Reliability Analysis Update

Sub Regional RTEP Committee - PJM West

December 17, 2021

Recommended Solution

Baseline Reliability Projects

APS Transmission Zone: Baseline
Messick Road to Ridgeley 138 kV Upgrades

Process Stage: Recommended Solution

Criteria: RTEP Generation Deliverability

Assumption Reference: 2026 RTEP assumption

Model Used for Analysis: 2026 summer RTEP case

Proposal Window Exclusion: Below 200 kV Exclusion

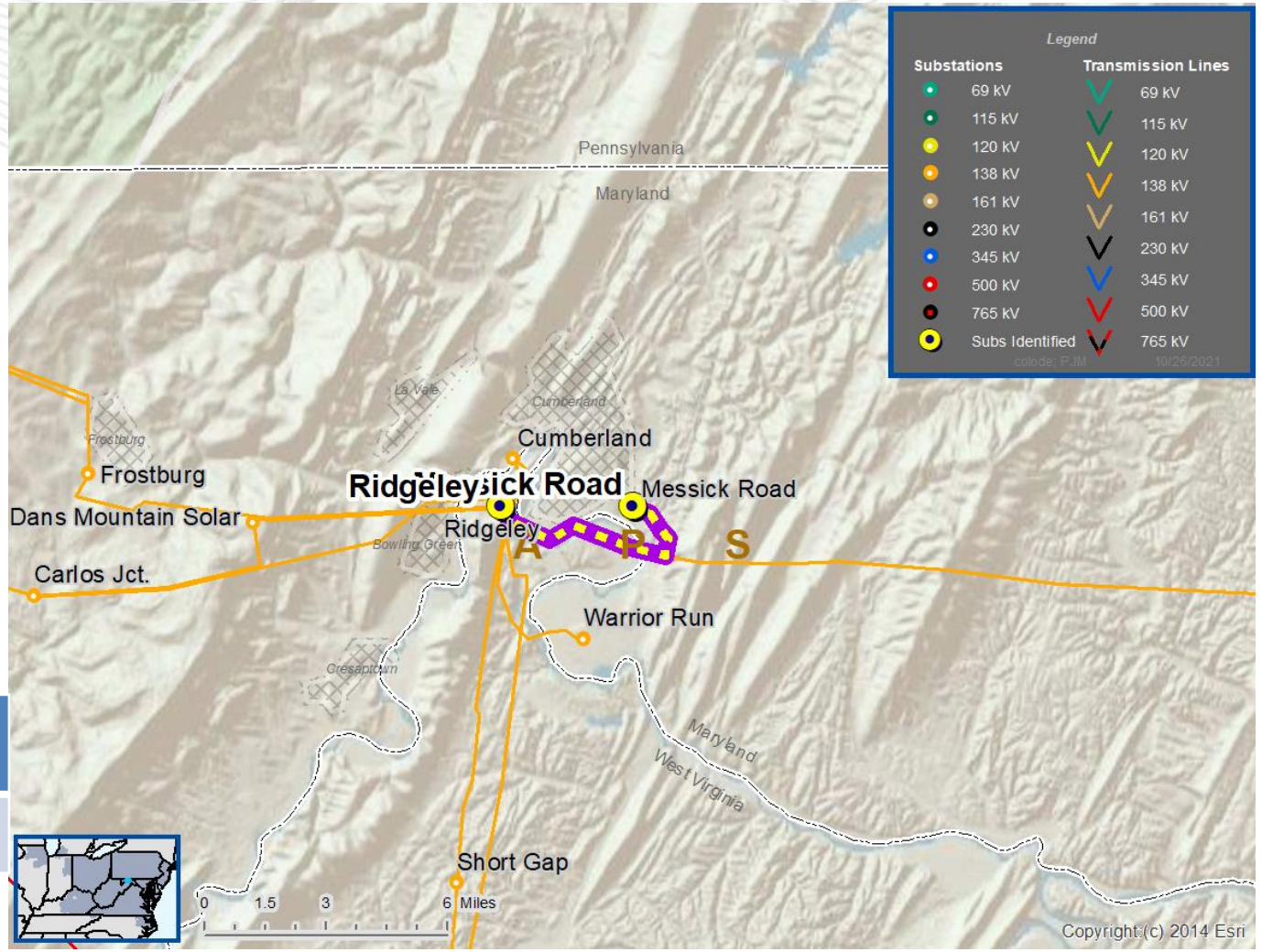
Problem Statement:

FG: GD-S446 and GD-S448

In 2026 Summer RTEP case, Messick Road to Ridgeley 138 kV line is overloaded due to multiple breaker contingencies.

Existing Facility Rating:

Branch	SN/SE/WN/WE (MVA)
01RIDGLY - 01MESSCK 138 kV	221/268/250/287



APS Transmission Zone: Baseline
Messick Road to Ridgeley 138 kV Upgrades

Recommended Solution: Reconductor the existing 556.5 ACSR line segments on the Messick Road-Ridgeley WC4 138 kV line with 954 45/7 ACSR to achieve 308/376 MVA SN/SE and 349/445 MVA WN/WE ratings. Replace the remote end equipment for the Messick Road-Ridgeley WC4 138 kV line.**(B3683)**

Transmission Estimated Cost: $11.2M

Preliminary Facility Rating:

