SRRTEP Committee: Western AEP Supplemental Projects

August 14, 2020

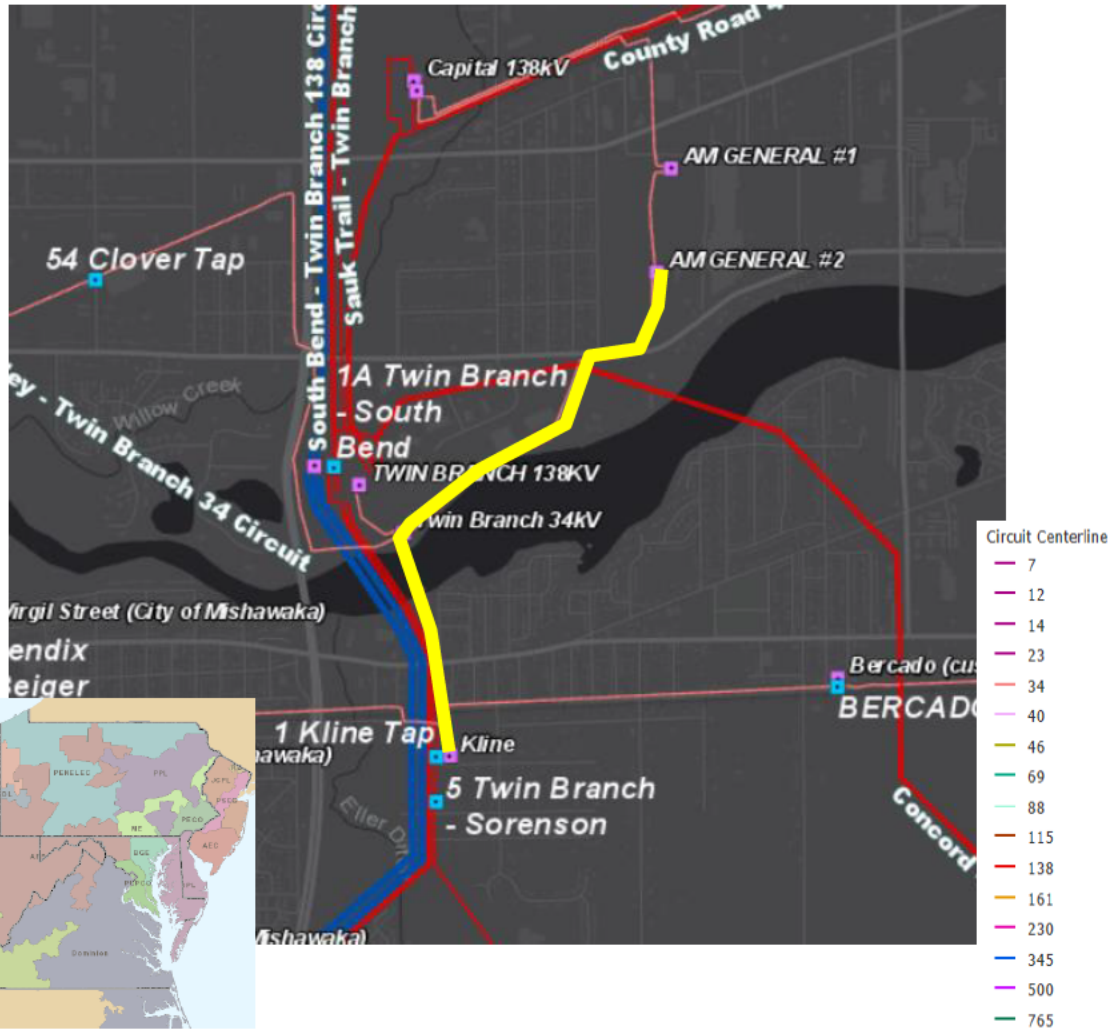
Needs

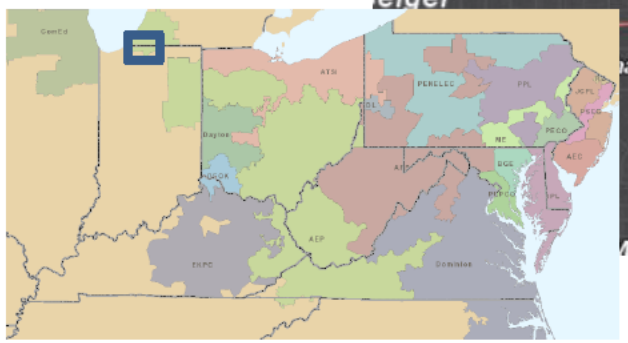
Stakeholders must submit any comments within 10 days of this meeting in order to provide time necessary to consider these comments prior to the next phase of the M-3 process

