

SRRTEP Committee: Western AEP Supplemental Projects

June 17, 2019

AEP Transmission Zone: Supplemental Waverly-Adams-Seaman 138 kV Line Rebuild

Previously Presented: 4/17/2018 SRRTEP, 5/21/2018 SRRTEP

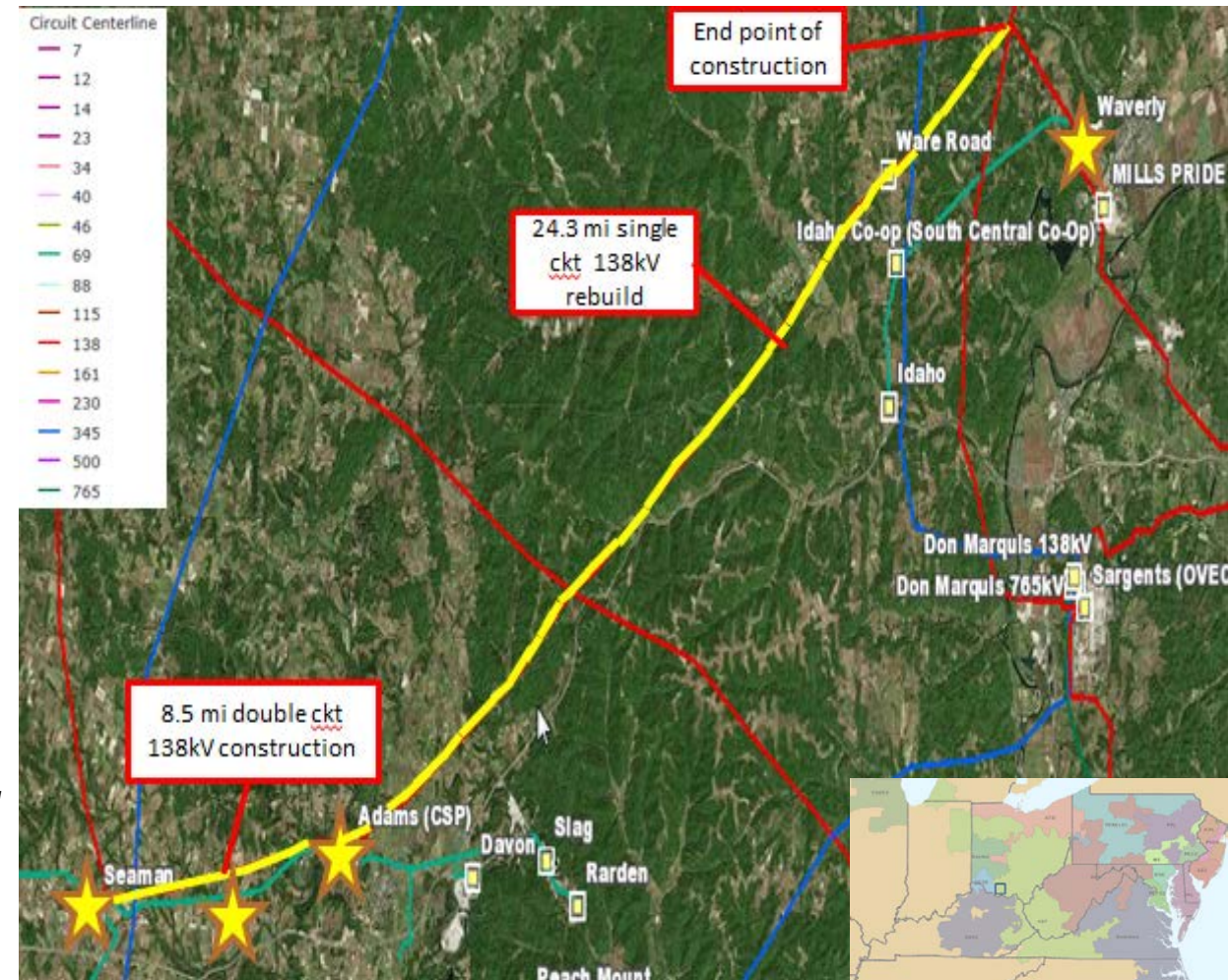
Problem Statement:

Equipment Material/Condition/Performance/Risk:

The 32.8 mile Waverly-Adams-Seaman 138 kV line was built in 1954 with 336 ACSR conductor (150 MVA rating). On the 244 structures on this line, there are 153 open conditions. There have been over 1 Million customer minutes of interruption in a 3-year period. The conditions include: rotten cross-arms, burnt/broken insulators, and loose/broken conductor hardware. The average duration of sustained outage is 2.8 hours.

The majority of the Adams-Seaman 69kV line was built in 1939 with 336 ACSR (75 MVA rating). The line extends 11.9 miles radially from Seaman to serve Sardinia. On the line's 440 structures, there are 401 open conditions. Of the 401 conditions between Adams and Sardinia, approximately 88 conditions are in the Adams-Seaman section (97 structures). There have been 8 momentary and 5 sustained outages on this circuit over the last 3 years. The 69kV line is needed to serve Adams Coop's 69-12kV Lawshe load, and to provide a back up source for Seaman and Adams.

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AEP Transmission Zone: Supplemental Waverly-Adams-Seaman 138 kV Line Rebuild

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Selected Solution

Rebuild the 138kV line from Waverly to Adams utilizing 1033.5 ACSR (296 MVA). The rebuild will begin at structure 22 west of Waverly where the line changes to the Waverly-Ross line and continue 24.3 miles to Adams Substation. The remaining 3.1-mile section from structure 22 to Waverly is newer double ckt construction and was not identified for renewal at this time. Remove old line after rebuild complete. (S1621.1)

Estimated Cost: \$42.0M

Rebuild two independent lines, less than 1/2 mile apart between Seaman and Adams, one 138kV and one 69kV, as a double circuit for approximately 8.5 miles using 1033.5 ACSR. Remove old lines after rebuild complete. There will also need to be a short single ckt tap for Lawshe 69kV. (S1621.2)

Estimated Cost: ~~\$23.0M~~-\$35.8M

Reason for the Cost Increase: The cost increase is related to design impacts identified after completion of more detailed engineering analysis associated with the hilly terrain that the lines traverse, along with an escalation in material costs (steel).

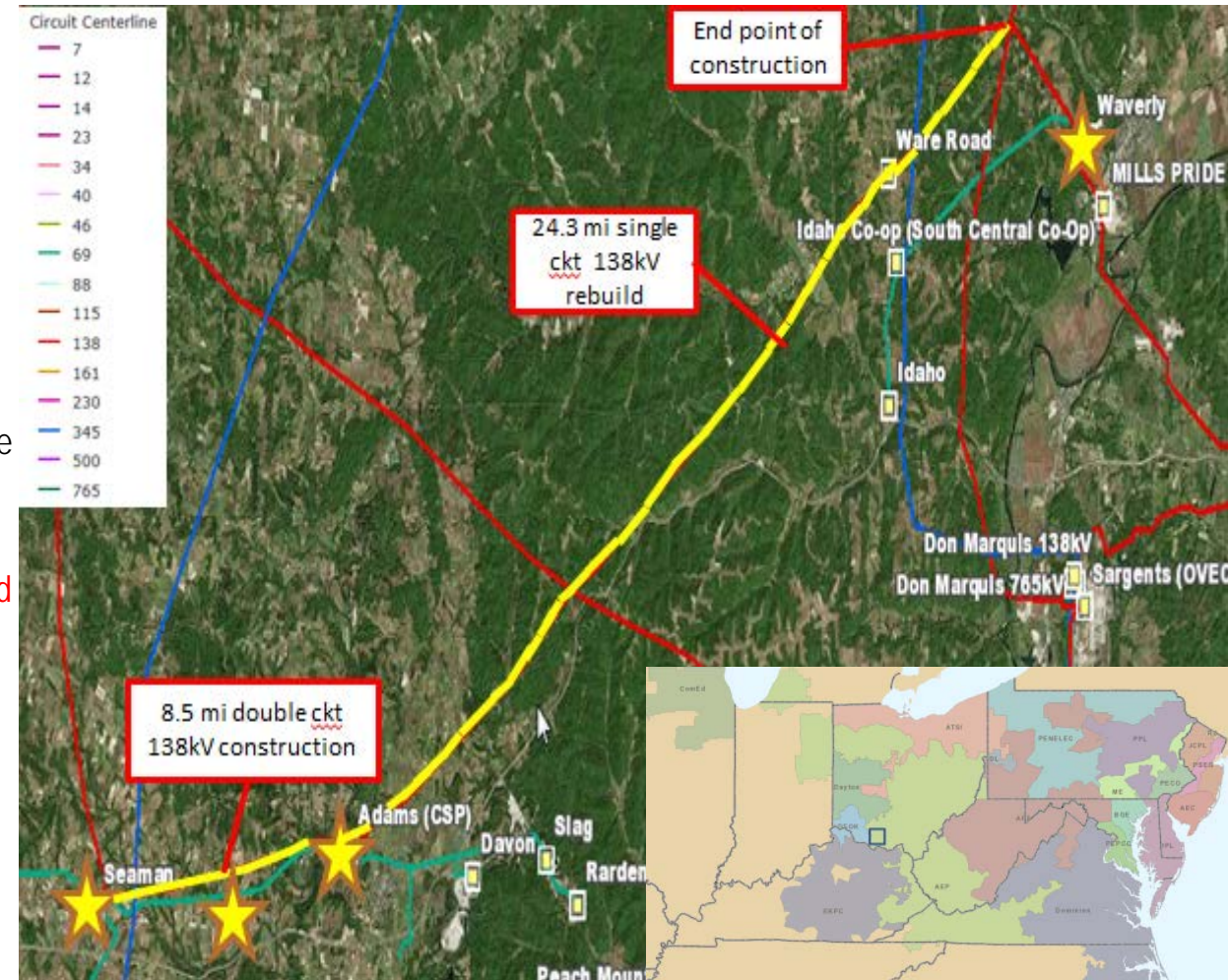
A three-way POP switch structure will be constructed outside Lawshe 69kV substation. (S1621.3)

Estimated Cost: \$1.0M

Total Estimated Transmission Cost: ~~\$66M~~ 78.8M

Projected In-service: 06/01/2021

Project Status: Engineering



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

AEP Transmission Zone: Supplemental Danville, Virginia Area

Need Number: AEP-2019-AP012

Process Stage: Need Meeting 06/17/2019

Project Driver:

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

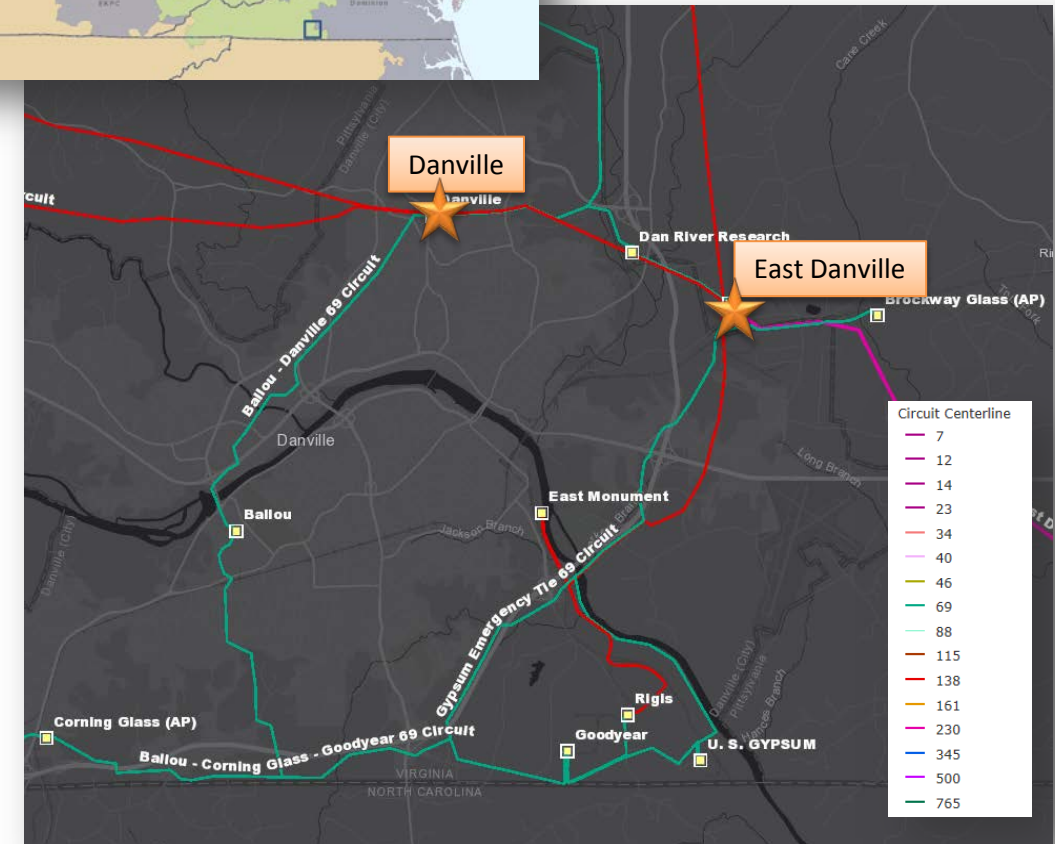
Specific Assumption References:

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

Problem Statement:

Danville, VA Area Pilot Wire

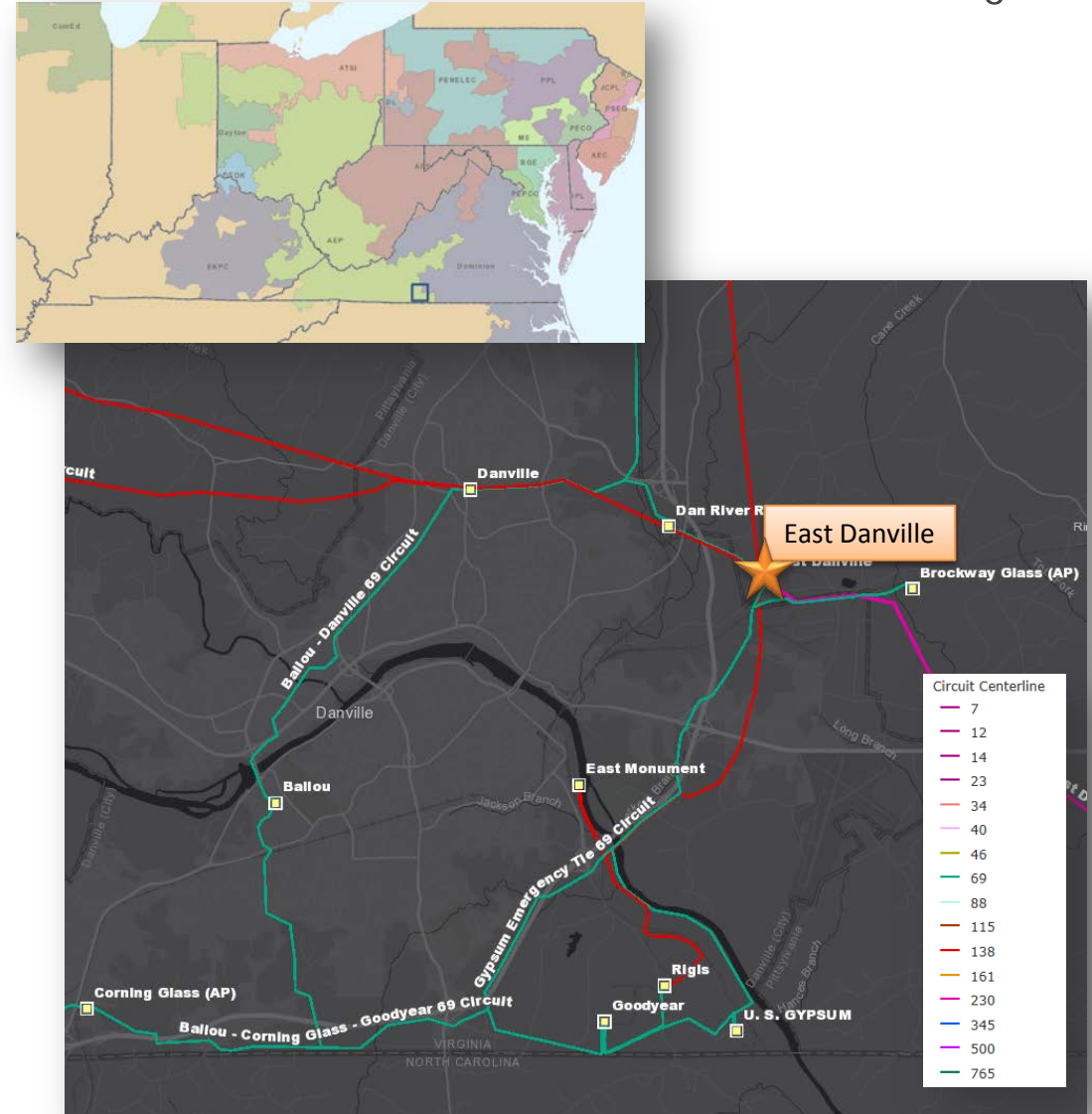
- Several documented mis-operations have occurred related to defective and disabled pilot wire relaying between Danville, East Danville and the local 69 kV network. Pilot wire maintenance is a known safety concern especially during poor weather conditions. Elimination of pilot wire in the Danville area will address ground splice concerns, pilot wire cabinet access issues and low hanging pilot wire on poles. Corrective maintenance continues to be a concern due to the lack of spare relay components and it being an obsolete technology. Due to the abnormal conditions and overall age of the pilot wire in the Danville area, mis-operations have impacted several large industrial customers.



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East Danville Station

- 138 kV Circuit Breakers L and M
 - 12 malfunction records indicating low SF6 gas during cold weather conditions with continued maintenance required
 - Have experienced 19 and 49 fault operations respectively. The manufacturer's recommendation for this type of breaker is 10.
- 138 kV Circuit Breaker P
 - CB P is FK type oil breaker (1955 vintage)
 - Oil breakers that are difficult to maintain due to the required oil handling. There is an increased potential for oil spills during routine maintenance and failures with these types of breakers.
- 69 kV Circuit Breakers F and H
 - FK type oil breakers (1965 vintage)
 - Malfunction on CB H for an air leak on the control valve
 - Have experienced 46 and 78 fault operations respectively. The manufacturer's recommendation for this type of breaker is 10.
- 69/12 kV T#3
 - High side MOAB Ground Switch
 - Tapped off of East Danville-US Gypsum 69 kV line, not currently tapped off bus



AEP Transmission Zone: Supplemental Danville, Virginia Area

Continued from previous slide...

Goodyear Station

- 69 kV Circuit Breakers A, C and D
 - FK type oil breakers (1959, 1973 and 1972 vintage respectively)
 - Oil breakers that are difficult to maintain due to the required oil handling. There is an increased potential for oil spills during routine maintenance and failures with these types of breakers.
 - Have experienced 18, 9 and 7 fault operations respectively. The manufacturer's recommendation for this type of breaker is 10.
- Customer metering CTs and PTs are over 50 years old and accuracy class below recommended

US Gypsum Station

- Customer metering CTs and PTs are over 50 years old and accuracy class below recommended
- 69 kV Circuit Breaker A
 - FK type oil breaker (1966 vintage); experienced 21 fault operations

Rigis Station

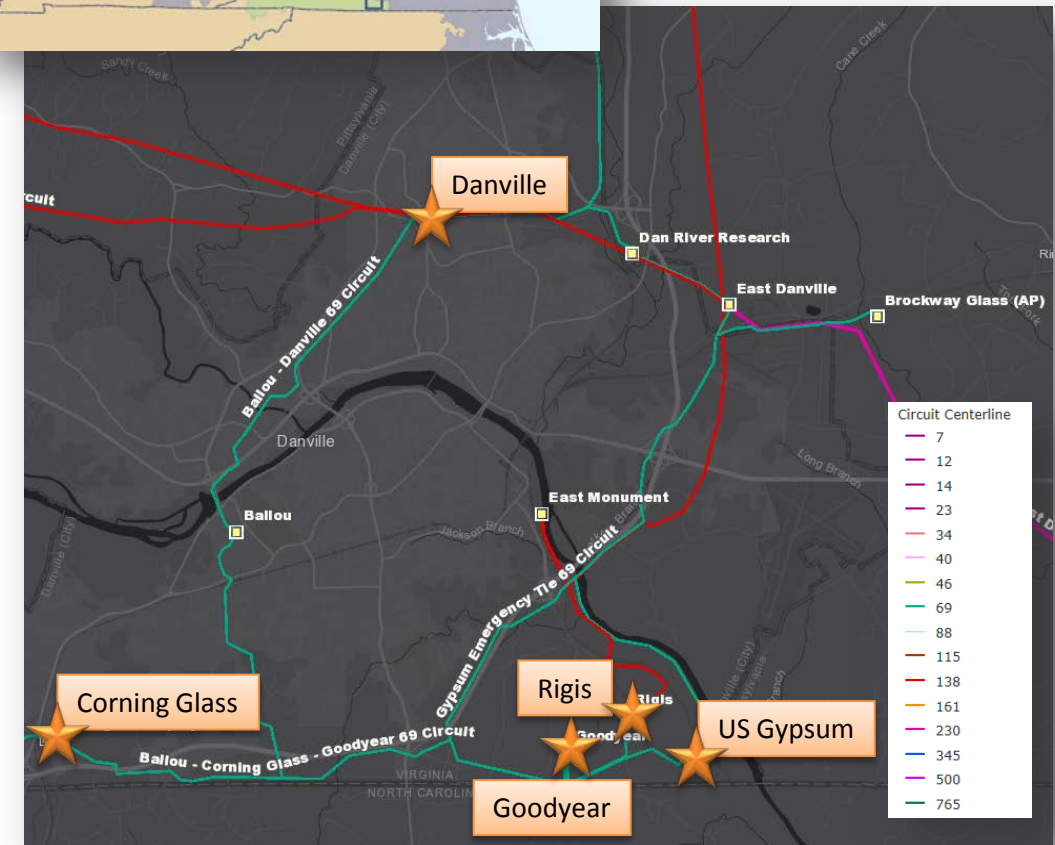
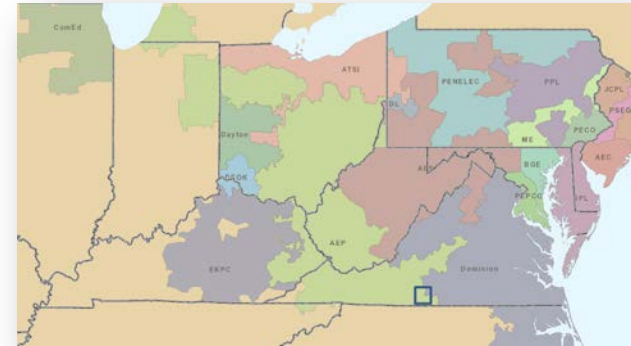
- 138/69 kV T#1
 - High side MOAB ground switch protection

Corning Glass Station

- 69 kV Circuit Breaker B
 - FK type oil breaker (1966 vintage); experienced 80 fault operations
- Circuit Switchers A and AA
 - S&C 2030-69, no gas monitor, model family has numerous documented malfunction records concerning gas loss and interrupter failures

Danville Station

- 69 kV Circuit Breaker J
 - FK type oil breaker (1966 vintage)



AEP Transmission Zone: Supplemental Raleigh County, West Virginia

Need Number: AEP-2019-AP016

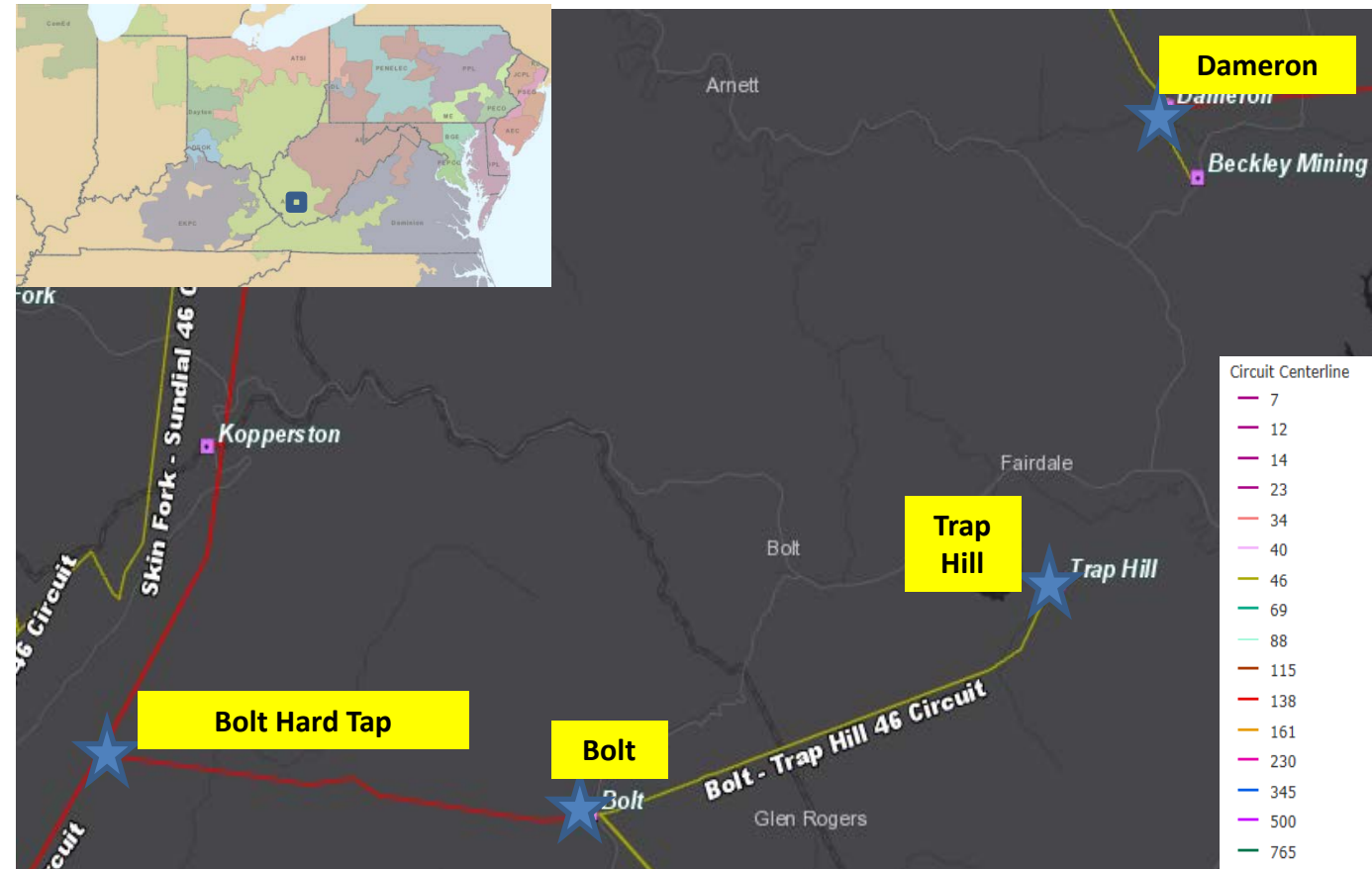
Process Stage: Needs Meeting 6/17/2019

Project Driver: Equipment Material/Condition/Performance/Risk

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

Problem Statement:

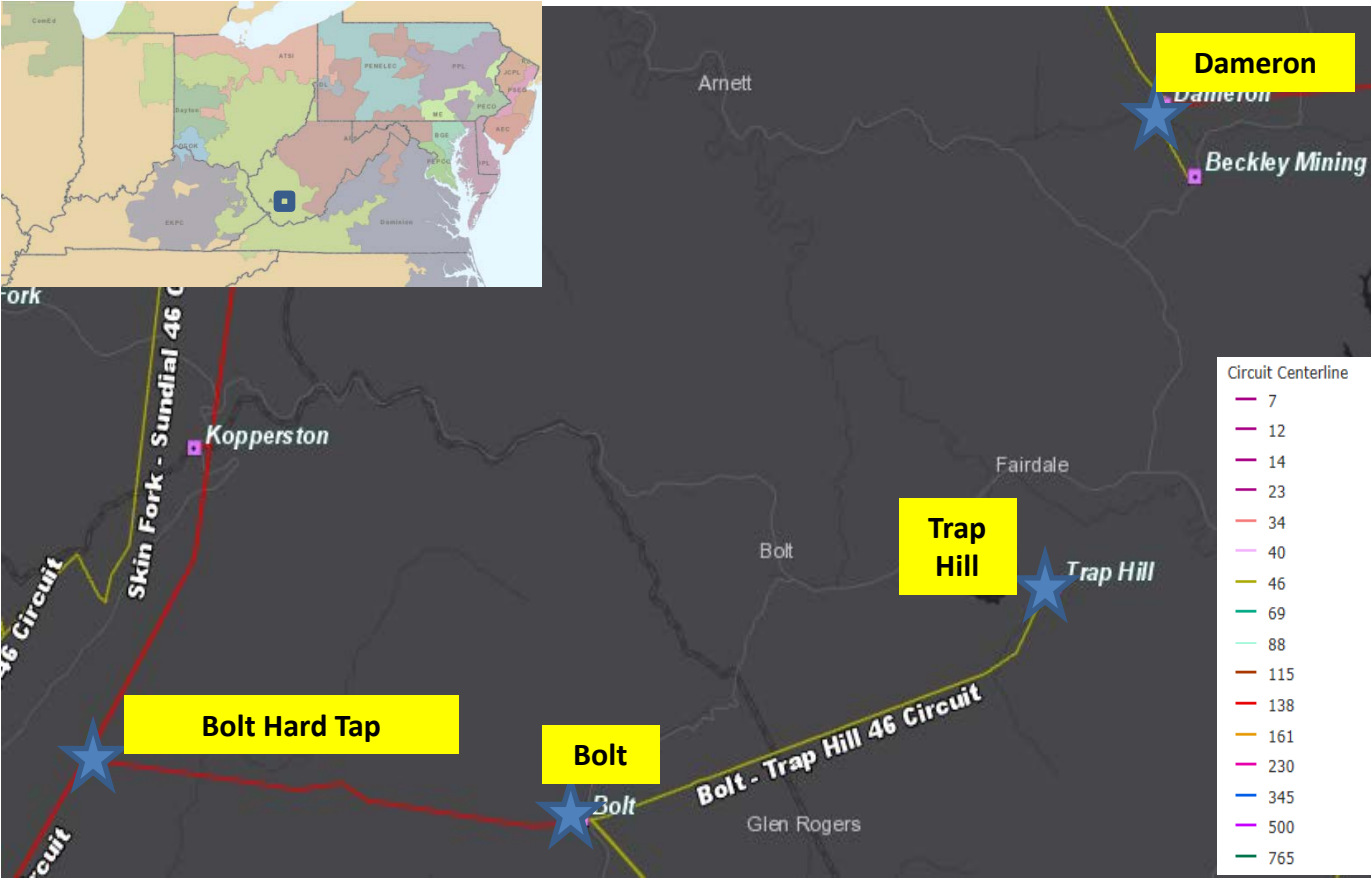
- Trap Hill Station serves approximately 20 MVA of load from a 6 mile radial thus exceeding AEP's threshold for looped service of 75 MVA-mile. Long radial line or radial lines serving a significant amount of load are concerning as they age due to:
 - Maintenance of radial facilities being difficult due to the required customer outages.
 - Radial delivery points resulting in extended outages to customers for any loss of the feed due to the lack of looped service and transferability of the load.
- Bolt Tap 138 kV is a hard tap off the Baileysville – Sundial 138 kV #1 circuit.
 - Hard taps are difficult to maintain due to required outages or temporary jumper configurations in lieu of a switch.
 - It can also result in extended outages to customers due to the inability to sectionalize faulted facilities.
- Dameron 46 kV CB-A
 - Oil filled ITE 69KA-2500-12D type breaker, 1 of 13 of this type of model left on the AEP system.
 - These types of breakers experience issues with their parts and maintenance costs due to lack of vendor support.
 - Oil breakers are more difficult to maintain as oil spills have the potential to occur during maintenance which could pose an environmental and safety hazard.



AEP Transmission Zone: Supplemental Raleigh County, West Virginia

Problem Statement (cont'd):

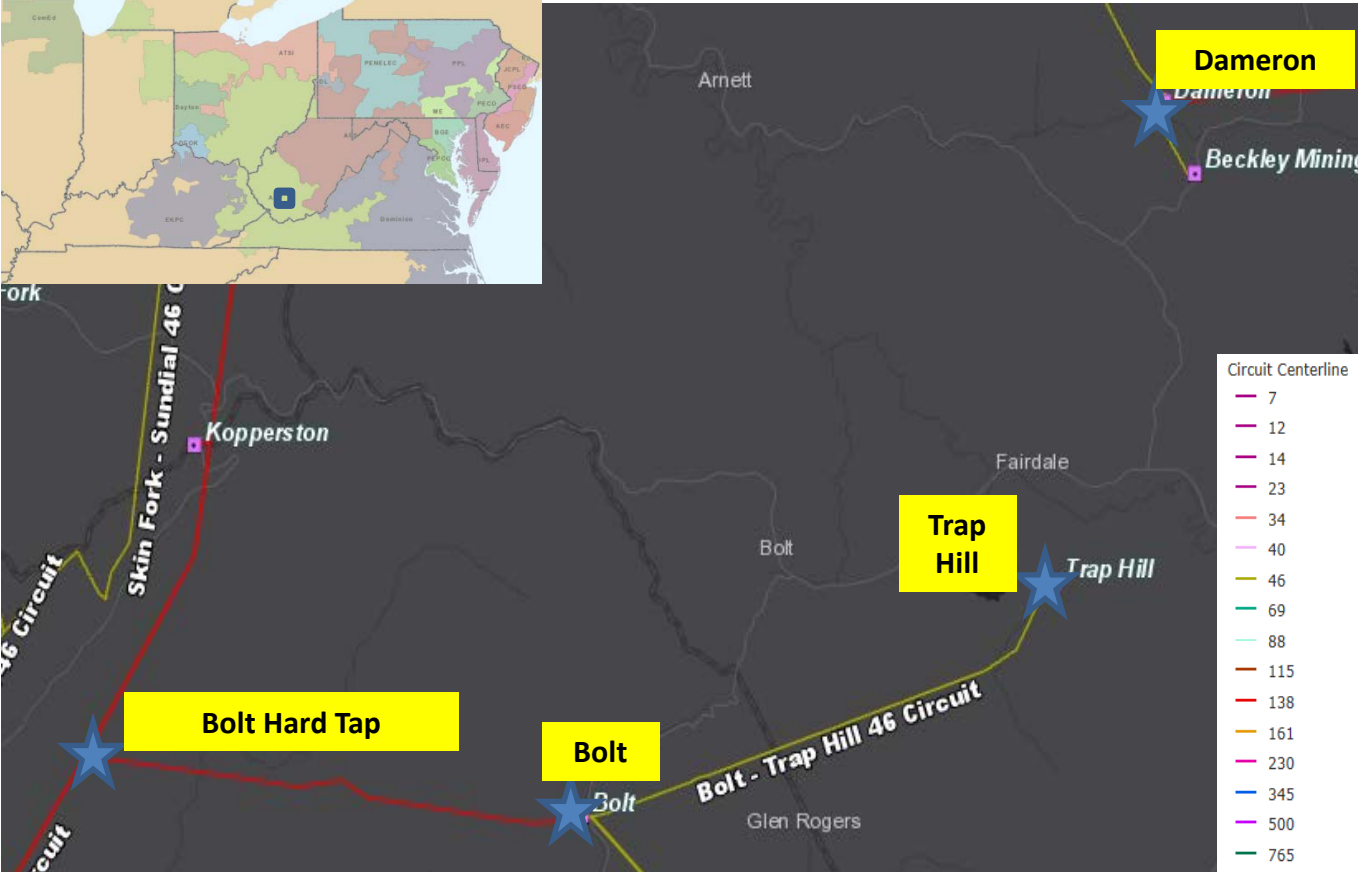
- Dameron 46 kV Cap switcher AA
 - S&C 2030-69 unit that has no gas monitor and sister units on the AEP system have experienced 62 malfunctions since 1999. Major events include gas loss, interrupter failures, and operating mechanism failures.
- Dameron 138/46 kV Bank #1
 - Rising moisture, carbon monoxide (CO), and carbon dioxide (CO2) levels which indicate a deterioration of the insulating paper.
 - Sustained low levels of interfacial tension also ties to insulation degradation and is an indication of sludge formation. Sludge can impede oil circulation and generate numerous instances of overheating, further accelerating the declining health of the unit.
 - The current MOAB/Ground SW configuration on the high side.
- Dameron grounding transformer
 - 99 year old unit in which all 3 phases are facing similar condition issues.
 - Sustained elevated moisture levels and power factor have led to decreasing dielectric strength.
 - Sustained low levels of interfacial tension is an indication of sludge formation.
 - Sludge can impede oil circulation and generate numerous instances of overheating, further accelerating the declining health of the unit.
- Dameron Substation currently deploys 41 relays, implemented to ensure the adequate protection and operation of the substation.
 - Currently, 36 of the 41 relays (88% of all station relays) are in need of replacement.
 - There are 33 of the electromechanical type and 1 static type which have significant limitations with regards to fault data collection and retention. In addition, 2 microprocessor relays were commissioned in 1997 and 2005, indicative of obsolete firmware that is no longer vendor supported.



AEP Transmission Zone: Supplemental Raleigh County, West Virginia

Problem Statement (cont'd):

- Bolt 46 kV cap switcher AA
 - 1 of 15 remaining VBM-69 types left on the AEP system.
 - These types of cap switchers perform poorly in cold weather and replacement parts are known to be expensive when they are available per the TFS obsolete list.
- Bolt 46 kV grounding transformer
 - All 3 phases are facing similar condition issues as listed.
 - Sustained elevated moisture levels and power factor have led to decreasing dielectric strength.
 - Sustained low levels of interfacial tension is in indication of sludge formation, in which sludge can impede oil circulation and generate numerous instances of overheating, further decreasing the health of the unit.
- Bolt 138/46 kV XFR
 - Moisture levels and power factor have been on the rise since 2004. These increases correspond to decreasing dielectric strength levels seen over the same period. The most probable causes of moisture in oil for this unit are paper breakdown (aging), moisture ingress through gaskets, and leaks (main tank; pumps; etc.).
 - Interfacial tension has been at a sustained low level since 2008; this is an early indication of the development of sludge from contaminants in the oil. Over time, the sludge can further impede the ability of oil to properly circulate, potentially leading to more frequent unit overheating.



AEP Transmission Zone M-3 Process Putnam/Kanawha Counties, WV

Need Number: AEP-2019-AP013

Process Stage: Need Meeting 6/17/2019

Project Driver:

Equipment Condition/Performance/Risk

Specific Assumption References:

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

Model: N/A

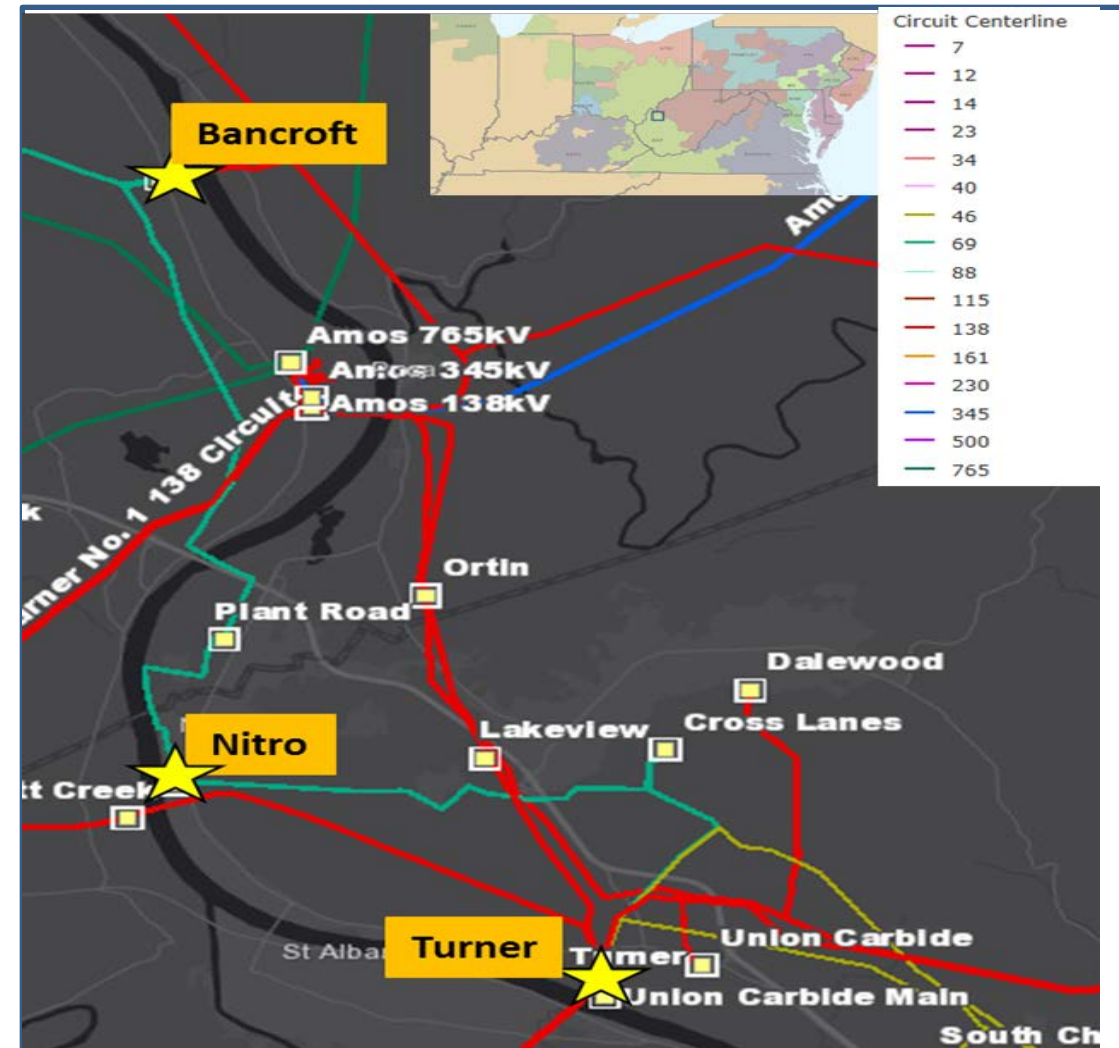
Problem Statement:

Bancroft – Nitro 69 kV (~7.6 miles)

- Majority of the circuit is constructed with 1930s (46/97, 47%) and 1960s (20/97, 21%) wood structures
- The circuit currently has 27 open conditions
- Structure loading does not meet current NESC standards.
 - The conductor is greater than 65 years old, and exceeds the recommended lifespan. Grounding on this line does not meet current standards.
- Between 2015-2018 the circuit experienced 2 momentary and 1 permanent outage resulting in approximately 800k customer minutes of interruption

Nitro – Turner 69 kV (~7.3 miles)

- Over half of the circuit is constructed with 1920s wood structures (51/75 structures, 68%)
- The circuit currently has 60 open conditions
- Approximately half of the line is not shielded.
- From 2015-2018 the circuit has experienced 8 momentary and 6 permanent outages resulting in approximately 130k customer minutes of interruption



AEP Transmission Zone: Supplemental Floyd County, Kentucky

Need Number: AEP-2019-AP017

Process Stage: Need Meeting 06/17/2019

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)

Model: N/A

Problem Statement:

Beaver Creek – McKinney #1 46 kV Circuit

- From 2016-2018, the approximately 24.6 mile Beaver Creek – McKinney #1 46 kV circuit has experienced 22 outages.
- The circuit is comprised of 152 structures, the majority of which are wood structures dating back to 1929 (22/152, 14%) and 1949 (61/152, 40%).
- There are 142 open conditions along the 24.6 mile long line. These include damaged poles and cross-arms, conductor/shield wires, and guy anchor/knee/vee braces.

Hays Branch Station

- Hays Branch serves a ~30 MW gas compressing operation that is currently radially fed from a ~8.25 mile line out of Morgan Fork station.

Saltlick Station

- Saltlick serves an EKPC co-op that is currently radially fed off the Beaver Creek – McKinney 46 kV circuit.



AEP Transmission Zone: Supplemental Floyd County, Kentucky



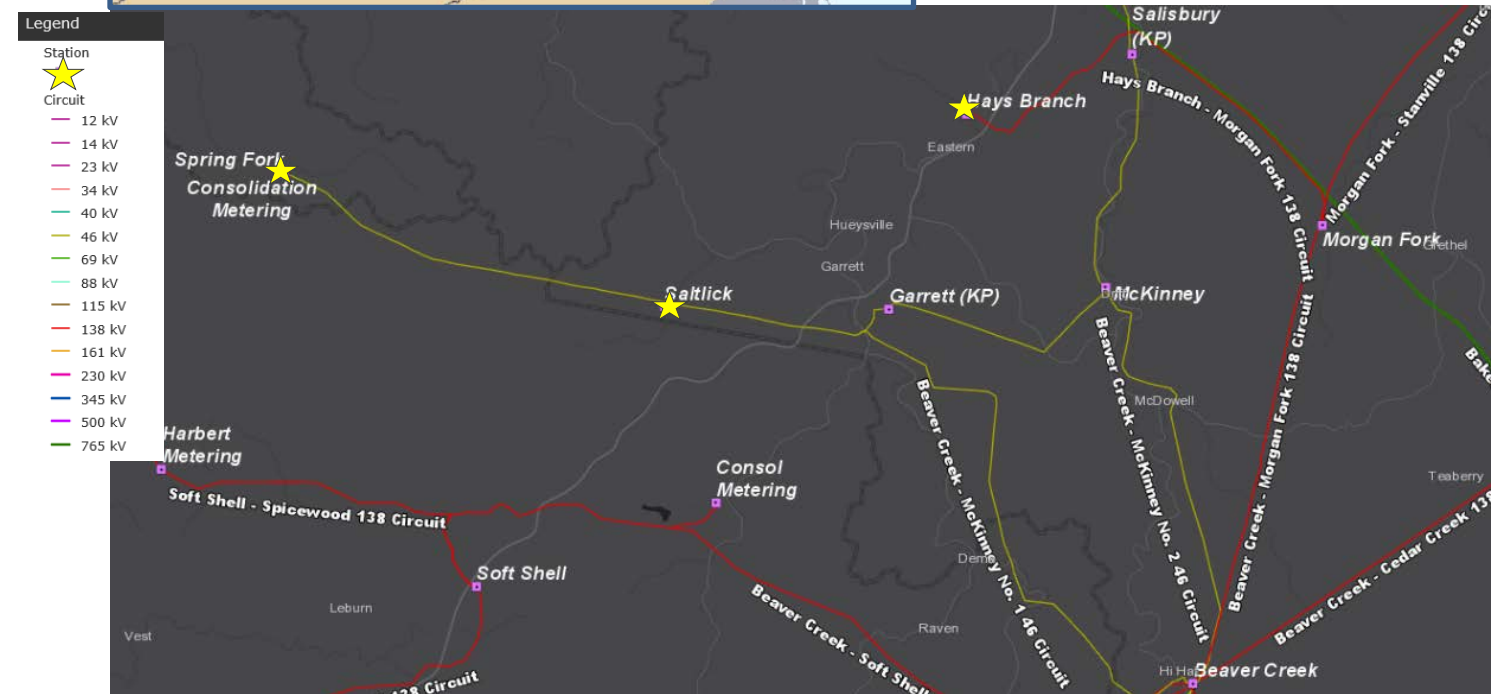
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Spring Fork

- Spring Fork station serves KPCo distribution customers and is currently radially fed off the Beaver Creek – McKinney 46 kV circuit.

Consolidation Metering

- Consolidation Metering station serves a mining operation and is currently radially fed off the Beaver Creek – McKinney 46 kV circuit.



AEP Transmission Zone M-3 Process Adams & Pennville, Indiana

Need Number: AEP-2019-IM019

Process Stage: Needs Meeting 06/17/2019

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

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

Problem Statement:

Adams 138/69kV station

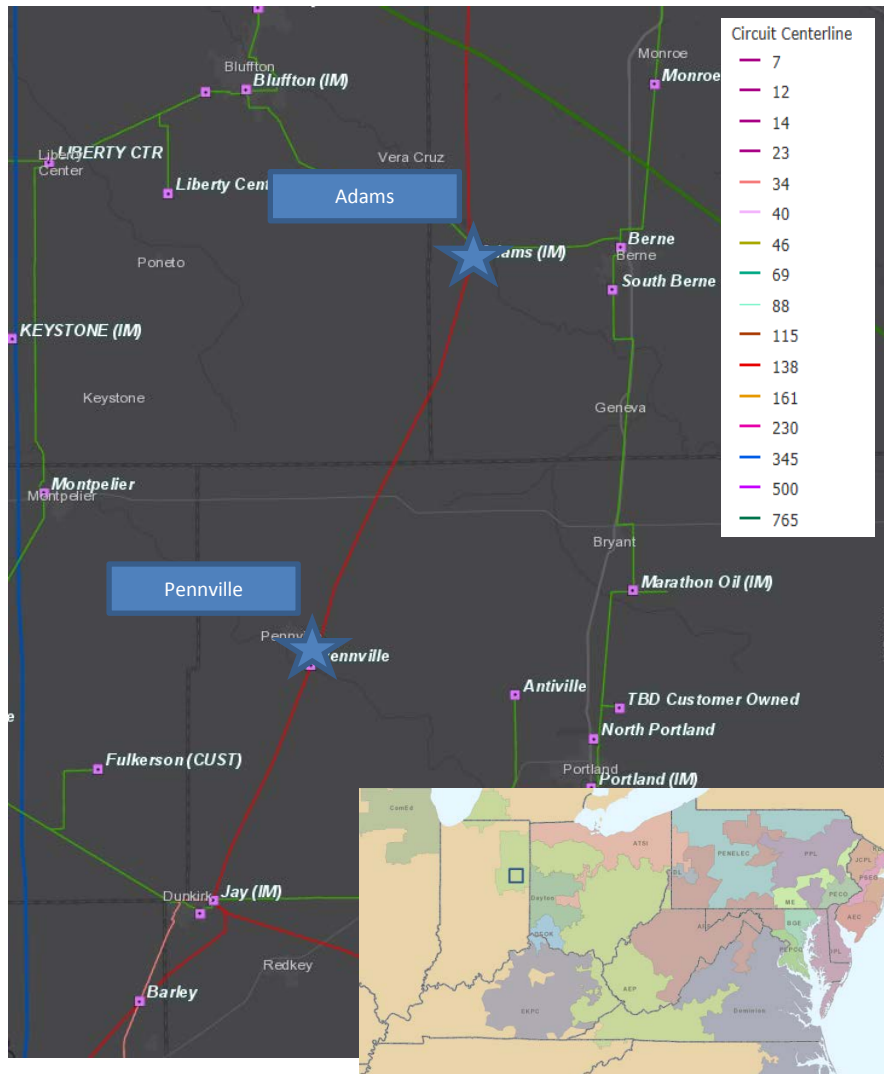
- The 138/69kV XFR currently is protected by a high side ground switching MOAB.
- Currently there are 3 dissimilar zones of protection at this station with a 138kV line, 138kV bus and a 138/69kV transformer

Pennville 138kV station

- This station's through path is composed of wood support structures and cap and pin bus insulators, both have been identified as safety concerns.
- The Cap and Pin support insulators have a documented history of failing due to degradation in the glue that holds them together. It is currently AEP policy to remove these support style insulators whenever we come across them.
- The support structures for the station's through path reside mostly outside of the station footprint. These bus support structures straddle the station fence which leaves most of the main bus, switches, insulators and support structures outside the station's footprint where there is no ground grid. This has been identified as a safety hazard and will be addressed.

