



# Reliability Analysis Update PJM West

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# Existing Project Cancellation

## Baseline Reliability Projects



# AEP Transmission Zone: Baseline B3295 Cancellation

**B3295: Presented in 12/18/2020 and 2/17/2021 W-SRRTEP**

**Original Scope:** Grundy 34.5 kV: Install a 34.5 kV 9.6 MVAR cap bank.

**Estimated Cost:** \$0.8M

**Required In-Service:** 6/1/2025

**Criteria:** AEP 715 criteria

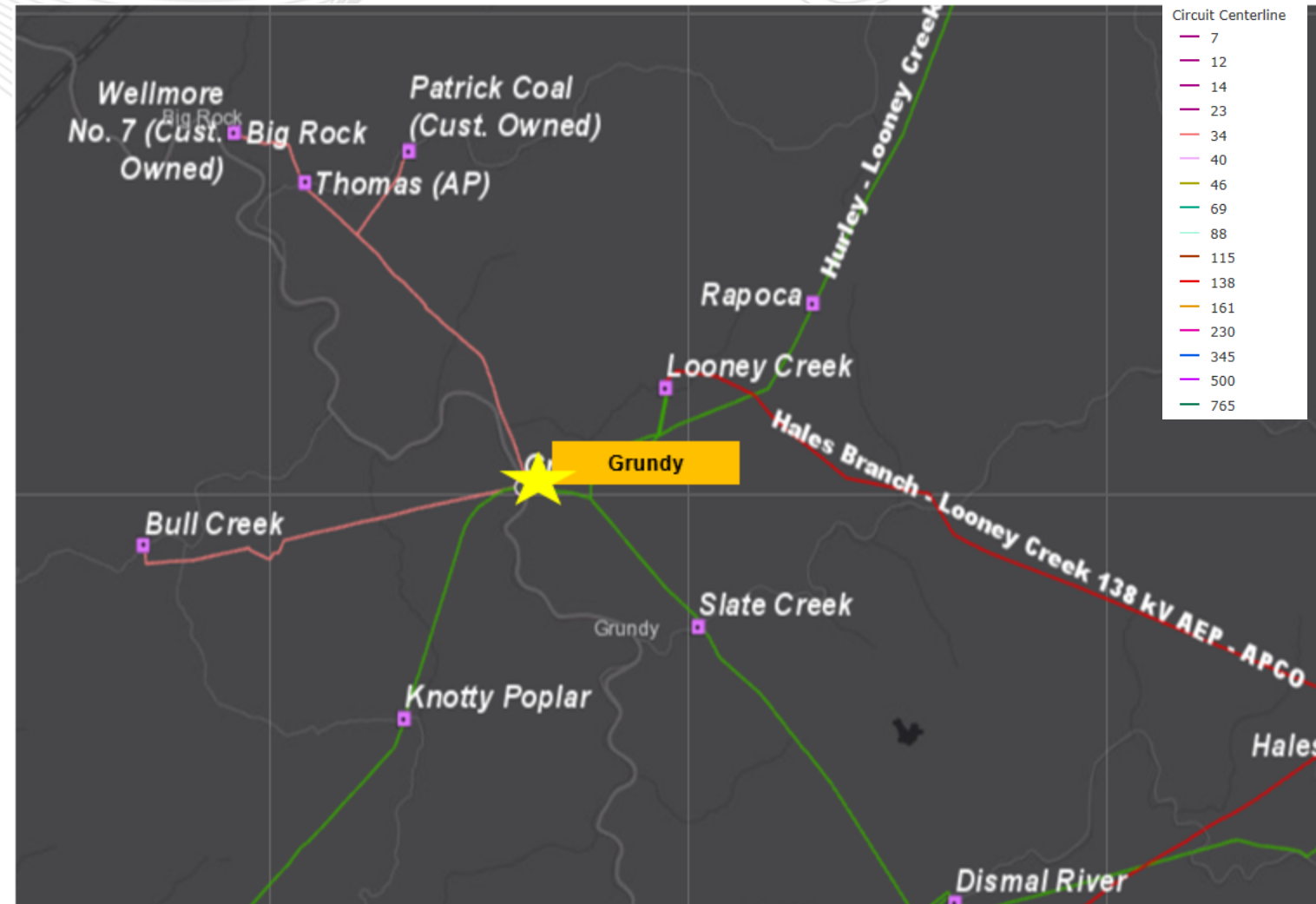
**Assumption Reference:** 2025 RTEP assumption

**Model Used for Analysis:** 2025 RTEP cases

**Proposal Window Exclusion:** Below 200 kV

**Original Driver:** In the 2025 Summer and Winter RTEP cases, voltage violations are identified on the existing Big Rock 34.5kV, Patrick 34.5 kV, Thomas 34.5 kV, Bull Creek 34.5 kV, Grundy 34.5 kV, Grundy 69kV and Knotty Poplar 69 kV buses for one line with stuck breaker contingency and multiple N-1-1 contingency pairs.

**Reason for Cancellation:** Since the approval of the baseline project, a portion of the load in the area was retired and is no longer served from the transmission system. There is no longer a violation in the area and the cap bank is no longer necessary





# 2024 RTEP First Read Baseline Reliability Projects



# ComEd Transmission Zone: Baseline Change No Load Taps at 6 stations

**Process Stage:** First Review

**Criteria:** LL N-0 and N-1

**TEAC/SRRTEP assumptions:** 2024 RTEP assumptions

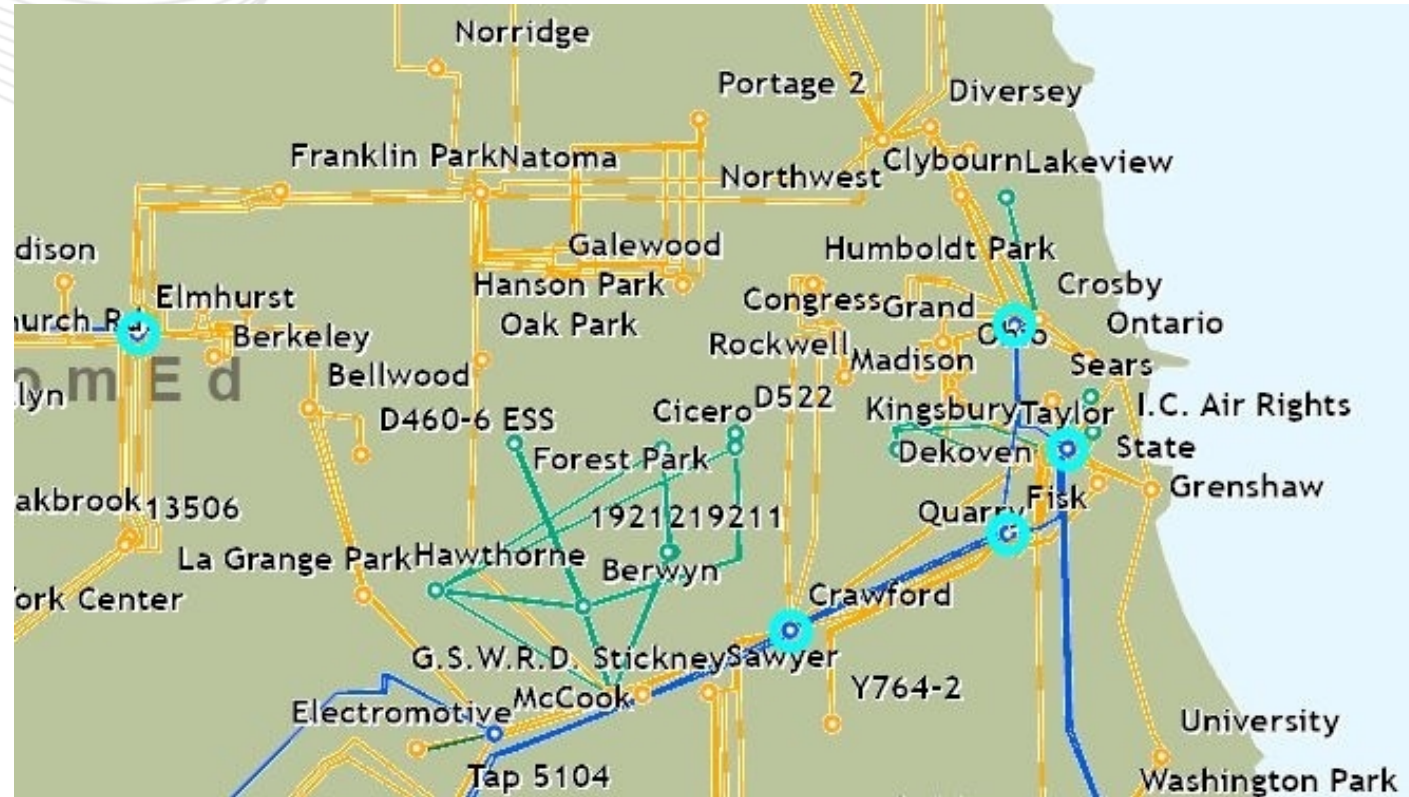
**Model Used for Analysis:** 2029 RTEP Light Load base case

**Proposal Window Exclusion:** Below 200 kV Exclusion, Substation Equipment Exclusion

**Problem Statement:**

FG: Valid FGs in the range of 2024W1-N0-LLVM1 through 2024W1-N0-LLVM29 and 2024W1-N1-LLVM3 through 2024W1-N1-LLVM1177

In the 2029 RTEP Light Load case, multiple buses in the Chicago 138 kV network show high voltage issues in the base case and for N-1 and N-2 outages.



# ComEd Transmission Zone: Baseline Change No Load Taps at 6 stations

## Proposed Solution:

- Change No-load Tap of 2 Autotransformers at Fisk from 338.25 kV to 346.5 kV. **Estimated Cost: 34K**
- Change No-load Tap of 4 Autotransformers at Crawford from 338.25 kV to 3456.5 kV. **Estimated Cost: 68K**
- Change No-load Tap of 3 Autotransformers at Elmhurst from 338.25kV to 346.5 kV. **Estimated Cost: 51K**
- Change No-load Tap of 2 Autotransformers at West Loop from 338.25kV to 346.5kV. **Estimated Cost: 34K**
- Change No-load Tap of 2 Autotransformers at Taylor from 338.25kV to 346.5kV. **Estimated Cost: 34K**
- Change No-load Tap of 4 Autotransformers at Skokie from 338.25 kV to 3456.5 kV. **Estimated Cost: 68K**

**Total Estimated Cost: \$289 K**

## Alternatives:

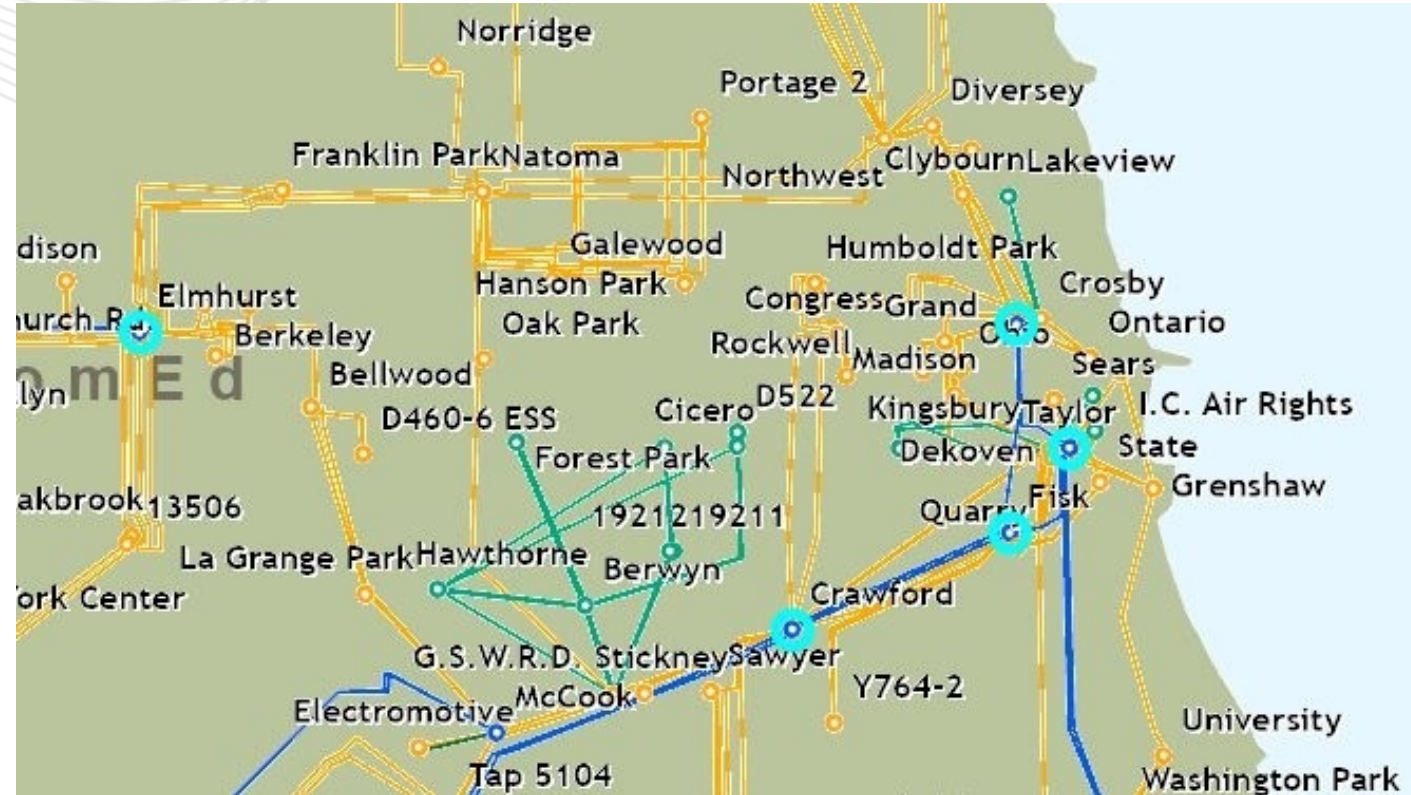
N/A

## Ancillary Benefits:

N/A

**Required In-Service: 4/15/2029**

**Projected IS Date: 4/15/2029**





# 2024 RTEP Recommended Solution Baseline Reliability Projects



# AEP Transmission Zone: Baseline Cloverdale 138kV XT8 Circuit Switcher Replacement

**Process Stage:** Recommended Solution

**Criteria:** Short Circuit

**Assumption Reference:** 2024 RTEP assumptions

**Model Used for Analysis:** 2026 & 2029 RTEP Short Circuit base cases

**Proposal Window Exclusion:** Below 200kV

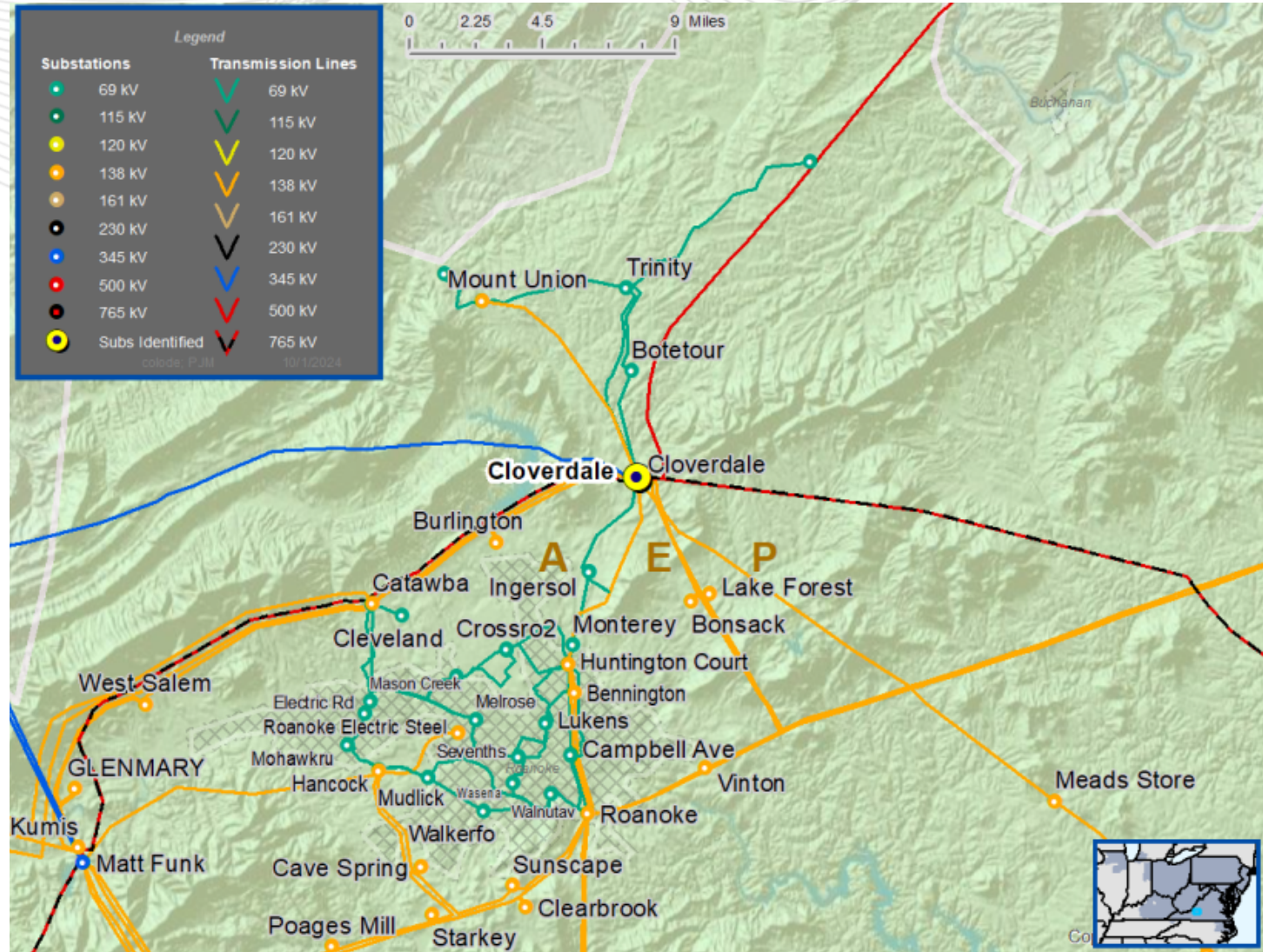
**Problem Statement:**

FG: 2024W1-SC-1

In both 2026 and 2029 RTEP Short Circuit base cases, the Cloverdale 138kV circuit switcher XT8 is identified as being over duty.

**Existing Facility Rating:**

Circuit Switcher	Interrupting Rating (kA)
138kV Circuit Switcher XT8	40







# AEP Transmission Zone: Baseline Cloverdale 138kV XT8 Circuit Switcher Replacement

## Recommended Solution:

Replace over duty Cloverdale 138kV circuit switcher XT8 with a 63 kA circuit breaker. (B3897.1)

**Estimated Cost:** \$1.0M

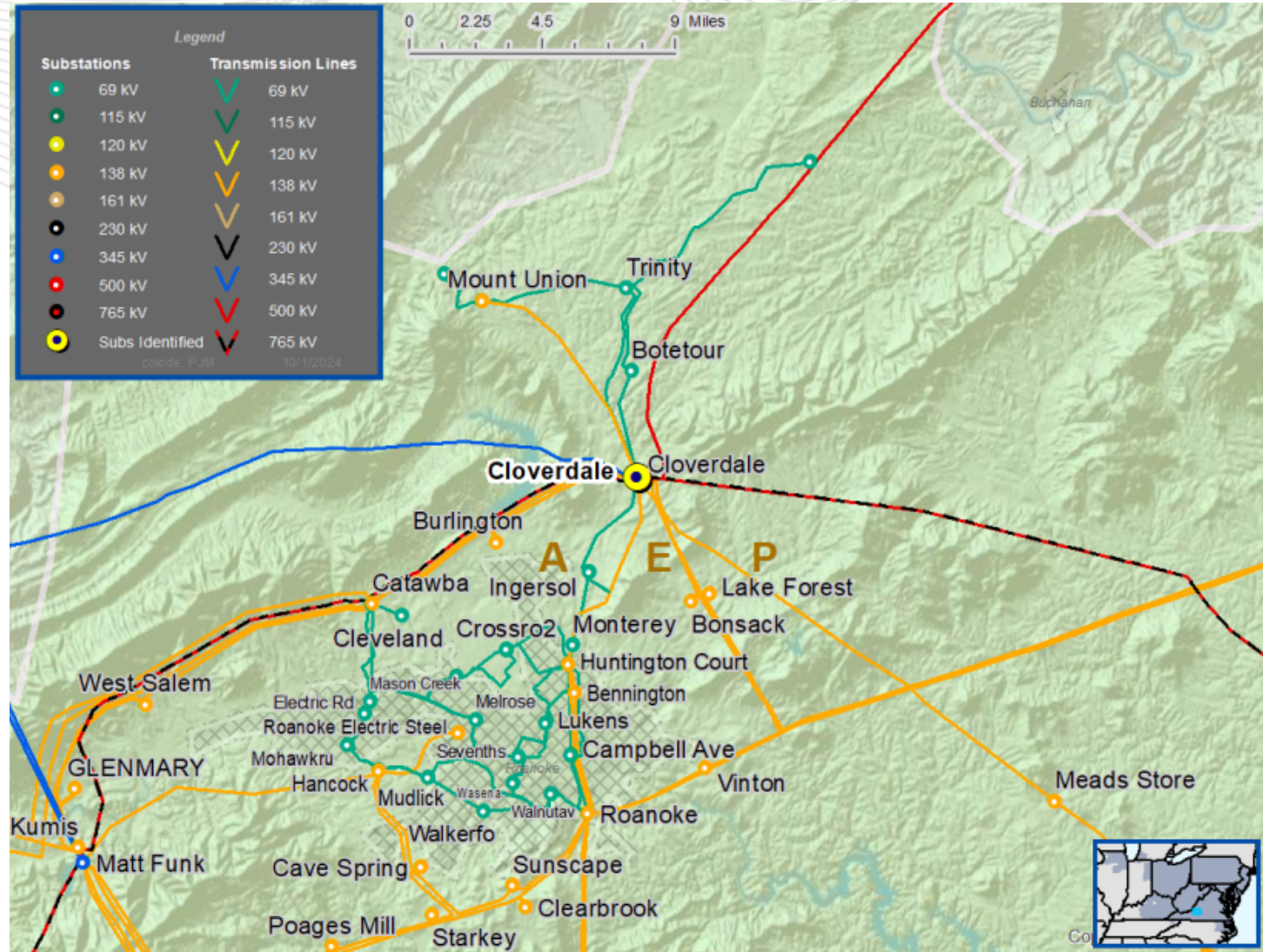
**Preliminary Facility Rating:**

Circuit Breaker	Interrupting Rating (kA)
138kV breaker XT8	63

**Required IS Date:** 6/1/2026

**Projected IS Date:** 6/1/2026

**Previously Presented:** 10/18/2024





# AEP Transmission Zone: Baseline Sunnyside 138kV BB CB Replacement

**Process Stage:** Recommended Solution

**Criteria:** Short Circuit

**Assumption Reference:** 2024 RTEP assumptions

**Model Used for Analysis:** 2026 & 2029 RTEP Short Circuit base cases

**Proposal Window Exclusion:** Below 200kV

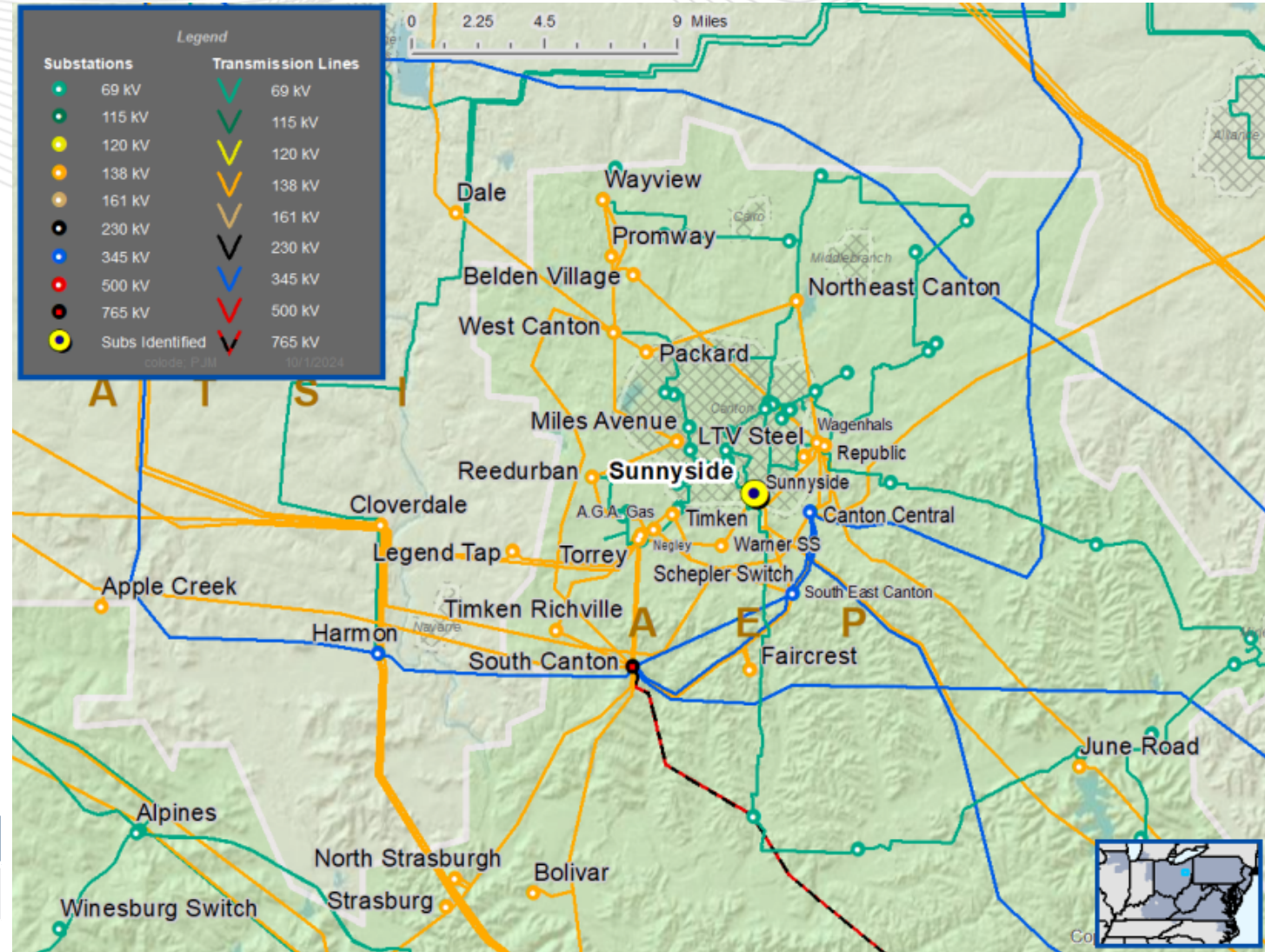
**Problem Statement:**

FG: 2024W1-SC-3

In both 2026 and 2029 RTEP Short Circuit base cases, the Sunnyside 138kV breaker BB is identified as being over duty.