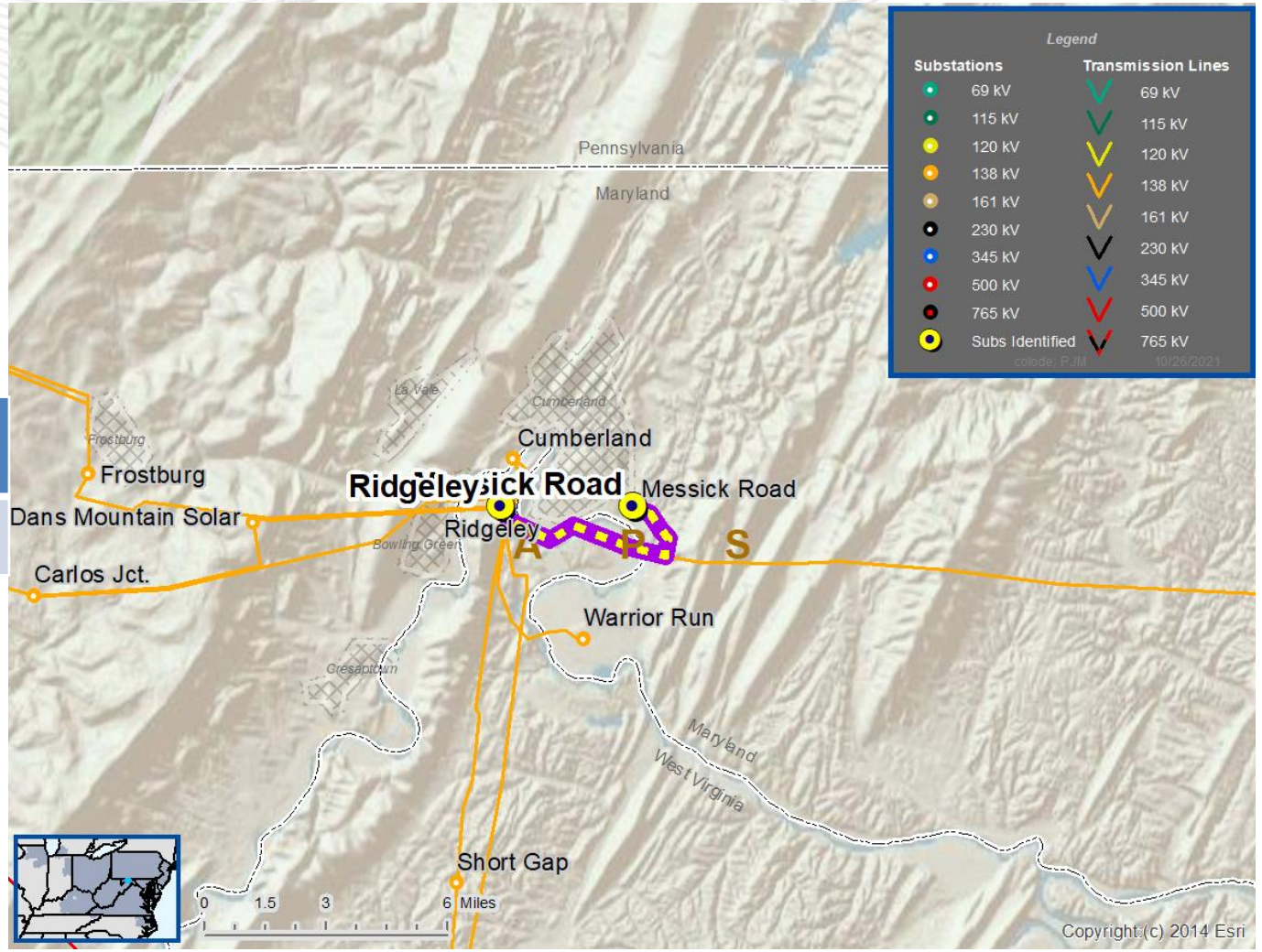
Branch	SN/SE/WN/WE (MVA)
01RIDGLY - 01MESSCK 138 kV	308/376/349/445

Ancillary Benefits: This facility is commonly seen to overload for the loss of various 500 kV lines. This upgrade will result in less operational switching to alleviate N-1 overloads.

Alternatives: No cost effective alternative identified.

Required IS date: 06/01/2026

Projected IS date: 06/01/2026



First Review

Baseline Reliability Projects

AEP Transmission Zone: Baseline Bellefonte 69kV breakers

Process Stage: First Review

Criteria: AEP 715 Criteria

Assumption Reference: 2026 RTEP assumption

Model Used for Analysis: 2023 short circuit RTEP case

Proposal Window Exclusion: Below 200 kV Exclusion and Immediate Need Exclusion

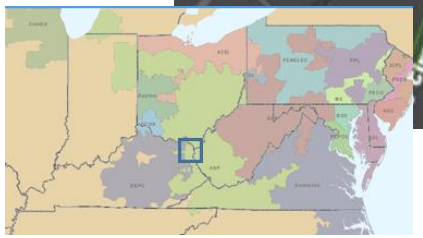
Problem Statement:

FG: AEP-SC1, AEP-SC2, AEP-SC3, AEP-SC4, AEP-SC5, AEP-SC6

In 2023 RTEP short circuit case, Bellefonte 69kV breakers JJ, C, I, AB, Z and G are overdutied.

Existing Facility Rating:

Breaker	KA
BELLEFNT 69kV Breakers: C, G, I, JJ, I, AB, Z	27



AEP Transmission Zone: Baseline Bellefonte 69kV breakers

Recommended Solution:

Replace overdutied 69kV breakers C, G, I, Z, AB and JJ in place. The new 69kV breakers to be rated at 3000 A 40kA breakers.

