

Sub Regional RTEP Committee: Western AEP Supplemental Projects

September 11, 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-AP039

Process Stage: Needs Meeting 9/11/2020

Supplemental Project Driver: Customer Service

Specific Assumption References: AEP Connection

Requirements for the AEP Transmission System (AEP Assumptions Slide 7)

Problem Statement:

APCO Distribution has requested a new distribution station located in Fayette County, West Virginia.

Summer projected load: 9 MVA

Winter projected load: 14 MVA.



Need Number: AEP-2020-AP040

Process Stage: Needs Meeting 9/11/2020

Process Chronology: Needs Meeting 9/11/2020

Supplemental Project Driver: Equipment Material/ Condition/Performance/Risk, Operational Flexibility and Efficiency

Specific Assumption References: AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 8)

Problem Statement:

Station

Station Name: Lovedale

Circuit Breakers A, B & G (34.5 KV) Concerns:

- All of these breakers are 52 years old, oil filled without oil containment; oil filled breakers pose significant environmental risk associated with oil handling and leaks. Additionally, oil filled breakers require frequent maintenance. Oil spills are common and can result in significant environmental mitigation costs.
- Breakers A & B have experienced 41 & 11 fault operations, respectively, exceeding manufacturer's recommended number of 10.
- Breakers A, B & G are 3 of 31 of the FKA-34.5-1500-1 model remaining on the AEP system. Spare parts for these units are impossible to procure as this model type is no longer vendor supported.

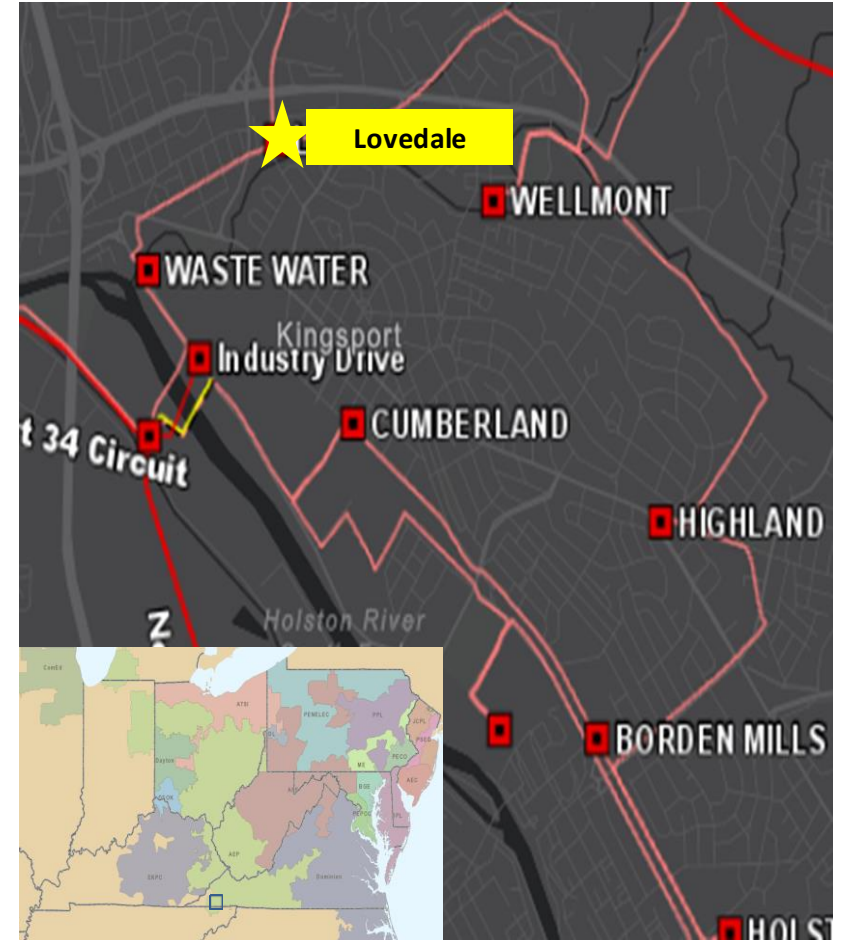
Other station concerns:

- The station yard is very cramped and tight. There is limited ability for crews to perform necessary maintenance due to a lack of space for vehicles and equipment.
- The bus arrangement is tight and congested with tubing comprised mainly of copper
- Cap and pin insulators are used throughout the station
- There are additional needs on the Distribution voltage class equipment within the station

Relay concerns:

- Currently, 33 of the 40 deployed relays are electromechanical type which have significant limitations with regards to fault data collection and retention. In addition, these relays lack vendor support with no spare part availability for repairs.

AEP Transmission Zone: Supplemental Sullivan, TN



Need Number: AEP-2020-IM019

Process Stage: Need Meeting 09/11/2020

Supplemental Project Driver: Equipment Condition/Performance/Risk

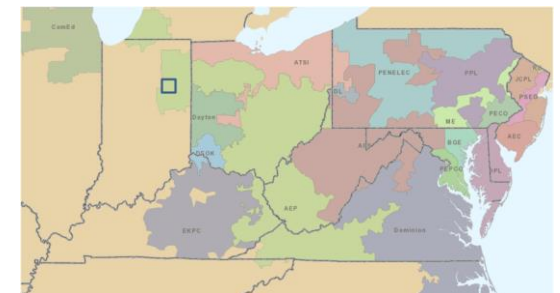
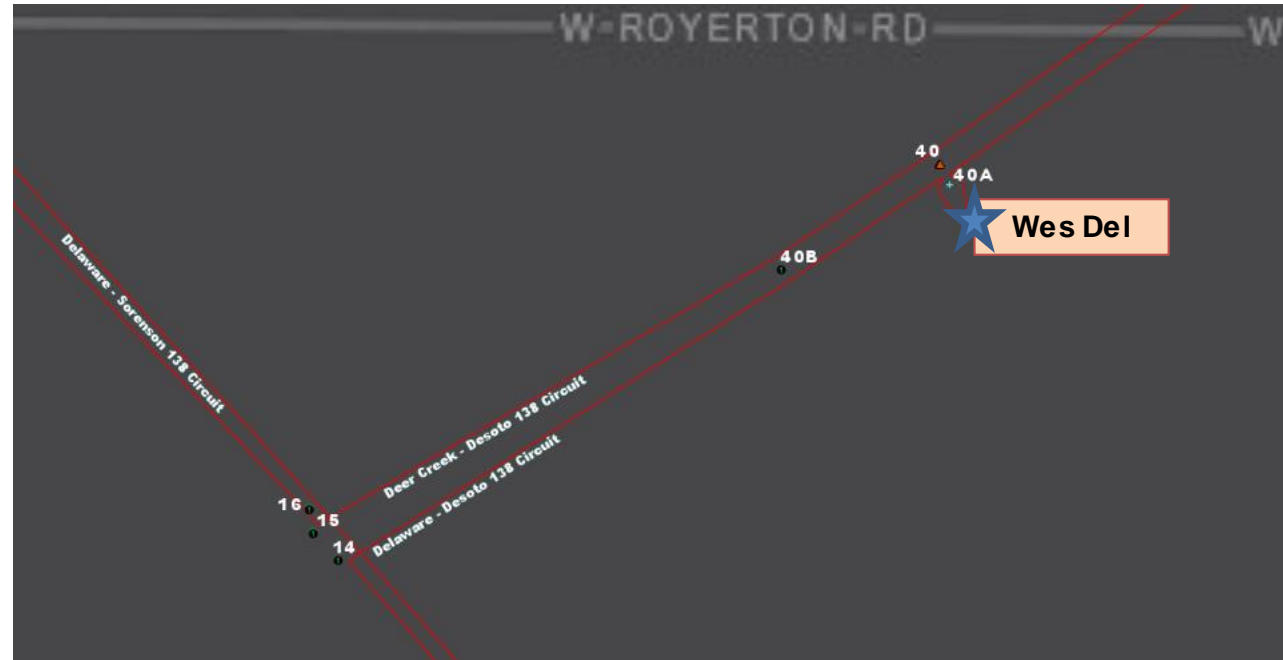
Specific Assumption Reference:

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

Problem Statement:

Wes Del 138/12kv station

- 138/69/12 kV Transformer #1
 - Unit failed in February 2020, station currently served by mobile unit
 - 1968 vintage
- Line MOABs X & Y
 - Configuration of switches on non-standard structure makes them impossible to maintain without a transformer outage.
 - Due to switch operating condition and length of operating pipe, motor operators cannot be properly adjusted to attain full open/close position.
 - Switches were manufactured in 1969
 - Neither switch will fully close after operation without assistance.



Need Number: AEP-2020-IM021

Process Stage: Needs Meeting 09/11/2020

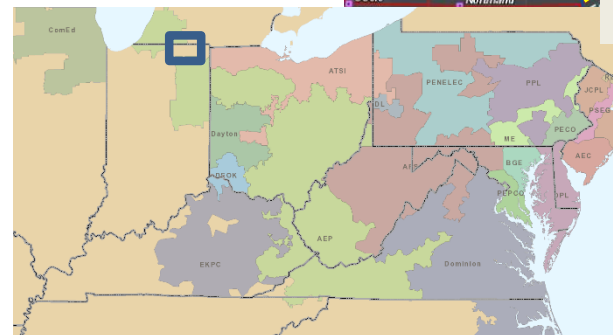
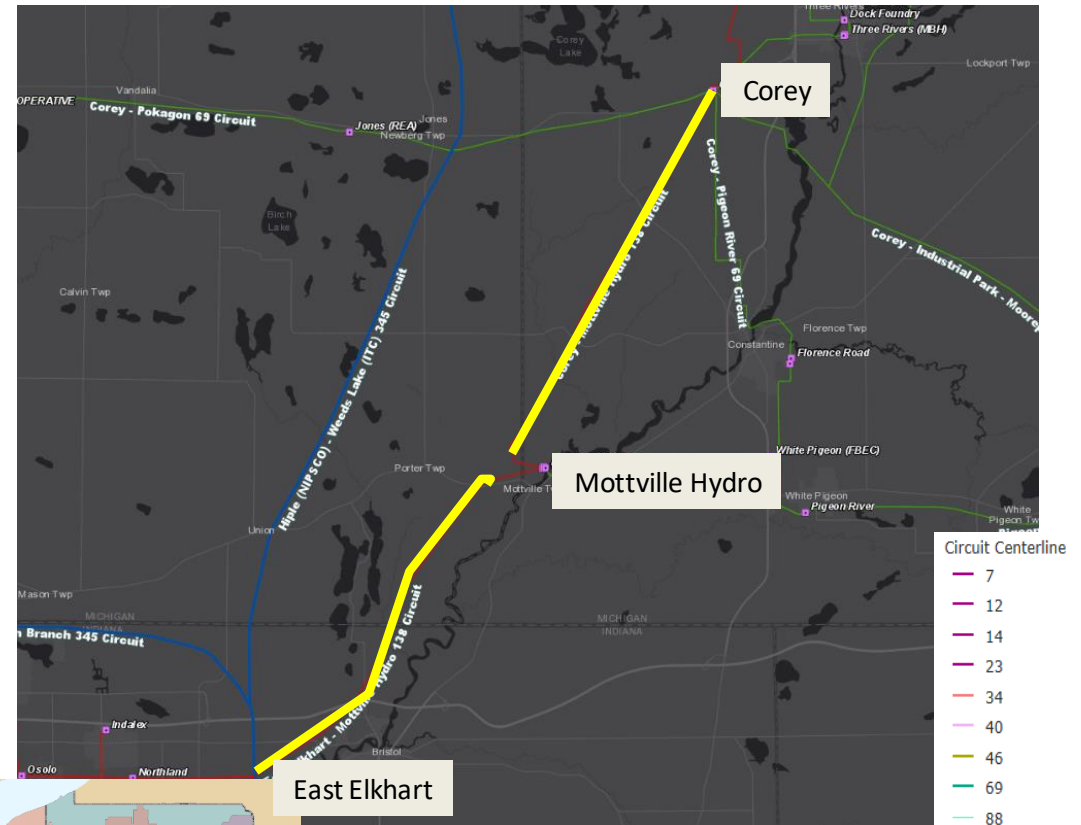
Supplemental Project Driver: Equipment Condition/Performance/Risk

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

Problem Statement:

East Elkhart- Mottville Hydro- Corey 138kV

- 16.3 miles consisting of 1960's wood pole H frame structures with vertical insulators
 - 88% of structures are original
 - 100% of conductor is original
- Since 2014 there have been
 - 3 momentary outages on Corey-Mottville Hydro 138kV
 - 2 momentary outages on East Elkhart-Mottville Hydro 138kV
- The line contains 36 open conditions including burnt or broken insulators and broken or missing ground lead wire
 - Leads to poor lightning performance (3 outages caused by lightning)
 - Shielding angle does not meet current AEP shielding requirements
 - The grounding utilizes butt wraps which are not current AEP standards
- Field assessment found 45% of the structures assessed with at least one condition. Conditions included cracked and split cross arms, upper pole and knee brace decay, woodpecker damage and flashed insulators
- Insulators don't meet CIFO and minimum leakage requirements



AEP Transmission Zone: Supplemental South Butler Load Increase

Need Number: AEP-2020-IM022

Process Stage: Solutions Meeting 09/11/2020

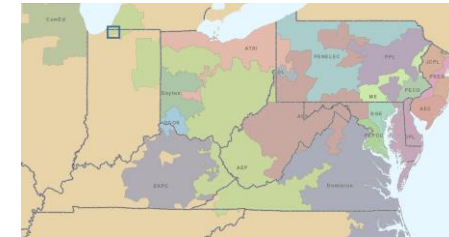
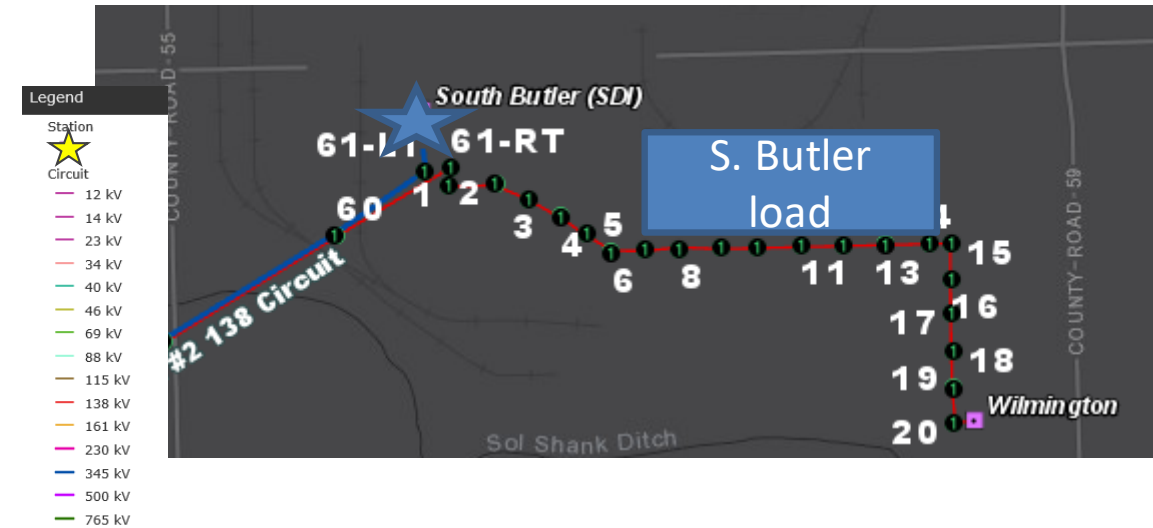
Supplemental Project Driver: Customer Service

Specific Assumptions Reference: AEP Interconnection Guidelines (AEP Assumptions Slide 7)

Problem Statement:

At South Butler 345kV station, the customer has requested delivery for a 10 MW load increase served by a new transformer at the station.

