

Subregional RTEP Committee – Western FirstEnergy Supplemental Projects

March 19, 2026

Needs

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

Need Number: ATSI-2026-022
Process Stage: Need Meeting 03/19/2026
Project Driver: Equipment Material Condition, Performance & Risk

Specific Assumption References:

System Performance Global Factors

- System reliability/performance
- Substation/Line equipment limits

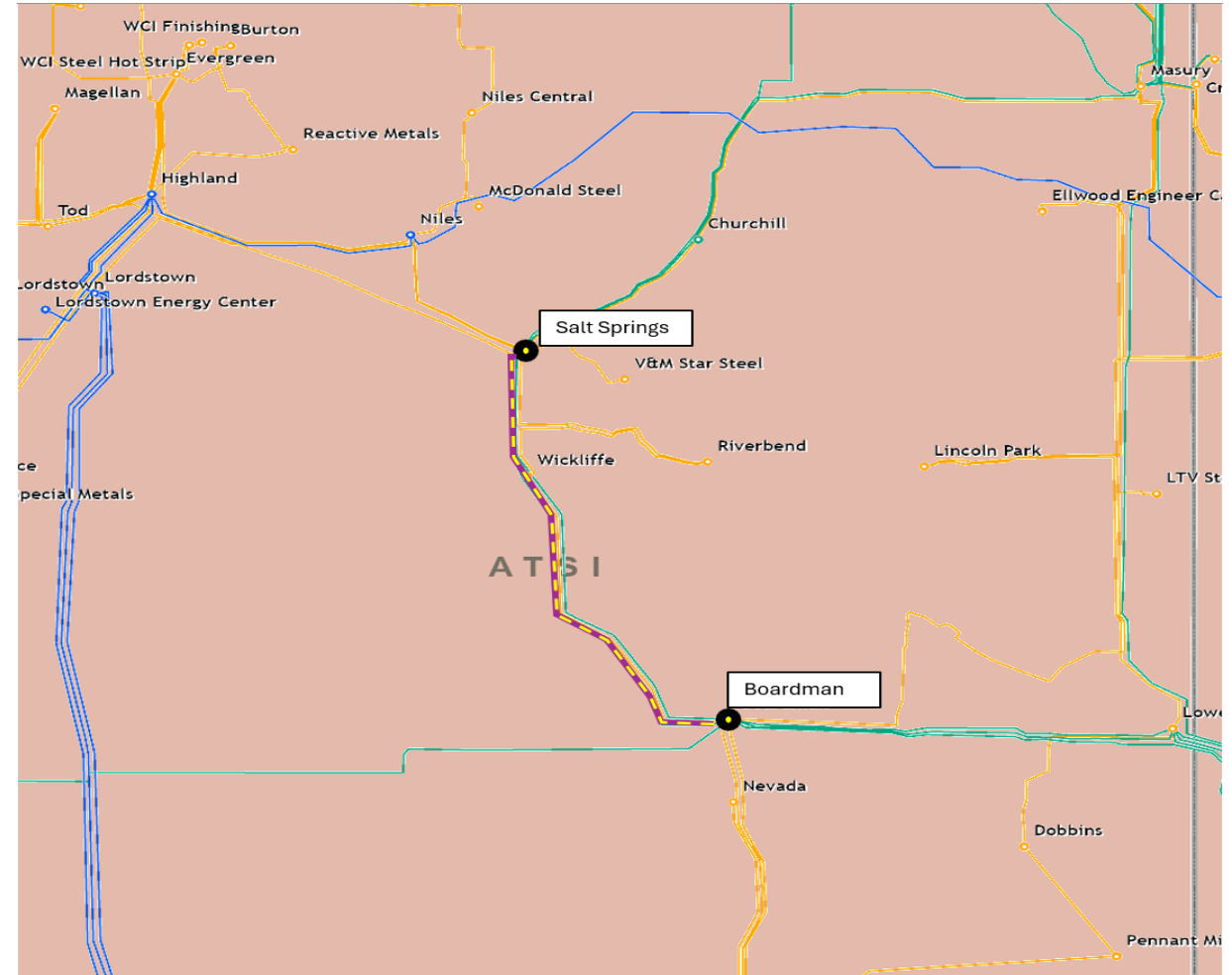
Line Condition Rebuild/Replacement

- Age/condition of wood pole transmission line structures

Problem Statement:

- The Boardman - Salt Springs East 69 kV line was constructed approximately 38 years ago and is approaching end of life. It is approximately 11 miles long with 39 wood pole transmission line structures.
- Per recent inspections, the line is exhibiting deterioration resulting in increased maintenance costs. Inspection findings include:
 - 37 poles with measurable shell rot (95%)
 - 5 poles with exposed or enclosed pockets (13%)
 - 13 poles with broken ground wires (33%)
 - 1 pole with woodpecker damage (3%)
- Since 2021, the line has had four unscheduled sustained outages. Additionally, there is a one mile tap to a retired customer (WCI Sinter) which is an unnecessary maintenance cost and risk to reliability.