Transmission Estimated Cost: $2.0M

Remote end relaying at Point Pleasant, Coalton and South Point 69KV substations

Transmission Estimated Cost: $0M

Distribution Estimated Cost: $1.52M

Preliminary Facility Rating:

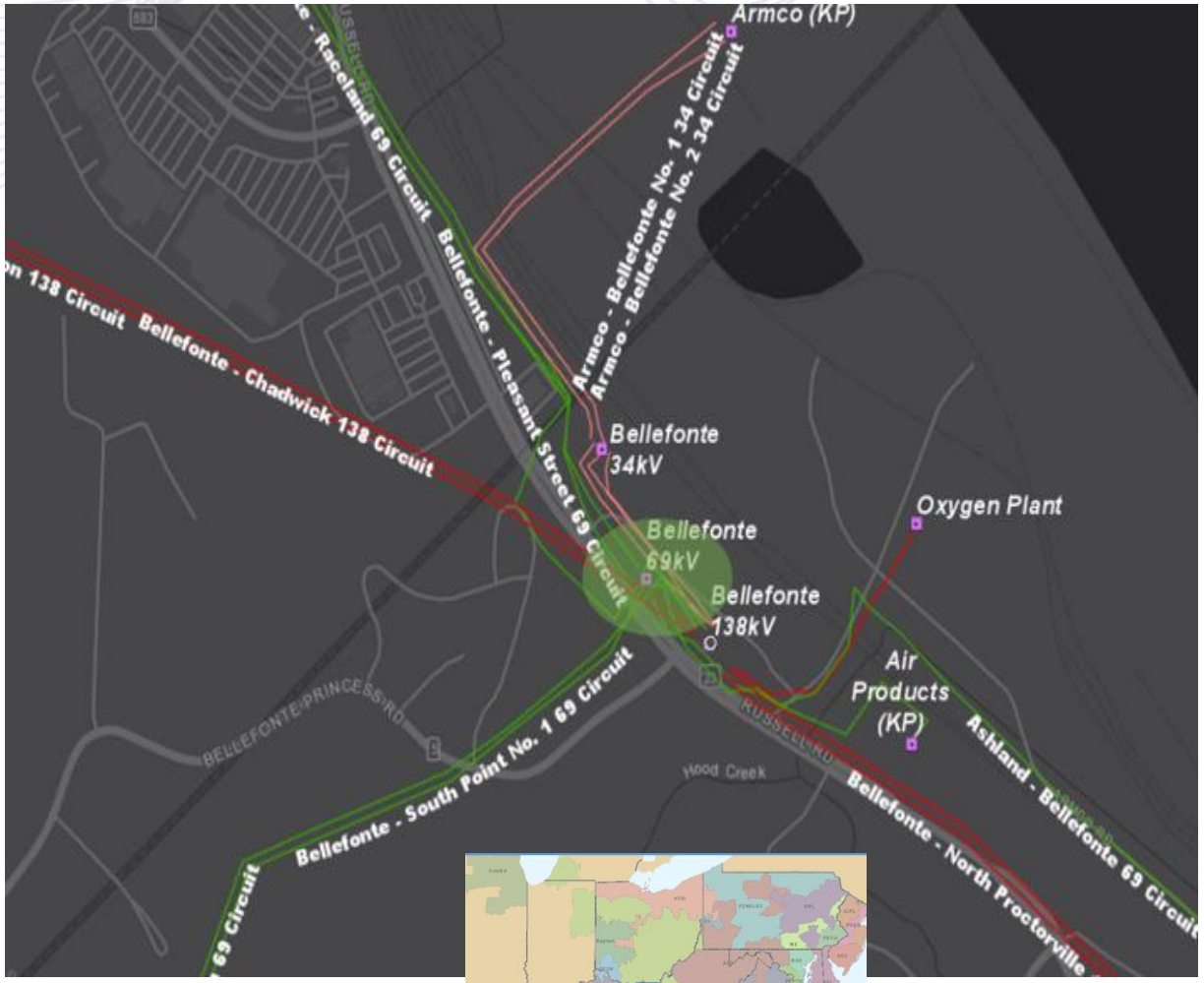
Breaker	KA
BELLEFNT 69kV Breakers: C, G, I, JJ, I, AB, Z	40

Ancillary Benefits: Breakers C, G, I, Z, AB and JJ are Oil Circuit Breakers without oil containment. Oil filled breakers have much more maintenance required due to oil handling that their modern, SF6 counterparts do not require. Spare parts for these units are difficult to impossible to procure, and this model type is no longer vendor supported.

Alternatives: No cost effective alternative identified.

Required IS date: 6/1/2023

Projected IS date: 6/1/2023



AEP Transmission Zone: Baseline Bexley Breaker Replacement

Process Stage: First Review

Criteria: AEP 715 Criteria

Assumption Reference: 2026 RTEP assumption

Model Used for Analysis: 2023 short circuit RTEP case

Proposal Window Exclusion: Below 200 kV Exclusion and Immediate Need Exclusion

Problem Statement:

FG: AEP-SC7, AEP-SC8

In 2023 RTEP short circuit case, 40 kV circuit breakers '42' and '43' at Bexley station are overdutied.

Existing Facility Rating:

Breaker	KA
Bexley 40kV Breakers: 42, 43	10

AEP Transmission Zone: Baseline Bexley Breaker Replacement

Recommended Solution:

Replace circuit breakers '42' and '43' at Bexley station with 3000A, 40 kA 69 kV breakers (operated at 40 kV), slab, control cables, jumpers.

Transmission Estimated Cost: $1.0M

Preliminary Facility Rating:

Breaker	KA
Bexley 40kV Breakers: 42, 43	40

Ancillary Benefits: Bexley 40kV breakers 42 and 43 are 1970's vintage Oil type Circuit Breakers without oil containment. Oil filled breakers have much more maintenance required due to oil handling that their modern, SF6 counterparts do not require. Spare parts for these units are difficult to impossible to procure, and this model type is no longer vendor supported.