Model: 2024 RTEP



AEP Transmission Zone M-3 Process Payne 69kV

Need Number: AEP-2020-OH040

Process Stage: Need Meeting 09/11/2020

Project Driver:

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

Specific Assumption Reference:

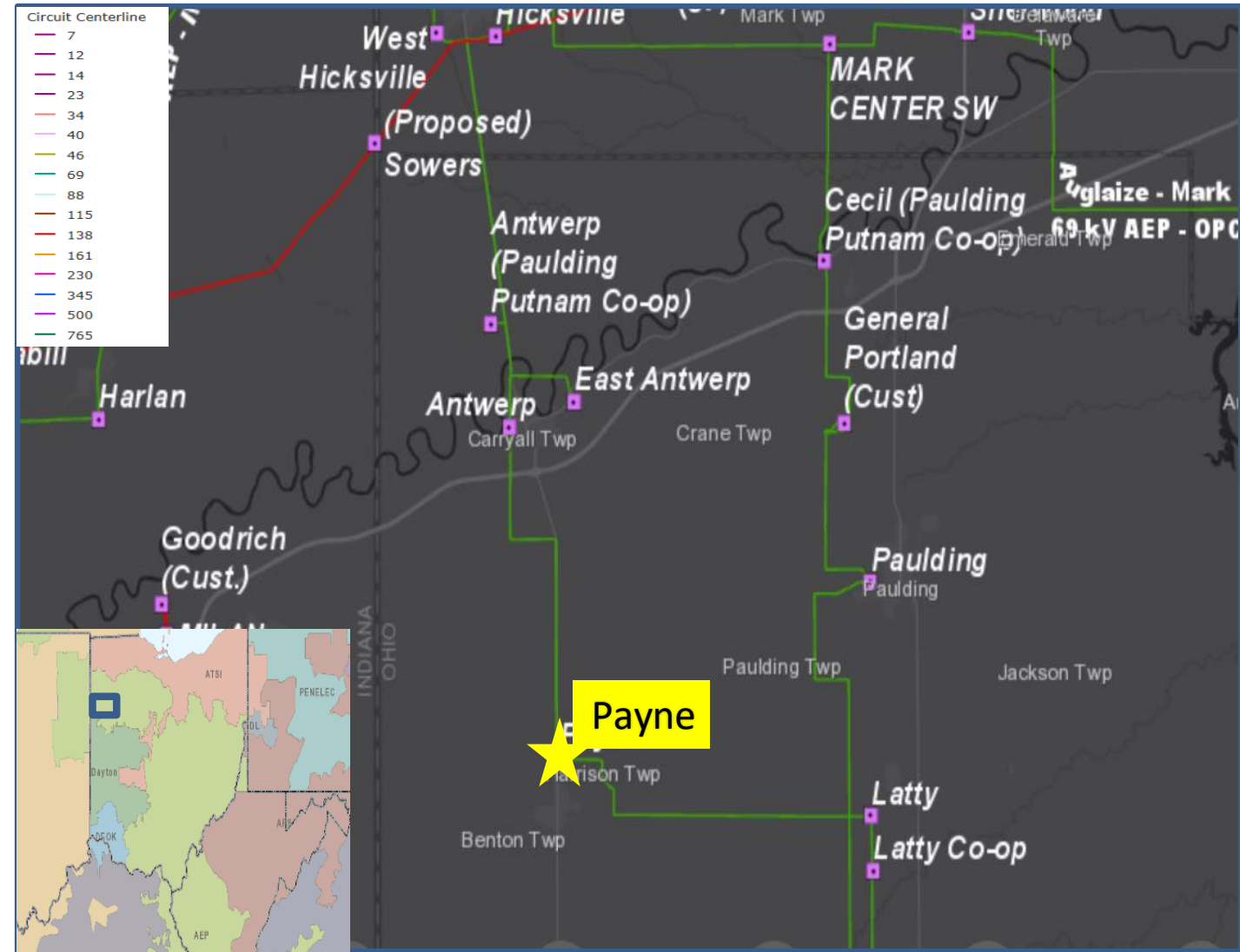
AEP Guidelines for Transmission Owner Identified Needs (slide 8).

Problem Statement:

Station

Payne 69kV

- Two (2) 69 kV circuit breakers are oil filled breakers of 1960s vintage without oil containment and have exceeded the recommended fault operations of 10. These breakers have 66 and 46 fault operations respectively. Additionally, oil filled breakers require frequent maintenance. Oil spills are common and can result in significant environmental mitigation costs.
- 21 out of 23 relays are electromechanical and 2 are static relays without vendor support, fault data collection, or SCADA ability.
- The 69/12 kV transformer is a fused bank with no disconnecting/sectionalizing capability. Low side breakers need to be opened to be able to safely work on the fuse and/or transformer.



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 Gateway & Columbia, Whitley Indiana

Need Number: AEP-2018-IM014

Previously Presented: Needs Meeting 10/26/2018

Process Stage: Solution Meeting 9/11/2020

Supplemental Project Driver: Equipment Material/Condition/Performance/Risk

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

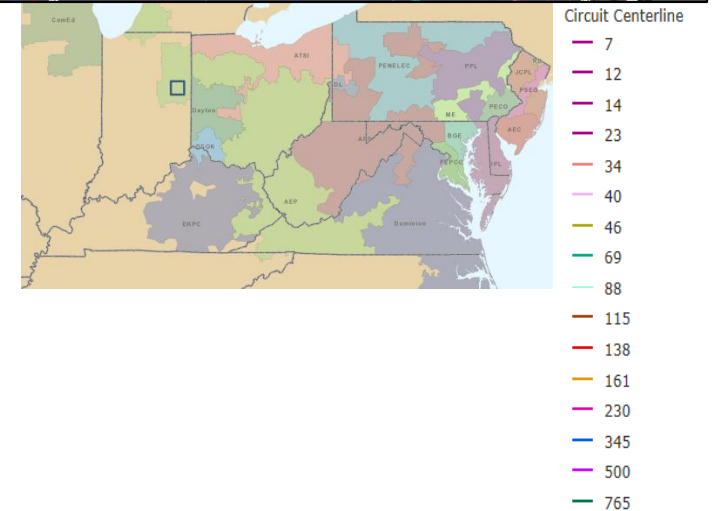
Problem Statement:

Columbia Station

- Circuit Breakers J 69kV
 - Vintage 1968
 - GE FKA type oil-filled breakers –without oil containment
 - Fault operations: CB A(95) – Recommended (10)
 - Trip coil failure
 - Spring charging motor failure

Gateway Station

- Circuit Breaker E 69kV
 - 1975 vintage
 - GE FKA type oil-filled breakers –without oil containment
 - Fault operations: CB E(49) – Recommended (10)
 - Three documented instances of breaker failing to close



AEP Transmission Zone M-3 Process Gateway & Columbia, Whitley Indiana

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

Need Number: AEP-2018-IM014

Process Stage: Solution Meeting 9/11/2020

Proposed Solution:

Replace 69kV CB “E” at Gateway station with a 3000A 40kA CB

Estimated Cost: \$0.9M

Replace 69kV CB “J” at Columbia station with a 3000A 40kA CB

Estimated Cost: \$0.9M

Total Estimated Transmission Cost: \$1.8M

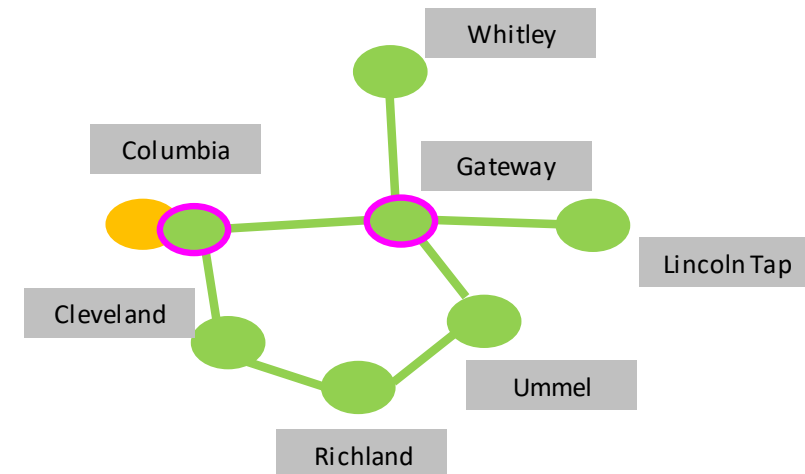
Alternatives Considered:

No viable transmission alternates identified

Projected In-Service: 04/03/2023

Project Status: Scoping

Model: N/A



AEP Transmission Zone: Supplemental Rob Park – Lincoln 138kV line rebuild

Need Number: AEP-2020-IM016

Previously Presented: Needs Meeting 4/20/2020

Process Stage: Solution Meeting 9/11/2020

Supplemental Project Driver: Equipment

Material/Condition/Performance/Risk & Operational Flexibility

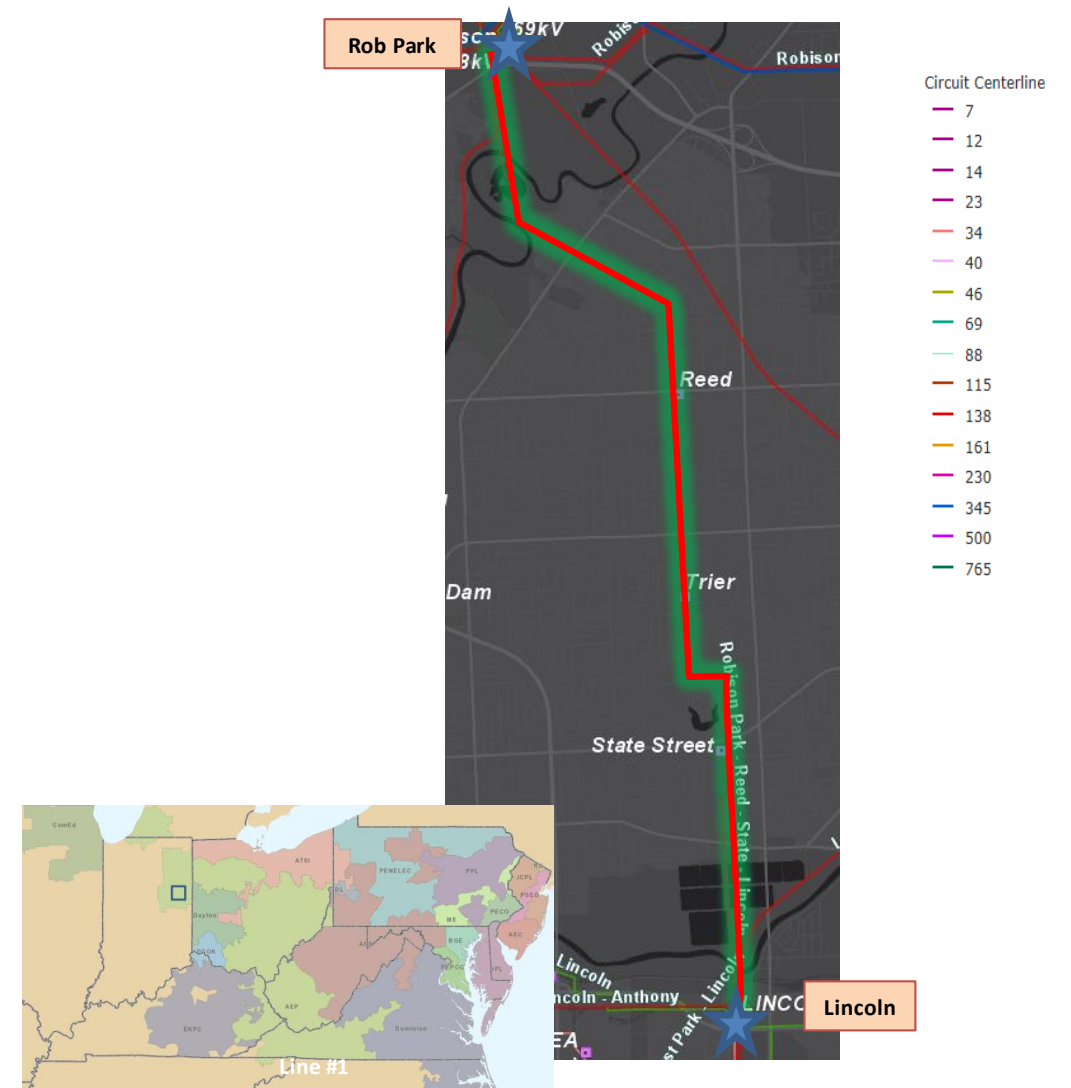
Specific Assumptions Reference: AEP Guidelines for
Transmission Owner Identified Needs (AEP Assumptions Slide 8)

Problem Statement:

Robison Park – Lincoln 138kV (~~~10.9~~ 7.8 mi)

- 44 structures with an open condition (~67%) with most revolving around rusted legs, broken/chipped insulators and rusted shield wire
- Fails to meet current AEP structural strength requirements
- Fails to meet AEP shield angle requirements
- Top half of towers were replaced and re-conducted in 1968 to allow for 138kV voltage operation, but the bottom half and foundations are original 1928 installation
- 4 MOABS in series currently which is over the AEP max of 3.