Model:

N/A



AEP Transmission Zone: Supplemental Huntington, Indiana

Need Number: AEP-2019-IM022

Process Stage: Needs Meeting 06/17/2019

Project Driver: Equipment Condition/Performance/Risk

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

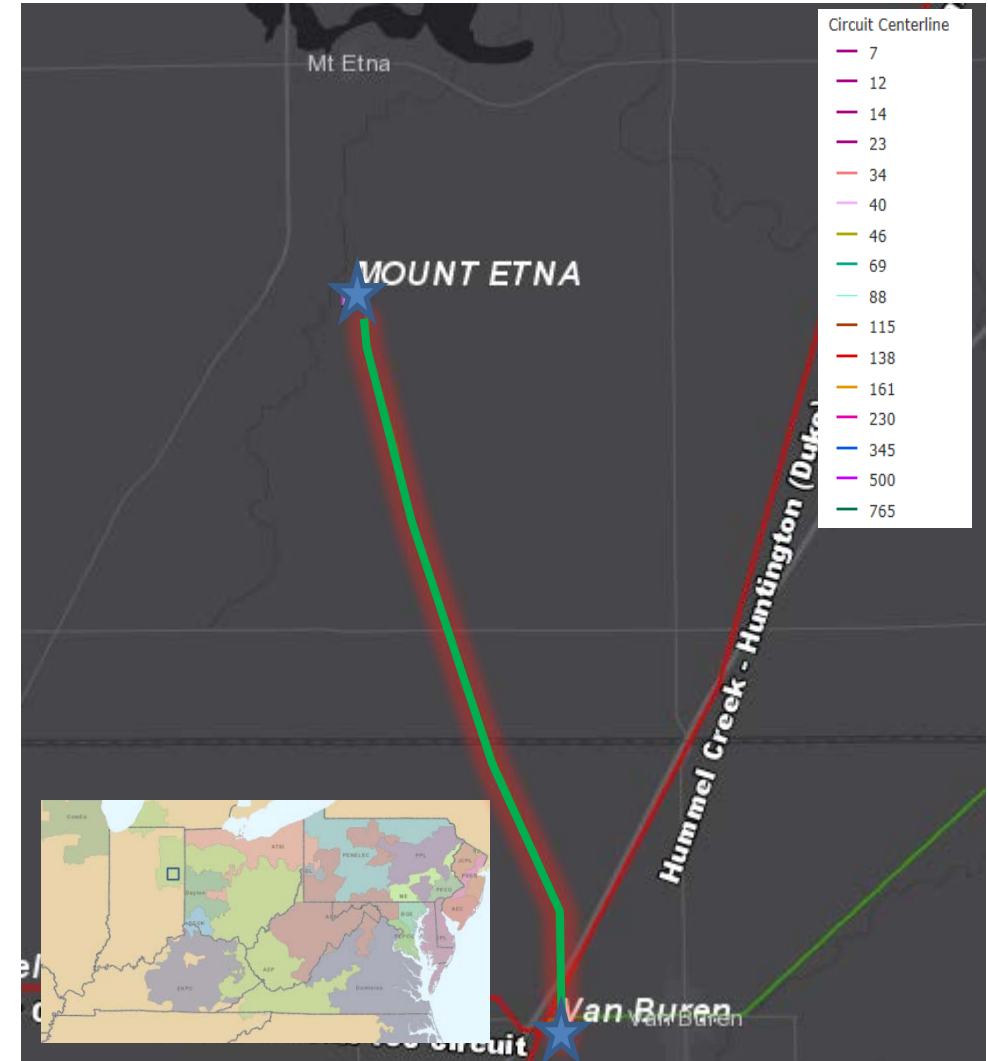
Problem Statement:

Mount Etna 69kV Tap (~6.8 Miles)

- 1959 wood pole construction
- 5 open conditions
- 116 active maintenance events in the past 10 years
- Structures on this line fail to meet the current NESC loading requirements
- 7 permanent and 14 momentary outages in the 3 year timeframe between 2015-2018
- 641,081 CMI
- Radial lines are difficult to maintain without significant impacts to the customer

Model:

N/A



AEP Transmission Zone M-3 Process Deer Creek - Makahoy, Indiana

Need Number: AEP-2019-IM023

Process Stage: Needs Meeting 06/17/2019

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

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

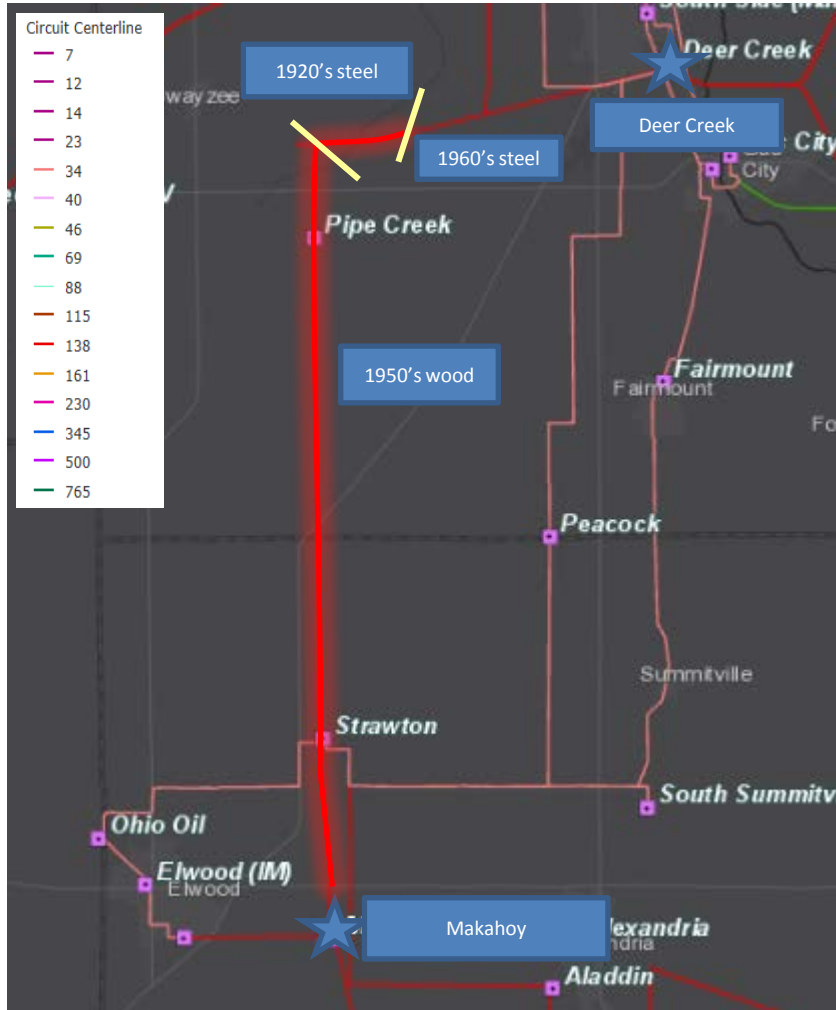
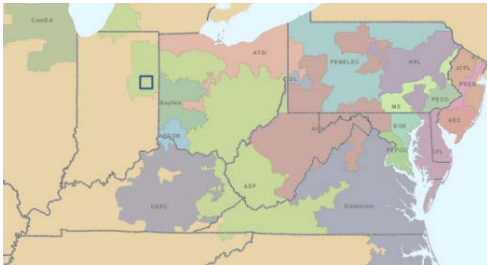
Problem Statement:

Deer Creek – Makahoy 138kV line

- ~15 miles – 1950’s wood pole construction
- ~1.5 miles – 1920’s steel tower construction
- 64 open conditions with the majority being structure and conductor issues
- 18 momentary outages
- 6 permanent outages over the last 10 years

Model:

N/A



AEP Transmission Zone M-3 Process Muncie, Indiana

Need Number: AEP-2019-IM024

Process Stage: Needs Meeting 06/17/2019

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

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

Problem Statement:

Delaware – Bethel overhead 34.5kV Line (2.8 miles)

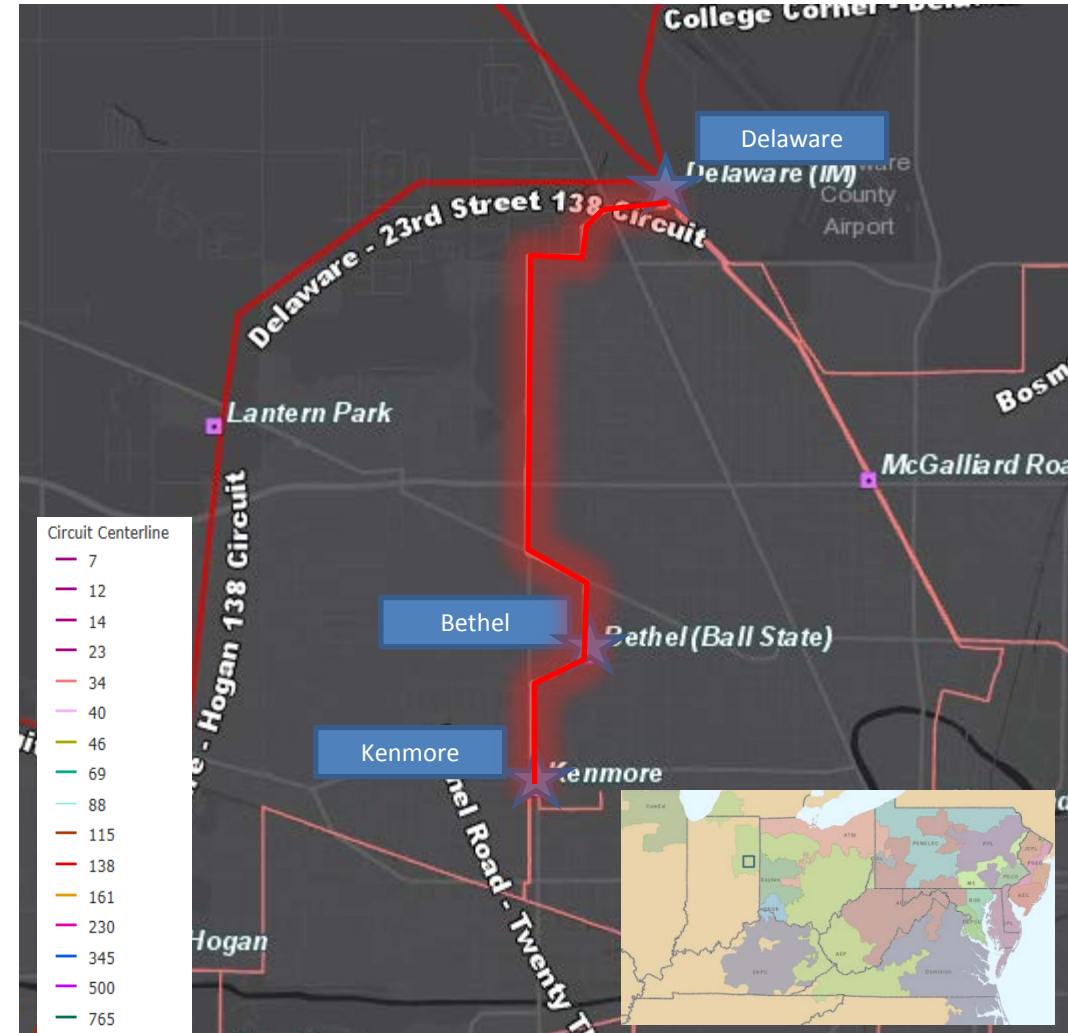
- 1960's vintage wood construction.
- 16 open conditions all related to structural issues.
- Issues with ROW encroachments.

Bethel – Kenmore underground 34.5kV line (.8 miles)

- 1960's vintage underground construction
- Both cables are through common man-hole ducts, which can present a safety issue. Currently TFS personal will not work on this line unless both northern feeds to Kenmore are de-energized due to this configuration.
- Underground construction makes it difficult to identify and fix outages. This means that as this cable ages, the area will start experiencing prolonged forced outages. This line has already experienced multiple of these type of outages.
- This UG section was out for 14 straight days in June 2010 and 29 straight days in August 2017

Model:

N/A



AEP Transmission Zone M-3 Process Harrison County, Ohio

Need Number: AEP-2019-OH029

Process Stage: Needs Meeting 06/17/2019

Supplemental Project Driver:

Customer Service

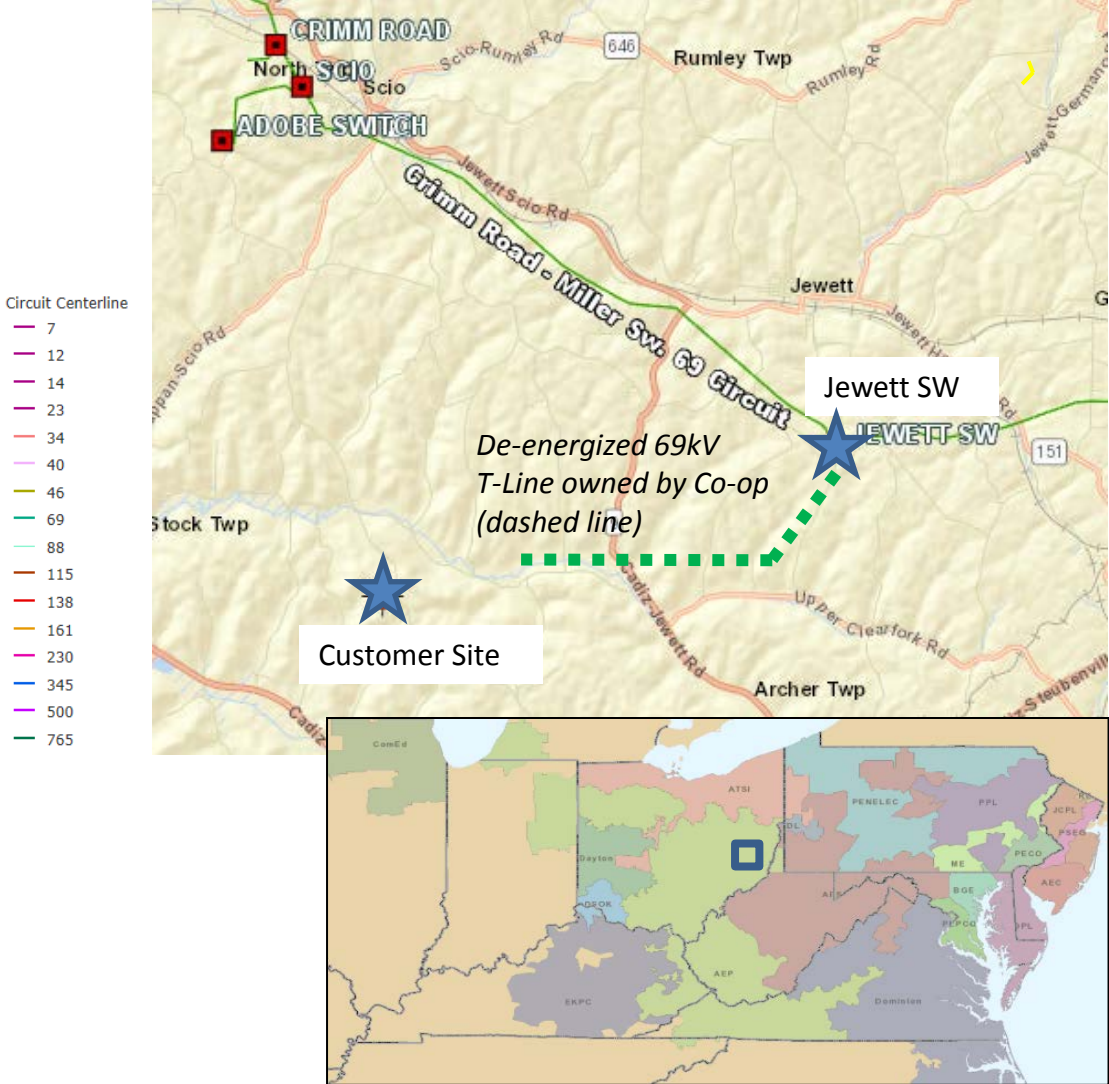
Specific Assumption References:

AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 7)

Model: 2023 RTEP

Problem Statement:

- Buckeye Power, on behalf of South Central Power Co-op, has requested transmission service in Stock Township of Harrison County, Ohio.
- The forecasted peak demand is 16 MVA, with an in-service date of 9/1/2020.



AEP Transmission Zone M-3 Process Perry & Licking Counties, Ohio

Need Number: AEP-2019-OH030

Process Stage: Need Meeting 06/17/2019

Project Driver:

Equipment Material/Condition/Performance/Risk

Specific Assumption Reference:

AEP Guidelines for Transmission Owner Identified Needs

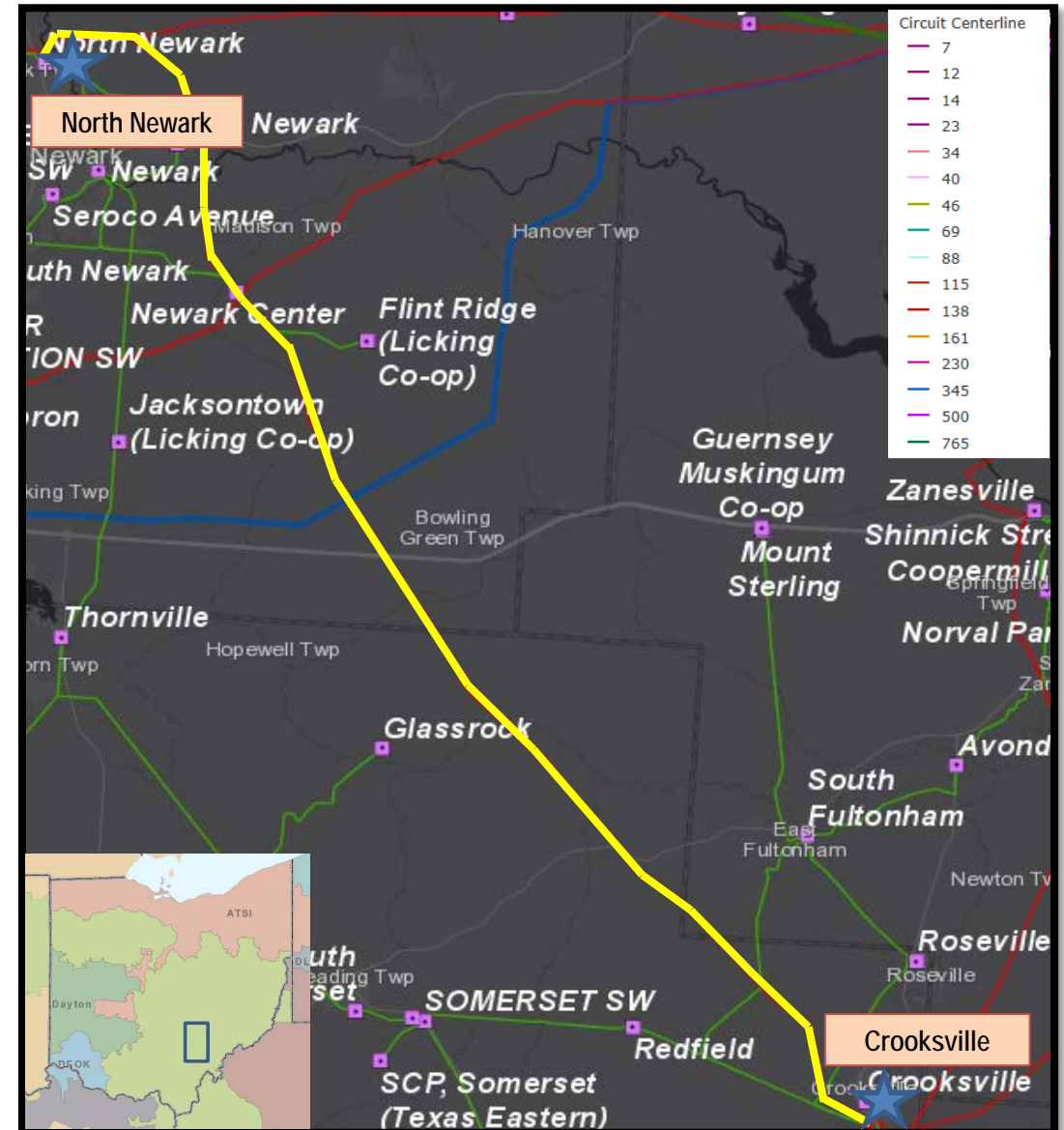
Problem Statement:

Line:

Crooksville – North Newark (Vintage - 1952)

- Length: 30.63 Miles
- Original Construction Type: Wood
- Original Conductor Type: 266,800 CM ACSR 26/7 (Partridge)
- Momentary/Permanent Outages: 5 outages last 5 years
- Number of open conditions: 338
 - Open conditions include: Pole Rot, Insect/Bird Damage, Damaged Conductors, Ground Wires, & Guy Wires.

Model: N/A



Need Number: AEP-2019-OH031

Process Stage: Need Meeting 6/17/2019

Project Driver:

Equipment Material/Condition/Performance/Risk

Specific Assumption Reference:

AEP Guidelines for Transmission Owner Identified Needs

Problem Statement:

Honey Creek SW - North Central Co-op Line Section (vintage 1955)

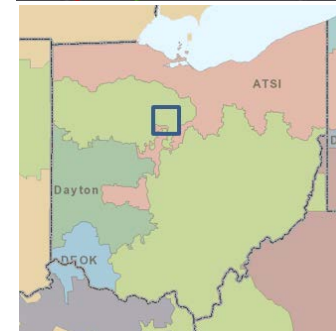
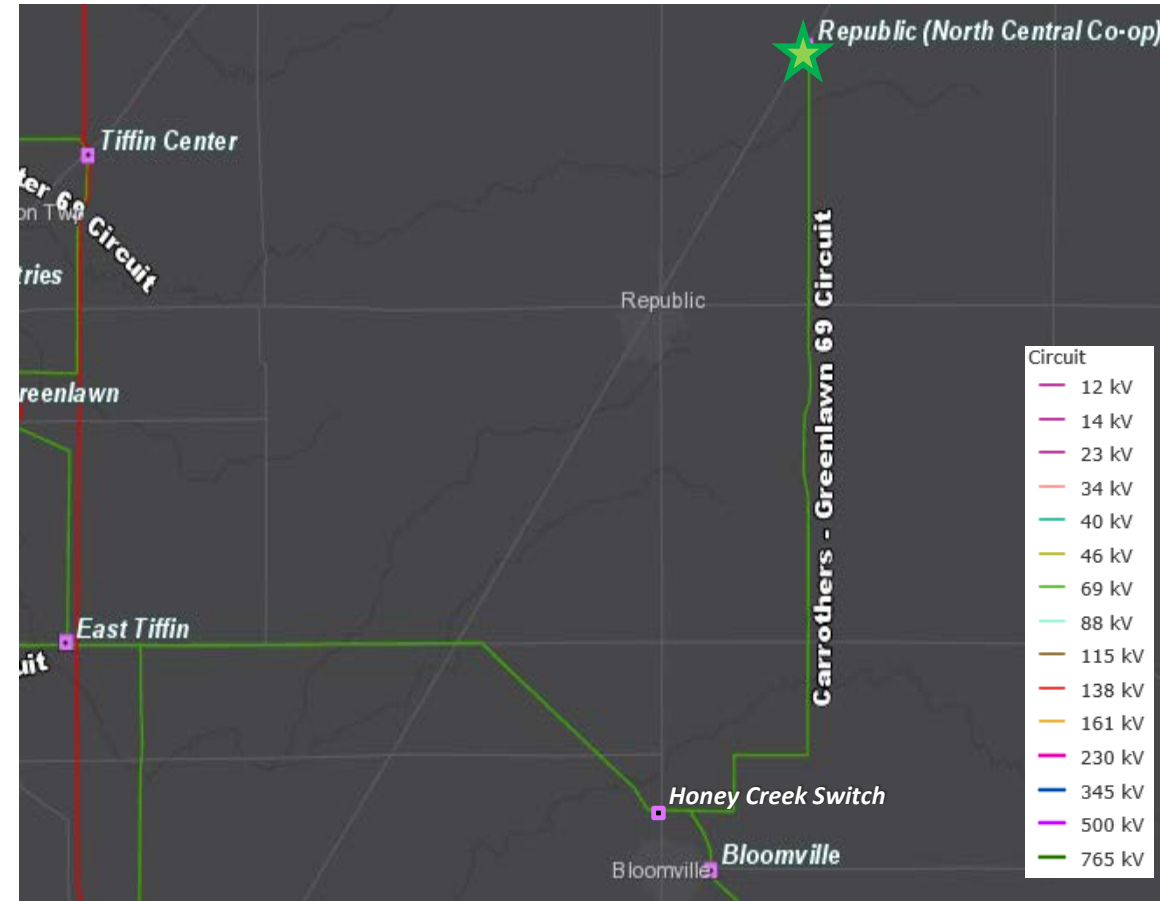
- Length: 8.06 Miles
- Original Construction Type: Wood
- Original Conductor Type: 1/0 ACSR 6/1 (Raven)
- Momentary/Permanent Outages: 13 in the past 5 years
- CMI: 2,505,168
- Number of open conditions: 46
 - Open conditions include: Damaged HP Insulators, Poles, Ground Lead, & Guy Wires

Additional Info: Radial service severely restricts the ability to perform routine maintenance and restoration activities.

