC 715

Model Used for Analysis: 2024 RTEP Summer

Proposal Window Exclusion: FERC 715 and Below 200kV

Problem Statement:

For N-1-1 loss of the Pokagon - Lake Street and South Bend – Niles 69 kV lines:

- Pletcher – Buchanan 69kV line overloads to 117% of the 75MVA rating (336 ACSR)
- The area experiences voltage violations with voltages as low as .89 pu and voltage drops as high as 8.5% at the Niles and Lake Street 34.5 kV buses and affects the following load serving buses. Lakehead 69kV, Lake Street 69kV, Lake Street 34.5kV, National Standard 69kV, Simplicity 34.5kV, Niles 69kV, Niles 34.5kV.

For N-1 loss of the Niles 69/34 transformer, Niles 69kV bus or any of the Niles 69kV breakers the following overload occurs.

- Niles – Simplicity 34.5kV line overloads to up to 103% of the 68MVA rating (600A breaker)

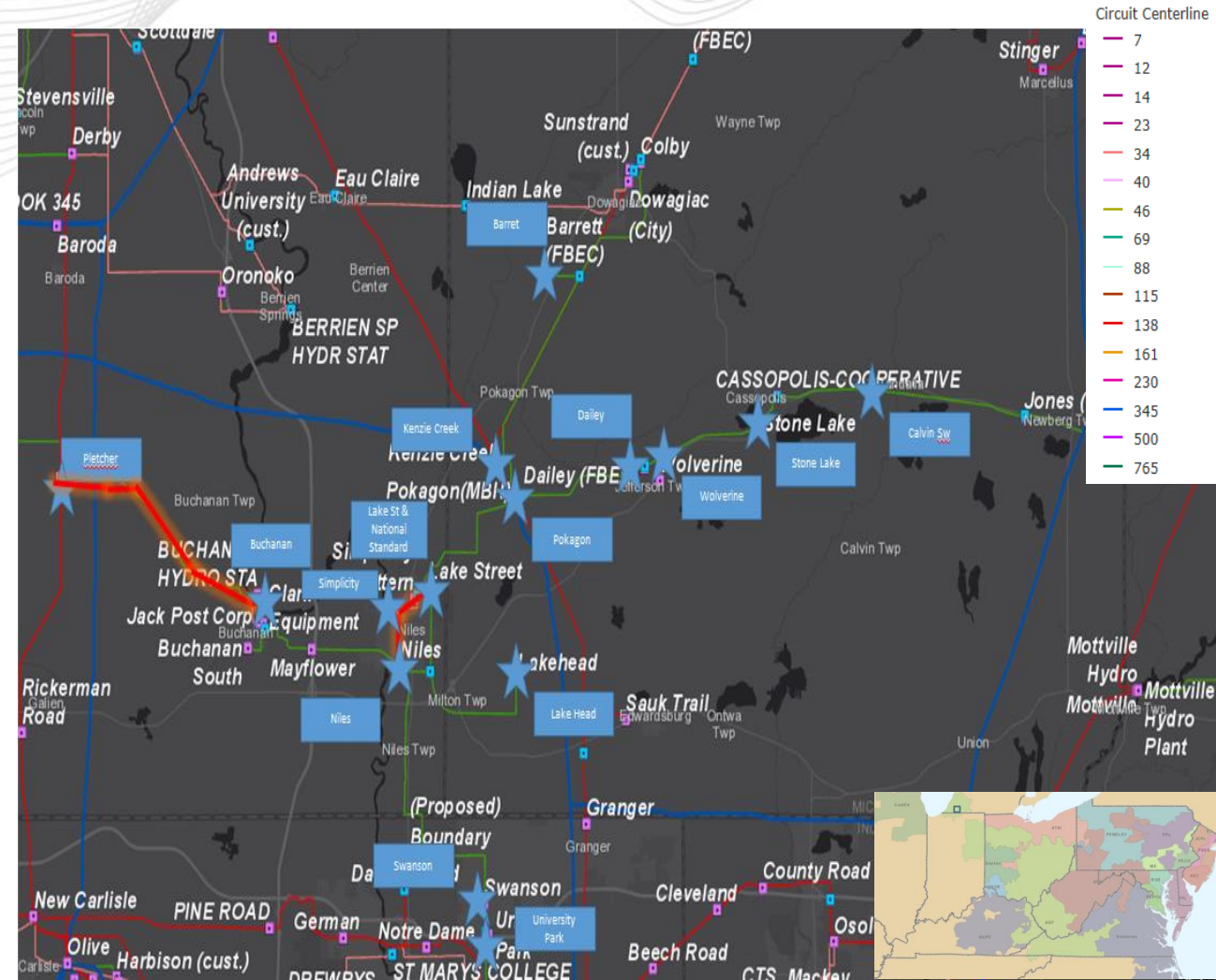
For N-1-1 loss of the Niles 69/34.5kV transformer (which takes out the 69kV bus) and the Pokagon 138/69kV transformer:

- The area experiences voltage violations with voltages as low as .79 pu and voltage drops as high as 18.2% at the Niles 34.5 kV bus and affects the following load serving buses. Barrett 69kV, Calvin 69kV, Dailey 69kV, Lakehead 69kV, Lake Street 69kV, Lake Street 34.5kV, National Standard 69kV, Simplicity 34.5kV, Niles 69kV, Niles 34.5kV, Pokagon 69kV, Stone Lake 69kV and Wolverine 69kV station.

For N-1-1 loss of the Lake Street 69/34kV XFR (takes out 69kV bus) and South Bend – Niles 69kV line:

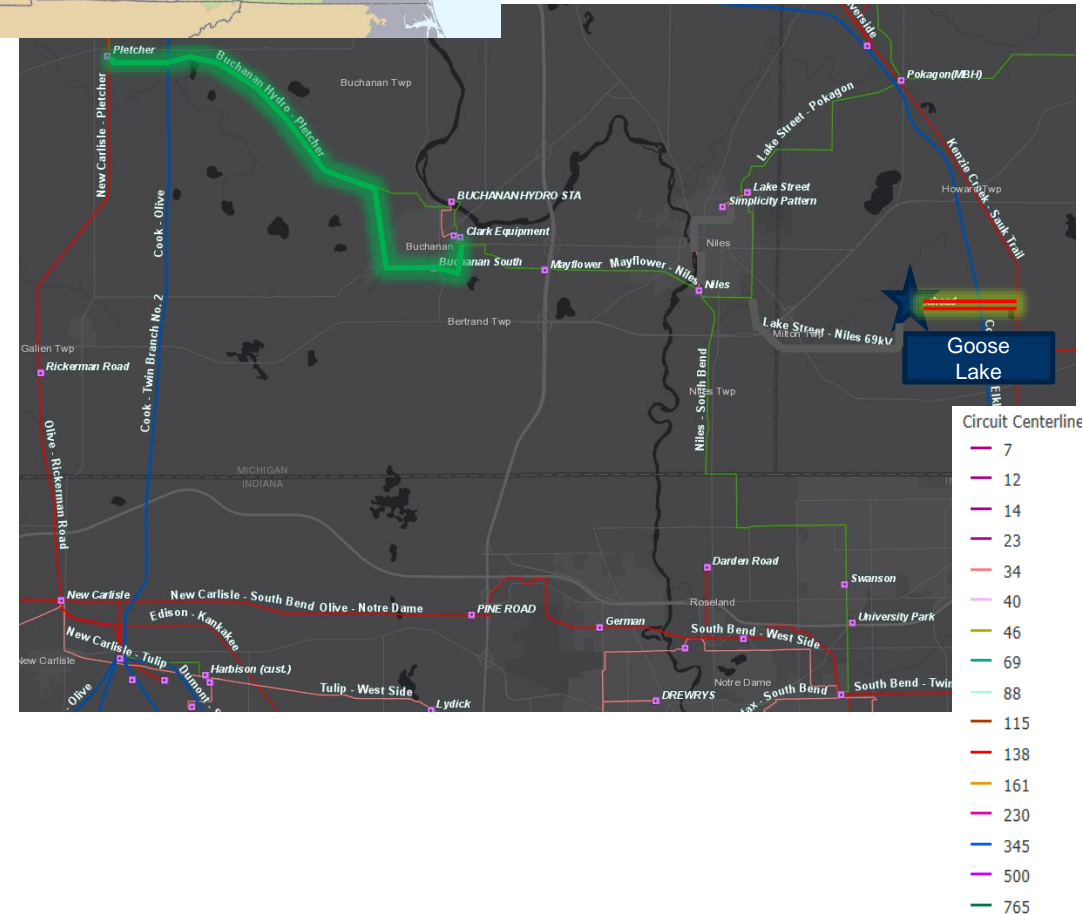
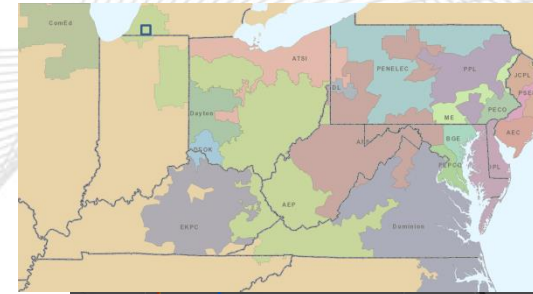
- The area experiences voltage violations with voltages as low as .85 pu and voltage drops as high as 9.0% at the Niles, Simplicity and Lake Street 34.5 kV buses