Note: the remaining 3.1 miles of line is covered under need AEP-2019-IM038 and will be addressed with a future solution.



AEP Transmission Zone: Supplemental Rob Park – Lincoln 138kV line rebuild

Need Number: AEP-2020-IM016

Process Stage: Solutions Meeting 09/11/2020

Proposed Solution:

Rebuild the ~7.8 mile 138kV Rob Park – Lincoln line using Drake 795 ACSR (SN/SE/WN/WE: 257/360/325/404MVA).

Estimated Cost: \$25.1M

Add a 3000A bus tie CB at 138kV Trier station to separate the 4 MOAB's in series. **Estimated Cost: \$1.2M**

Total Estimated Transmission Cost: \$26.3M

Alternatives Considered:

Install CB at 138kV Reed Station to address 4 MOABS in series. This would similar in cost, but placing the CB at 138kV Trier more evenly breaks up the line exposure.

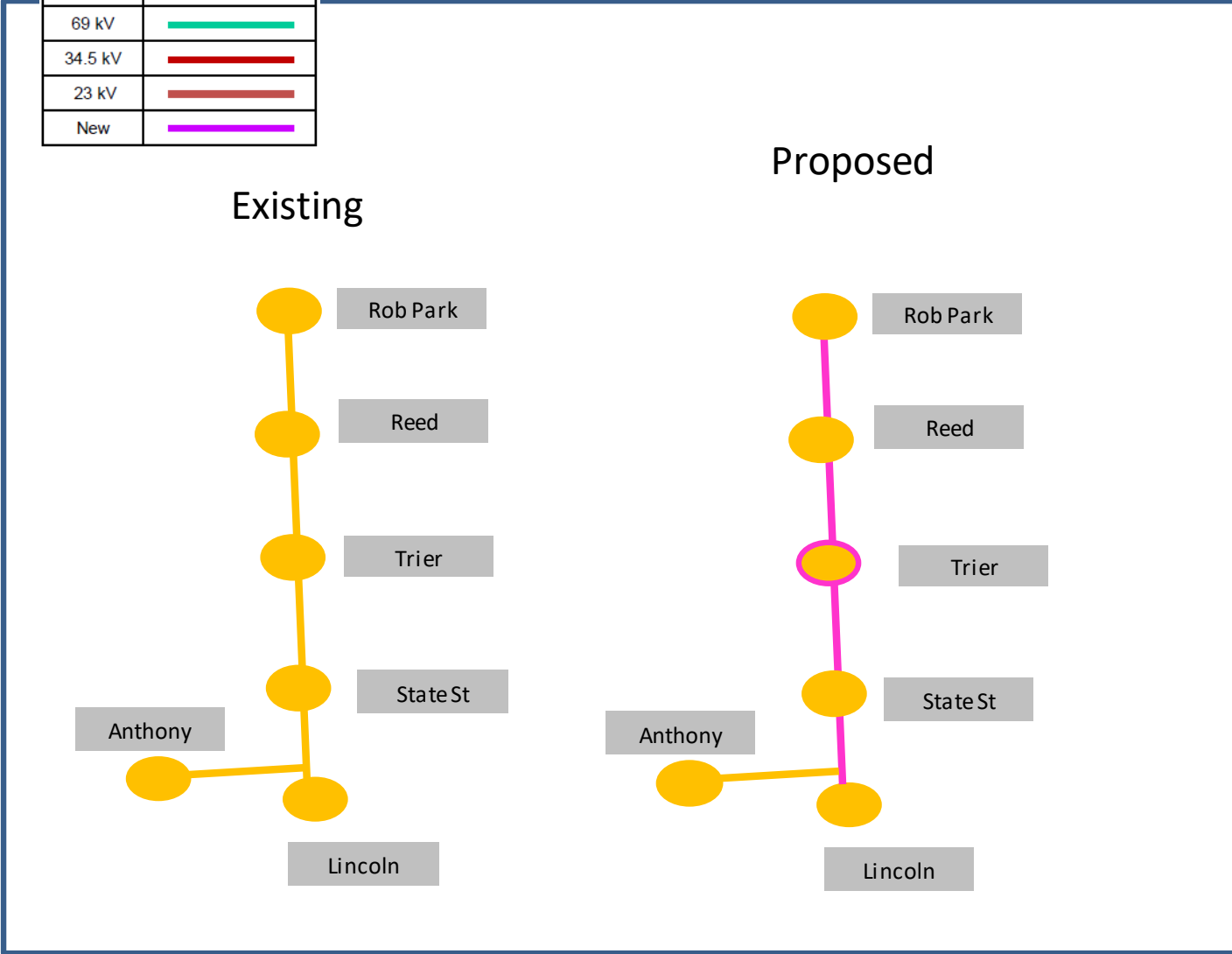
Estimated Cost: \$26.3M

Projected In-Service: 04/03/2023

Project Status: Scoping

Model: N/A

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



AEP Transmission Zone: Supplemental Rob Park – S. Hicksville 69kV line rebuild

Need Number: AEP-2019-IM014

Process Stage: Solution Meeting 09/11/2020

Previously Presented: Needs Meeting 04/23/2019

Supplemental Project Driver: Equipment Condition/Performance/Risk

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

Problem Statement:

Robison Park – South Hicksville 69kV Line (~27 Miles)

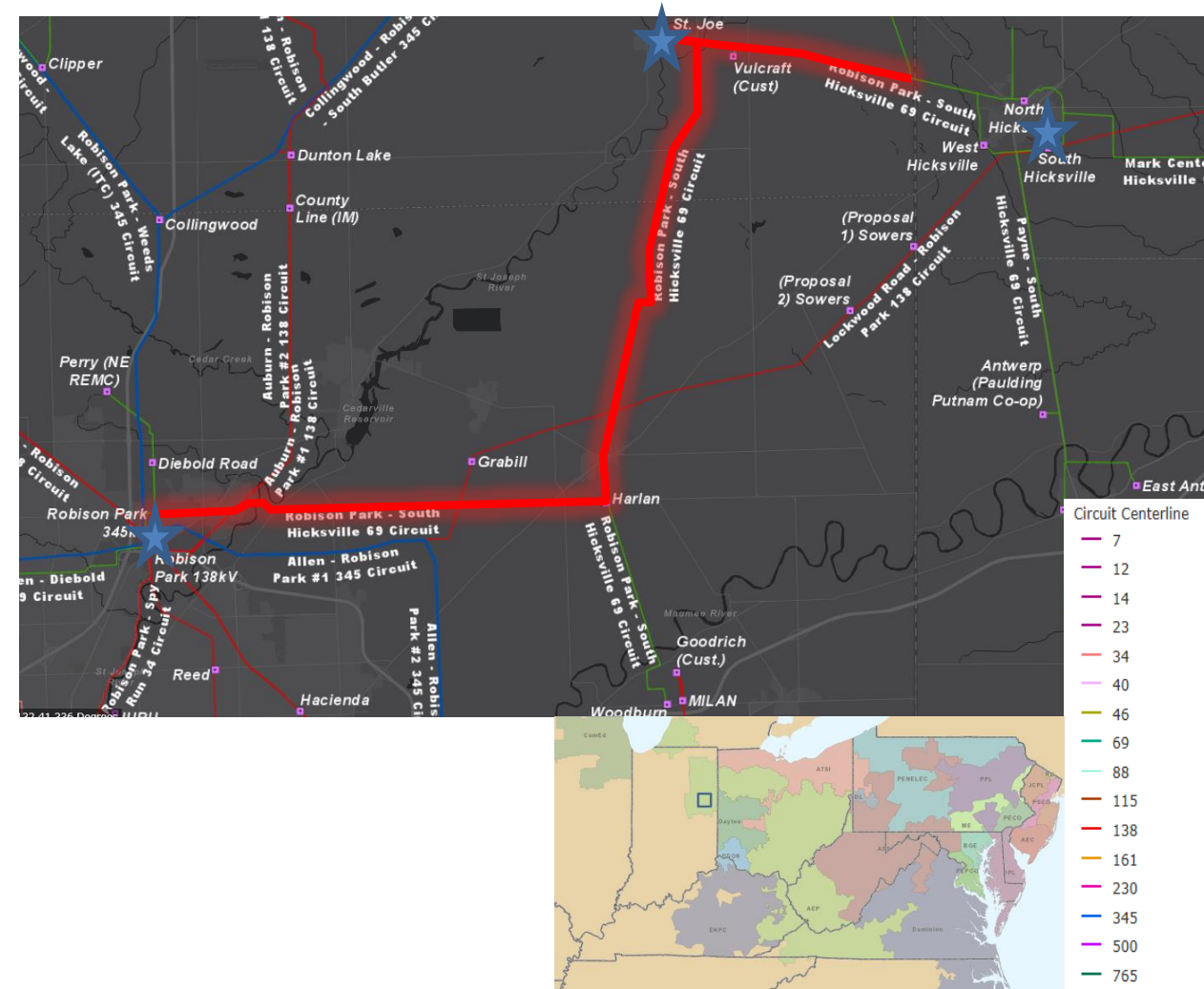
- 1967 vintage wood cross arm construction.
- There are currently 56 open conditions on this line with majority (94%) being structure issues. The O&M cost of the line is expected to increase as the age of the line increases.
- 4/0 ASCR conductor with horizontal post type porcelain insulators.
- CMI: 526,269
- Forced Momentary Outages: 6
- Forced Permanent Outages: 5

St Joe Tap 69kV Line (~0.6 Miles)

- 1967 vintage wood cross arm construction
- There are currently 3 open conditions on this line. The O&M cost of the line is expected to increase as the age of the line increases.
- St. Joe is radially served out of Robison Park – South Hicksville 69kV Line and it is susceptible to single event outages.
- It occasional encounter floodwaters of Bear Creek that leave some of the existing poles inaccessible.

St. Joe Tap Switch

- The Switch has accessibility challenges due to St. Joseph River floodwaters.



AEP Transmission Zone: Supplemental Rob Park – S. Hicksville 69kV line rebuild

Need Number: AEP-2020-OH008

Process Stage: Solution Meeting 09/11/2020

Previously Presented: Needs Meeting 2/21/2020

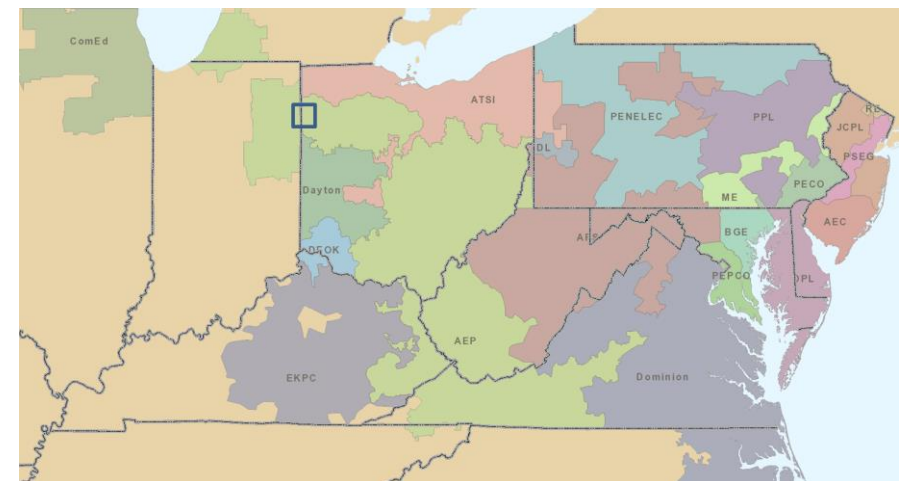
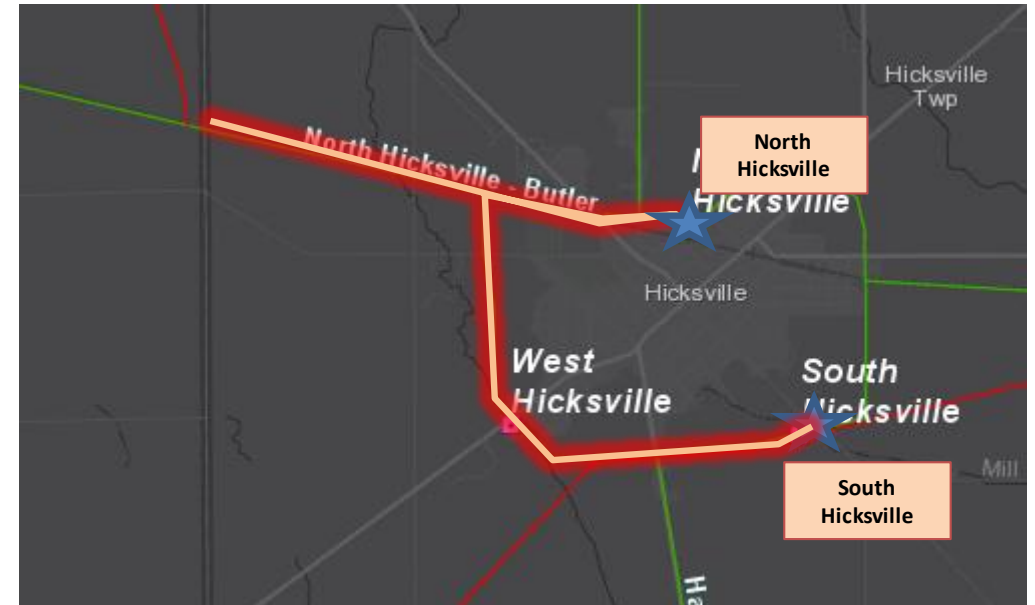
Supplemental Project Driver: Equipment Condition/Performance/Risk

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

Problem Statement:

Rob Park – South Hicksville (OH) 34kV (~4.6 Miles)