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ATSI Transmission Zone M-3 Process Boardman - Salt Springs East 69 kV line

Need Number: ATSI-2026-022
Process Stage: Need Meeting 03/19/2026

Problem Statement (Cont’):

Existing Transmission Line and Conductor Ratings:

Salt Springs - Crum Tap 69 kV Line

- 80 / 96 / 90 / 114 MVA (SN/SE/WN/WE)

Crum Tap - Belle Vista 69 kV Line

- 51 / 66 / 73 / 82 MVA (SN/SE/WN/WE)

Belle Vista - Austintown Tap 69 kV Line

- 76 / 92 / 87 / 11 MVA (SN/SE/WN/WE)

Austintown Tap - American Steel City Tap 69 kV Line

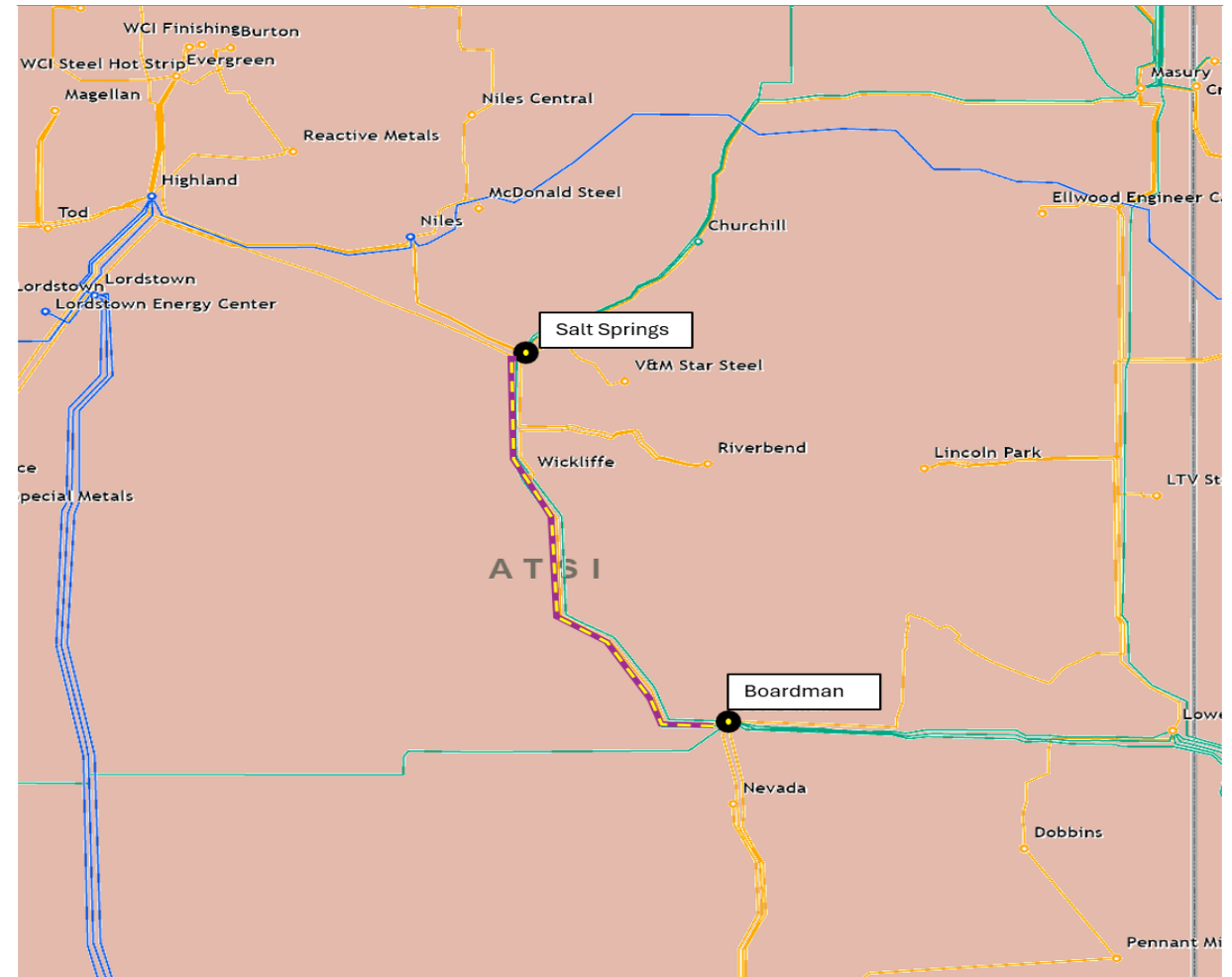
- 76 / 92 / 87 / 11 MVA (SN/SE/WN/WE)