**Existing Facility Rating:**

Circuit Breaker	Interrupting Rating (kA)
138kV breaker BB	40





# AEP Transmission Zone: Baseline Sunnyside 138kV BB CB Replacement

## Recommended Solution:

Replace over duty Sunnyside 138kV circuit breaker BB with a 63 kA circuit breaker. (B3882.1)

**Estimated Cost:** \$1.0M

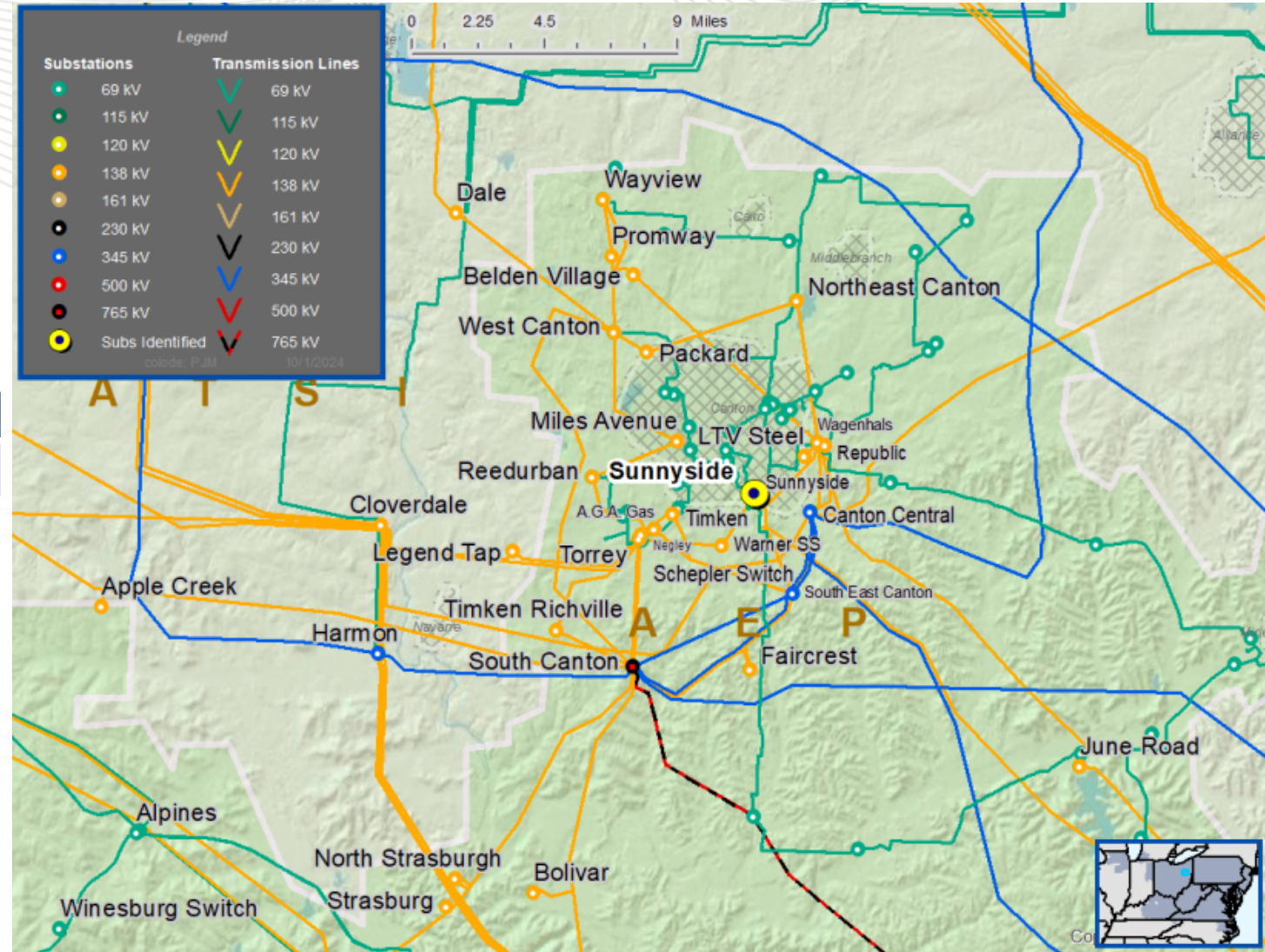
## Preliminary Facility Rating:

Circuit Breaker	Interrupting Rating (kA)
138kV breaker BB	63

**Required IS Date:** 6/1/2026

**Projected IS Date:** 6/1/2026

**Previously Presented:** 10/18/2024





# AEP Transmission Zone: Baseline Greentown 138kV CS-XT5 Circuit Switcher Replacement

**Process Stage:** Recommended Solution

**Criteria:** Short Circuit

**Assumption Reference:** 2024 RTEP assumptions

**Model Used for Analysis:** 2026 & 2029 RTEP Short Circuit base cases

**Proposal Window Exclusion:** Below 200kV

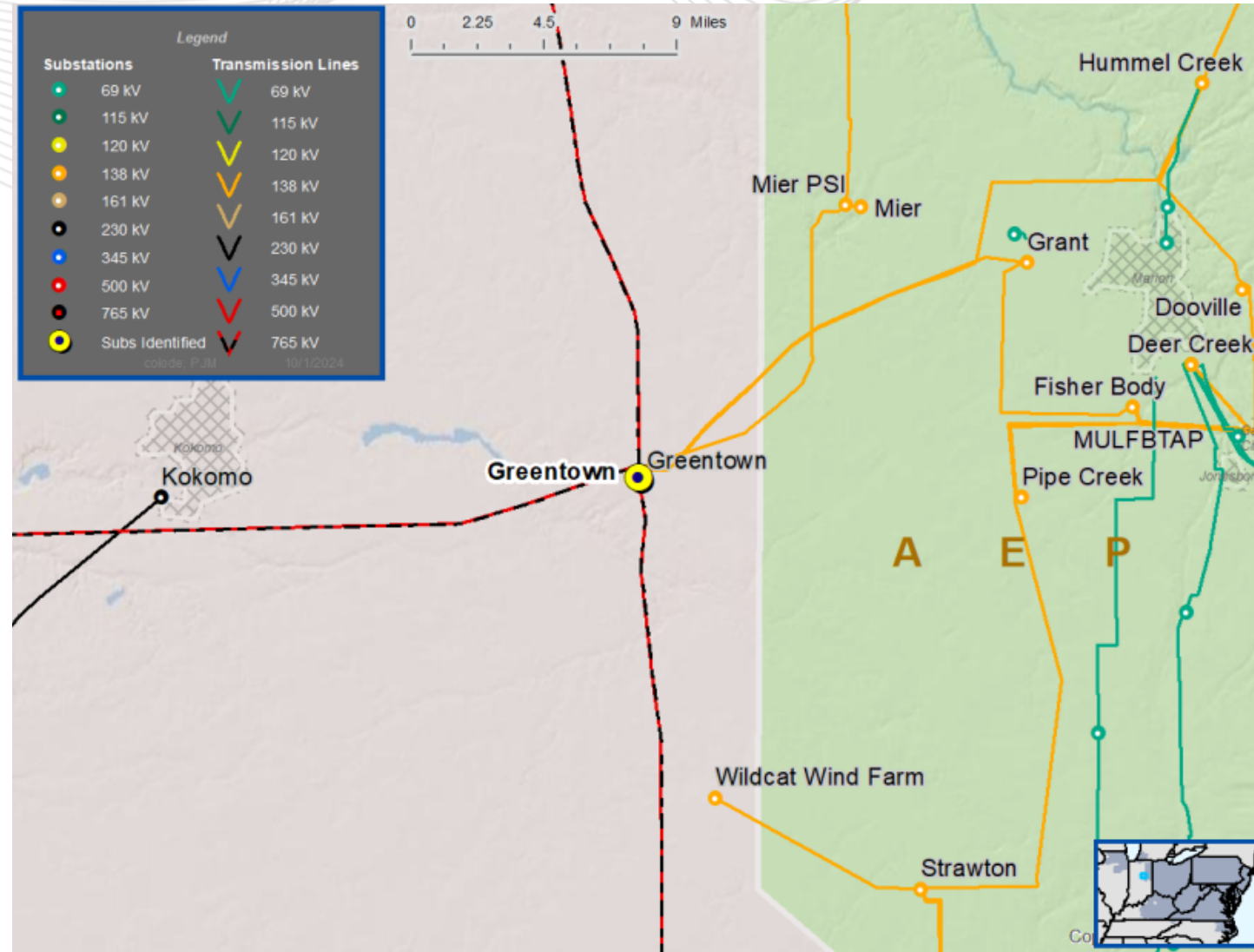
**Problem Statement:**

FG: 2024W1-SC-42

In both 2026 and 2029 RTEP Short Circuit base cases, the Greentown 138kV circuit switcher CS-XT5 is identified as being over duty.

**Existing Facility Rating:**

Circuit Breaker	Interrupting Rating (kA)
138kV breaker CS-XT5	40





# AEP Transmission Zone: Baseline Greentown 138kV CS-XT5 Circuit Switcher Replacement

## Recommended Solution:

Replace over duty Greentown 138kV circuit switcher CS-XT with a 63 kA circuit breaker. (B3887.1))

**Estimated Cost:** \$1.0M

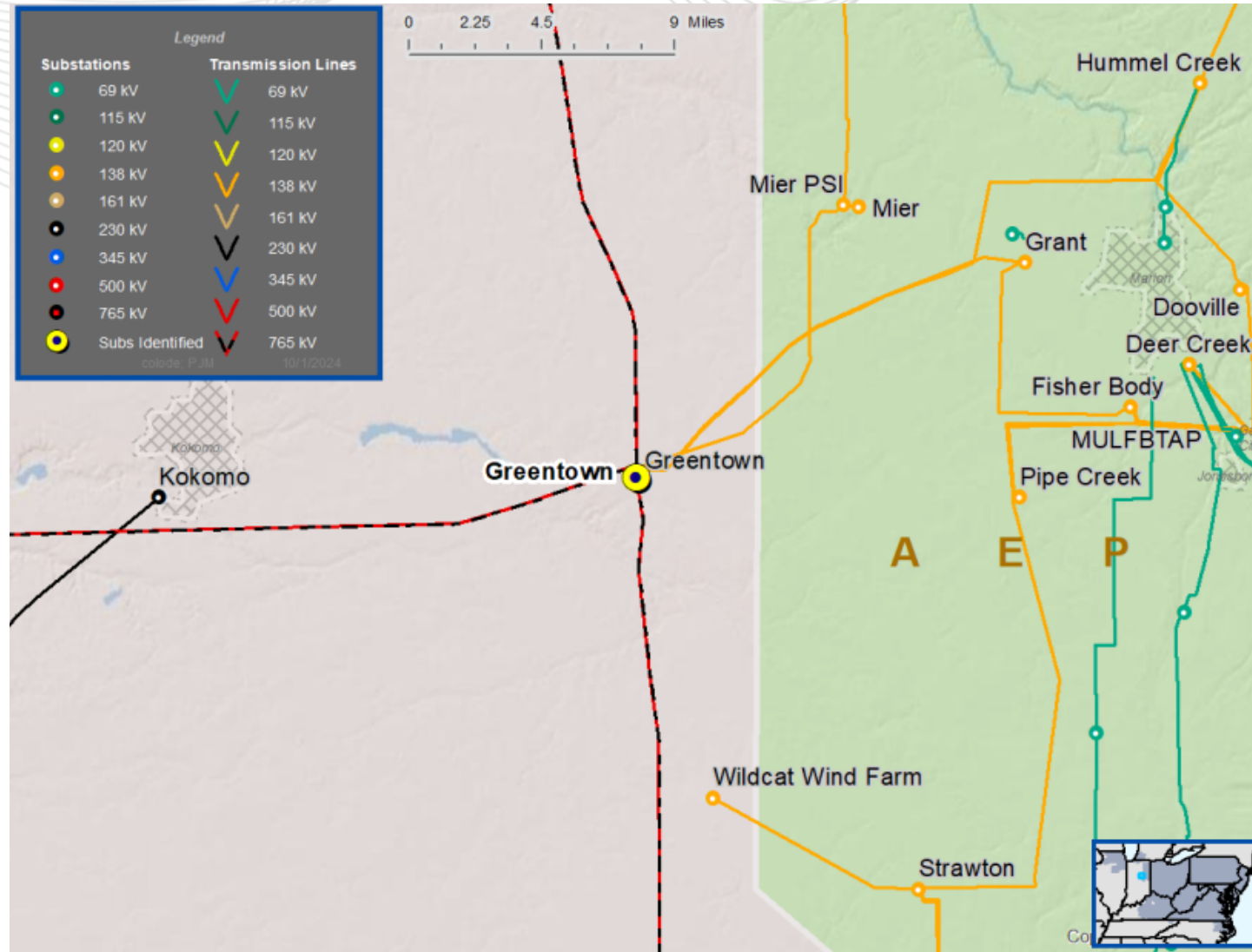
## Preliminary Facility Rating:

Circuit Breaker	Interrupting Rating (kA)
138kV breaker XT8	63

**Required IS Date:** 6/1/2026

**Projected IS Date:** 6/1/2026

**Previously Presented:** 10/18/2024





# AEP Transmission Zone: Baseline Jacksons Ferry 138kV L Circuit Switcher Replacement

**Process Stage:** Recommended Solution

**Criteria:** Short Circuit

**Assumption Reference:** 2024 RTEP assumptions

**Model Used for Analysis:** 2026 & 2029 RTEP Short Circuit base cases

**Proposal Window Exclusion:** Below 200kV

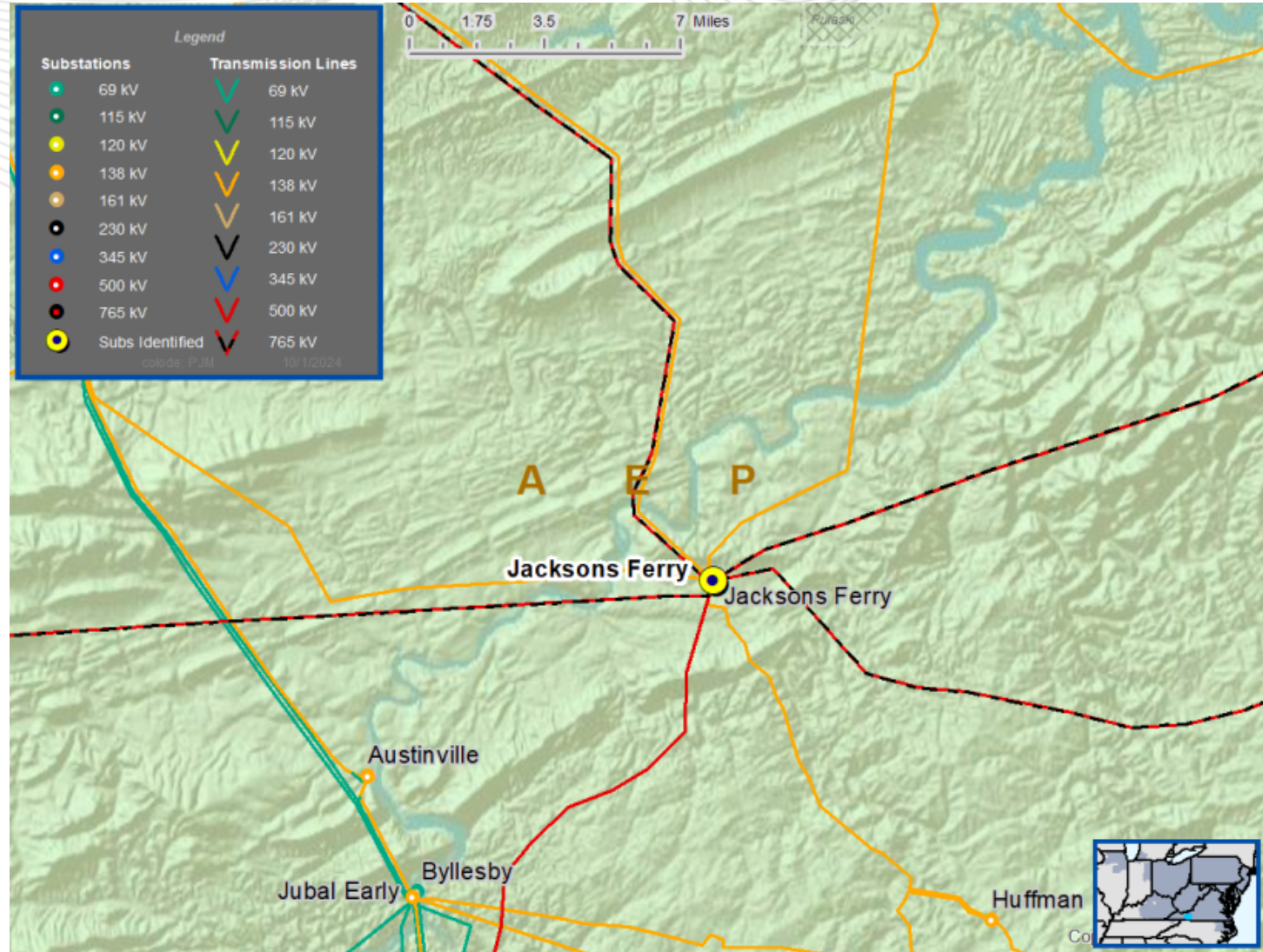
**Problem Statement:**

FG: 2024W1-SC-31

In both 2026 and 2029 RTEP Short Circuit base cases, the Jacksons Ferry 138kV circuit switcher L is identified as being over duty.

**Existing Facility Rating:**

Circuit Breaker	Interrupting Rating (kA)
138kV breaker L	40





# AEP Transmission Zone: Baseline Jacksons Ferry 138kV L Circuit Switcher Replacement

## Proposed Solution:

Replace over duty Jacksons Ferry 138kV circuit switcher L with a 63 kA circuit breaker. (B3895.1)

**Estimated Cost:** \$1.0M

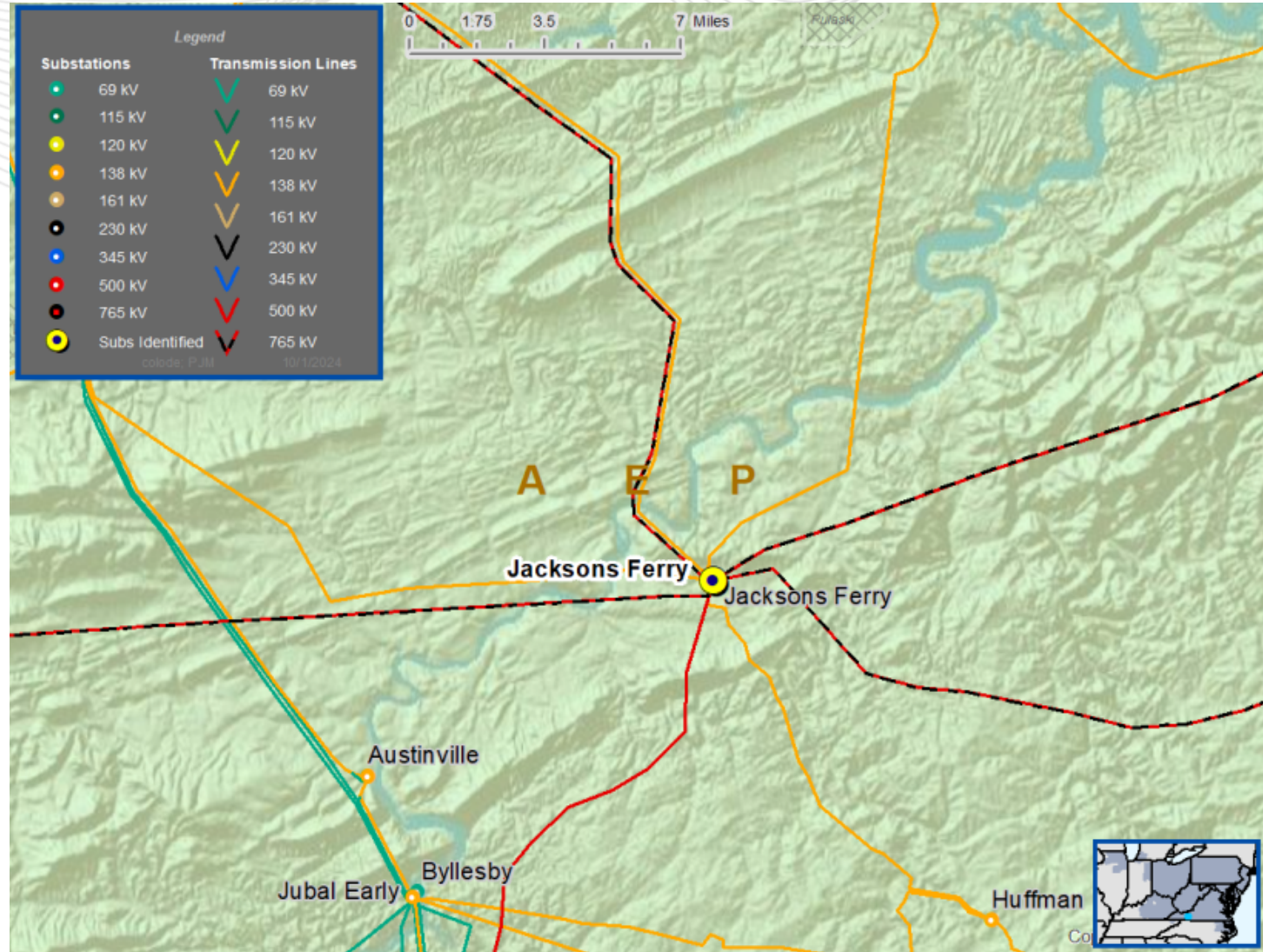
## Preliminary Facility Rating:

Circuit Breaker	Interrupting Rating (kA)
138kV breaker L	63

**Required IS Date:** 6/1/2026

**Projected IS Date:** 6/1/2026

**Previously Presented:** 10/18/2024





# AEP Transmission Zone: Baseline Hartford Transformer Tap Change Replacement

**Process Stage:** Recommended Solution

**Criteria:** TO 715 Criteria Violation

**Assumption Reference:** 2024 RTEP assumptions

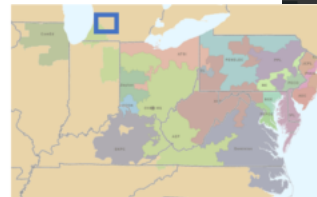
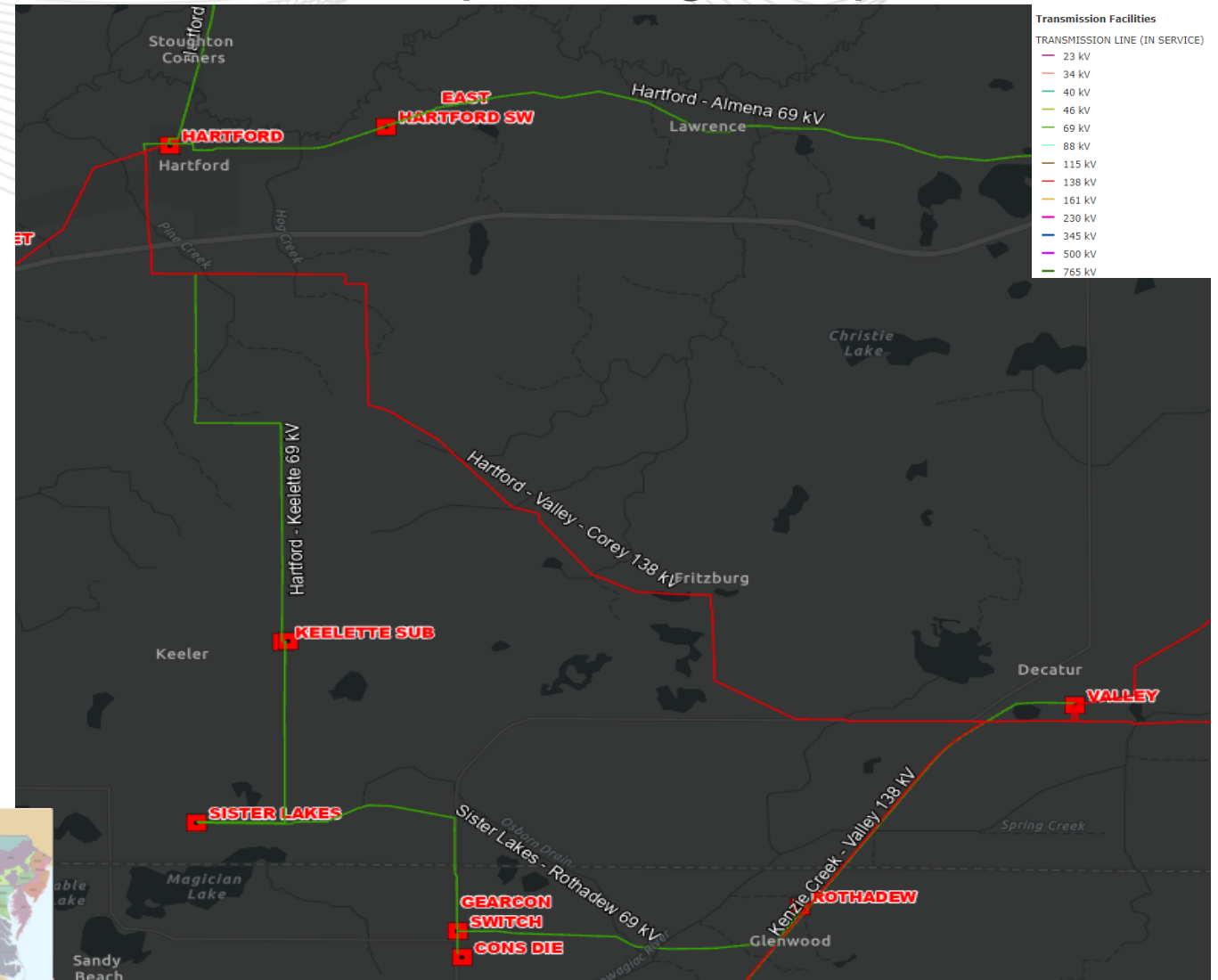
**Model Used for Analysis:** 2024 RTEP Light Load base case

**Proposal Window Exclusion:** Below 200kV

## Problem Statement:

FGs: 2024-W1-AEP-VM27, 2024-W1-AEP-VM28, 2024-W1-AEP-VM29

In the 2029 RTEP Light load case, AEP identified high voltage violations at Hartford, Keelette Switch and Sister Lakes 34.5kV buses for a single contingency.