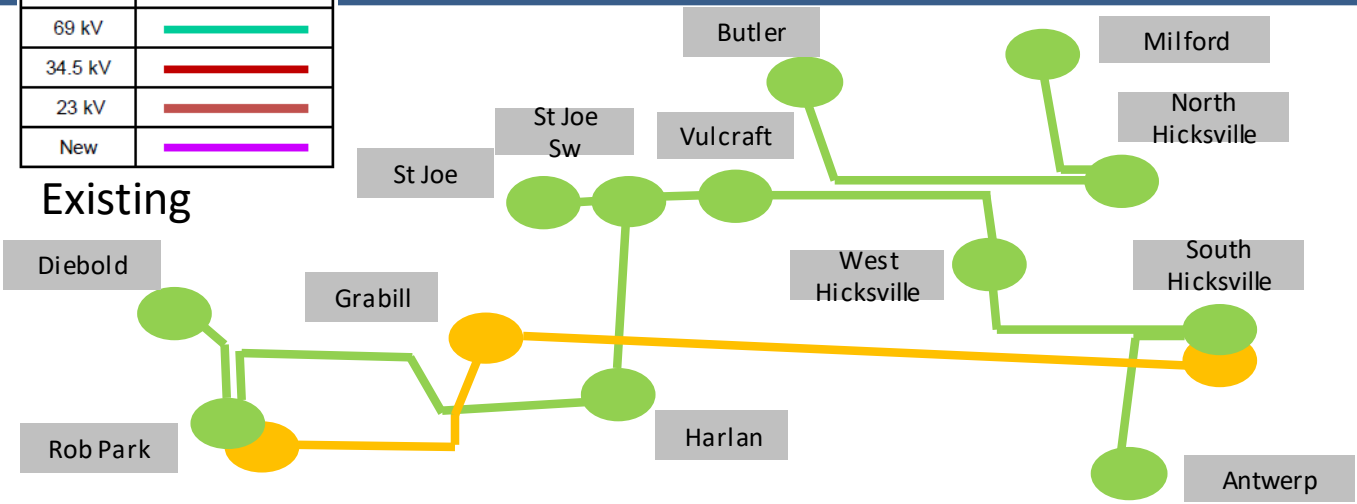
- 1956 & 1962 vintage wood pole construction with 32 open conditions on 17 unique structures, approximately 17% of the line. These conditions include but not limited to damaged poles, broken insulators, broken shield wire, rot top and broken Knee/Vee braces
- The circuits on this line have had the following outages across the last 5 years.
Rob Park – South Hicksville: 9 momentary and 6 permanent
CMI: 526,269
North Hicksville – Butler: 5 Momentary and 2 Permanent.
CMI: 120 over the last 5 years.
- Related to previously shared need AEP-2019-IM014.



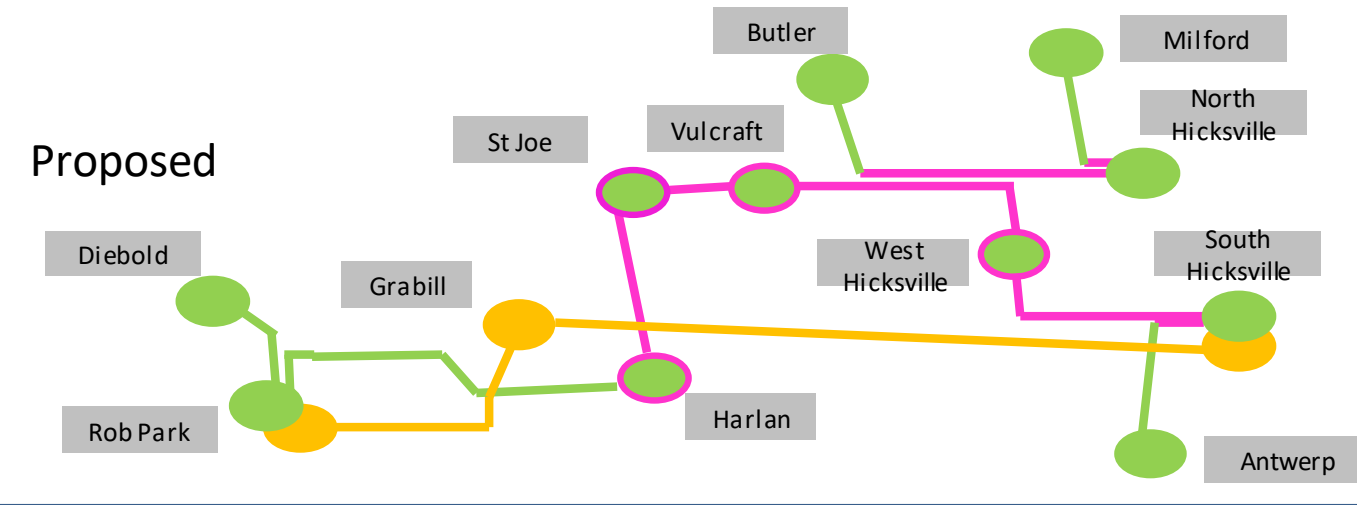
AEP Transmission Zone: Supplemental Rob Park – S. Hicksville 69kV line rebuild

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

Existing



Proposed



Need Number: AEP-2020-OH008 & AEP-2019-IM014
Process Stage: Solutions Meeting 09/11/2020
Proposed Solution:

On the South Hicksville – Rob Park 69kV line. Rebuild the 21.6 miles as currently constructed, including ~2.4 miles of 69kV double circuit and ~19.2 miles of 69kV single circuit

Estimated Cost: \$50.8M

Rebuild the through path of St Joe 69kV station. Install a breaker on the Harlan line exit to eliminate four MOABs in series. **Estimated Cost: \$1.3M**

At Harlan 69kV (FERC-Distribution) station, replace a switch and line riser in order to accommodate the new line entrance. **Estimated Cost: \$0M**

Replace the West Hicksville 69kV PoP switch to accommodate the new line height, route and structure/conductor type. **Estimated Cost: \$1.0M**

In order to rebuild the line, the in-line switch at Vulcraft 69kV needs to be replaced. The switch replacement will be a 3-way switch with a MOAB toward West Hicksville 69kV . **Estimated Cost: \$1.0M**

Total Estimated Transmission Cost: \$54.1M

AEP Transmission Zone: Supplemental Rob Park – S. Hicksville 69kV line rebuild

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

Need Number: AEP-2020-OH008 & AEP-2019-IM014

Process Stage: Solutions Meeting 09/11/2020

Alternatives Considered:

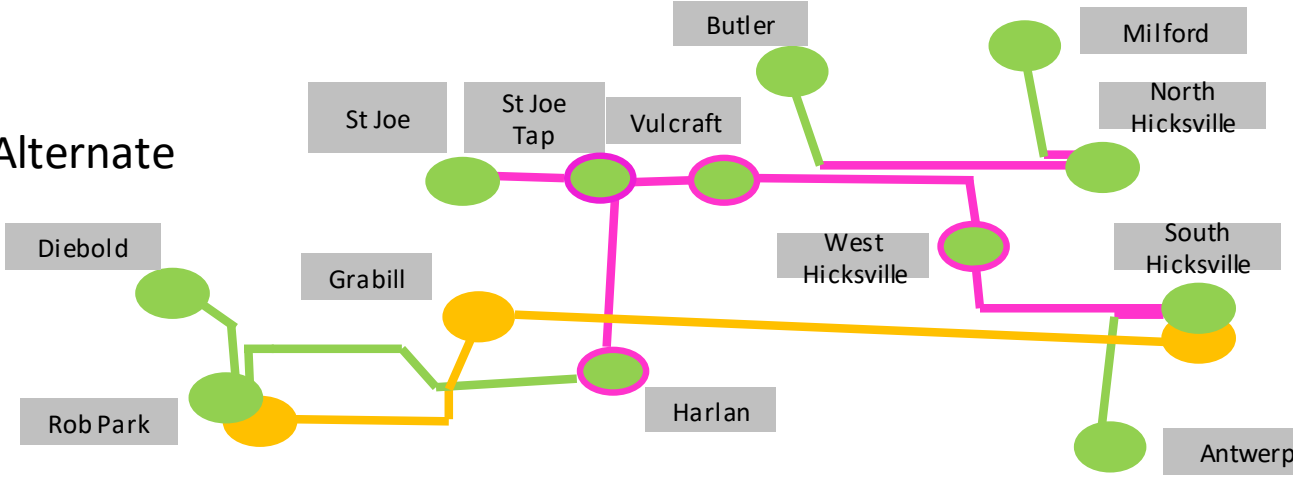
1. Considering the number of stations and locations served from this line, no viable alternates were identified.

Projected In-Service: 06/02/2023

Project Status: Scoping

Model: N/A

Alternate



AEP Transmission Zone M-3 Process Haviland, Ohio

Need Number: AEP-2020-OH015

Process Stage: Solution Meeting 9/11/2020

Previously Presented: Needs Meeting 4/20/2020

Project Driver:

Equipment Material/Condition/Performance/Risk

Specific Assumption Reference:

AEP Guidelines for Transmission Owner Identified Needs

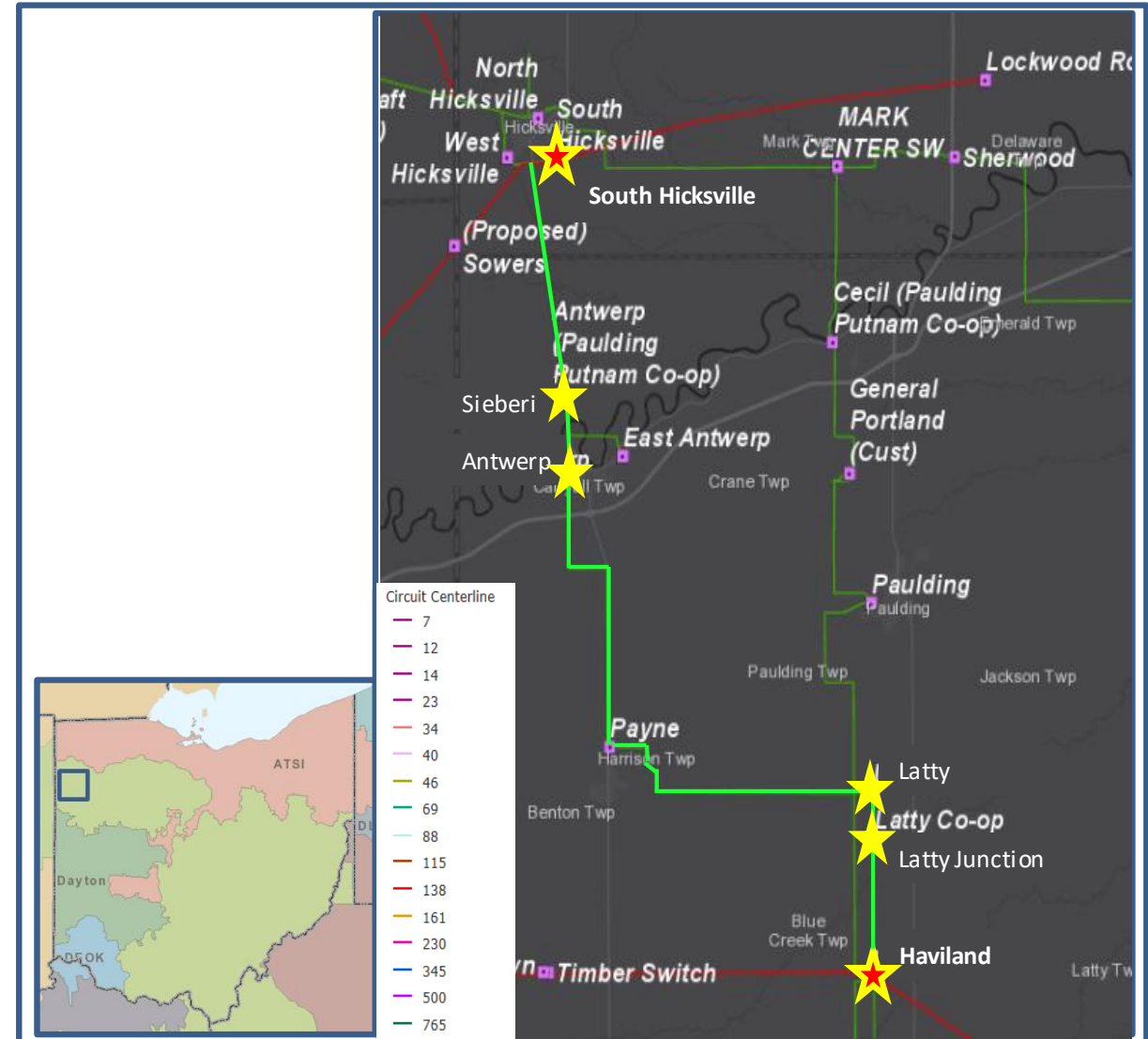
Problem Statement:

Line

Haviland – South Hicksville 69kV

Original Install Date: 1927

- **Length of Line:** 26.15
- **Total structure count:** 560
- **Original Line Construction Type:** Wood
 - 16% of structures recently replaced (~2.5 miles)
 - Wooden Cross Arms
 - Horizontal Ceramic insulators
- **Conductor Type:** 336.4 KCM ACSR 18/1 Merlin (original 1927 install)



AEP Transmission Zone M-3 Process Haviland, Ohio

CONDITION / PERFORMANCE / RISK ASSESSMENT:

• Outage History

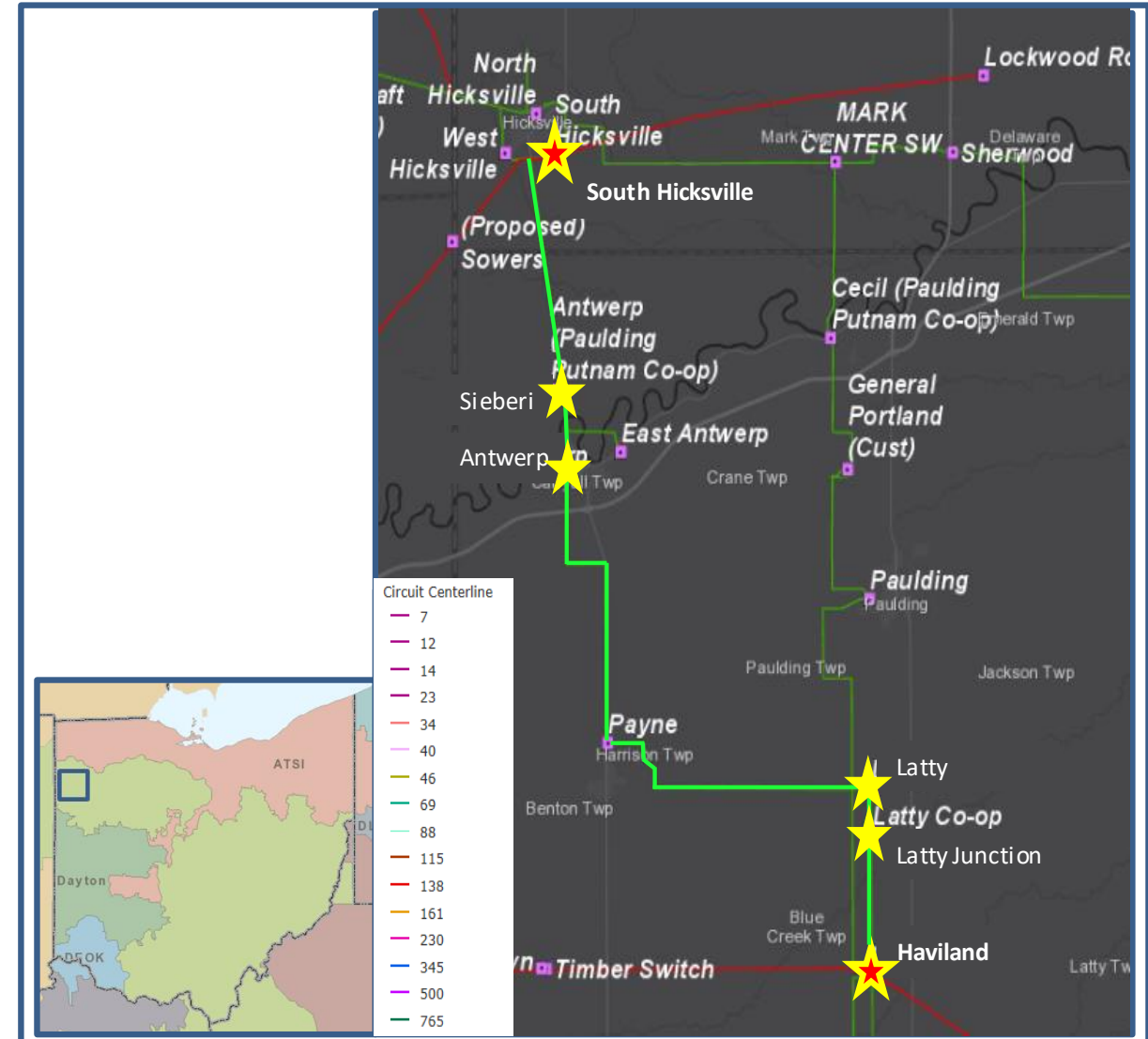
- **Momentary/Permanent Outages and Duration:** 12 Momentary and 8 Permanent – average duration of 26.32 hours
- **CMI:** 8.2 M
- This line is comprised of two circuits, having breakers in between at Payne. No automatic line sectionalizing scheme between the breakers.

• Condition Summary

- **Number of open conditions by type / defects / inspection failures:** 40 open conditions on 39 unique structures
- **Open conditions / defects / inspection failures include:** broken structures, rotting structures, burnt conductors, broken/missing ground lead

Risk

- **Number of Customers at Risk:** 9,639
- **Load at Risk:** 17.794 MVA
- The Antwerp (Paulding Putnam Co-op) customer is served off of a hard tap.



AEP Transmission Zone M-3 Process Haviland, OH

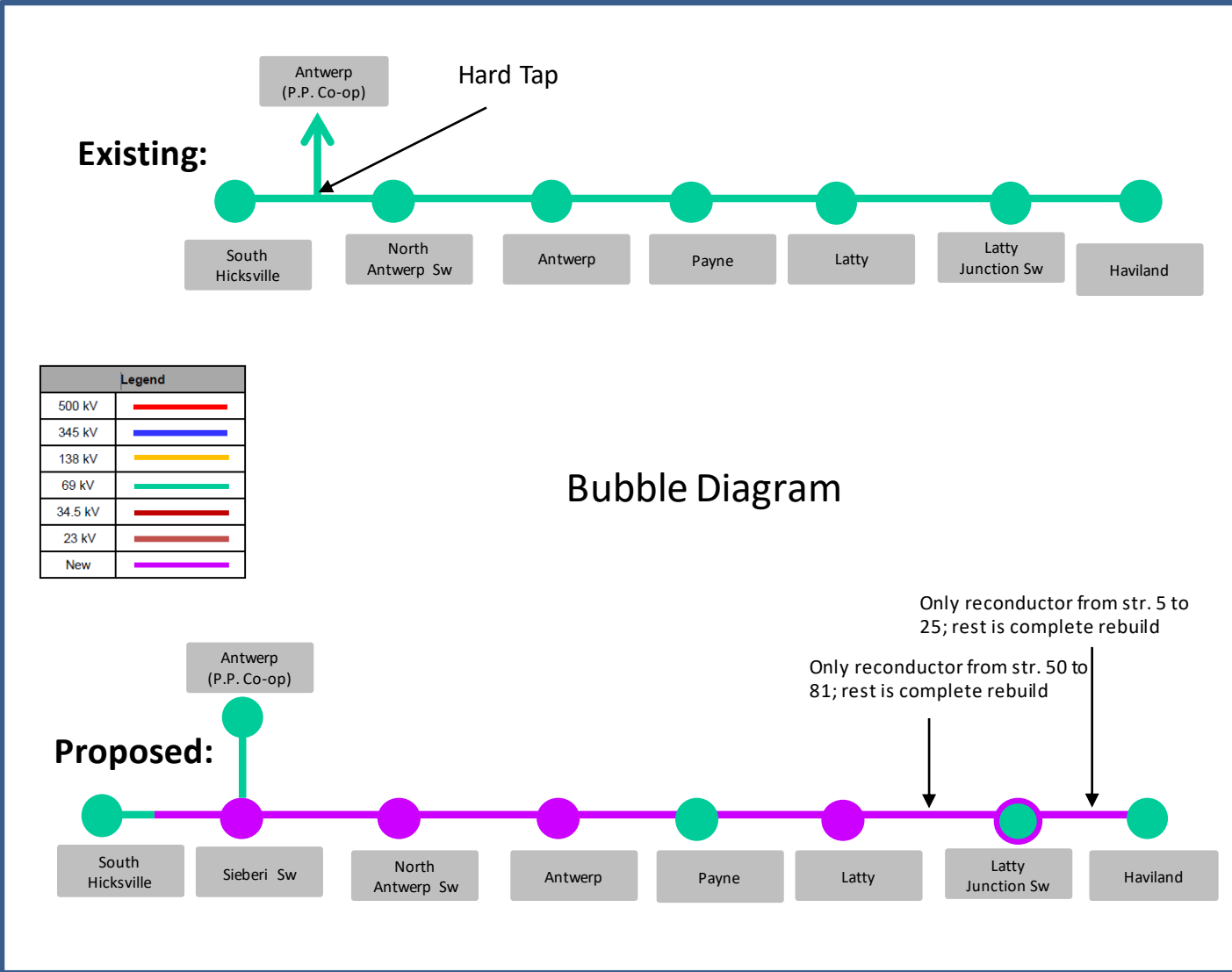
Need Number: AEP-2018-0015

Process Stage: Solutions Meeting 09/11/2020

Proposed Solution:

- Rebuild ~14.3 mi of the Payne - South Hicksville 69kV circuit. **Estimated Cost \$30.6M**
- Rebuild ~9.3 mi of the line between Haviland – Payne 69kV circuit. Reconductor the remaining 2.7 mi line sections. **Estimated Cost \$21.8M**
- Install Seiberi switch as a new 69 kV, 1200A, 3-way Phase-over-Phase switch with sectionalizing capability to eliminate the hard tap. **Estimated cost \$0.5M**
- Replace Antwerp Sw with 69 kV, 1200A, 3-way Phase-over-Phase switches with sectionalizing capability, including 4.3 miles of fiber buildout to allow for sectionalizing. **Estimated cost \$1.1M**
- Replace North Antwerp Sw with 69 kV, 1200A, 3-way Phase-over-Phase switches with sectionalizing capability. **Estimated cost \$0.6M**
- Replace Latty Switch with 69 kV, 1200A, 3-way Phase-over-Phase switches with sectionalizing capability. **Estimated Cost \$0.6M**
- At Latty Junction Switch, install motor operators, a relay, and PT’s on existing Phase-over-Phase switches to add sectionalizing capability. **Estimated Cost \$0.4M**

Total Estimated Transmission Cost: \$55.6M



AEP Transmission Zone M-3 Process Haviland, OH

Proposed Solution (continued)

Ancillary Benefits:

- Outage restoration and Operational Flexibility will be improved by replacing/installing switches and adding sectionalizing capability.

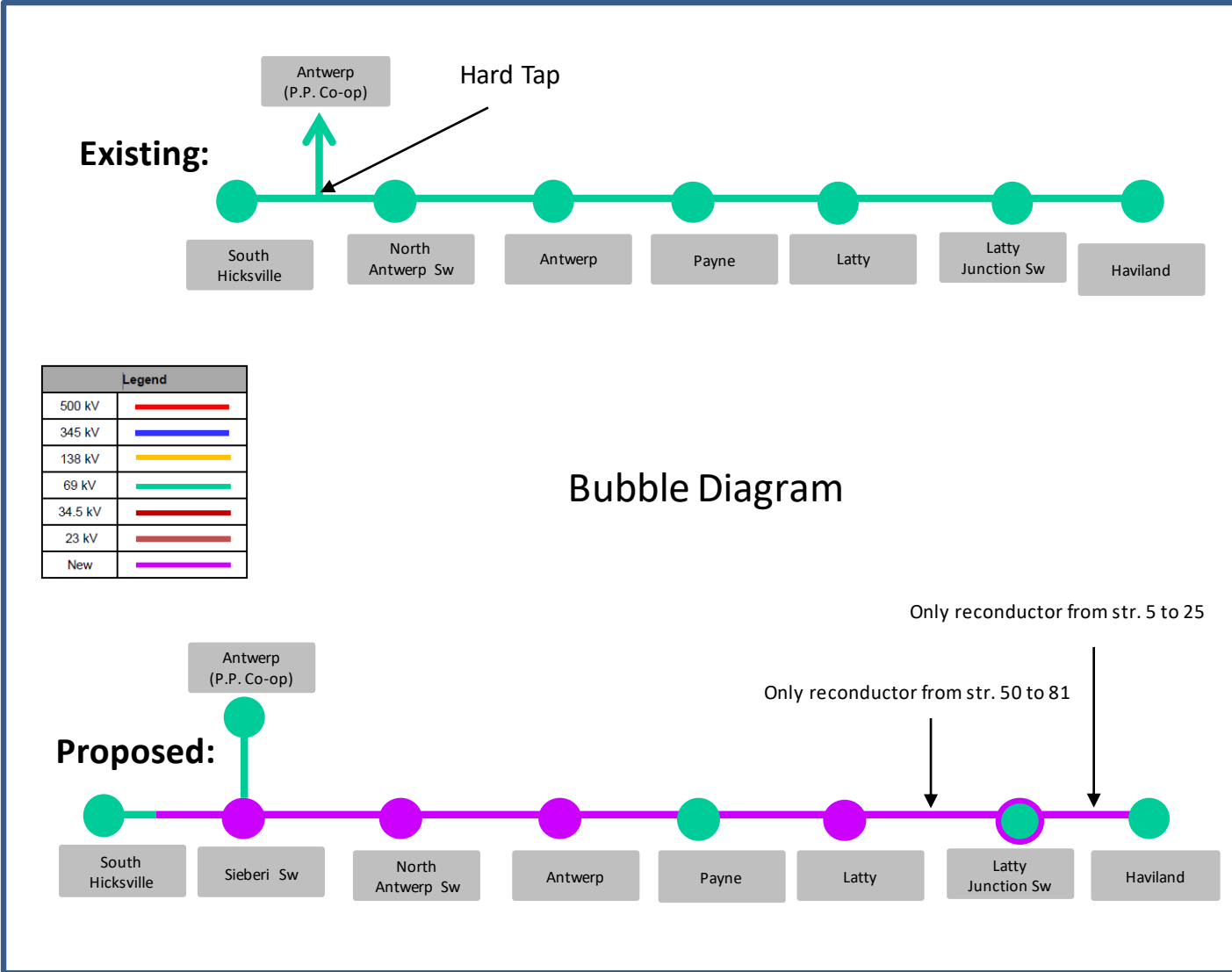
Alternatives Considered:

- Considering the number of stations and locations served from this line, no viable alternates were identified.