Need Number: AEP-2020-IM020
Process Stage: Needs Meeting 08/14/2020
Supplemental Project Driver: Equipment Condition/Performance/Risk
Specific Assumptions Reference: AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 8)
Problem Statement:

AM General-Twin Branch-Kline 34.5kV

- 1 mile of 1950's wood pole cross arm construction
- 7 structures, 28% of the line, with open conditions
  - Open conditions include: pole rot, broken or missing ground lead wires
- The grounding method utilizes butt wraps which is not current AEP standards
- During field assessment structures were found with vertical pole splitting, decay to cross arms, rot top, and upper pole decay





AEP Transmission Zone M-3 Process
Canton, Ohio

Need Number: AEP-2020-OH036

Process Stage: Need Meeting 8/14/2020

Project Driver:

Equipment Material/Condition/Performance/Risk

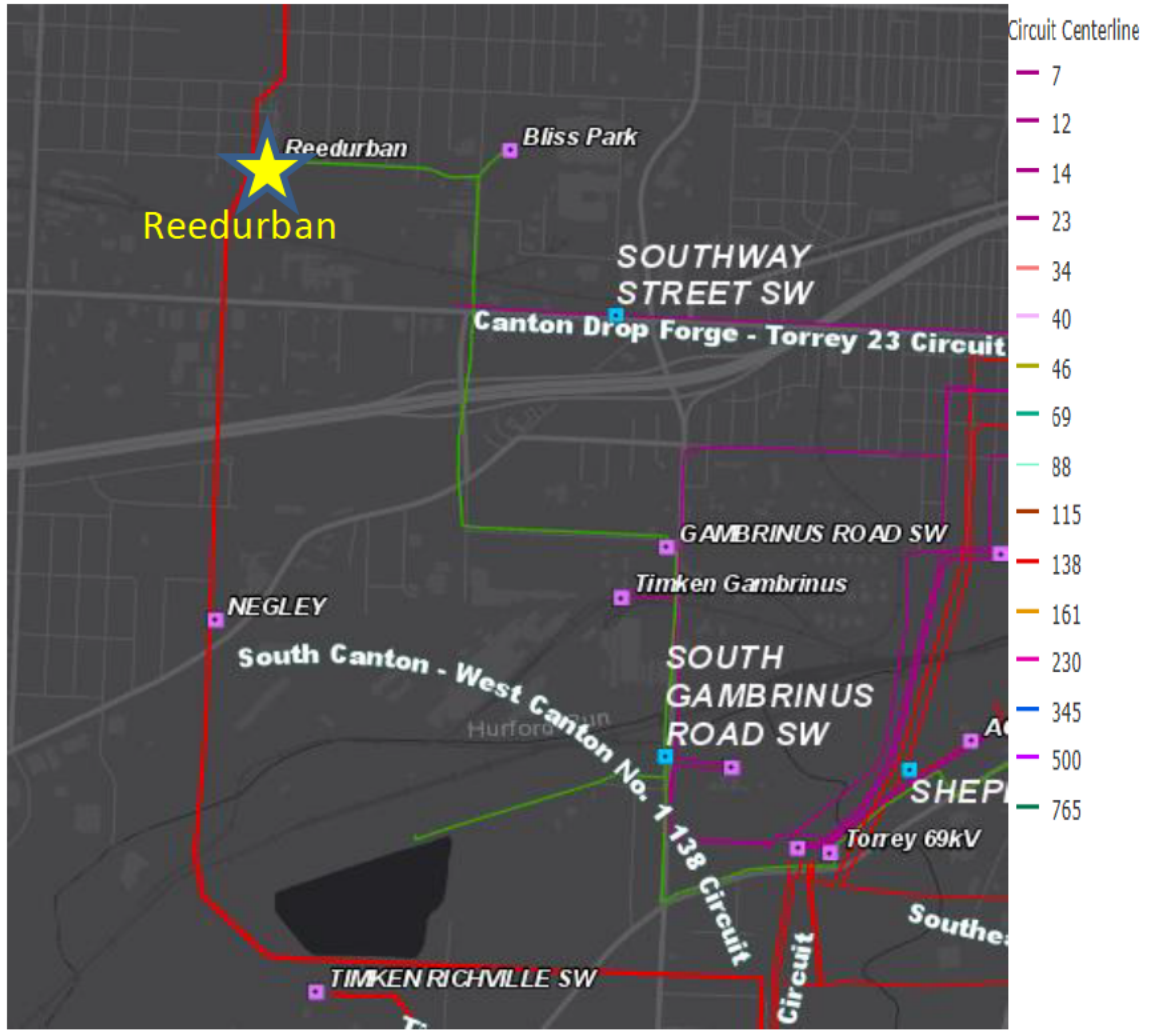
Specific Assumption Reference:

