Reliability Analysis Update

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Sub Regional RTEP Committee - PJM West

September 16, 2022

First Review

Baseline Reliability Projects

AEP Transmission Zone: Baseline Darrah – Barnett 69 kV Line Rebuild

Process Stage: First Review Solution

Criteria: AEP 715 Criteria

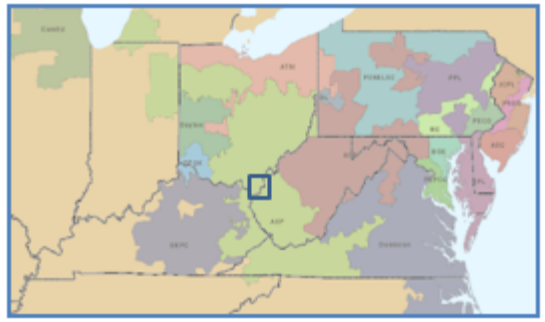
Assumption Reference: 2027 RTEP assumption

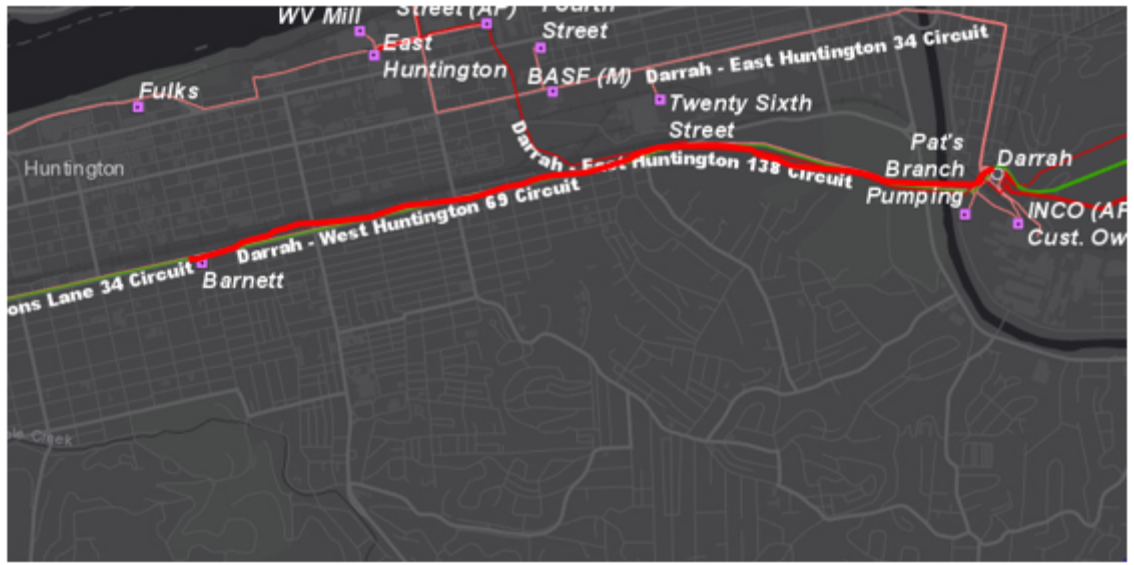
Model Used for Analysis: 2027 Winter RTEP case

Proposal Window Exclusion: Below 200 kV Exclusion

Problem Statement: 2022W1-AEP-T1, 2022W1-AEP-T2

In 2027 RTEP winter case, the Darrah – Barnett 69 kV line is overloaded under a N-1-1 contingency scenario





Existing Facility Rating:

Branch	SN/SE/WN/WE (MVA)
Darrah – Barnett 69 kV	50/50/63/63

AEP Transmission Zone: Baseline Darrah – Barnett 69 kV Line Rebuild

Proposed Solution:

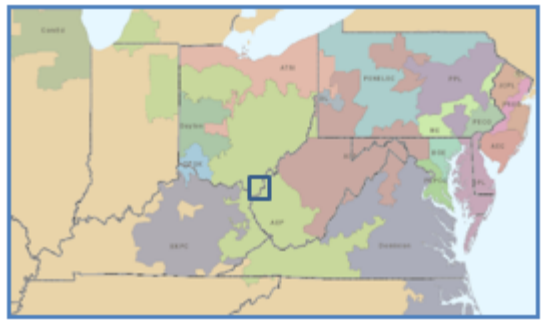
- Rebuild the existing Darrah - Barnett 69 kV line, approximately 2.8 miles and replace a riser at Darrah Station.