Projected In-Service: 11/15/2024

Project Status: Scoping

Model: N/A



AEP Transmission Zone M-3 Process Upper Sandusky, OH

Need Number: AEP-2018-OH008

Process Stage: Solutions Meeting 09/11/2020

Previously Presented:

Needs Meeting 10/26/18

Project Driver:

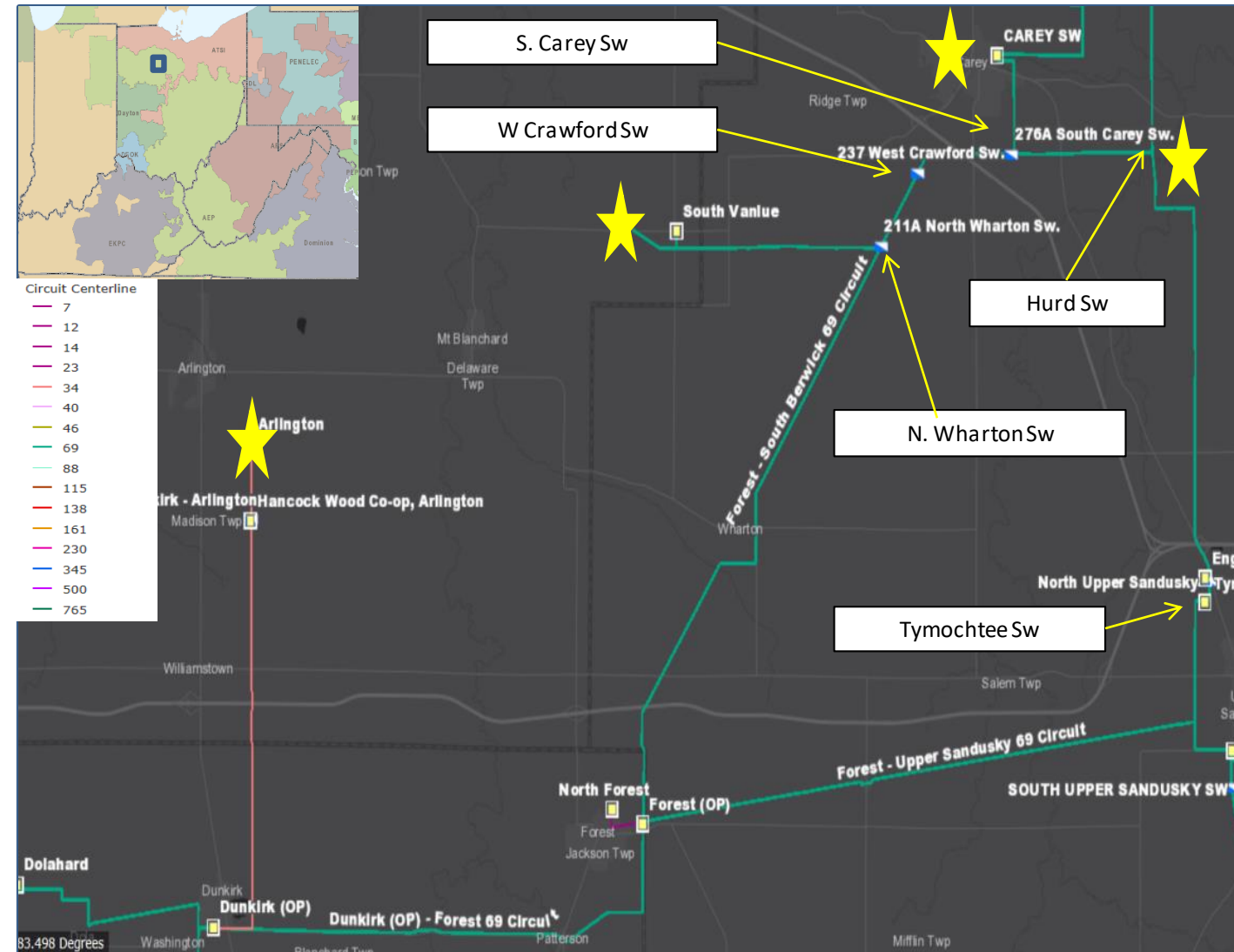
Equipment Condition/Performance/Risk, Operational Flexibility and Efficiency, and Customer Service.

Specific Assumption Reference:

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

Problem Statement:

- There is 1.27 miles of 1/0 Copper and 2.58 miles of 1/0 ACSR conductor on the 69 kV system in the Upper Sandusky area.
- There are 10 open conditions on the Arlington – Dunkirk 34.5 kV line (~ 7.29 miles) & 29 open conditions on the Forest – South Berwick 69 kV line (~27.6 miles).
- There is a three-terminal hard tap just west of Hurd Switch.
- South Carey Switch and North Wharton Switch are both three-terminal lines.
- West Crawford Switch and Hurd Switch are set in an N.O. position to prevent thermal overloads.
- The City of Carey has reliability concerns, where both feeds to the city can be lost for a single outage.
- Hancock-Wood Co-op has reliability and maintenance concerns due to radial loads at Arlington and Blanchard Stations.
- Arlington – Dunkirk Circuit:
 - Peak Load Impact: 6.57 MW
 - CMI (2015 – 2018): 162,840
- Forest – South Berwick Circuit:
 - Peak Load Impact: 7.68 MW
 - CMI (2015 – 2018): 1,713



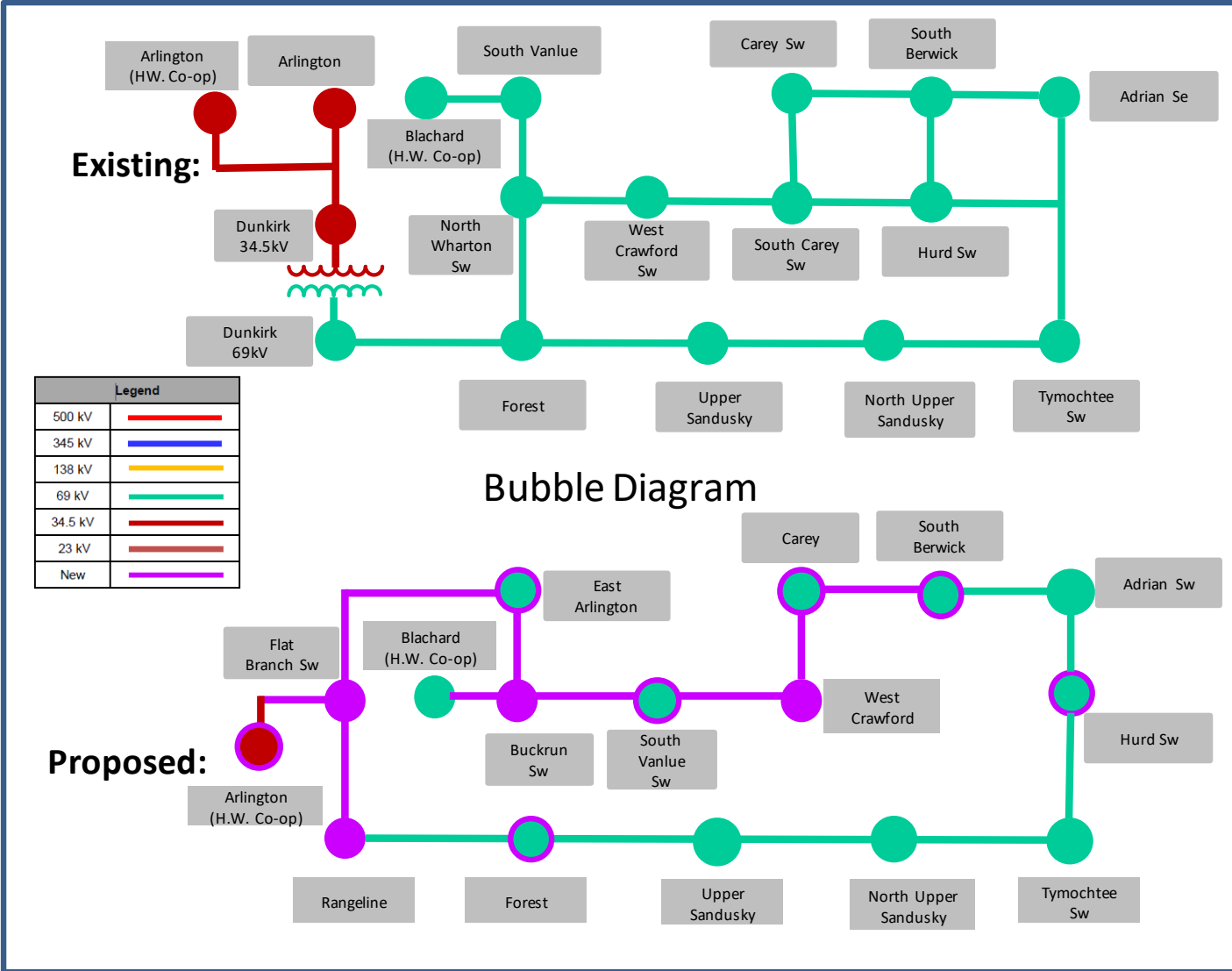
AEP Transmission Zone M-3 Process Upper Sandusky, OH

Need Number: AEP-2018-OH008

Process Stage: Solutions Meeting 09/11/2020

Proposed Solution:

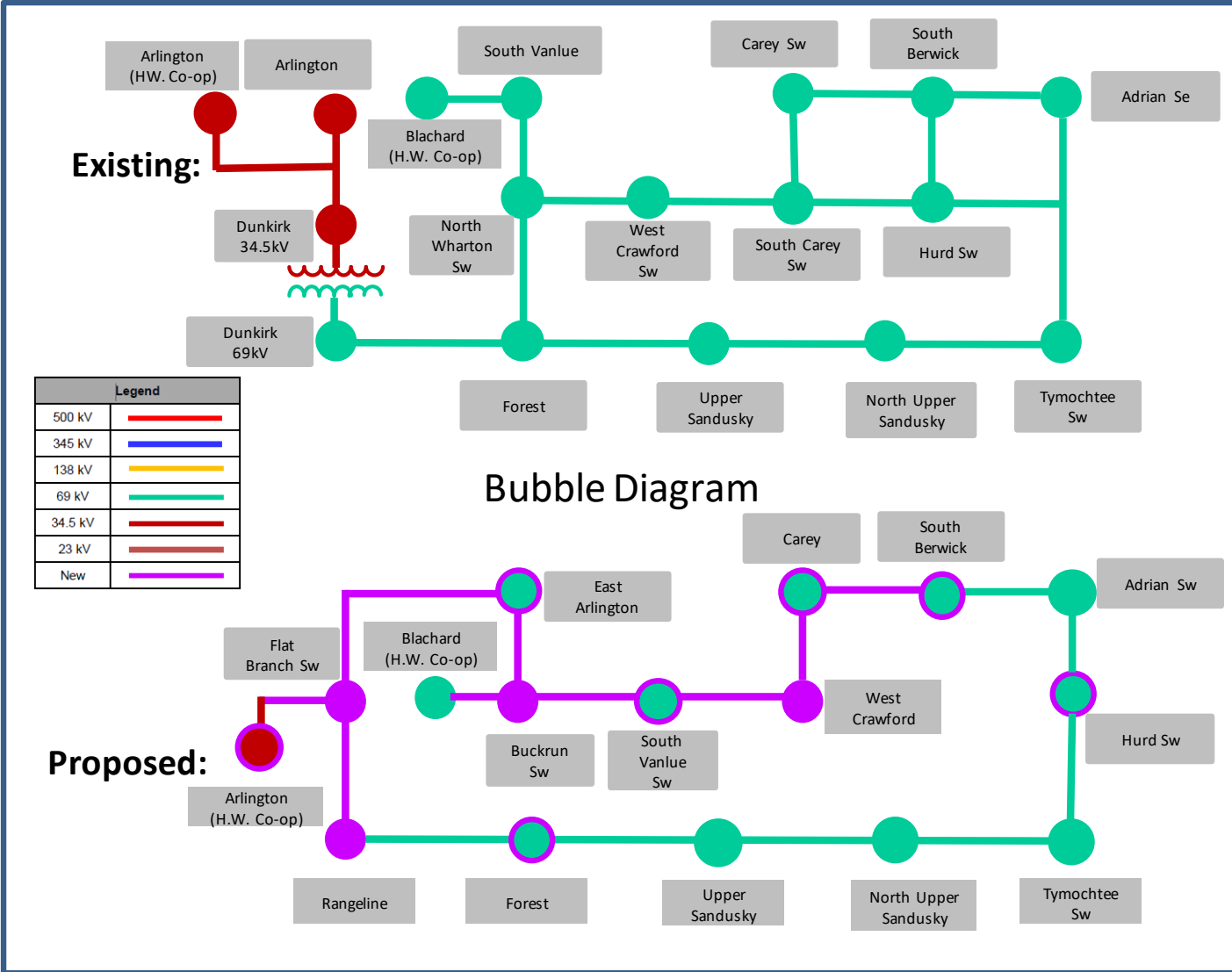
- Rebuild existing double circuit portion of the Dunkirk – Forest line asset from existing Str 194 to the greenfield Rangeline station (1.35 miles). Rebuild existing ~6.5 mi Arlington – Dunkirk 34.5 kV as Rangeline – East Arlington single 69 circuit from Str 194 to the greenfield East Arlington (formerly Arlington) . **Estimated Cost \$21.0M**
- Reconfigure ~0.05mi Dunkirk – Kenton 69kV line to terminate into Rangeline station. **Estimated Cost \$0.1M**
- Reconfigure ~0.05mi Dunkirk – Ada 69kV line to terminate into Rangeline station. **Estimated Cost \$0.1M**
- Build ~10.1 mi 69kV line section between greenfield Buckrun Sw and East Arlington as single circuit 69kV. **Estimated Cost \$22.0M**
- Rebuild ~5.75 mi 69kV line section between greenfield West Crawford Station and Buckrun Switch (outside of Blanchard Station) as single circuit 69kV. **Estimated Cost \$13.0M**
- Rebuild ~0.22 mi South Vanlue Extension to tie into East Arlington – West Crawford 69kV ckt. **Estimated Cost \$0.1M**
- Rebuild ~11.5 mi 69kV line between West Crawford and South Berwick Stations. **Estimated Cost \$28.9M**



AEP Transmission Zone M-3 Process Upper Sandusky, OH

Proposed Solution (continued)

- Remove/retire ~10 mi of 69 kv line from Forest to North Wharton Switch. **Estimated Cost \$8.3M**
- Reconfigure North Upper Sandusky – South Berwick 69kV line to tie into Hurd Switch **Estimated Cost \$0.1M**
- Remove/Retire ~2.58 mi South Carey – Hurd Switch 69kV line. **Estimated Cost \$1.9M**
- **Carey 69kV:** Install 69kV Box Bay with 2000A, 40kA MOABs with sectionalizing capability. Remove existing Carey Sw. **Estimated cost \$1.5M**
- **West Crawford 69kV (Rebuild):** Install a new 69kV ring bus with three 3000A, 40kA circuit breakers to replace West Crawford Sw. Replace Cap switcher “AA” and relocate Cap bank from Carey Sw to West Crawford 69 kV bus. **Estimated cost: \$5.6M**
- **South Carey Sw 69kV:** Remove South Carey Sw 69kV. **Estimated Cost \$0.1M**
- **North Wharton Sw 69kV:** Remove North Wharton Sw 69kV. **Estimated Cost \$0.1M**
- **South Vanlue 69kV:** Replace 69kV bus and existing switches with 2000A, 40kA line MOABs with sectionalizing capability. **Estimated Cost: \$0.5M**