# AEP Transmission Zone: Baseline Hartford Transformer Tap Change Replacement

## Proposed Solution:

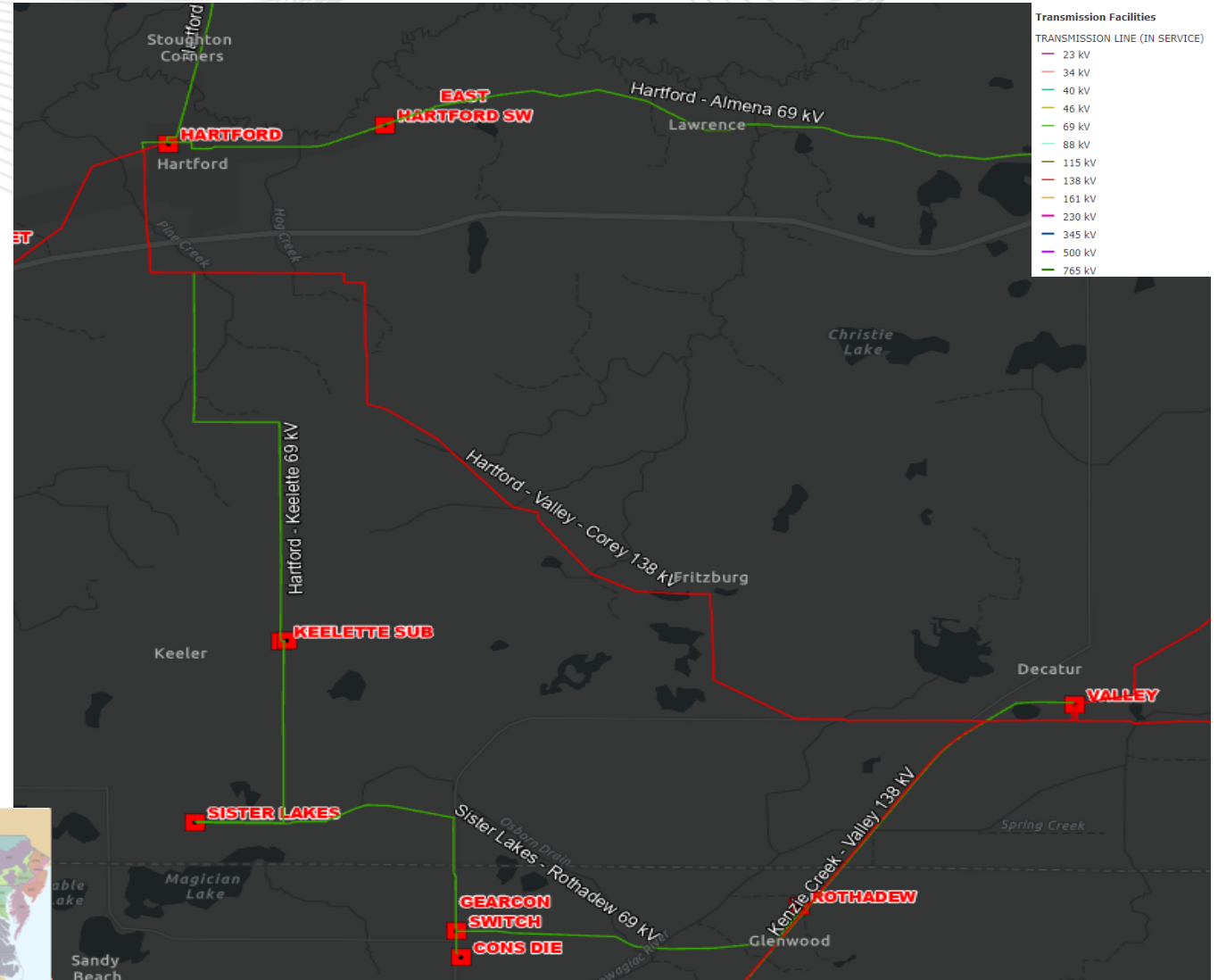
Adjust the tertiary tap on the Hartford 138/69/34.5 kV transformer 1 and on Hartford 138/69/12 kV transformer 4 to eliminate the high voltage issues and avoid circulating current (B3872.1)

**Estimated Cost:** \$0.1M

**Required IS Date:** 4/15/2029

**Projected IS Date:** 6/1/2026

**Previously Presented:** 10/18/2024





# AEP Transmission Zone: Baseline Benwood 69kV A CB Replacement

**Process Stage:** Recommended Solution

**Criteria:** TO 715 Criteria Violation

**Assumption Reference:** 2024 RTEP assumptions

**Model Used for Analysis:** 2026 & 2029 RTEP Short Circuit base cases

**Proposal Window Exclusion:** Below 200kV

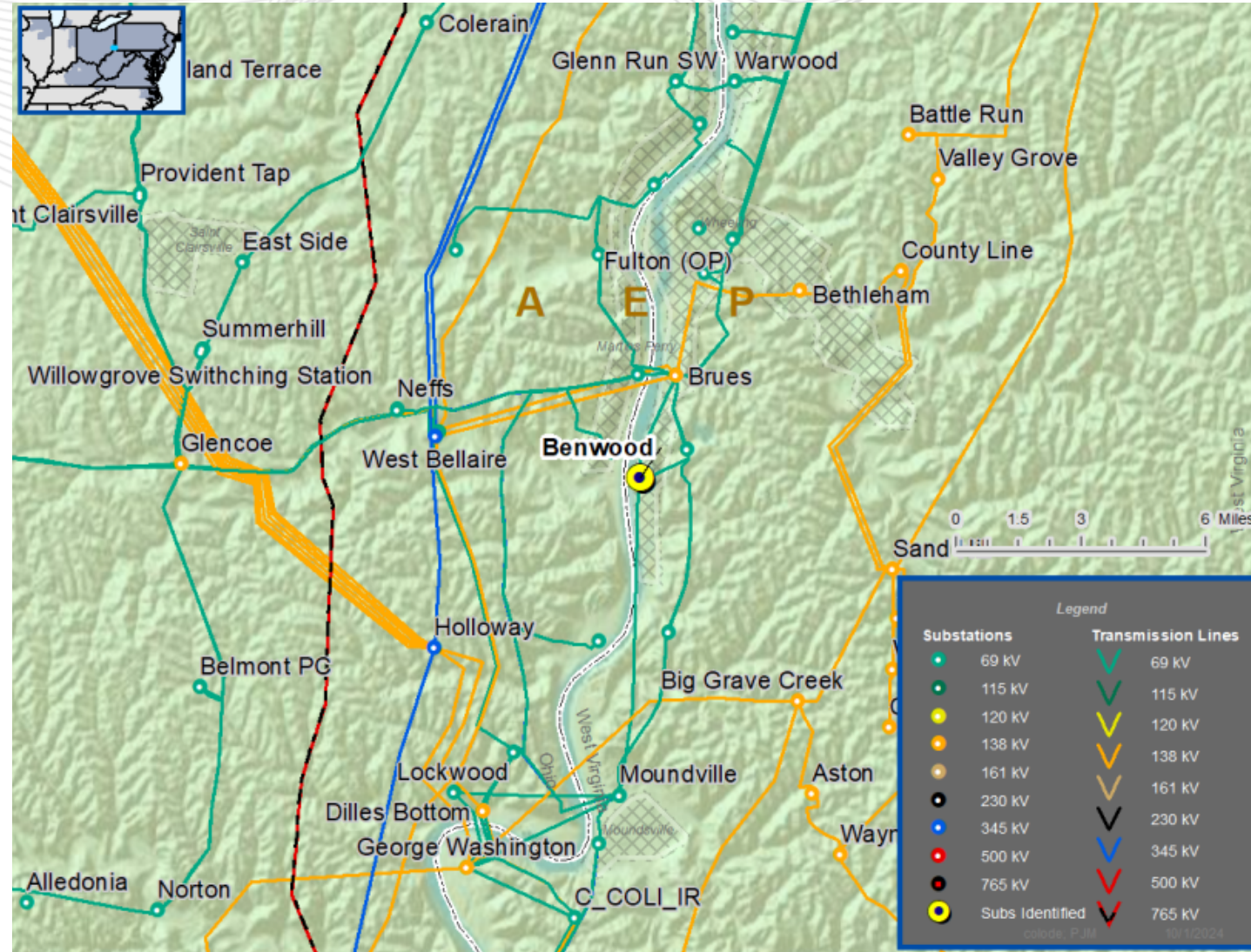
**Problem Statement:**

FG: 2024W1-AEP-SC2

In both 2026 and 2029 RTEP Short Circuit base cases, the Benwood 69kV breaker A is identified under FERC Form 715 as being over duty.

**Existing Facility Rating:**

Circuit Breaker	Interrupting Rating (kA)
69kV breaker A	12.6





# AEP Transmission Zone: Baseline Benwood 69kV A CB Replacement

## Proposed Solution:

Replace over duty Benwood 69kV circuit breaker A with a 40 kA circuit breaker. (B3886.1)

**Estimated Cost:** \$1.0M

**Preliminary Facility Rating:**

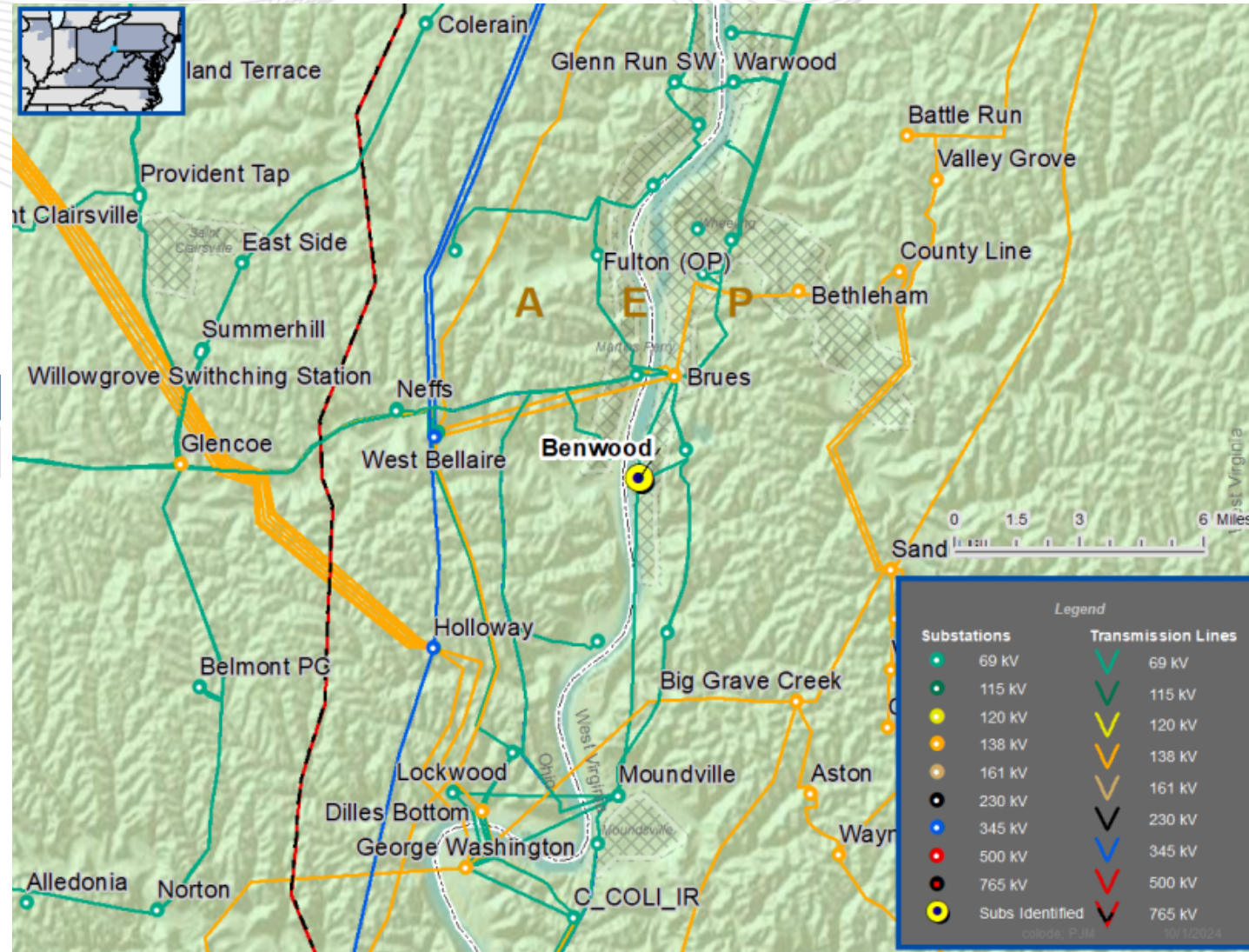
Circuit Breaker	Interrupting Rating (kA)
69kV breaker A	40

**Ancillary Benefits:** Circuit breaker 'A' at Benwood station is an oil breaker of FK type that was originally manufactured in 1965.

**Required IS Date:** 6/1/2026

**Projected IS Date:** 6/1/2026

**Previously Presented:** 10/18/2024





# AEP Transmission Zone: Baseline Van Wert 69kV D CB Replacement

**Process Stage:** Recommended Solution

**Criteria:** TO 715 Criteria Violation

**Assumption Reference:** 2024 RTEP assumptions

**Model Used for Analysis:** 2026 & 2029 RTEP Short Circuit base cases

**Proposal Window Exclusion:** Below 200kV

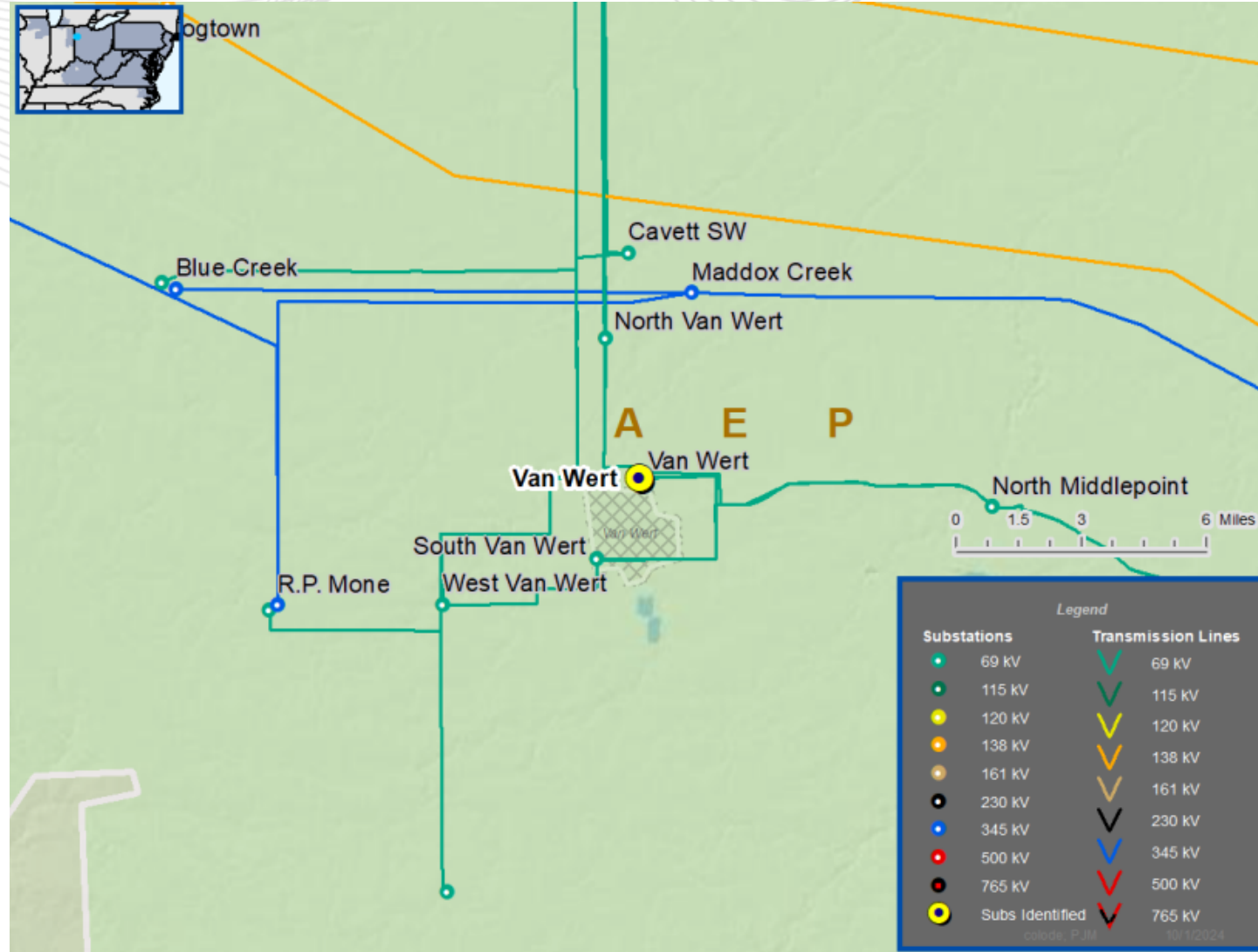
**Problem Statement:**

FG: 2024W1-AEP-SC3

In both 2026 and 2029 RTEP Short Circuit base cases, the Van Wert 69kV breaker D is identified under FERC Form 715 as being over duty.

**Existing Facility Rating:**

Circuit Breaker	Interrupting Rating (kA)
69kV breaker D	8.82





# AEP Transmission Zone: Baseline Van Wert 69kV D CB Replacement

## Recommended Solution:

Replace the over duty Van Wert 69kV circuit breaker D with a 40 kA circuit breaker. (B3884.1)

**Estimated Cost:** \$1.0M

## Preliminary Facility Rating:

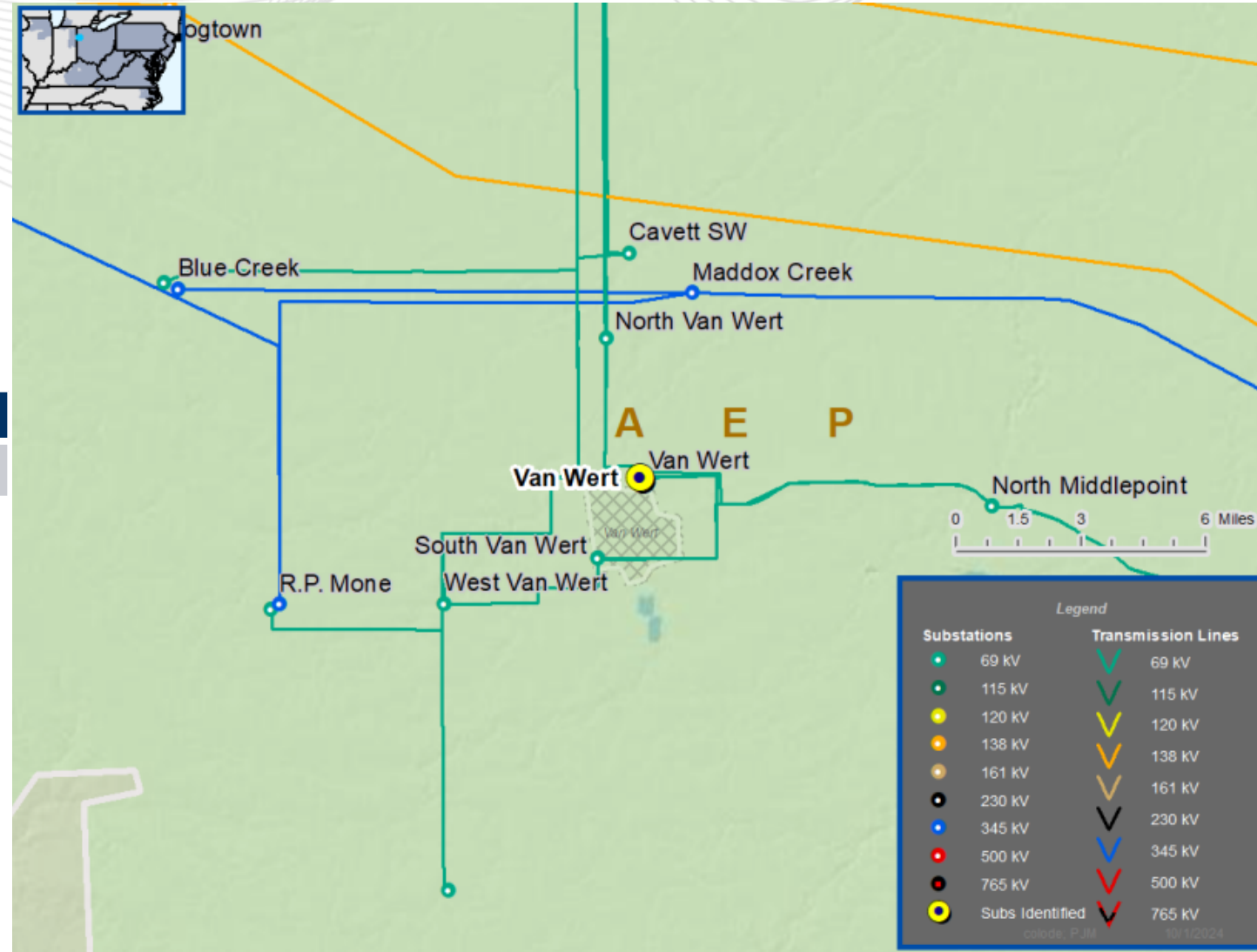
Circuit Breaker	Interrupting Rating (kA)
69kV breaker D	40

**Ancillary Benefits:** Replaces a 1950s FK type oil breaker

**Required IS Date:** 6/1/2026

**Projected IS Date:** 6/1/2026

**Previously Presented:** 10/18/2024





# AEP Transmission Zone: Baseline Mount Vernon 69kV A and S CB Replacements

**Process Stage:** Recommended Solution

**Criteria:** TO 715 Criteria Violation

**Assumption Reference:** 2024 RTEP assumptions

**Model Used for Analysis:** 2026 & 2029 RTEP Short Circuit base cases

**Proposal Window Exclusion:** Below 200kV

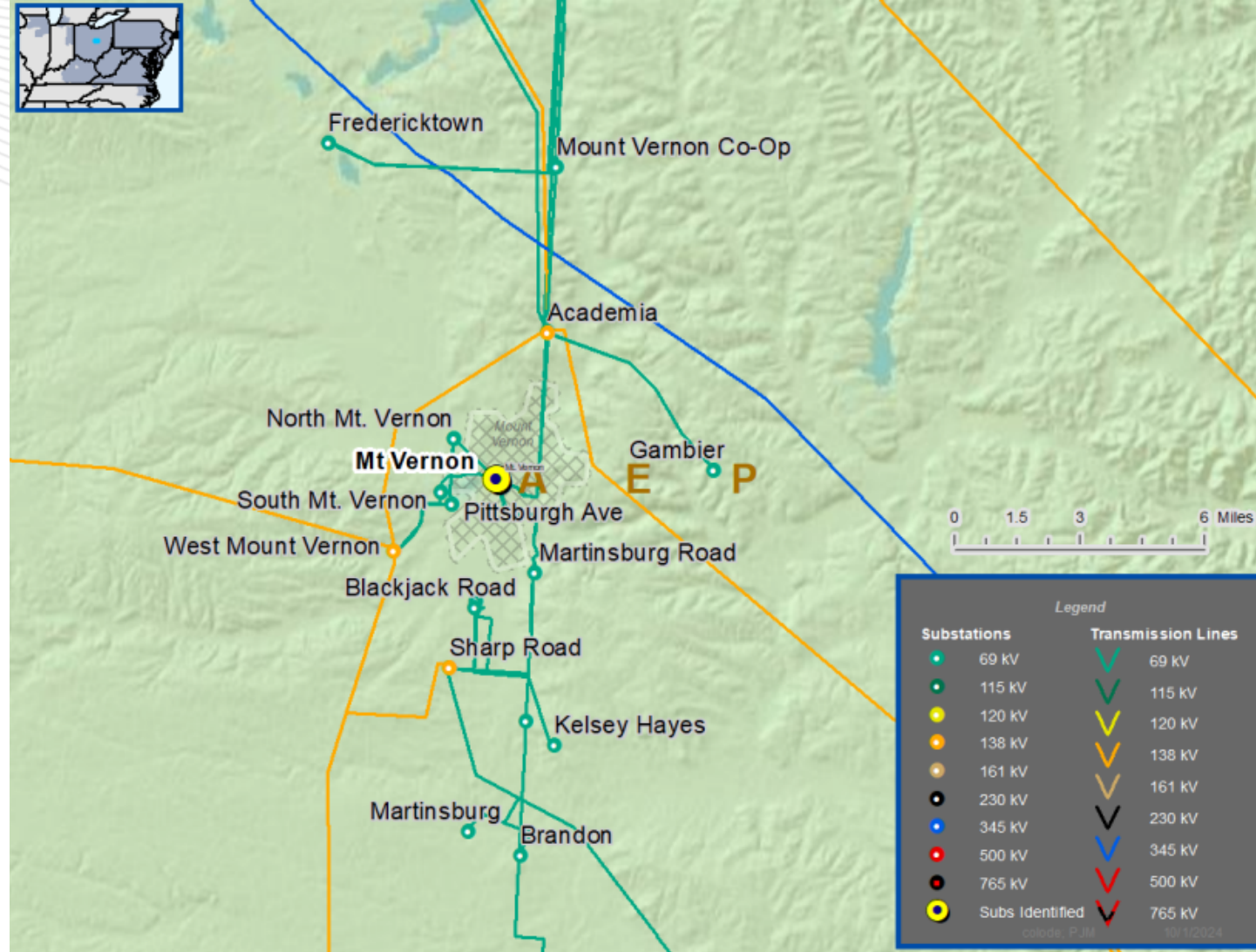
**Problem Statement:**

FGs: 2024W1-AEP-SC4, -SC5

In both 2026 and 2029 RTEP Short Circuit base cases, the Mount Vernon 69kV breakers A and S are identified under FERC Form 715 as being over duty.