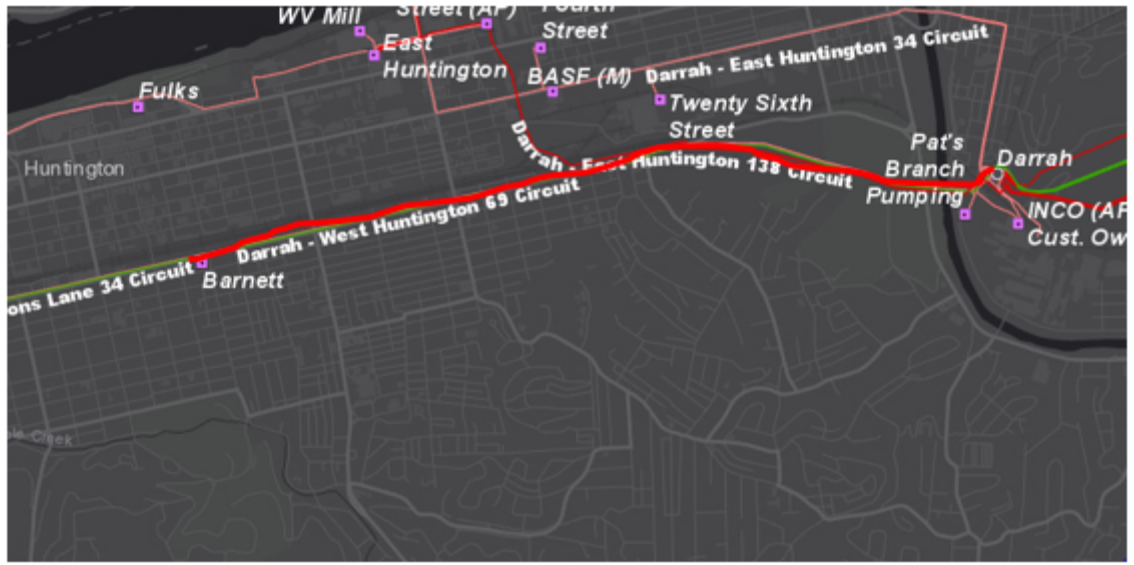
Transmission Estimated Cost: $6.98M

Ancillary Benefits: Supplemental needs on the Darrah – Barnett 69 kV line section: Darrah - Owens Illinois Circuit originally installed in 1954, currently has 213 conditions on 86 structures

Alternatives:

Considered serving the station from 138 kV, but this is not a realistic option as this is a heavily congested residential area and the nearest 138 kV line is approximately 2.5 miles away so it would not eliminate any line mileage.





Preliminary Facility Rating:

Branch	SN/SE/WN/WE (MVA)
Darrah – Barnett 69 kV	93/114/118/134

Required IS Date: 12/1/2027

AEP Transmission Zone: Baseline
George Washington-Kammer 138kV Line Rebuild

Process Stage: First Review Solution

Criteria: Summer Generation Deliverability

Assumption Reference: 2027 RTEP assumption

Model Used for Analysis: 2027 Summer RTEP case

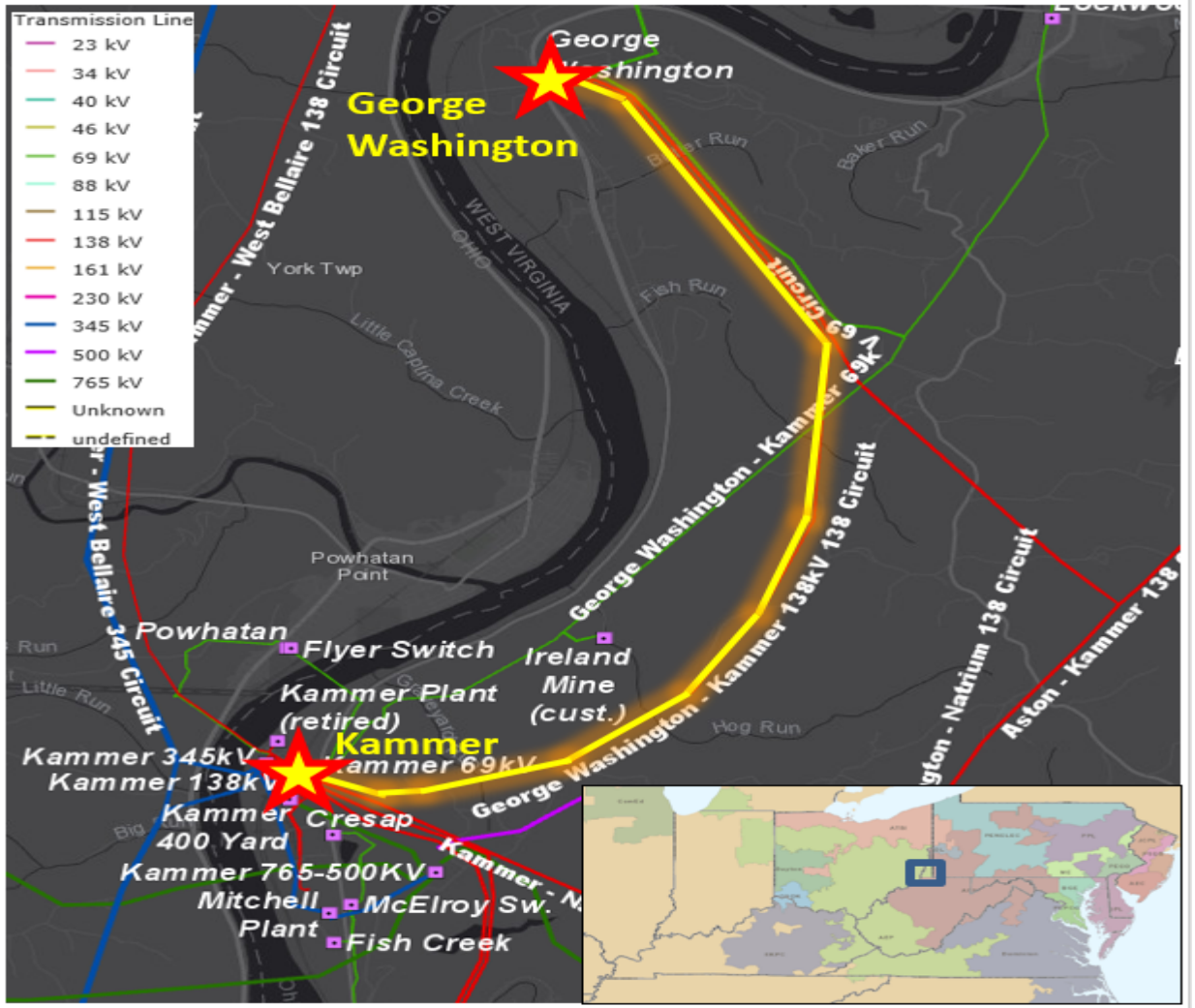
Proposal Window Exclusion: Below 200 kV Exclusion