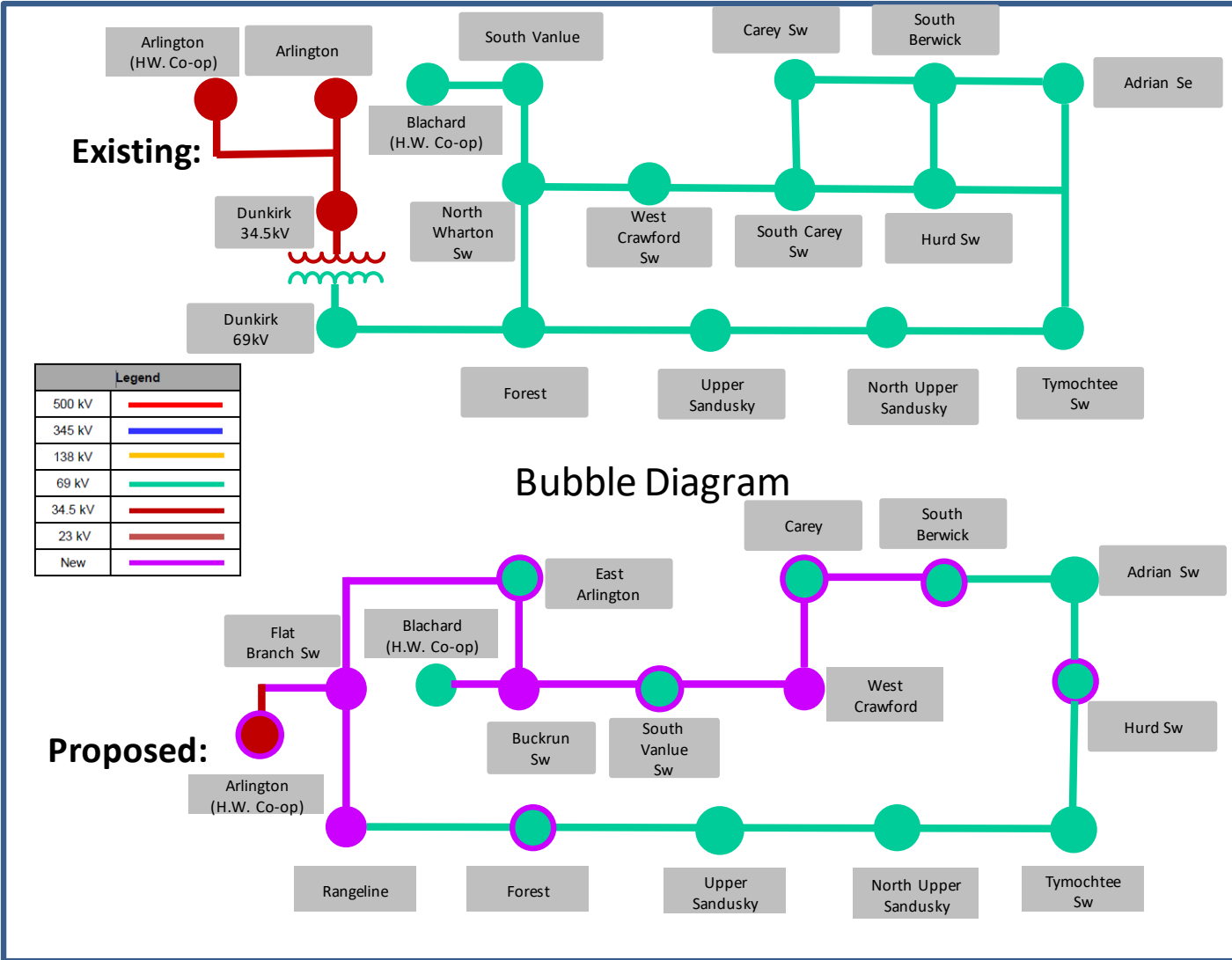


AEP Transmission Zone M-3 Process Upper Sandusky, OH

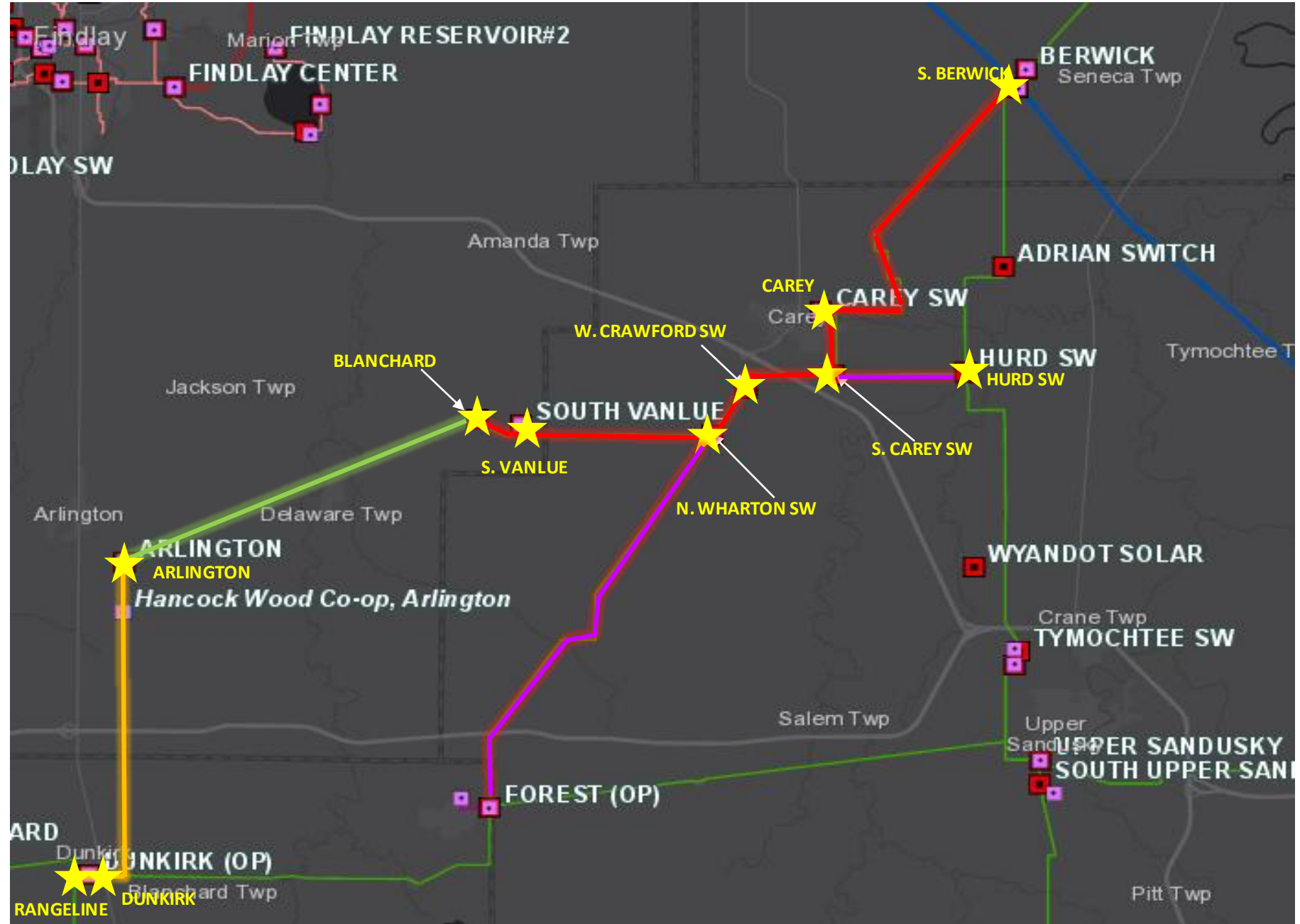
Proposed Solution (continued)

- **Buckrun Sw 69kV:** Install a new 69 kV, 2000A, 40kA, 3-way Phase-over-Phase Switch with sectionalizing capability. **Estimated cost \$0.6M**
- **East Arlington 69kV:** Install a new 69kV ring bus with three 3000A, 40kA circuit breakers, DICM and a new distribution transformer. **Estimated cost \$8.6M**
- **Flat Branch Sw 69kV:** Install 69 kV, 2000A, 40kA, 3-way Phase-over-Phase Switch with sectionalizing capability. **Estimated Cost \$0.7M**
- **South Berwick 69kV:** Remote end work. **Estimated cost: \$0.4M**
- **Rangeline 69kV:** Install a 5-breaker(3000A, 40kA) 69 kV ring bus and a new distribution transformer to replace Dunkirk station. **Estimated cost: \$10.6M**
- **Forest 69kV:** Remove 69kV CB-H towards South Berwick. **Estimated Cost \$0.1M**
- **Dunkirk 69kV:** Retire Dunkirk 69kV station. **Estimated Cost \$1.0M**

Total Estimated Transmission Cost: \$125.3M



- 69 kV Conversion
- Greenfield
- Rebuild
- Retire



AEP Transmission Zone M-3 Process Upper Sandusky, OH

Ancillary Benefits:

- The project will eliminate multiple hard-taps on the system. It will improve reliability and operational flexibility for all of the delivery points served from the lines.
- It will also improve overall reliability by rebuilding multiple line sections that have asset renewal needs

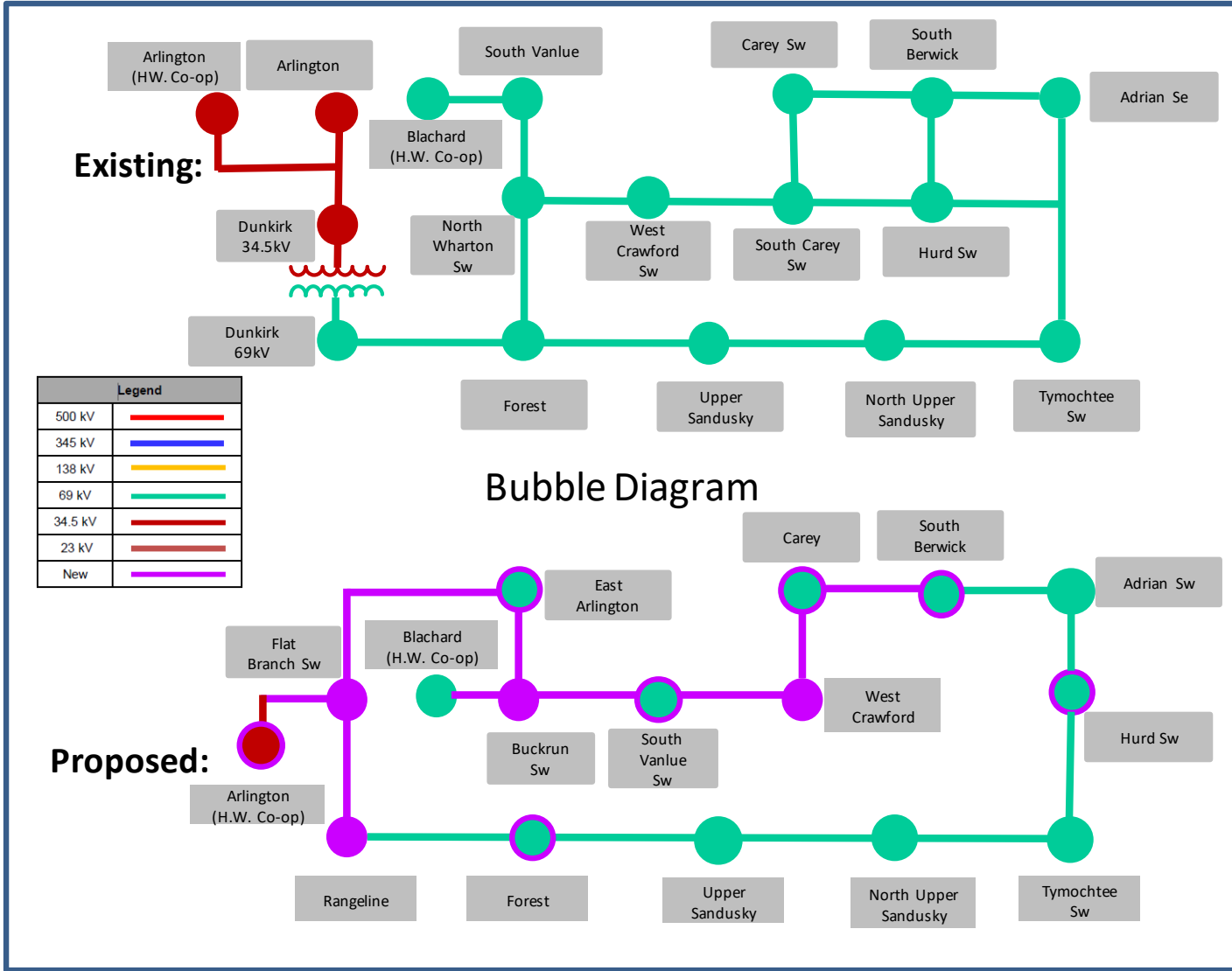
Alternatives Considered:

- Considering the number of stations served from these lines, no viable alternates were identified.

