Subregional RTEP Committee – Western
FirstEnergy Supplemental Projects

Submission of Supplemental Projects for Inclusion in the Local Plan

Abbe – Medina 69 kV Line Customer Connection - s2056 Scope Change

s2056: Originally presented in 05/20/2019 and 7/24/2019 SRRTEP Western meetings

Supplemental Project Driver(s):

Customer Service

Specific Assumption Reference(s):

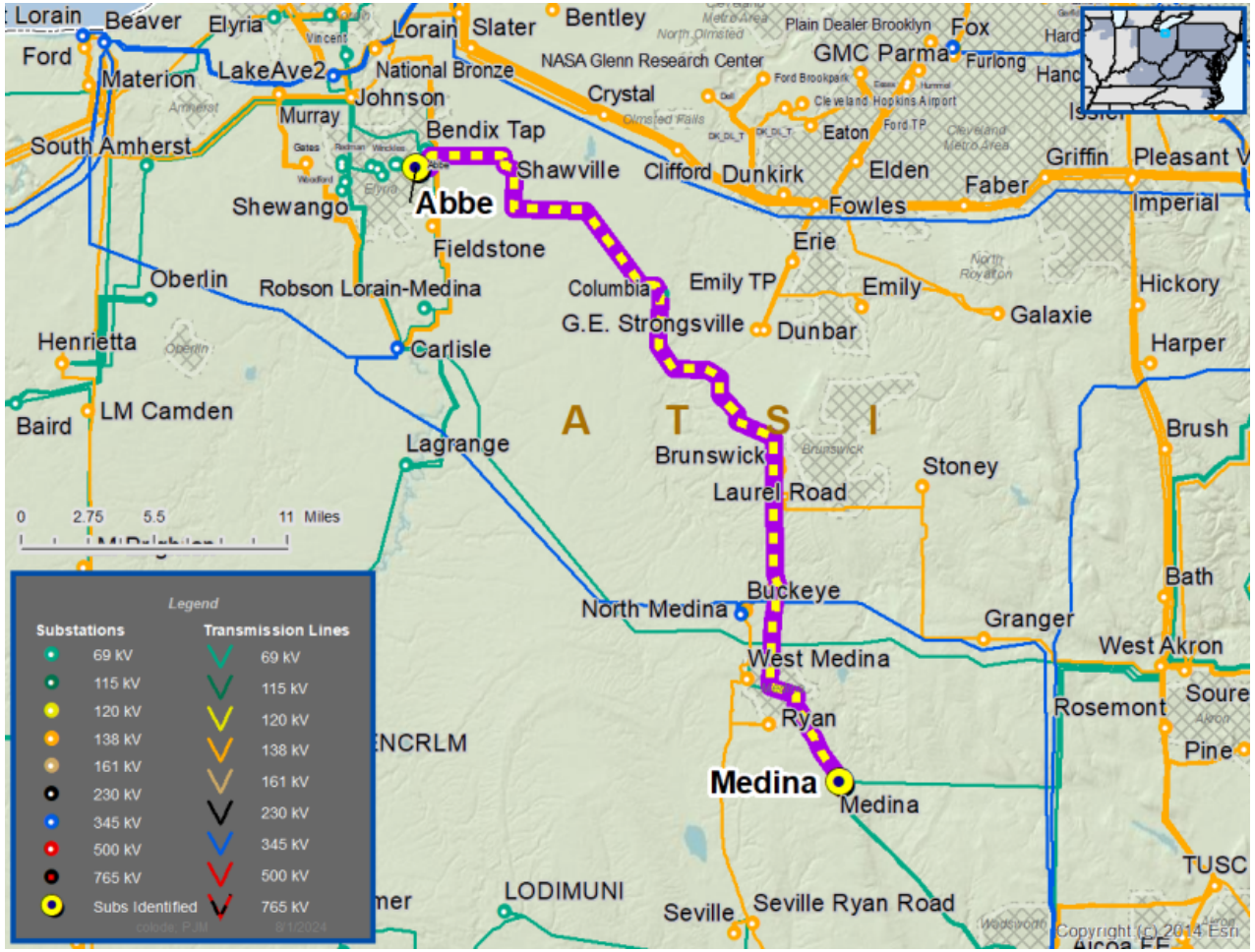
New customer connection request will be evaluated per FirstEnergy's "Requirements for Transmission Connected Facilities" document and "Transmission Planning Criteria" document.

Problem Statement

New Customer Connection – Ohio Edison Distribution has requested a new 69 kV delivery point near the Abbe – Medina 69 kV Line. The anticipated load of the new customer connection is 11.2 MVA.

Requested In-Service Date:

December 31, 2024



ATSI Transmission Zone M-3 Process

Abbe – Medina 69 kV Line Customer Connection - s2056 Scope Change

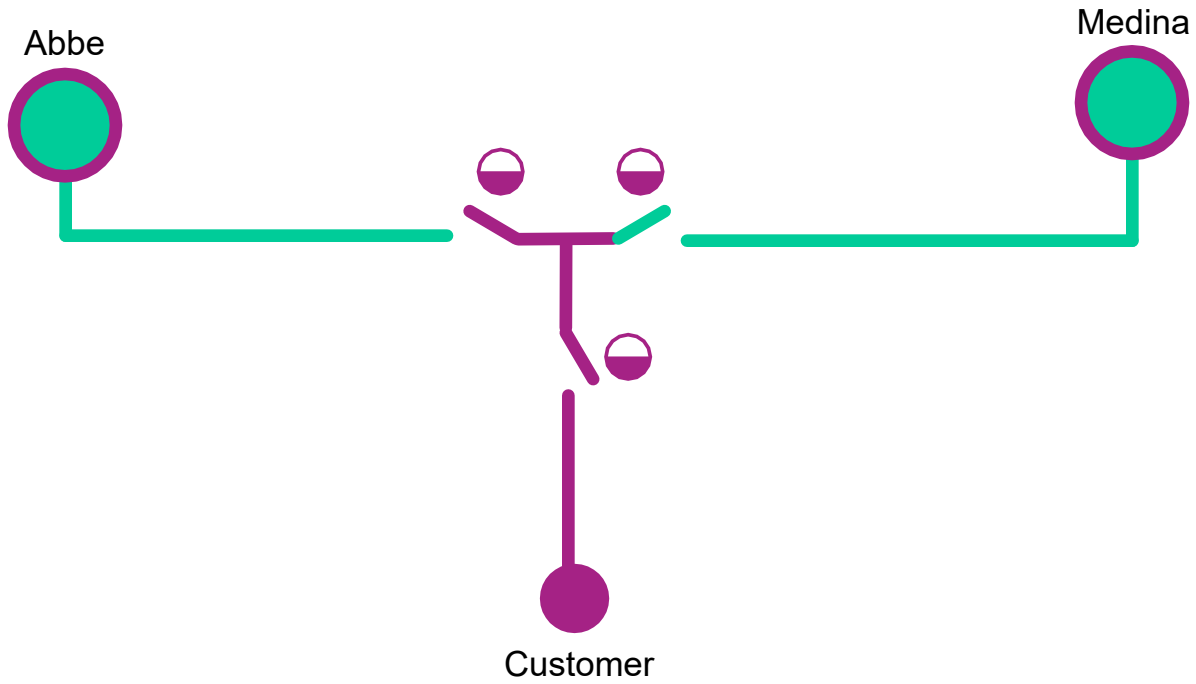
Need Number: ATSI-2019-056 (s2056)

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 3/7/2025

Selected Solution:

138 kV Transmission Line Tap

- Tap the Abbe-Medina 69 kV line approximately 11.1 miles from Medina substation and build one 69 kV span to the proposed customer substation
- Install one (1) 69 kV in-line switches with SCADA control on either side of the new tap connection
- Install SCADA capabilities to existing main-line switch
- Install one tap-line SCADA controlled switch.
- Adjust relay settings at Abbe and Medina substations.
- Install revenue metering.



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

Estimated Project Cost: $0.9 M

Projected In-Service: 12/31/2024

Supplemental ID: s2056

ATSI Transmission Zone M-3 Process
Angola – Midway 138 kV Line

Need Number: ATSI-2022-013

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 3/7/2025

Previously Presented: Need Meeting – 05/19/2022
Solution Meeting – 06/14/2024

Supplemental Project Driver(s):

Operational Flexibility and Efficiency

Equipment Material Condition, Performance and Risk

Infrastructure Resilience

Specific Assumption Reference(s):

Global Considerations

- System reliability and performance
- Load at risk in planning and operational scenarios
- Load and/or customers at risk on single transmission lines
- Substation/line equipment limits

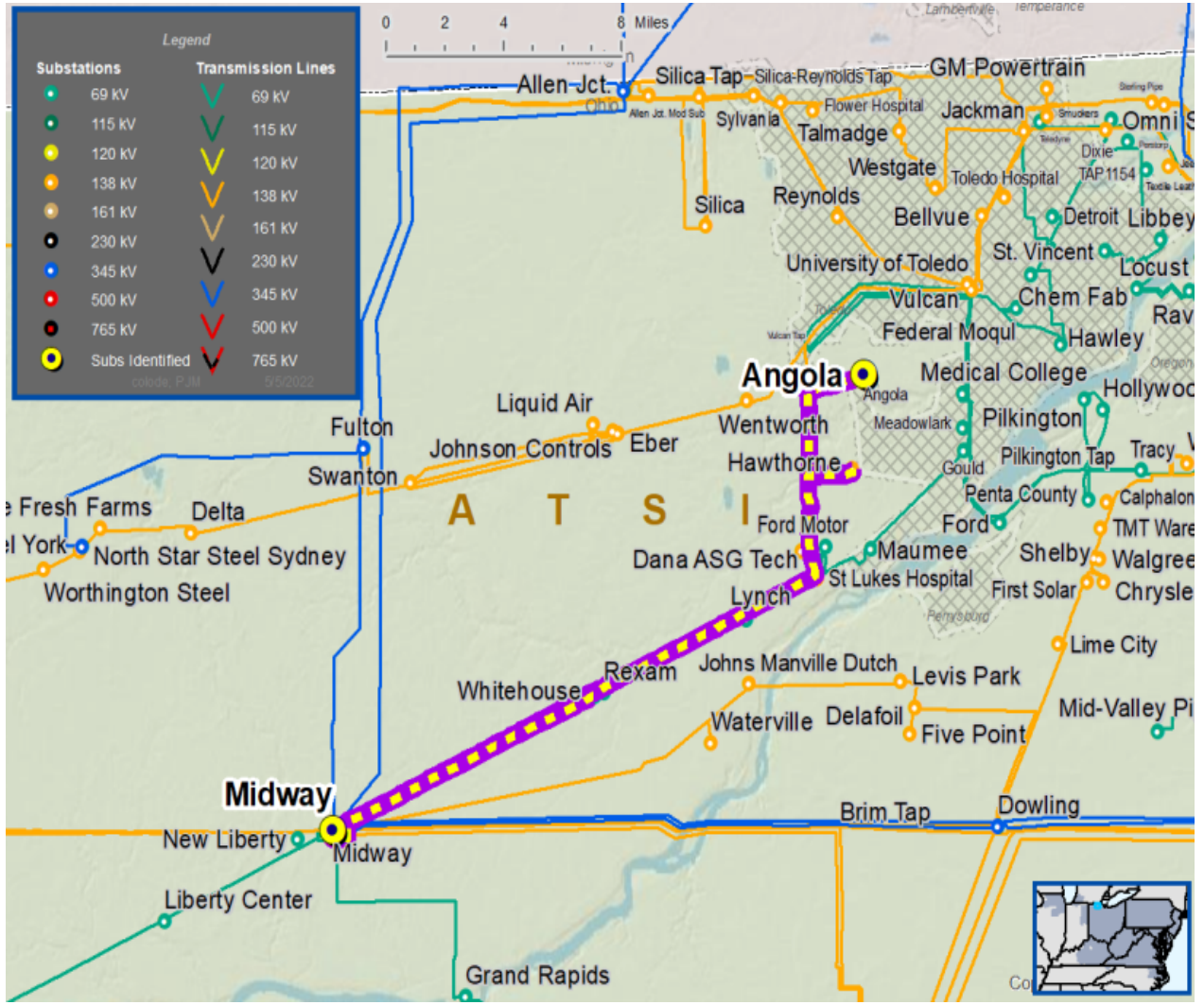
Add/Expand Bus Configuration

- Loss of substation bus adversely impacts transmission system performance

Problem Statement:

The loss of the Angola-Midway 138 kV Line results in the loss of approximately 38.5 MW and 7,400 customers at three delivery points.

Since 2017, the Angola-Midway 138 kV Line has experienced four unscheduled outages: two sustained and two momentary.



ATSI Transmission Zone M-3 Process
Angola – Midway 138 kV Line

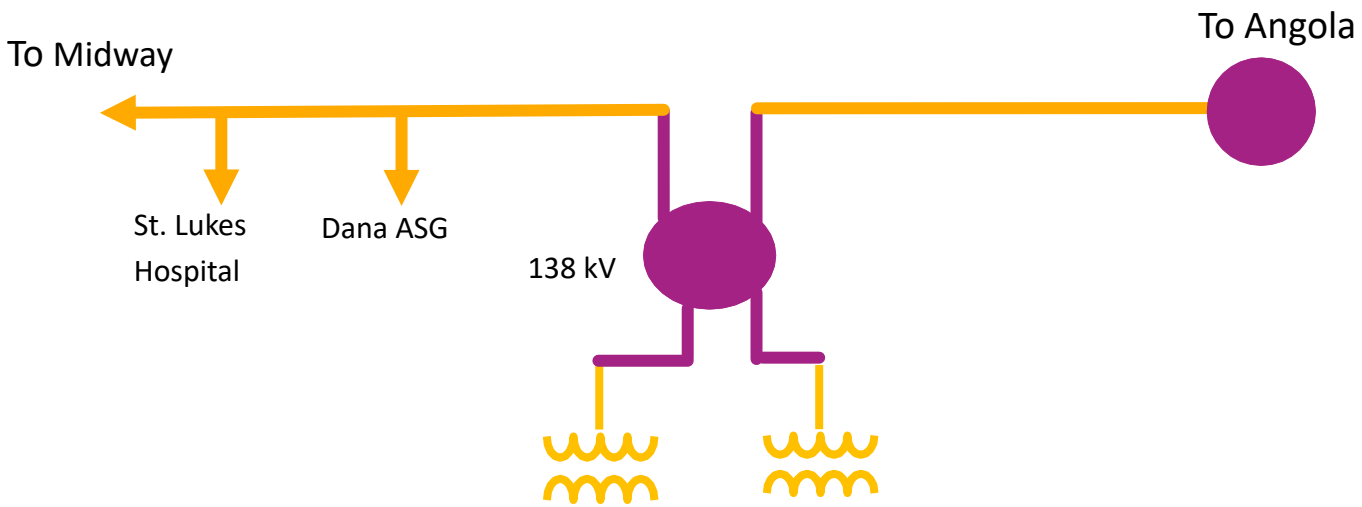
Need Number: ATSI-2022-013
Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 3/7/2025

Selected Solution:

Expand Hawthorne Station into a ring bus configuration

- Build a four breaker 138 kV ring bus.

Estimated Project Cost: $11.6M
Projected In-Service: 3/14/2028
Supplemental Project ID: s3543.1



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

ATSI Transmission Zone M-3 Process
Longview – Nottingham 138 kV Line Customer Connection

Need Number: ATSI-2024-039

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 3/7/2025

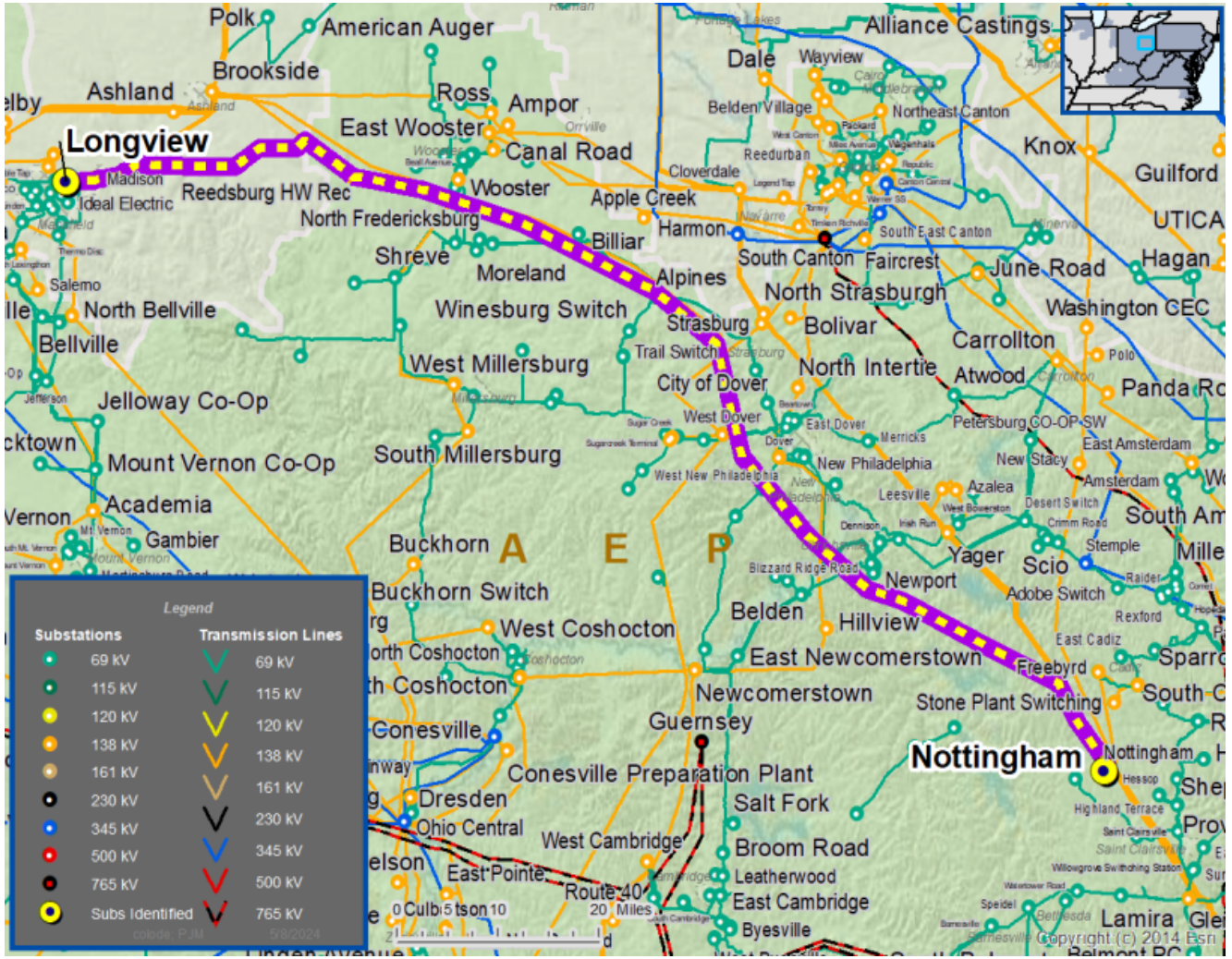
Previously Presented: Need Meeting – 05/17/2024
Solution Meeting – 08/16/2024

Supplemental Project Driver(s):
Customer Service

Specific Assumption Reference(s):
New customer connection request will be evaluated per FirstEnergy's "Requirements for Transmission Connected Facilities" document and "Transmission Planning Criteria" document.

Problem Statement
New Customer Connection – Ohio Edison Distribution has requested a new 138 kV delivery point near the Longview – Nottingham 138 kV Line. The anticipated load of the new customer connection is 6 MVA.