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AEP Transmission Zone: Baseline Niles Area



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Existing Facility Ratings:

Pletcher – Buchanan 69kV line: 68/75/90/94 MVA for SN/SE/WN/WE
 Sauk Trail – Pakagon 138kV line: 296/380/375/375 for SN/SE/WN/WE

Preliminary Facility Ratings:

Pletcher – Buchanan South 69kV line: 128/128/162/162 MVA for SN/SE/WN/WE
 Buchanan South – Buchanan 69kV line: 68/86/90/103 MVA for SN/SE/WN/WE
 Sauk Trail – Lakehead 138kV line: 296/398/375/452 for SN/SE/WN/WE
 Pokagon – Lakehead 138kV line: 296/398/375/452 for SN/SE/WN/WE
 Lake Head 138/69kV transformer: 20/20/20/20 for SN/SE/WN/WE



AEP Transmission Zone: Baseline Niles Area

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Proposed Solution:

Construct a ~2.4 mile double circuit 138kV Extension using 1033 ACSR to connect Lake Head to the 138kV network. **(B3160.1)**

Estimated Cost: \$6M

Retire the ~2.5 mile 34.5kV Niles – Simplicity Tap line. **(B3160.2)**

Estimated Cost: \$1.2M

Retire the ~4.6 mile Lakehead 69kV Tap **(B3160.3)**

Estimated Cost: \$1.4M

Build new 138/69kV drop down station to feed Lakehead with a 138kV CB, 138kV Switcher, 138/69kV XFR and a 138kV MOAB **(B3160.4)**

Estimated Cost: \$4M

Rebuild the ~8.4 mile 69kV Pletcher – Buchanan Hydro line as the ~9 mile Pletcher – Buchanan South 69kV line using 795 ACSR. **(B3160.6)**

Estimated Cost: \$20M

Rebuild the ~1.2 mile Buchanan South 69kV Radial Tap using 795 ACSR **(B3160.5)**