**Existing Facility Rating:**

Circuit Breaker	Interrupting Rating (kA)
69kV breaker A	12.6
69kV breaker S	10





# AEP Transmission Zone: Baseline Mount Vernon 69kV A and S CB Replacements

## Recommended Solution:

Replace over duty Mount Vernon 69kV circuit breakers A and S with 40 kA circuit breakers. (B3892.1)

**Estimated Cost:** \$2.0M

## Preliminary Facility Rating:

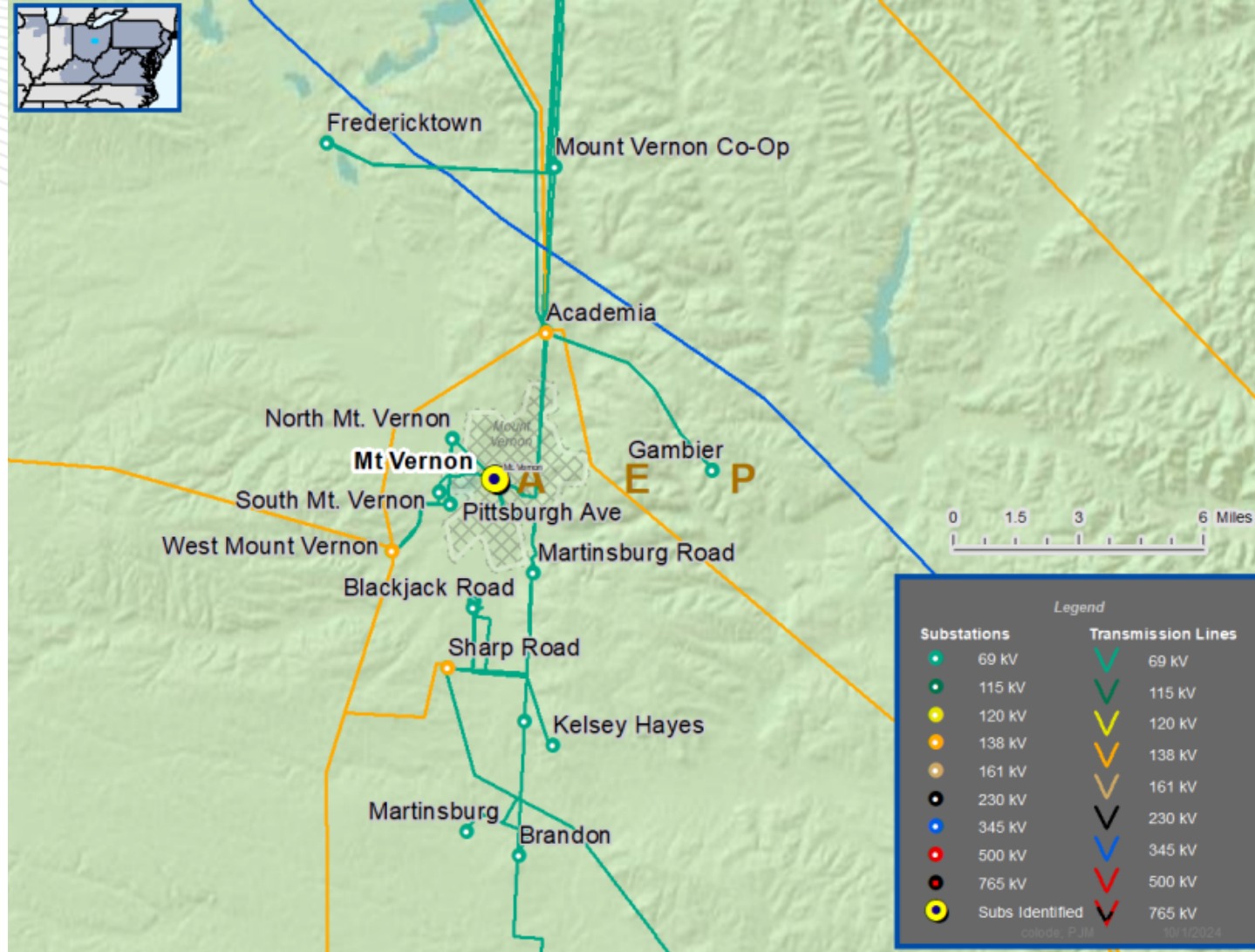
Circuit Breaker	Interrupting Rating (kA)
69kV breaker A	40
69kV breaker S	40

**Ancillary Benefits:** Solution proposes to replace FK type oil breakers manufactured in the 1950's.

**Required IS Date:** 6/1/2026

**Projected IS Date:** 6/1/2026

**Previously Presented:** 10/18/2024





# AEP Transmission Zone: Baseline Schroyer Avenue 69kV M and N CB Replacements

**Process Stage:** Recommended Solution

**Criteria:** TO 715 Criteria Violation

**Assumption Reference:** 2024 RTEP assumptions

**Model Used for Analysis:** 2026 & 2029 RTEP Short Circuit base cases

**Proposal Window Exclusion:** Below 200kV

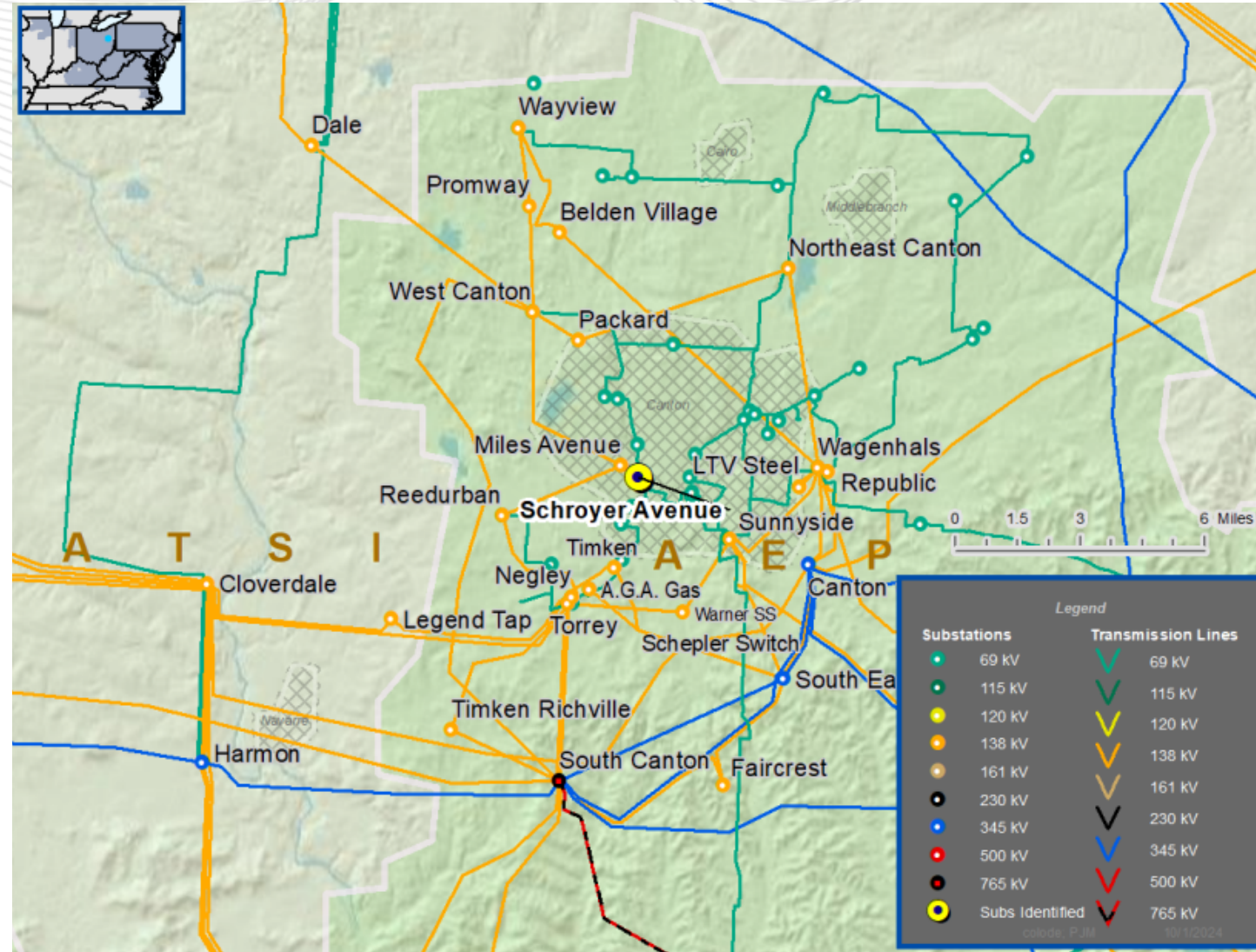
**Problem Statement:**

FGs: 2024W1-AEP-SC6, -SC7

In both 2026 and 2029 RTEP Short Circuit base case, the Schroyer Avenue 69kV breakers M and N are identified under FERC Form 715 as being over duty.

**Existing Facility Rating:**

Circuit Breaker	Interrupting Rating (kA)
69kV breaker A	21
69kV breaker S	19







# AEP Transmission Zone: Baseline Schroyer Avenue 69kV M and N CB Replacements

## Recommended Solution:

Replace over duty Schroyer Avenue 69kV circuit breakers M and N with 40 kA circuit breakers. (B3885.1)

**Estimated Cost:** \$2.0M

## Preliminary Facility Rating:

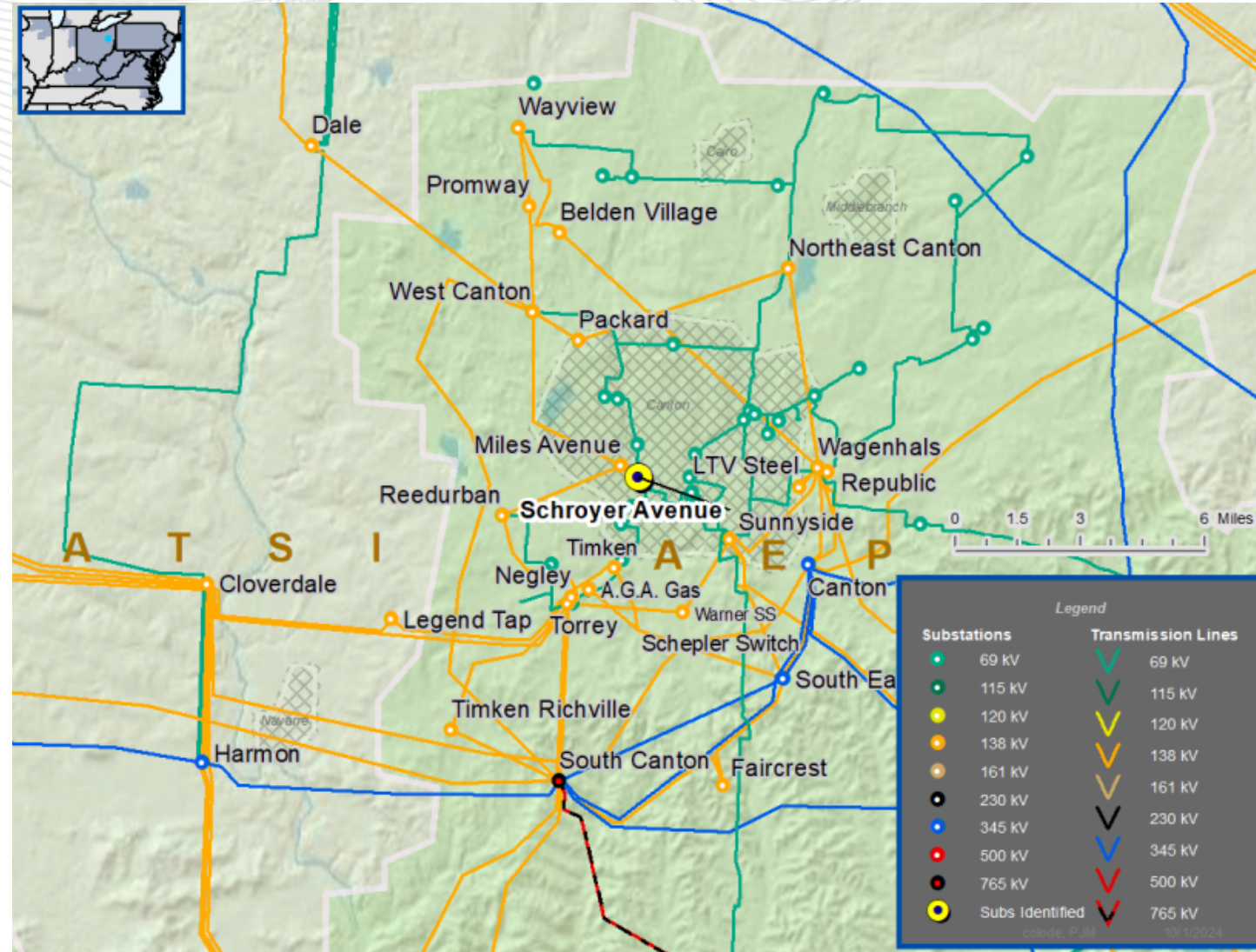
Circuit Breaker	Interrupting Rating (kA)
69kV breaker M	40
69kV breaker N	40

**Ancillary Benefits:** Replaces two oil breakers from the 1960s

**Required IS Date:** 6/1/2026

**Projected IS Date:** 6/1/2026

**Previously Presented:** 10/18/2024





# AEP Transmission Zone: Baseline Greenleaf Cap Bank

**Process Stage:** Recommended Solution

**Criteria:** TO 715 Criteria Violation

**Assumption Reference:** 2024 RTEP assumptions

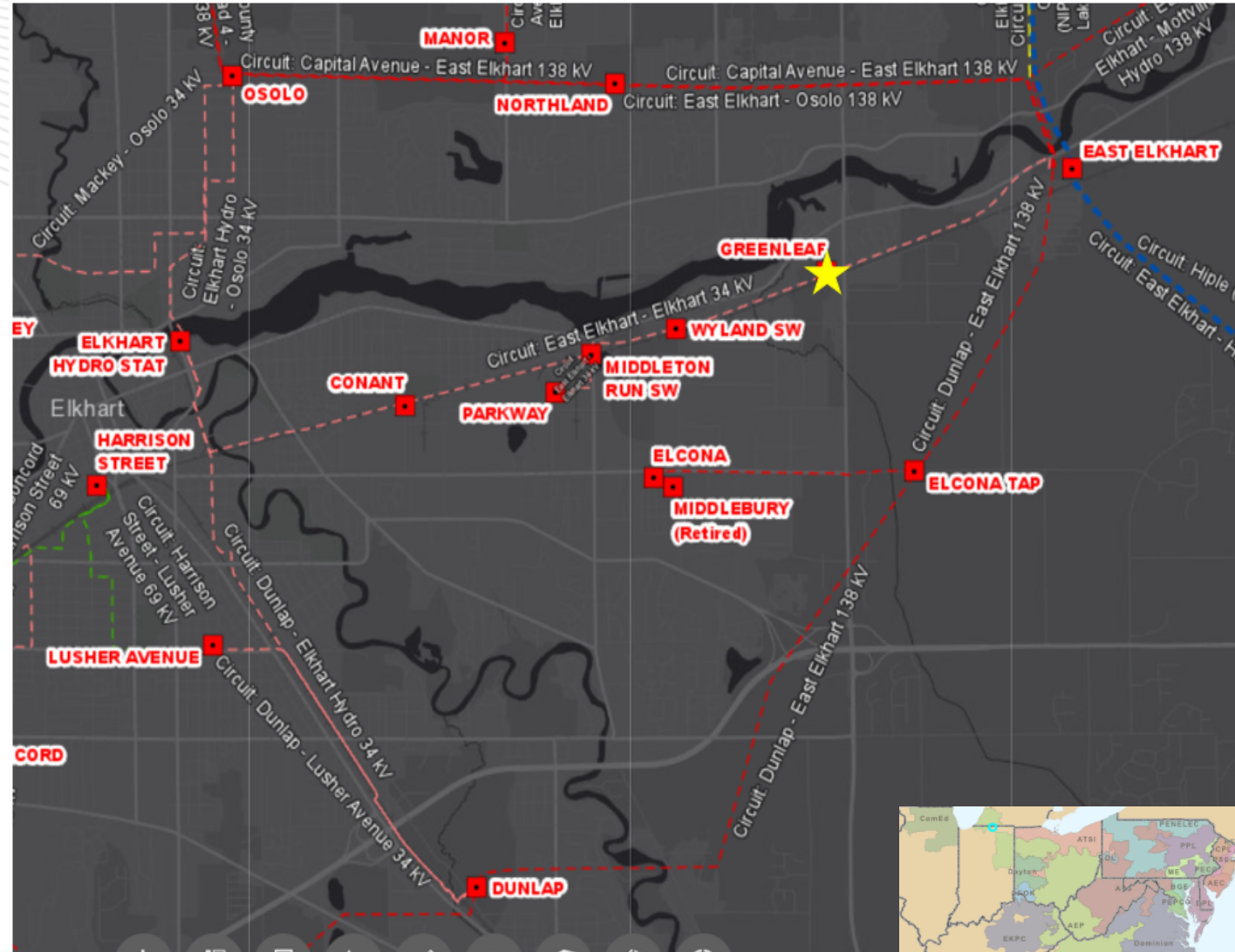
**Model Used for Analysis:** 2029 RTEP Summer base case

**Proposal Window Exclusion:** Below 200kV

**Problem Statement:**

FGs: 2024-W1-AEP-VD1 through VD6

In the 5-year 2029 RTEP Summer base case, the Greenleaf, Conant, Middlebury, Wyland, Parkway, and Middleton Run 34.5kV buses have voltage drop violations for a N-1-1 contingency pair.





# AEP Transmission Zone: Baseline Greenleaf Cap Bank

## Recommended Solution:

Install a 34.5 kV 12 MVAR cap bank and a 45 kA circuit breaker at Greenleaf. (B3873.1)

Estimated Cost: \$1.314M

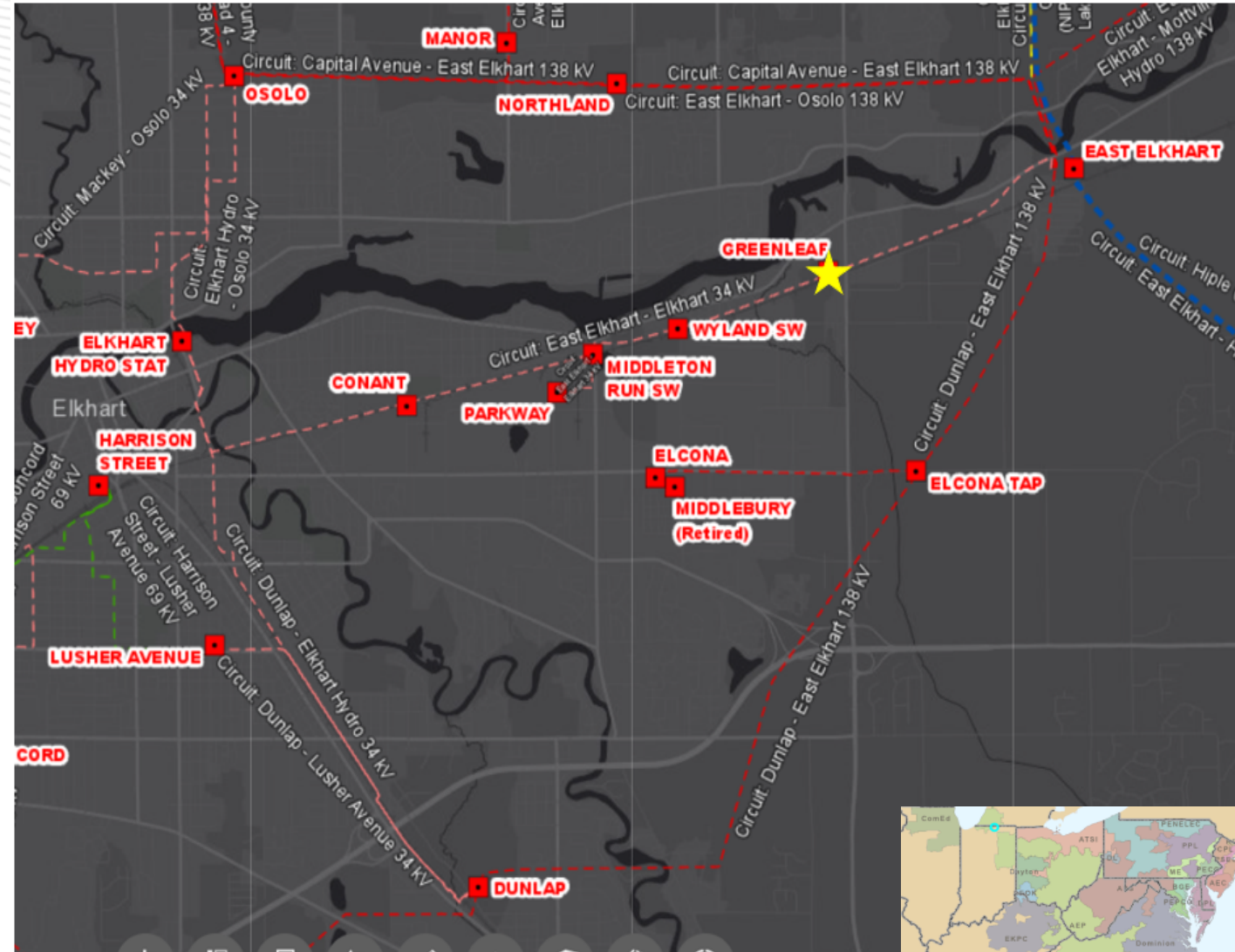
## Preliminary Facility Rating:

Circuit Breaker	Interrupting Rating (kA)
34.5kV cap breaker	45

Required IS Date: 6/1/2029

Projected IS Date: 6/1/2029

Previously Presented: 10/18/2024





# AEP Transmission Zone: Baseline Firebrick – Jefferson 69kV Reconductor

**Process Stage:** Recommended Solution

**Criteria:** TO 715 Criteria Violation

**Assumption Reference:** 2024 RTEP assumptions

**Model Used for Analysis:** 2029 RTEP Summer base case

**Proposal Window Exclusion:** Below 200kV

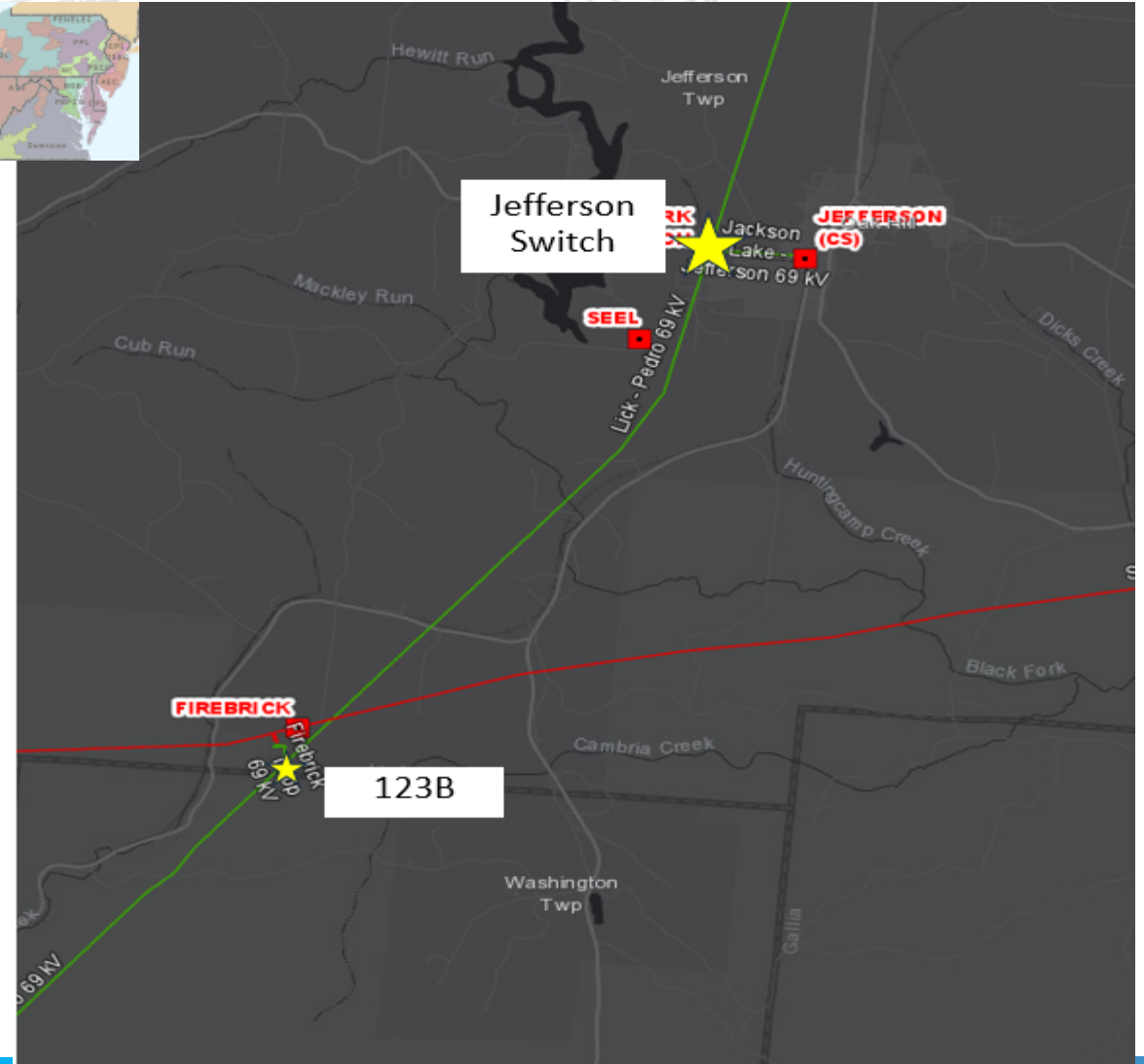
**Problem Statement:**

FGs: 2024W1-AEP-T11 through T13

In the 5-year 2029 RTEP Summer base case, the Firebrick-Jefferson Switch 69 kV branch is overloaded under for multiple N-1-1 contingency pairs.