The maintenance of radial transmission lines often requires costly temporary facilities or other labor-intensive measures involving energized work because a maintenance outage to such radial loads is generally not feasible.

Model: N/A

AEP Transmission Zone M-3 Process Republic, Ohio



Need Number: AEP-2019-OH032

Process Stage: Need Meeting 6/17/2019

Project Driver:

Equipment Material/Condition/Performance/Risk

Specific Assumption Reference:

AEP Guidelines for Transmission Owner Identified Needs

Problem Statement:

West Rockaway – North Central Co-op Line (vintage 1960)

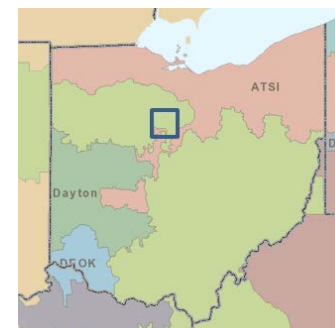
- Length: 8.32 Miles
- Original Construction Type: Wood
- Original Conductor Type: 1/0 ACSR 6/1 (Raven)
- Momentary/Permanent Outages: 13 in the past 5 years
- CMI: 2,505,168

Additional Info: Radial service severely restricts the ability to perform routine maintenance and restoration activities. The maintenance of radial transmission lines often requires costly temporary facilities or other labor-intensive measures involving energized work because a maintenance outage to such radial loads is generally not feasible.

Model:

N/A

AEP Transmission Zone M-3 Process Sycamore, Ohio



Need Number: AEP-2019-OH034

Process Stage: Need Meeting 6/17/2019

Project Driver:

Equipment Material/Condition/Performance/Risk

Specific Assumption Reference:

AEP Guidelines for Transmission Owner Identified Needs

Problem Statement:

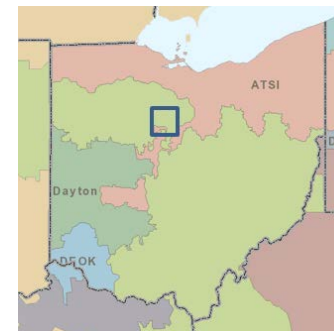
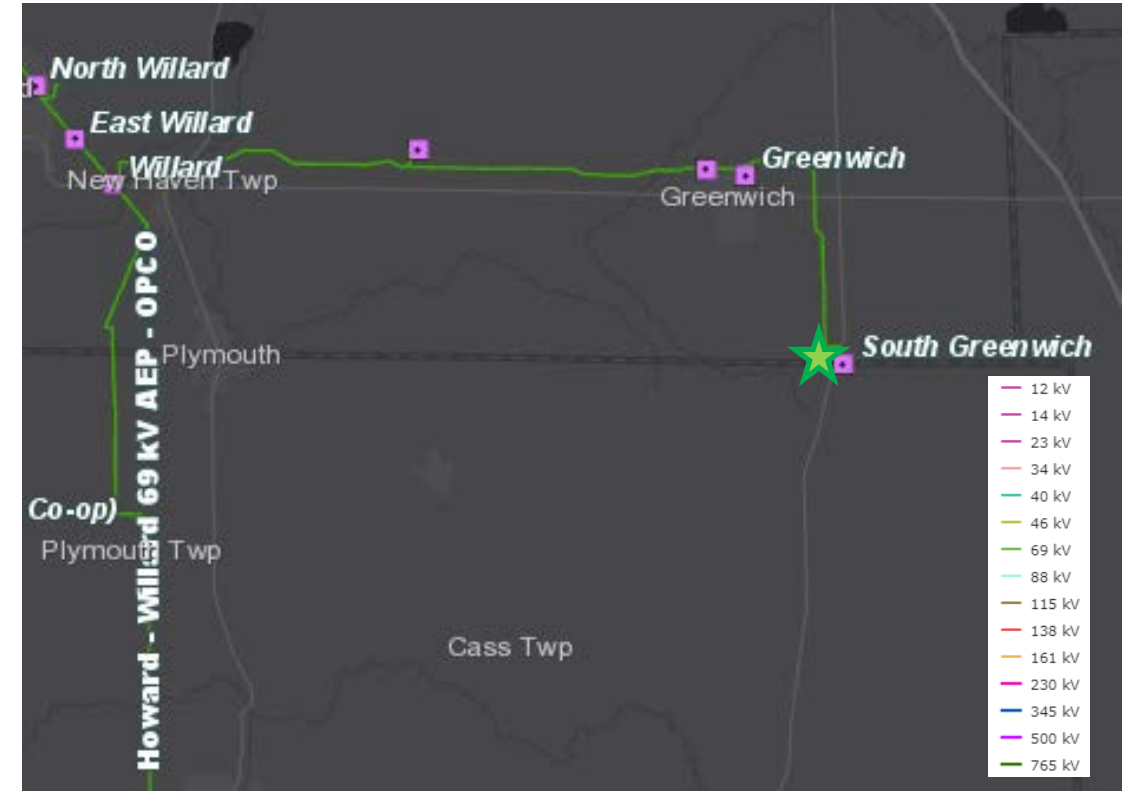
South Greenwich-Willard (vintage 1964)

- Length: 15.22 Miles
- Original Construction Type: Wood
- Original Conductor Type: 4/0 ACSR 6/1 (Penguin)
- Momentary/Permanent Outages: 13 in the past 5 years
- Number of open conditions: 77
 - Open conditions include: Damaged Insulator, Structure, Guy Wire, Ground Lead Wire, & Shield Wire

Radial service severely restricts the ability to perform routine maintenance and restoration activities. The maintenance of radial transmission lines often requires costly temporary facilities or other labor-intensive measures involving energized work because a maintenance outage to such radial loads is generally not feasible.

Model: N/A

AEP Transmission Zone M-3 Process Greenwich, Ohio



AEP Transmission Zone M-3 Process Holmes County, Ohio

Need Number: AEP-2019-OH035

Process Stage: Needs Meeting 06/17/2019

Project Driver:

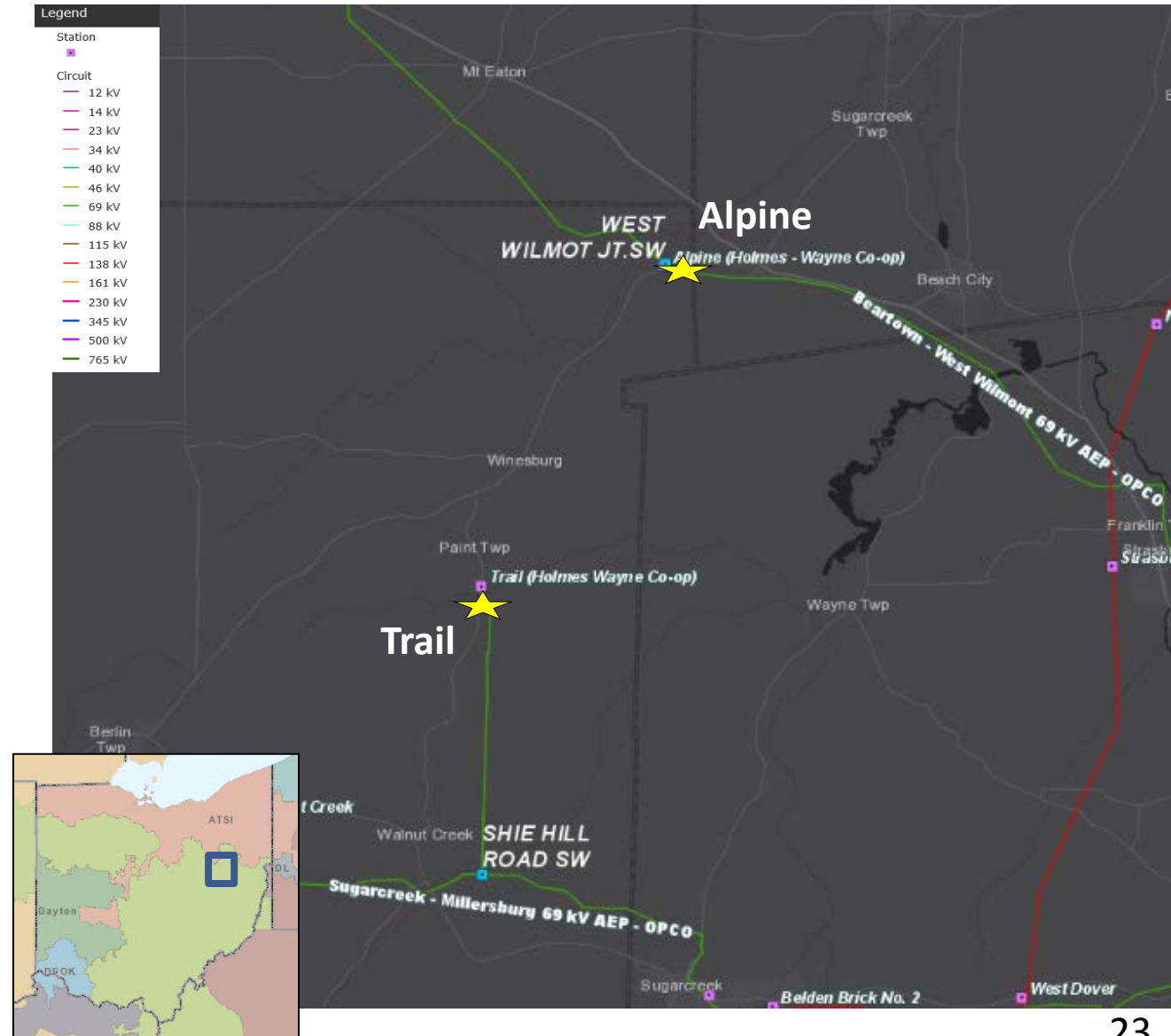
Equipment Condition, Operational Flexibility, and Customer Service

Specific Assumption Reference:

AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions slide 8);

Problem Statement:

- Holmes-Wayne Electric Cooperative customers are connected to the Trail and Alpine delivery points that are served from the Berlin – Sugarcreek Terminal and Beartown – Moreland Sw 69 kV circuits in eastern Holmes County.
- The Trail and Alpine delivery points have accumulated approximately 2.4 million minutes of CMI in the past five years.
- The Trail delivery point is served radial via a ~4.1 mile wood pole line out of Shiehill Road Switch.
- Maintenance on the line is difficult to coordinate as it requires outages to Trail station.



AEP Transmission Zone M-3 Process Western Columbus/Beatty Area

Need Number: AEP-2019-OH036

Process Stage: Needs Meeting 06/17/2019

Project Driver: Equipment Condition, Operational Flexibility, and Customer Service

Specific Assumption References: AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions slide 8); AEP Connection Requirements for the AEP Transmission System (AEP Assumptions Slide 7)

Model: N/A

Problem Statement:

Hilliard Station 69kV:

69 kV Circuit breakers 61, 62, and 63

- CF-48 type oil breakers. (1967, 1967, and 1966 vintage)
- These are oil breakers that are difficult to maintain due to the required oil handling. There is an increased potential for oil spills during routine maintenance and failures with these types of breakers.
- Other drivers include damage to bushings and the breakers have experienced 15, 21, and 31 fault operations respectively. The manufacturer’s recommendation for this type of breaker is 10.

Relaying

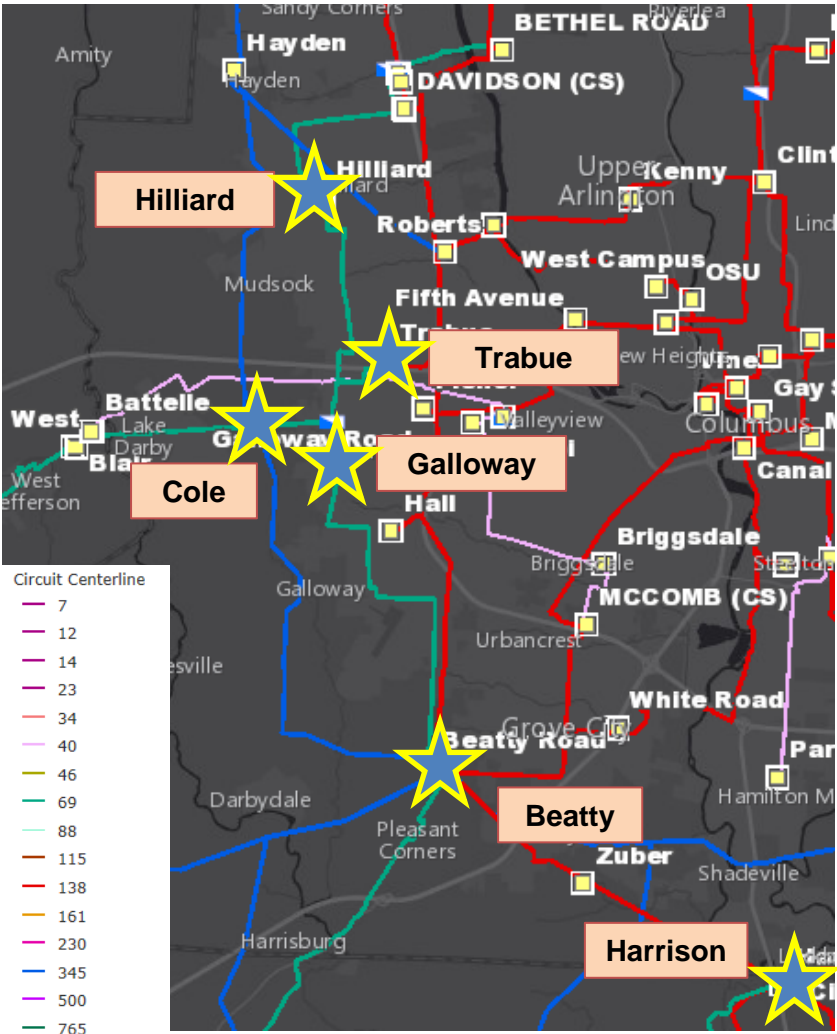
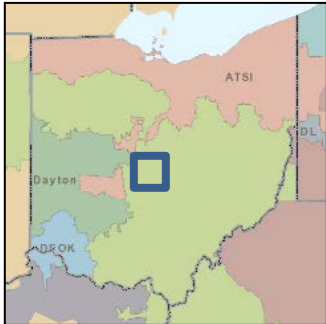
- 105 of the 119 relays are electromechanical relays. EM relays have limited spare part availability, and lack vendor support, no SCADA functionality, and no fault data collection ability.

Station Structures

- The structure steel is deteriorating due to rust and the foundation supporting the steel shows severe cracking.

69/13.2 kV Transformer #1 and #2

- AEP Ohio Distribution Transformers 1 & 2 are protected by high speed ground switch MOABs.

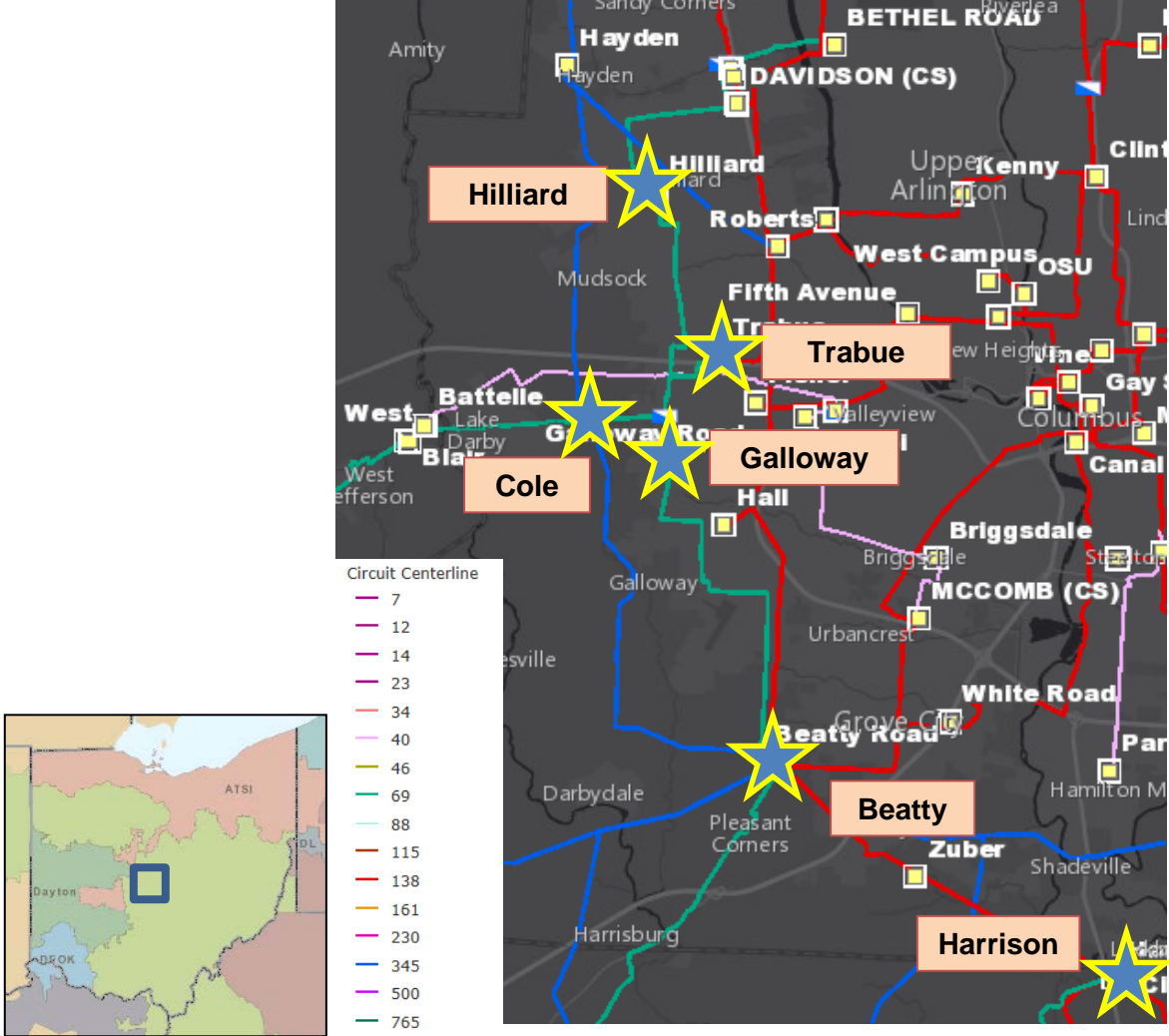


AEP Transmission Zone M-3 Process Western Columbus/Beatty Area

Continued from previous slide...

Beatty Station:

- 69 kV Circuit breakers 63, 64, and 65
 - FK type oil breakers. (1965, 1966, and 1965 vintage)
 - These are oil breakers that are difficult to maintain due to the required oil handling. There is an increased potential for oil spills during routine maintenance and failures with these types of breakers.
 - Other drivers include damage to bushings and the breakers have experienced 5, 34, and 6 fault operations respectively. The manufacturer’s recommendation for this type of breaker is 10.
- 138/69 kV Transformers #1 and #2
 - Showing signs of deterioration. Both are experiencing short circuit strength breakdown (due to the amount of through fault events) and dielectric strength breakdown with a history and overheating and stray gassing.
 - Transformers 1 & 2 are in the same 138kV zone of protection causing both to experience an outage whenever there is a fault in that zone.
- 345/138 kV Transformer #4
 - Showing signs of deterioration. Experiencing short circuit strength breakdown (due to the amount of through fault events), dielectric strength breakdown, and bushing damage.
- 138/13 kV Transformer #5
 - Currently directly connected via a MOAB to the 138 West Bus at Beatty Station
- 138/13 kV Transformer #6
 - Currently directly connected via a ground switch MOAB scheme to the 138 East Bus at Beatty Station
- 138kV McComb line
 - Connected via a partial breaker string resulting in line outage with an outage of the east bus, including those caused by outage of Transformer #6.



AEP Transmission Zone M-3 Process Western Columbus/Beatty Area

Continued from previous slide...

Cole Station 138/13kV:

- AEP-Ohio has requested a new 138/13kV delivery point at Cole station.

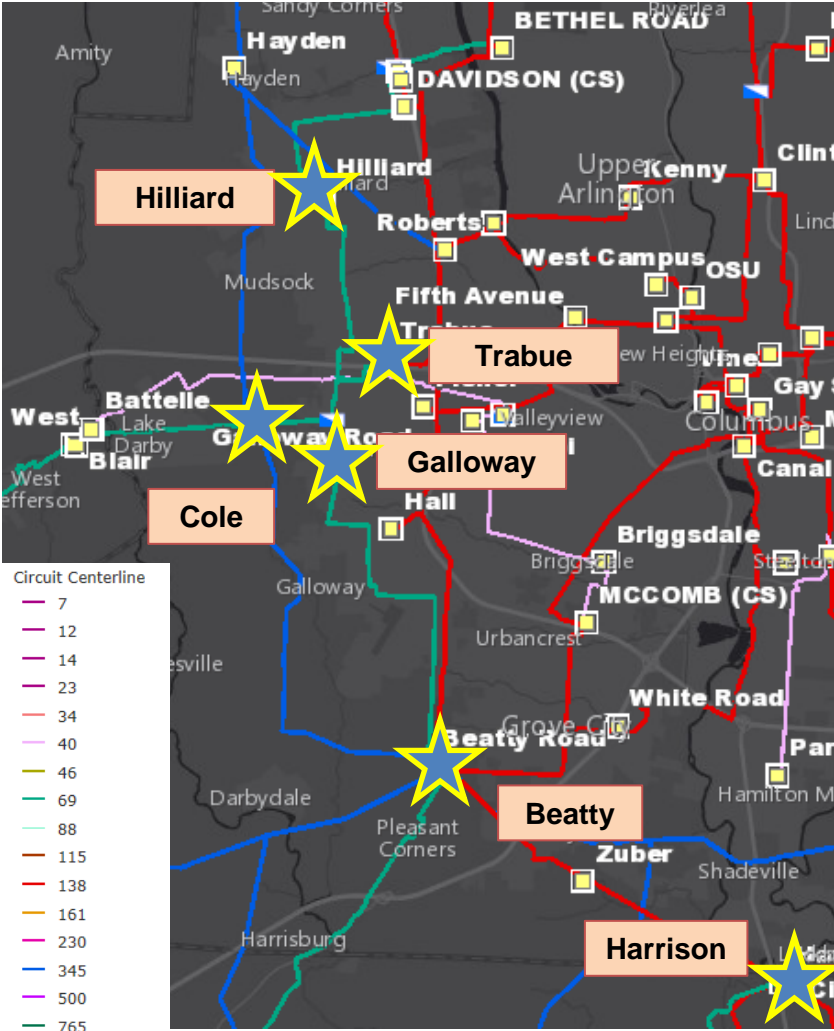
Trabue Station:

- More than two dissimilar zones of protection in the 138 kV yard (transformer, line, and bus)
- AEP-Ohio has requested sectionalizing to separate two distribution transformers to improve reliability.
- 60 of the 86 relays are electromechanical relays. EM relays have limited spare part availability, a lack vendor support, no SCADA functionality, and no fault data collection ability.

Blair – Galloway 69 kV circuit:

Line section between Galloway station and Structure 26 (~1.0 miles)

- Wood pole line with structures and conductor dating back to 1968.
- 19 open structure conditions including rotted and split poles.



AEP Transmission Zone M-3 Process Monroe County, Ohio

Need Number: AEP-2019-OH037

Process Stage: Needs Meeting 06/17/2019

Project Driver:

Customer Service and Operational Flexibility

Specific Assumption Reference:

AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slides 7 and 8)

Problem Statement:

The Cameron-Switzer 69kV circuit is 16.2 miles long and serves 3 wholesale customer stations (over 3,800 customers), with a combined peak load of 11 MW.