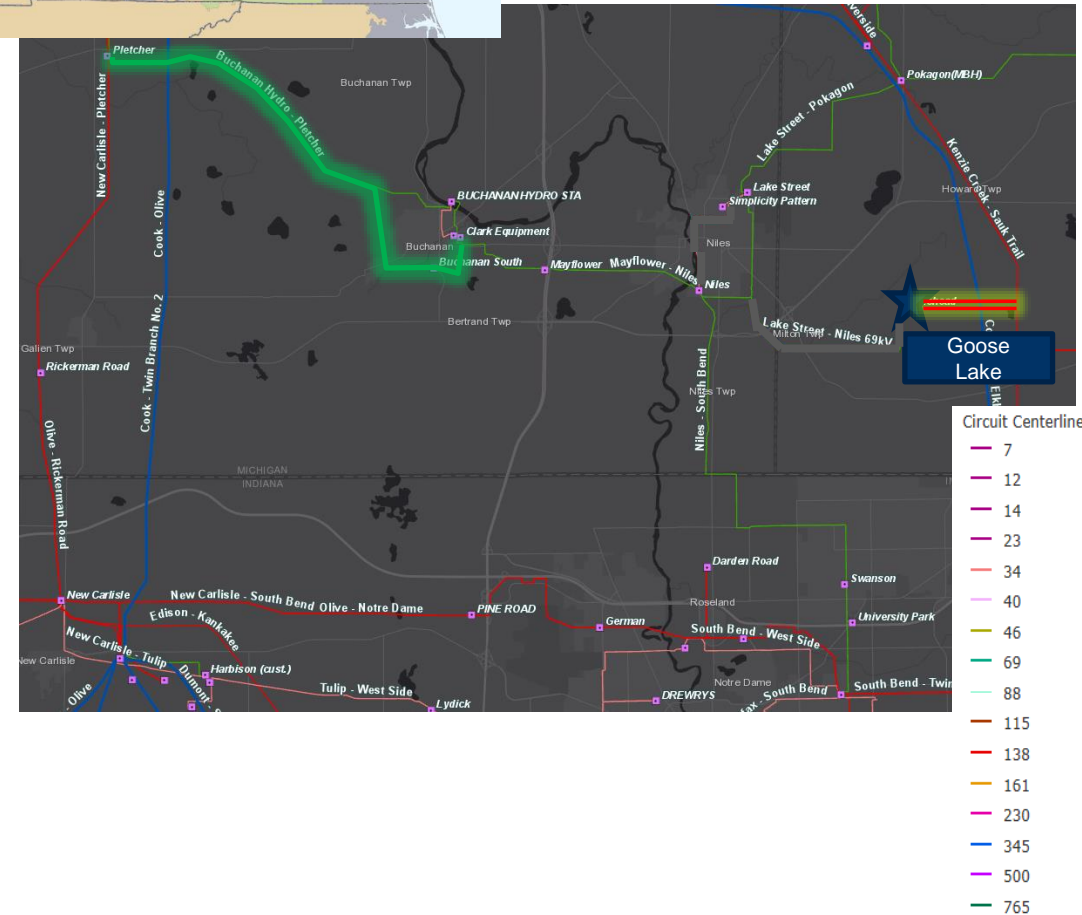
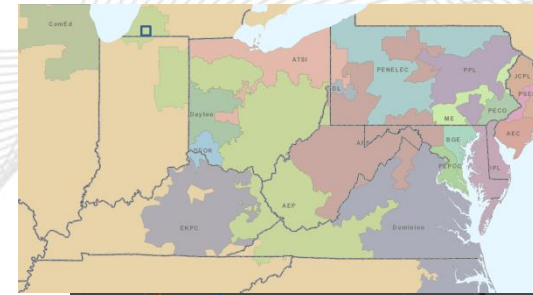
Estimated Cost: \$3M

Install a PoP switch at Buchanan South station with 2 line Moabs. **(B3160.7)**