**Existing Facility Rating:**

Branch	SN/SE/WN/WE (MVA)
Firebrick - Jefferson (69KV)	50/50/63/63





# AEP Transmission Zone: Baseline Firebrick – Jefferson 69kV Reconductor

## Recommended Solution:

Reconductor ~3.95 miles of ACSR 6/1 Penguin (4/0) on the Firebrick-Jefferson Switch 69 kV branch with ACSR 556.6 26/7. Remote End (Line protection settings) would need to be updated at Firebrick and Lick. Replace 600A Switches at Jefferson and replace 477 AA 19 sub conductor at Firebrick. (B3875.1)

**Estimated Cost:** \$8.5M

## Preliminary Facility Rating:

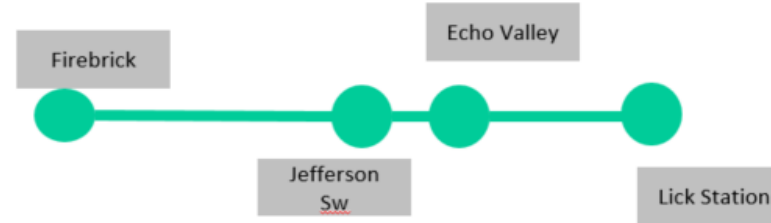
Branch	SN/SE/WN/WE (MVA)
Firebrick - Jefferson (69kV)	102/129/129/135

**Required IS Date:** 6/1/2029

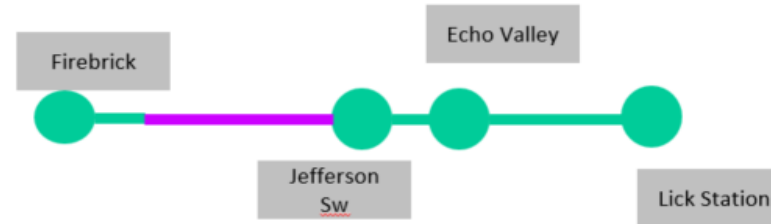
**Projected IS Date:** 4/1/2029

**Previously Presented:** 10/18/2024

## Existing:



## Proposed:



Legend	
500 kV	
345 kV	
138 kV	
69 kV	
34.5 kV	
23 kV	
New	



# AEP Transmission Zone: Baseline Richlands Cap 69kV Bank Installation

**Process Stage:** Recommended Solution

**Criteria:** TO 715 Criteria Violation

**Assumption Reference:** 2024 RTEP assumptions

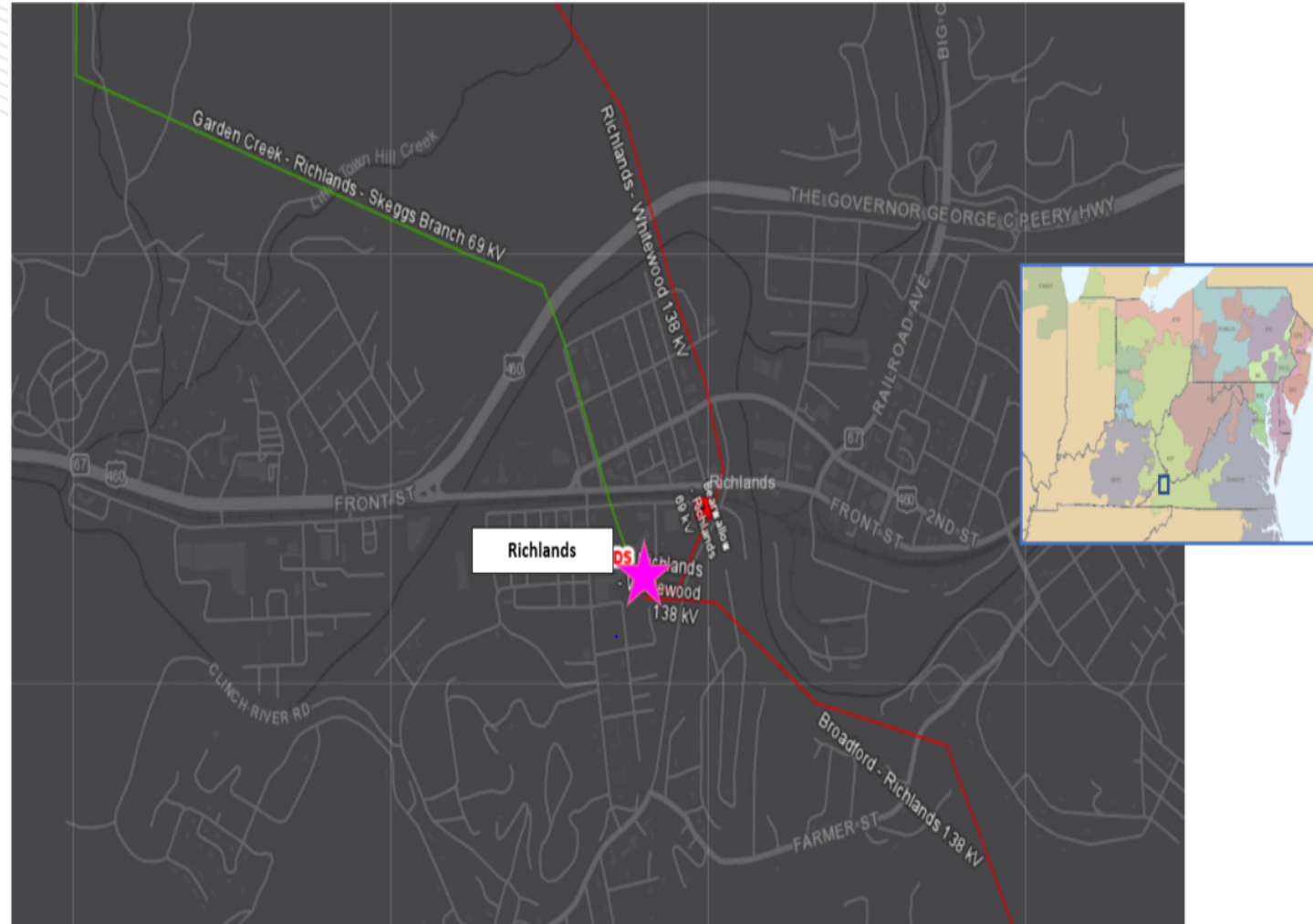
**Model Used for Analysis:** 2029 RTEP Winter base case

**Proposal Window Exclusion:** Below 200kV

**Problem Statement:**

FGs: 2024W1-AEP-VD45, 2024W1-AEP-VD46

In the 5-year 2029 RTEP Winter base case, the voltage drop violations at Richlands and Town of Richlands stations are identified under for a N-1-1 contingency pair.





# AEP Transmission Zone: Baseline Richlands 69kV Cap Bank Installation

## Recommended Solution:

Install a 69kV 11.5MVar capacitor bank at Richlands station with a circuit switcher. (B3876.1)

**Estimated Cost:** \$1.0M

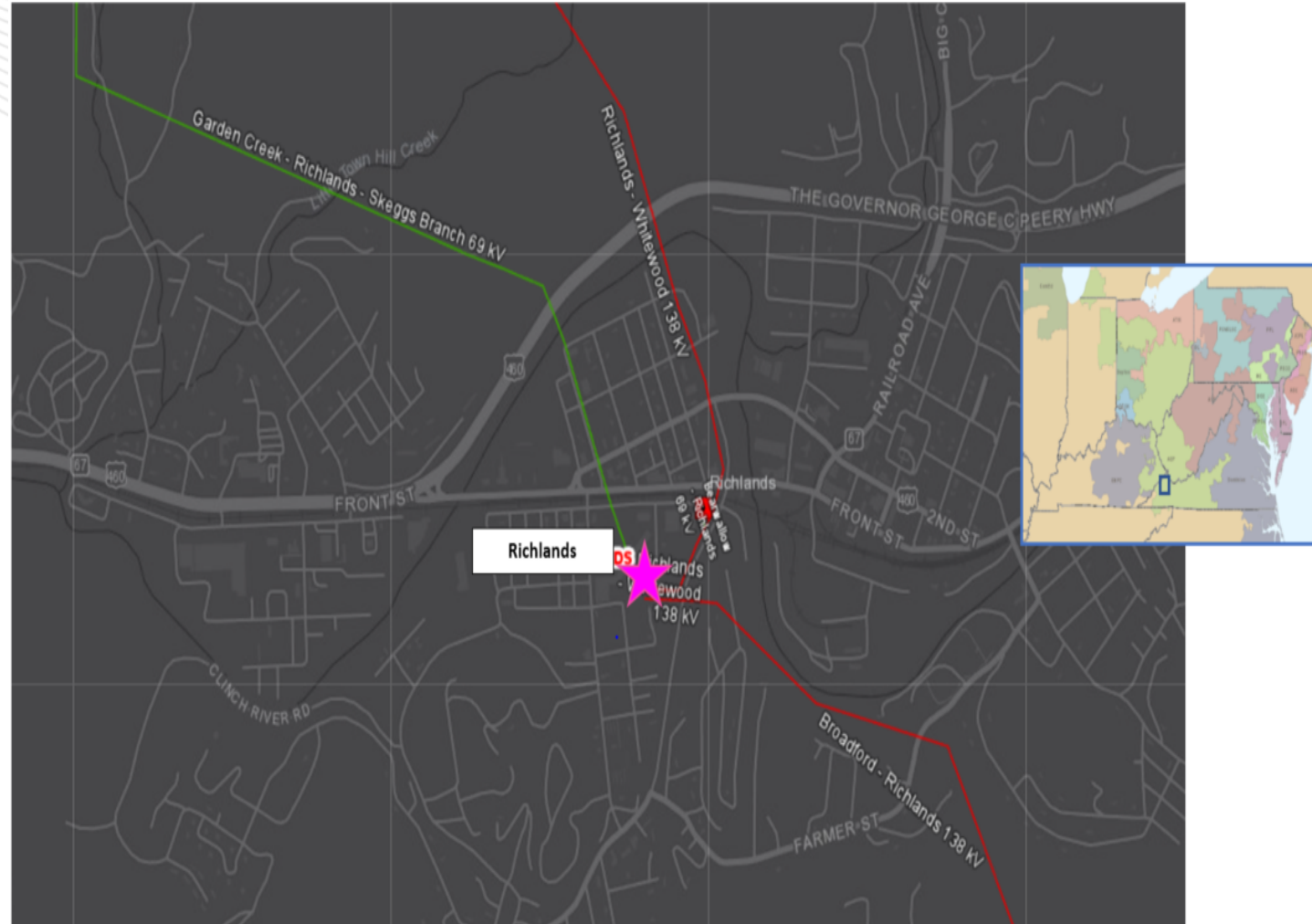
**Preliminary Facility Rating:**

Circuit Switcher	Capacity (KA)
Richlands 69kV circuit switcher EE	40

**Required IS Date:** 12/1/2029

**Projected IS Date:** 12/1/2029

**Previously Presented:** 10/18/2024





# AEP Transmission Zone: Baseline Toronto – South Toronto Tap 69kV Reconductor

**Process Stage:** Recommended Solution

**Criteria:** TO 715 Criteria Violation

**Assumption Reference:** 2024 RTEP assumptions

**Model Used for Analysis:** 2029 RTEP Summer base case

**Proposal Window Exclusion:** Below 200kV

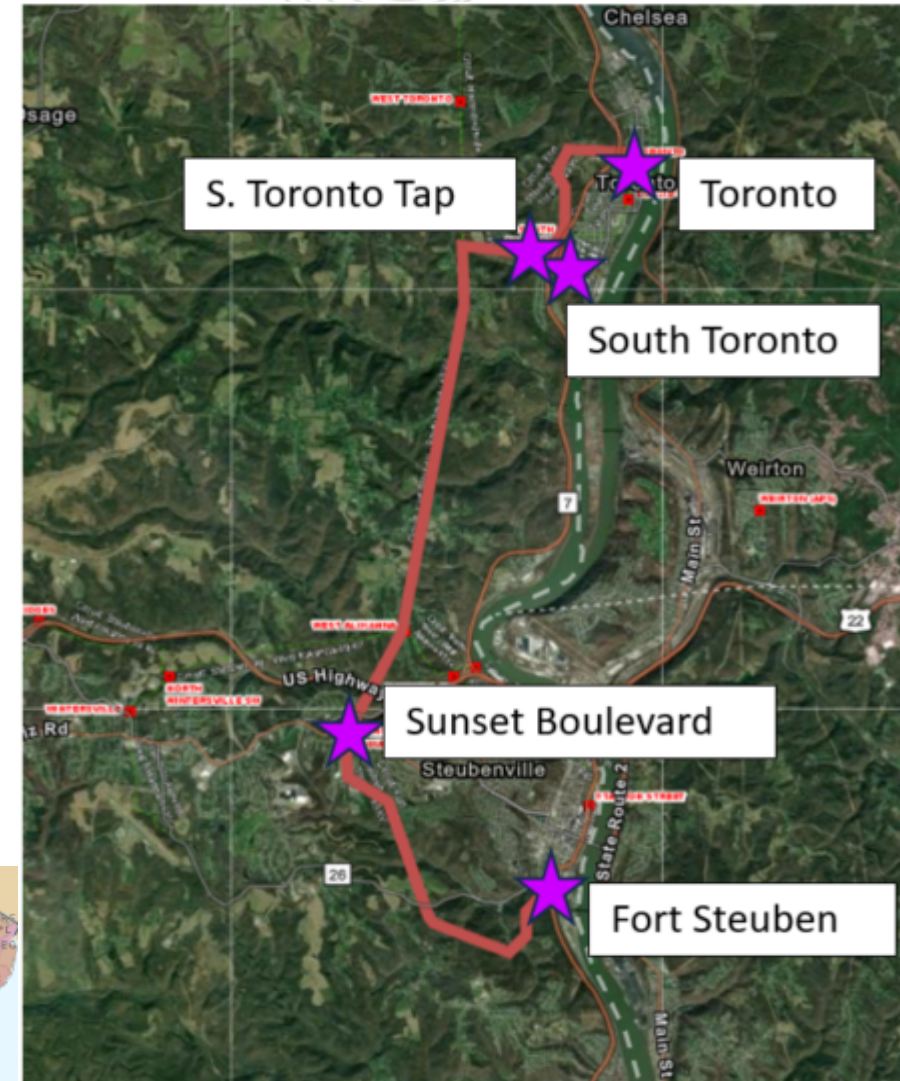
**Problem Statement:**

FG: 2024-W1-AEP-T8

In the 5-year 2029 RTEP Summer base case, the line section between South Toronto station and the South Toronto Tap 69 kV is overloaded under for a N-2 contingency.

**Existing Facility Rating:**

Branch	SN/SE/WN/WE (MVA)
South Toronto - South Toronto (138)	50/50/63/63
South Toronto - South Toronto Tap (69)	50/50/63/63







# AEP Transmission Zone: Baseline Toronto – South Toronto Tap 69kV Reconductor

## Recommended Solution:

Replace line conductor, ~0.11 miles of 4/0 ACSR 6/1 conductor with 556.5 26/7 between South Toronto and the South Toronto Tap .

(B3879.1) **Estimated Cost: 0.50M**

Upgrade the wave trap, CCVTs, switches, and station conductor at South Toronto station currently limiting the line to South Toronto Tap.

(B3879.2) **Estimated Cost: 0.60M**

**Total Estimated Cost: \$1.1M**

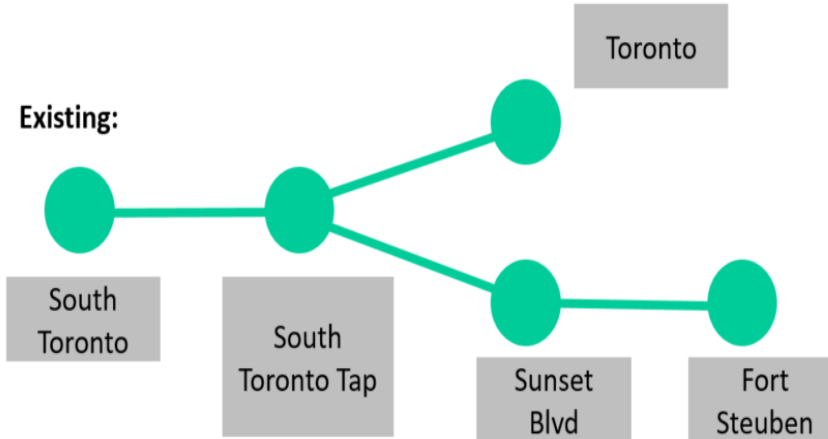
## Preliminary Facility Rating:

Branch	SN/SE/WN/WE (MVA)
South Toronto - South Toronto (138)	151/151/196/196
South Toronto - South Toronto Tap (69)	151/151/196/196

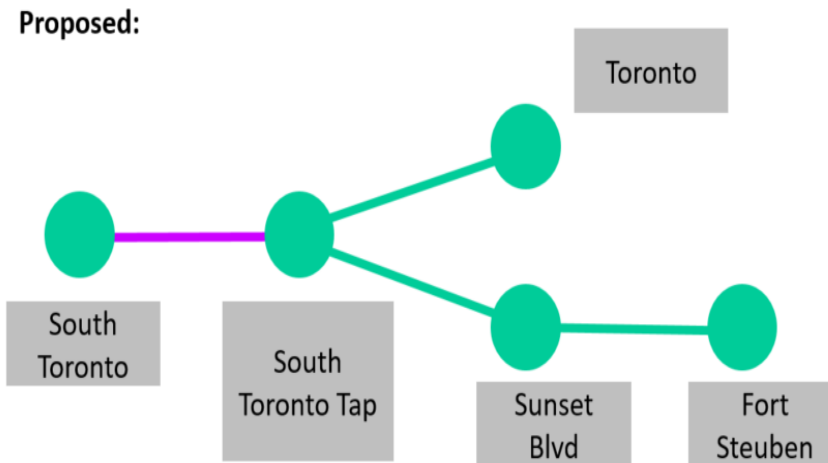
**Required IS Date: 6/1/2029**

**Projected IS Date: 6/1/2029**

**Previously Presented: 10/18/2024**



Legend	
500 kV	
345 kV	
138 kV	
69 kV	
34.5 kV	
23 kV	
New	





# AEP Transmission Zone: Baseline Beatty 69kV Cap Bank

**Process Stage:** Recommended Solution

**Criteria:** TO 715 Criteria Violation

**Assumption Reference:** 2024 RTEP assumptions

**Model Used for Analysis:** 2029 RTEP Summer/Winter base cases

**Proposal Window Exclusion:** Below 200kV

## Problem Statement:

FGs: 2024W1-AEP-VD7 through VD44, 2024W1-AEP-VM1 through VM26

In the 5-year 2029 RTEP Summer/Winter base cases, low voltage and voltage drop violations at the Galloway, Beatty, Clark Lakes, Ballah SS, Madison, Deer Creek, Texas Eastern, Dry Run SS, Darbyville, Big Darby SS 69kV buses are identified under for a N-2 contingency pair.





# AEP Transmission Zone: Baseline Beatty 69kV Cap Bank

## Recommended Solution:

At Beatty Road substation, install a 69kV 23 Mvar capacitor bank along with the 69kV cap bank breaker. (B3880.1)

**Estimated Cost:** \$2.25M

**Preliminary Facility Rating:**

Circuit Breaker	SN/SE/WN/WE (kA)
Beatty Road Capacity 69kV breaker	40

**Required IS Date:** 6/1/2029

**Projected IS Date:** 6/1/2029

**Previously Presented:** 10/18/2024





# AEP Transmission Zone: Baseline Haviland Station Upgrades

**Process Stage:** Recommended Solution

**Criteria:** TO 715 Criteria Violation

**Assumption Reference:** 2024 RTEP assumptions

**Model Used for Analysis:** 2029 RTEP Winter base case

**Proposal Window Exclusion:** Below 200kV

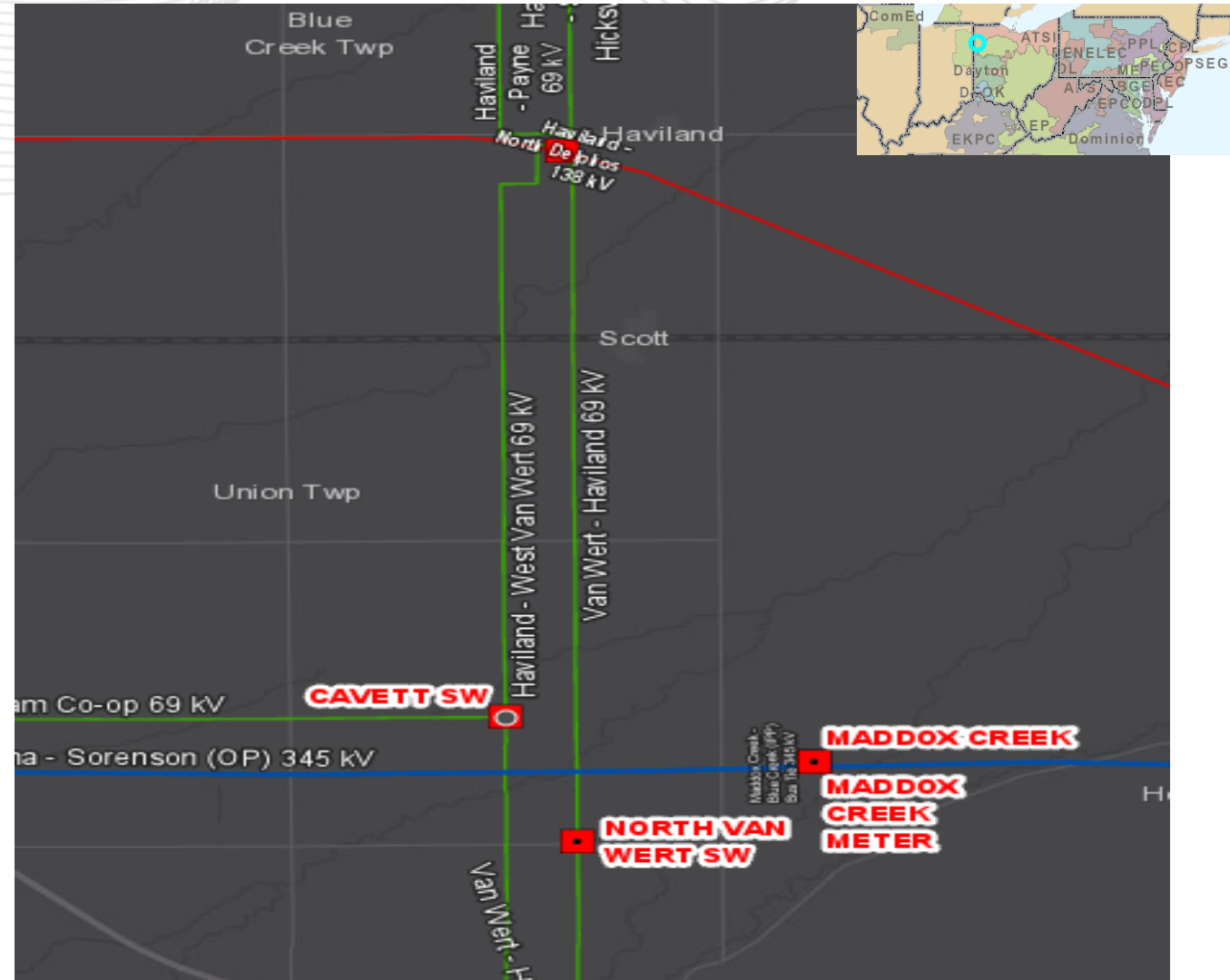
**Problem Statement:**

FGs: 2024W1-AEP-T14 through T25

In the 5-year 2029 RTEP Winter base case, the Haviland - Cavett and Haviland - North Van Wert 69 kV branches are overloaded under multiple contingencies.

**Existing Facility Rating:**

Branch	SN/SE/WN/WE (MVA)
Cavett - Haviland (69)	57/57/57/57
Haviland - North Van Wert (69)	82/85/85/85





# AEP Transmission Zone: Baseline Haviland Station Upgrades

## Recommended Solution:

Replace the 69 kV station equipment, including relays, conductor, and switches at Haviland station in order to address identified overloads on the lines to North Van Wert and Cavett. (B3883.1)

**Estimated Cost:** \$0.8M

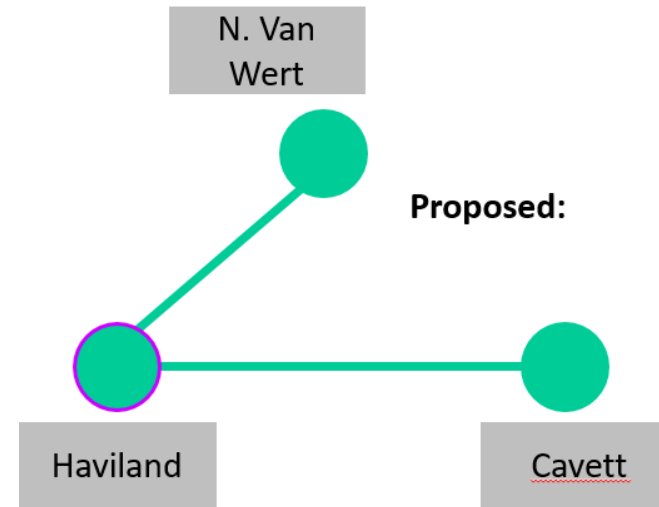
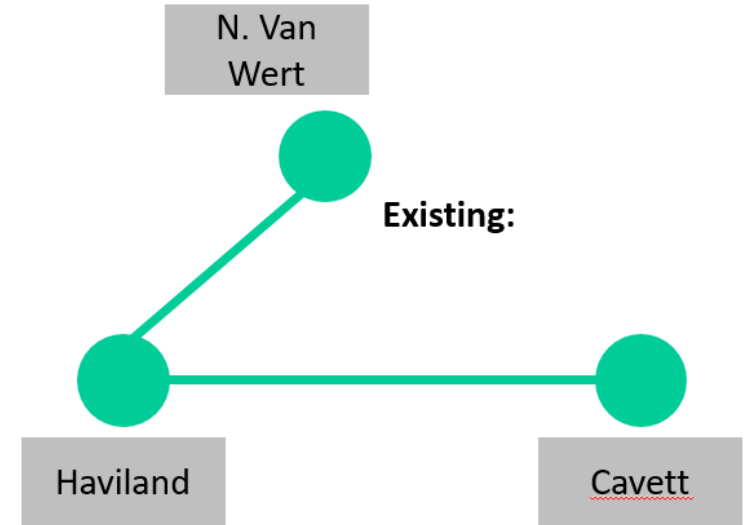
**Preliminary Facility Rating:**

Branch	SN/SE/WN/WE (MVA)
Cavett - Haviland (69)	129/180/162/202
Haviland - North Van Wert (69)	129/129/162/162

**Required IS Date:** 12/1/2029

**Projected IS Date:** 4/1/2029

**Previously Presented:** 10/18/2024



Legend	
500 kV	
345 kV	
138 kV	
69 kV	
34.5 kV	
23 kV	
New	



# East Leipsic – AE2-072 (Lammer) Sag Study and Mitigation

**Process Stage:** Recommended Solution

**Criteria:** Summer Gen Deliv, Summer/Winter IPD

**Assumption Reference:** 2024 RTEP assumptions

**Model Used for Analysis:** 2029 RTEP Summer/Winter base cases

**Proposal Window Exclusion:** Below 200kV

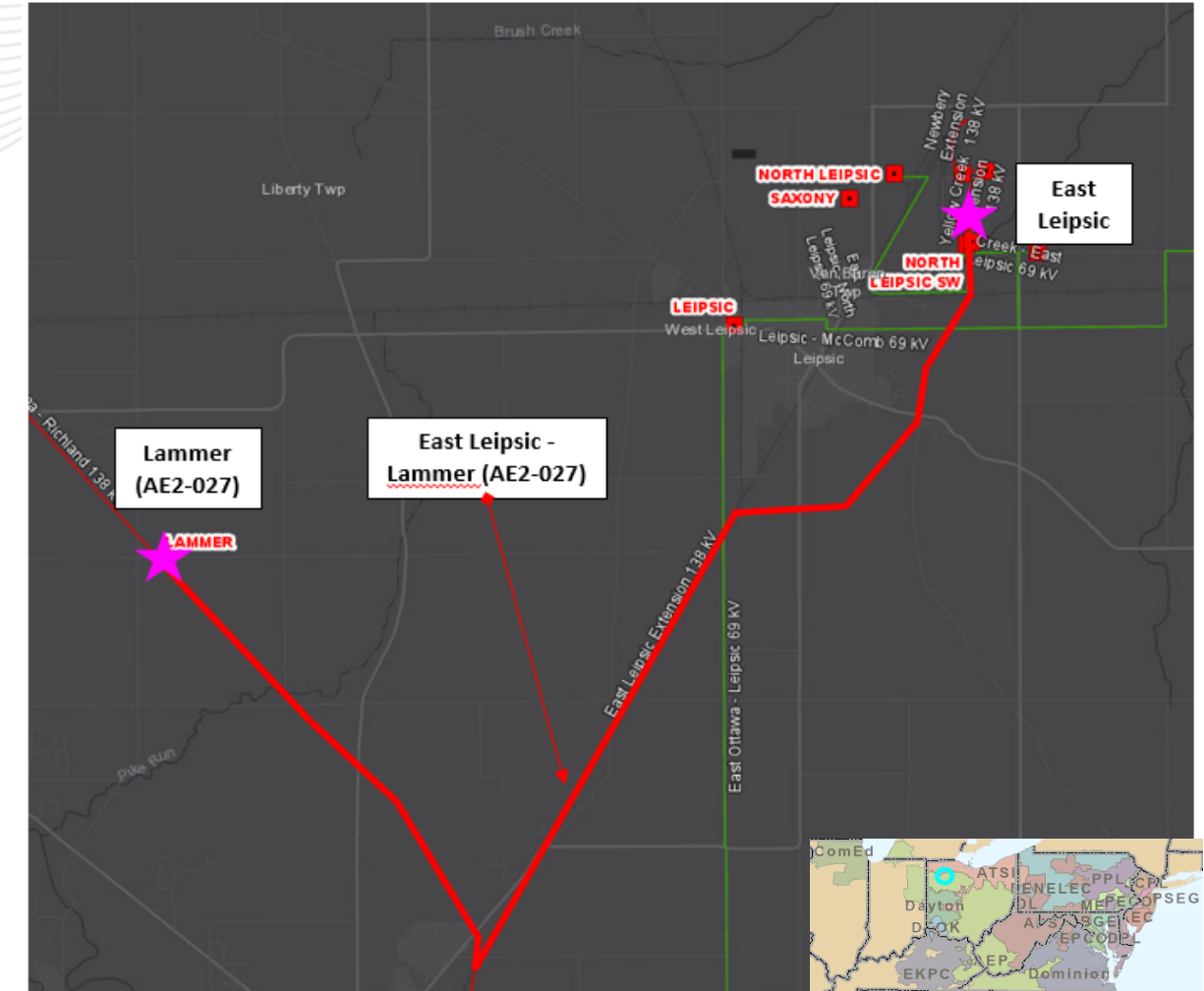
## Problem Statement:

FGs: 2024-W1-GD-S882, 2024-W1-IPD-S80, 2024-W1-IPD-W1

In the 5-year 2029 RTEP Summer Gen Deliv and Summer/Winter IPD tests, The line conductor between East Leipsic and AE2-072 (Lammer) 138 kV is overloaded for a N-2 contingency pair.