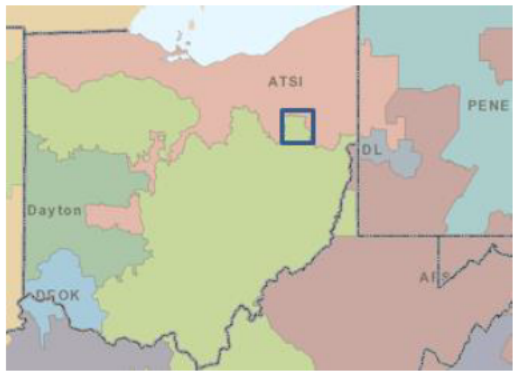
AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 8)

Problem Statement:

Station Name: Reedurban

- The 138-69kV transformer has failed and has been temporarily replaced with a mobile 138-69kV transformer.
- Manufactured and installed in 1988.
- 60 MVA nameplate, Westinghouse unit.
- Failure attributed to significant deterioration of transformer windings





AEP Transmission Zone M-3 Process
Columbus, OH

Need Number: AEP-2020-OH038

Process Stage: Need Meeting 08/14/2020

Project Driver:

Operational Flexibility and Efficiency, Equipment Material/Condition/Performance/Risk

Specific Assumption Reference:

AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 8)

Problem Statement:

Customer Service:

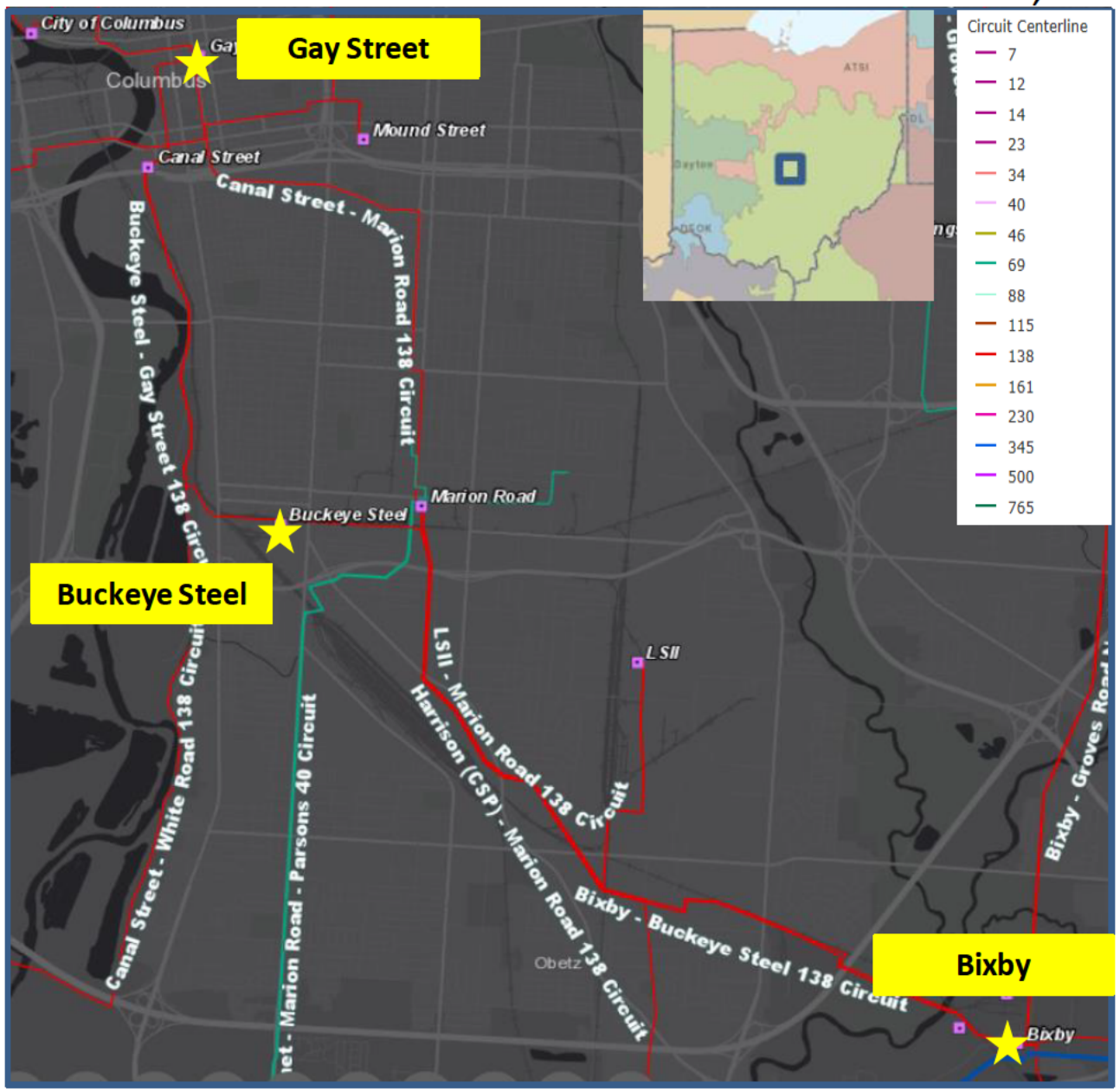
The customer served out of this station has indicated they no longer require Transmission service and has disconnected their load.