Problem Statement: 2022W1-GD-S1032

In 2027 RTEP Summer case, the George Washington-Kammer 138 kV line is overloaded under a contingency scenario in generation deliverability test.

Existing Facility Rating:

Branch	SN/SE/WN/WE (MVA)
George Washington – Kammer 138kV	446/621/563/698



AEP Transmission Zone: Baseline
George Washington-Kammer 138kV Line Rebuild

Proposed Solution:

- Rebuild the George Washington – Kammer 138kV circuit, except for 0.1-mile of previously-upgraded T-line outside each terminal station (6.7 miles of total upgrade scope). Remove the existing 6-wired steel lattice towers and supplement the right-of-way as needed..

Transmission Estimated Cost: $18.3M

Ancillary Benefits: Addresses M-3 facility condition needs (AEP-2021-OH013), as presented in 3/19/2021 and 5/19/2022 W-SRREP

Alternatives:

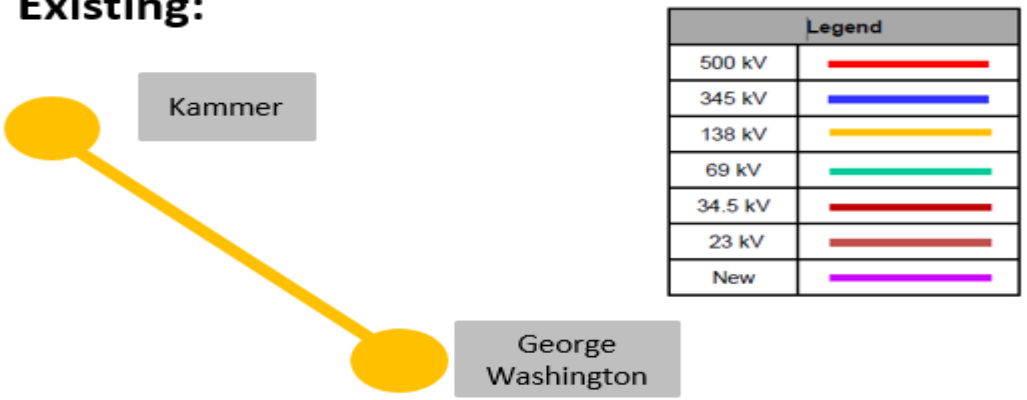
No viable alternatives identified for this equipment condition issue. Retirement or re-routing of the 138kV circuit was not an option, as this is a heavily-loaded circuit in an area with much generation, large industrial customers, and tie-lines from West Virginia to Ohio. Rebuilding this 66-year-old transmission facility ensures a high level of system reliability for decades to come

Preliminary Facility Rating:

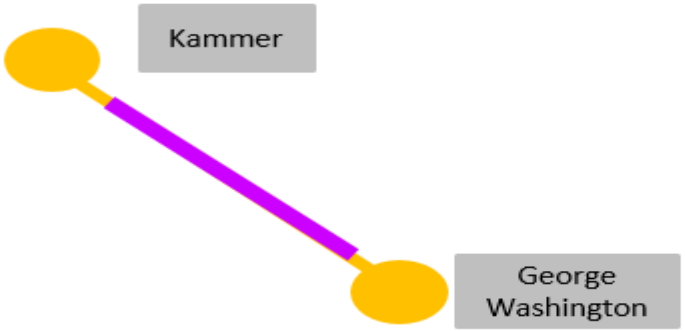
Branch	SN/SE/WN/WE (MVA)
George Washington – Kammer 138kV	730/747/791/791

Required IS Date: 6/1/2027

Existing:



Proposed:



AEP Transmission Zone: Baseline Roanoke Station Circuit Switcher

Process Stage: First Review Solution

Criteria: AEP 715 Criteria

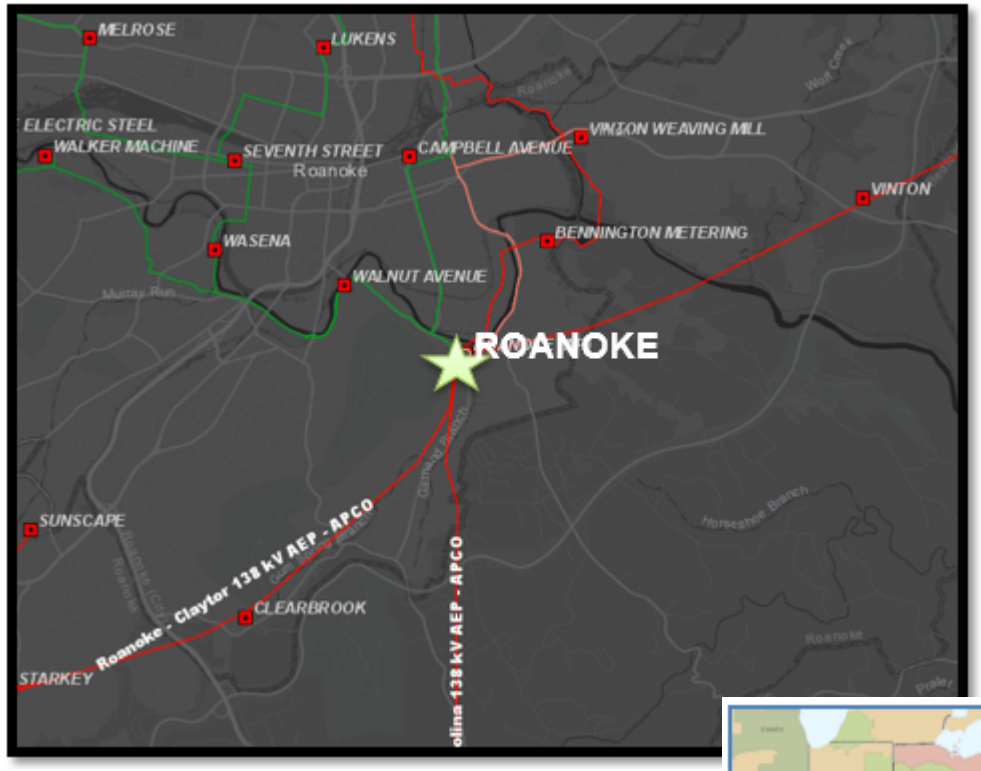
Assumption Reference: 2027 RTEP assumption

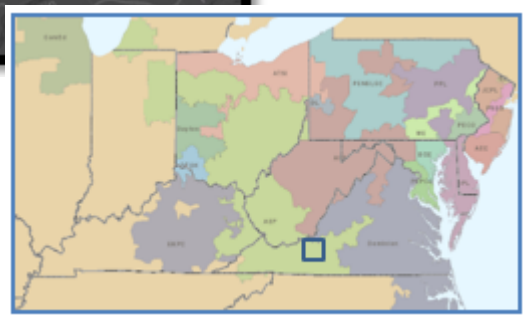
Model Used for Analysis: 2027 Summer RTEP case

Proposal Window Exclusion: Below 200 kV Exclusion

Problem Statement: 2022W1-AEP-T5 through T9

In 2027 RTEP summer case, the Cloverdale-Ingersoll Rand-Monterey Avenue 69 kV line sections caused by multiple N-1-1 contingency scenarios.





AEP Transmission Zone: Baseline Roanoke Station Circuit Switcher

Proposed Solution:

- Install 138 kV circuit switcher on the high-side of Transformer #2 at Roanoke Station (previously proposed as a portion of s2469.7, posted in 2021 AEP local plan)