Alternatives: No cost effective alternative identified.

Required IS date: 6/1/2023

Projected IS date: 6/1/2023

AEP Transmission Zone: Baseline
South Side Lima Breaker Replacement

Process Stage: First Review

Criteria: AEP 715 Criteria

Assumption Reference: 2026 RTEP assumption

Model Used for Analysis: 2023 short circuit RTEP case

Proposal Window Exclusion: Below 200 kV Exclusion and Immediate Need Exclusion

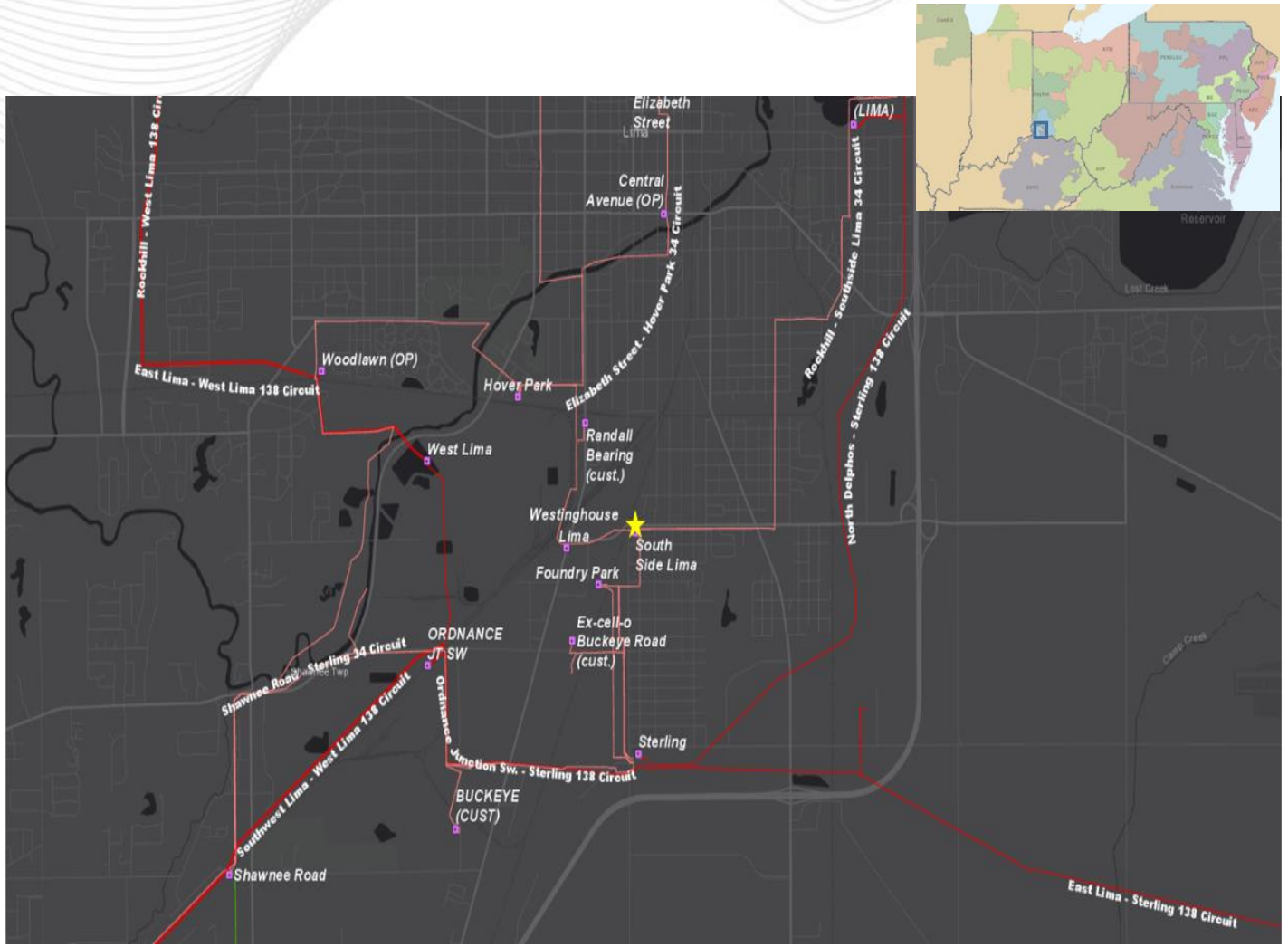
Problem Statement:

FG: AEP-SC13, AEP-SC14

In 2023 RTEP short circuit case, 34.5 kV circuit breakers 'A' and 'B' at South Side Lima station are overdutied.

Existing Facility Rating:

Breaker	KA
South Side Lima 34.5kV Breakers: A, B	14.2



AEP Transmission Zone: Baseline
South Side Lima Breaker Replacement

Recommended Solution:

Replace 34.5kV circuit breakers 'A' and 'B' at South Side Lima station with 1200A, 25 kA 34.5 kV breakers , slab, control cables, jumpers.