American Steel City Tap - Cornersburg 69 kV Line

- 76 / 92 / 87 / 11 MVA (SN/SE/WN/WE)

Cornersburg - Boardman 69 kV Line

- 76 / 92 / 87 / 11 MVA (SN/SE/WN/WE)



Need Number: ATSI-2026-023
Process Stage: Need Meeting 03/19/2026
Project Driver: Equipment Material Condition, Performance & Risk, Infrastructure Resilience, Operational Flexibility and Efficiency

Specific Assumption References:

System Performance Projects

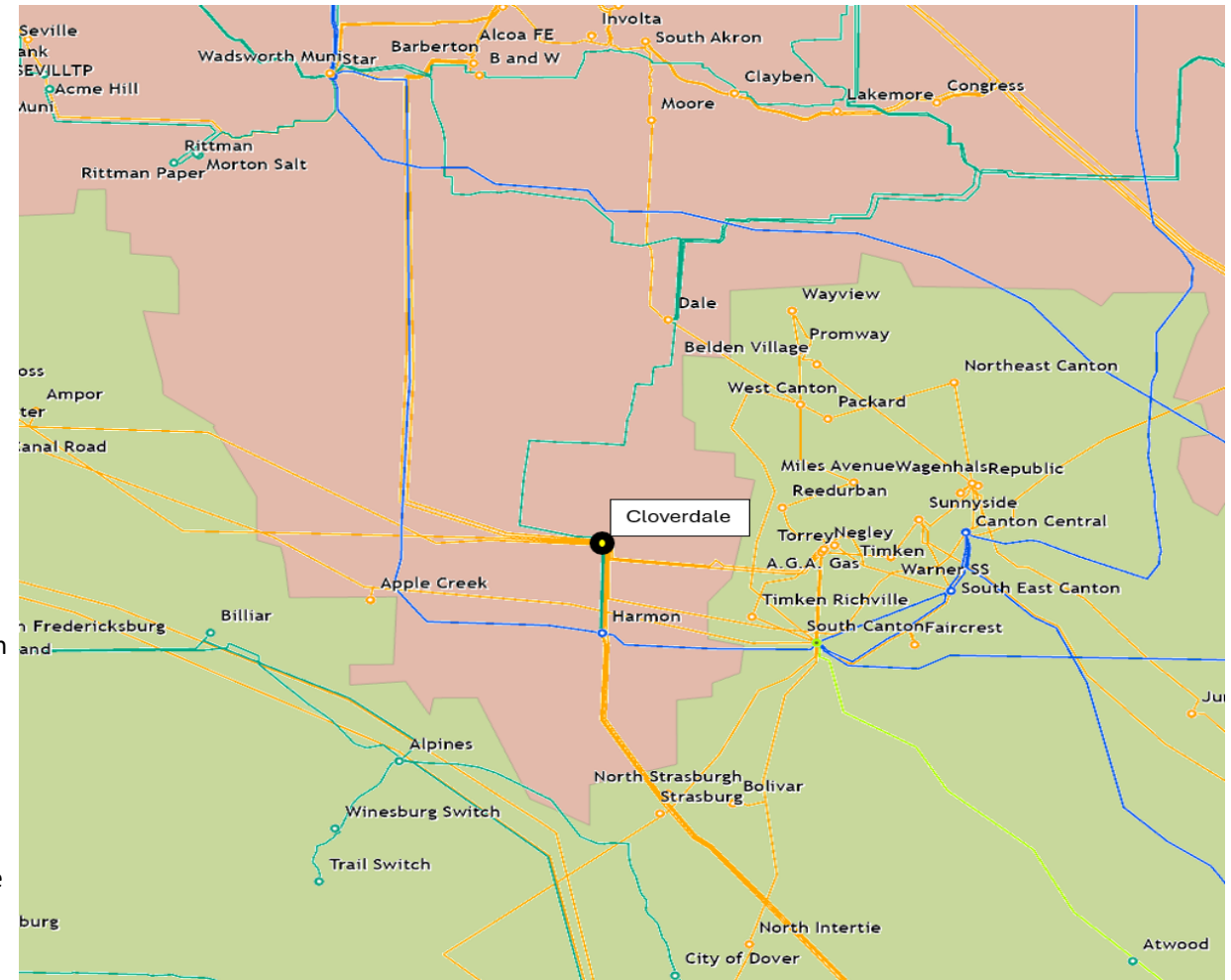
- Add/Expand Bus Configuration
- Load at risk in planning and operational scenarios
- Reduce the amount of exposed potential local load loss during contingency conditions
- Eliminate simultaneous outages to multiple networked elements
- Capability to perform system maintenance