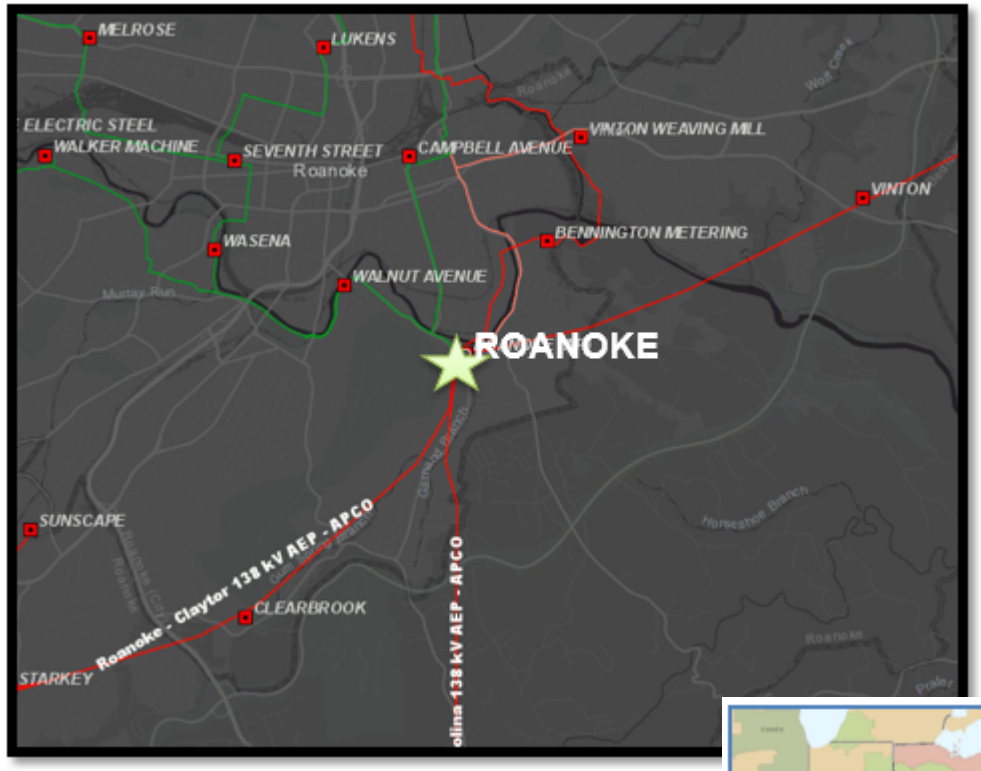
Transmission Estimated Cost: $0.1M

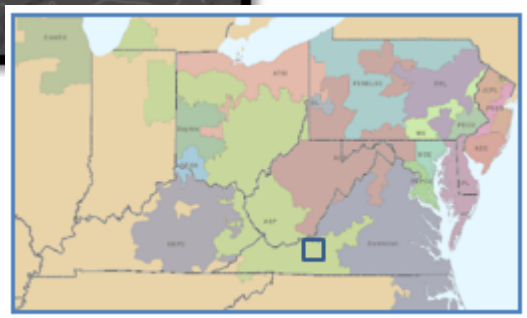
Ancillary Benefits: Separates the transformer and bus zones of protection. Included as part of s2469.7 previously, now converted to baseline

Alternatives:

Replace both 69 kV, 600 A in-line switches at Ingersoll Rand and a single 600 A switch at Monterey Avenue (on the Ingersoll Rand side) with 1200 A rated switches or higher

Required IS Date: 6/1/2027





ATSI Transmission Zone: Baseline Avery – Hayes 138 kV line

Process Stage: First Review Solution

Criteria: Generation Deliverability

Assumption Reference: 2027 RTEP assumption

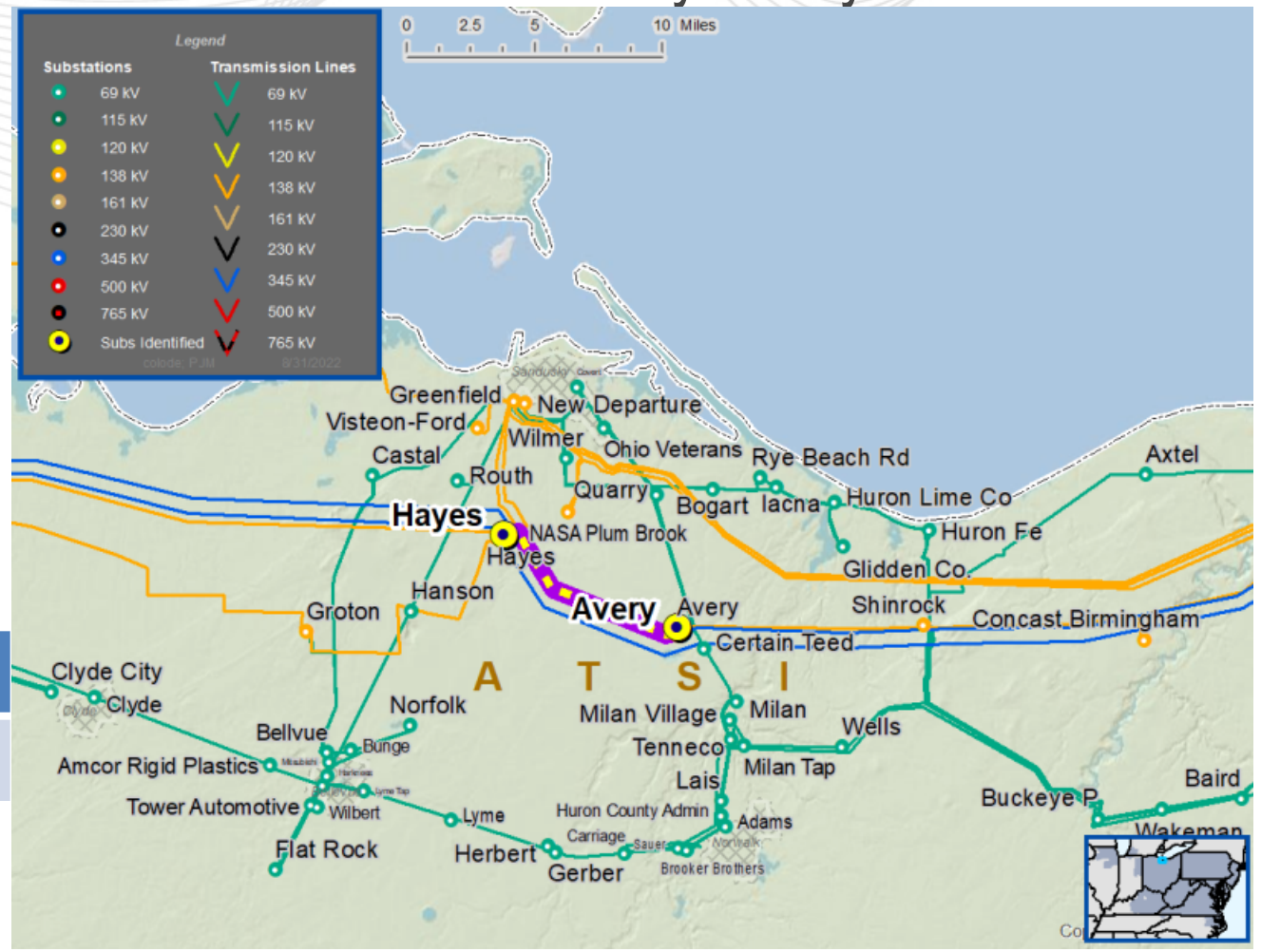
Model Used for Analysis: 2027 Summer RTEP case