Equipment Material/Condition/Performance/Risk:

The oil filled circuit breakers 101 – 104 (vintage 1977) have a number of malfunctions/maintenance issues including hydraulic oil leaks, replaced hydraulic pressure system motors and pumps. Breaker 103 has experienced 12 fault operations, exceeding the manufacturer recommend number of 10. Additionally, oil filled breakers require frequent maintenance. Oil spills are common and can result in significant environmental mitigation costs.

37 of the 41 relays are electromechanical type relays, which have no vendor support due to their obsoleteness, lack SCADA ability, and don't have fault data collection capabilities. The existing legacy RTU is no longer supported by the vendor and has no spare parts available.

Model: N/A



Solutions

Stakeholders must submit any comments within 10 days of this meeting in order to provide time necessary to consider these comments prior to the next phase of the M-3 process

AEP Transmission Zone M-3 Process
Twin Branch Hydro 34.5kV Solution

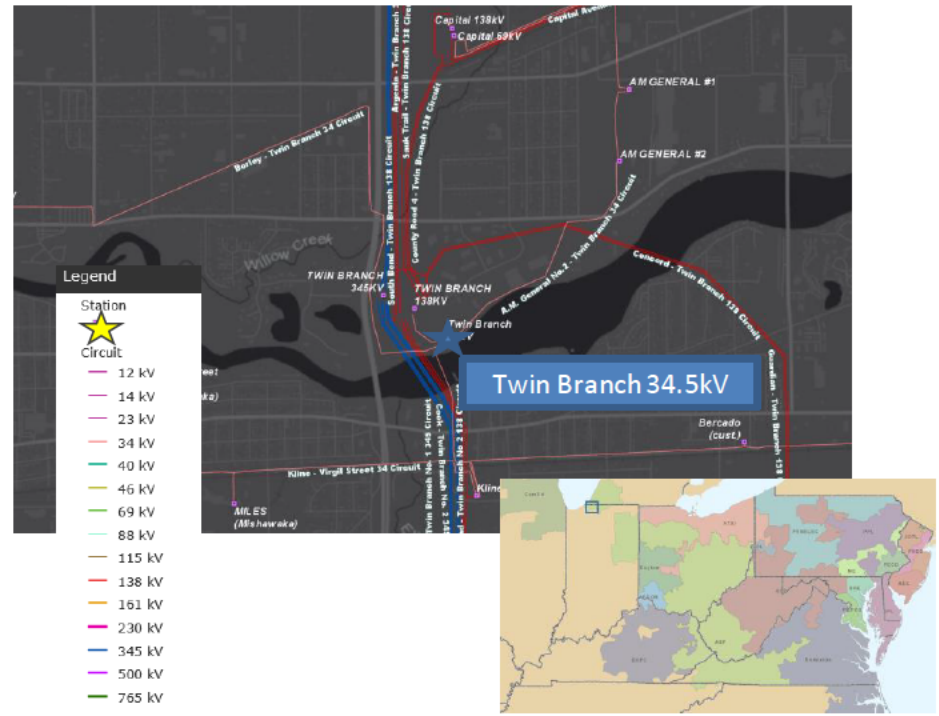
Need Number: AEP-2019-IM044
Process Stage: Solutions Meeting 08/14/2020
Previously Presented: Needs Meeting 11/22/2019
Supplemental Project Driver: Equipment Material/Condition/Performance/Risk
Specific Assumptions Reference: AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 8)

Problem Statement:
Twin Branch Hydro 34.5kV Station:
34.5kV Breakers:

- The 34.5 kV Circuit Breakers CB, BB, DD, HH, and NN at Twin Branch 34.5kV Station are GE 'FK' oil-filled breaker manufactured in the 1950's. Common failure modes documented in AEP malfunction records for these breaker types are:
  - compressor failures and valve defects, which cause low pressure and oil leaks.
  - trip or reclose failures, caused primarily by spring latching and charging motor component failures.
  - the vacuum oil and oil breakers have a lot of oil contamination from aging gaskets allowing moisture and other particle ingress.
- Oil spills are frequent with failures and routine maintenance, which can also present an environmental hazard
- Because these breaker types are no longer manufactured, spare parts are not available.