Estimated Cost: \$0.6M

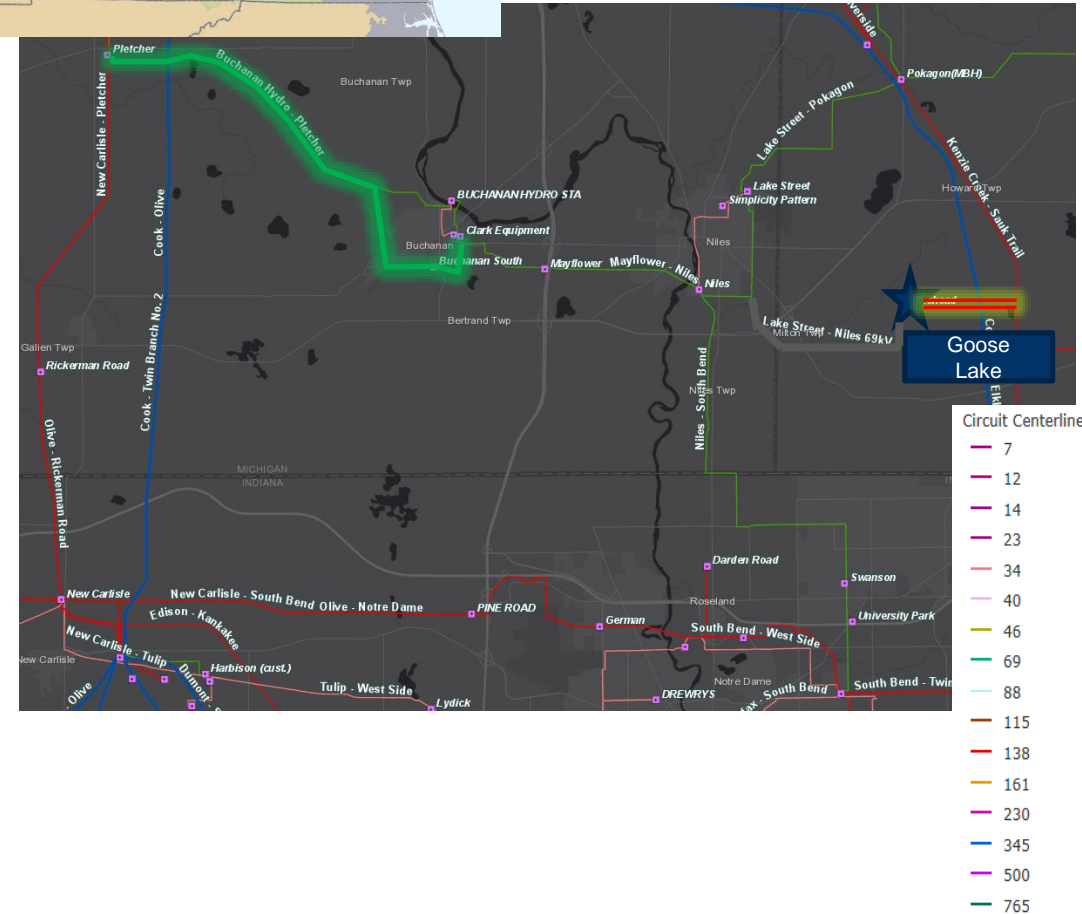
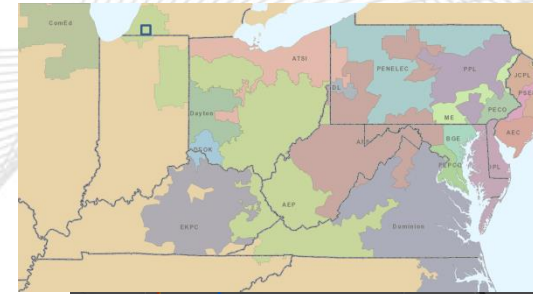
Total Estimated Transmission Baseline Cost: \$36.2M