Proposal Window Exclusion: Below 200 kV Exclusion

Problem Statement: 2022W1-GD-S1030

In 2027 RTEP Summer case, Hayes to Avery 138 kV line is overloaded due to a tower contingency

Branch	SN/SE/WN/WE (MVA)
Hayes to Avery 138 kV	233/282/263/333



ATSI Transmission Zone: Baseline Avery – Hayes 138 kV line

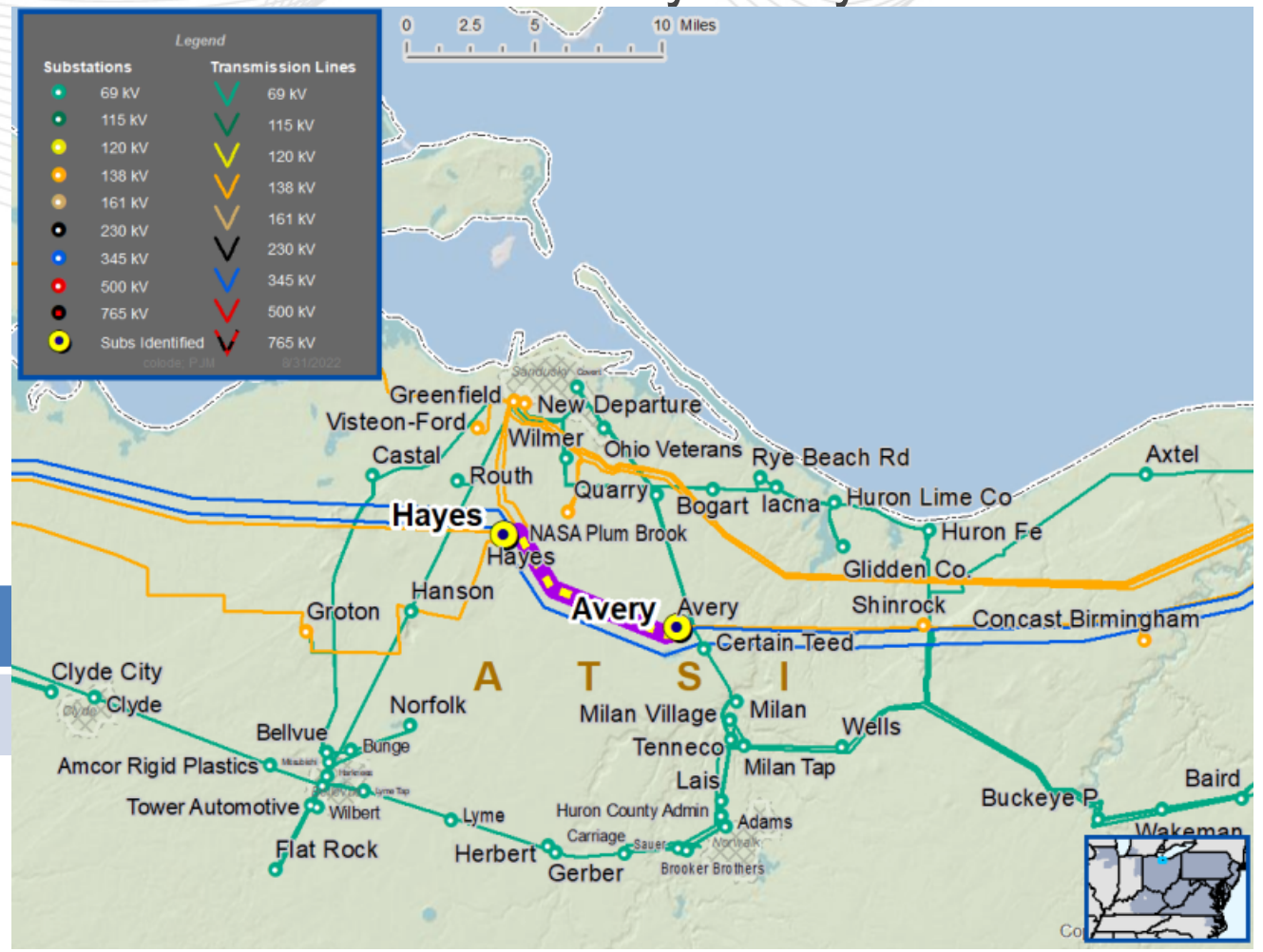
Recommended Solution:

Rebuild and reconductor the Avery-Hayes 138 kV line (approx. 6.5 miles) with 795 KCMIL 26/7 ACSR

Transmission Estimated Cost: $10.4M

Ancillary Benefits: Capacity increase for future load growth

Alternatives: None



Preliminary Facility Rating:

Branch	SN/SE/WN/WE (MVA)
Hayes to Avery 138 kV	278/339/315/401

Required in-service date: 6/1/2027

ATSI Transmission Zone: Baseline Abbe – Johnson 69 kV line

Process Stage: First Review Solution

Criteria: First Energy 715 Criteria

Assumption Reference: 2027 RTEP assumption

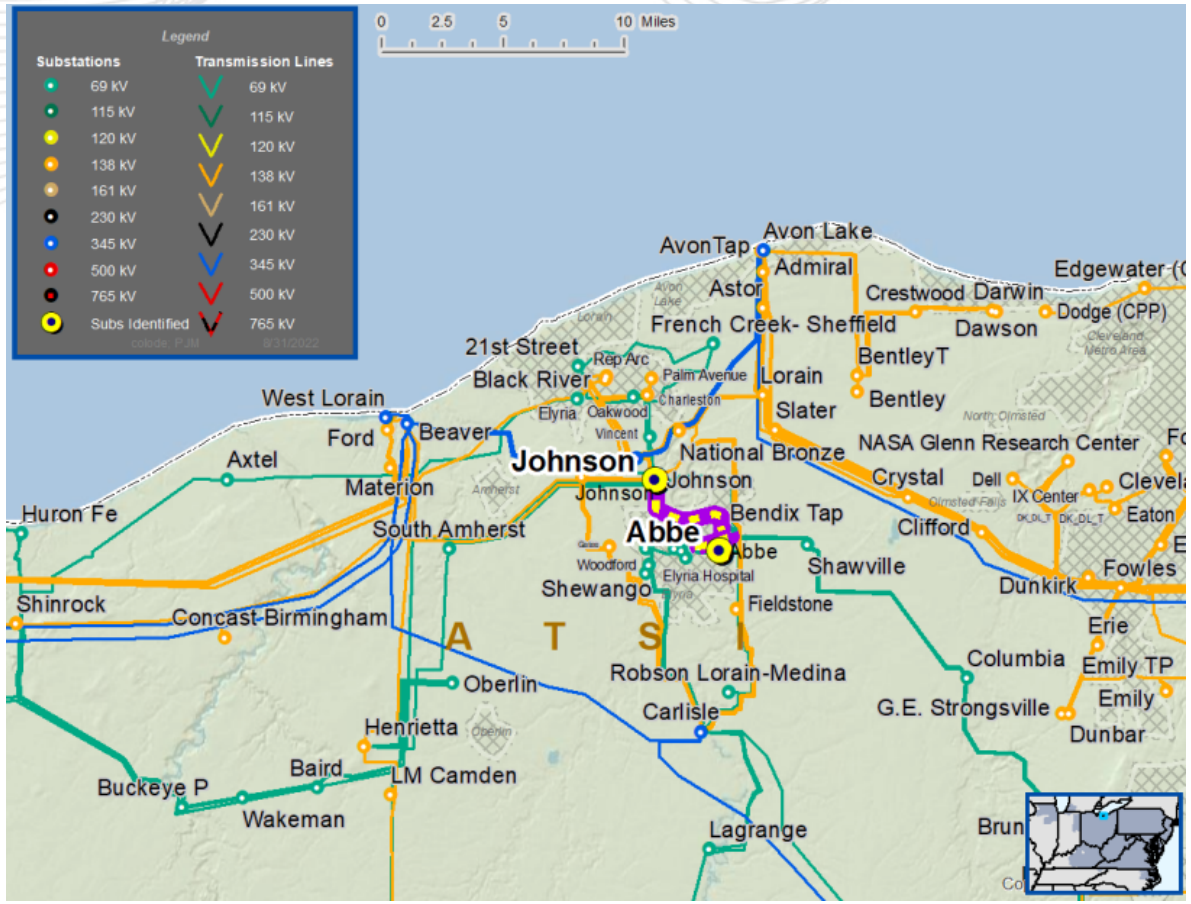
Model Used for Analysis: 2027 Summer RTEP case