Requested In-Service Date:
June 1, 2026



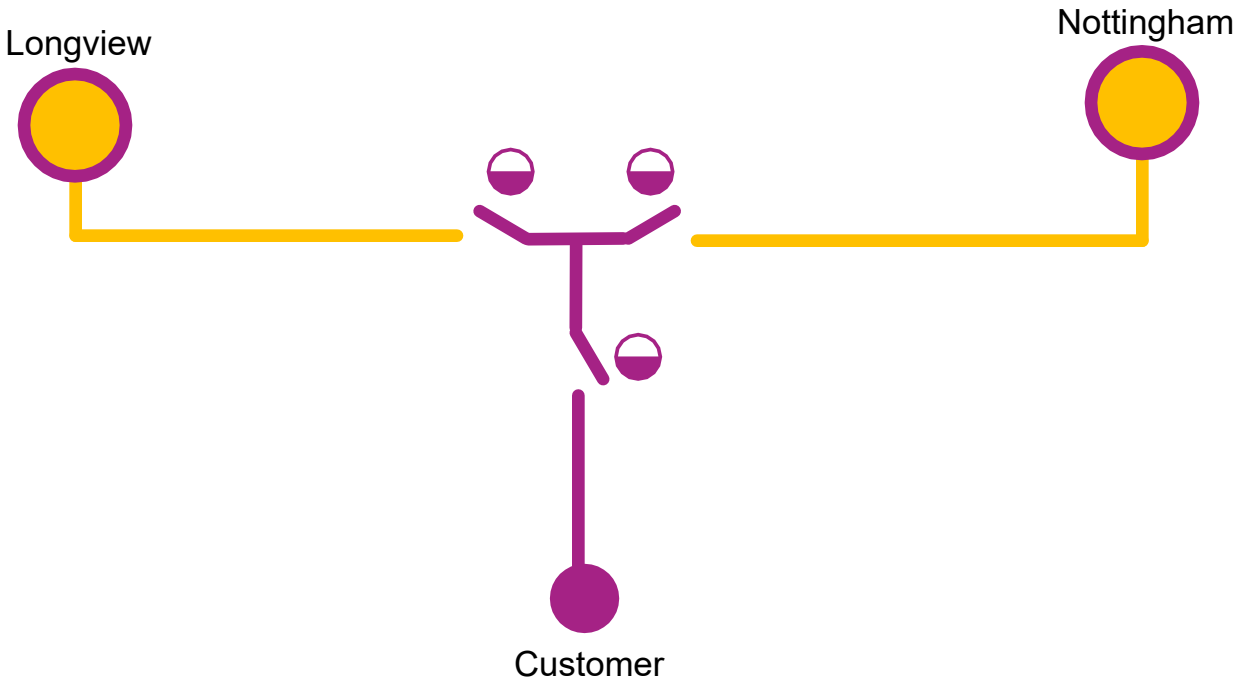
ATSI Transmission Zone M-3 Process
Longview – Nottingham 138 kV Line Customer Connection

Need Number: ATSI-2024-039
Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 3/7/2025

Selected Solution:

138 kV Transmission Line Tap

- Install two main-line SCADA controlled switches.
- Install one tap-line SCADA controlled switch.
- Construct 0.1 miles of 138 kV line extension.
- Adjust relay settings at Longview substations.
- Install revenue metering.



Estimated Project Cost: $1.5 M
Projected In-Service: 12/31/2027
Supplemental Project ID: s3544.1

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

ATSI Transmission Zone M-3 Process
Glenmount 138 kV Substation

Need Number: ATSI-2023-009

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 3/7/2025

Previously Presented: Need Meeting – 04/21/2023
Solution Meeting – 09/20/2024

Supplemental Project Driver(s):

Operational Flexibility and Efficiency

Equipment Material Condition, Performance and Risk

Infrastructure Resilience

Specific Assumption Reference(s):

Global Considerations

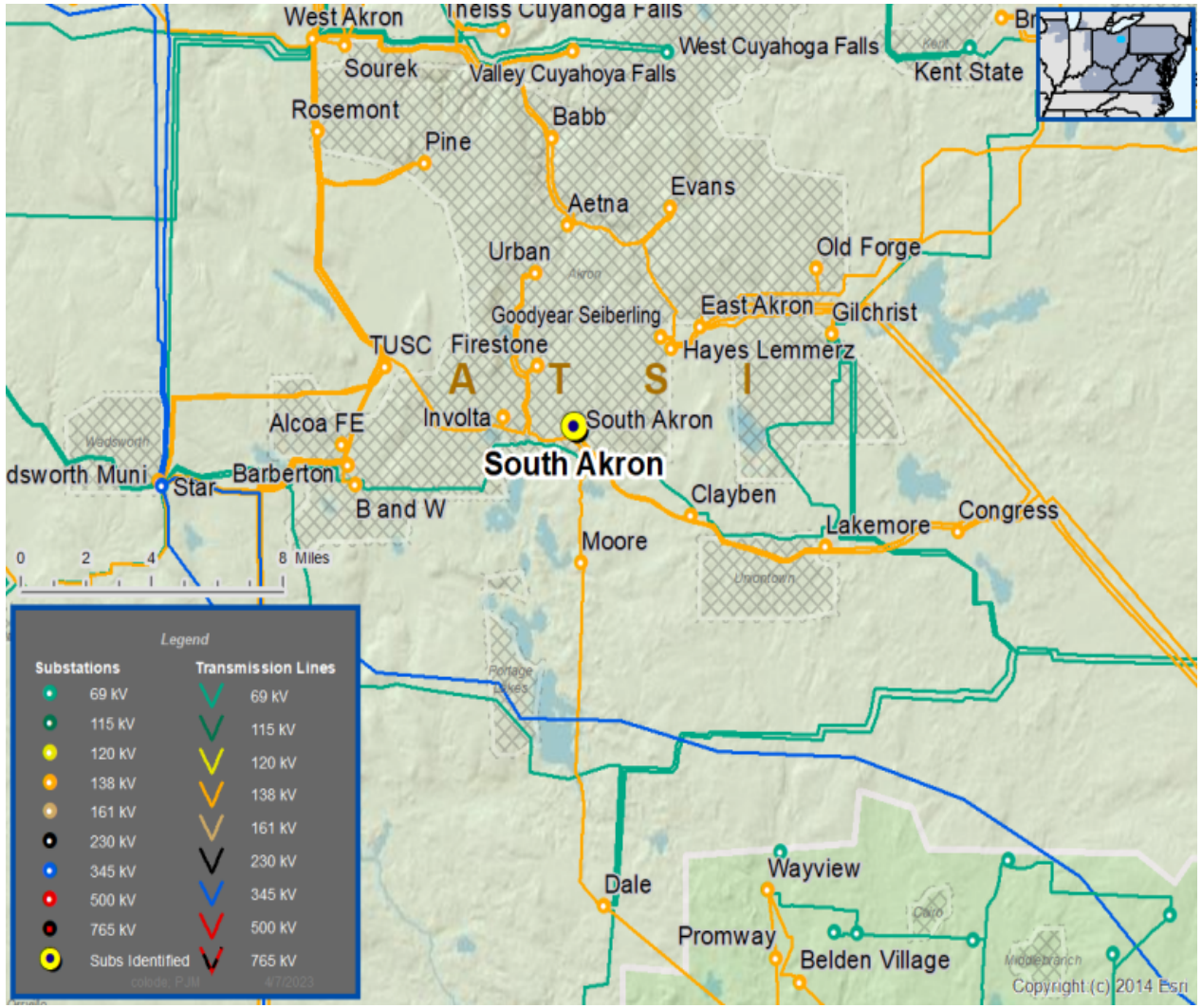
- System reliability and performance
- Load at risk in planning and operational scenarios

Substation Condition Rebuild/Replacement

- Increasing negative trend in maintenance findings and/or costs.
- Expected service life (at or beyond) or obsolescence

Add/Expand Bus Configuration

- Loss of substation bus adversely impacts transmission system performance
- Eliminate simultaneous outages to multiple networked elements under N-1 analysis
- Capability to perform system maintenance



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ATSI Transmission Zone M-3 Process
Glenmount 138 kV Substation

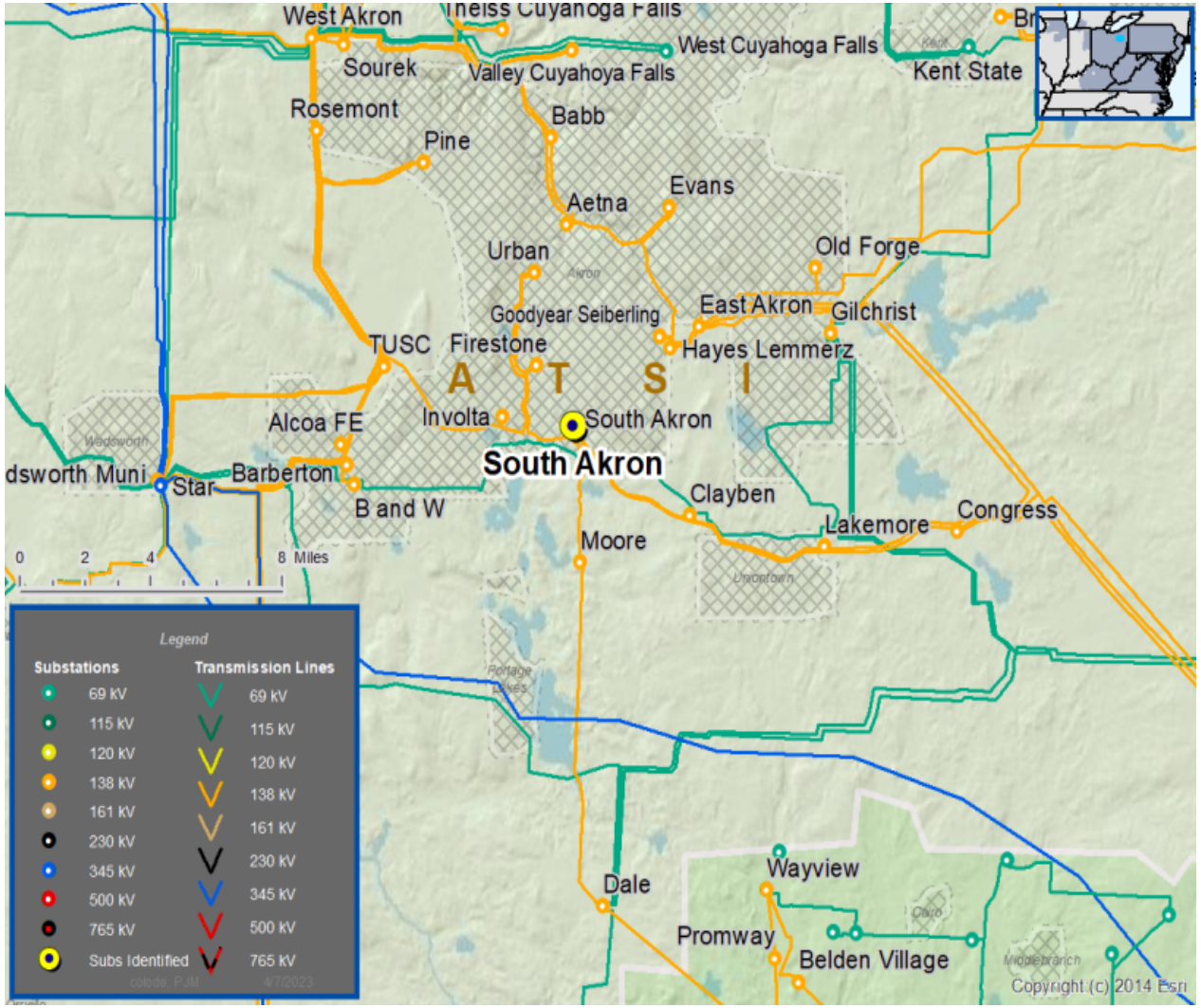
Need Number: ATSI-2023-009

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 3/7/2025

Previously Presented: Need Meeting – 04/21/2023
Solution Meeting – 09/20/2024

Problem Statement

- An N-1 bus outage at South Akron Substation results in the loss of approximately 55 MW and 17,000 customers.
- An N-1 bus outage at South Akron Substation results in several sub-transmission 23 kV lines overloaded beyond the summer emergency rating.
- The South Akron 138 kV bus protection consists of a non-redundant electromechanical (PVD) scheme
- 138 kV Breaker B-30 is 66 years old with increasing maintenance concerns; compressor issues, deteriorated operating mechanisms and increasing maintenance trends.
- 138 kV Breaker B-1 has a pneumatic mechanism
  - Manufacture date is 1952
  - Several corrective maintenance and preventive issues (magnetic loader failed, valve for pneumatic mechanism failed, replaced 52Y relay) and expected reoccurring failure
- 138 kV breaker B-10 has a pneumatic mechanism
  - Manufacture date is 1951
  - Several corrective maintenance and preventive issues (high ductor reading (high resistance on contact, air compressor for pneumatic mechanism failed, lower control valve failed for air charged to trip breaker) and anticipated reoccurring failures



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ATSI Transmission Zone M-3 Process
Glenmount 138 kV Substation

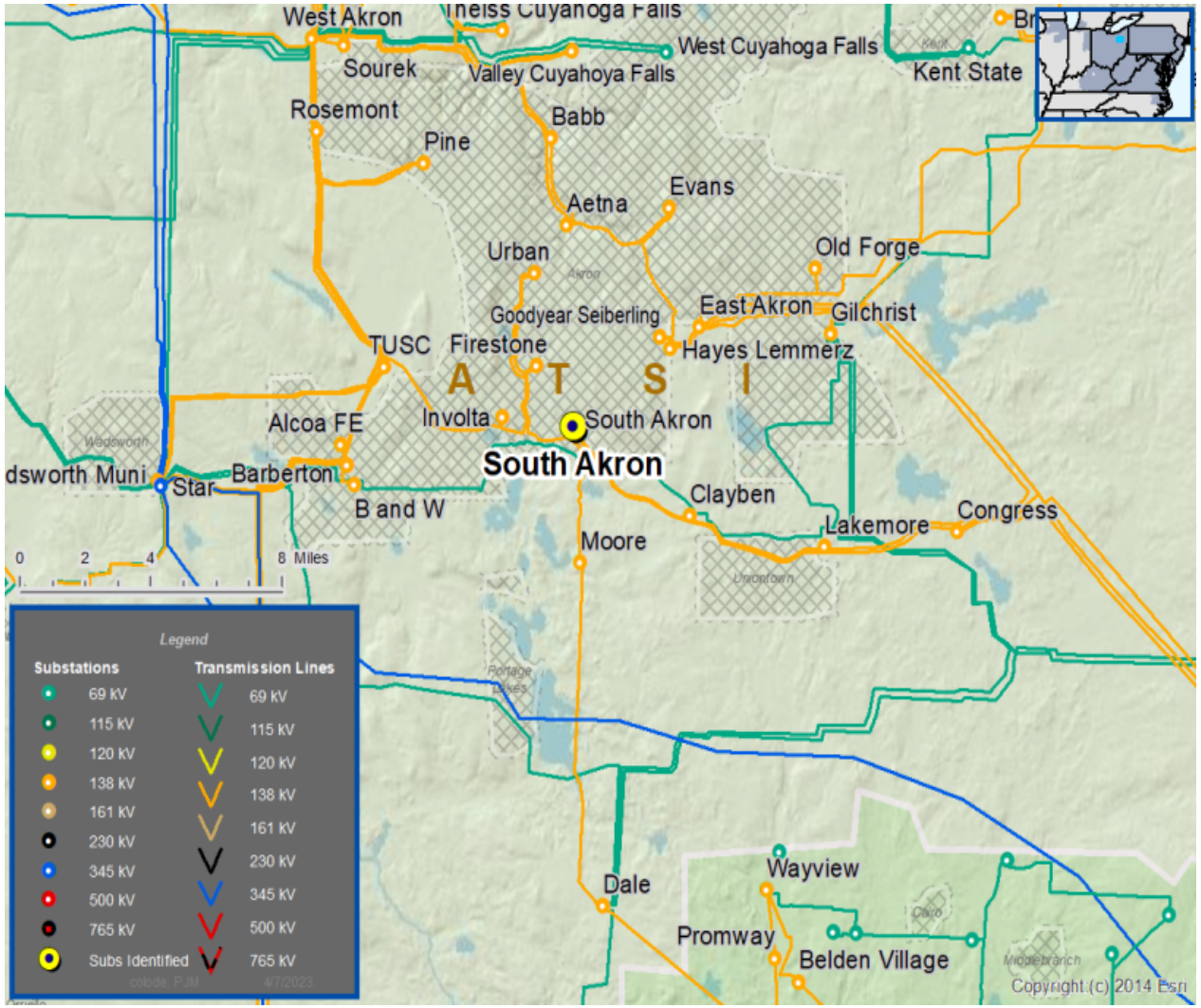
Need Number: ATSI-2023-009

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 3/7/2025

Previously Presented: Need Meeting – 04/21/2023
Solution Meeting – 09/20/2024

Problem Statement

- Since 2017, the South Akron 138 kV lines have experienced the following unscheduled outages:
  - The Dale-South Akron 138 kV line has one momentary and one sustained outage.
  - The Firestone-South Akron 138 kV line has one sustained outage.
  - The Lakemore-South Akron 138 kV line has one sustained outage.
  - The South Akron-Toronto 138 kV has five momentary and two sustained outages.



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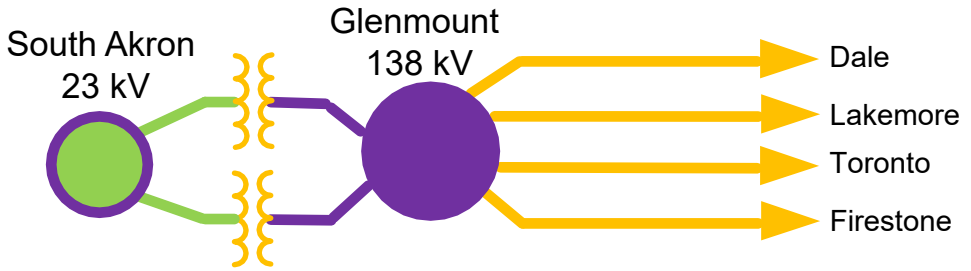
ATSI Transmission Zone M-3 Process
Glenmount 138 kV Substation

Need Number: ATSI-2023-009

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 3/7/2025

Selected Solution:

- Install new 138 kV BAAH substation (Glenmount) adjacent to South Akron substation on existing FE property
  - Install (11) new 138 kV breakers, (23) GOAB switches, (4) Motor Operated Line Switches, (6) Sets of CCVTs (4) A frames, (2) SSVTs, (1) control house w/ (21) relay panels, (1) 138kV Cap Switcher & Cap Bank, (3) 138kV free standing CTs
  - Re-terminate the Glenmount-Firestone 138 kV Line, Glenmount-Toronto 138 kV Line, Glenmount-Lakemore 138 kV Line, and the Glenmount-Dale 138 kV Line (previously connected to South Akron).
  - Install (2) new 138kV T Lines from Glenmount to South Akron using 795 kcmil ACSR conductor (0.2 miles each)
  - Add fencing, ground grid, stormwater detention pond (~ 143,000 ft2)
- Modify South Akron substation
  - Replace (2) Breakers
  - Remove (4) 138kV breakers & associated equipment
  - Demo (1) 138kV Cap Bank
- Replace previous equipment noted to be “relocated” from South Akron (breakers, cap switcher & bank, auxiliary equipment) to reduce construction constraints within outages
- Modify (4) incoming 138kV T Lines to South Akron, temporarily, to open space for construction of new substation
- Update relay settings at (4) Remote Ends
- Install new MPLS Equipment for SCADA Transport at Glenmount
- Run ADSS from Existing South Akron to Glenmount



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

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ATSI Transmission Zone M-3 Process
Glenmount 138 kV Substation

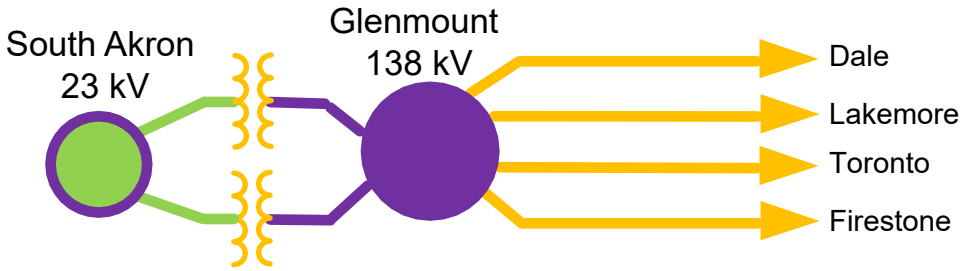
Need Number: ATSI-2023-009
Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 3/7/2025

Selected Solution (continued)…

Transmission Line Ratings:

- Glenmount (previously South Akron) 138 kV-South Akron 23 kV TR1:
  - Before Proposed Solution: 55/69/72/83 MVA (SN/SE/WN/WE)
  - After Proposed Solution: 74/80/93/98 MVA (SN/SE/WN/WE)
- Glenmount (previously South Akron) 138 kV-South Akron 23 kV TR3:
  - Before Proposed Solution: 79/85/96/96 MVA (SN/SE/WN/WE)
  - After Proposed Solution: 79/85/99/105 MVA (SN/SE/WN/WE)
- Glenmount (previously South Akron)-Dale 138 kV Line (Glenmount-Moore 138 kV Branch):
  - Before Proposed Solution: 225/282/263/333 MVA (SN/SE/WN/WE)
  - After Proposed Solution: 233/282/263/333 MVA (SN/SE/WN/WE)
- Glenmount (previously South Akron)-Firestone 138 kV Line:
  - Before Proposed Solution: 225/282/263/333 MVA (SN/SE/WN/WE)
  - After Proposed Solution: 233/282/263/333 MVA (SN/SE/WN/WE)

Estimated Project Cost: $23.54 M
Projected In-Service: 12/31/2027
Supplemental Project ID: s3546.1



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

ATSI Transmission Zone M-3 Process
Cardington (Galion) 138 kV Line Customer Connection