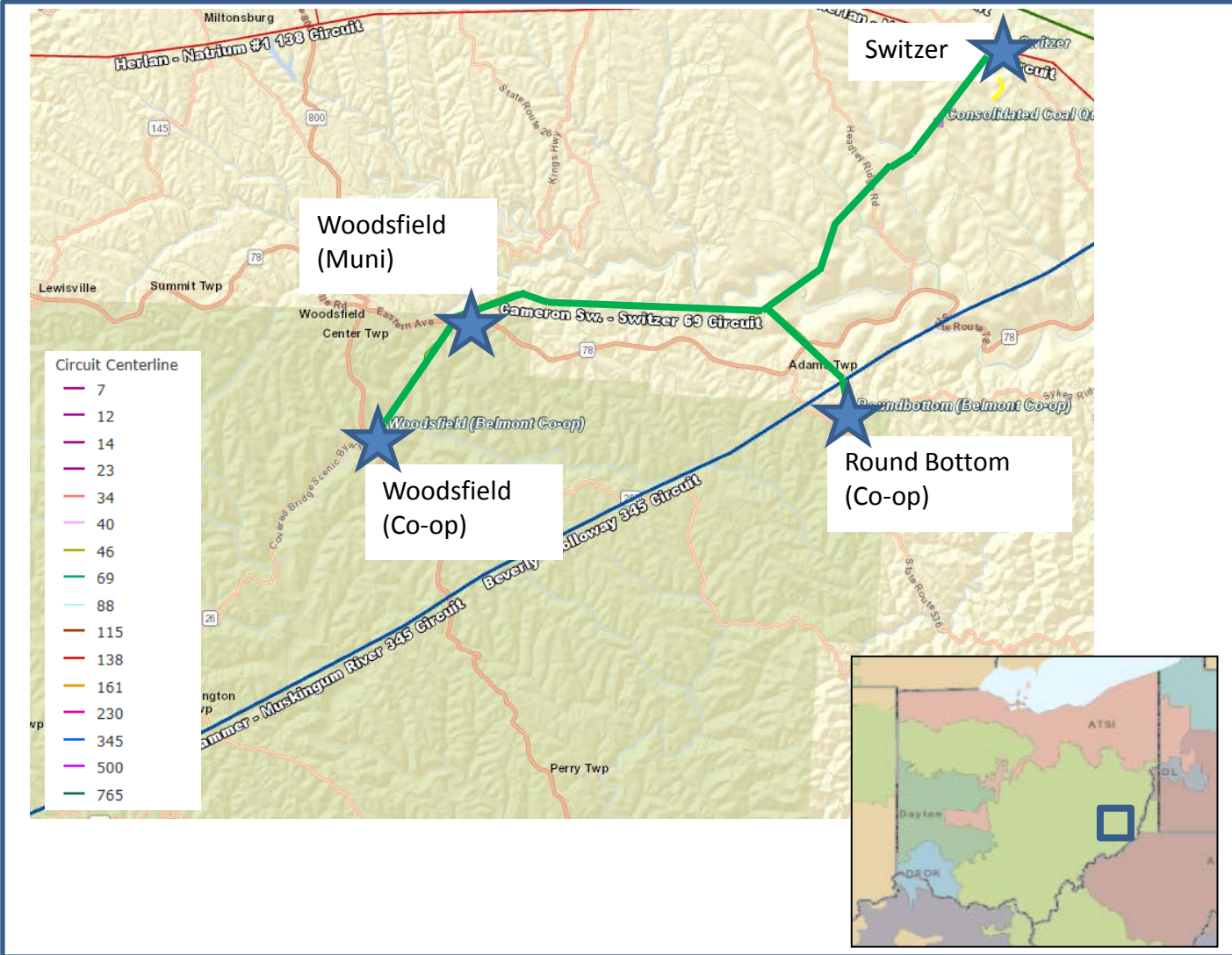
The circuit is radially fed from AEP's Switzer Station, making it difficult to perform proactive maintenance or restoration activities after an outage. The circuit is located in a remote part of AEP's service territory and traverses very hilly and wooded terrain.

The 69kV transmission line is of wood pole construction and was built in 1970. There are currently 121 open conditions on the circuit, with the majority being structure deficiencies (e.g., burnt insulators, insect damage, & cracked cross-braces).

In addition, the City of Woodsfield is served via a 69kV hard tap, with no line sectionalizing switches present.

South Central Power Co-op has reported 1.1 million customer-outage minutes (CMI) over a three year period (2015-2017).

Model: N/A



AEP Transmission Zone M-3 Process Columbus, OH



Need Number: AEP-2019-OH038

Process Stage: Need Meeting 06/17/2019

Project Driver:

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

Specific Assumption Reference:

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

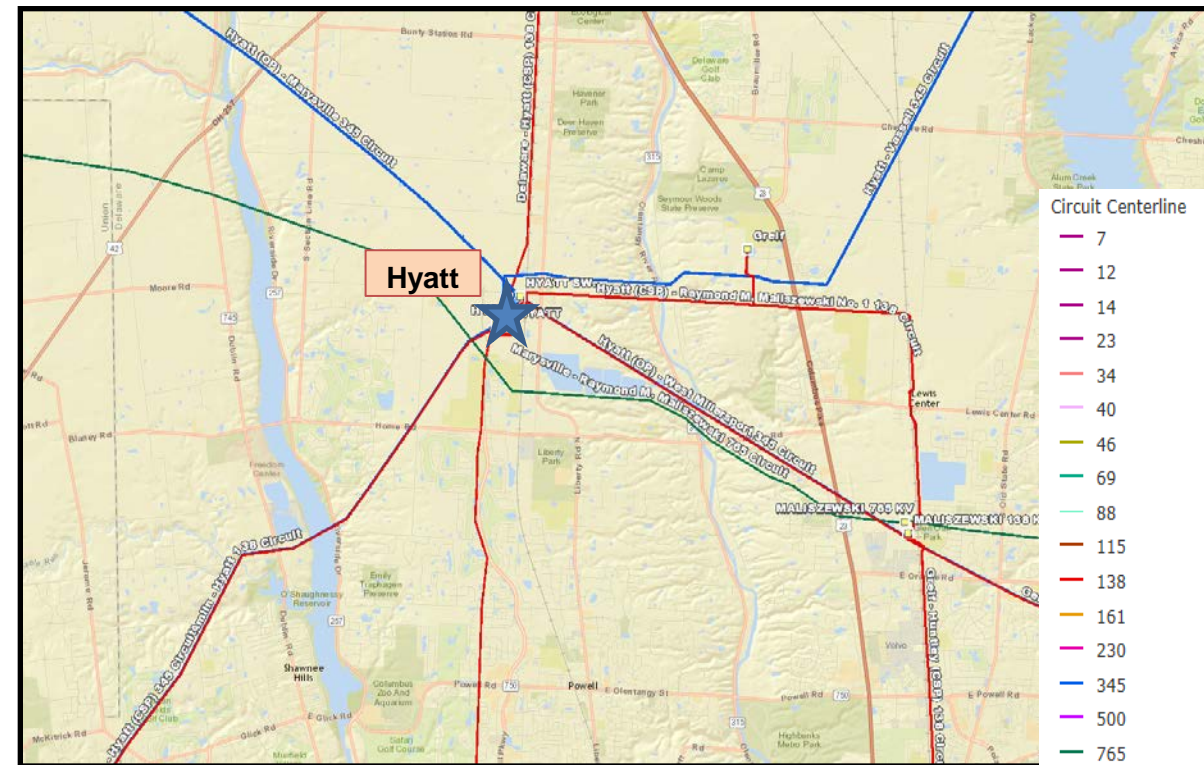
Problem Statement:

138kV circuit breaker 105S at Hyatt station is showing signs of deterioration. This is an oil breaker installed in 1980. Oil breaker maintenance has become more difficult due to the oil handling required to maintain them. Oil spills are frequent with breaker failures and routine maintenance and can become an environmental hazard. This is the last remaining oil breaker at Hyatt.

Transformer 1A has failed at Hyatt station and needs to be replaced. Transformer 1B is the same age (1973) and type, and Transmission Field Services has expressed similar concerns with 1B as they did with 1A (pre-failure), including dielectric breakdown (insulation), accessory damage (bushings), and short circuit breakdown (due to through faults).

The existing configuration of Hyatt station includes both 345/138kV transformers in the same protection zone. The 345kV side of this zone is only energized from one bus such that a single bus outage would outage both transformers.

Model: N/A



AEP Transmission Zone M-3 Process Centerburg Area, Ohio

Need Number: AEP-2019-OH039

Process Stage: Needs Meeting 06/17/2019

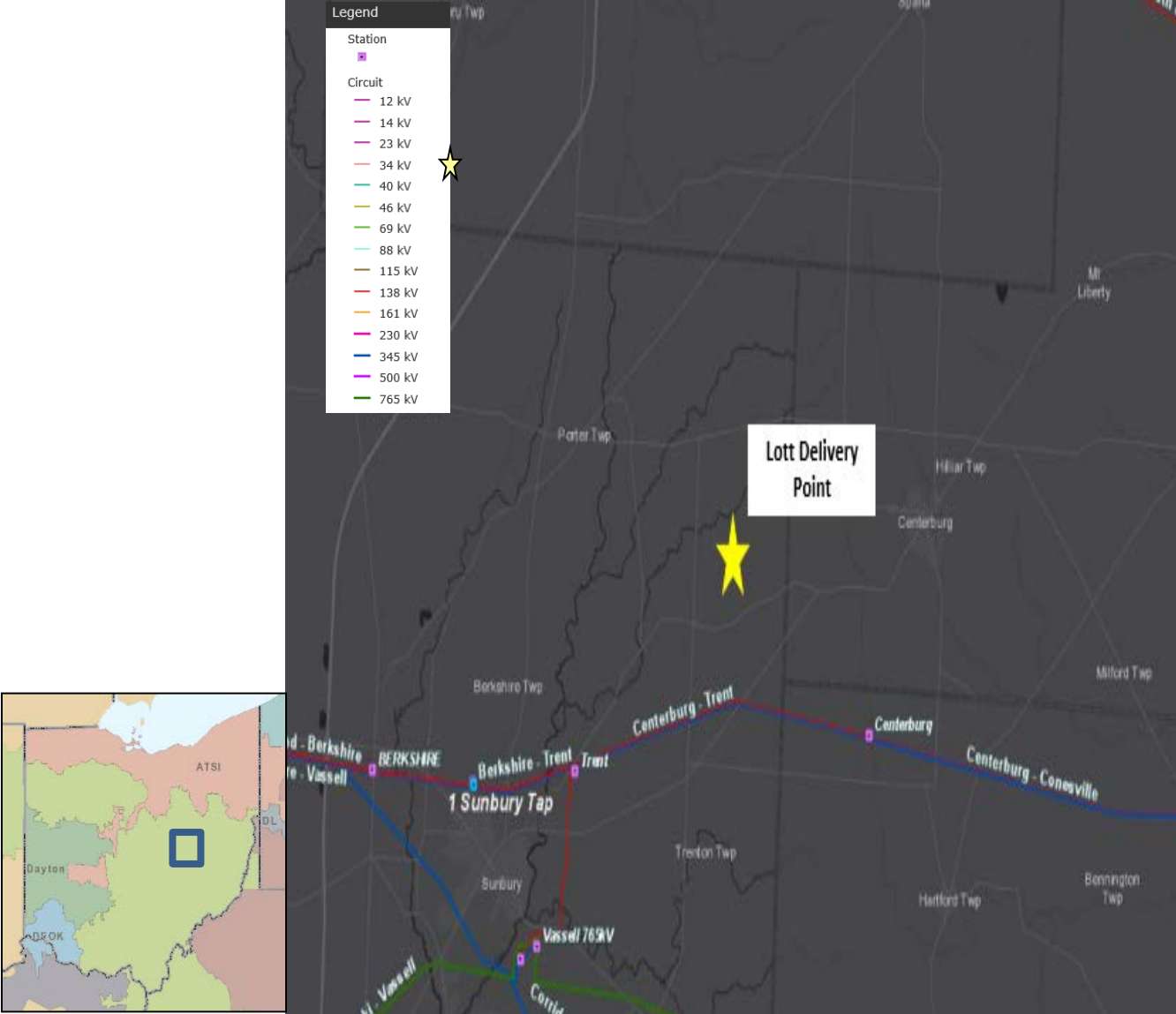
Supplemental Project Driver:
Equipment Condition, Operational Flexibility, and Customer Service

Specific Assumption Reference:
AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions slide 8); AEP Connection Requirements for the AEP Transmission System (AEP Assumptions Slide 7)

Problem Statement:

Lott Delivery Point (CEC):

- Buckeye Power, on behalf of Consolidated Electric Cooperative, has requested transmission service in Delaware County west of Centerburg, Ohio.
- Consolidated Electric Cooperative customers are currently connected to a radial 34.5 kV distribution line from AEP Ohio’s Trent station.
- The delivery point has consistently been identified as having poor reliability by Buckeye.
- Consolidated Electric Cooperative has reported approximately 700 thousand customer-outage minutes (CMI) over a three year period (2015-2017).



AEP Transmission Zone M-3 Process Cambridge Area, Ohio

Need Number: AEP-2019-OH040

Process Stage: Needs Meeting 06/17/2019

Project Driver:

Operational Flexibility and Customer Service

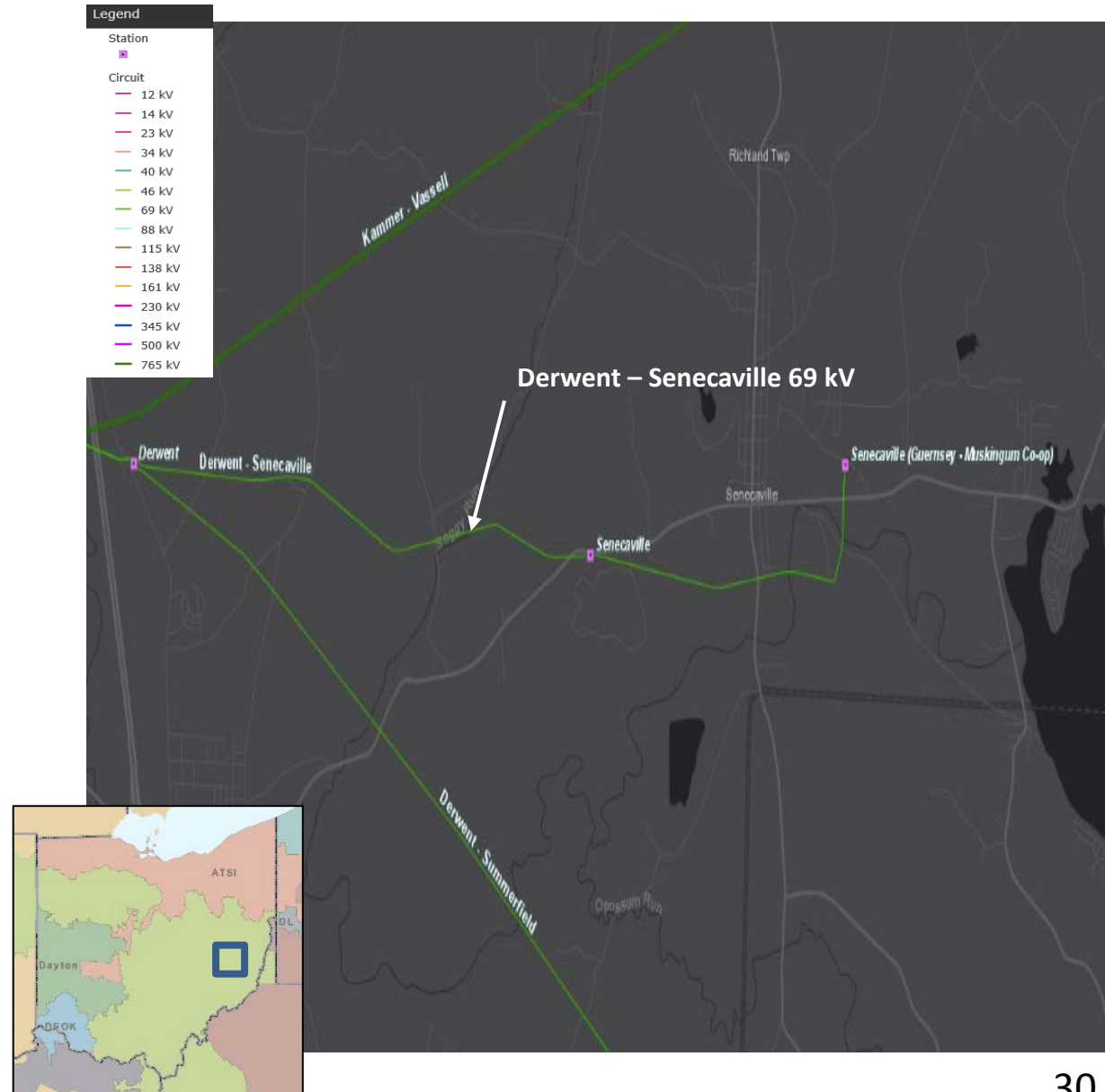
Specific Assumption Reference:

AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions slides 7 and 8);

Problem Statement:

Derwent – Senecaville 69 kV circuit

- The Derwent – Senecaville 69 kV circuit is ~4.3 miles long and serves a AEP Ohio and Guernsey-Muskingum Electric Cooperative station radially out of Derwent station.
- Guernsey-Muskingum Electric Cooperative and AEP Ohio customers are currently served off the radial line.
- Maintenance on the line is difficult to coordinate as it requires outages to multiple stations.
- Guernsey-Muskingum Electric Cooperative has reported approximately 210,000 customer-outage minutes (CMI) over a three year period (2015-2017).



AEP Transmission Zone M-3 Process Canton Area, Ohio

Need Number: AEP-2019-OH041

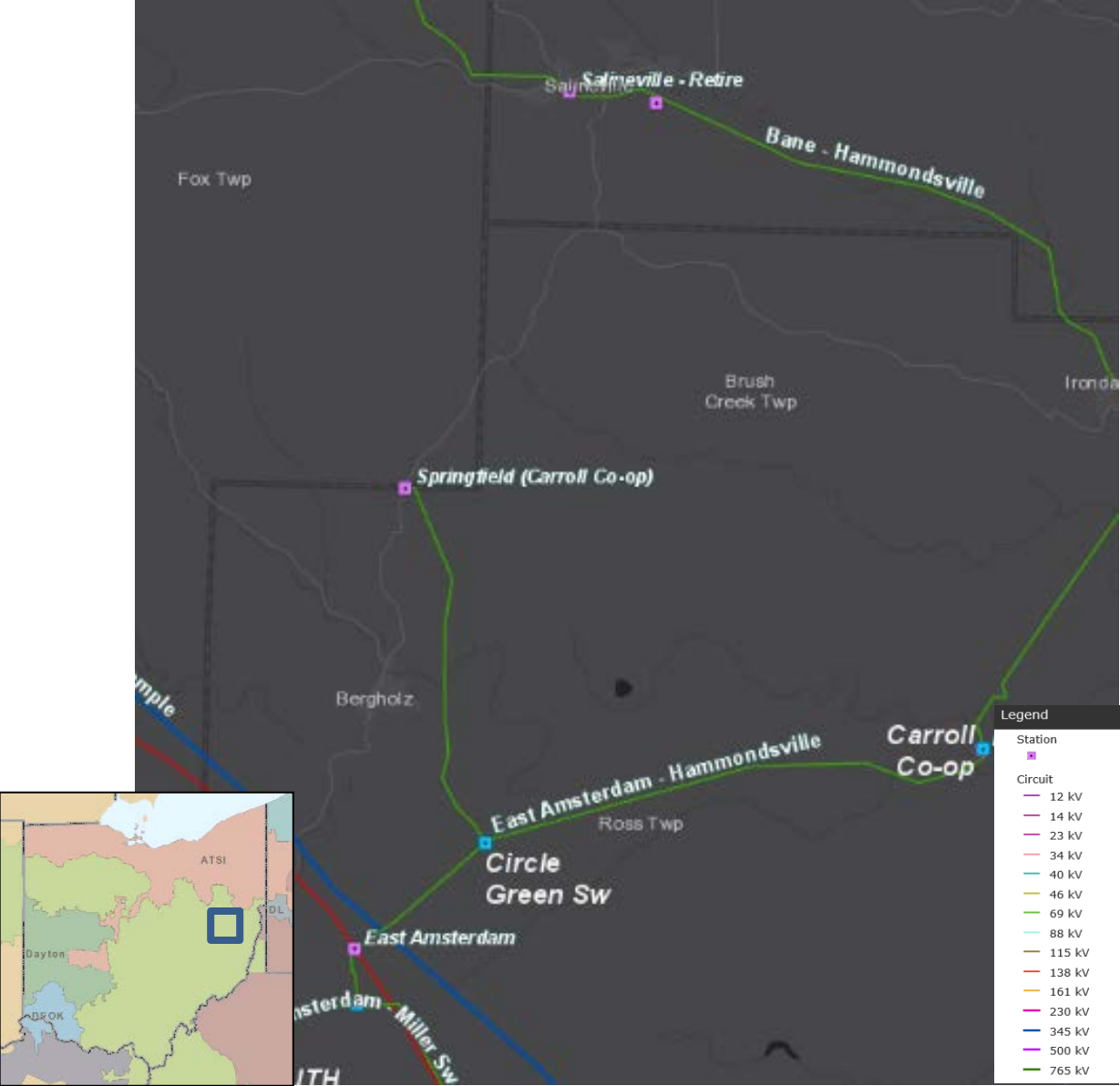
Process Stage: Needs Meeting 06/17/2019

Supplemental Project Driver:
Operational Flexibility and Customer Service

Specific Assumption Reference:
AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions slides 7 and 8);

Problem Statement:
Springfield Radial 69 kV Line

- Maintenance of the 4.5-mile radial line is difficult to coordinate as it requires an outage to Carroll’s station.
- Carroll Electric Cooperative has reported approximately 204,000 customer-outage minutes (CMI) over a three year period (2015-2017).



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 Matt Funk Breaker Replacements

Need Number: AEP-2018-AP015

Process Stage: Solutions Meeting 6/17/2019

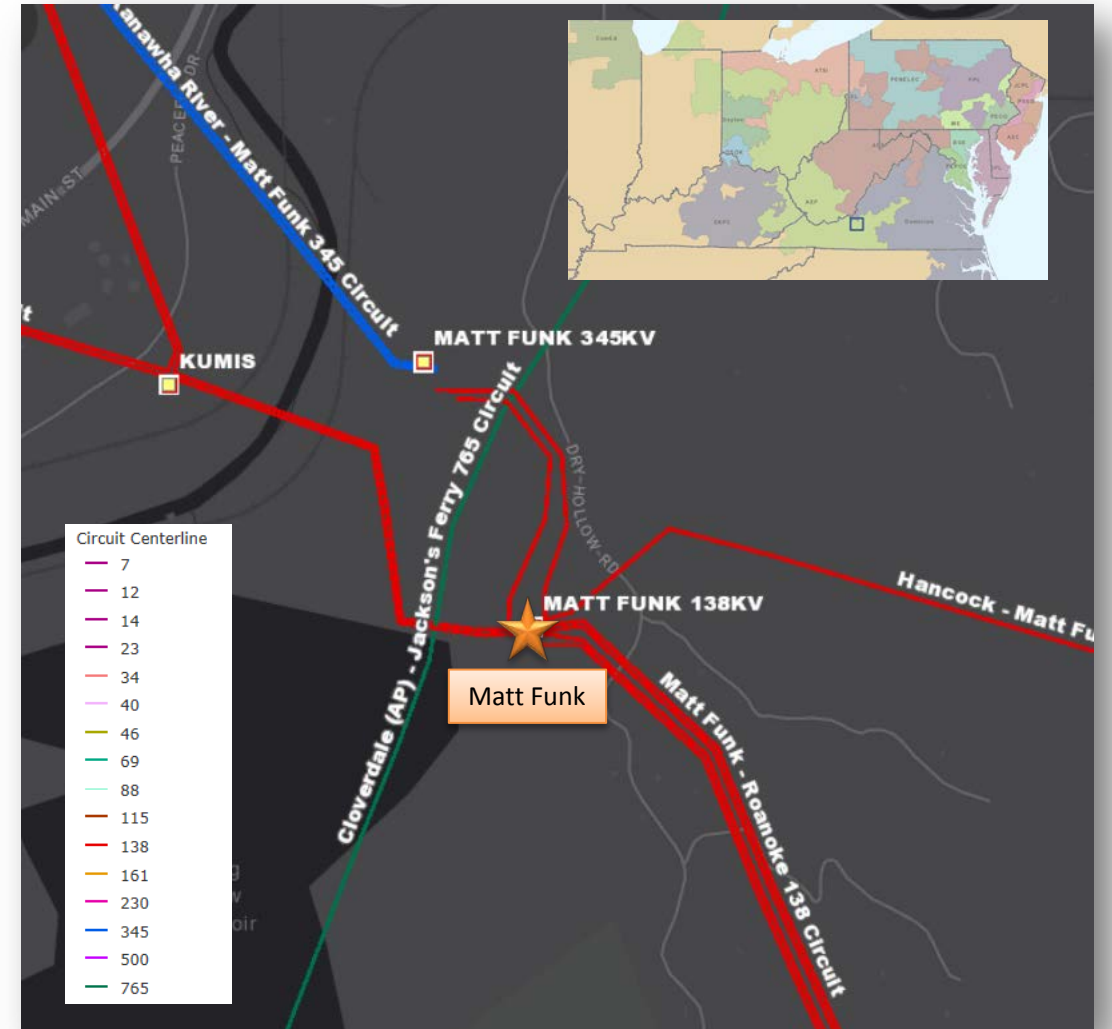
Previously Presented: Needs Meeting 1/11/2019

Project Driver: Equipment Material/Condition/Performance/Risk

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

Problem Statement:

138 kV circuit breakers H1, K, K1, K2 are PK air blast breakers manufactured in 1968. Air blast breakers are being replaced across the AEP system due to their potential for catastrophic and violent failures. Sharp pieces of porcelain from their bushings are typically expelled from the breakers and can be a potential safety hazard to field personnel. Other factors driving the replacement are age and scarce availability of spare parts. In addition, breakers H1, K, K1, K2 have experienced 55, 31, 32, and 26 fault operations, respectively.



AEP Transmission Zone M-3 Process Matt Funk Breaker Replacements

Need Number: AEP-2018-AP015

Process Stage: Solutions Meeting 6/17/2019

Selected Solution:

Replace existing 138 kV circuit breakers H1, K, K1, K2 and associated disconnect switches at Matt Funk Station with four new 138 kV, 3000 A, 63 kA circuit breakers and 3000 A switches.