Proposal Window Exclusion: Below 200 kV Exclusion

Problem Statement: 2022W1-ATSI-T1

In 2027 RTEP Summer case, Johnson to Redman 138 kV line is overloaded due to a P2-1 contingency

Branch	SN/SE/WN/WE (MVA)
Abbe to Johnson 138 kV	76/92/87/111



ATSI Transmission Zone: Baseline Abbe – Johnson 69 kV line

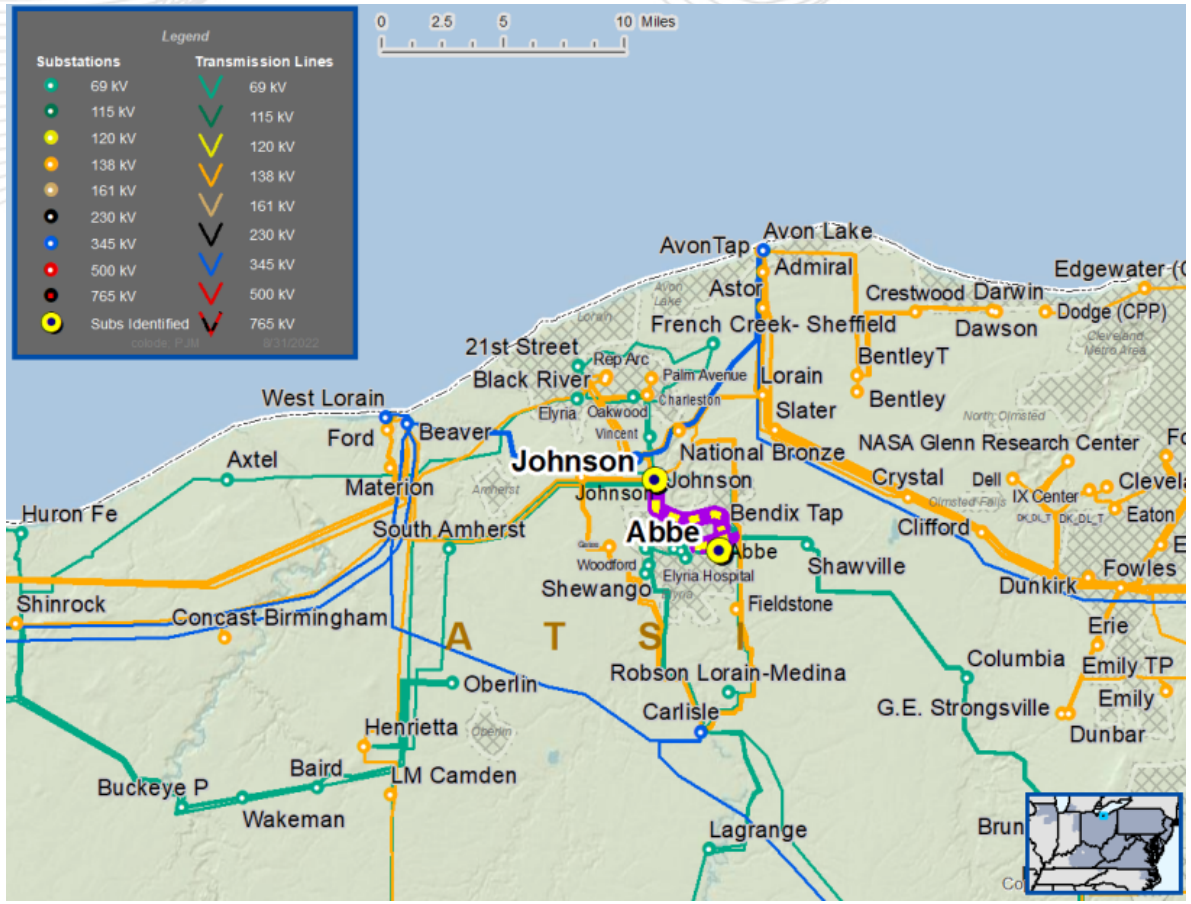
Recommended Solution:

- Rebuild the Abbe-Johnson #2 69 kV Line (approx. 4.9 miles) with 556 kcmil ACSR conductor
- Replace (3) disconnect switches (A17, D15 & D16) and line drops and revise relay settings at Abbe.
- Replace (1) disconnect switch (A159) and line drops and revise relay settings at Johnson.
- Replace (2) MOAB disconnect switches (A4 & A5), (1) disconnect switch (D9), and line drops at Redman.

Transmission Estimated Cost: $10.9M

Ancillary Benefits: Capacity increase for future load growth

Alternatives: None



Preliminary Facility Rating:

Branch	SN/SE/WN/WE (MVA)
Abbe to Johnson 138 kV	111/134/125/159

Contact

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SRRTEP-W Reliability Analysis Update

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Revision History

- V1 – 9/12/2022 – Original slides posted

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