Problem Statement:

Cloverdale Substation 138 kV bus and 69 kV bus configuration and condition:

- The 138 kV is currently configured as two straight buses with a transfer bus with nine transmission line, two 138-23 kV transformers, two 138/69 kV transformers, and a capacitor bank.
- The Cloverdale Substation North and South 138 kV buses are operated normally open from each other. The normally open bus-tie breaker between two buses cannot be closed due to protection limitation.
- Four transformers, five transmission lines, and the capacitor bank are connected on the North 138 kV bus. A fault on the bus or a failure of a single circuit breaker will result on an outage of the entire bus.

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Need Number: ATSI-2026-023
Process Stage: Need Meeting 03/19/2026

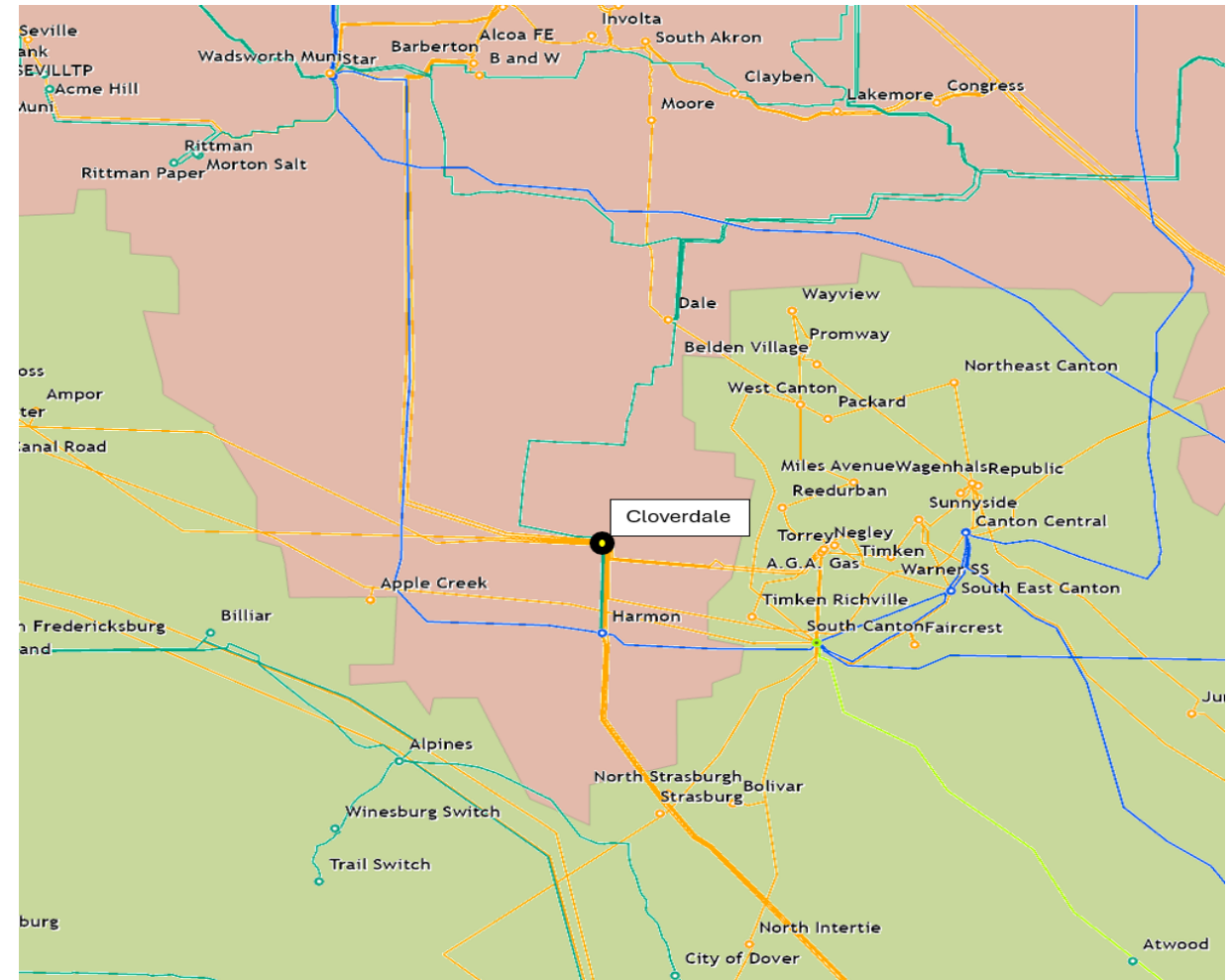
Problem Statement (Cont’):