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AEP Transmission Zone: Baseline Niles Area



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Ancillary Benefits:

The proposed solution also addresses these supplemental needs:

Lake St – Niles 34.5kV line:

1965 Wood line with cap and pin insulators. Submitted in AEP-2018-IM002

Lakehead Pumping 69kV Tap:

1960's wood crossarm construction. Part of asset submitted in AEP-2018-IM002

Pletcher – Buchanan 69kV line:

1963 wood line. Submitted in AEP-2019-IM047

Buchanan South Side 69kV Tap:

1970 wood radial line. Submitted in AEP-2019-IM047

Required IS Date: 6/1/2024

Proposed IS Date: 6/1/2022

Previously Presented: 12/18/2019 SRRTEP



AEP Transmission Zone: Baseline Project

Previously Presented: 8/31/2018 SR RTEP, 9/28/2018 SR RTEP

Generator Deliverability and Common Mode Outage (Winter)

Below 200 kV

Problem Statement:

- The Logtown – North Delphos 138 kV line is overloaded for multiple contingencies in the winter case. (FG# GD-W290, GD-W291, GD-W39 and GD-W40)

Recommended Solution:

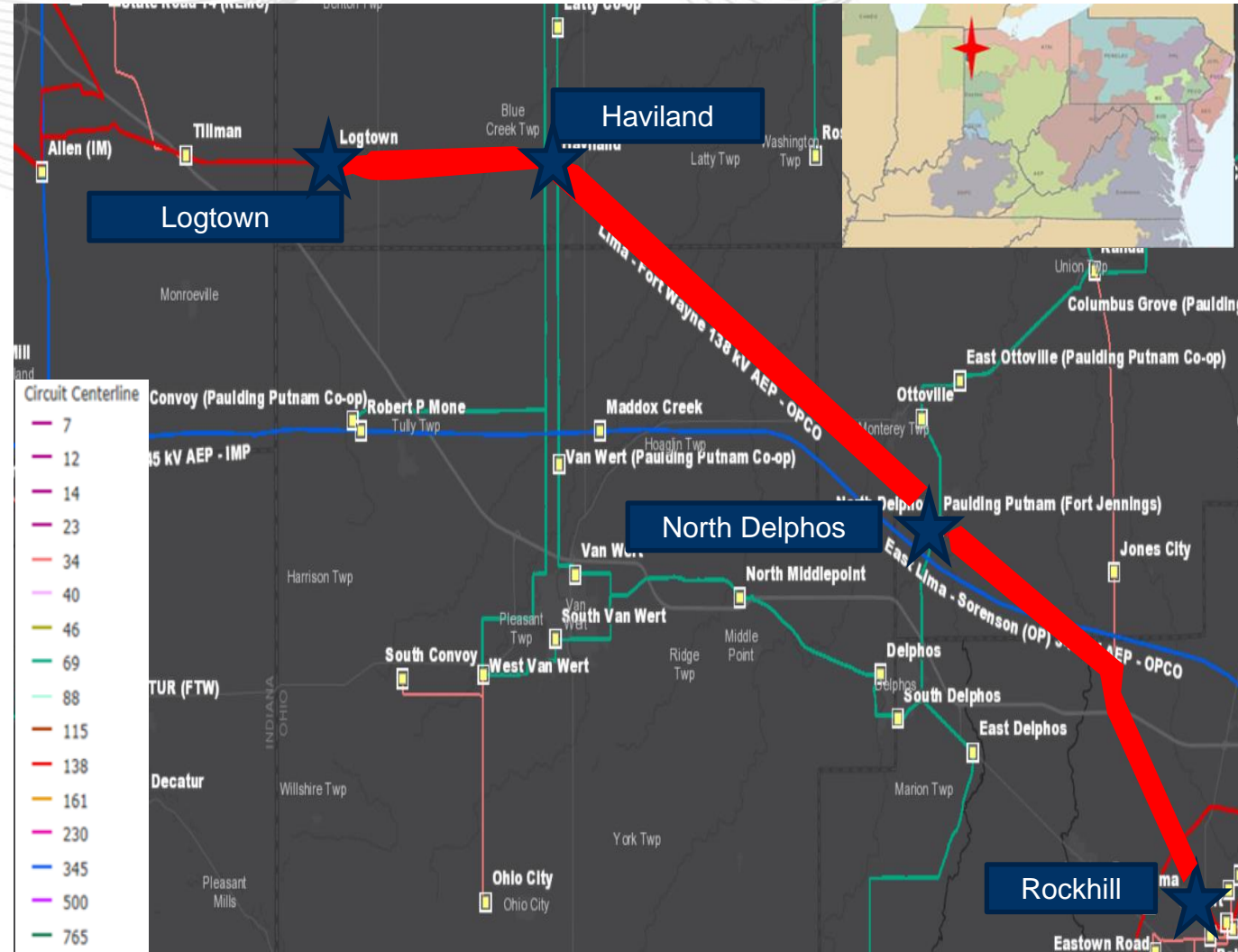
- Convert S1563.2-1 into baseline (**B3036**)
- ~~S1563.2: North Delphos – Rockhill 138 kV: Rebuild 15.4 miles of double circuit 138 kV line utilizing 1033 ACSR 1033 ACSR conductor (296 MVA rating)~~
- S1563.1: Haviland – North Delphos 138kV: Rebuild 15.6 miles of double circuit 138kV line utilizing 1033 ACSR conductor (296 MVA rating)**

Estimated Project Cost : ~~\$24.5 M~~ **\$24.3M**

Required IS Date: 12/1/2023

Projected IS date: 12/18/2020

Status: Engineering





DLC Duquesne Transmission Zone Baseline Dravosburg 138 kV Breaker “Z-78 Logans Ferry”

Process Stage: Recommended Solution

Criteria: over duty breaker

Assumption Reference: PJM Planning Criteria

Model Used for Analysis: 2024 Short Circuit Model

Proposal Window Exclusion: Below 200 kV

Problem Statement:

The Dravosburg 138 kV breaker “Z-78 Logans Ferry” becomes over duty due to the project b3011 (Construct new Route 51 substation and connect 10 138 kV lines to new substation)

Existing Facility Rating: 15000 MVA

Preliminary Facility Rating: 63KA

Proposed Solution:

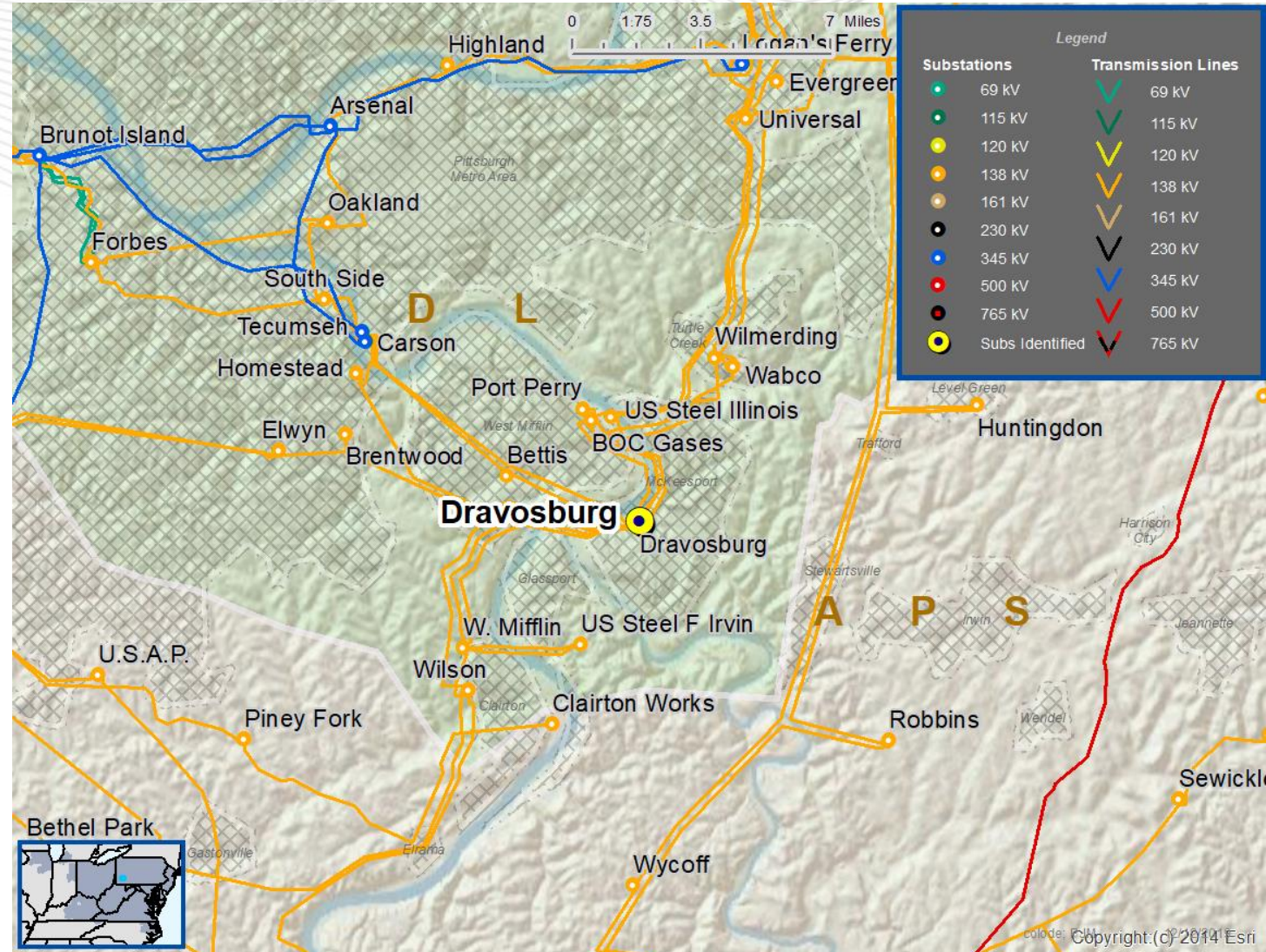
B3011.8: Replace the Dravosburg 138 kV breaker “Z-78 Logans Ferry” with a 63 kA breaker

Estimated Cost: \$0.9 M

Required In-Service Date: 6/1/2021

Projected In-Service Date: 6/1/2021

Previously Presented: 1/17/2020 SRTEP



Process Stage: Recommended Solution

Criteria: over duty breaker

Assumption Reference: PJM Planning Criteria

Model Used for Analysis: 2024 Short Circuit Model

Proposal Window Exclusion: Below 200 kV

Problem Statement:

The Crescent 138 kV oil-type breaker “2-5 TIE” is found to be over duty following a model review and correction to short circuit base case.

Existing Facility Rating: 12000 MVA

Preliminary Facility Rating: 63KA

Recommended Solution:

The “2-5 TIE” breaker shall remain opened and out of service until it can be replaced with a DLC standard 138kV 63 kA breaker (B3212)

Estimated Cost: \$0.35 M

Required In-Service Date: 01/31/2020

In-Service Date: 01/31/2020