Need Number: ATSI-2024-040

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 3/7/2025

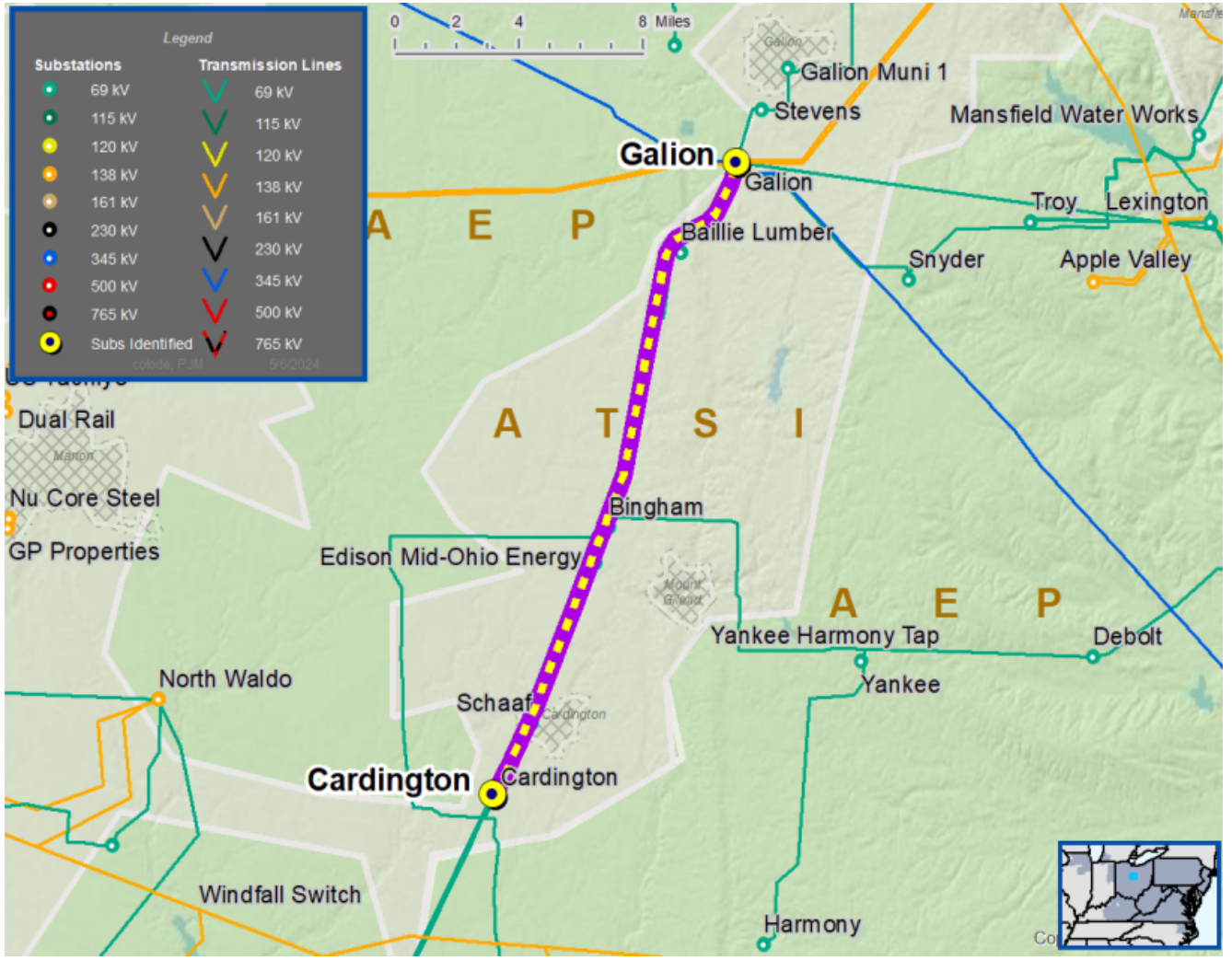
Previously Presented: Need Meeting – 05/17/2024
Solution Meeting – 08/16/2024

Supplemental Project Driver(s):
Customer Service

Specific Assumption Reference(s):
New customer connection request will be evaluated per FirstEnergy's "Requirements for Transmission Connected Facilities" document and "Transmission Planning Criteria" document.

Problem Statement
New Customer Connection – Ohio Edison Distribution has requested a new 138 kV delivery point near the Cardington (Galion) 138 kV Line. The anticipated load of the new customer connection is 6 MVA.

Requested In-Service Date:
June 1, 2026



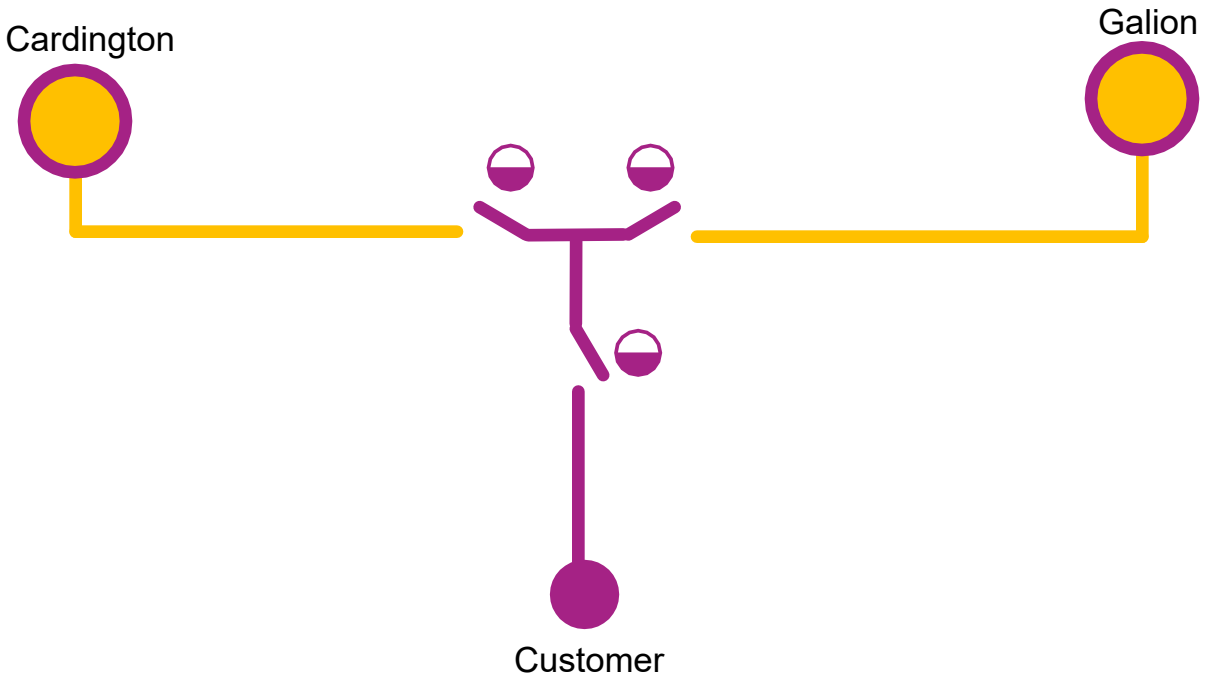
ATSI Transmission Zone M-3 Process
Cardington (Galion) 138 kV Line Customer Connection

Need Number: ATSI-2024-040
Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 3/7/2025

Selected Solution:

138 kV Transmission Line Tap

- Install two main-line SCADA controlled switches.
- Install one tap-line SCADA controlled switch.
- Construct 0.1 miles of 138 kV line extension.
- Install one breaker at Cardington Substation
- Adjust relay settings at Galion substations.
- Install revenue metering.



Estimated Project Cost: $2.8 M
Projected In-Service: 12/31/2027
Supplemental Project ID: s3545.1

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

ATSI Transmission Zone M-3 Process
Gilchrist – Star 69 kV Line

s3359.1: Originally presented in 10/14/2022 and 10/18/2024 SRRTEP Western meetings
Changes are marked in red

Supplemental Project Driver(s):
Equipment Material Condition, Performance and Risk

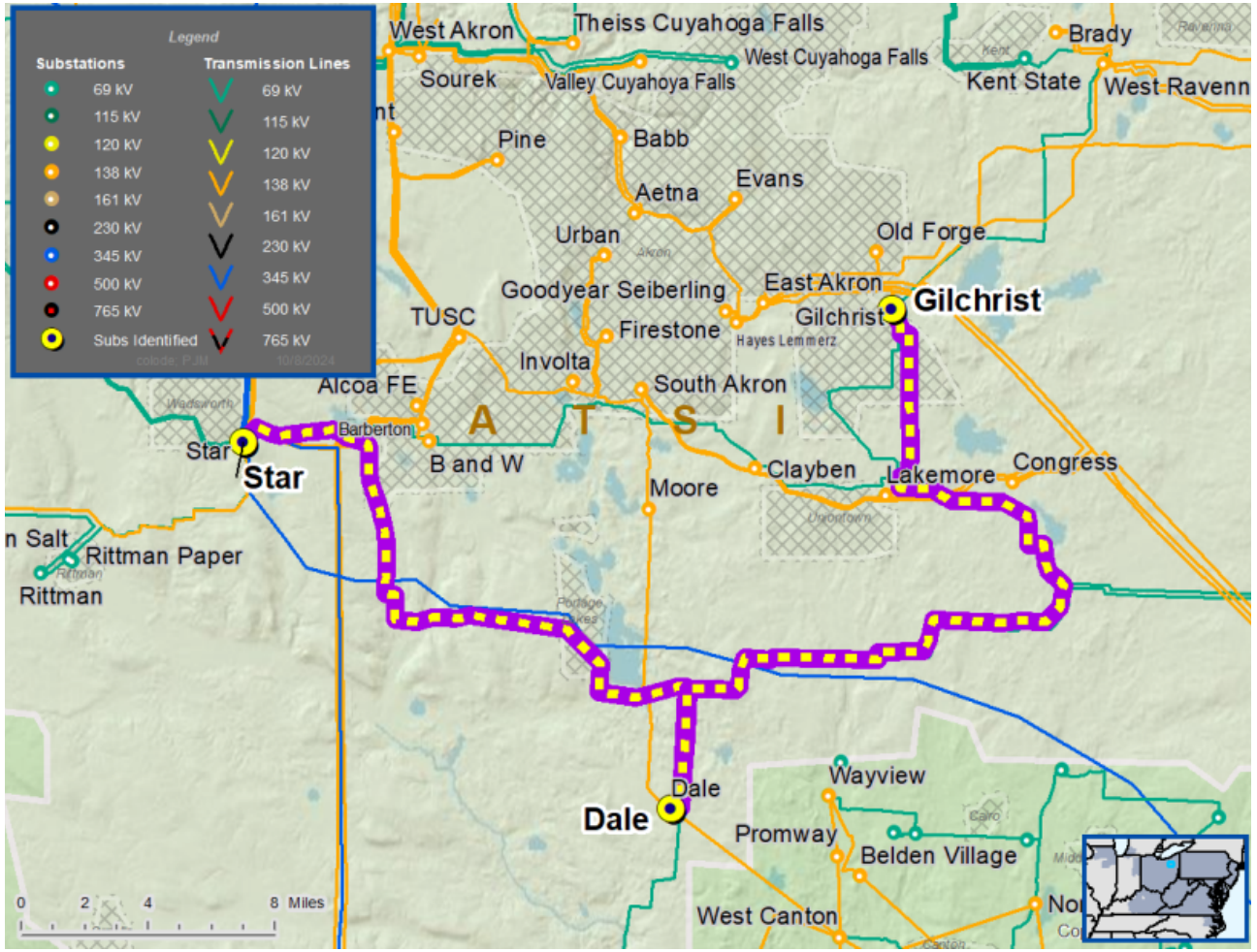
Specific Assumption Reference(s)

Line Condition Rebuild / Replacement

- Aged or deteriorated transmission line structures
- Negatively impact customer outage frequency and/or durations
- Demonstrate an increasing trend in maintenance findings and/or costs
- Transmission line ratings are limited by terminal equipment.

Problem Statement:
The Gilchrist – Star 69 kV Line is approximately 25 miles in length.
The Dale – Star 69 kV Line shares structures with the Gilchrist – Star 69 kV Line for approximately 3.3 miles.

- Line survey in 2020 showed a structure reject rate of 89% (413 of 461). The primary reasons for reject were wood pole deterioration, woodpecker holes, ground system damage, and decay damage.
- Since 2017, there has been a total of eight (8) momentary and six (6) sustained unscheduled outages on the line.
- Transmission line switches are obsolete and limiting the transmission line rating.



ATSI Transmission Zone M-3 Process
Gilchrist – Star 69 kV Line

Need Number: ATSI-2022-028 (s3359.1)

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 3/7/2025

Proposed Solution:

Gilchrist – Star 69 kV Line

- Rebuild the Gilchrist – Star 69 kV Line with new conductor.
- Replace A-42, A-87, A-86, A-38 switches with new switches equipped with SCADA Control & Motor Operation.

Dale – Star 69 kV Line

- Rebuild the 3.3 mile Dale – Star 69 kV Line section that is double circuited with the Gilchrist-Star 69 kV Line with new conductor. This includes the Star – Martin 69 kV Line and part of the Martin – Marathon Tap 69 kV Line section.

~~Gilchrist~~

~~• Replace 69 kV breaker B23~~

Transmission Line Ratings:

Gilchrist – McKnights 69 kV Line

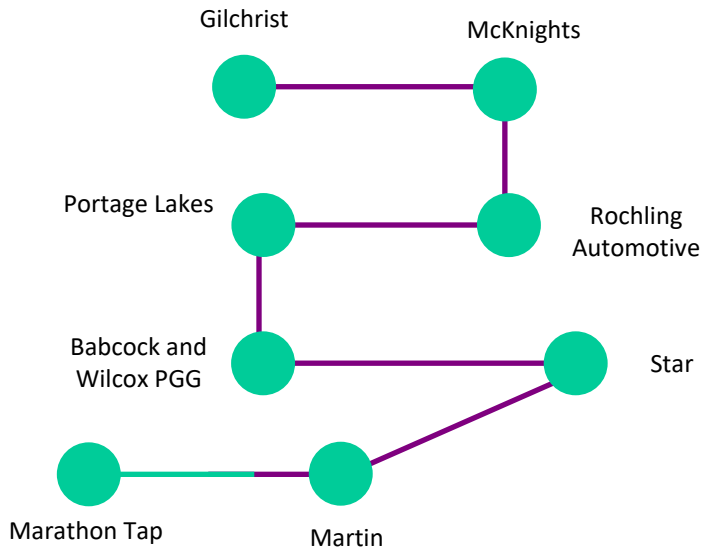
- Before Proposed Solution: 80 / 96 / 90 / 114 MVA (SN/SE/WN/WE)
- After Proposed Solution: 111 / 134 / 125 / 159 MVA (SN/SE/WN/WE)

McKnights – Rochling Automotive 69 kV Line

- Before Proposed Solution: 80 / 96 / 90 / 114 MVA (SN/SE/WN/WE)
- After Proposed Solution: 111 / 134 / 125 / 159 MVA (SN/SE/WN/WE)

Rochling Automotive – Portage Lakes 69 kV Line

- Before Proposed Solution: 74 / 76 / 83 / 83 MVA (SN/SE/WN/WE)
- After Proposed Solution: 111 / 134 / 125 / 159 MVA (SN/SE/WN/WE)



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

ATSI Transmission Zone M-3 Process
Gilchrist – Star 69 kV Line

Need Number: ATSI-2022-028 (s3359.1)

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 3/7/2025

Transmission Line Ratings:

Portage Lakes – Babcock and Wilcox PGG 69 kV Line

- Before Proposed Solution: 74 / 76 / 83 / 83 MVA (SN/SE/WN/WE)
- After Proposed Solution: 111 / 134 / 125 / 159 MVA (SN/SE/WN/WE)

Babcock and Wilcox PGG – Star 69 kV Line

- Before Proposed Solution: 74 / 76 / 83 / 83 MVA (SN/SE/WN/WE)
- After Proposed Solution: 111 / 134 / 125 / 159 MVA (SN/SE/WN/WE)

Martin – Star 69 kV Line

- Before Proposed Solution: 71 / 91 / 87 / 111 MVA (SN/SE/WN/WE)
- After Proposed Solution: 71 / 91 / 87 / 111 MVA (SN/SE/WN/WE)

Martin – Marathon Tap 69 kV Line

- Before Proposed Solution: 45 / 54 / 51 / 65 MVA (SN/SE/WN/WE)
- After Proposed Solution: 45 / 54 / 51 / 65 MVA (SN/SE/WN/WE)

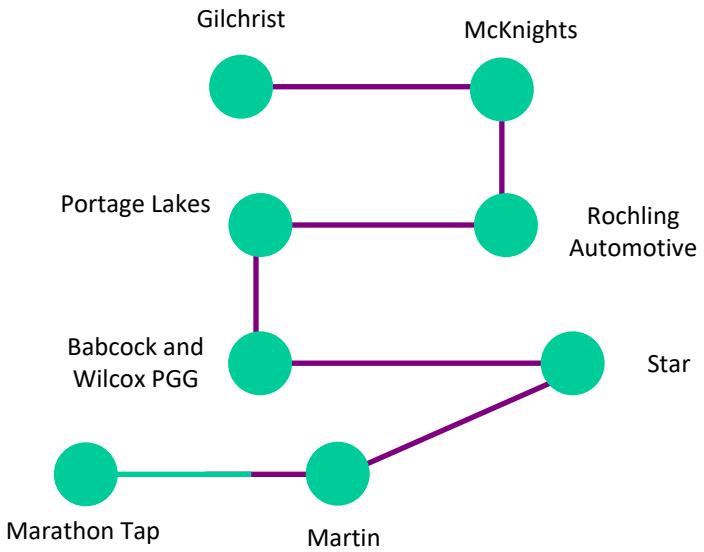
Alternatives Considered:

- Maintain existing condition and elevated risk of failure.

Estimated Project Cost: ~~$97.7 M~~ $71.7 M

Projected In-Service: 12/1/2027

Supplemental ID: s3359.1



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

ATSI Transmission Zone M-3 Process
Beaver No. 1 345/138 kV Transformer

s1757: Originally presented in 09/28/2018 and 10/26/2018 SRRTEP Western meetings
Changes are marked in red

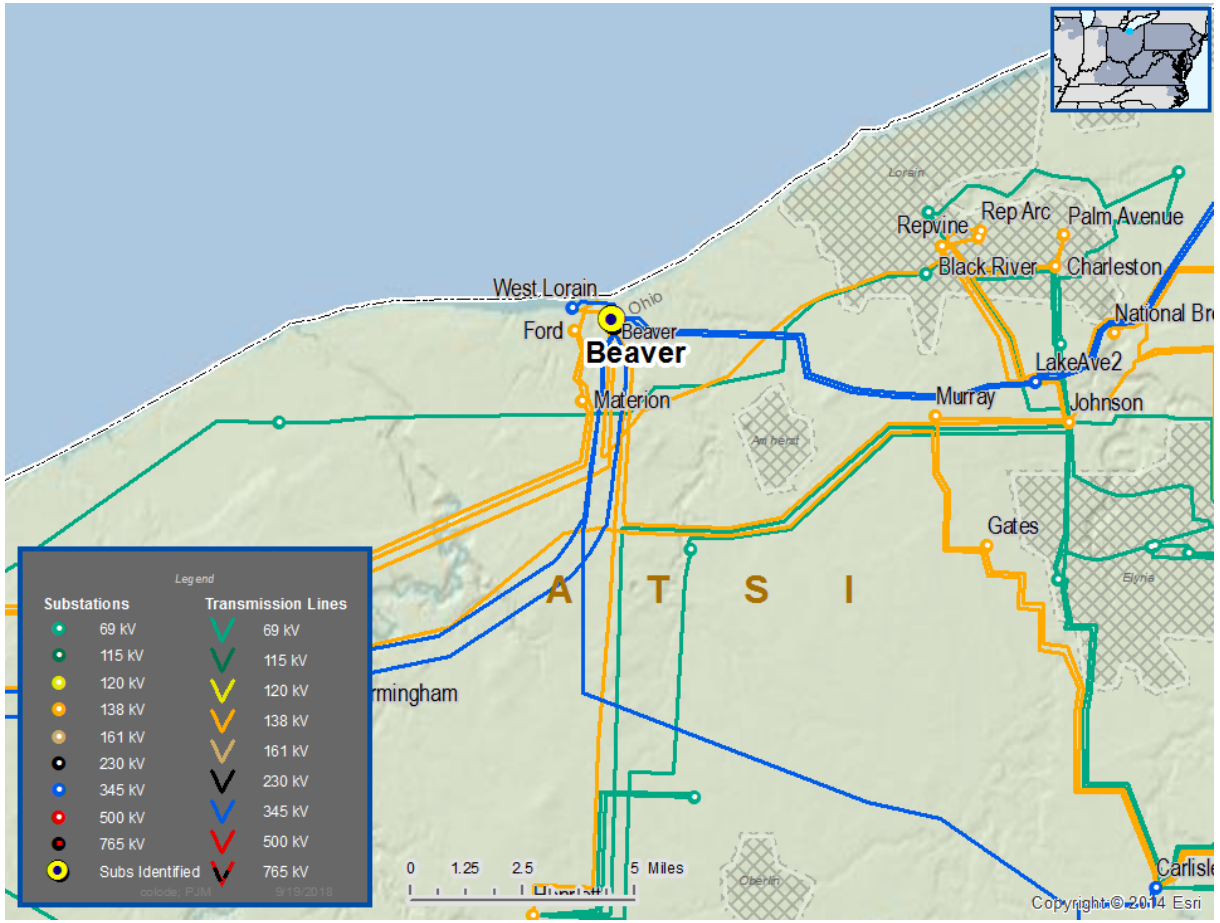
Supplemental Project Driver(s):
Equipment Material Condition, Performance and Risk