- A bus outage of the North 138 kV bus would result in approximately 215 MW load at risk.
- Four transmission lines are connected on the South 138 kV bus. A fault on the bus or a failure of a single circuit breaker will result in an outage of the entire bus.
- Recent customer request for 310 MW will be directly connected to Cloverdale 138 kV bus.
- Adding anymore load to the South 138 kV bus will lead to thermal overloads in N-1 scenarios on the lines that tie with AEP off the South 138 kV bus.
- The 69 kV bus is currently configured as a main and transfer bus configuration.
- A fault on the 69 kV bus will result in an outage of the entire bus and interrupt four 69 kV lines and two 138/69 kV transformers.

Deteriorating control building and substation equipment:

- Oil circuit breakers B-30 and B-41 on the North 138 kV bus at/beyond expected service life (greater than 50 years old) with increasing maintenance concerns, compressor issues, deteriorated operating mechanisms and increasing maintenance trends
- 138 kV transfer breaker disconnect switches are original. They require increased maintenance to keep them operational. Replacement parts are not available.
- 138 kV yard has no room for expansion due to its configuration.
- 138 kV bus insulators are original. Bus outages have been needed to replace failed insulators. This is becoming more frequent as they continue to age.

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Need Number: ATSI-2026-023
Process Stage: Need Meeting 03/19/2026

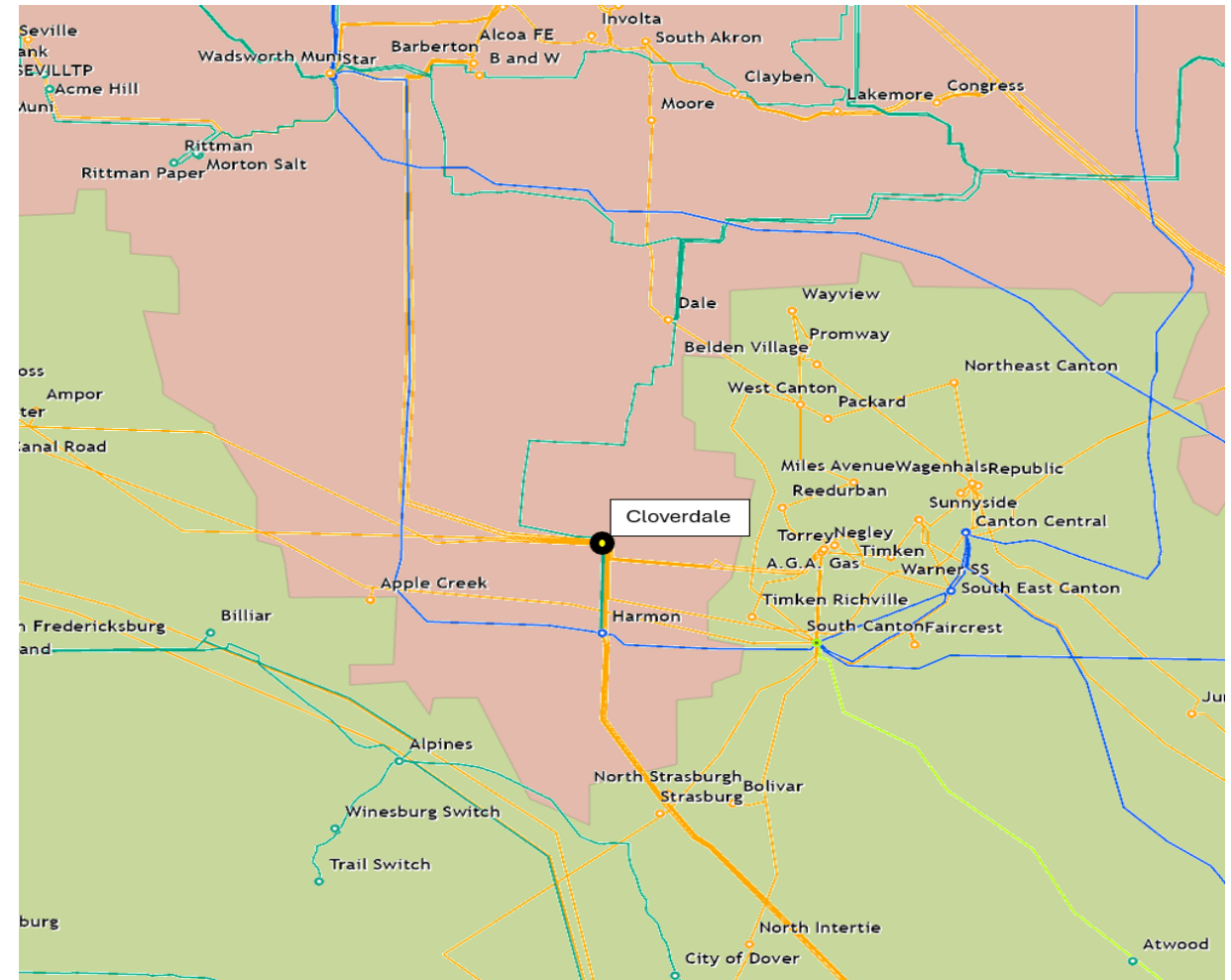
Problem Statement (Cont’):