## Existing Facility Rating:

Branch	SN/SE/WN/WE (MVA)
East Leipsic - Lammer (138)	223/223/281/281





# AEP Transmission Zone: Baseline East Leipsic – AE2-072 (Lammer) Sag Study and Mitigation

## Recommended Solution:

Perform sag study and complete mitigations on the 138 kV line between East Leipsic and the AE2-072 tap (Lammer) to allow line's conductor to operate to its maximum operating temperature (MOT). (B3888.1)

**Estimated Cost:** \$2.5M

## Preliminary Facility Rating:

Branch	SN/SE/WN/WE (MVA)
East Leipsic - Lammer (138)	223/310/281/349

**Required IS Date:** 6/1/2029

**Projected IS Date:** 4/1/2029

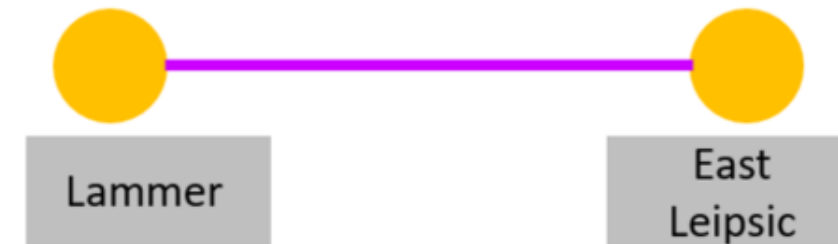
**Previously Presented:** 10/18/2024

Legend	
500 kV	
345 kV	
138 kV	
69 kV	
34.5 kV	
23 kV	
New	

## Existing:



## Proposed:





# AEP Transmission Zone: Baseline Tiltonsville Upgrades

**Process Stage:** Recommended Solution

**Criteria:** Summer Gen Deliv, Summer IPD

**Assumption Reference:** 2024 RTEP assumptions

**Model Used for Analysis:** 2029 RTEP Summer/Winter base cases

**Proposal Window Exclusion:** Below 200kV

**Problem Statement:**

FGs: 2024-W1-GD-S368, 2024-W1-GD-S489, 2024-W1-GD-S877, 2024-W1-IPD-S87, 2024-W1-IPD-S88

In the 5-year 2029 RTEP Summer Gen Deliv and IPD tests, the Tiltonsville - Windsor Junction 138 kV branch is overloaded for multiple N-2 contingencies.

**Existing Facility Rating:**

Branch	SN/SE/WN/WE (MVA)
Tiltonsville (AEP) - Windsor (FE) (138)	329/361/419/421







# AEP Transmission Zone: Baseline Tiltonsville Upgrades

## Recommended Solution:

Replace limiting station equipment at Tiltonsville station to increase the rating on the branch to Windsor. (B3889.1)

Estimated Cost: \$0.8M

## Preliminary Facility Rating:

Branch	SN/SE/WN/WE (MVA)
Tiltonsville (AEP) - Windsor (FE) (138)	329/413/419/421

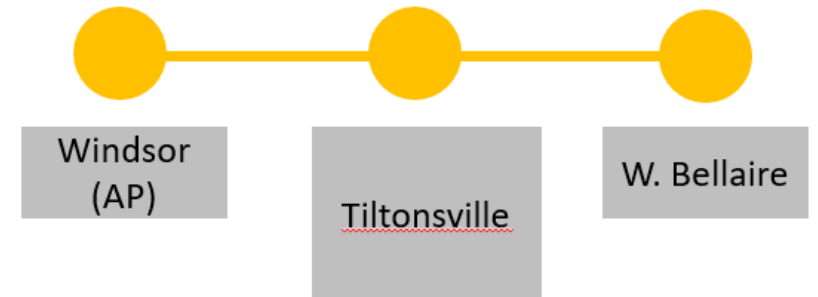
Required IS Date: 6/1/2029

Projected IS Date: 4/1/2029

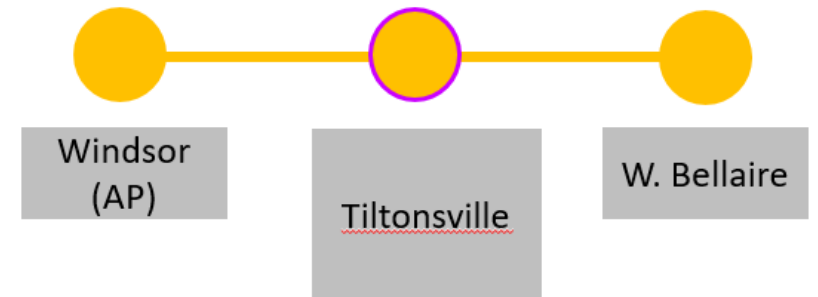
Previously Presented: 10/18/2024

Legend	
500 kV	
345 kV	
138 kV	
69 kV	
34.5 kV	
23 kV	
New	

## Existing:



## Proposed:





# AEP Transmission Zone: Baseline South Coshocton Station Upgrades

**Process Stage:** Recommended Solution

**Criteria:** Summer Gen Deliv

**Assumption Reference:** 2024 RTEP assumptions

**Model Used for Analysis:** 2029 RTEP Summer base case

**Proposal Window Exclusion:** Substation Equipment Exclusion and Below 200kV Exclusion

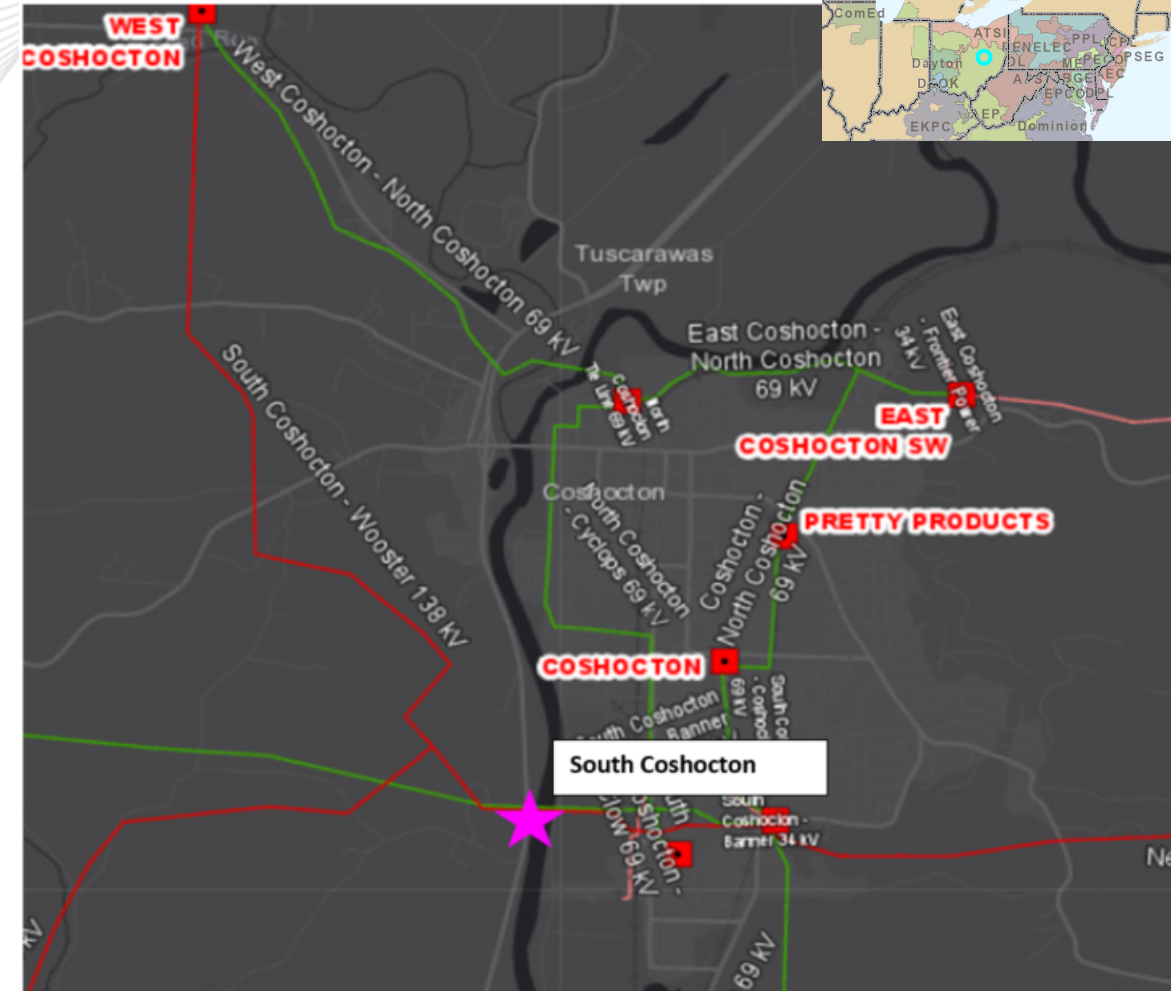
**Problem Statement:**

FG: 2024-W1-GD-S485

In the 5-year 2029 RTEP Summer Gen Deliv test, the Ohio Central - South Coshocton 138 kV line is overloaded for a N-2 contingency.

**Existing Facility Rating:**

Branch	SN/SE/WN/WE (MVA)
Ohio Central - Coshocton (138)	136/167/173/200





# AEP Transmission Zone: Baseline South Coshocton Station Upgrades

## Recommended Solution:

Replace station conductor at South Coshocton 138kV station currently limiting the branch to Ohio Central. (B3890.1)

**Estimated Cost:** \$0.2M

**Preliminary Facility Rating:**

Branch	SN/SE/WN/WE (MVA)
Ohio Central - Coshocton (138)	185/223/281/281

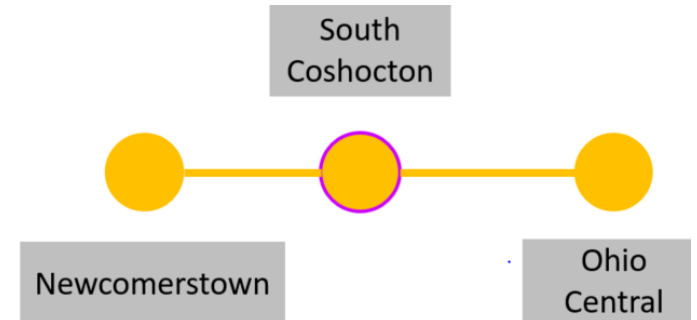
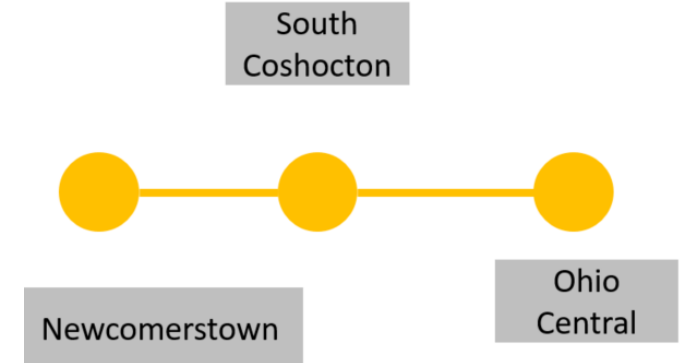
**Required IS Date:** 6/1/2029

**Projected IS Date:** 4/1/2029

**Previously Presented:** 10/18/2024

Legend	
500 kV	
345 kV	
138 kV	
69 kV	
34.5 kV	
23 kV	
New	

**Existing:**





**Process Stage:** Recommended Solution

**Criteria:** Summer Gen Deliv/IPD and Base case analysis, Summer/Winter N-1-1

**Assumption Reference:** 2024 RTEP assumptions

**Model Used for Analysis:** 2029 RTEP Summer/Winter base cases

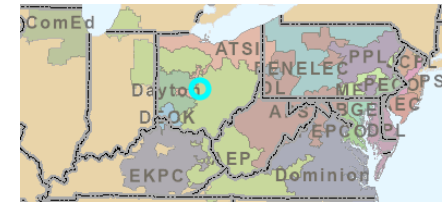
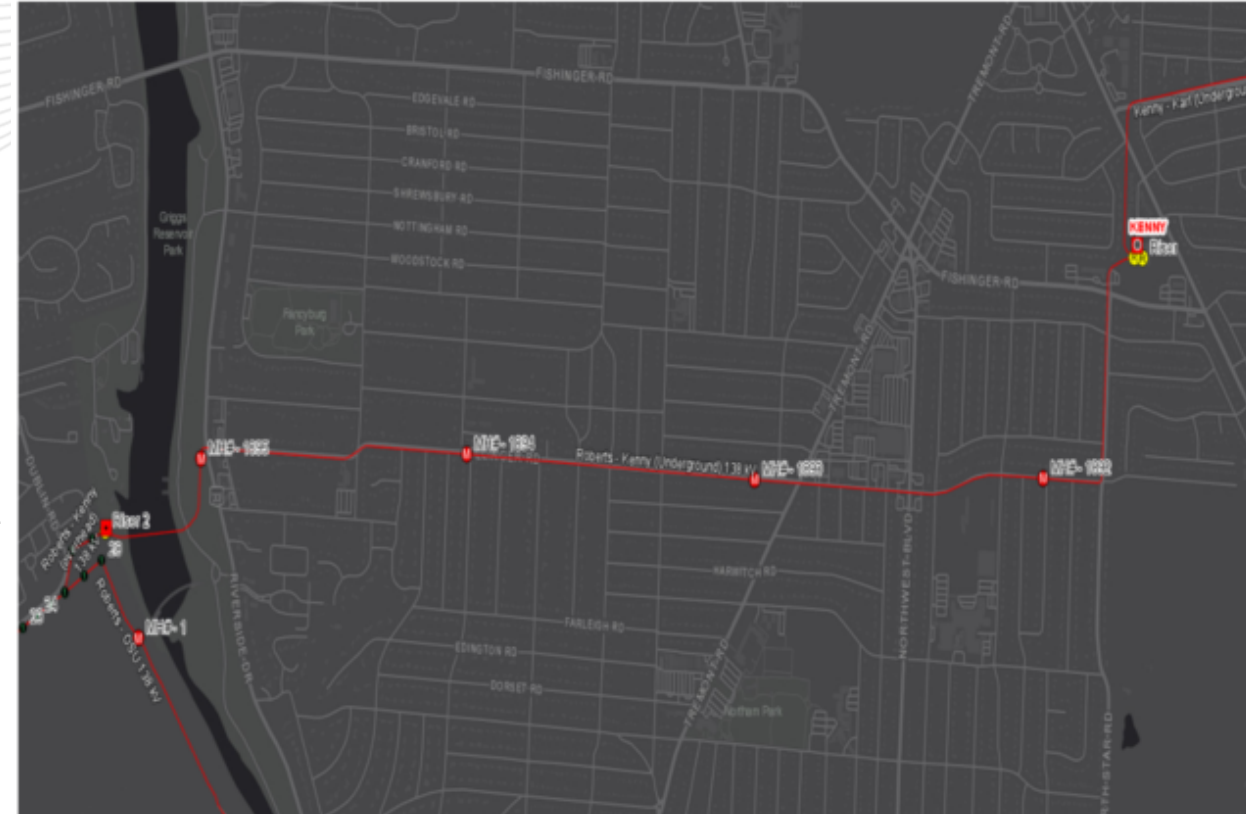
**Proposal Window Exclusion:** Substation Equipment Exclusion and Below 200kV Exclusion

**Problem Statement:**

FGs: 2024-W1-GD-S300, 2024-W1-GD-S302, 2024-W1-GD-S303, 2024-W1-GD-S311, 2024-W1-GD-S320, 2024-W1-GD-S56, 2024-W1-GD-S57, 2024-W1-GD-S7, 2024-W1-GD-S760, 2024-W1-GD-S777, 2024-W1-GD-S793, 2024-W1-GD-S8, 2024-W1-GD-S81, 2024-W1-GD-S869, 2024-W1-GD-S881, 2024-W1-GD-S887, 2024-W1-GD-S888, 2024-W1-GD-S891, 2024-W1-IPD-S20 through S41, 2024-W1-IPD-S47, 2024-W1-IPD-S49, 2024-W1-IPD-S52, 2024-W1-IPD-S64 through S69, 2024-W1-N1-ST110, 2024-W1-N1-ST115, 2024-W1-N1-ST116, 2024-W1-N1-ST20 through ST31, 2024-W1-N1-ST52, 2024-W1-N1-ST68, 2024-W1-N1-ST82, 2024-W1-N1-ST83, 2024-W1-N1-ST94, 2024-W1-N1-ST95, 2024-W1-N11-WT3, 2024-W1-N11-WT4, 2024-W1-N11-WT7, 2024-W1-N11-WT8

In the 5-year 2029 RTEP Summer Gen Deliv/IPD, Base case analysis, and Summer/Winter N-1-1 tests, the Kenny – Roberts 138 kV line is overloaded for multiple contingencies.

# AEP Transmission Zone: Baseline Kenny - Roberts 138kV Relay Upgrades



**Existing Facility Rating:**

Branch	SN/SE/WN/WE (MVA)
Kenny - Roberts (138)	184/184/184/184



# AEP Transmission Zone: Baseline Kenny - Roberts 138kV Relay Upgrades

## Recommended Solution:

Perform relay upgrades at Kenny 138 kV to raise the CT & Relay thermal limits that are currently limiting the line to Roberts. (B3891.1)

Estimated Cost: \$0.4M

## Preliminary Facility Rating:

Branch	SN/SE/WN/WE (MVA)
Kenny - Roberts (138)	213/311/221/318

Required IS Date: 6/1/2029

Projected IS Date: 4/1/2029

Previously Presented: 10/18/2024

Legend	
500 kV	
345 kV	
138 kV	
69 kV	
34.5 kV	
23 kV	
New	

## Existing:



## Proposed:





# AEP Transmission Zone: Baseline Tidd Station Upgrades

**Process Stage:** Recommended Solution

**Criteria:** Summer Gen Deliv

**Assumption Reference:** 2024 RTEP assumptions

**Model Used for Analysis:** 2029 RTEP Summer base case

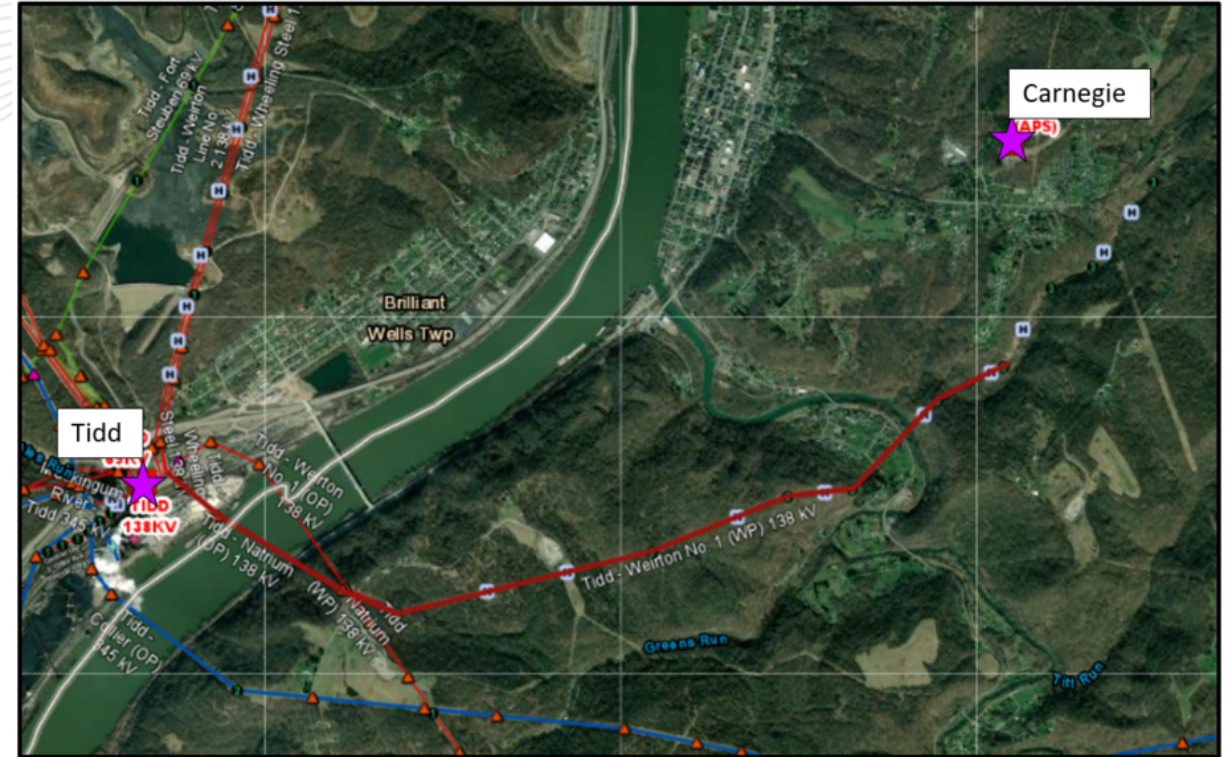
**Proposal Window Exclusion:** Substation Equipment Exclusion

**Problem Statement:**

FGs: 2024-W1-GD-S477, 2024-W1-GD-S895

In the 5-year 2029 RTEP Summer Gen Deliv test, the Tidd – Carnegie 138 kV line is overloaded for multiple contingencies.

**Existing Facility Rating:**



Branch	SN/SE/WN/WE (MVA)
Tidd (AEP) - Carnegie (FE) (138)	187/240/247/285



# AEP Transmission Zone: Baseline Tidd Station Upgrades

## Recommended Solution:

Replace limiting 138kV station conductor at Tidd on the line to Carnegie (FE). (B3894.1)

Estimated Cost: \$0.5M

Preliminary Facility Rating:

Branch	SN/SE/WN/WE (MVA)
Tidd (AEP) - Carnegie (FE) (138)	200/254/253/293

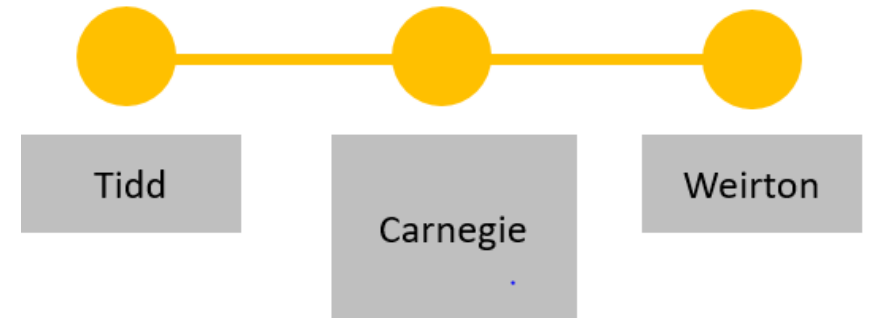
Required IS Date: 6/1/2029

Projected IS Date: 4/1/2029

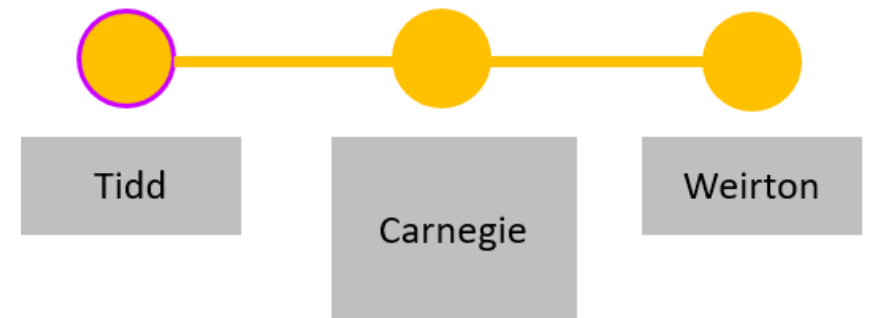
Previously Presented: 10/18/2024

Legend	
500 kV	
345 kV	
138 kV	
69 kV	
34.5 kV	
23 kV	
New	

## Existing:



## Proposed:





# AEP Transmission Zone: Baseline Skimmer Cap Bank Settings Adjustments

**Process Stage:** Recommended Solution

**Criteria:** TO 715 Criteria

**Assumption Reference:** 2024 RTEP assumptions

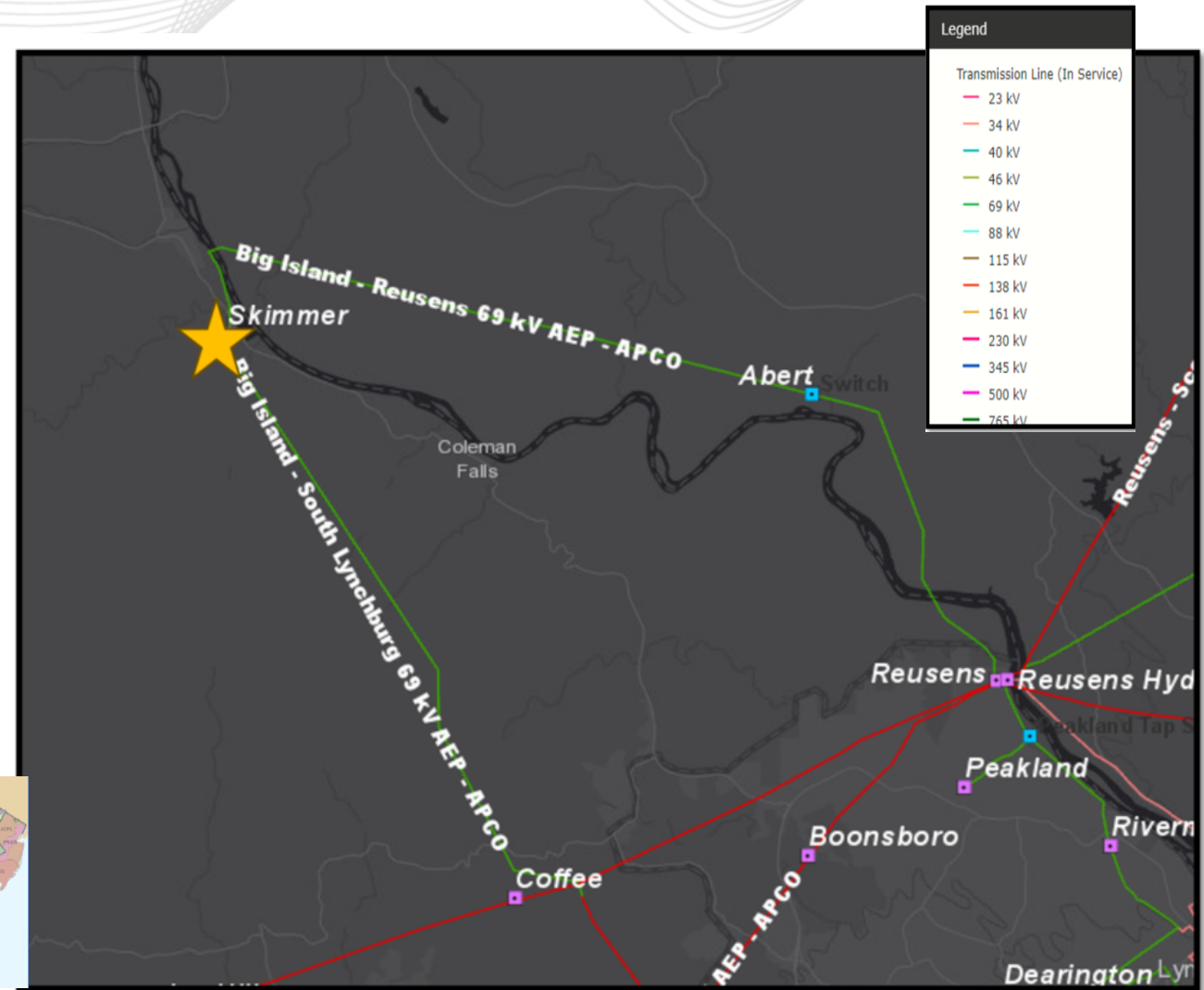
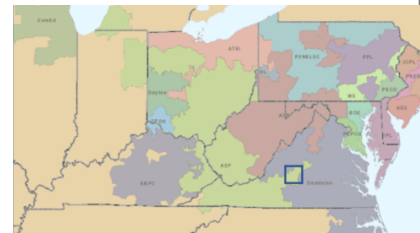
**Model Used for Analysis:** 2029 RTEP Winter base case

**Proposal Window Exclusion:** Below 200kV

**Problem Statement:**

FGs: 2024-W1-AEP-VD47 through VD50

In the 5-year 2029 RTEP Winter base case, voltage drop violation is identified at the Skimmer 69kV bus for multiple N-1-1 contingency pairs.