Specific Assumption Reference(s)
Substation Condition Rebuild / Replacement
- Power Transformers and Load Tap Changers (LTC)

Problem Statement
Beaver 345 / 138 / 13.2 kV 392 MVA #1 Transformer
- Oil Pump issues and maintenance
- Increased failure probability
- Aging/deteriorating bushings

The problem statement for Beaver # 2 345/138 kV transformer has been removed from this Need/Solution and is being addressed under need ATSI-2024-033

~~Beaver 345 / 138 / 13.2 kV 392 MVA #2 Transformer~~
- ~~Oil Pump issues and maintenance~~
- ~~Increased failure probability~~
- ~~Aging/deteriorating bushings~~



ATSI Transmission Zone M-3 Process
Beaver No. 1 345/138 kV Transformer

Need Number: ATSI-2018-004 (s1757)

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 3/7/2025

Proposed Solution:

Beaver #1 ~~and Beaver #2~~ 345/138 kV Transformer Replacement

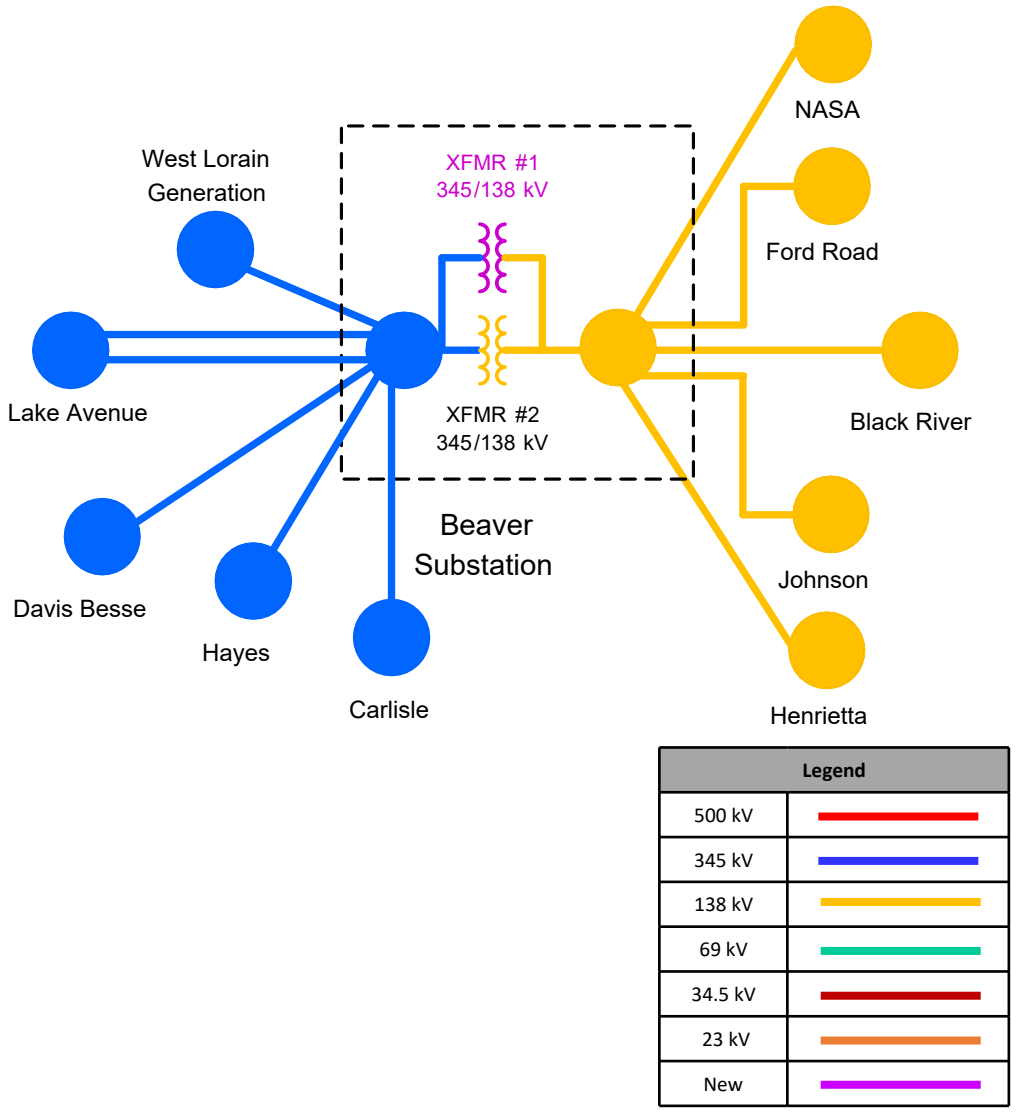
- Replace existing Beaver #1 345/138/13.2 kV transformer (350 MVA) with new 345/138/13.2 kV transformer (448 MVA)
- ~~Replace existing Beaver #2 345/138/13.2 kV transformer (350 MVA) with new 345/138 kV transformer (448 MVA)~~
- ~~Install new 138/13.2 kV transformer (14MVA) and breaker for power to station service at Beaver~~
- ~~Install new 138/13.2 kV transformer (14MVA) and breaker for power to station service at West Lorain Generation~~

Beaver Substation – Terminal equipment to be replaced include:

- Replace disconnect switches, VT's, CCVT's, and associated relaying.

Transformer Circuit Ratings:

- Beaver #1 345/138 kV Transformer:
  - Before Proposed Solution: 498 / 642 / 606 / 702 MVA (SN/SE/WN/WE)
  - After Proposed Solution: 577 / 700 / 682 / 777 MVA (SN/SE/WN/WE)



ATSI Transmission Zone M-3 Process
Beaver No. 1 345/138 kV Transformer

Need Number: ATSI-2018-004 (s1757)

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 3/7/2025

Alternatives Considered:

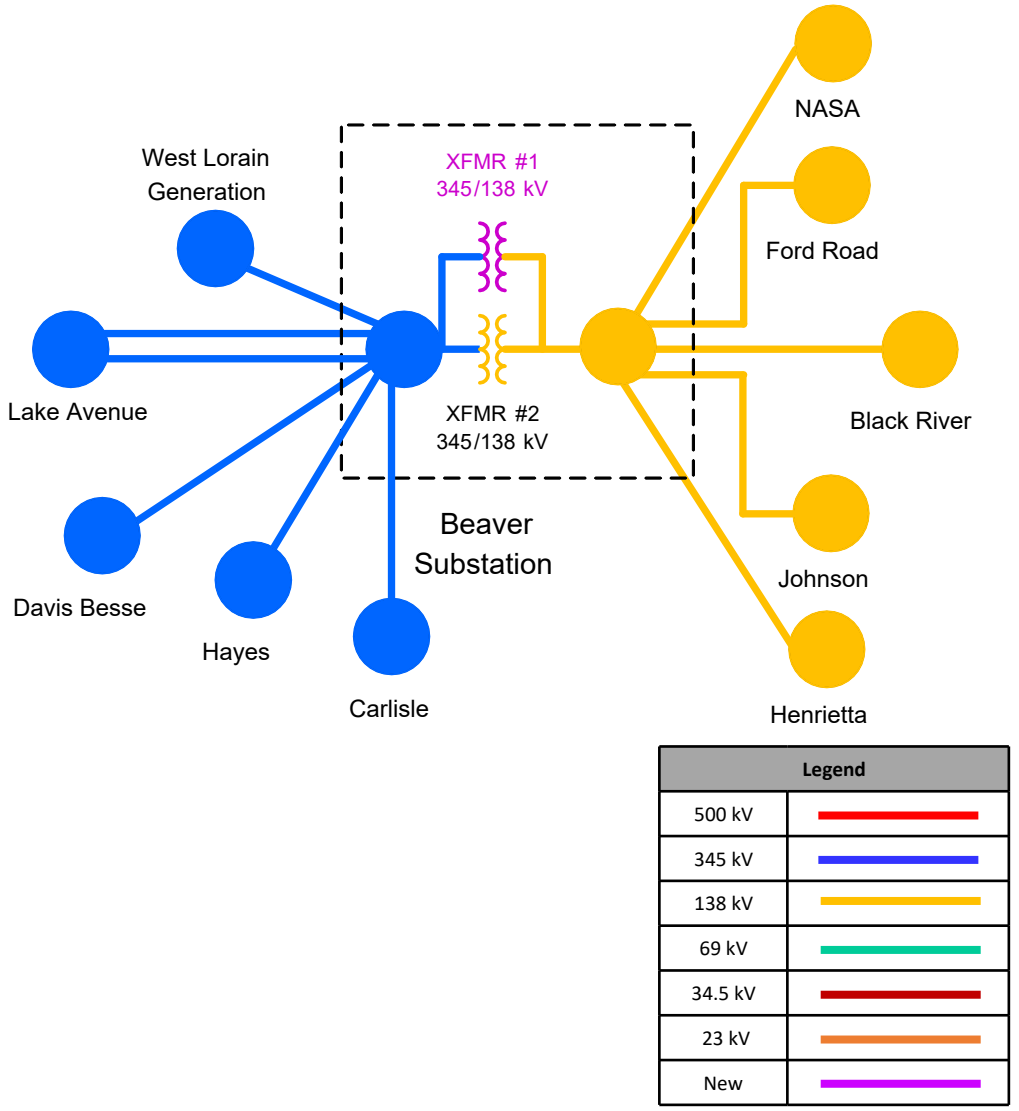
- Maintain existing condition and elevated risk of failure

Estimated Project Cost: ~~$12.7M~~ 10.0 M

Projected IS Date: ~~12/31/2021~~ 4/23/2029

Status: ~~Conceptual~~ Engineering

Supplemental ID: s1757



ATSI Transmission Zone M-3 Process
Campbellsport-Ravenna No.1 69 kV Line

Need Number: ATSI-2023-002

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 4/7/2025

Previously Presented: Need Meeting – 04/21/2023

Solution Meeting – 1/17/2025

Supplemental Project Driver(s):

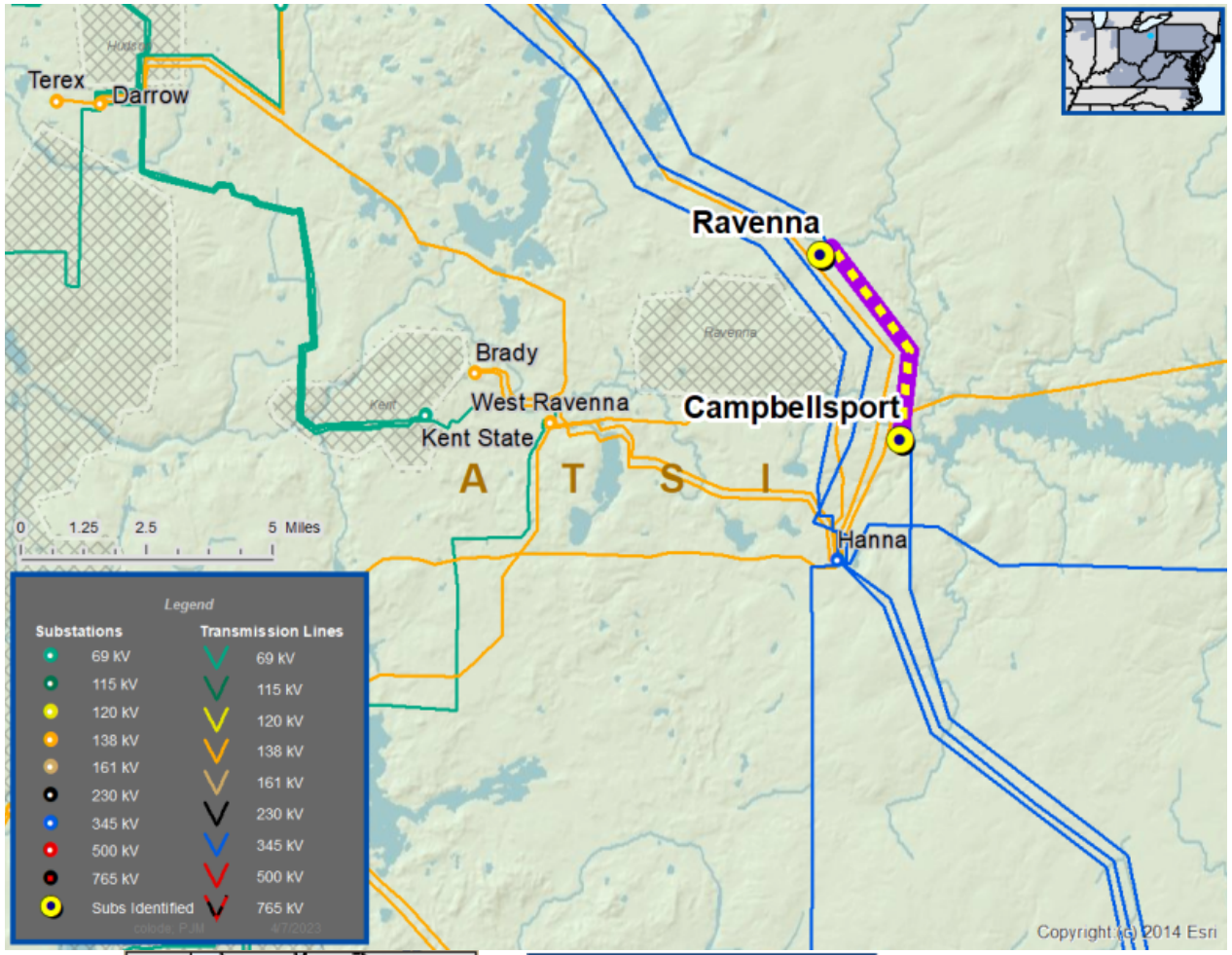
Equipment Material Condition, Performance and Risk

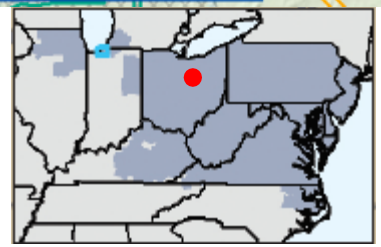
Specific Assumption Reference(s)

- Substation / Line equipment limits
- System reliability and performance
- Reliability of Non-Bulk Electric System (Non-BES) Facilities
- Transmission line with high loading

Problem Statement:

- Campbellsport - Ravenna #1 69 kV Line is 10.77 miles, and a section of the line approximately 2.8 miles has high loading (95% of Summer Emergency rating) using the 2021 RTEP 2026 Summer peak case for an N-1-1 outage.
- FE Transmission System Operations identified a potential real-time overload on the Campbellsport – Ravenna #1 69 kV Line and issued two PCLLRW's in two consecutive days 6/28/2021 & 6/29/2021 for the same N-1-1 outage noted above.





Legend	
345 kV	
138 kV	
69 kV	

ATSI Transmission Zone M-3 Process
Campbellsport-Ravenna No.1 69 kV Line

Need Number: ATSI-2023-002

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 4/7/2025

Previously Presented: Need Meeting – 04/21/2023

Solution Meeting – 01/17/2025

Selected Solution:

Campbellsport – Ravenna No.1 69 kV Line Reconductor

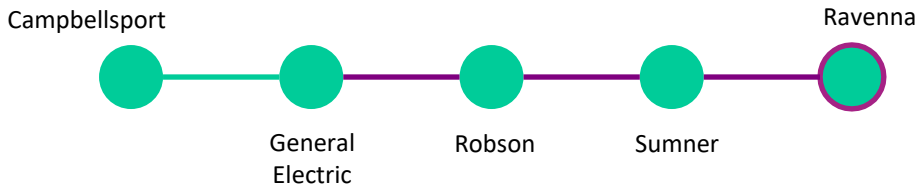
- Reconductor approximately 2.8 miles of the Campbellsport - Ravenna No.1 69 kV Line using 556 kcmil 26/7 ACSR conductor.
- Upgrade A-115 switch with new 1200A units with SCADA control.
- Install vacuum bottle on A-408 switch.
- Install new 1200A switch with vacuum bottle and SCADA control at the Robson tap.

Ravenna Substation:

- Adjust relay settings.
- Upgrade D-15, and D-16 switches with new 1200A units with whips.
- Upgrade the SCCIR 477 kcmil ACSR substation conductor with 605 kcmil ACSR conductor.

Sumner Substation:

- Upgrade A-9, A-10 and A-44 switches with new 1200A units with whips.
- Upgrade the SCCIR 477 kcmil ACSR substation conductor with 605 kcmil ACSR conductor.
- Install new 1200A switch with vacuum bottle and SCADA control.



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

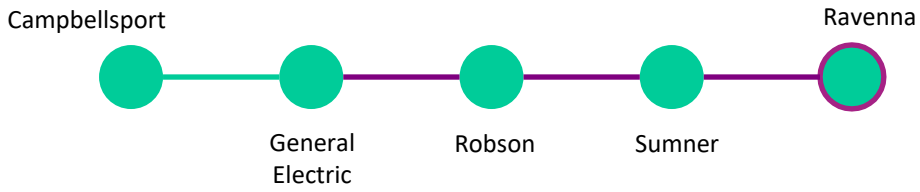
ATSI Transmission Zone M-3 Process
Campbellsport-Ravenna No.1 69 kV Line

Need Number: ATSI-2023-002

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 4/7/2025

Previously Presented: Need Meeting – 04/21/2023

Solution Meeting – 01/17/2025



Transmission Line Ratings:

Ravenna - Sumner Tap
- Old rating 82MVA/SN, 92MVA/SE & 92MVA/WN, 92MVA/WE
- New rating 100MVA/SN, 121MVA/SE & 113MVA/WN, 143MVA/SE

Sumner Tap – Sumner
- Old rating 45MVA/SN, 54MVA/SE & 51MVA/WN, 65MVA/WE
- New rating 111MVA/SN, 134MVA/SE & 125MVA/WN, 159MVA/SE

Sumner Tap - Robinson Hospital Tap
- Old rating 45MVA/SN, 54MVA/SE & 51MVA/WN, 65MVA/WE
- New rating 111MVA/SN, 134MVA/SE & 125MVA/WN, 159MVA/SE

Robinson Hospital Tap – General Electric Tap
- Old rating 45MVA/SN, 54MVA/SE & 51MVA/WN, 65MVA/WE
- New rating 111MVA/SN, 134MVA/SE & 125MVA/WN, 159MVA/SE

Estimated Project Cost: $6.7 M
Projected In-Service: 12/31/2025
Supplemental ID: s3576.1

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

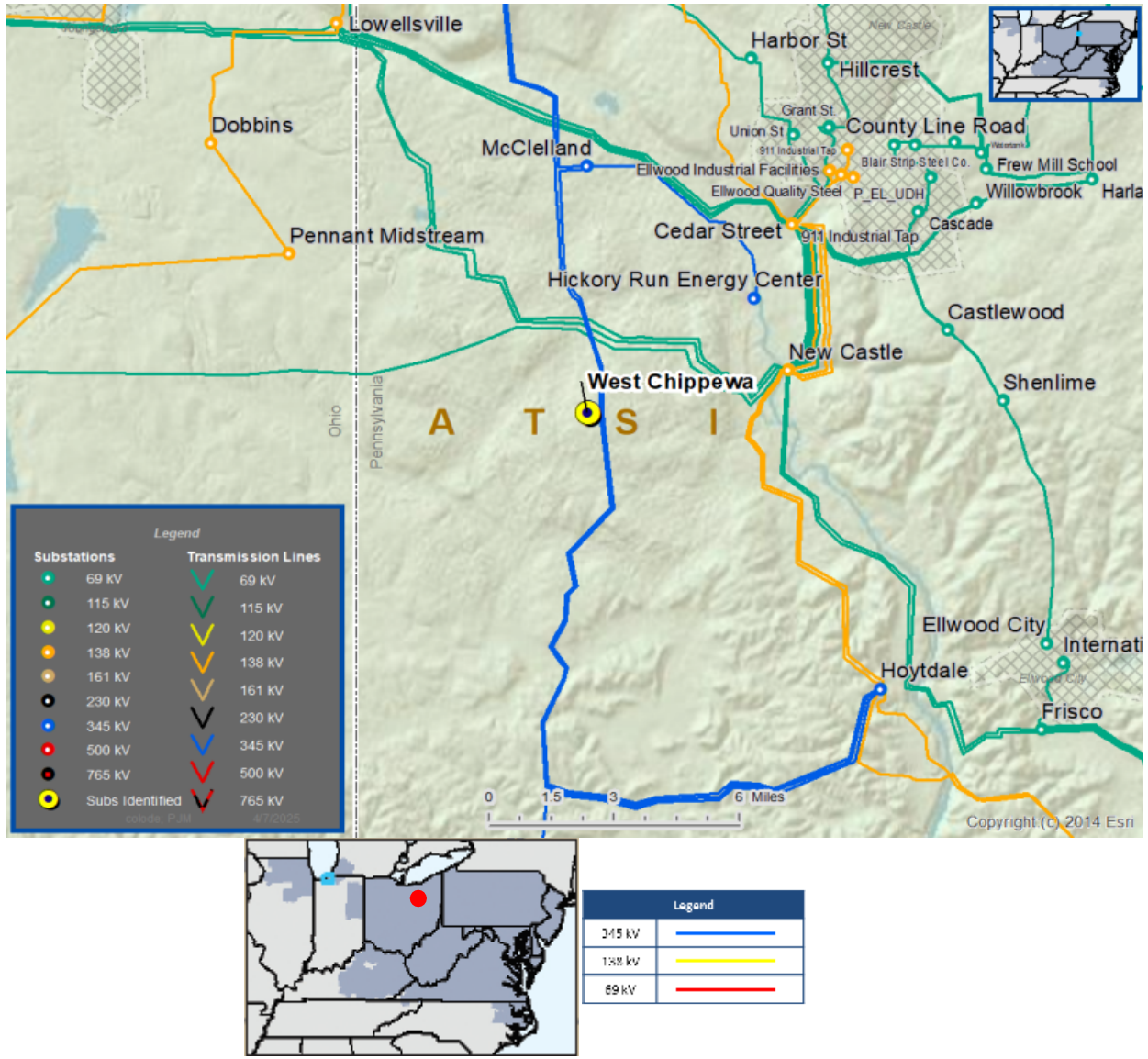
ATSI Transmission Zone M-3 Process
West Chippewa 69 kV Substation

s1717: Originally presented in 08/31/2018 and 9/28/2018 SRRTEP Western meetings

Problem Statement (Scope and Need/Drivers):