Estimated Cost: \$ 1.7 M

Projected In-Service: 10/31/2020

No bubble diagram required

AEP Transmission Zone M-3 Process Mabscott

Need Number: AEP-2018-AP002

Process Stage: Solutions Meeting 6/17/2019

Process Chronology: Needs Meeting 10/26/2018

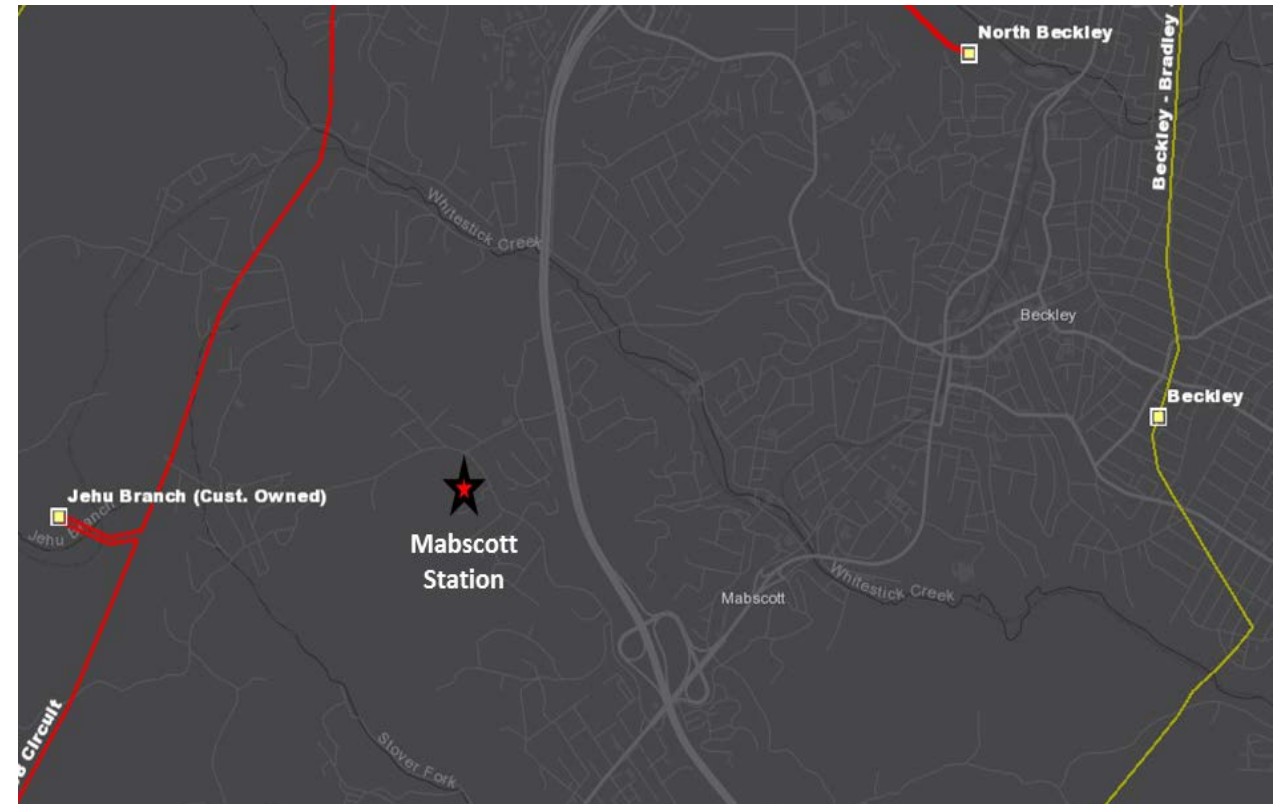
Project Driver: Customer Service

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

Model: 2023 RTEP

Problem Statement:

APCO Distribution has requested a new distribution station located in Mabscott, West Virginia. Winter projected load 15 MVA.



AEP Transmission Zone M-3 Process Mabscott

Need Number: AEP-2018-AP002

Process Stage: Solution Meeting 6/17/2019

Potential Solution:

Tap the existing Bradley – Tams Mtn. 138 kV line. Construct a new 138 kV double circuit in/out feed (~1.5 miles) from the Bradley – Tams Mtn. 138 kV Tap, to the new Mabscott Station. Estimated Transmission Cost: \$6.0M

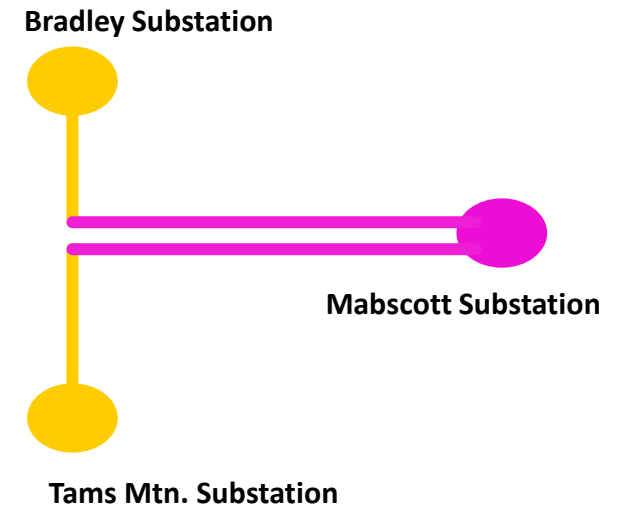
Install two new 138 kV MOABs at Mabscott Station. Estimated Transmission Cost: \$1.5M

Total Estimated Transmission Cost: \$7.5m

Alternatives Considered:

No viable transmission alternative.

Projected In-Service: 11/1/2020



Legend	
345 kV	
138 kV	
69 kV	
46 kV	
New	

AEP Transmission Zone M-3 Process Huntington Court Capacitor Switchers

Need Number: AEP-2018-AP014

Process Stage: Solutions Meeting 6/17/2019

Previously Presented: Needs Meeting 1/11/2019

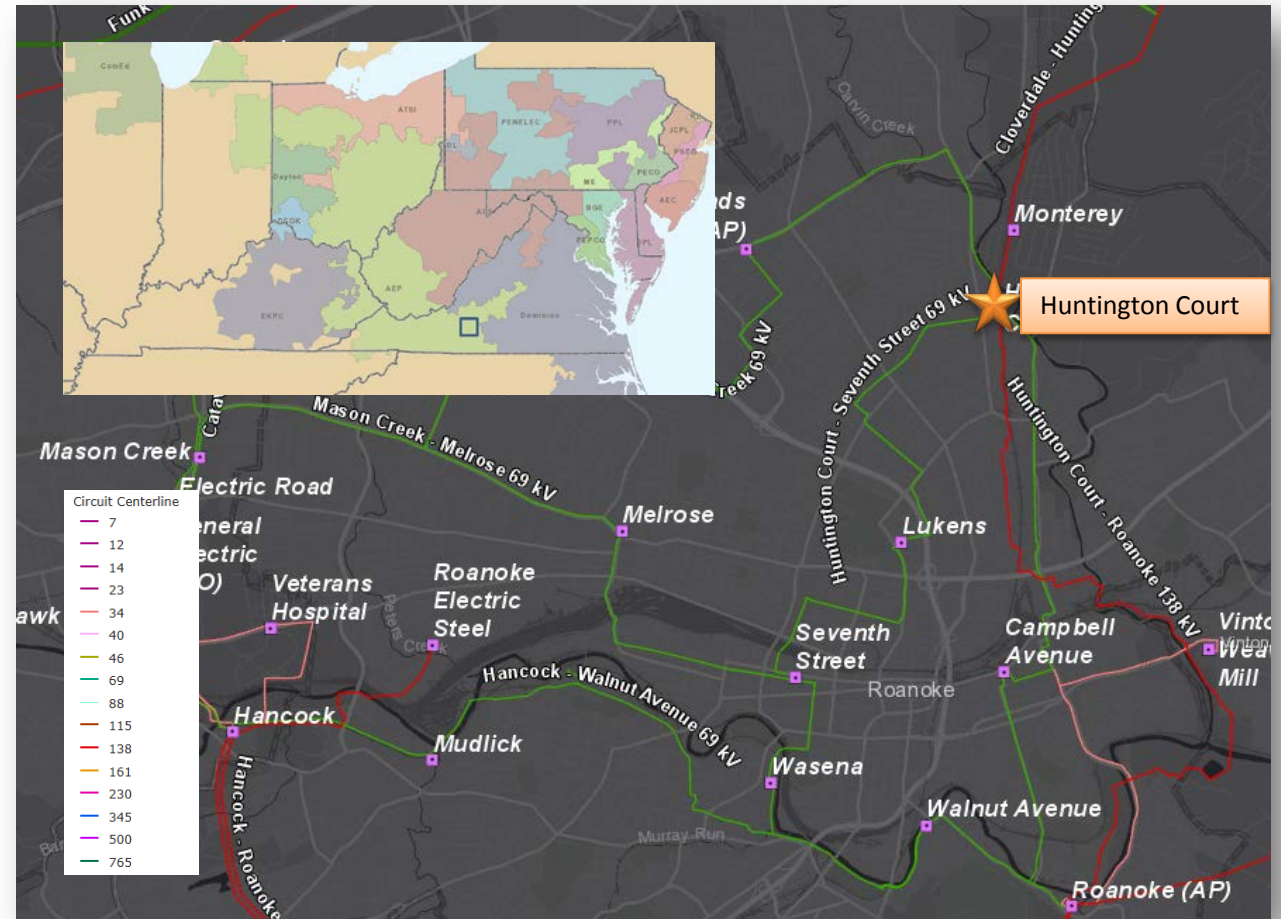
Project Driver: Equipment
Material/Condition/Performance/Risk

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

Model: N/A

Problem Statement:

Huntington Court 138 kV cap switcher BB is a MARK V type which has presented AEP with a large amount of failures and mis-operations. These types of switchers are being replaced and upgraded with the latest AEP cap switcher standard across AEP's system. 69 kV cap switcher AA is an SC-2030 type that has no gas monitor and sister units have experienced numerous gas and interrupter failures.



AEP Transmission Zone M-3 Process Huntington Court Capacitor Switchers

Need Number: AEP-2018-AP014

Process Stage: Solutions Meeting 6/17/2019

Proposed Solution:

Replace existing 138 kV capacitor bank switcher BB and 69 kV capacitor bank switcher AA with capacitor bank breakers.

Alternates Considered:

No viable transmission alternatives were identified.

Estimated Cost: \$0 (All Distribution Cost)

Projected In-Service: 10/31/2020

No bubble diagram required

AEP Transmission Zone: Supplemental Hummel Creek Station Rehab

Need Number: AEP-2018-IM022

Process Stage: Solution Meeting 6/17/2019

Previously Presented: Needs Meeting 1/11/2019

Project Driver: Equipment Condition/Performance/Risk

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

Model: N/A

Problem Statement:

Hummel Creek 34.5kV

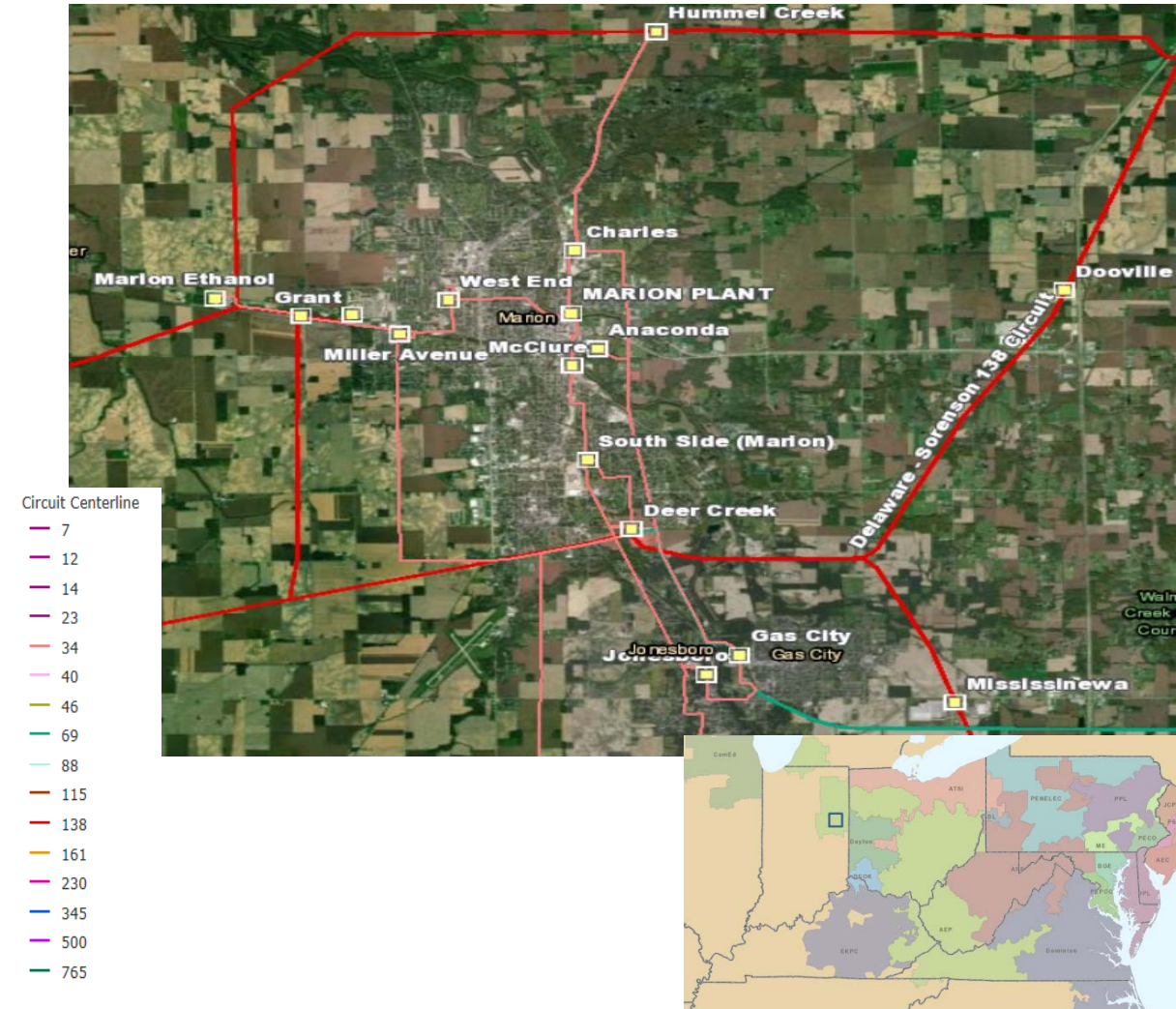
- Breakers "L" and "M"

- 1949-1950 vintage FK oil breaker without containment
- Fault Operations: CB M(33)– Recommended(10)

Gas City 34.5kV

- Breakers "A"

- 1940 vintage FK oil breaker without containment
- Fault Operations: CB A(50) – Recommended(10)



AEP Transmission Zone: Supplemental Hummel Creek Station Rehab

Need Number: AEP-2018-IM022
Process Stage: Solutions Meeting 6/17/2019

Potential Solution
 At Hummel Creek station, replace both 34.5kV breakers “L” and “M” with system spares. Install a high side circuit switcher on Hummel Creek’s XFR 1.
Estimated Cost: \$2.6M

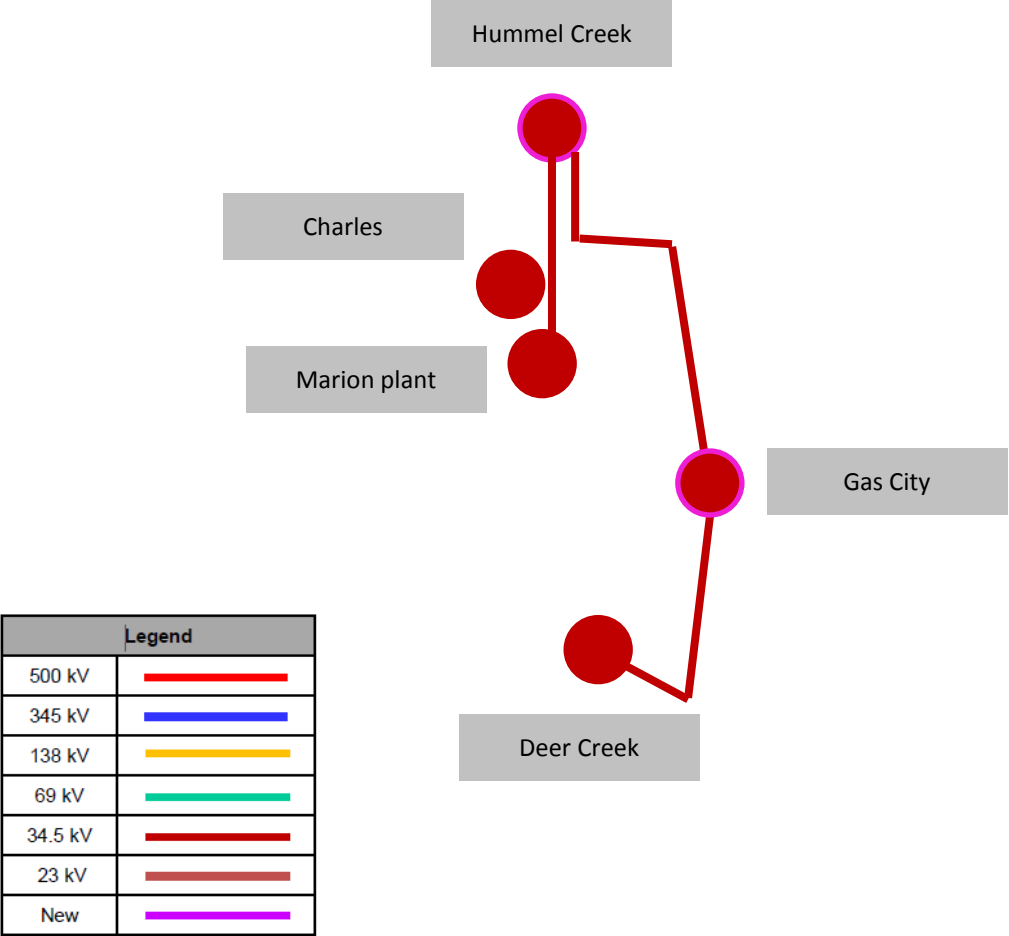
At Gas City station, remove the existing 34.5kV breaker and re-use the existing switch as a MOAB. **Estimated Cost: \$0M**

Total Estimated Transmission Cost: \$2.6M

Alternates Considered
 No viable transmission alternatives identified.

Projected IS Date: 12/1/2022

Project Status: Scoping



AEP Transmission Zone: Supplemental Eastern Muncie Indiana

Need Number: AEP-2019-IM001

Process Stage: Solution Meeting 6/17/2019

Previously Presented: Needs Meeting 02/20/2019

Project Driver: Equipment Condition/Performance/Risk

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

Model: N/A

Problem Statement:

Medford – Blaine Street 34.5kV (~3.3 Miles)

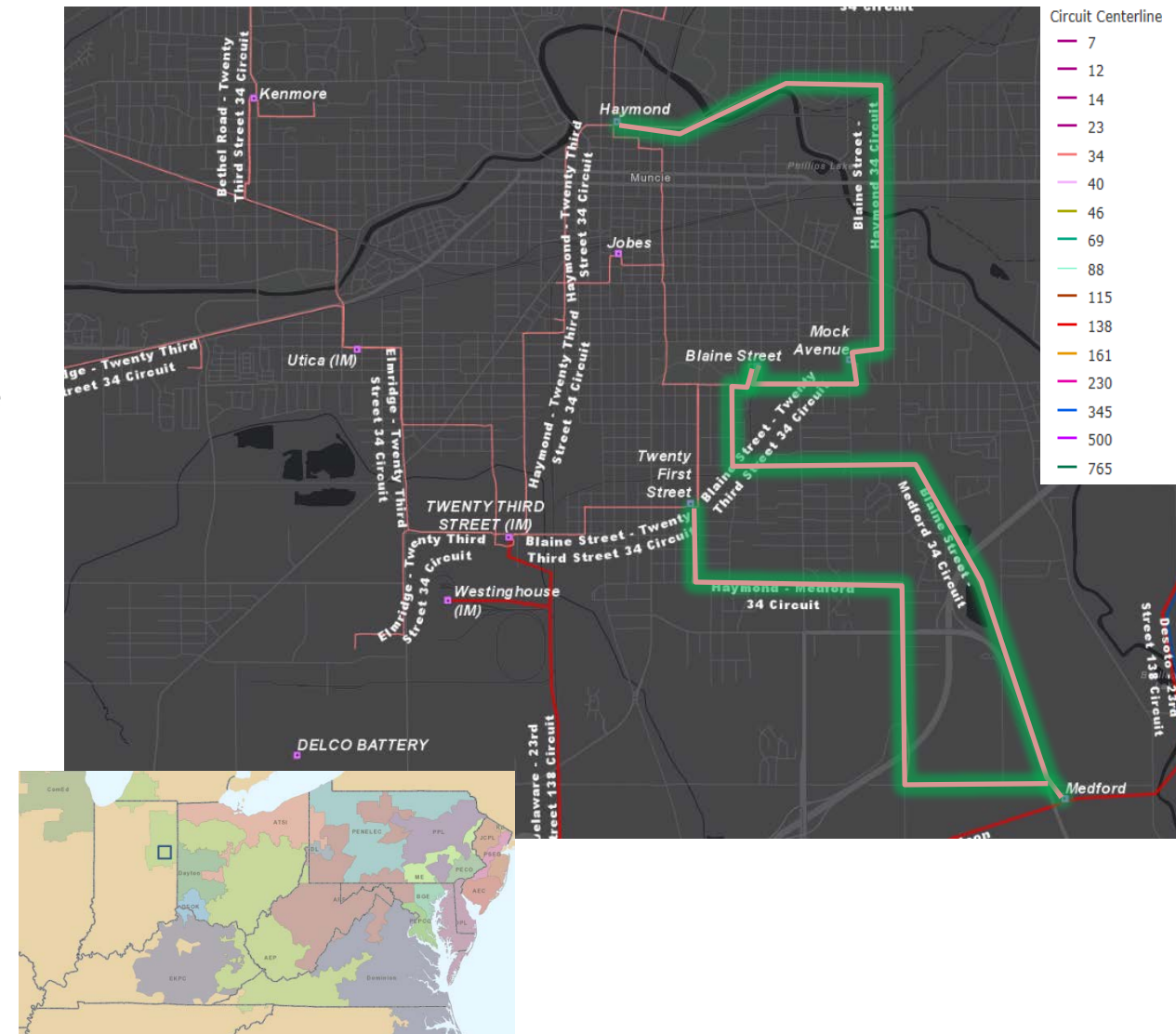
- 1940's vintage wood crossarm construction with cap and pin insulators
- There are currently 40 open conditions on this line. This trend is expected to increase as the structures and conductor age.

Medford – Haymond 34.5kV (section in question is Medford – near 21st Street ~3.3 miles)

- 1940's vintage wood crossarm construction with cap and pin insulators
- There are currently 29 open conditions on this segment of the line. This trend is expected to increase as the structures and conductor age.

Haymond – Blaine Street 34.5kV (~3.7 miles)

- 1950's vintage wood crossarm construction with cap and pin insulators
- There are currently 7 open conditions on this segment of the line. This trend is expected to increase as the structures and conductor age.



AEP Transmission Zone: Supplemental Eastern Muncie Indiana

Need Number: AEP-2019-IM001

Process Stage: Solutions Meeting 6/17/2019

Potential Solution

Rebuild the 3.3 mile Medford – Blaine Street 34.5kV line to 69kV using 795 Drake ACSR.

Estimated Cost: \$9.8M

Retire the 3.7 mile Haymond – Blaine 34.5kV line. **Estimated Cost: \$1.2M**

Retire the 3.3 mile Haymond – Medford 34.5kV line portion south of 21st street station.