# AEP Transmission Zone: Baseline Skimmer Cap Bank Settings Adjustments

## Recommended Solution:

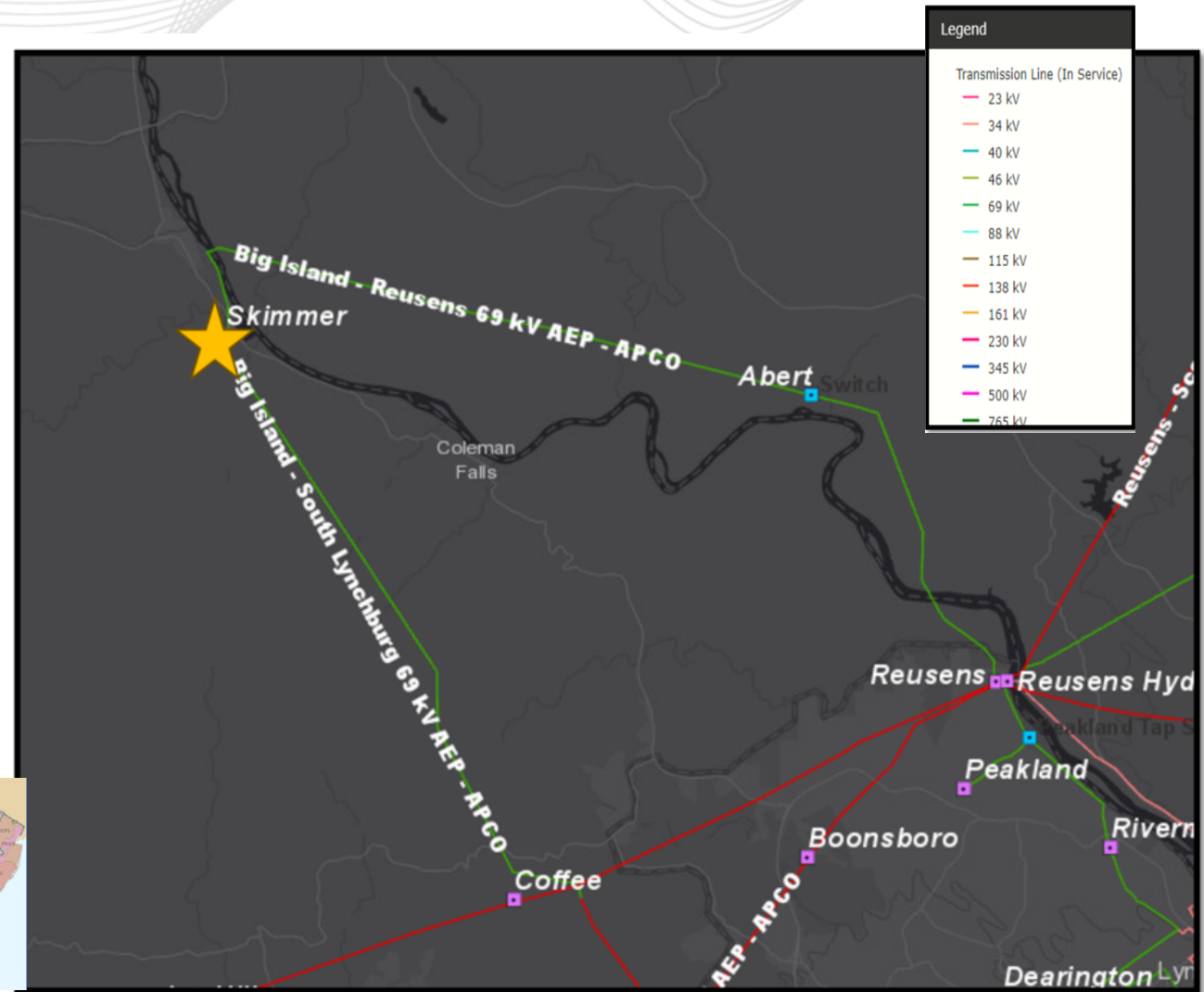
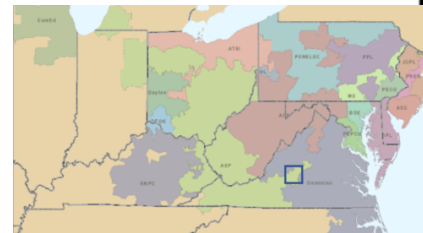
Adjust the 69kV Skimmer capacity bank voltage settings. (B3896.1)

Estimated Cost: \$0.1M

Required IS Date: 12/1/2029

Projected IS Date: 6/1/2029

Previously Presented: 10/18/2024





# AEP Transmission Zone: Baseline Buchanan – Keen Mountain Upgrades

**Process Stage:** Recommended Solution

**Criteria:** Winter Gen Deliv

**Assumption Reference:** 2024 RTEP assumptions

**Model Used for Analysis:** 2029 RTEP Winter base case

**Proposal Window Exclusion:** Below 200kV

**Problem Statement:**

FG: 2024-W1-GD-W11

In the 5-year 2029 RTEP Winter Gen Deliv test, the Buchanan – Keen Mountain 138kV line is overloaded in the base case.

**Existing Facility Rating:**



Branch	SN/SE/WN/WE (MVA)
Buchanan - Keen Mountain (138)	86/86/86/86



# AEP Transmission Zone: Baseline Buchanan – Keen Mountain Upgrades

## Recommended Solution:

Upgrade the CT thermal limit at Buchanan station on the Buchanan-Keen Mountain 138 kV line. (B3898.1)

**Estimated Cost:** \$0.1M

## Preliminary Facility Rating:

Branch	SN/SE/WN/WE (MVA)
Buchanan - Keen Mountain (138)	179/179/179/179

**Required IS Date:** 12/1/2029

**Projected IS Date:** 12/1/2025

**Previously Presented:** 10/18/2024

## Existing:

Legend	
500 kV	
345 kV	
138 kV	
69 kV	
34.5 kV	
New	



## Proposed:





# APS Transmission Zone: Baseline 2024 RTEP Window 1

**Process Stage:** Recommended Solution

**Criteria:** Winter N-1-1

**Assumption Reference:** 2024 RTEP assumptions

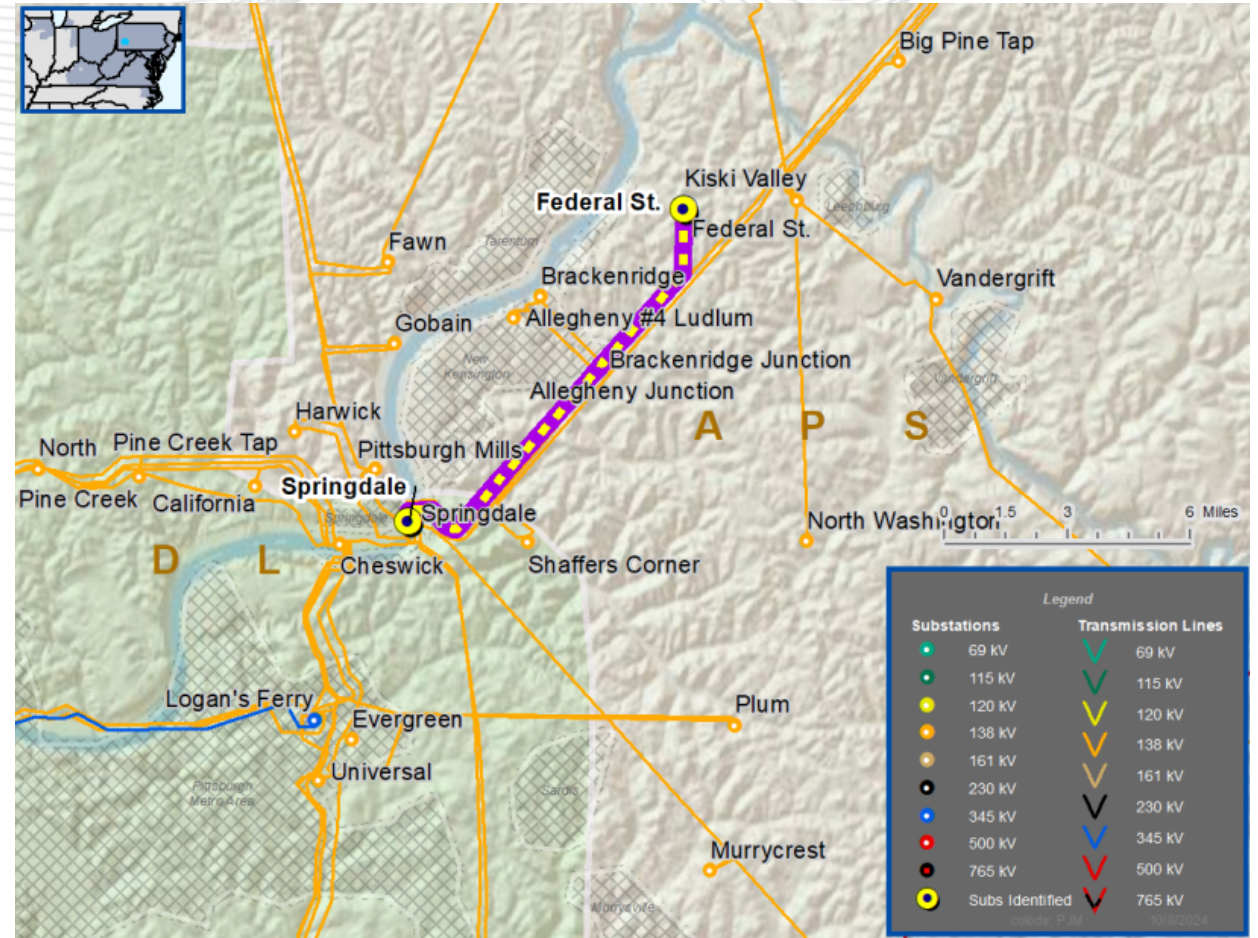
**Model Used for Analysis:** 2029 RTEP cases

**Proposal Window Exclusion:** Less than 200 kV

**Problem Statement:**

2024W1-N11-WT1 and 2024W1-N11-WT2

In 2029 RTEP Winter case, the Springdale to Federal St 138 kV line is overloaded for N-1-1 outages.





# APS Transmission Zone: Baseline 2024 RTEP Window 1

## Proposed Solution: At Federal Street Substation:

- Install (3) 138 kV CCVTs on the 138 kV bus.
- Remove the Transformer 1 CO-6 138 kV Phase relay overcurrent relays.
- Install (1) SEL-421 relay on the high side of Transformer 1.
- Install foundations, conduit, and grounding for new CCVTs.
- Install cables between CCVTs and relay. **(b3870)**

**Estimated Cost:** \$0.69 M

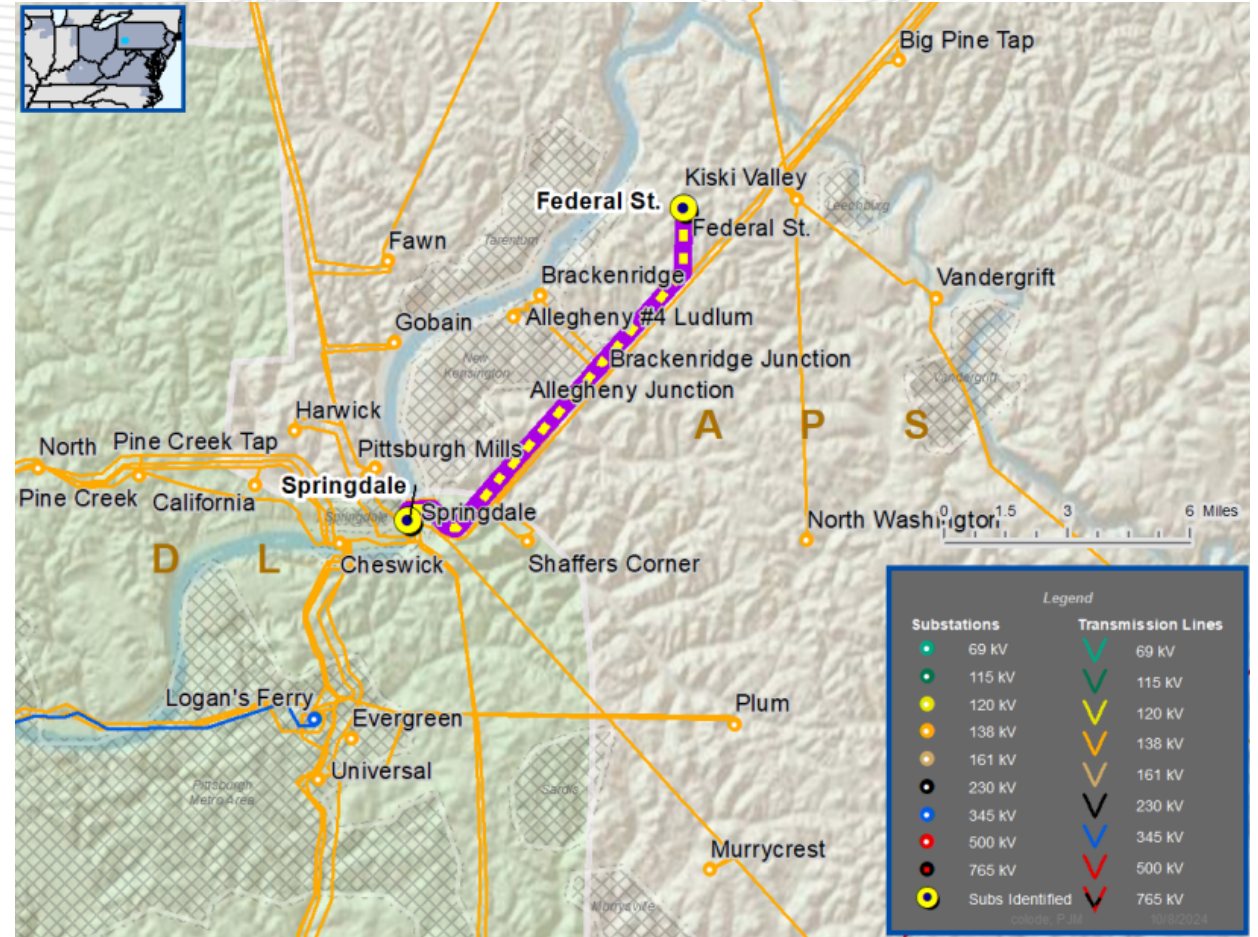
**Required IS Date:** 12/1/2029

**Projected IS Date:** 06/01/2029

**Previously Presented:** 10/18/2024

## Facility Rating:

Branch	Existing Facility Ratings – SN/SE/WN/WE (MVA)	Preliminary Facility Ratings – SN/SE/WN/WE (MVA)
Federal St – Springdale 138 kV	166/166/166/166	268/333/323/416





# DLCO Transmission Zone: Baseline 2024 RTEP Window 1

**Process Stage:** Recommended Solution

**Criteria:** Summer Generator Deliverability

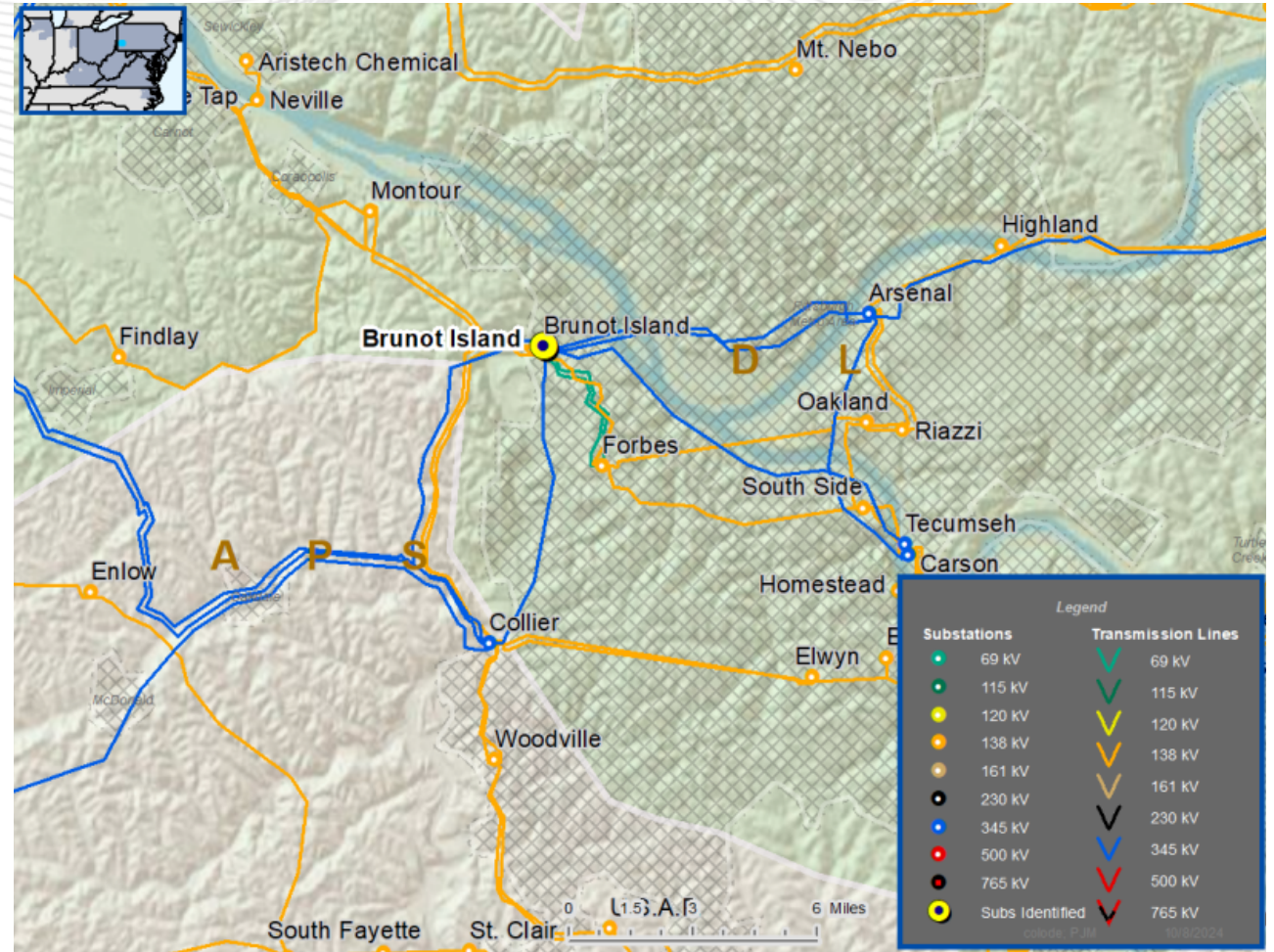
**Assumption Reference:** 2024 RTEP assumptions

**Model Used for Analysis:** 2029 RTEP cases

**Proposal Window Exclusion:** Substation  
Equipment Exclusion

**Problem Statement:**  
2024W1-GD-S889

In 2029 RTEP summer case, the Brunot Island 2-12 138 kV tie breaker is overloaded for N-2 outage.





# DLCO Transmission Zone: Baseline 2024 RTEP Window 1

## Proposed Solution:

Replace two 138 kV disconnect switches with 3000 amp disconnect switches and replace a portion of the stranded conductor on the #2 138 kV Bus with aluminum pipe bus. **(b3871)**

**Estimated Cost:** \$8.0 M

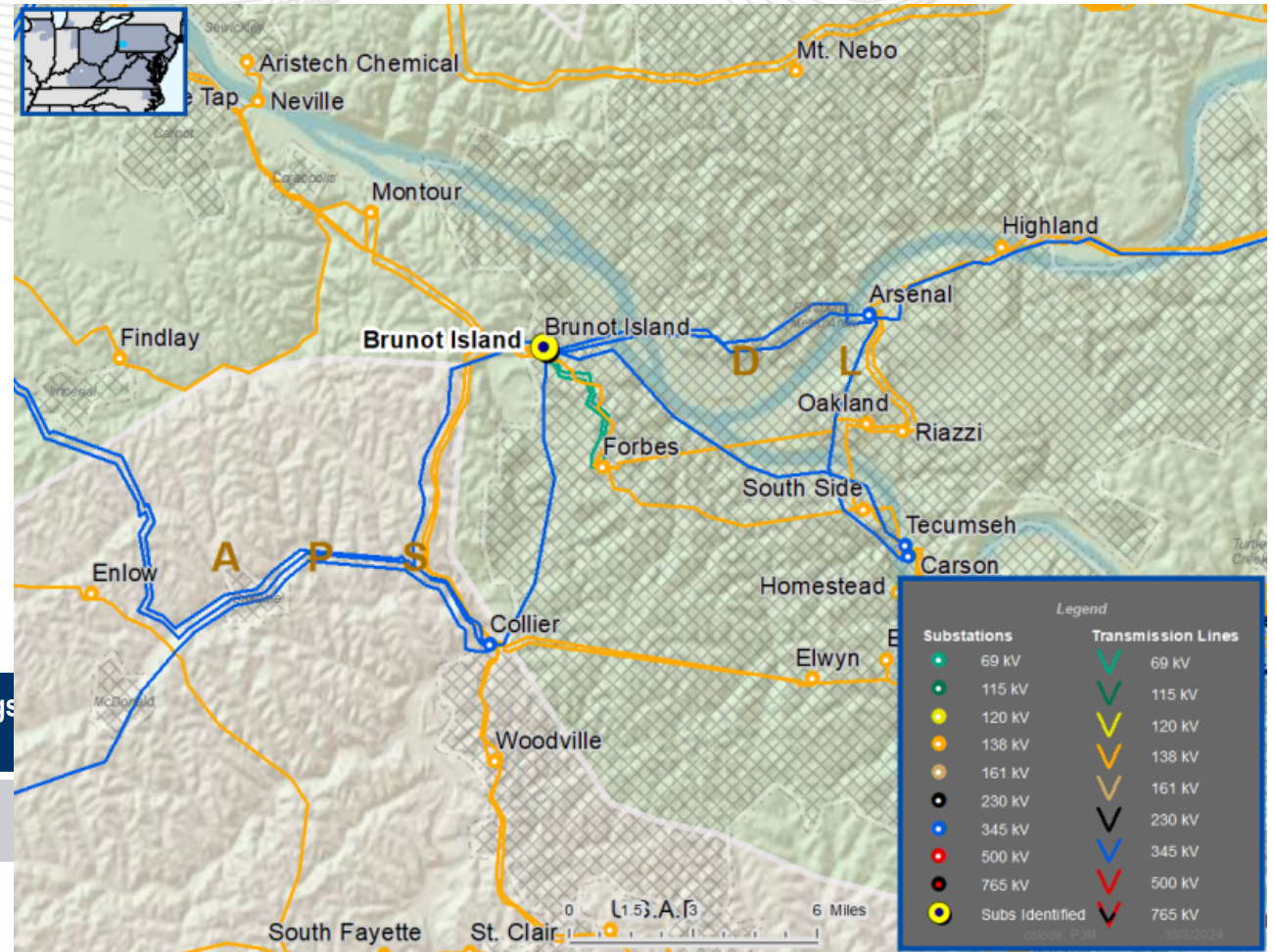
**Required IS Date:** 6/1/2029

**Projected IS Date:** 12/31/2028

**Previously Presented:** 10/18/2024

## Facility Rating:

Branch	Existing Facility Ratings – SN/SE/WN/WE (MVA)	Preliminary Facility Ratings – SN/SE/WN/WE (MVA)
Brunot Island 2-12 Bus tie breaker 138 kV	385/458/454/478	643/696/696/696