Operational Flexibility and Efficiency

- Improve operational flexibility during maintenance and restoration efforts.
- Improve reliability to customers; circuit line exposure is approximately 24 miles.
- Reduce amount of potential local load loss (Approximately 36 MWs) under (P1) contingency conditions.
  - *Loss of the New Castle-State Line 69 kV line.*



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ATSI Transmission Zone M-3 Process
West Chippewa 69 kV Substation

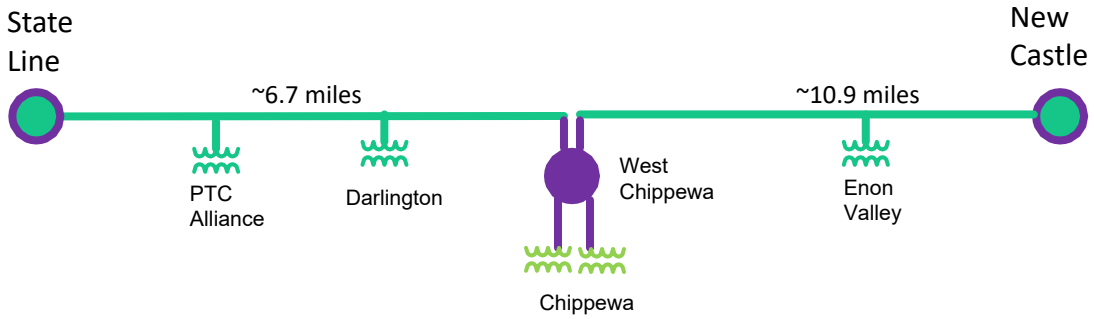
Need Number: (s1717)

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 4/7/2025

Selected Solution:

West Chippewa 69 kV Ring Bus

- Construct a 5-breaker ring bus at West Chippewa substation
- Loop the State Line – New Castle 69 kV line in/out of the new West Chippawa 69 kV ring bus substation
  - Construct a new 69 kV line from the West Chippewa tap (Structure 163) into new ring bus (~0.1 mi) as a double circuit.
  - The project splits the State Line – New Castle 69 kV Line and creates the following two lines:
    - State Line – West Chippewa 69 kV Line
    - New Castle – West Chippewa 69 kV Line
- Install one 15.6 MVAR cap at West Chippewa
- Construct a new 69 kV line from West Chippawa 69 kV ring bus into the existing Chippewa substation (~2.7 mi).
- Rebuild the existing 69 kV line from West Chippawa 69 kV ring bus into the existing Chippewa substation (~2.7 mi).
- Install (3) 69 kV SCADA controlled switches outside of Chippewa substation.
- Reconfigure and re-terminate at Chippewa substation as necessary to accommodate the new 69 kV line and new switches.
- Revise relay settings at New Castle & State Line substations.



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

ATSI Transmission Zone M-3 Process
West Chippewa 69 kV Substation

Need Number: (s1717)

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 4/7/2025

Transmission Line/Branch Ratings:

Enon Valley T - West Chippewa 69 kV Branch: 100/121/113/143 MVA (SN/SE/WN/WE)

Darlington - West Chippewa 69 kV Branch: 100/121/113/143 MVA (SN/SE/WN/WE)

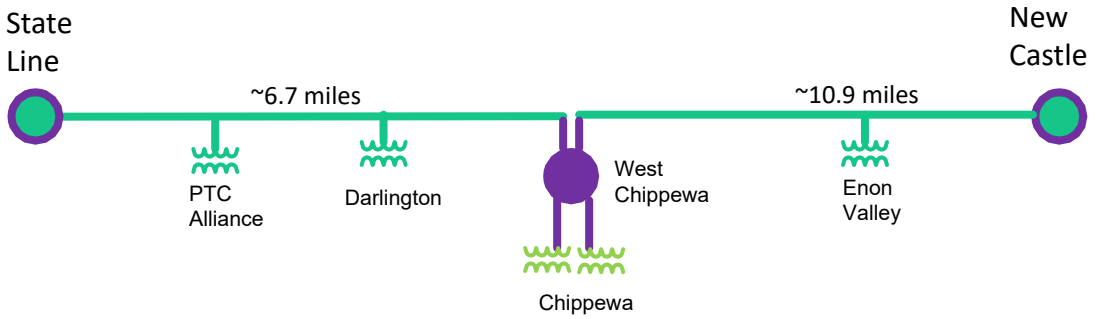
Chippewa– West Chippewa #1 69 kV Line: 80/96/90/114 MVA (SN/SE/WN/WE)

Chippewa– West Chippewa #2 69 kV Line: 80/96/90/114 MVA (SN/SE/WN/WE)

Estimated Project Cost: $34 M

Projected IS Date: 12/31/2025

Supplemental ID: s1717



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

ATSI Transmission Zone M-3 Process
New Departure 345 kV Customer Connection

Need Number: ATSI-2024-056

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 08/13/2025

Previously Presented Need Meeting – 07/19/2024

Solution Meeting – 9/13/2024

Supplemental Project Driver(s):

Customer Service

Specific Assumption Reference(s):

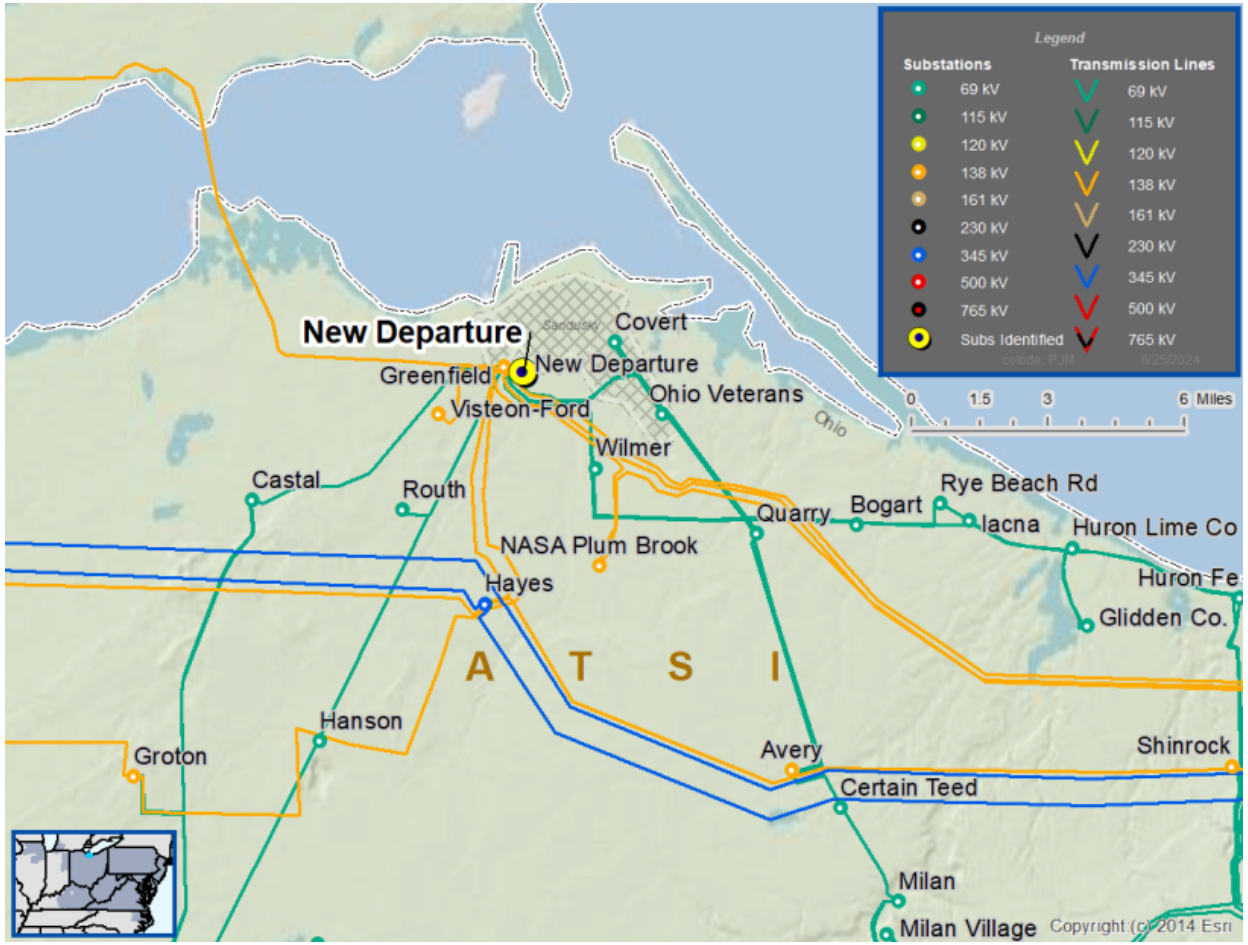
New customer connection request will be evaluated per FirstEnergy's "Requirements for Transmission Connected Facilities" document and "Transmission Planning Criteria" document.

Problem Statement

New Customer Connection – Customer has requested a new 345 kV delivery point near the New Departure area. The anticipated load of the new customer connection is 540 MVA.

Forecasted In-Service Date:

November 28, 2029



ATSI Transmission Zone M-3 Process
New Departure 345 kV Customer Connection

Need Number: ATSI-2024-056

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 08/13/2025

Previously Presented Need Meeting – 07/19/2024
Solution Meeting – 9/13/2024

Selected Solution:

Phase 1: 138 kV Direct Connection to New Departure

- Adjust relay settings at New Departure Substation

Estimated Project Cost: $0.1 M

Projected In-Service: 3/1/2025

Supplemental ID: s3660.1

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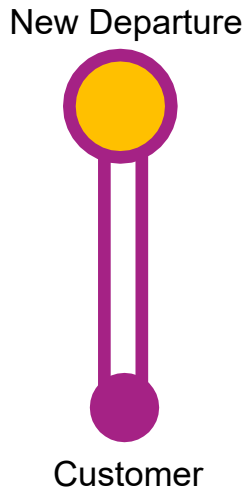
Phase 1: 138 kV Direct Connection to New Departure



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

ATSI Transmission Zone M-3 Process
New Departure 345 kV Customer Connection

Need Number: ATSI-2024-056

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 08/13/2025

Previously Presented Need Meeting – 07/19/2024

Solution Meeting – 9/13/2024

Selected Solution:

Phase 2: 138 kV Switching Station

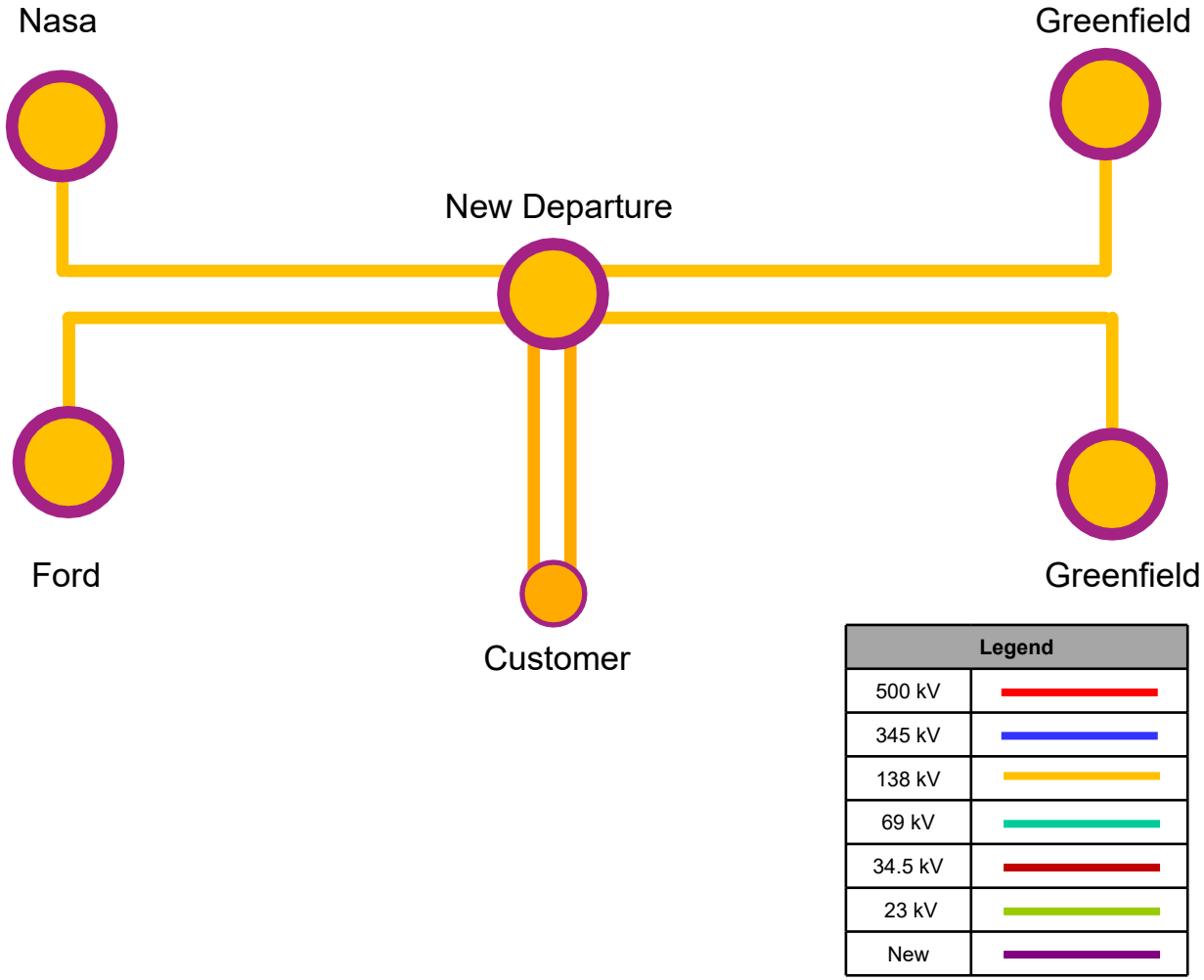
- Rebuild New Departure Substation as a new nine breaker, breaker-and-a-half, 138 kV switching station
- Re-terminate the lines from Ford Substation and Greenfield Substation into the New Departure Substation.
- Loop the Greenfield – Nasa 138 kV Line in and out of the new substation
- Install two sets of revenue metering equipment
- Upgrade relaying/adjust relay settings at Greenfield, Nasa and Ford substations

Estimated Project Cost: $27M

Projected In-Service: 5/25/2028

Supplemental ID: s3660.2

Phase 2: 138 kV Transmission Switching Station



ATSI Transmission Zone M-3 Process
New Departure 345 kV Customer Connection

Need Number: ATSI-2024-056

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 08/13/2025

Previously Presented Need Meeting – 07/19/2024

Solution Meeting – 9/13/2024

Selected Solution:

Phase 3: 345 kV Switching Station

- Build a new four-breaker 345 kV ring bus at New Departure Substation.
- Add six new 138 kV breakers at New Departure Substation and install two 345/138 kV transformers.
- Loop the Davis Besse – Hayes 345 kV Line in and out of the new 345 kV ring bus by constructing two 345 kV lines, approximately 3.5 miles in length.
- Install two additional sets of revenue metering.
- Upgrade relaying/adjust relay settings at Davis Besse and Hayes substations

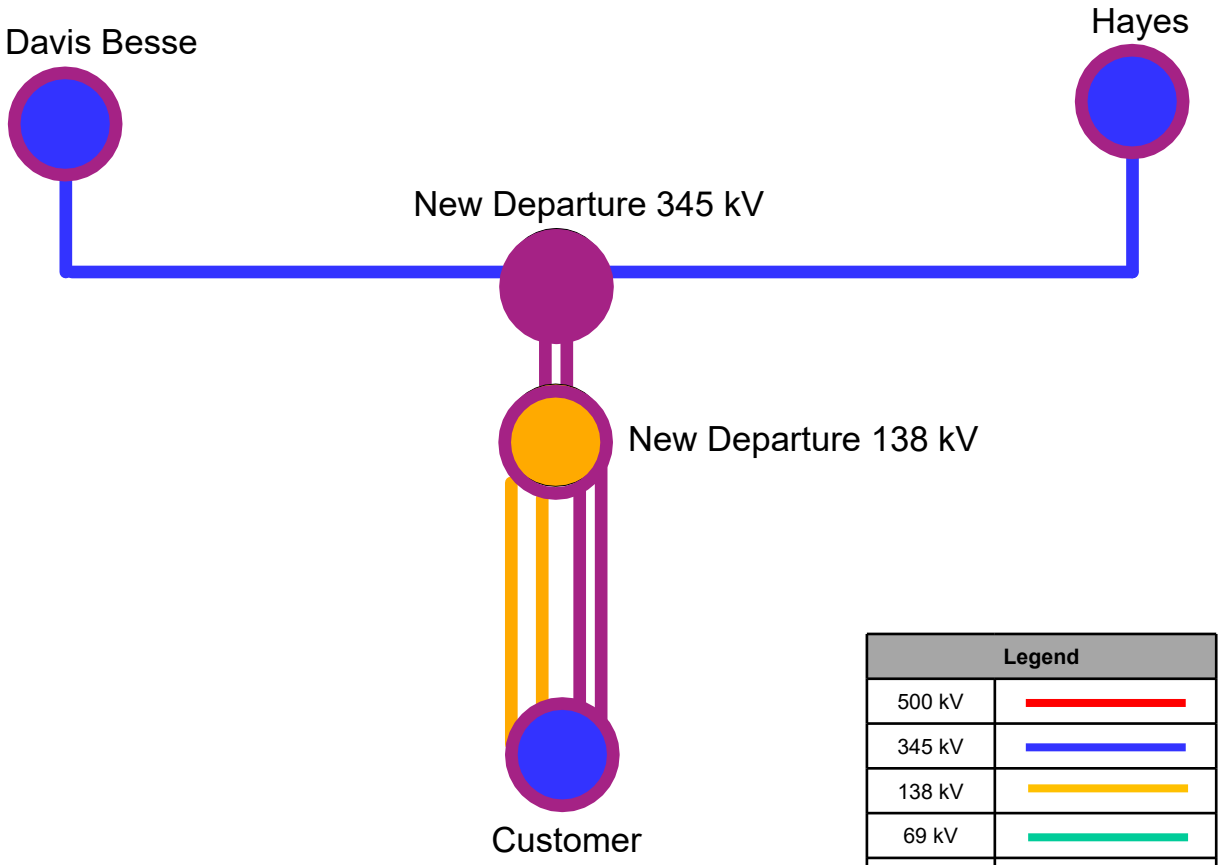
Estimated Project Cost: $72M

Projected In-Service: 11/28/2029

Supplemental ID: s3660.3

Total Estimated Project Cost: $99.1 M (Phase 1, Phase 2, and Phase 3)