Estimated Cost: \$0.9M

Build a new Blaine Street double circuit extension to facilitate the retermination of the Haymond and 23rd street lines into Blaine Street. **Estimated Cost: \$2.5M**

Retire the unused breaker E at Haymond station. **Estimated Cost: \$0M**

Total Estimated Transmission Cost: \$14.4M

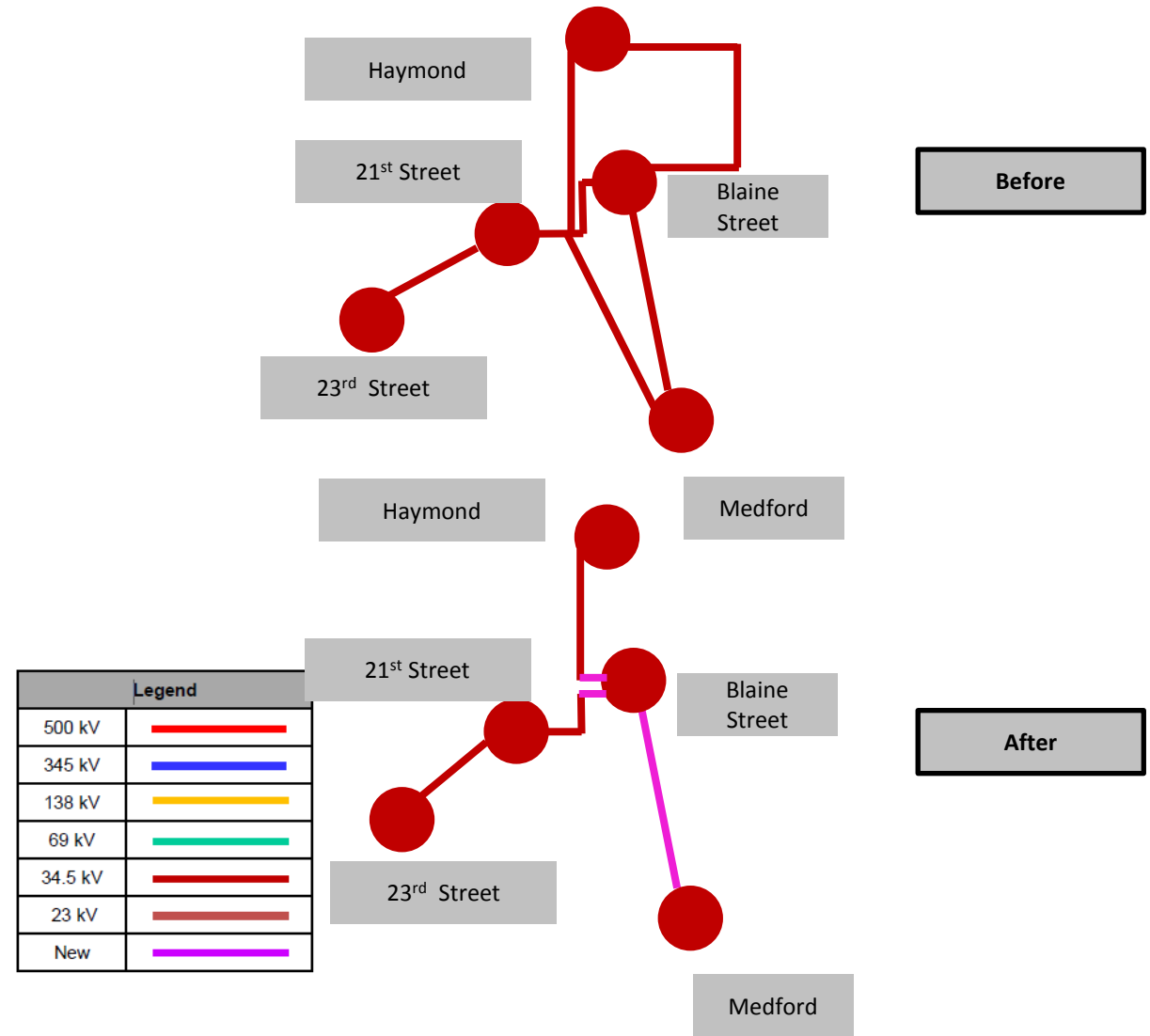
Alternates Considered

Rebuild the Medford – Haymond 34.5kV line as is. This would require an additional ~3 mile rebuild in lieu of the line retermination at Blaine Street. Due to the increased cost associated with this, this option was not preferred.

Projected IS Date: 12/1/2022

Project Status: Scoping

*This project will be coordinated and will be aligned with AEP-2018-IM007 which has station work at Medford, Blaine St and 23rd St.



AEP Transmission Zone M-3 Process New Buffalo Area, Indiana

Need Number: AEP-2019-IM009

Process Stage: Solutions Meeting 06/17/2019

Previously Presented: Needs Meeting 04/23/2019

Project Driver: Equipment Condition/Performance/Risk

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

Model: N/A

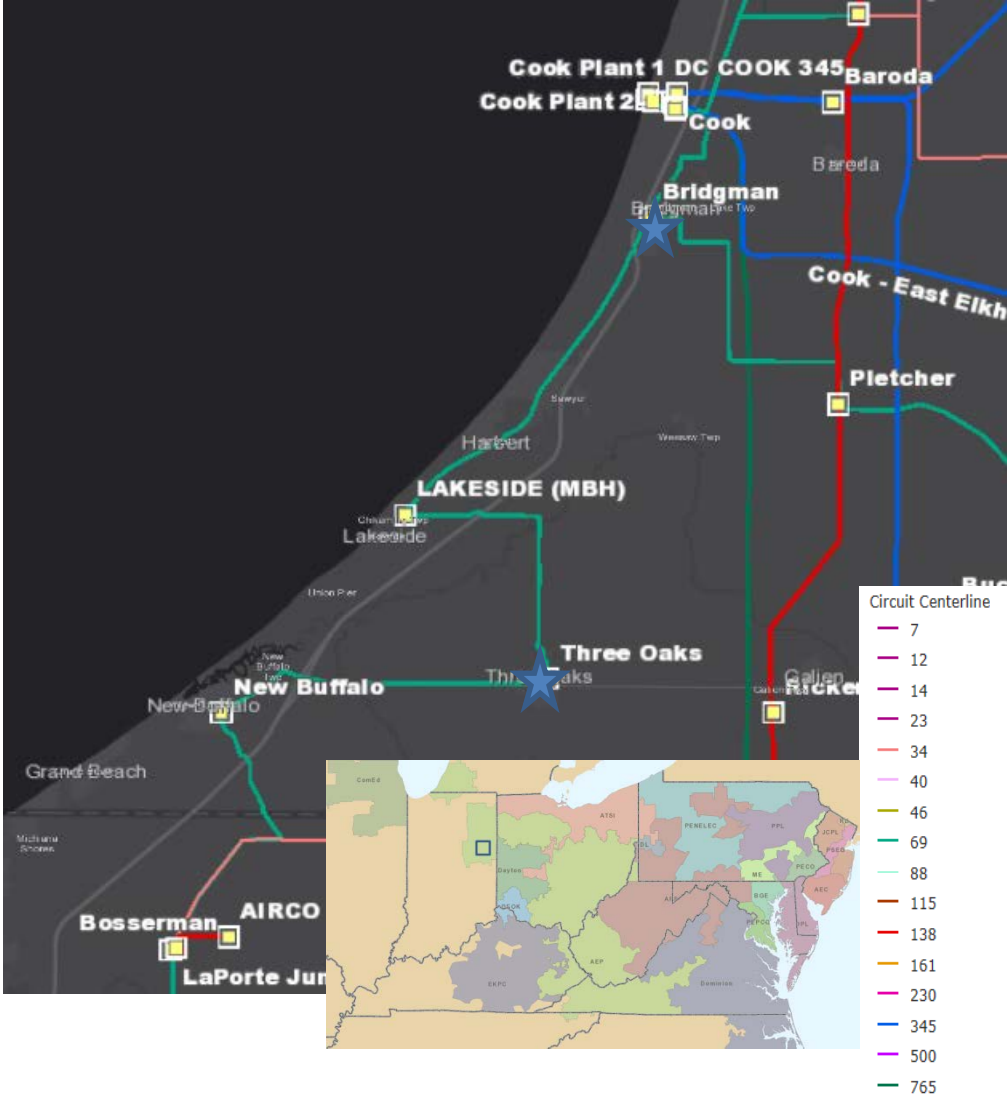
Problem Statement:

Bridgman 69kV Station

- Breakers C, A, & B 69kV
 - 1968 vintage FK Oil breakers
 - Fault Operations: C(204), A(48) & B(58) – Recommended(10)
 - Oil filled breakers have much more maintenance required due to oil handling that their modern, vacuum counterparts do not require. Finding spare parts for these units is difficult or impossible, and these models are no longer vendor supported

Three Oaks 69kV Station

- Breakers C & B 69kV
 - 1968 vintage FK Oil breakers
 - Fault Operations: C(73) & B(63) – Recommended(10)
 - Oil filled breakers have much more maintenance required due to oil handling that their modern, vacuum counterparts do not require. Finding spare parts for these units is difficult or impossible, and these models are no longer vendor supported



AEP Transmission Zone M-3 Process New Buffalo Area, Indiana

Need Number: AEP-2019-IM009

Process Stage: Solutions Meeting 06/17/2019

Previously Presented: Needs Meeting 04/23/2019

Project Driver: Equipment Condition/Performance/Risk

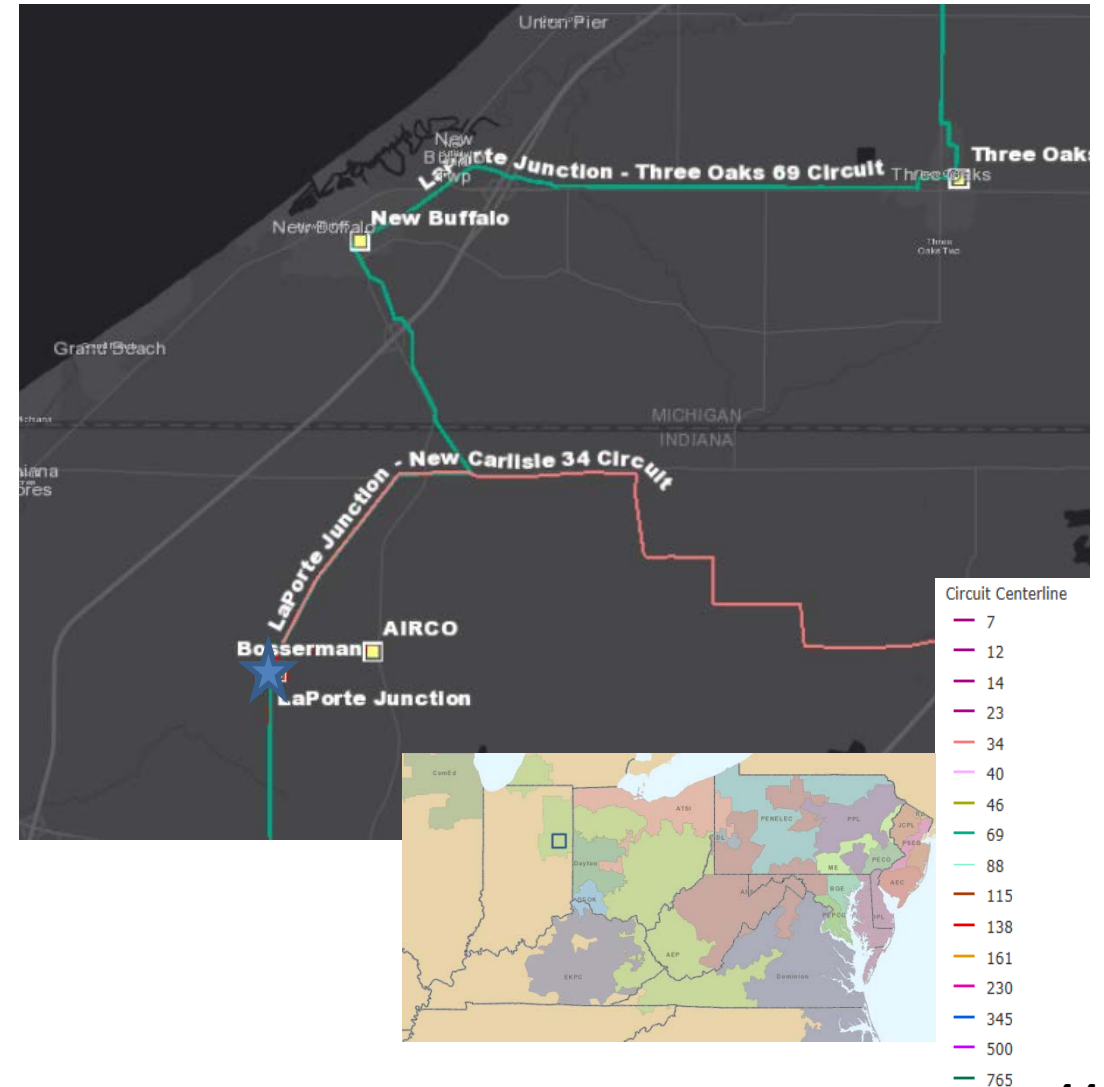
Specific Assumptions Reference: AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 8)

Model: N/A

Problem Statement:

LaPorte 69kV Station

- Breaker B 69kV
 - 1968 vintage FK Oil breakers
 - Fault Operations: B(62) – Recommended(10)
 - Oil filled breakers have much more maintenance required due to oil handling that their modern, vacuum counterparts do not require. Finding spare parts for these units is difficult or impossible, and these models are no longer vendor supported
- Transformer #1 138/69/34kV
 - 1967 vintage
 - Its showing significant signs of deterioration and has high levels of Carbon Dioxide dissolved in the oil.
 - Equipment condition concerns include dielectric strength breakdown (winding insulation), short circuit strength breakdown (due to the amount of through fault events), and accessory damage (bushings).



AEP Transmission Zone M-3 Process New Buffalo Area, Indiana

Need Number: AEP-2019-IM009

Process Stage: Solutions Meeting 06/17/2019

Previously Presented: Needs Meeting 04/23/2019

Project Driver: Equipment Condition/Performance/Risk

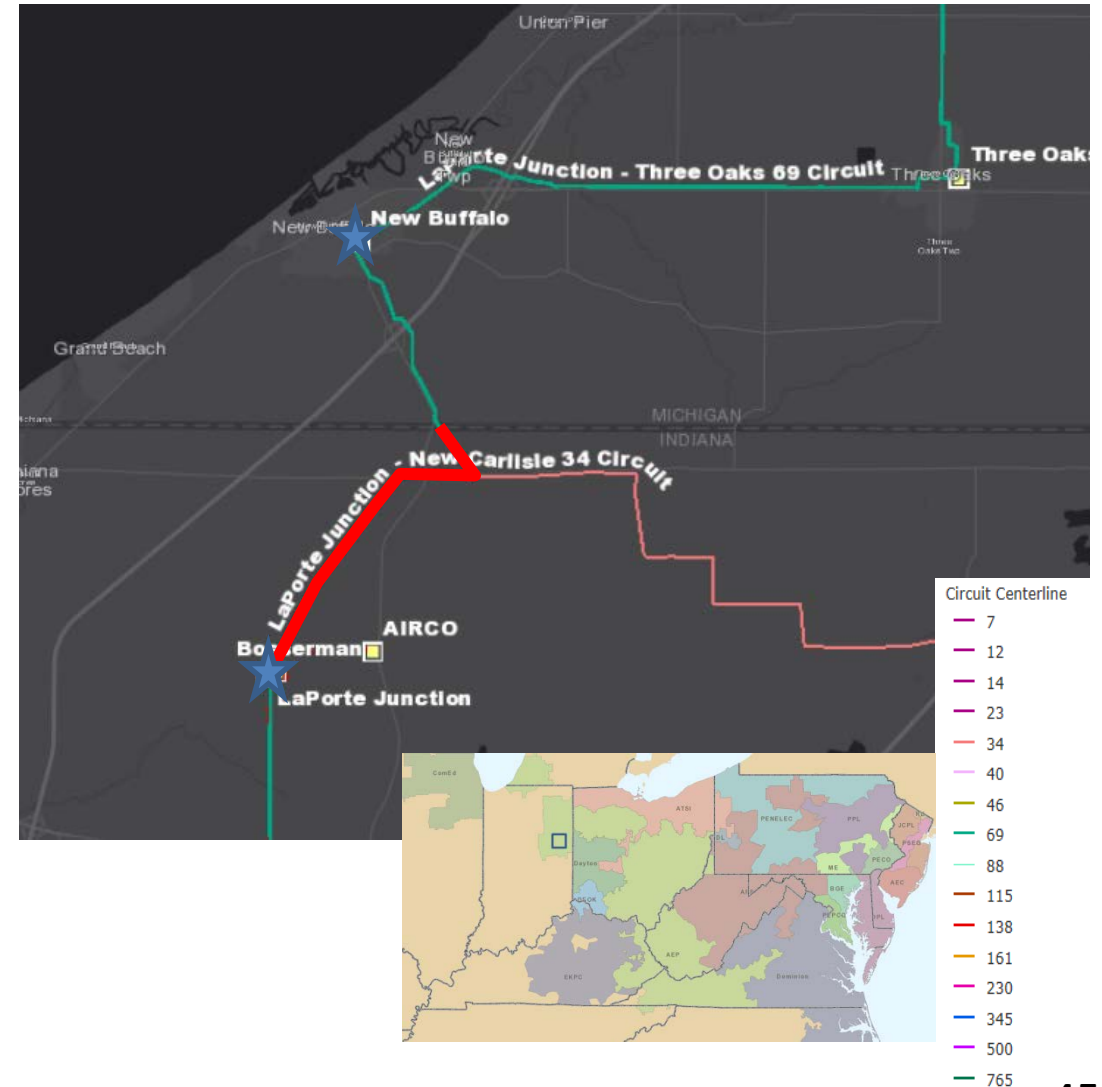
Specific Assumptions Reference: AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 8)

Model: N/A

Problem Statement:

Laporte Junction – New Buffalo (IN) 69kV Line (~4 Miles)

- 1960's vintage wood crossarm construction
- Approximately 67% of the structures have Insect Damage
- There are currently 132 open conditions on this line with majority being structure issues. The O&M cost of the line is expected to increase as the age of the line increases.



AEP Transmission Zone M-3 Process New Buffalo Area, Indiana

Need Number: AEP-2019-IM009

Process Stage: Solutions Meeting 06/17/2019

Proposed Solution:

Rebuild 3.52 miles of the LaPorte-New Buffalo 69 kV line and reterminate into Bosserman station.

Estimated Cost: \$7.7M

At Bosserman station, install new 138/69kV transformer, install 69kV low side breaker on TR#1, and 69kV line breaker B towards Three Oaks Station

Estimated Cost: \$3.6M

At Three Oaks station, replace 69kV line breakers C and B

Estimated Cost: \$2.7M

At Bridgman station, replace 69kV line breakers B, A and C.

Estimated Cost: \$1.2M

Retire Laporte Junction Station

Estimated Cost: \$0.5M

Total Estimated Transmission Cost: \$15.7M

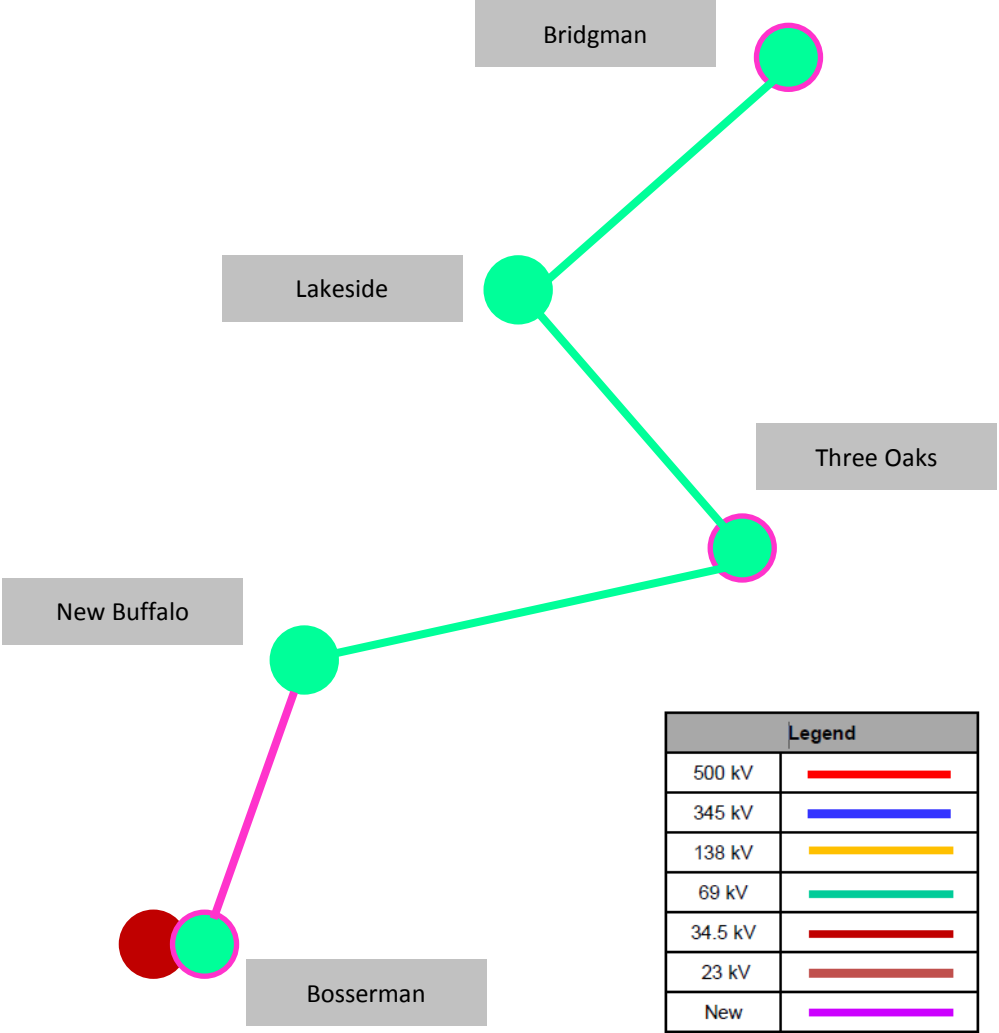
Alternatives Considered:

Rebuilding Laporte Station is not desirable as Bosserman Station was built to accommodate the existing transformation at Laporte Station. This alternate will incur additional maintenance cost, hence not a cost effective solution.

Projected In-Service: 12/15/2020

Project Status: Engineering

Note: The remaining lines out of LaPorte station are addressed by supplemental project s1279.



AEP Transmission Zone M-3 Process Columbus, Ohio

Need Number: AEP-2018-OH013

Process Stage: Solutions Meeting 06/17/2019

Previously Presented: Needs Meeting 10/28/18

Project Driver:

Equipment Material/Condition/Performance/Risk

Specific Assumption References:

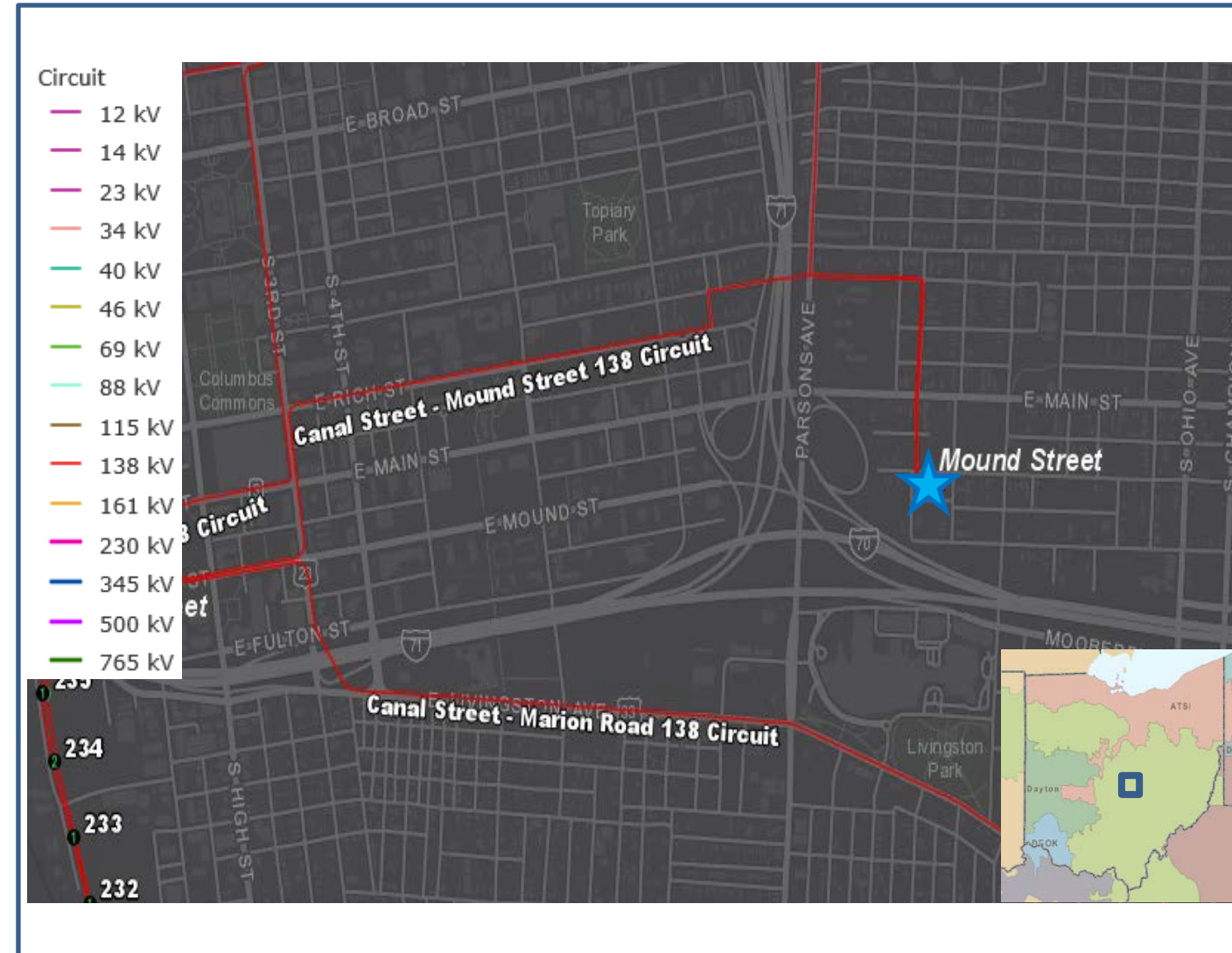
AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 8)

Problem Statement:

The 138 kV CB-101 at Mound Street is the last remaining oil breaker at the station. This oil breaker doesn't have oil containment. Oil breaker maintenance has become more difficult due to the oil handling required to maintain them. Oil spills can occur with breaker failures and routine maintenance which has the potential for an environmental risk. This breaker is a model that has identified reliability concerns due to past failures and lack of spare part availability.

This CB separates two transformers that serve critical hospital loads. A failure could cause a sustained outage to the entire facility.