Transmission Estimated Cost: $0.75M

Preliminary Facility Rating:

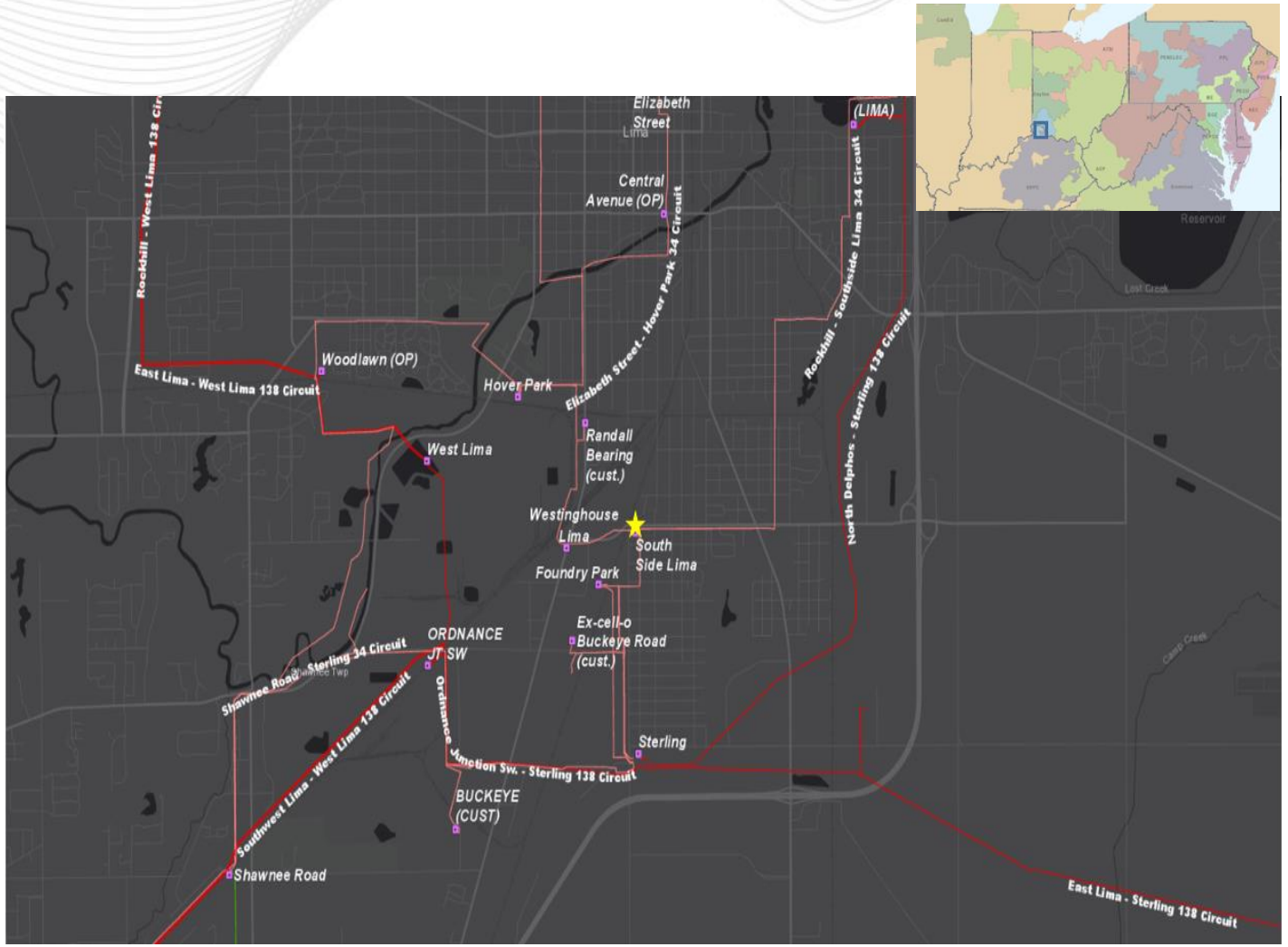
Breaker	KA
South Side Lime 34.5kV Breakers: A, B	25

Ancillary Benefits: South Side Lima 34.5kV breakers A and B are 1950's vintage Oil type Circuit Breakers without oil containment. Oil filled breakers have much more maintenance required due to oil handling that their modern, SF6 counterparts do not require. Spare parts for these units are difficult to impossible to procure, and this model type is no longer vendor supported.

Alternatives: No cost effective alternative identified.