Phase 3: 345 kV Transmission Switching Station



ATSI Transmission Zone M-3 Process
Avon – Fowles Q1 138 kV Customer

Need Number: ATSI-2024-048

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 08/13/2025

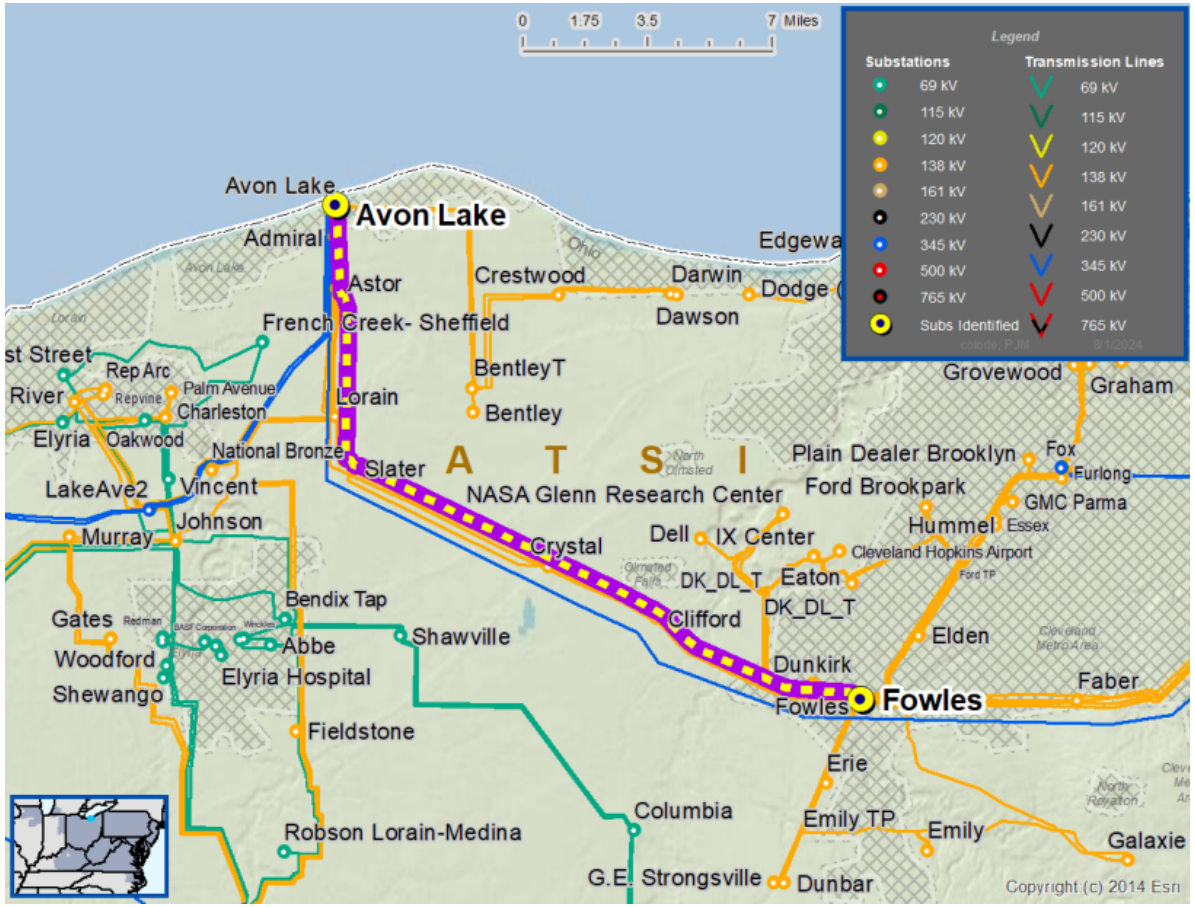
Previously Presented: Need Meeting – 08/16/2024
Solution Meeting – 9/20/2024

Project Driver:
Customer Service

Specific Assumption Reference:
Customer request will be evaluated per FirstEnergy's "Requirements for Transmission Connected Facilities" document and "Transmission Planning Criteria" document.

Problem Statement:
New Customer Connection – A customer has requested to expand an existing 138 kV delivery point near the Avon – Fowles Q1 138 kV Line. The anticipated load addition at the customer connection is 28 MVA. The request is near Bentley Substation, approximately four miles from Avon Substation.

Requested in-service date is 5/15/2026



ATSI Transmission Zone M-3 Process
Avon – Fowles Q1 138 kV Customer

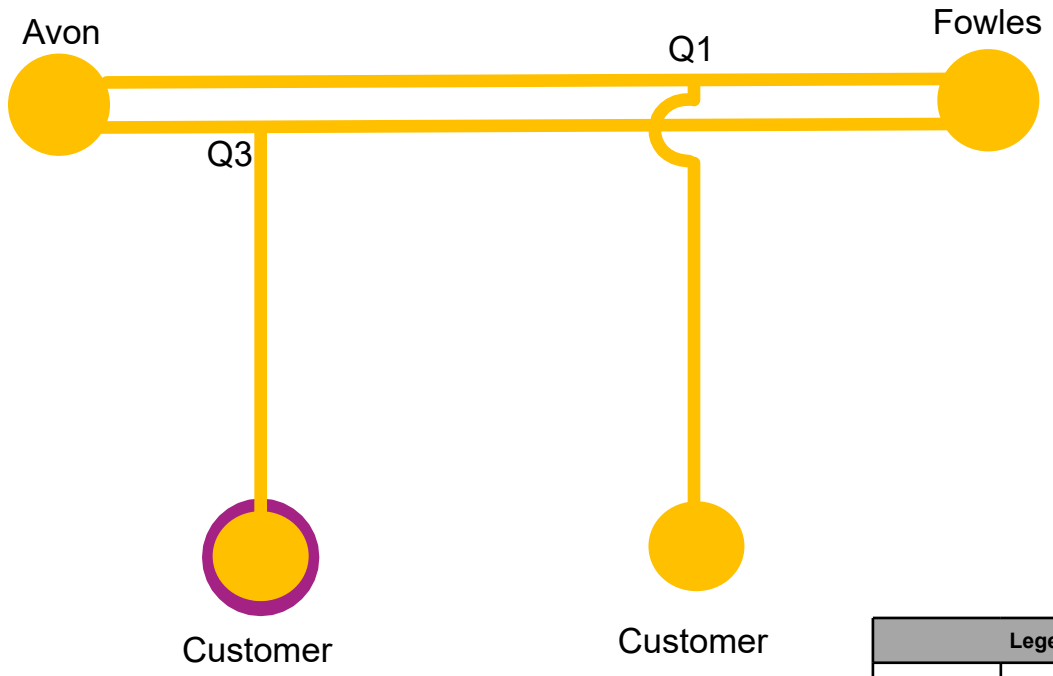
Need Number: ATSI-2024-048

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 08/13/2025

Previously Presented: Need Meeting – 08/16/2024
Solution Meeting – 9/20/2024

Selected Solution:
- Install revenue metering

Estimated Project Cost: $0.10M
Projected In-Service: 05/14/2026
Supplemental ID: s3659.1



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

ATSI Transmission Zone M-3 Process
Ellsworth Substation – s1952 Scope Change

s1952: Originally presented in 01/14/2019 and 03/25/2019 SRRTEP Western meetings and re-presented in 04/19/2024 & 02/14/2025 SRRTEP Western meetings.

Project Driver(s):

Operational Flexibility and Efficiency

Infrastructure Resilience

Specific Assumption Reference(s)

Global Considerations

- System reliability and performance
- Reliability of Non-Bulk Electric System (Non-BES) facilities
- Load and risk in planning and operational scenarios

Problem Statement

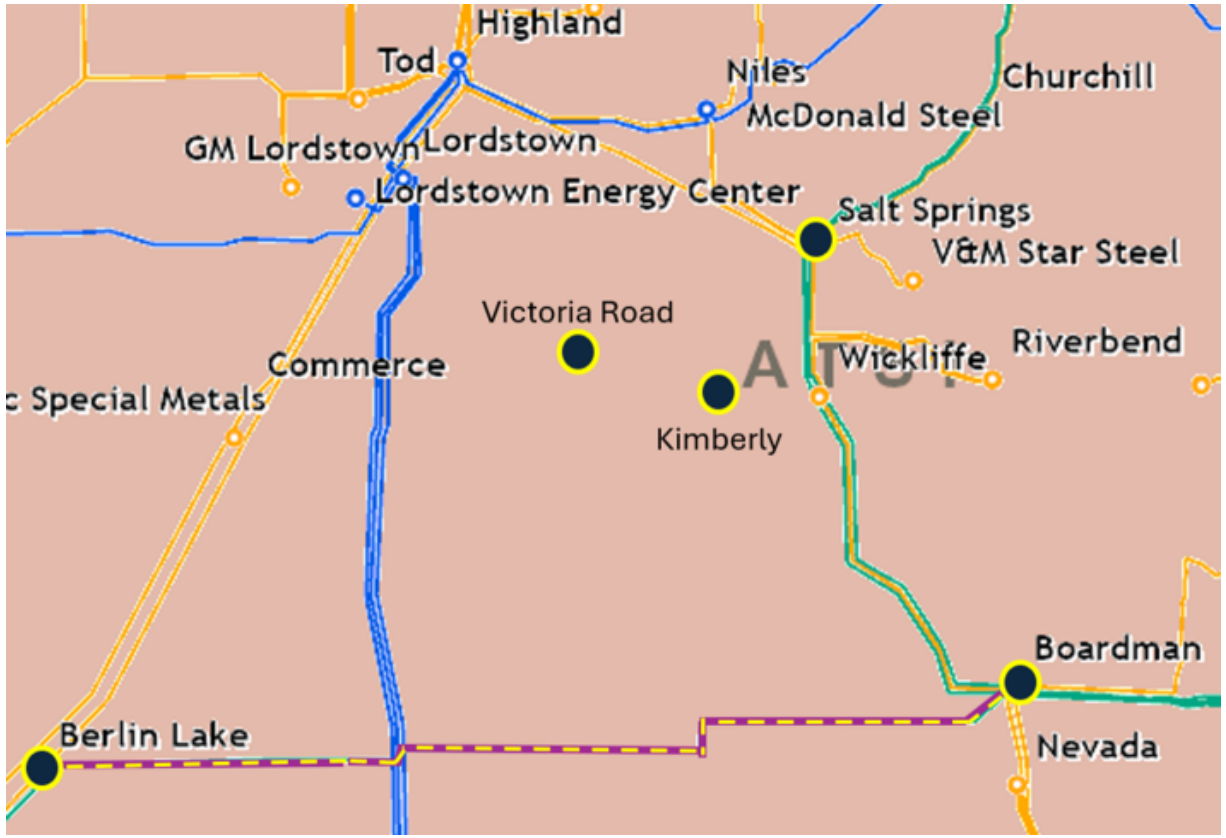
Kimberly Area 69 kV system

The Kimberly Substation is served from a 3.6-mile radial transmission line from Salt Springs Substation with 19 MW and 5,500 customers at risk.

Additionally, the contingency loss of the nearby Berlin Lake-Boardman 69 kV Line results in the loss of approximately 46 MW and 12,500 customers at four (4) transmission service points.

Reason for Revision (02/14/2025):

Clarify and add scope to construct the new Ellsworth – Kimberly 69 kV Line.



ATSI Transmission Zone M-3 Process
Ellsworth Substation – s1952 Scope Change

Need Number: ATSI-2019-008

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 08/13/2025

Previously Presented: Need Meeting – 1/14/2019
Solution Meeting – 3/25/2019
Re-present Solution Meeting – 2/14/2025

Selected Solution:

- At Ellsworth Substation
  - Expand and reconfigure existing Ellsworth Substation to a new 69 kV four-breaker ring bus substation
  - Install associated line relaying and control
- Loop in the existing Berlin Lake – Boardman 69 kV Line into Ellsworth Substation creating two new circuits:
  - Berlin Lake – Ellsworth 69 kV Line (5.1 circuit miles)
  - Boardman – Ellsworth 69 kV Line (11.9 circuit miles)
- At Kimberly
  - Install two 69 kV SCADA controlled switches
- At Victoria Road
  - Install three 69 kV SCADA controlled switches
- Construct a new Ellsworth – Kimberly 69 kV Line (approximately 9.7 miles)

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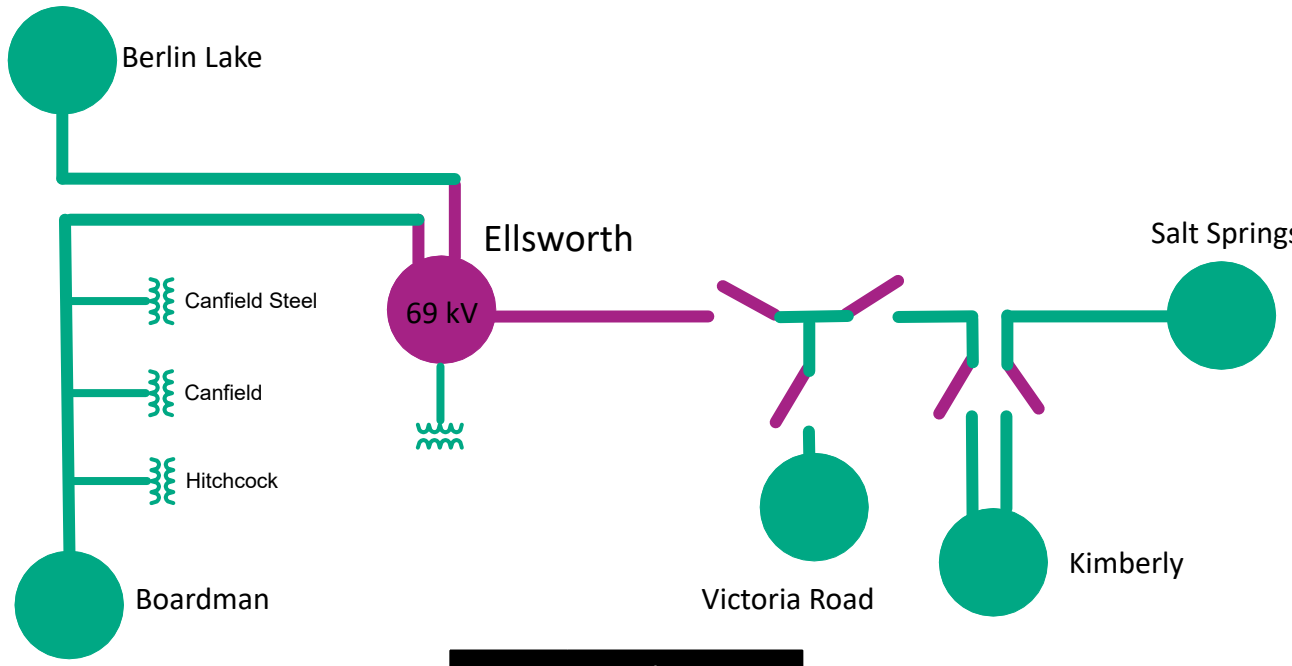


Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

ATSI Transmission Zone M-3 Process
Ellsworth Substation – s1952 Scope Change

Need Number: ATSI-2019-008

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 08/13/2025

Previously Presented: Need Meeting – 1/14/2019

Solution Meeting – 3/25/2019

Re-present Solution Meeting – 2/14/2025

Transmission Line Ratings:

Berlin Lake – Ellsworth 69 kV Line

- Before Proposed Solution: N/A
- After Proposed Solution: 80 / 96 / 90 / 114 MVA (SN/SE/WN/WE)

Boardman – Ellsworth 69 kV Line

- Before Proposed Solution: N/A
- After Proposed Solution: 80 / 96 / 90 / 114 MVA (SN/SE/WN/WE)

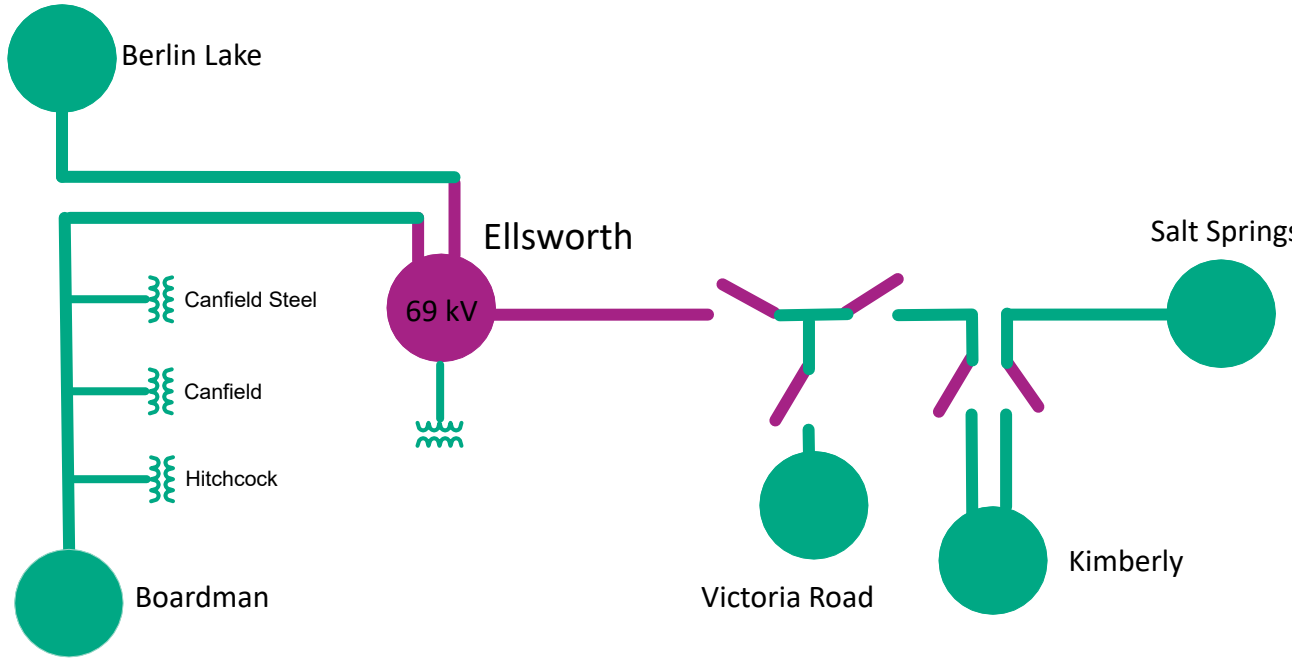
Ellsworth – Kimberly 69 kV Line

- Before Proposed Solution: N/A
- After Proposed Solution: 111 / 134 / 125 / 159 MVA (SN/SE/WN/WE)

Estimated Project Cost: $36.3M

Project IS Date: 4/30/2027

Supplemental ID: s1952



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

ATSI Transmission Zone M-3 Process
Brush Wellman – Genoa 69 kV Line

Need Number: ATSI-2019-089

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 08/13/2025

Previously Presented: Need Meeting - 11/22/2019
Solution Meeting - 05/16/2025

Supplemental Project Driver(s):

Equipment Material Condition, Performance and Risk

Specific Assumption Reference(s):

System Performance Global Factors

- System reliability and performance

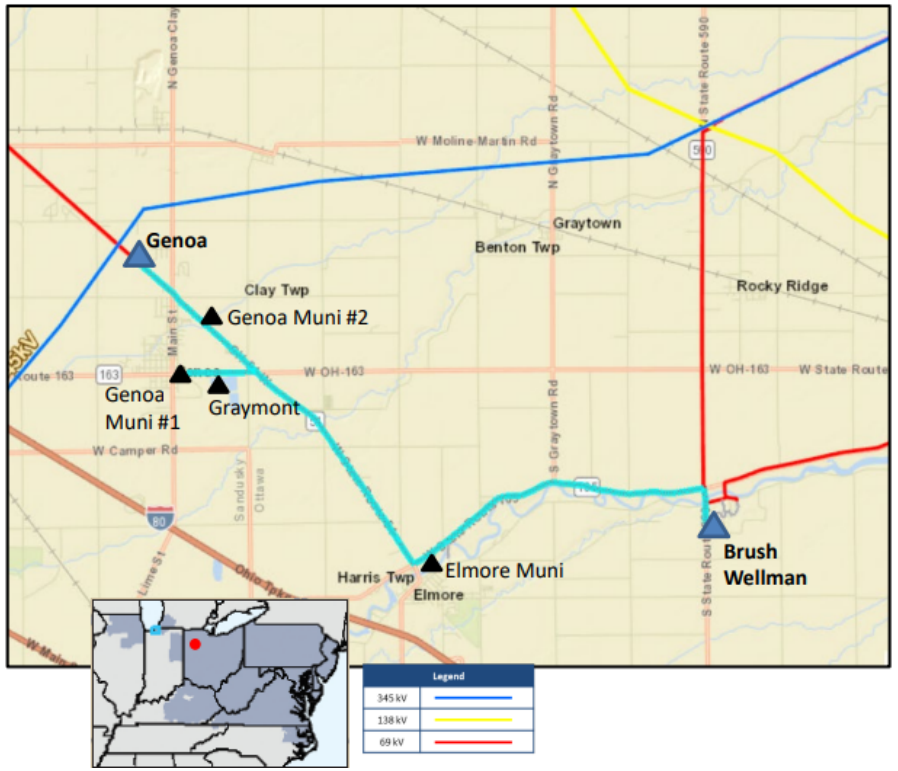
Line condition rebuild / replacement

- Age/condition of wood pole transmission line structures
- Age/condition of transmission line conductors

Problem Statement:

The existing Brush Wellman – Genoa 69 kV Line is approximately 11.4 miles long with approximately 20 MWs of load and 2,592 customers at risk. It has four transmission service connection points