Model: N/A



AEP Transmission Zone M-3 Process Columbus, Ohio

Need Number: AEP-2018-OH013

Process Stage: Solutions Meeting 06/17/2019

Potential Solution:

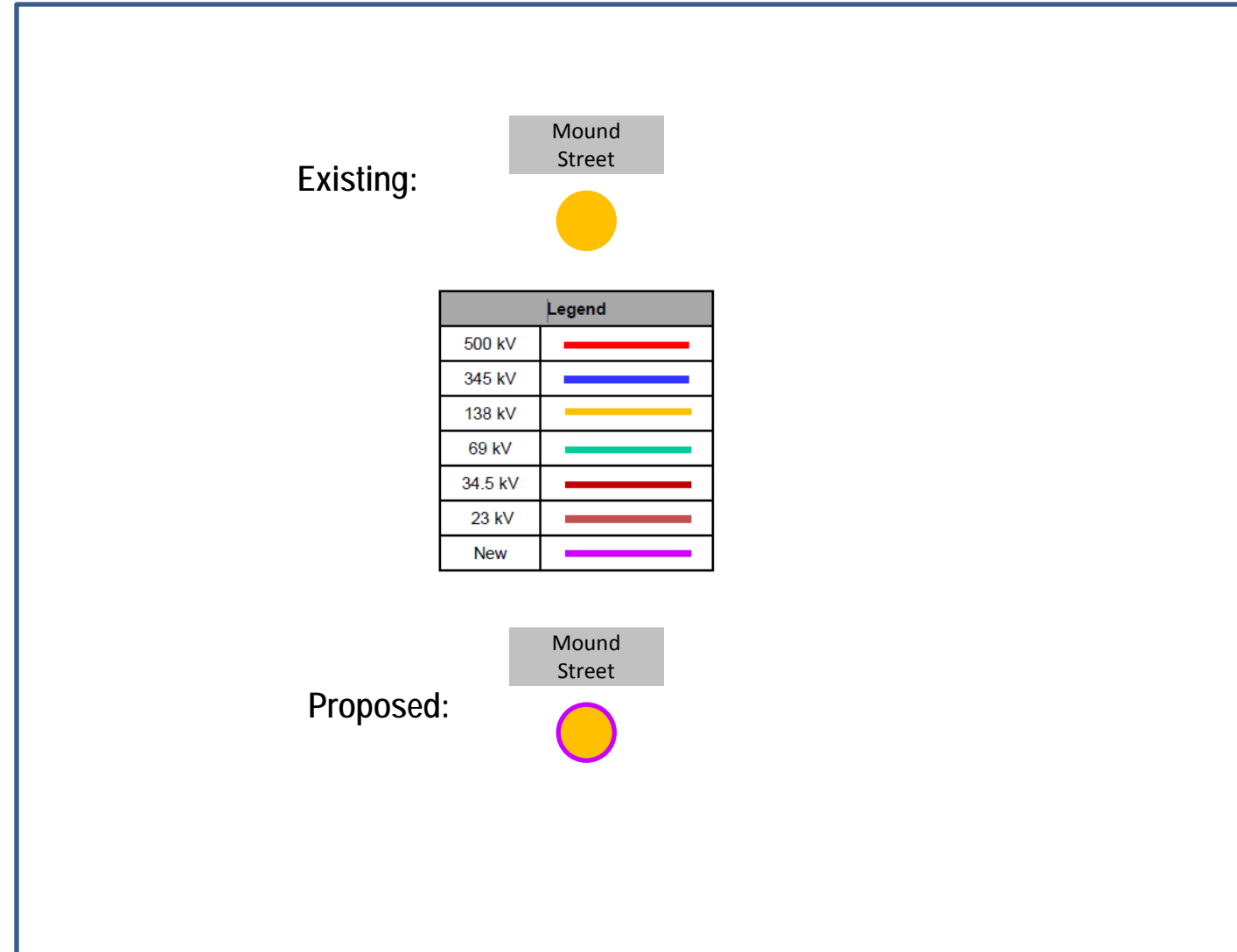
At Mound Street station, replace CB-101 with a new 138 kV 3000 A, 40 kA CB. Install new risers, rated at 3000 A. Upgrade 138 kV relaying. **Estimated Cost: \$1.1 M**

Alternatives Considered:

No viable cost-effective transmission alternative was identified.

Projected In-Service: 12/30/2019

Project Status: Scoping



AEP Transmission Zone M-3 Process Columbus, Ohio

Need Number: AEP-2018-OH028

Process Stage: Solutions Meeting 06/17/2019

Previously Presented: Needs Meeting 01/11/2019

Project Driver:

Equipment Material/Condition/Performance/Risk

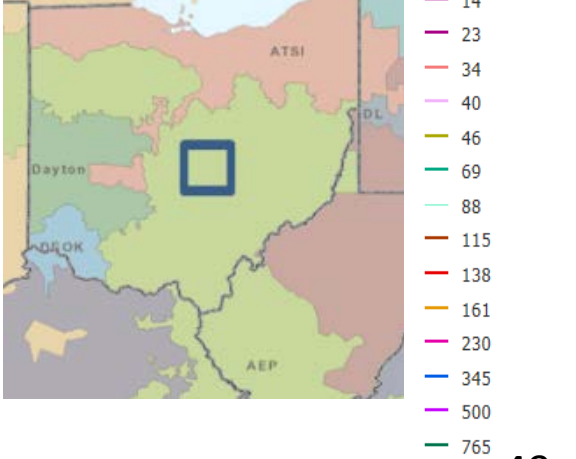
Specific Assumption Reference:

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

Problem Statement:

The 345/138kV, 675MVA transformer #1 failed and caught fire at Bixby station. The MOAB switch and risers cannot be repaired. A replacement is needed to support the load in the area.

Model: N/A



AEP Transmission Zone M-3 Process Columbus, Ohio

Need Number: AEP-2018-OH028

Process Stage: Solutions Meeting 06/17/2019

Proposed Solution:


At Bixby station, replace the failed transformer #1 with a 675MVA, 345/138kV transformer. Replace the damaged switches with 3000A switches. **Estimated Cost: \$4.5M**








Alternatives Considered:


- No viable cost-effective transmission alternative was identified.

Projected In-Service: 06/30/2019

Project Status: Engineering

Existing: Bixby 345kV 

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

Proposed: Bixby 345kV 

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AEP Transmission Zone M-3 Process Harrison County, Ohio

Need Number: AEP-2019-OH009

Process Stage: Solutions Meeting 6/17/2019

Previously Presented:

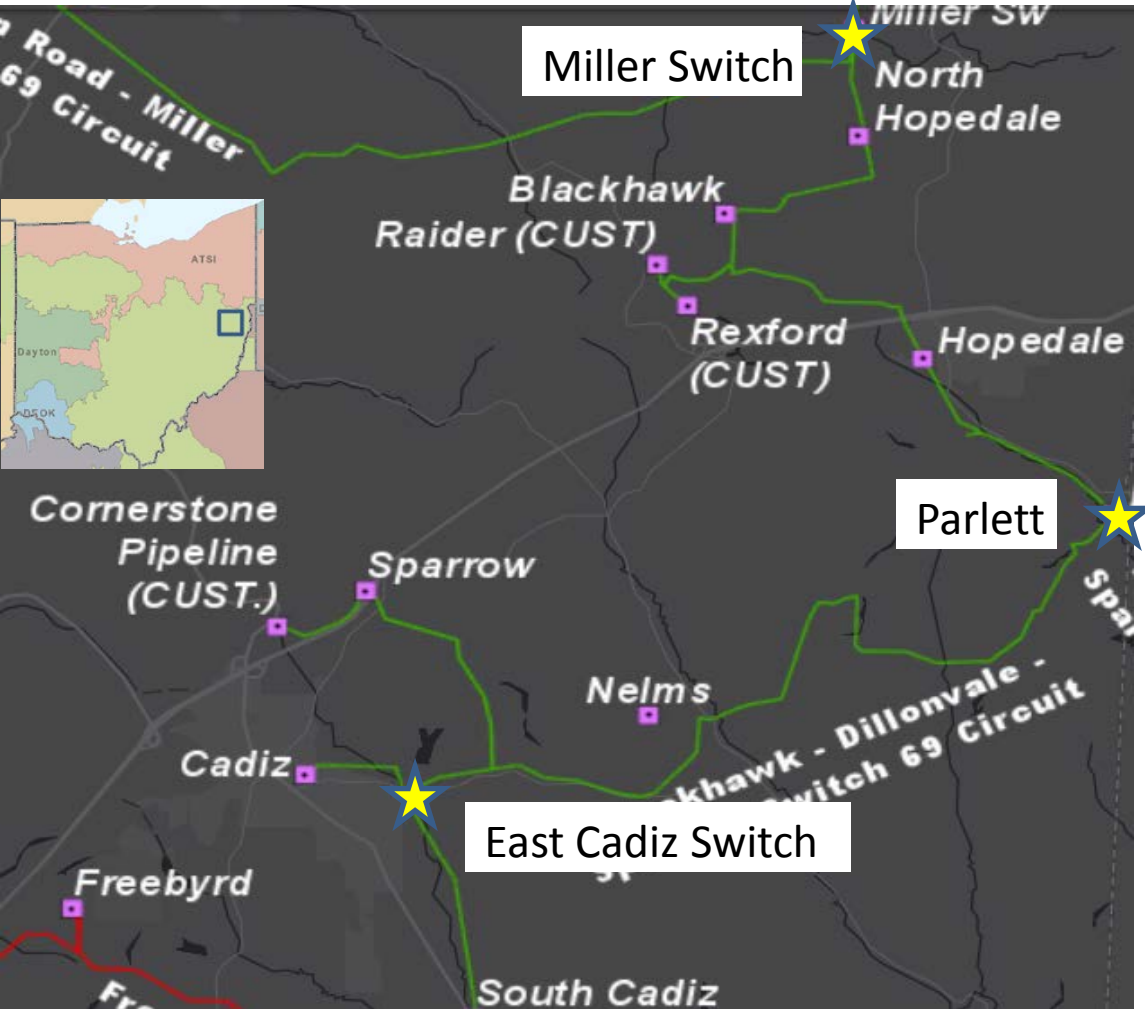
Needs Meeting 3/25/2019

Project Driver: Customer Service, Equipment Condition, and Operational Flexibility

Specific Assumption References: AEP Guidelines for Owner Identified Needs

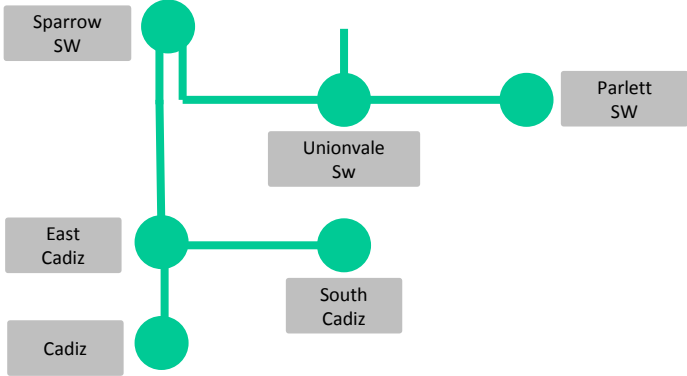
Problem Statement:

- East Cadiz Switch (1950's) serves Cadiz station on a mile long radial line, which is in a remote part of our system. In addition, this switch is sitting in an area prone to flooding.
- The Parlett-East Cadiz 69kV line, approximately 8 miles long, is comprised of deteriorated 1929 vintage wood structures and still has original 1/0 Cu and 4/0 ACSR conductor on it.
- The South Cadiz-East Cadiz 69kV line, approximately 2 miles long, is comprised of deteriorated 1954 vintage wood structures with the original 4/0 ACSR conductor on it.
- The Parlett-South Cadiz 69kV line has 190 open conditions.
- The Blackhawk – Miller Switch 69 kV line section, approximately 2.5 miles long, has some of the original 1918 conductor still on it (1/0 Cu). More than half of the wood pole structures on this sections are of pre-1980 vintage and are affected by heavy rot, woodpecker, & insect damage through the years. There are 22 open conditions on this circuit.

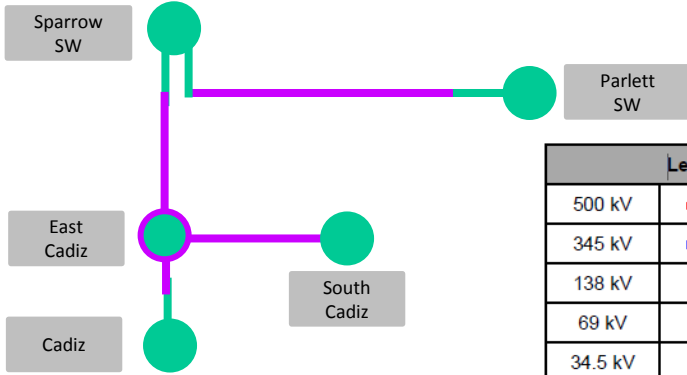


AEP Transmission Zone M-3 Process Harrison County, Ohio

Existing:



Proposed:



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

Need Number: AEP-2019-OH009

Process Stage: Solutions Meeting 6/17/2019

Potential Solution:

- Rebuild 9.65 miles of 69kV line as single circuit using 795 ACSR conductor, energized at 69kV. Install ADSS. **Cost: \$39.42M**
- Retire 0.41 miles radial, de-energized 69kV line that is routed west from Unionvale Switch. **Cost: \$0.76M**
- Retire Unionvale Switch **Cost: \$0.13M**
- Replace and relocate East Cadiz Switch with a three way POP Switch (2,000A) with MOAB's on each side. **Cost: \$0.72M**
- Remote relaying at South Cadiz, Parlett, & Sparrow. **Cost: \$0.5M**

Estimated Cost: \$41.53M

Alternatives Considered:

No cost effective alternative identified.

Projected In-Service: 12/01/2020

AEP Transmission Zone M-3 Process Seneca, Ohio

Need Number: AEP-2019-OH021

Process Stage: Solutions Meeting 6/17/2019

Previously Presented: Need Meeting 04/23/2019

Project Driver:

Operational Flexibility and Efficiency

Specific Assumption References:

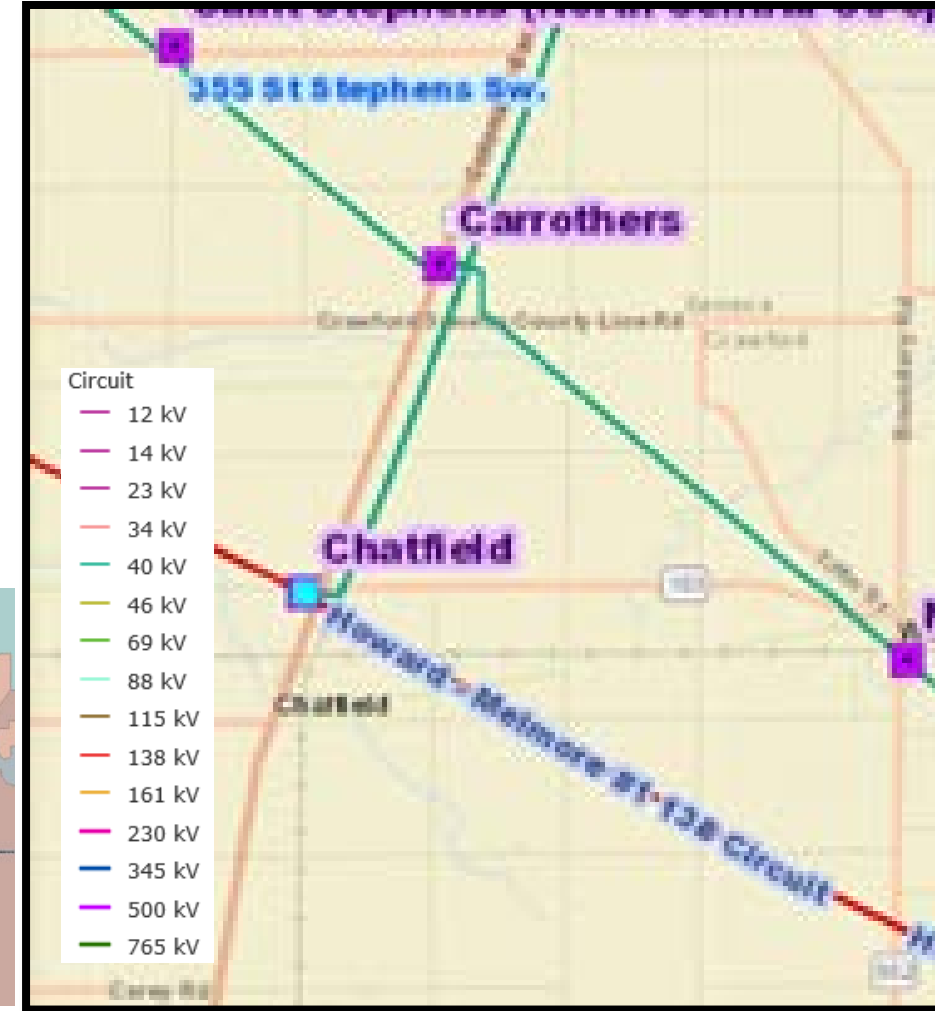
AEP Guidelines for Owner Identified Needs (AEP Assumptions slide 8)

Problem Statement:

The Carrothers 69 kV Station has three dissimilar zones of protection (Bus, Transformer, and Line). Dissimilar zones of protection can cause mis-operations and over tripping.

Model:

N/A



AEP Transmission Zone M-3 Process Seneca, Ohio

Need Number: AEP-2019-OH021

Process Stage: Solutions Meeting 6/17/2019

Proposed Solution:

At Carrothers 69kV station, replace line MOAB Y with a new 3000A 40 kA circuit breaker and replace/upgrade relaying at Carrothers and Chatfield stations to accommodate new breaker.

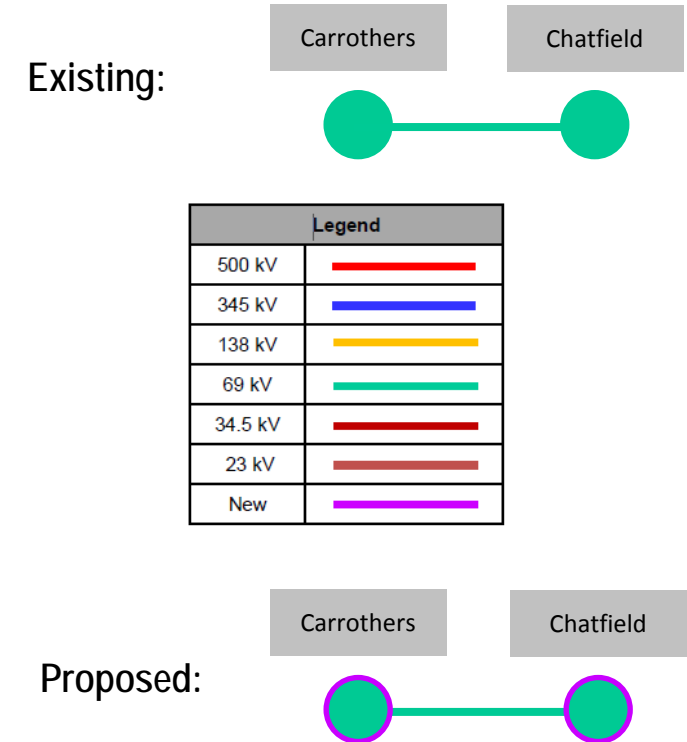
Estimated Cost: \$2.00M

Alternatives Considered:

No viable cost-effective transmission alternative was identified.

Projected In-Service: 09/02/2022

Project Status: Scoping



AEP Transmission Zone M-3 Process Sunbury, Ohio

Need Number: AEP-2019-OH022

Process Stage: Solutions Meeting 06/17/2019

Previously Presented: Need Meeting 05/20/2019

Project Driver: Customer Service

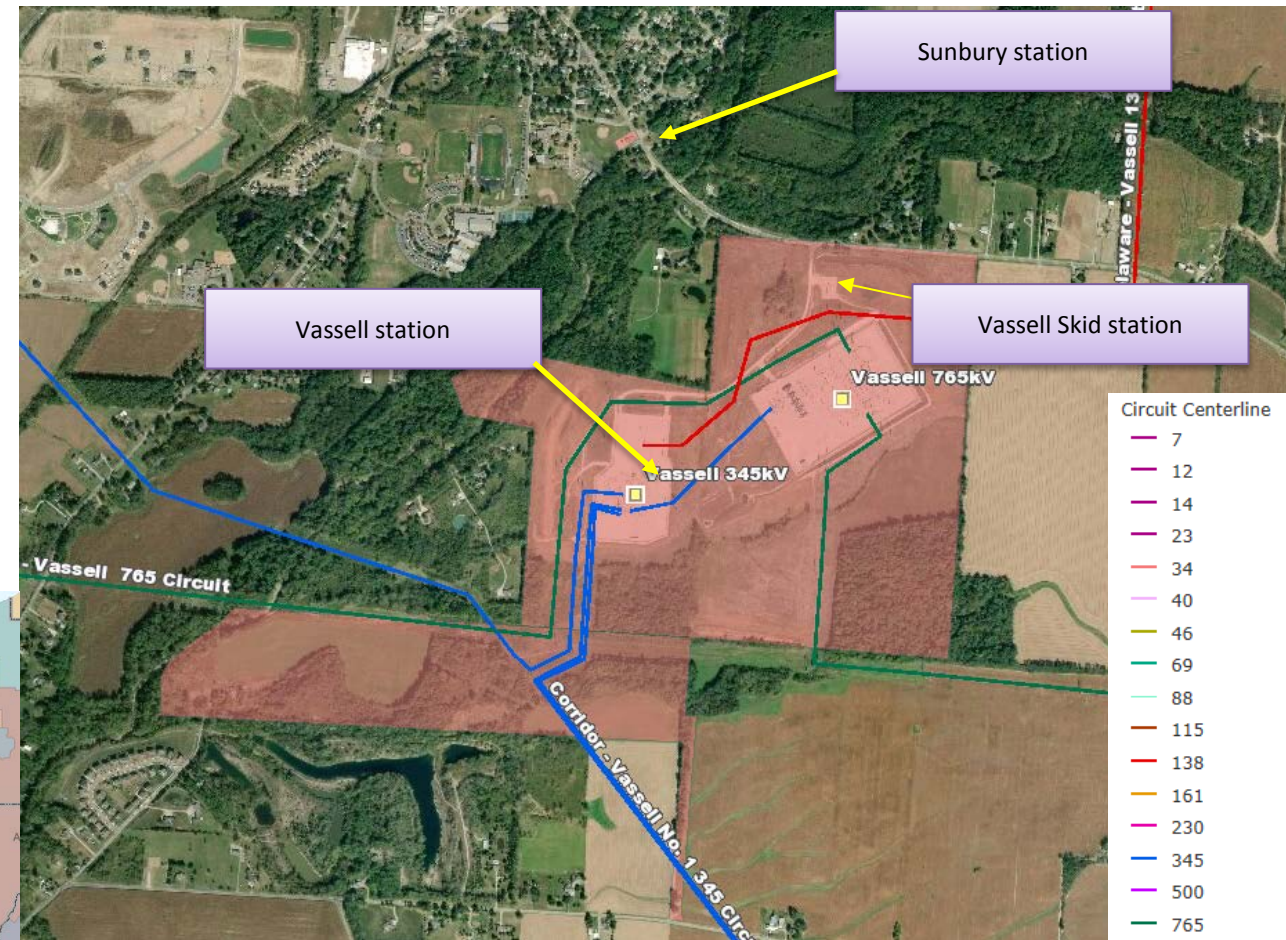
Specific Assumption References:

AEP Guidelines for Transmission Owner Identified Needs (AEP Assumptions Slide 7)

Problem Statement:

Transformation at the 34.5/13kV Sunbury station failed leading to the immediate need to install a 138/13kV skid station at Vassell station to continue serving customer load. AEP-Ohio has requested to remove the existing temporary skid station outside Vassell station and to replace it with a new 138kV delivery point installation at Vassell station.

Model: 2023 Summer RTEP



AEP Transmission Zone M-3 Process Sunbury, Ohio

Need Number: AEP-2019-OH022
Process Stage: Solutions Meeting 06/17/2019
Proposed Solution:

At Vassell station, install 138kV 4,000A 63kA CB and 138kV bus extension to support connection of customer transformer. **Estimated Cost: \$1.3M**

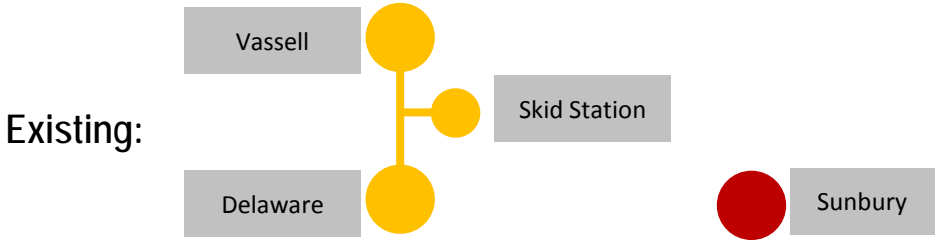
Remove and retire Sunbury 34.5kV Station. **Estimated Cost: \$0.5M**

Total Estimated Transmission Cost: \$1.8M

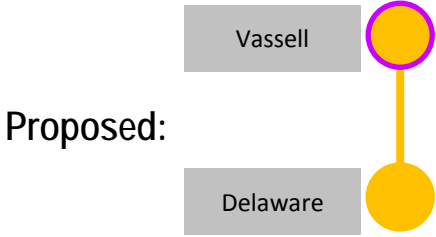
Alternatives Considered:
 No viable cost-effective transmission alternative was identified. AEP Ohio has requested the location for the new transformer at Vassell.

Projected In-Service: 12/09/2020

Project Status: Scoping



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



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

6/7/2019 – V1 – Original version posted to pjm.com

6/12/2019 – V2 – Slide #30, Updated the map

6/13/2019 – V3 – Slide #51-53, Removed the slides

6/17/2019 – V4 – Slide #3, Corrected the total cost

7/10/2019 – V5 – Slide #48, AEP-2019-OH013, Corrected CB rating units (kV -> kA)