34.5/4kV Transformer #4:

- The interfacial tension of the oil is below acceptable limits and the moisture content in the oil relates to a level of relative saturation. These indicate that:
  - sludge has formed in the radiators, core and coil.
  - high moisture levels in the oil and paper insulating materials.
  - the transformer oil is in poor quality to withstand dielectric events.
- Due to the age of this transformer, oil processing is not feasible option to extend the life of the unit.



AEP Transmission Zone M-3 Process
Twin Branch Hydro 34.5kV Solution

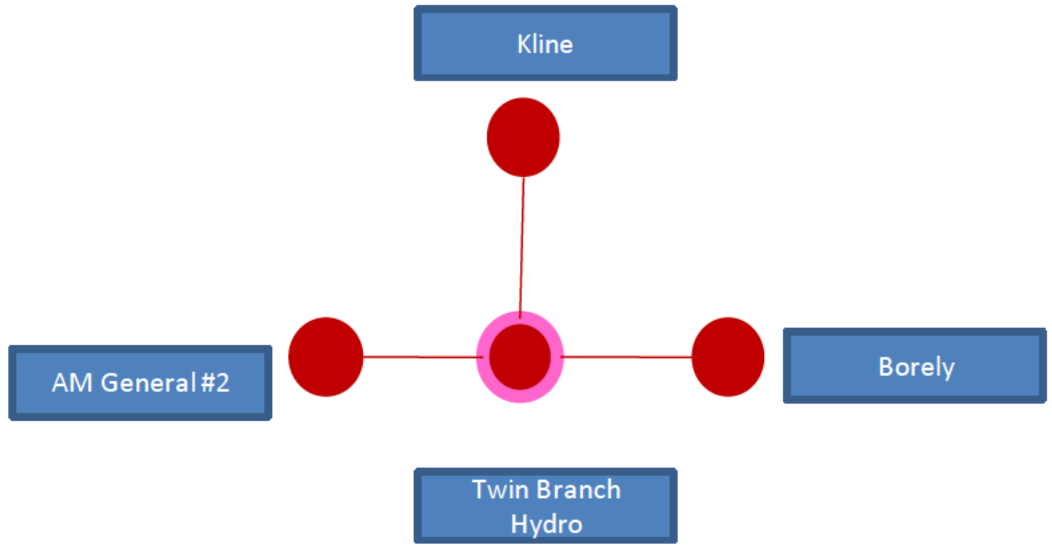
Need Number: AEP-2019-IM044
Process Stage: Solutions Meeting 08/14/2020
Project Status: Scoping

Proposed Solution:

Twin Branch Hydro 34.5kV Station:
Replace 34.5kV Breakers BB, CC, DD, HH, NN and 34.5kV/4kV Transformer #4
Estimated Transmission Cost: $2.8M

Alternatives:
Rebuilding Twin Branch Hydro as a greenfield station to accommodate a ring bus was considered for this project due to the space constraints at the current location. This was ultimately not chosen due to the fact that future expansion of the station was not expected and limited availability for a greenfield site.
Estimated Cost: $4.8M

Proposed IS Date: 05/10/2022
Project Status: Scoping



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

AEP Transmission Zone M-3 Process
Lima, Ohio

Need Number: AEP-2020-OH009

Process Stage: Solutions Meeting 08/14/2020

Previously Presented:

Need Meeting 2/21/2020

Project Driver:

Equipment Material/Condition/Performance/Risk, Operational Flexibility and Efficiency, Customer Service

Specific Assumption Reference:

AEP Guidelines for Transmission Owner Identified Needs

Problem Statement:

Equipment Material/Condition/Performance/Risk:

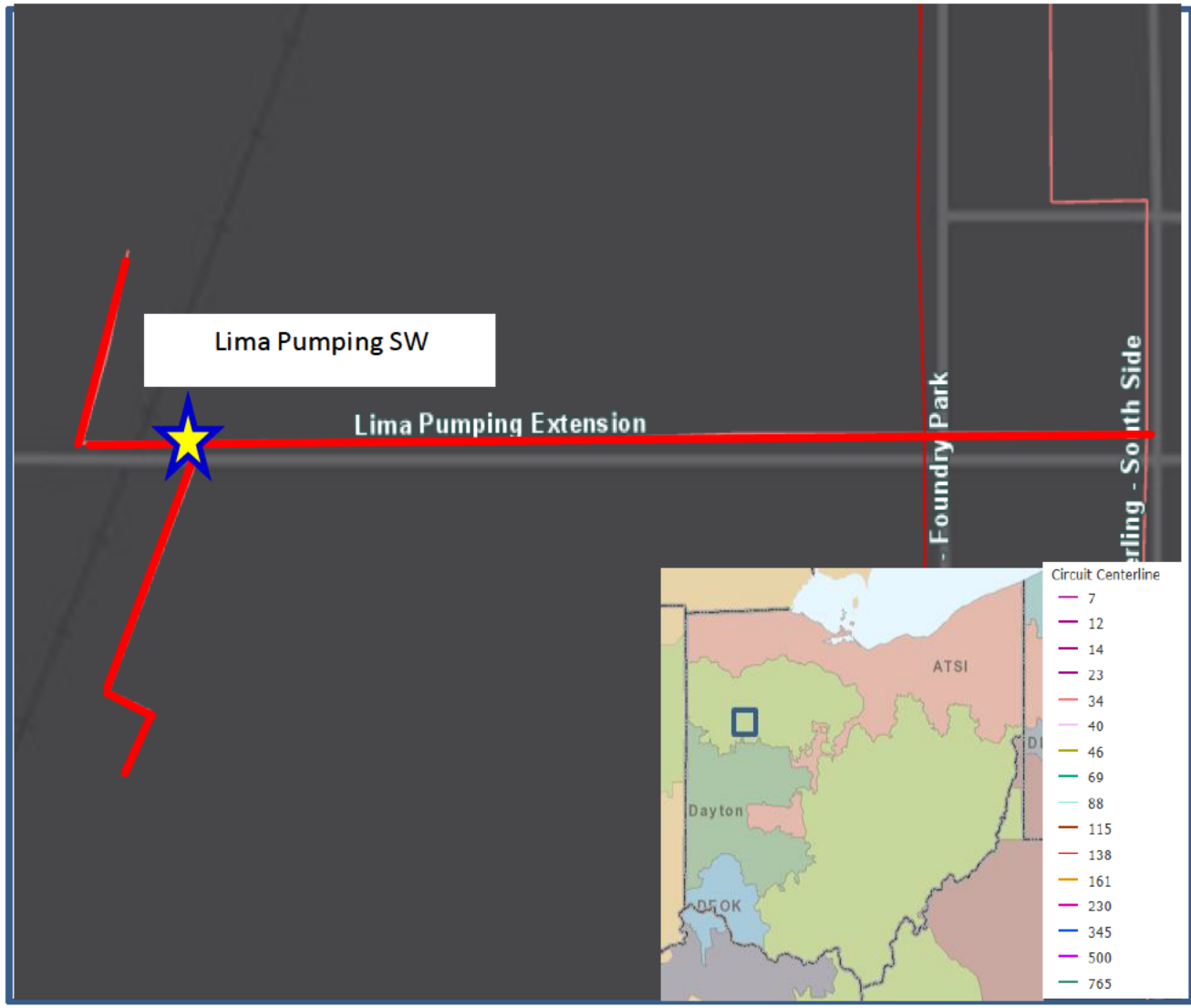
- This line consists of 15 wood pole structures and has predominantly the original #2 ACSR/AW Sparrow conductors installed in 1943. 9 out of the 15 structures on this line were installed more than 60 years ago. 5 year CMI on this circuit is approx. 95,000. The existing construction is obsolete crossarm construction with 35 kV vertical stud post insulators. A couple of the poles have shield wire support bay-o-nets.

Operational Flexibility and Efficiency

- The line has experienced four (4) conductor failures since August 1, 2018. The first 8 spans of the line have 35 total splices. In most cases the burned down 34.5 kV conductors end up falling into and faulting the AEP Ohio 3-phase distribution underbuild, interrupting several hundred additional distribution customers.

Customer Service:

- Marathon Pipe Line has experienced multiple outages to their facilities due to geese contact with AEP's 34.5 kV transmission line serving them and another customer. Additionally these two customers are connected off of a hard tap at the end of the radial 34.5 kV line forcing both of them to be out when one of them request and outage.