- 83% of the wood poles failed recent line inspection
- Typical age of the line components is 59 years
- Six obsolete line switches
- System performance over the past five years: 1 momentary / 0 sustained



ATSI Transmission Zone M-3 Process
Brush Wellman – Genoa 69 kV Line

Need Number: ATSI-2019-089

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 08/13/2025

Previously Presented: Need Meeting - 11/22/2019
Solution Meeting - 05/16/2025

Selected Solution:

Brush Wellman – Genoa 69 kV Line

- Rebuild 11.4 miles of 69 kV line, replacing deteriorated wood pole construction

Brush Wellman Substation:

- Replace circuit breakers B7226 and B7227

Genoa Substation:

- Replace circuit breaker 6873
- Replace associated disconnect switches

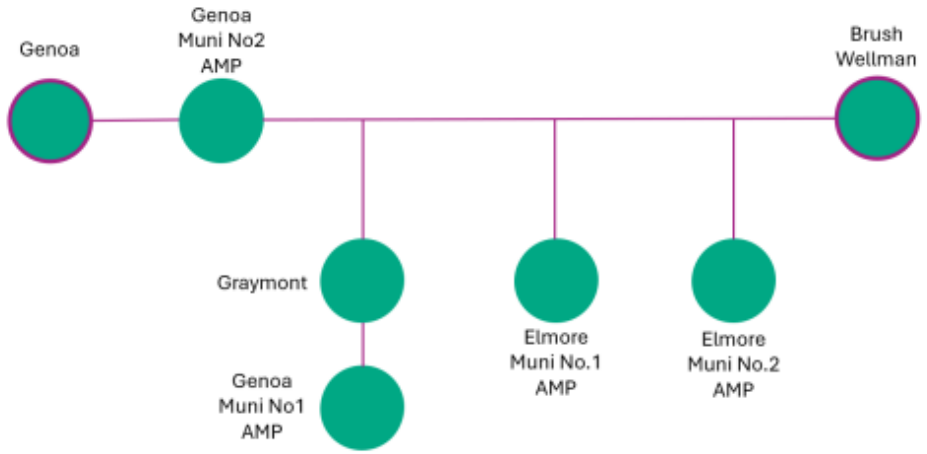
Transmission Line Ratings:
Brush Wellman – Genoa 69 kV Line

- Existing Line Rating 79 / 95 / 89 / 113 MVA (SN/SE/WN/SE)
- New Line Rating 139 / 169 / 158 / 201 MVA (SN/SE/WN/SE)

Estimated Project Cost: $32.27M

Projected In-Service: 6/1/2027

Supplemental ID: s3669.1



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

ATSI Transmission Zone M-3 Process
Bellevue-Groton 69 kV Line

Need Number: ATSI-2023-013

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 08/13/2025

Previously Presented: Need Meeting – 10/20/2023
Solution Meeting - 03/14/2025

Supplemental Project Driver(s):

Equipment Material Condition, Performance and Risk

System Reliability

Infrastructure Resilience

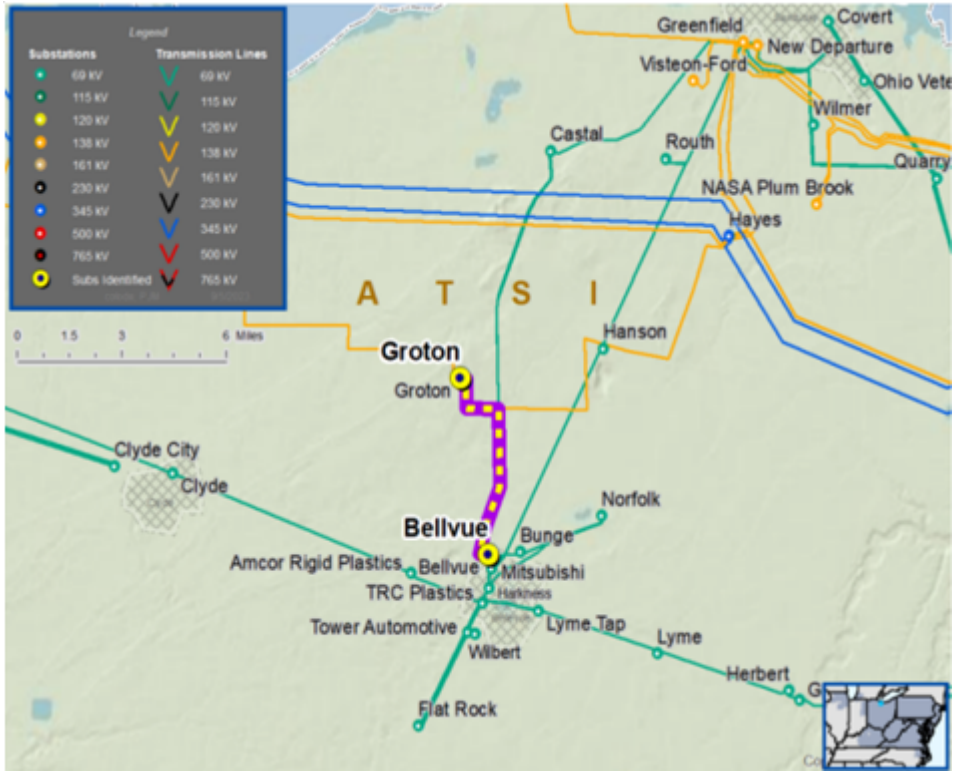
Operational Flexibility and Efficiency

Specific Assumption Reference(s):

- Substation / Line equipment limits
- System reliability and performance
- Reliability of Non-Bulk Electric System (Non-BES) Facilities
- Transmission line with high loading

Problem Statement:

- The Bellevue – Groton 69 kV Line is approximately four miles in length with 4/0 CU and 336 ACSR 26/7 conductor types.
- The Bellevue – Groton 69 kV Line is expected to approach its thermal capability based on local planning studies.
- Bellevue – Groton 69 kV Line has experienced 5 unscheduled outages (sustained) since 2018.
- The structures on this line are 41 years old.



ATSI Transmission Zone M-3 Process
Bellevue-Groton 69 kV Line

Need Number: ATSI-2023-013

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan - 08/13/2025

Previously Presented: Need Meeting – 10/20/2023
Solution Meeting - 03/14/2025

Selected Solution:

- Rebuild 4 miles of the Bellevue – Groton 69 kV Line with 556 kcmil ACSR conductor. The portion of Bellevue to Str 220-1b will be rebuilt. The portion of Groton to Str 200-1b will be reconductored.
- Groton Substation: Revise relay settings
- Bellevue Substation: Replace 6 manual switches with 2 GOAB switches, replace switch A98. Revise relay settings, upgrade ACSR connections

Estimated Project Cost: $10.1M

Projected In-Service: 06/01/2026

Supplemental ID: s3648

Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

ATSI Transmission Zone M-3 Process
Niles – Shenango 345 kV Line

Need Number: ATSI-2024-006

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 09/25/2025

Previously Presented: Need Meeting - 04/02/2024
Solution Meeting - 07/08/2025

Project Driver(s):

Equipment Material Condition, Performance and Risk

Specific Assumption Reference:

System Performance Global Factors

- Past system reliability/performance
- Substation/Line equipment limits

Line Condition Rebuild/Replacement

- Age/condition of wood pole transmission line structures

Problem Statement:

- The Niles – Shenango 345 kV Line was constructed approximately 48 years ago and is approaching end of life. It is approximately 19 miles long with 122 total structures of which 64 are wood pole structures.
- Per recent inspections, a 12-mile section of the line comprised of 64 wood pole structures is exhibiting deterioration resulting in increased maintenance costs. Inspection findings include rotten/cracked wood poles and crossarms, woodpecker damage, burnt and broken insulators, and worn static-wire attachments.
    - 37 structures require repairs due to deterioration of wood pole structures.
    - 23 structures require repairs to insulators and related hardware deterioration, indicating that the components are reaching end of life
- Since 2015, the line has had two unscheduled sustained outages relating to failure of line equipment
- Existing Transmission Line Rating:
    - 1542 / 1878 / 1746 / 2143 MVA (SN/SE/WN/WE)

ATSI Transmission Zone M-3 Process
Niles – Shenango 345 kV Line

Need Number: ATSI-2024-006
Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 09/25/2025

Selected Solution:

Niles – Shenango 345 kV Line

- Rebuild the 12.4 mile wood pole section (total length 14.5 miles) from Structure 41946 to Structure 42033 an install new conductor.
- Reconductor approximately 2.1 miles from the Niles Substation to Structure 41946.

At Niles Substation:

- Replace five disconnect switches
- Replace line relaying

At Shenango Substation:

- Replace line relaying

Transmission Line Ratings:

Niles – Shenango 345 kV Line:

- Before Proposed Solution: 1542 / 1878 / 1746 / 2143 MVA (SN/SE/WN/WE)
- After Proposed Solution: 2504 / 2883 / 2505 / 3033 MVA (SN/SE/WN/WE)

Estimated Project Cost: $73.92M
Projected In-Service: 12/17/2027
Supplemental ID: s3714.1

Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

ATSI Transmission Zone M-3 Process
Beaver Valley – Hanna 345 kV Line and Hanna – Mansfield 345 kV Line

Need Number: ATSI-2024-013

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 09/25/2025

Previously Presented: Need Meeting - 04/02/2024
Solution Meeting - 07/08/2025

Project Driver(s):

Equipment Material Condition, Performance and Risk

Specific Assumption Reference:

System Performance Global Factors

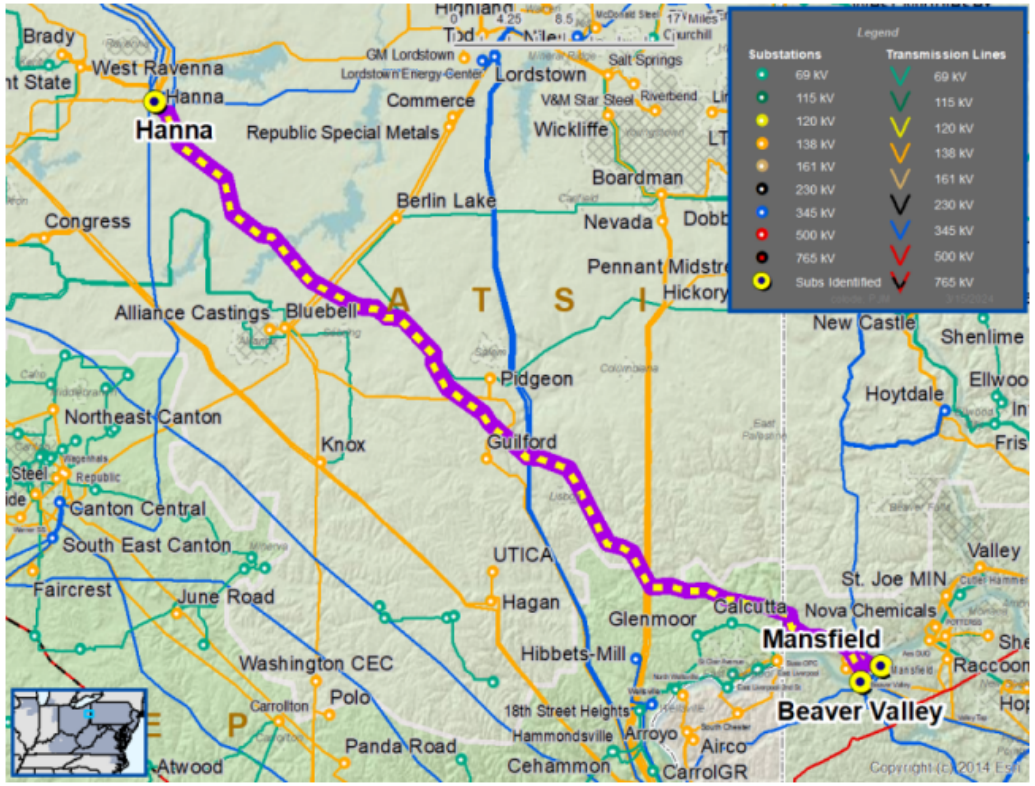
- Past system reliability/performance
- Substation/Line equipment limits

Line Condition Rebuild/Replacement

- Age/condition of steel and wood pole transmission line structures

Problem Statement:

- The double circuit section of the Beaver Valley – Hanna 345 kV Line and Hanna – Mansfield 345 kV Line were constructed approximately 46 years ago. The double circuit line section is approximately 60 miles long with 314 steel transmission line structures.
- Recent inspections have indicated that a seven-mile section of the double circuit line comprised of 33 steel structures has weathering lattice steel structures that are exhibiting severe deterioration. Inspection findings revealed heavy corrosion/thinning at the concrete/leg interface, advanced pack-out, and deep pitting.
  - 33 steel structures require repairs due to deterioration.
  - 13 wood pole structures require repairs due to deterioration (OH).
- Since 2015, the Beaver Valley – Hanna 345 kV Line has had one unscheduled sustained outage.
- Since 2015, the Hanna – Mansfield 345 kV Line has had two unscheduled sustained outage.
- Existing Beaver Valley – Hanna 345 kV Line Rating:
  - 1486 / 1739 / 1723 / 1739 MVA (SN/SE/WN/WE)
- Existing Hanna – Mansfield 345 kV Line Rating:
  - 1415 / 1745 / 1637 / 2116 MVA (SN/SE/WN/WE)



ATSI Transmission Zone M-3 Process
Beaver Valley – Hanna 345 kV Line and Hanna – Mansfield 345 kV Line

Need Number: ATSI-2024-013
Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 09/25/2025

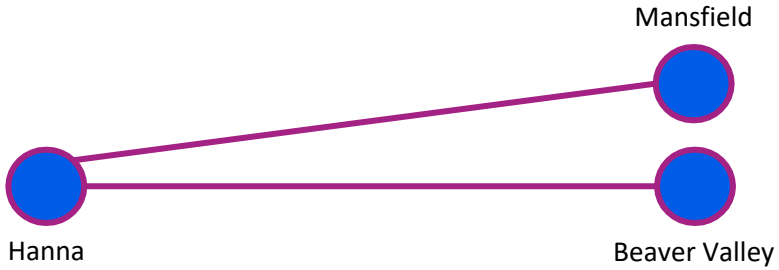
Selected Solution:

Beaver Valley – Hanna 345 kV Line and Hanna – Mansfield 345 kV Line

- Replace 33 steel structures from Structure 6270 to Structure 6632.
- Install new conductor on the Beaver Valley-Hanna line (approximately 6.9 miles).
- Install new conductor on the Hanna-Mansfield line (approximately 6.6 miles).

At Beaver Valley, Mansfield and Hanna substations:

- Adjust relay settings



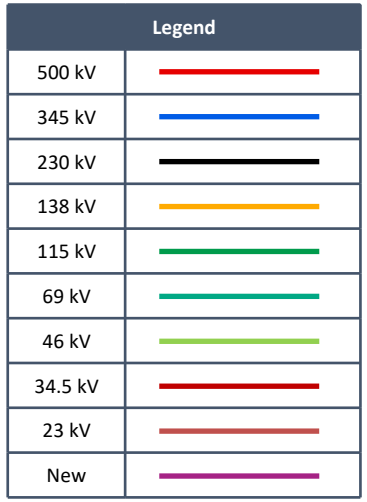
Transmission Line Ratings:

Beaver Valley – Hanna 345 kV Line:

- Before Proposed Solution: 1486 / 1739 / 1723 / 1739 MVA (SN/SE/WN/WE)
- After Proposed Solution: 1560 / 1900 / 1766 / 2251 MVA (SN/SE/WN/WE)

Hanna – Mansfield 345 kV Line:

- Before Proposed Solution: 1415 / 1745 / 1637 / 2116 MVA (SN/SE/WN/WE)
- After Proposed Solution: 1542 / 1878 / 1746 / 2225 MVA (SN/SE/WN/WE)



Estimated Project Cost: $53.35M
Projected In-Service: 5/31/2028
Supplemental ID: s3715.1

ATSI Transmission Zone M-3 Process
Bayshore – Davis Besse 345 kV Line

Need Number: ATSI-2024-019

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 09/25/2025

Previously Presented: Need Meeting - 04/02/2024
Solution Meeting - 07/08/2025

Project Driver(s):

Equipment Material Condition, Performance and Risk

Specific Assumption Reference:

System Performance Global Factors

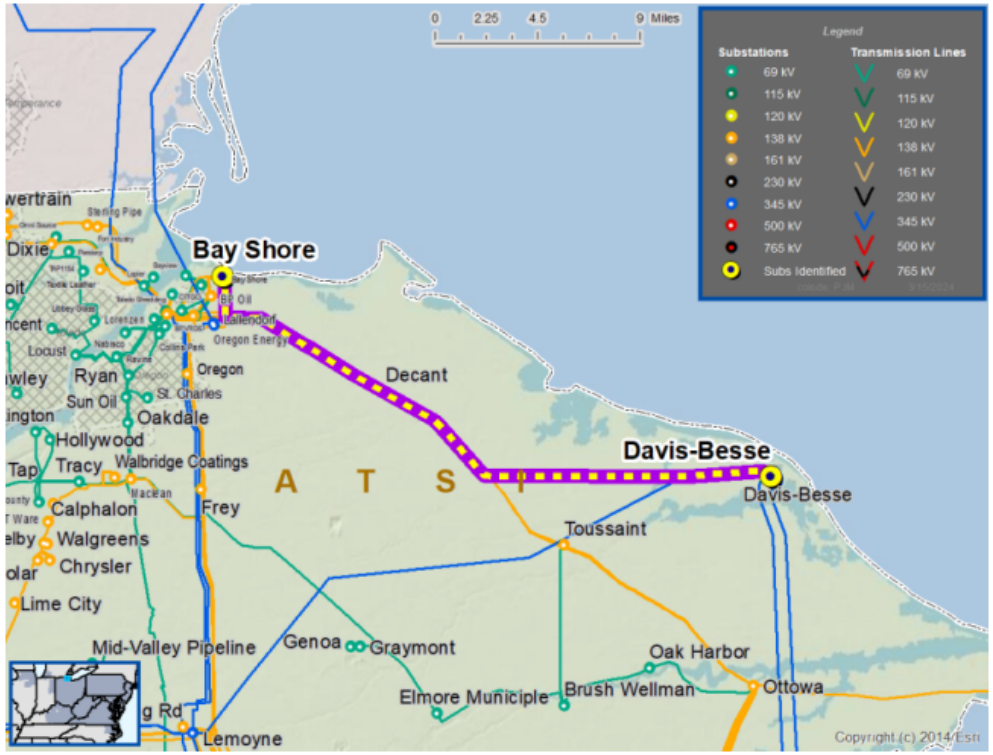
- Past system reliability/performance
- Substation/Line equipment limits

Line Condition Rebuild/Replacement

- Age/condition of wood pole transmission line structures

Problem Statement:

- The Bayshore – Davis Besse 345 kV Line was constructed approximately 55 years ago. It is approximately 21 miles long with a total of 110 structures with 17 wooden H-frame structures.
- Recent inspections have indicated that a four-mile section of the line comprised of 17 wood pole H-frame structures is exhibiting deterioration. Inspection findings include cracked wood poles, rotten braces, corona damage and broken down grounds.
  - 14 structures require repair due to deterioration.
  - 4 structures are phase-raised.
- The line has not had any unscheduled sustained outages over the last five years.
- Existing Transmission Line Rating:
  - 1411 / 1683 / 1723/ 1925 MVA (SN/SE/WN/WE)



ATSI Transmission Zone M-3 Process
Bayshore – Davis Besse 345 kV Line

Need Number: ATSI-2024-019

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 09/25/2025

Selected Solution:

Bayshore – Davis Besse 345 kV Line

- Replace 17 deteriorated wood pole and phase-raised structures on the four-mile section from Structure 9 to Structure 25 and install new conductor.