- 138/23 kV relay room is full. There are no more open spaces for future upgrades.
- Control building is aging. It requires increased maintenance to keep it functional. Building has peeling lead paint inside. Remediation will be needed in the future.
- Relay room is on the second floor of the building. Cranes are needed to replace relay panels. This is costly and challenging operationally.
- 69 kV bus has original insulators. Bus outages have been needed to replace failed insulators. Some of the disconnect switches are original and require increased maintenance to keep them operational.

System Performance

Over the past five years:

- The Cloverdale Substation 138 kV bus or transmission lines experienced five momentary outages and six sustained outages.
- The Cloverdale Substation 69 kV bus or transmission lines experienced two momentary outages and six sustained outages.



Need Number: ATSI-2026-034
Process Stage: Need Meeting 03/19/2026
Project Driver: Equipment Material Condition, Performance & Risk, Operational Flexibility and Efficiency

Specific Assumption References:

System Performance Projects Global Factors

- System reliability and performance
- Substation/line equipment limits
- Reliability of Non-Bulk Electric System (Non-BES facilities)
- Load at risk in planning and operational scenarios

Add/Expand Bus Configuration

- Eliminate simultaneous outages to multiple networked elements

Upgrade Relay Schemes

- Bus protection schemes
- Inadequate remote backup for circuit breaker failure to trip