AEP Transmission Zone M-3 Process
Lima Pumping Extension Rebuild

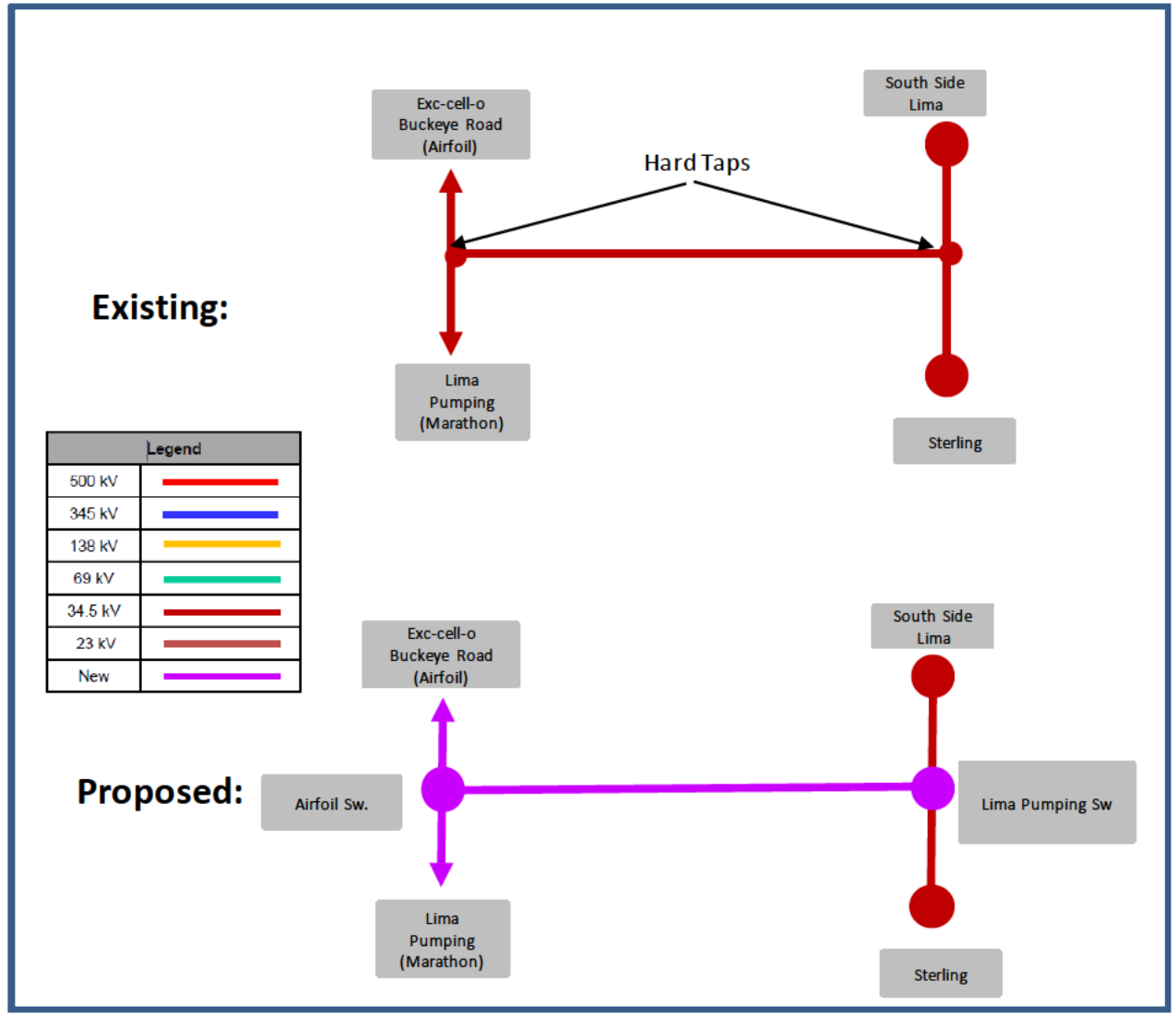
Need Number: AEP-2020-OH009

Process Stage: Solutions Meeting 08/14/2020

Proposed Solution:

- Rebuild the ~0.4 miles, 34.5 kV Lima Pumping Line Extension to 69 kV standards (operated at 34.5 kV). **Estimated Cost** $2.3M
- Rebuild the ~0.1 miles, 34.5 kV Ex-cell-o Line Extension to 69 kV standards (operated at 34.5 kV). **Estimated Cost** $0.5M
- **Lima Pumping Switch 34.5kV:** Install new 69 kV, 1200A, 40kA 3-way phase-over-phase manual switch on the Sterling – South Side Lima 34.5 kV circuit. **Estimated Cost** $0.4M
- **Airfoil Switch 34.5kV:** Install new 69kV, 1200A, 40kA 2-way Phase-over-phase manual switch on the Lima Pumping Extension. **Estimated Cost** $0.6M