Required IS date: 6/1/2023

Projected IS date: 6/1/2023



AEP Transmission Zone: Baseline
West End Fostoria Breaker Replacement

Process Stage: First Review

Criteria: AEP 715 Criteria

Assumption Reference: 2026 RTEP assumption

Model Used for Analysis: 2023 short circuit RTEP case

Proposal Window Exclusion: Below 200 kV Exclusion and Immediate Need Exclusion

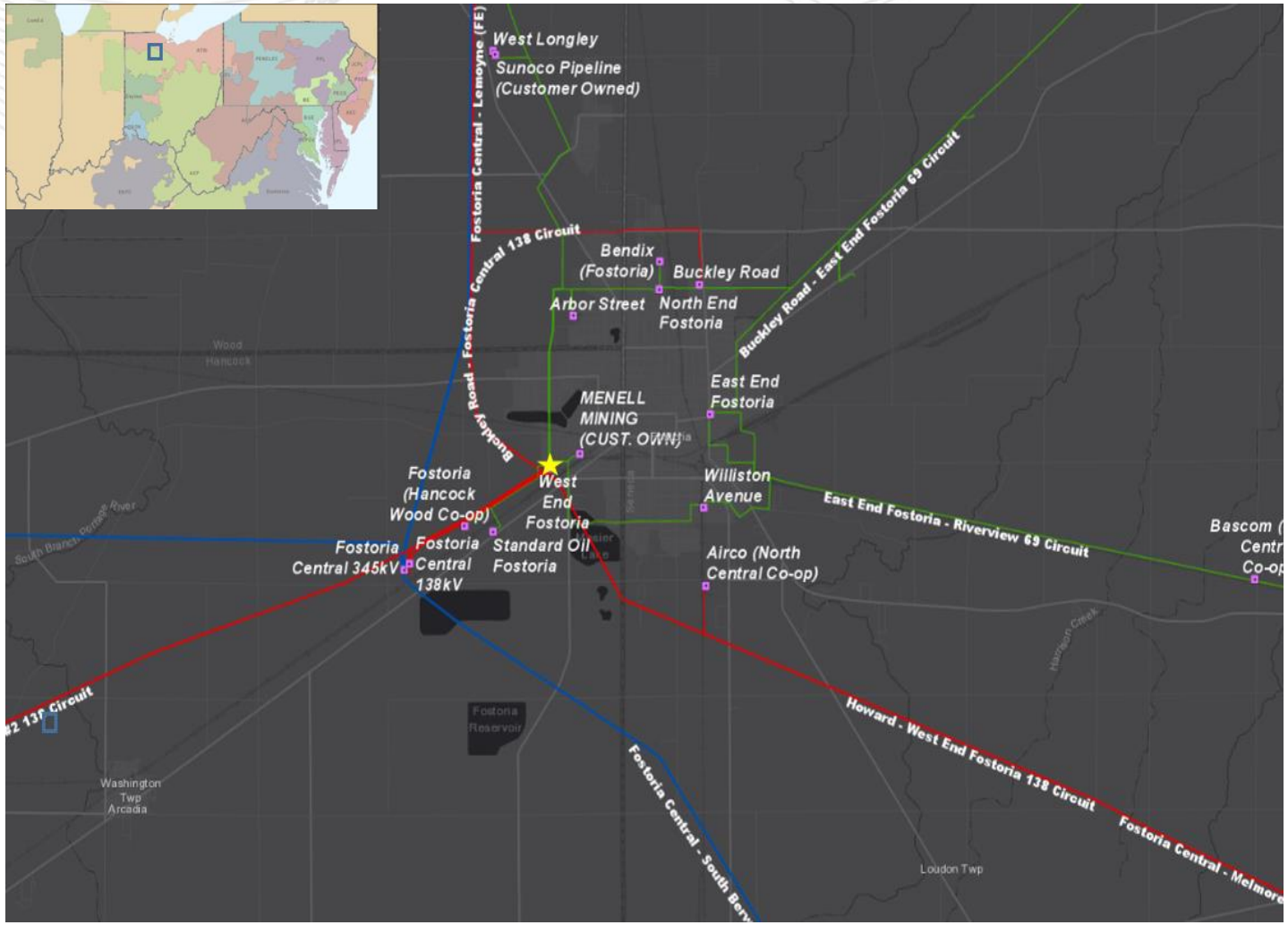
Problem Statement:

FG: AEP-SC15

In 2023 RTEP short circuit case, 69 kV circuit breaker 'H' at West End Fostoria station is overdutied.

Existing Facility Rating:

Breaker	KA
West End Fostoria 69kV Breakers: H	20



AEP Transmission Zone: Baseline
West End Fostoria Breaker Replacement

Recommended Solution:

Replace circuit breaker 'H' at West End Fostoria station with 3000A, 40 kA 69 kV breaker , slab, control cables, jumpers.

Transmission Estimated Cost: $0.5M

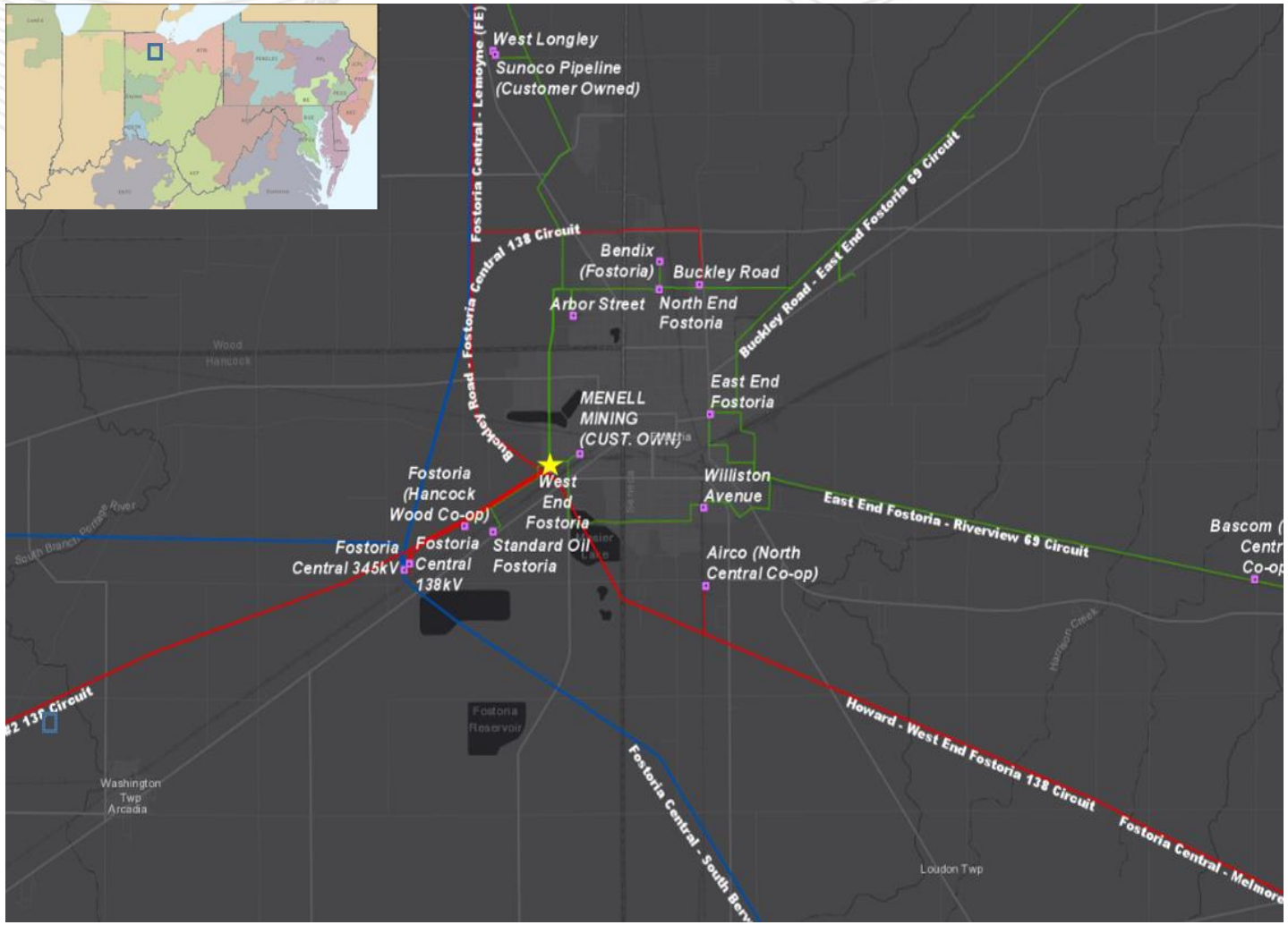
Preliminary Facility Rating:

Breaker	KA
West End Fostoria 69kV Breakers: H	40

Alternatives: No cost effective alternative identified.

Required IS date: 6/1/2023

Projected IS date: 6/1/2023



AEP Transmission Zone: Baseline Natrium Breaker Replacement

Process Stage: First Review

Criteria: AEP 715 Criteria

Assumption Reference: 2026 RTEP assumption

Model Used for Analysis: 2023 short circuit RTEP case

Proposal Window Exclusion: Below 200 kV Exclusion and Immediate Need Exclusion

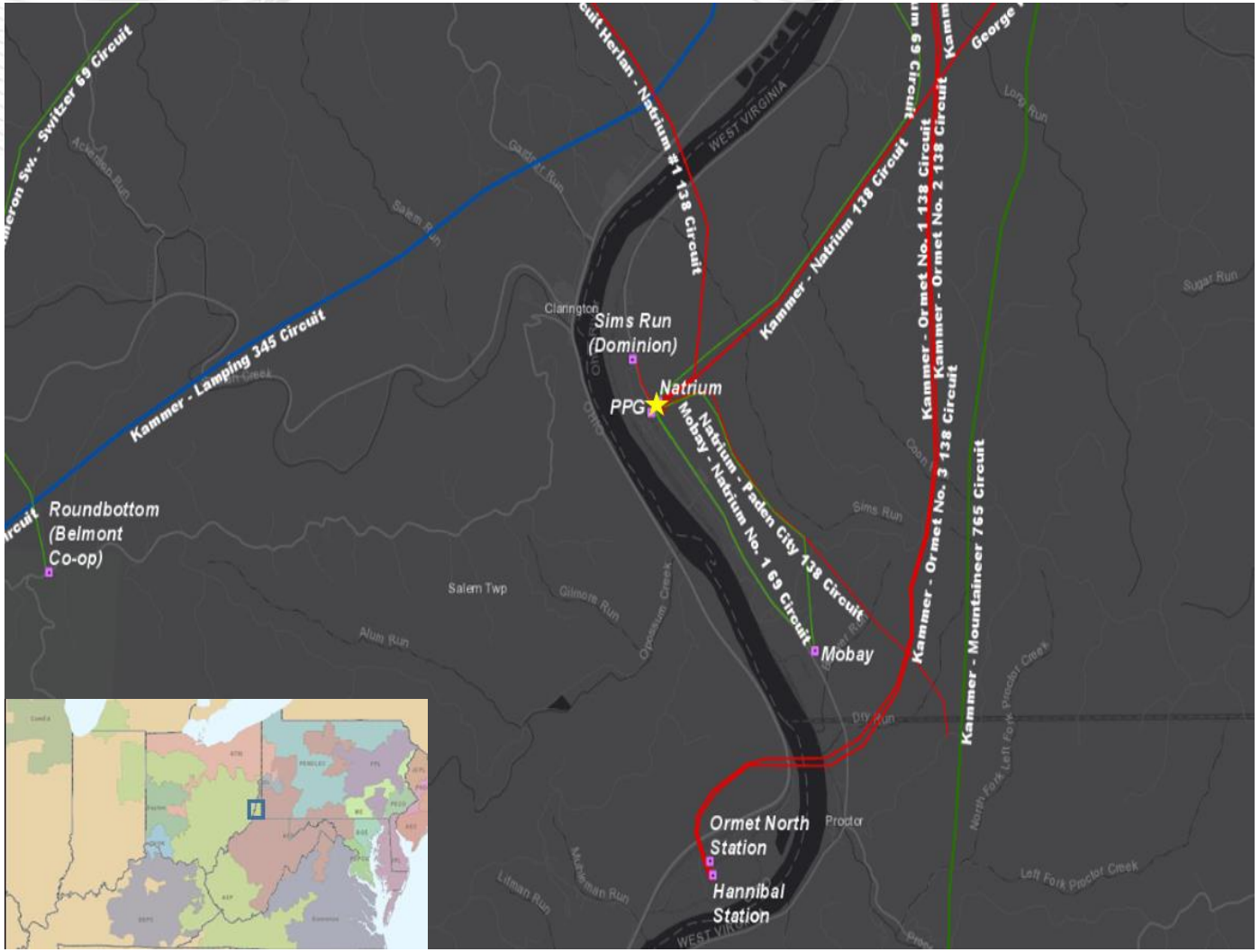
Problem Statement:

FG: AEP-SC10, AEP-SC11, AEP-SC12

In 2023 RTEP short circuit case, 69 kV circuit breakers 'C', 'E', and 'L' at Natrium station are overdutied.