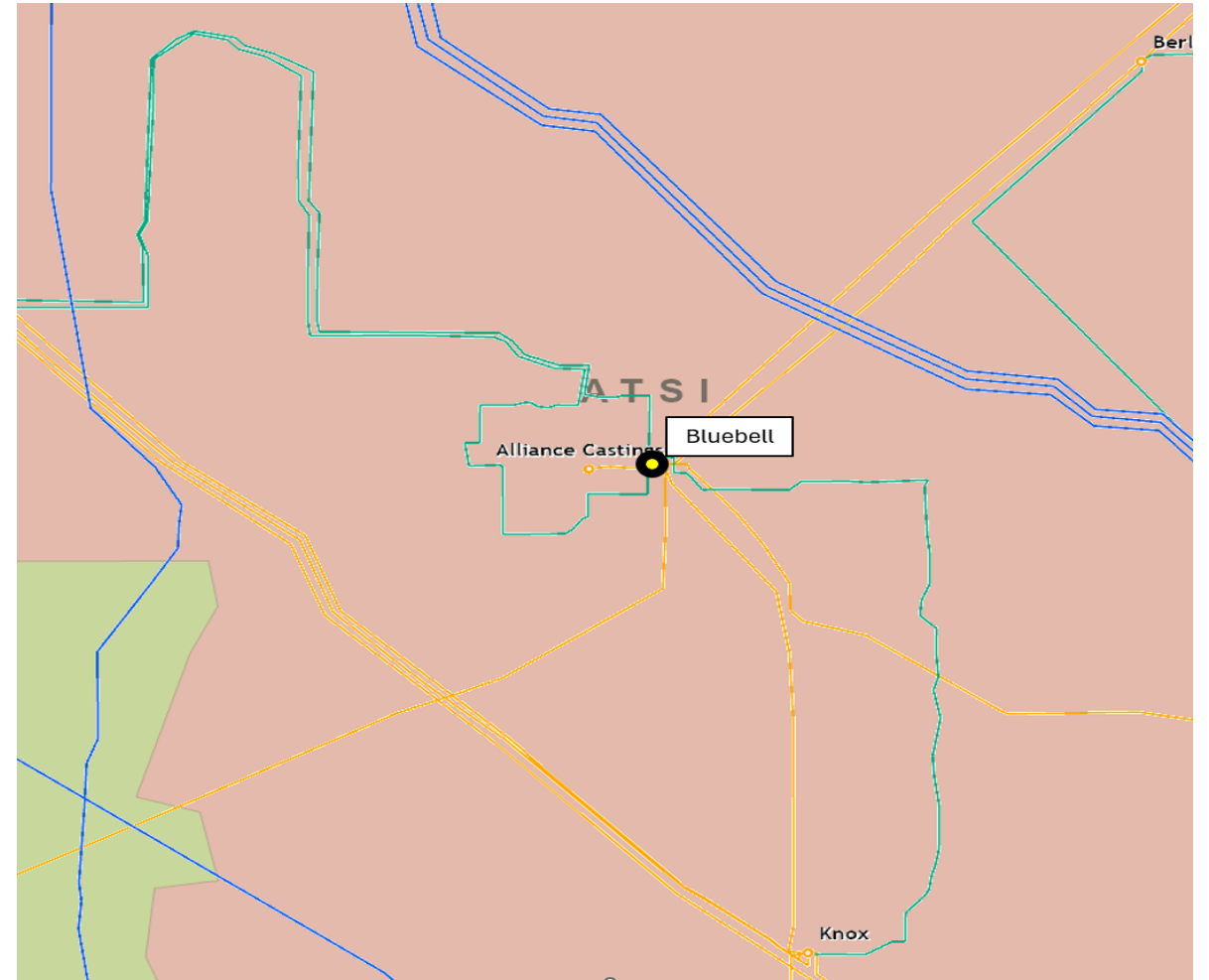
System Condition Projects

- Space constraints in the control enclosure or substation yard

Problem Statement:

- The Bluebell Substation 138 kV yard is currently configured as a straight bus with a transfer breaker. Six transmission lines, two 138-23 kV transformers and two 138-69 kV transformers are connected to the 138 kV bus. The Bluebell Substation 69 kV yard is currently configured as a straight bus with a transfer breaker. Four transmission lines and two 138-69 kV transformers are connected to the 69 kV bus.

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Need Number: ATSI-2026-034
Process Stage: Need Meeting 03/19/2026

Problem Statement (Cont’):

- A fault on the 138 kV bus will result in an outage of the entire bus or a failure of a single circuit breaker or a failure of a relay to trip will result in an outage of the entire bus. A bus fault outage at Bluebell 138 kV bus would result in approximately 2,525 customers and 15 MW of load at risk.
- A fault on the 69 kV bus will result in an outage of the entire bus or a failure of a single circuit breaker or a failure of a relay to trip will result in an outage of the entire bus.
- The existing control building at Bluebell Substation is in deteriorated condition and is congested. There is not sufficient space for additional panel upgrades. The Bluebell Substation 138 kV bus, 69 kV bus and 69 kV line exits do not have backup protection.

Transmission line ratings are limited by terminal equipment.

Bluebell - Alliance Castings 138 kV Line

- Existing line rating: 50 / 50 / 50 / 50 MVA (SN/SE/WN/WE)
- Existing conductor rating: 160 / 192 / 180 / 228 MVA (SN/SE/WN/WE)

Bluebell - Knox 138 kV Line

- Existing line rating: 153 / 199 / 219 / 247 MVA (SN/SE/WN/WE)
- Existing conductor rating: 200 / 242 / 226 / 286 MVA (SN/SE/WN/WE)