Total Estimated Transmission Cost: $3.8M



AEP Transmission Zone M-3 Process
Lima Pumping Extension Rebuild

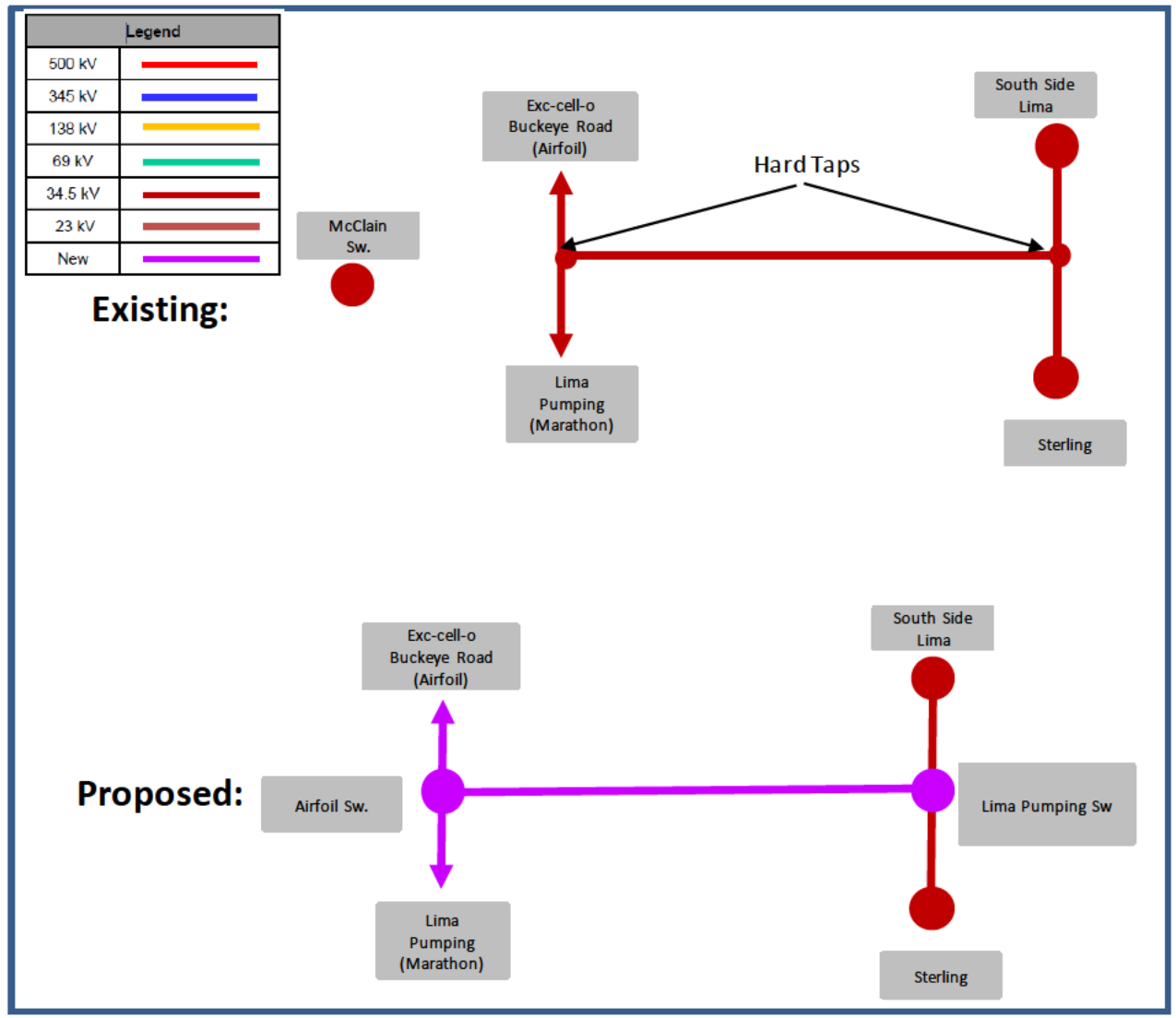
Alternatives Considered:

- Build a 34.5kV line from McClain Sw. to Ex-cell-o or Sterling – Lima Pumping Ext. (.8 miles away) and retire the current Lima Pumping Ext. However, this alternate involves construction next to railroads in a congested area. Additionally, there is potential concern regarding the Excello and Marathon customers experiencing flicker due to the Foundry Park Load, if McClain Sw were to be connected to Ex-cell-o.

Projected In-Service: 11/15/2021

Project Status: Scoping

Model: 2023 RTEP



Appendix

High Level M-3 Meeting Schedule

Assumptions

Activity	Timing
Posting of TO Assumptions Meeting information	20 days before Assumptions Meeting
Stakeholder comments	10 days after Assumptions Meeting

Needs

Activity	Timing
TOs and Stakeholders Post Needs Meeting slides	10 days before Needs Meeting
Stakeholder comments	10 days after Needs Meeting

Solutions

Activity	Timing
TOs and Stakeholders Post Solutions Meeting slides	10 days before Solutions Meeting
Stakeholder comments	10 days after Solutions Meeting

Submission of Supplemental Projects & Local Plan

Activity	Timing
Do No Harm (DNH) analysis for selected solution	Prior to posting selected solution
Post selected solution(s)	Following completion of DNH analysis
Stakeholder comments	10 days prior to Local Plan Submission for integration into RTEP
Local Plan submitted to PJM for integration into RTEP	Following review and consideration of comments received after posting of selected solutions

Revision History

8/4/2020 – V1 – Original version posted to pjm.com