Existing Facility Rating:

Breaker	KA
Natrium 69kV Breakers: C, E, L	21



AEP Transmission Zone: Baseline Natrium Breaker Replacement

Recommended Solution:

Replace circuit breakers 'C', 'E', and 'L' at Natrium station with 3000A, 40 kA 69 kV breakers, slab, control cables, jumpers.

Transmission Estimated Cost: $1.5M

Preliminary Facility Rating:

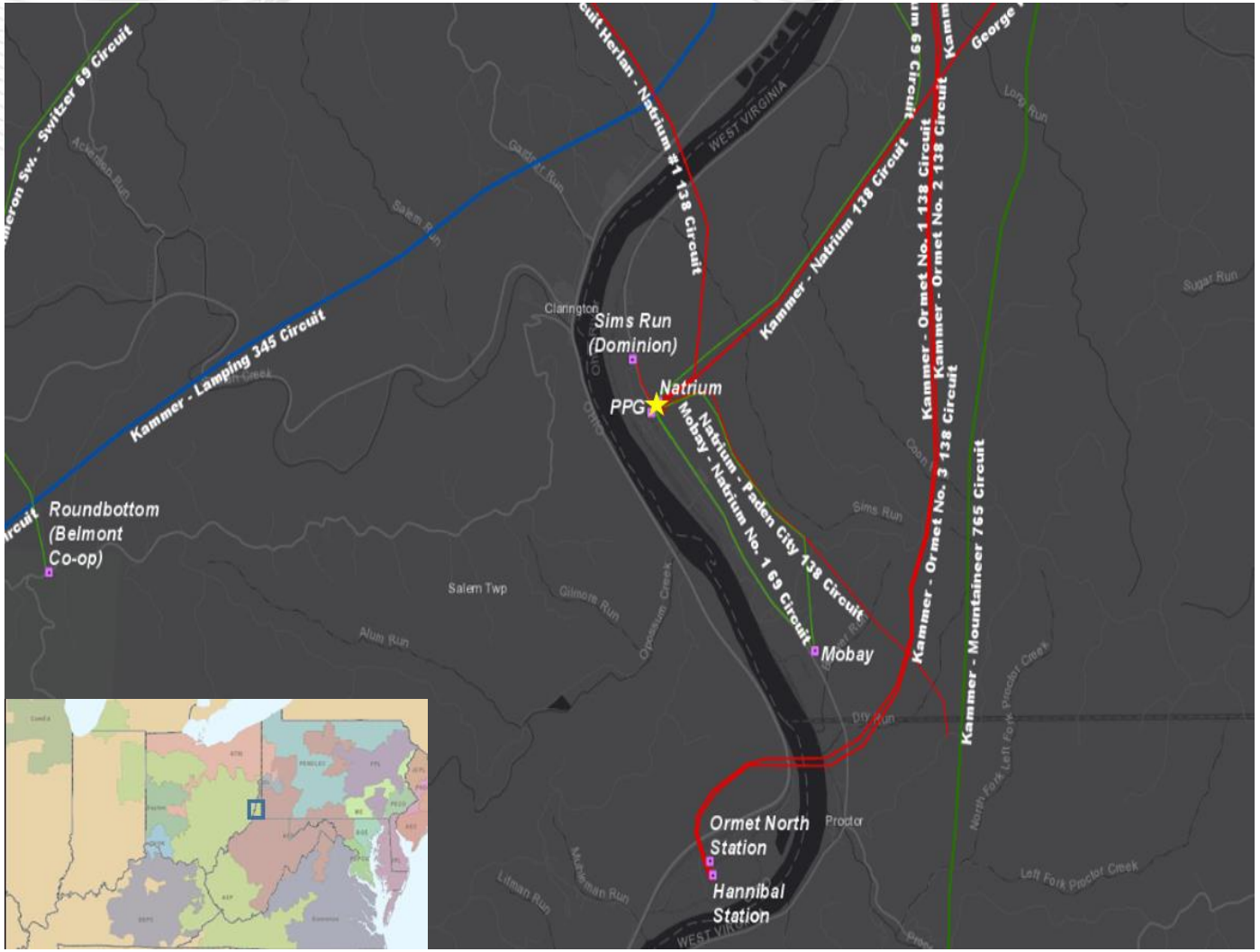
Breaker	KA
Natrium 69kV Breakers: C, E, L	40

Ancillary Benefits: Natrium 69kV breakers C, E and L are Oil Circuit Breakers without oil containment. Oil filled breakers have much more maintenance required due to oil handling that their modern, SF6 counterparts do not require. Spare parts for these units are difficult to impossible to procure, and this model type is no longer vendor supported.

Alternatives: No cost effective alternative identified.

Required IS date: 6/1/2023

Projected IS date: 6/1/2022



Revision History

- V1 – 12/14/2021 – Original slides posted
- V2 – 12/15/2021 – First review of EKPC FERC 715 project slides 16-21 removed.