# ComEd Transmission Zone: Baseline Kewanee 138kV L7411 (74 7411) CB Replacement

**Process Stage:** Recommended Solution

**Criteria:** Short Circuit

**TEAC/SRRTEP assumptions:** 2024 RTEP assumptions

**Model Used for Analysis:** 2026 & 2029 RTEP short circuit cases

**Proposal Window Exclusion:** Below 200 kV Exclusion

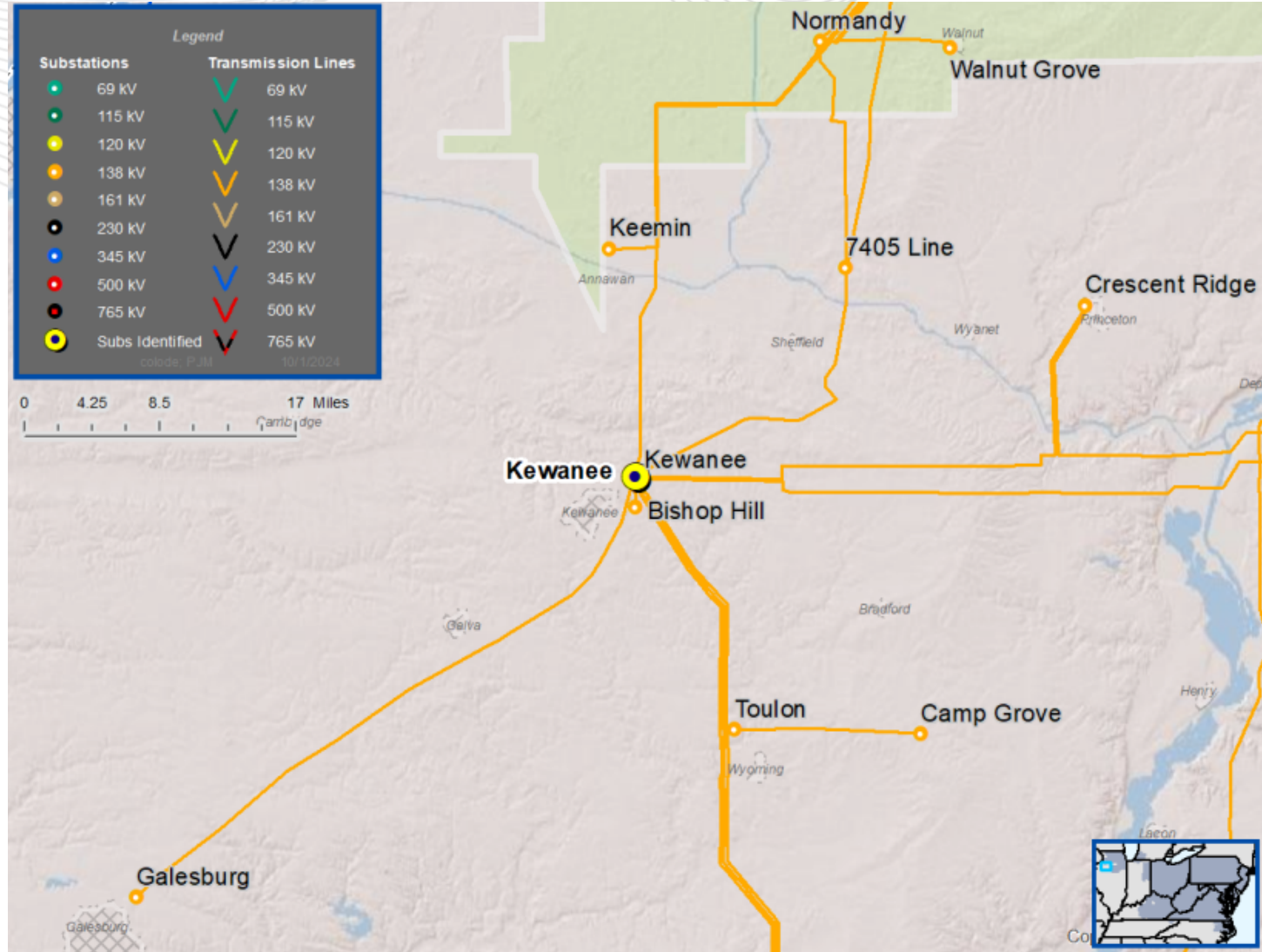
**Problem Statement:**

FG: 2024-W1-SC-60

In both 2026 and 2029 RTEP Short Circuit base case, the Kewanee 138 kV L7411 (74 7411) circuit breaker is identified as being over duty.

**Existing Facility Rating:**

Breaker	Capacity (kA)
74 7411 (138)	20.92







# ComEd Transmission Zone: Baseline Kewanee 138kV L7411 (74 7411) CB Replacement

**Recommended Solution:** Replace the Kewanee 138 kV L7411 circuit breaker with a SF6 circuit breaker. (b3903.1)

**Estimated Cost:** \$1.101 M

**Preliminary Facility Rating:**

Breaker	Capacity (kA)
74 7411 (138)	63

**Alternatives:**

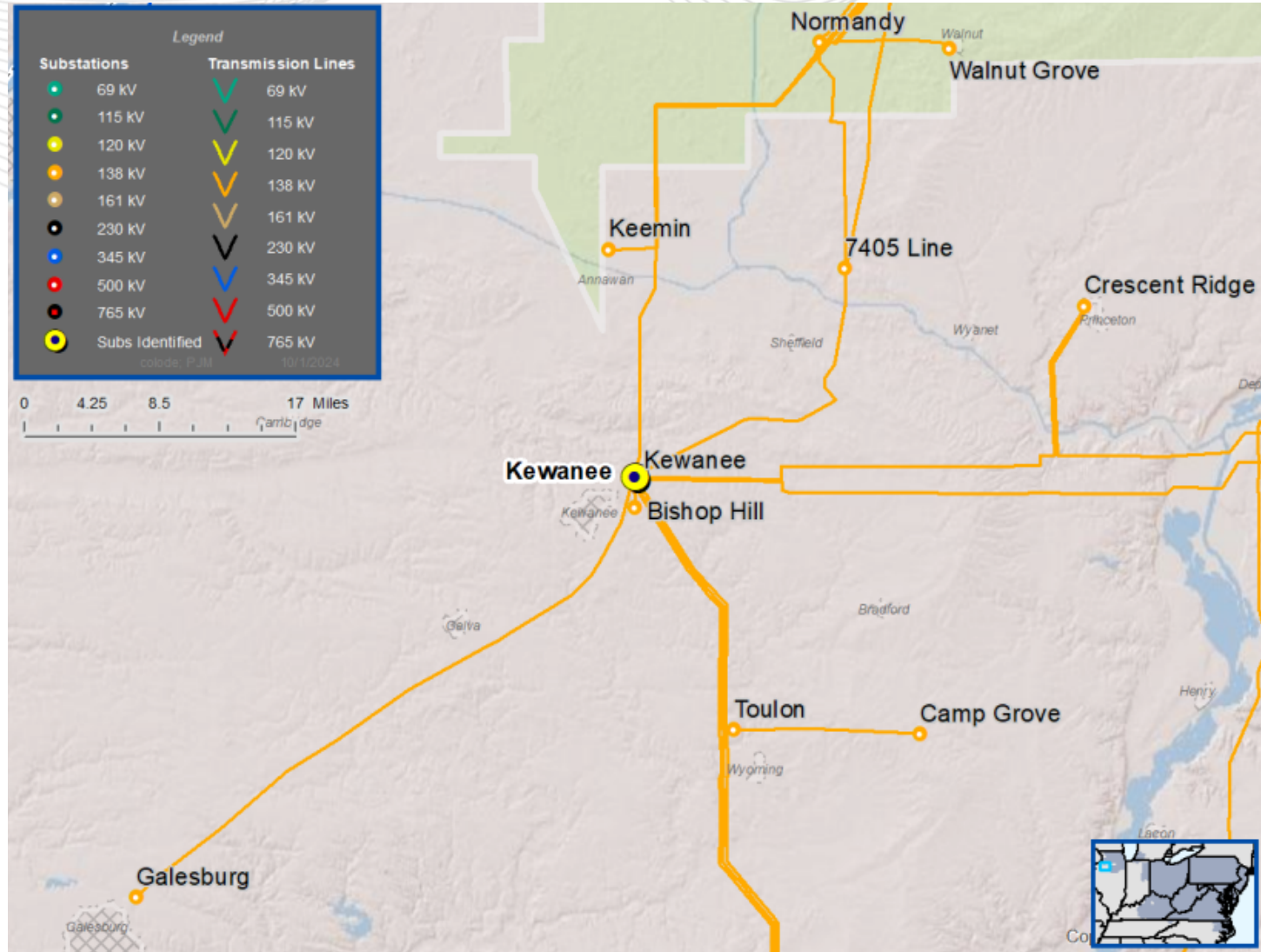
N/A

**Ancillary Benefits:**

Replacing obsolete oil circuit breaker with new gas circuit breaker.

**Required In-Service:** 6/1/2026

**Projected IS Date:** 6/1/2026





# ComEd Transmission Zone: Baseline Electric Junction to W541 Reconductor

**Process Stage:** Recommended Solution

**Criteria:** Baseline Load Growth Deliverability & Reliability

**TEAC/SRRTEP assumptions:** 2024 RTEP assumptions

**Model Used for Analysis:** 2029 RTEP Summer base case

**Proposal Window Exclusion:** Below 200 kV Exclusion

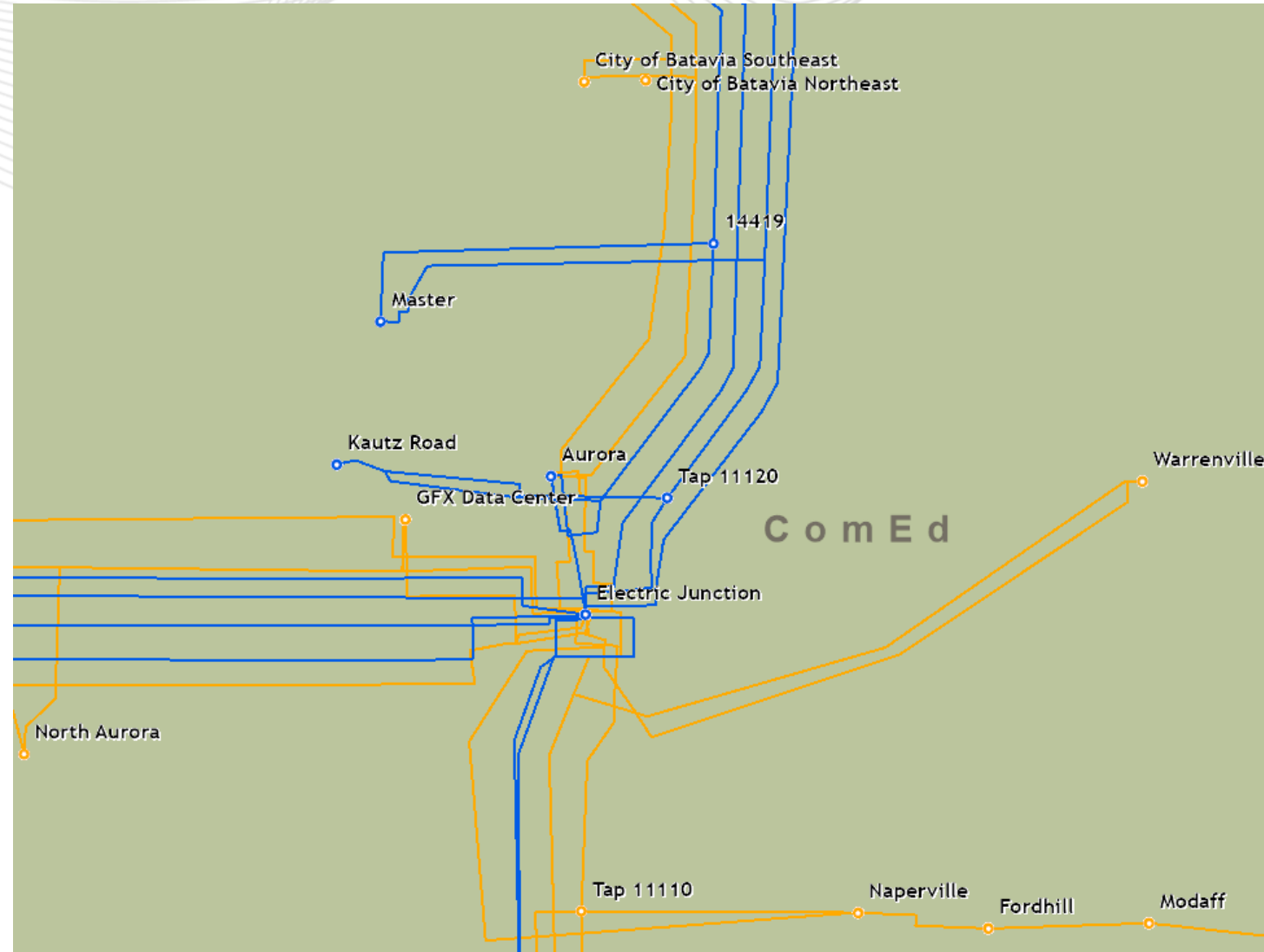
**Problem Statement:**

FG: 2024-W1-N11-ST19, 2024-W1-N11-ST35, 2024-W1-N11-ST38

In the 2029 RTEP Summer case, the Electric Junction-ESS W541 (Gfx Data Center) 138 kV line is overloaded for multiple N-1 outages.

**Existing Facility Rating:**

Branch	SN/SE/WN/WE (MVA)
Electric Junction - W541 (345)	351/449/421/500
Electric Junction - W541 Tap (138)	351/449/421/500





# ComEd Transmission Zone: Baseline Electric Junction to W541 Reconductor

## Recommended Solution:

- Reconductor 138 kV line from Electric Junction to W541. **Estimated Cost: 1.38M (b3901.1)**
- Replace 2" tubular bus, 2-500 KCMIL Cu and 1113 KCMIL ACSR/AA on bus 2 and line terminal of 138kV L11106 at TSS 111 Electric Junction with bus that meets or exceeds a minimum thermal capability of 2036/2236/2690A (487/534/643MVA) SN/SE/SLD. **Estimated Cost: 0.28M (b3901.2)**

**Total Estimated Cost:** \$1.657 M

## Preliminary Facility Rating:

Branch	SN/SE/WN/WE (MVA)
Electric Junction - W541 (345)	486/534/527/571
Electric Junction - W541 Tap (138)	486/534/527/571

## Alternatives:

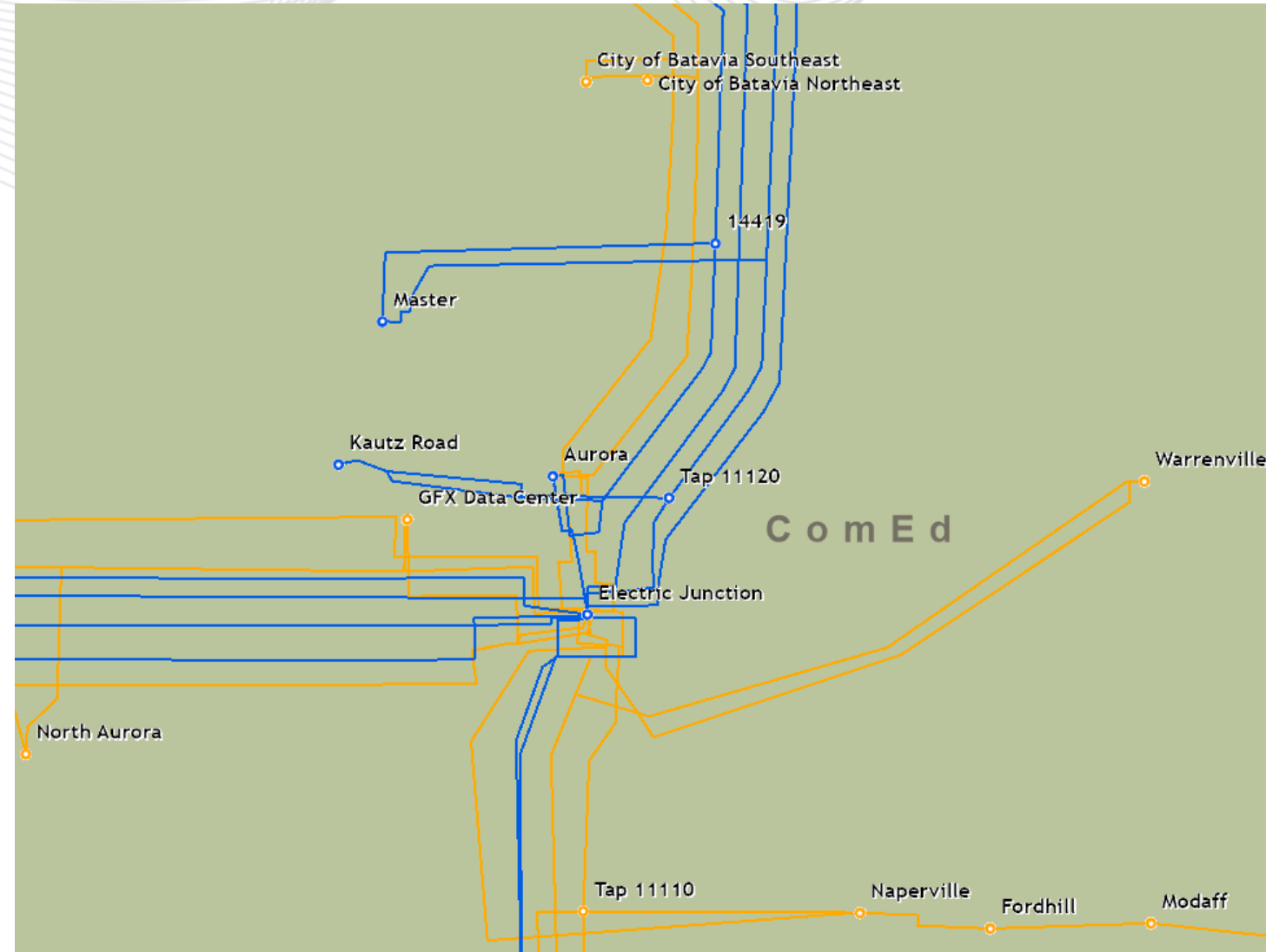
N/A

## Ancillary Benefits:

N/A

**Required In-Service:** 6/1/2029

**Projected IS Date:** 6/1/2029





# ComEd Transmission Zone: Baseline Kewanee Bus 1

**Process Stage:** Recommended Solution

**Criteria:** Baseline Load Growth Deliverability & Reliability

**TEAC/SRRTEP assumptions:** 2024 RTEP assumptions

**Model Used for Analysis:** 2029 RTEP Light Load base case

**Proposal Window Exclusion:** Substation Equipment Exclusion

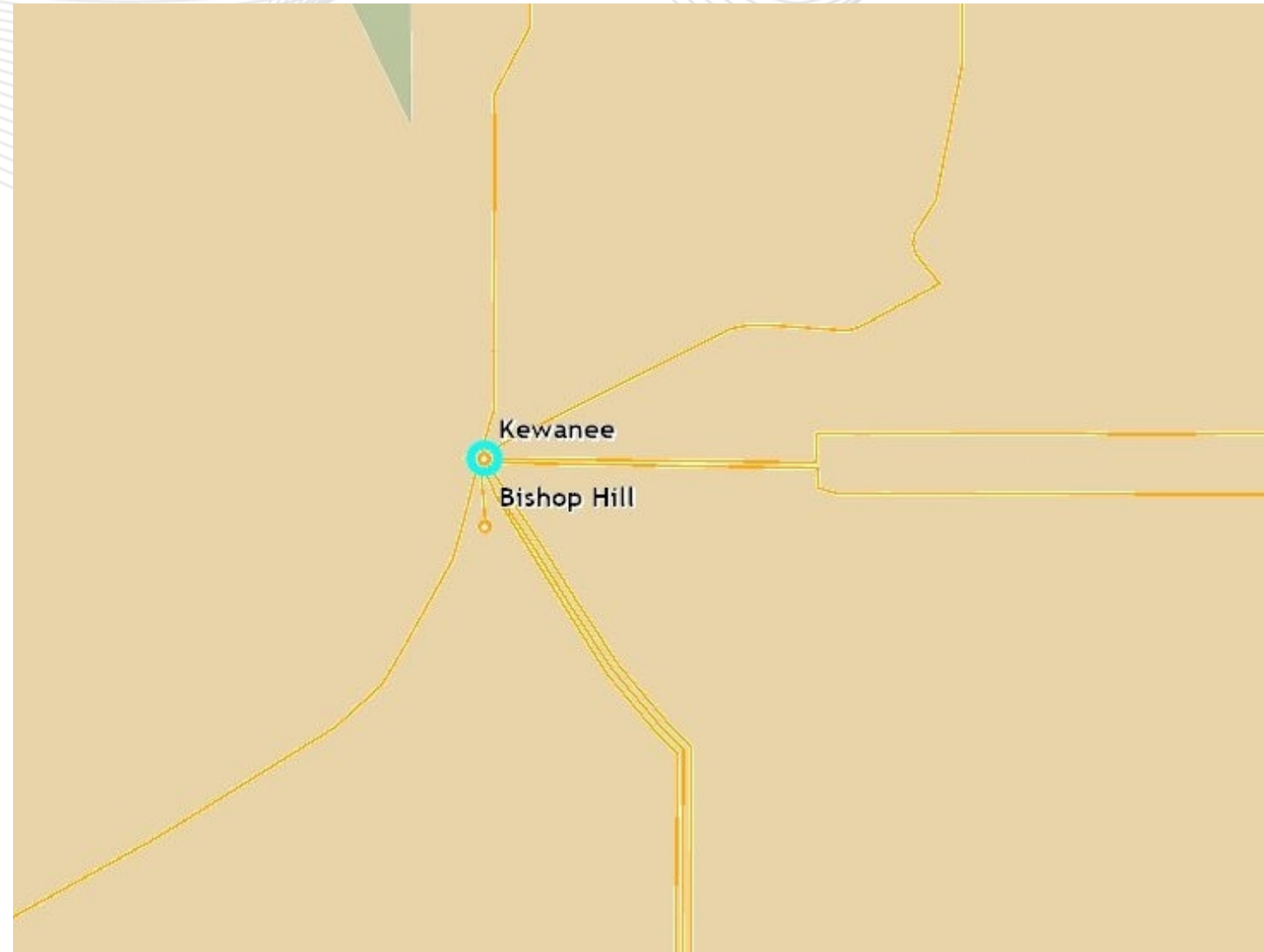
**Problem Statement:**

FG: 2024-W1-GD-LL25

In the 2029 RTEP Light Load case, the Kewanee 138 kV bus No. 1 is overloaded for a N-1 outage.

**Existing Facility Rating:**

Branch	SN/SE/WN/WE (MVA)
Kewanee - Kewanee (138)	190/246/235/279





# ComEd Transmission Zone: Baseline Kewanee Bus 1

**Recommended Solution:** Replace the 300 copper conductor with 1113 kcmil ACSR conductor on Kewanee bus No. 1. **(b3900.1)**

**Estimated Cost:** \$0.204 M

**Preliminary Facility Rating:**

Branch	SN/SE/WN/WE (MVA)
Kewanee - Kewanee (138)	351/449/421/500

**Alternatives:**

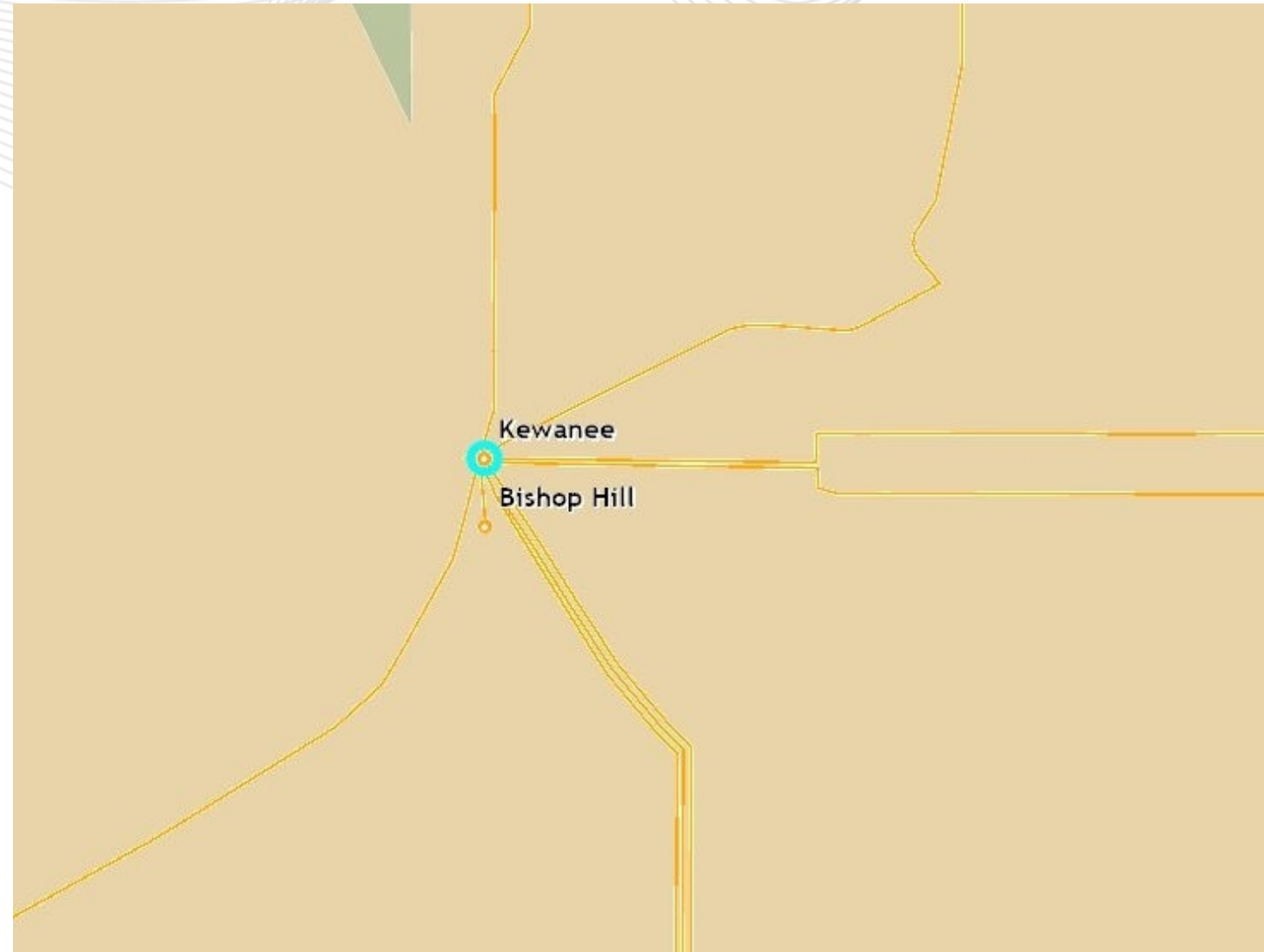
N/A

**Ancillary Benefits:**

Removes all of the remaining 300 Cu bus at Kewanee substation

**Required In-Service:** 4/15/2029

**Projected IS Date:** 4/15/2029



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## Reliability Analysis Update

Version No.	Date	Description
1	November 12, 2024	<ul style="list-style-type: none"><li>• Original slides posted</li></ul>

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