At Bayshore and Davis Besse substations:

- Replace line relaying

Transmission Line Ratings:

Bayshore – Davis Besse 345 kV Line:

- Before Proposed Solution: 1411 / 1683 / 1723 / 1925 MVA (SN/SE/WN/WE)
- After Proposed Solution: 1411 / 1683 / 1723 / 1925 MVA (SN/SE/WN/WE)

Legend
500 kV
345 kV
230 kV
138 kV
115 kV
69 kV
46 kV
34.5 kV
23 kV
New

Estimated Project Cost: $21.12M

Projected In-Service: 05/28/2027

Supplemental ID: s3716.1

ATSI Transmission Zone M-3 Process
Sammis – Star 345 kV Line

Need Number: ATSI-2024-027

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 09/25/2025

Previously Presented: Need Meeting - 04/02/2024
Solution Meeting - 07/08/2025

Project Driver(s):

Equipment Material Condition, Performance and Risk

Specific Assumption Reference:

System Performance Global Factors

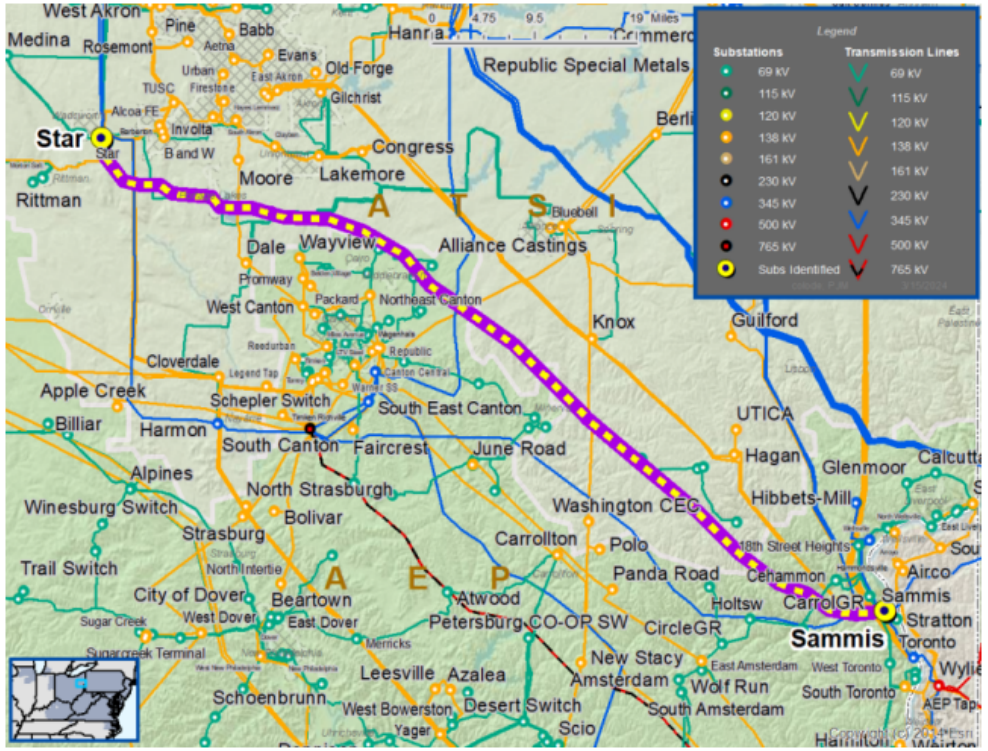
- Past system reliability/performance

Line Condition Rebuild/Replacement

- System characteristics including structural capacity needs
- Current design criteria, applicable codes and industry best practices

Problem Statement:

- The Sammis – Star 345 kV Line was constructed approximately 65 years ago. It is approximately 68.6 miles long and consists of 375 steel lattice towers and 22 wood pole H-frame structures.
- Suspension towers are susceptible to cascading failures. A tornado-induced tower failure destroyed 13 towers due to cascading.
- Current modeling techniques indicate the steel towers do not have the structural strength to withstand NESC required load cases, nor the additional wind and ice load cases required by FirstEnergy.
- Existing Transmission Line Ratings:
    - 1382 / 1712 / 1637 / 2116 MVA (SN/SE/WN/WE)



ATSI Transmission Zone M-3 Process
Sammis – Star 345 kV Line

Need Number: ATSI-2024-027

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 09/25/2025

Selected Solution:

Sammis – Star 345 kV Line

- Rebuild the existing Sammis – Star 345 kV line (approximately 68.6 miles)

At Sammis and Star substations:

- Replace line relaying

Transmission Line Ratings:

Sammis – Star 345 kV Line:

- Before Proposed Solution: 1382 / 1712 / 1637 / 2116 MVA (SN/SE/WN/WE)
- After Proposed Solution: 2504 / 2883 / 2505 / 3033 MVA (SN/SE/WN/WE)

Estimated Project Cost: $343.70M

Projected In-Service: 5/30/2031

Supplemental ID: s3717.1

Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

ATSI Transmission Zone M-3 Process
Campbellsport – Ravenna No. 2 69 kV Line

Need Number: ATSI-2022-029

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 09/25/2025

Previously Presented: Need Meeting - 11/18/2022
Solution Meeting - 06/13/2025

Supplemental Project Driver(s):

Equipment Material Condition, Performance and Risk

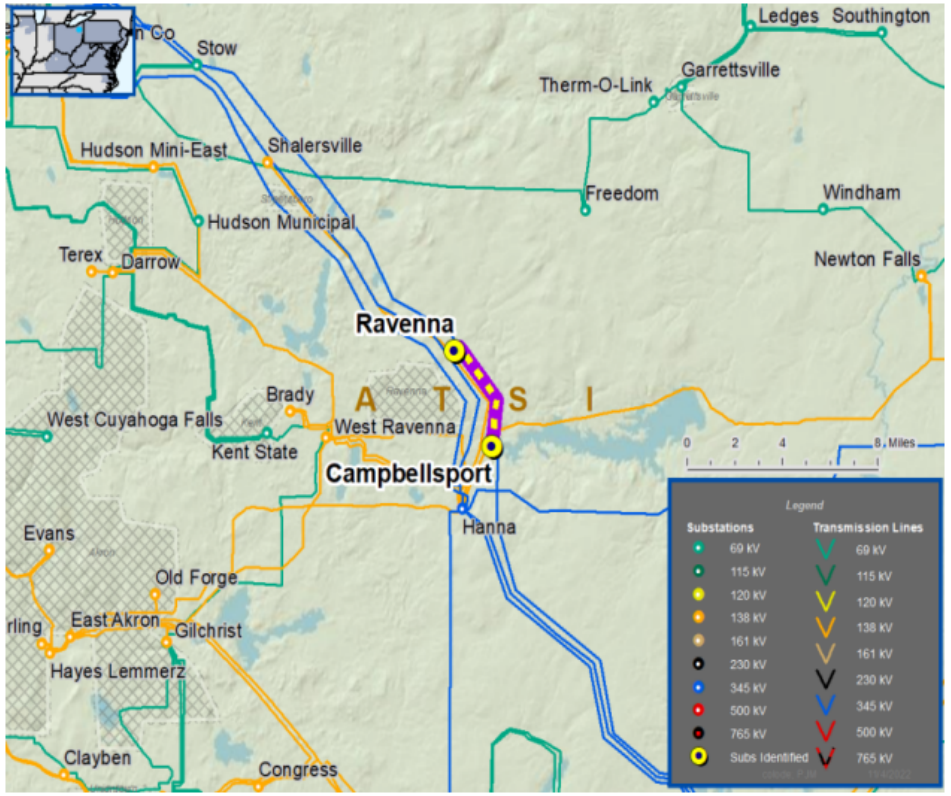
Specific Assumption Reference(s):

Line Condition Rebuild / Replacement

- Aged or deteriorated transmission line structures
- Negatively impact customer outage frequency and/or durations
- Demonstrate an increasing trend in maintenance findings and/or costs
- Transmission line ratings are limited by terminal equipment.

Problem Statement:

- Campbellsport-Ravenna No. 2 69 kV Transmission Line is approximately 4.4 miles in length. The line mileage includes approximately 0.2 miles on poles double circuited with Ravenna-West Ravenna No. 1 69 kV Line and approximately 2 miles on poles double circuited with Campbellsport-Ravenna No. 1 69 kV Line.
- Recent inspection of 32 structures (approximately 1.6 miles) of the Campbellsport – Ravenna No. 2 69 kV Transmission Line show a reject rate of 28% (9 of 32 structures). Inspection finding includes woodpecker holes, sound test failure, and evidence of decay or splitting. All poles are greater than 40 years of age.
- Disconnect switches and substation conductor at Ravenna Substation are limiting the transmission line rating.



ATSI Transmission Zone M-3 Process
Campbellsport – Ravenna No. 2 69 kV Line

Need Number: ATSI-2022-029
Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 09/25/2025

Selected Solution:

Campbellsport – Ravenna No. 2 69 kV Line

- Rebuild 1.6 miles of noncontiguous 69 kV line sections.

Ravenna Substation:

- Replace bus transfer switch
- Replace breaker disconnect switches
- Upgrade substation conductors to exceed transmission line rating

Transmission Line Ratings:

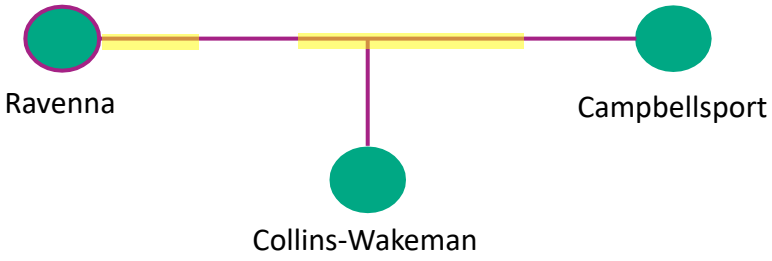
Collins – Ravenna 69 kV Line:

- Before Proposed Solution: 82 / 103 / 108 / 124 MVA (SN/SE/WN/WE)
- After Proposed Solution: 103 / 124 / 116 / 147 MVA (SN/SE/WN/WE)

Campbellsport – Collins 69 kV Line:

- Before Proposed Solution: 95 / 115 / 109 / 139 MVA (SN/SE/WN/WE)
- After Proposed Solution: 103 / 124 / 116 / 147 MVA (SN/SE/WN/WE)

Estimated Project Cost: $6.77M
Projected In-Service: 5/26/2026
Supplemental ID: s3718.1



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

ATSI Transmission Zone M-3 Process
Black River – Johnson West 69 kV Line

Need Number: ATSI-2025-011

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 09/25/2025

Previously Presented: Need Meeting - 3/14/2025
Solution Meeting - 06/13/2025

Supplemental Project Driver(s):

Equipment Material Condition, Performance and Risk

Specific Assumption Reference(s):

System Performance Global Factors

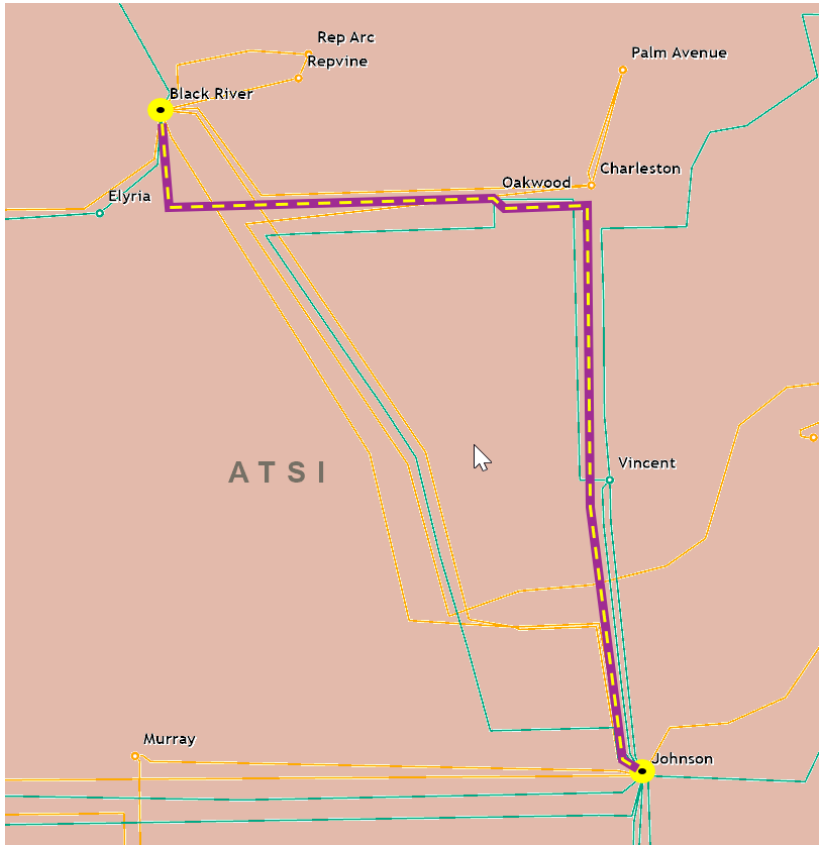
- System Reliability and Performance

Line Condition Rebuild / Replacement

- Aged or deteriorated wood pole transmission line structures
- Negatively impact customer outage frequency and/or durations
- Demonstrate an increasing trend in maintenance findings and/or cost

Problem Statement:

- The manually operated A-81 and A-82 switches on the Black River - Johnson West 69 kV Line were installed in 1956. The switches and supporting structure have reached expected end of life. Replacement components are difficult to source leading to non-standard repairs. The assembly of these switches is also subject to dimensional changes in the wood pole structure such as warping, shrinking or deflection. These changes can result in misoperation with the potential for unintended arcing, thereby increasing the exposure risk to switchmen.



ATSI Transmission Zone M-3 Process
Black River – Johnson West 69 kV Line

Need Number: ATSI-2025-011
Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 09/25/2025

Selected Solution:

Black River – Johnson West 69 kV Line

- Retire and replace obsolete 2-way line tap switches A-81 and A-82 at Oakwood Tap.
- Relocate new switches to mid-span structures and equip with SCADA controlled motor operators.

Transmission Line Ratings:

Black River – Oakwood Tap 69 kV Line

- Before Proposed Solution: 82 / 103 / 108 / 123 MVA (SN/SE/WN/WE)
- New Line Rating 103 / 124 / 116 / 147 MVA (SN/SE/WN/WE)

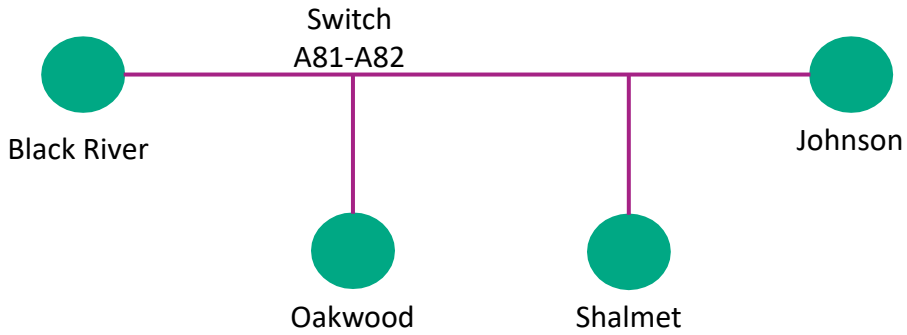
Oakwood Tap – Shalmet Tap 69 kV Line

- Before Proposed Solution: 82 / 103 / 108 / 123 MVA (SN/SE/WN/WE)
- After Proposed Solution: 103 / 124 / 116 / 147 MVA (SN/SE/WN/WE)

Shalmet Tap – Johnson West 69 kV Line

- Before Proposed Solution: 100 / 121 / 136 / 143 MVA (SN/SE/WN/WE)
- After Proposed Solution: 103 / 124 / 116 / 147 MVA (SN/SE/WN/WE)

Estimated Project Cost: $1.66M
Projected In-Service: 12/31/2026
Supplemental ID: s3719.1



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

ATSI Transmission Zone M-3 Process
Gates – Johnson 138 kV Line

Need Number: ATSI-2025-015

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 09/25/2025

Previously Presented: Need Meeting – 05/16/2025
Solution Meeting – 06/13/2025

Project Driver(s):
Equipment Condition/Performance/Risk

Specific Assumption Reference(s):
System Performance Projects Global Factors

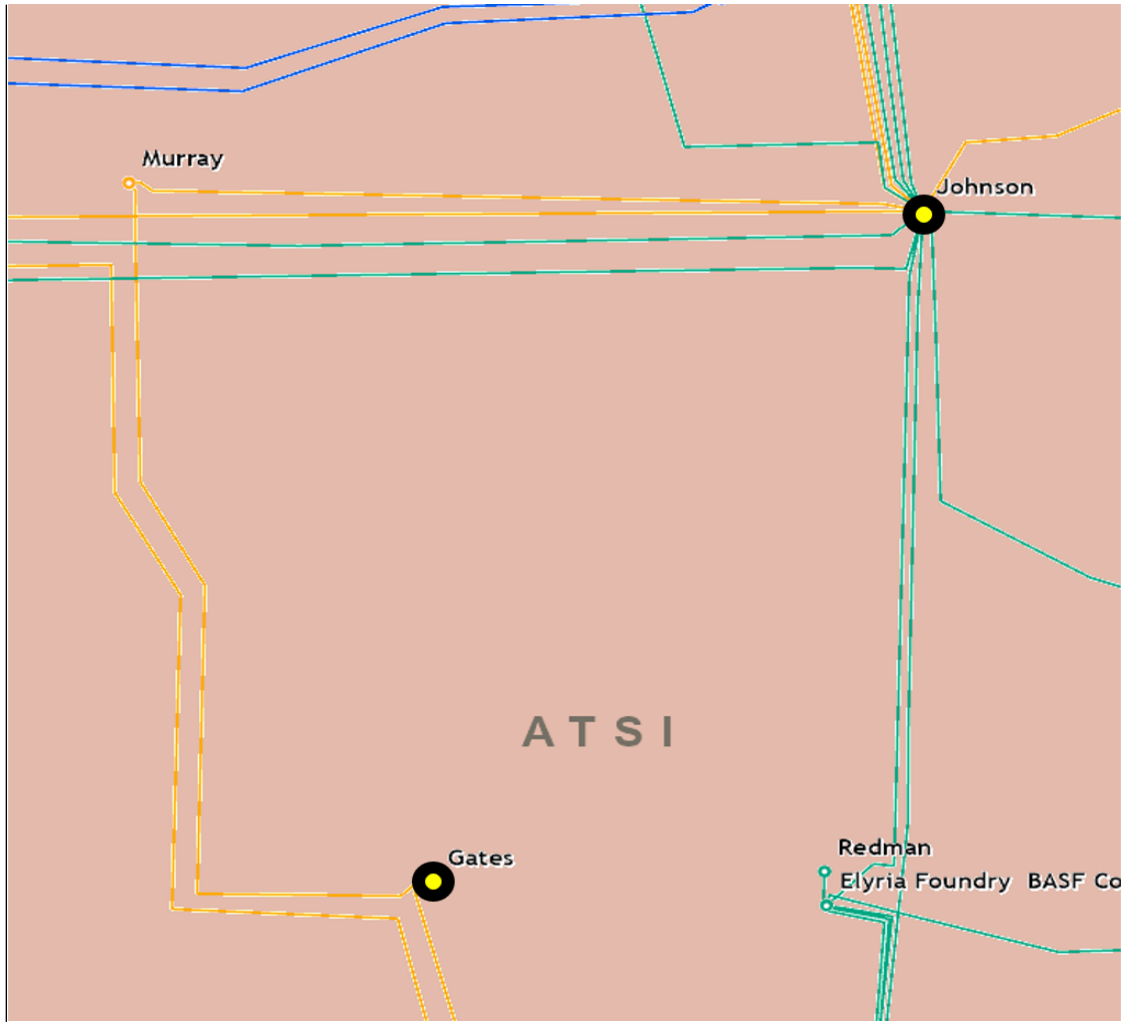
- Substation/Line equipment limits

Substation Condition Rebuild/Replacement

- Circuit breakers and other fault interrupting devices

Problem Statement:

- The 138 kV Oil Circuit Breaker B-4 and associated disconnect switches at Gates Substation are aging with increasing maintenance concerns. The breaker B-4 is 60 years old and other equipment is approximately 35 years old.
- Communication equipment at Gates and Johnson substations have reliability issues.
- Transmission line ratings are limited by terminal equipment.
- Existing ratings for Gates - Johnson 138 kV line (Gates - Murray section):
  - 195 / 209 /217 / 229 MVA (SN/SE/WN/WE)
- Conductor ratings for Gates - Johnson 138 kV line (Gates - Murray section):
  - 196 / 242 / 239 / 306 MVA (SN/SE/WN/WE)



ATSI Transmission Zone M-3 Process
Gates – Johnson 138 kV Line

Need Number: ATSI-2025-015

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 09/25/2025

Proposed Solution:

At Gates Substation:

- Replace 138 kV breaker and associated disconnect switches.
- Install surge arresters and power communications monitor PCM-5350.
- Replace substation conductor.

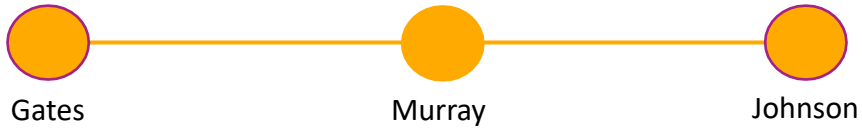
At Johnson Substation:

- Replace disconnect switches.
- Install power communications monitor PCM-5350.

Transmission Line Ratings:

Gates - Johson 138 kV line (Gates - Murray section):

- Before Proposed Solution: 195 / 209 / 217 / 229 MVA (SN/SE/WN/WE)
- After Proposed Solution: 196 / 242 / 239 / 306 MVA (SN/SE/WN/WE)



Legend	
500 kV	
345 kV	
230 kV	
138 kV	
115 kV	
69 kV	
46 kV	
34.5 kV	
23 kV	
New	

Estimated Project Cost: $1.96M

Projected In-Service: 12/29/2028

Supplemental ID: s3720.1

Revision History

3/7/2025 – V1 – Original Slides posted.

4/7/2025 – V2 – Added s3576.1 and s1717 (represent)

8/12/2025 – V3 - s3660, s3659, s1952 (represent), s3669

9/25/2025 – V4 - s3714.1, s3715.1, s3716.1, s3717.1, s3718.1, s3719.1 & s3720.1