Projected In-Service: 6/1/2025

Project Status: Scoping

Model: 2023 RTEP



AEP Transmission Zone M-3 Process Walnut Creek Capacitor Bank

Need Number: AEP-2020-OH027

Process Stage: Solutions Meeting 9/11/2020

Previously Presented: Needs Meeting 4/20/2020

Supplemental Project Driver: Customer Service

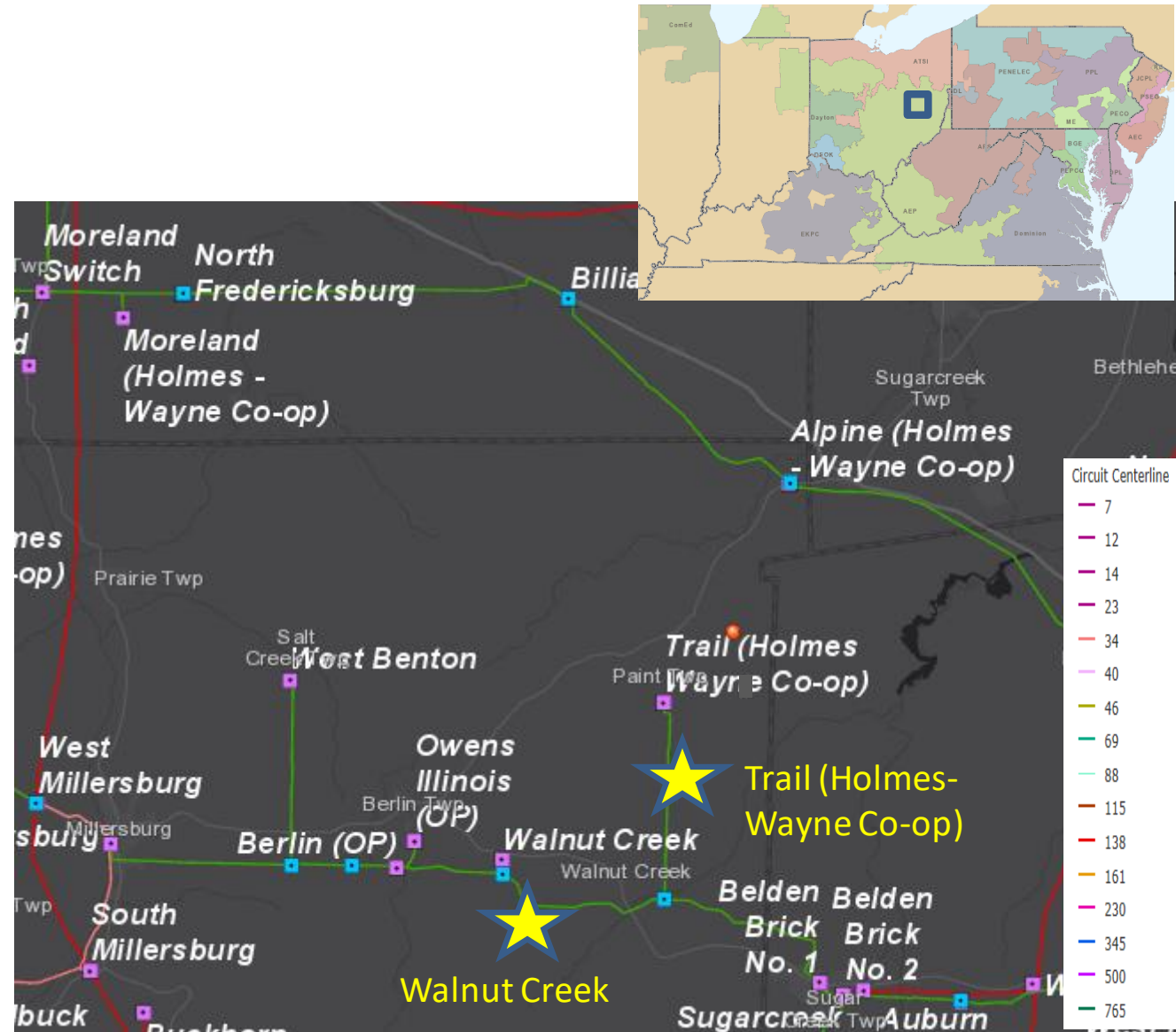
Specific Assumption Reference:

AEP Connection Requirements for the AEP Transmission System
(AEP Assumptions Slide 7)

Problem Statement:

- Holmes-Wayne Electric Cooperative has an urgent large block load increase and is replacing their Trail substation transformer with a larger unit.
- The anticipated new load is 8 MW. The load will be added incrementally starting in August 2020.

Model: PJM 2019 RTEP Series Cases



AEP Transmission Zone M-3 Process Walnut Creek Capacitor Bank

Need Number: AEP-2020-OH027

Process Stage: Solutions Meeting 9/11/2020

Proposed Solution:

Double the size of the existing Walnut Creek 69kV capacitor bank, from 7.2 to 14.4 MVAR. Update relay settings and SCADA equipment accordingly.

Cost estimate: \$0.1M

Alternatives Considered:

1. A 69kV mobile capacitor bank was evaluated. However, the fleet of mobile cap banks in the region are too large in reactive power output (28.8 MVAR) for this remote part of the transmission system. In addition, it would have tied up a mobile cap bank for several years and the mobile cap banks are preferred for short-term applications.
2. A new 69kV cap bank at the nearby Sugarcreek station was also studied. However, a completely new cap bank would have been significantly more expensive than the selected option of doubling an existing cap bank. Alternative #2 cost = \$800,000








Projected In-Service: 11/1/2020

Project Status: Engineering

Existing:

*Bubble diagram not applicable.
No system topology changes.*

Proposed:

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

AEP Transmission Zone M-3 Process

South Point – West Huntington

Need Number: AEP-2020-AP021

Process Stage: Solutions Meeting 9/11/2020

Previously Presented: Need Meeting 4/20/2020

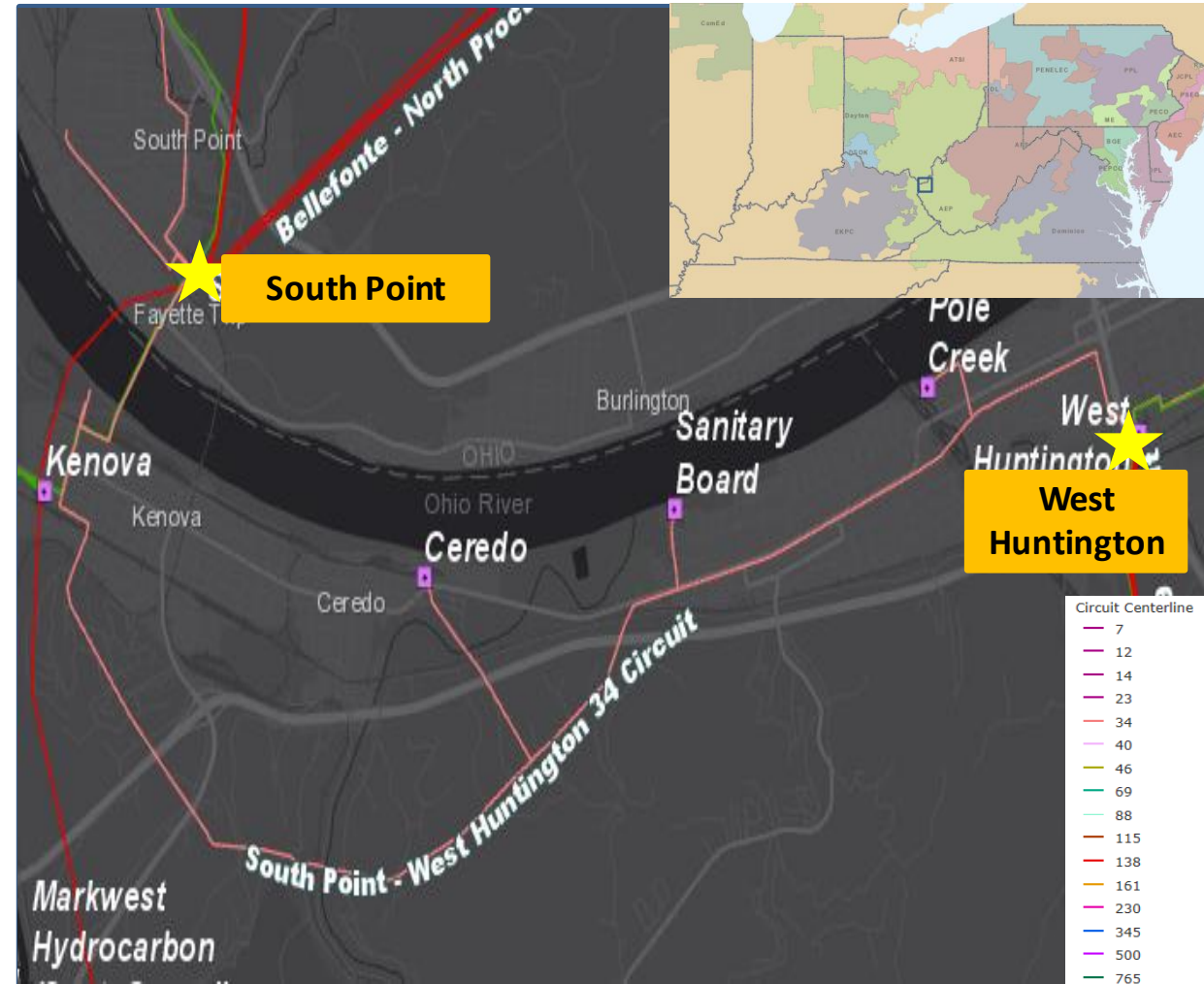
Project Driver: Equipment Condition/Performance/Risk

Specific Assumption Reference: AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 8)

Problem Statement:

South Point – West Huntington 34.5 kV Line (~11 miles)

- The line consists of mainly wood pole (79%) structures in addition to steel (12%) and lattice steel (9%) structures.
- The line was originally built in 1926 (69%) and 1930 (10%) primarily with 4/0 copper conductor.
- Structures on the line failed to meet 2017 NESC Grade B loading criteria, failed to meet current AEP structural strength requirements, and failed to meet current ASCE structural strength requirements
- Current shielding on the majority of the line does not meet current standards.
- There are currently 93 structures (62% of the line) with at least one open condition
 - A total of 159 structural open conditions on the line primarily related to pole and crossarm rot. Other structure conditions include woodpecker damage, split crossarms/poles and bowed crossarms/poles.
 - There are 54 shielding and grounding related open conditions including missing ground wire leads, damaged shield wire and broken ground wire leads.
 - There are an additional 15 open conditions related to burnt/broken insulators and guy wire.
- Since 2014 there have been 4 permanent outages on the circuit due to arrestor failure, wind, switch failure and vegetation contact from outside the ROW. The outages resulted in a total of 198k customer minutes interrupted.



AEP Transmission Zone M-3 Process South Point – West Huntington Rebuild

Need Number: AEP-2020-AP021

Process Stage: Solutions Meeting 9/11/2020

Proposed Solution:

Rebuild approximately 1.2 miles of line on the West Huntington– South Point 34.5 kV line between Kenova station and South Point station. **Estimated Cost: \$8.9M**

- **Cost drivers on this line section include Ohio River crossing, urban line route through Huntington, WV, and encroachments along the line.**

Rebuild approximately 5.5 miles of line on the West Huntington– South Point 34.5 kV line between Kenova station and West Huntington station. **Estimated Cost: \$0.0M**

- **Note: This segment of line is classified as Distribution and thus has no transmission cost.**

Install 3-way Phase over Phase GOAB switch at Ceredo Switch Station addressing hard tap. **Estimated Cost: \$0.6M**

Install 3-way Phase over Phase GOAB switch at Sanitary Board Station addressing hard tap. **Estimated Cost: \$0.6M**

Install 3-way Phase over Phase GOAB switch at Four Pole Creek Station addressing hard tap. **Estimated Cost: \$0.6M**

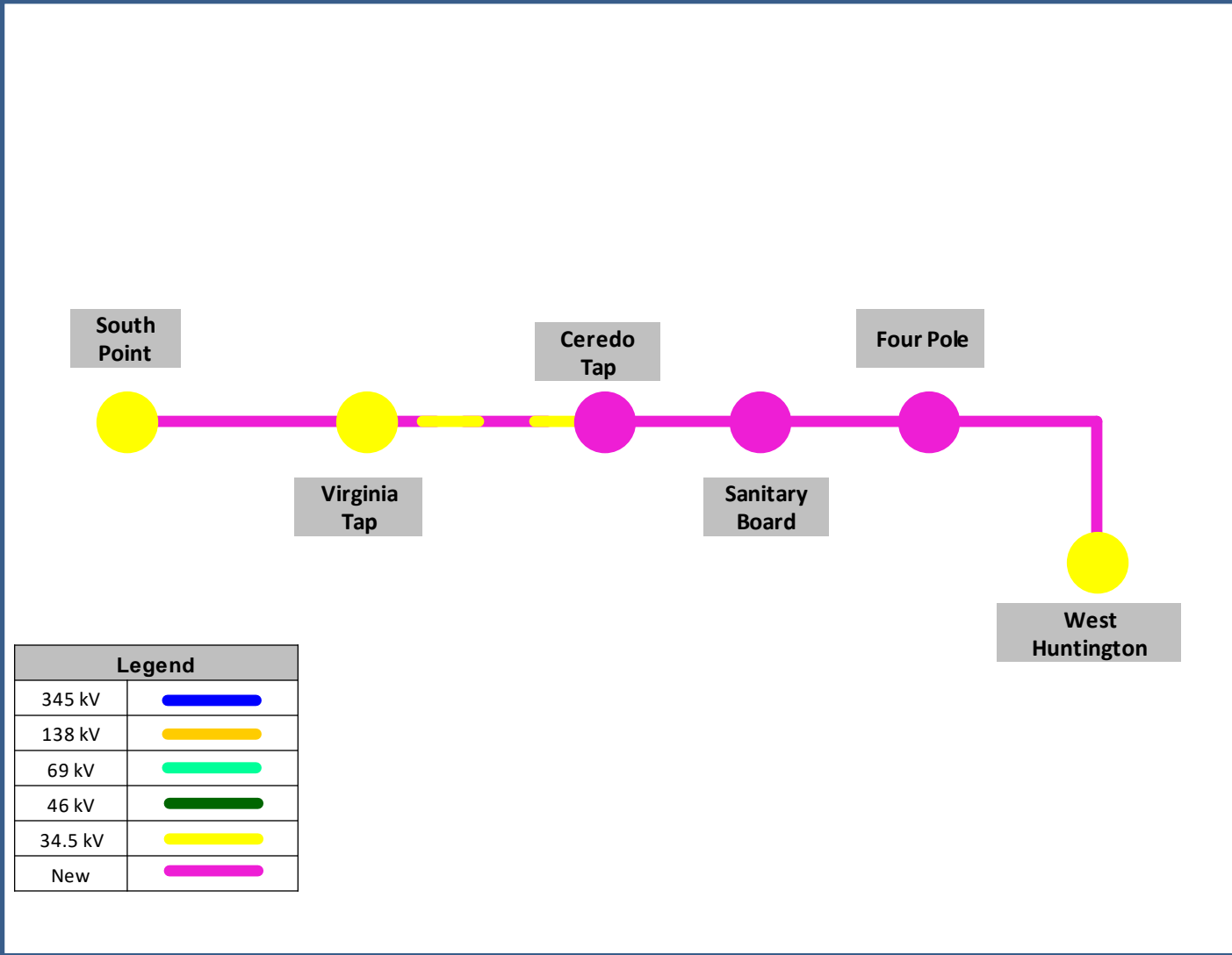
Total Estimated Transmission Cost: \$10.7M

Alternatives Considered:

1. These lines are constructed through a densely populated area of Huntington, WV. Underground construction was considered but was deemed to be not a cost effective solution. Similar urban area underground construction costs have been estimated at \$13M per mile. The underground construction option also does not take into account the required river crossing cost.

Projected In-Service: 11/1/2023

Project Status: Scoping



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

9/1/2020 – V1 – Original version posted to pjm.com

9/10/2020 – V2– Slides #22 and #23, Corrected Need # from AEP-2018-OH016 to AEP-2018-OH008