Bluebell - Canton Central 138 kV Line

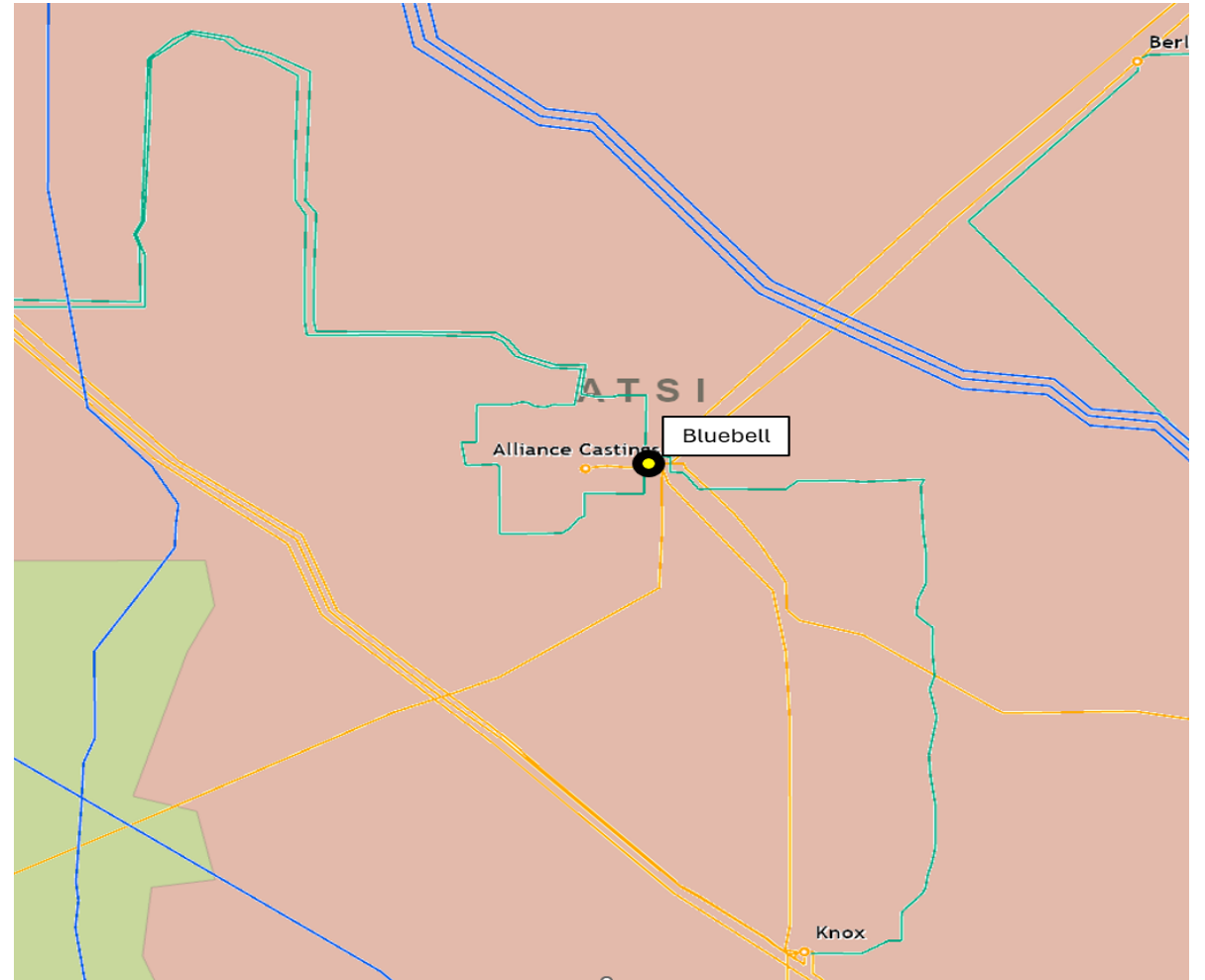
- Existing line rating: 257 / 314 / 325 / 343 MVA (SN/SE/WN/WE)
- Existing conductor rating: 257 / 360 / 325 / 404 MVA (SN/SE/WN/WE)

Bluebell - Knox No. 1 69 kV Line

Bluebell - Morgan Real Estate T 69 kV Branch

- Existing line rating: 76 / 92 / 87 / 96 MVA (SN/SE/WN/WE)
- Existing conductor rating: 76 / 92 / 87 / 111 MVA (SN/SE/WN/WE)

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Need Number: ATSI-2026-034
Process Stage: Need Meeting 03/19/2026

Problem Statement (Cont’):

Fairmont T - Knox 69 kV Branch

- Existing line rating: 72 / 72 / 72 / 72 MVA (SN/SE/WN/WE)
- Existing conductor rating: 89 / 108 / 103 / 131 MVA (SN/SE/WN/WE)

Bluebell - Hartville 69 kV Line:

Bluebell - Bluebell T 69 kV Branch

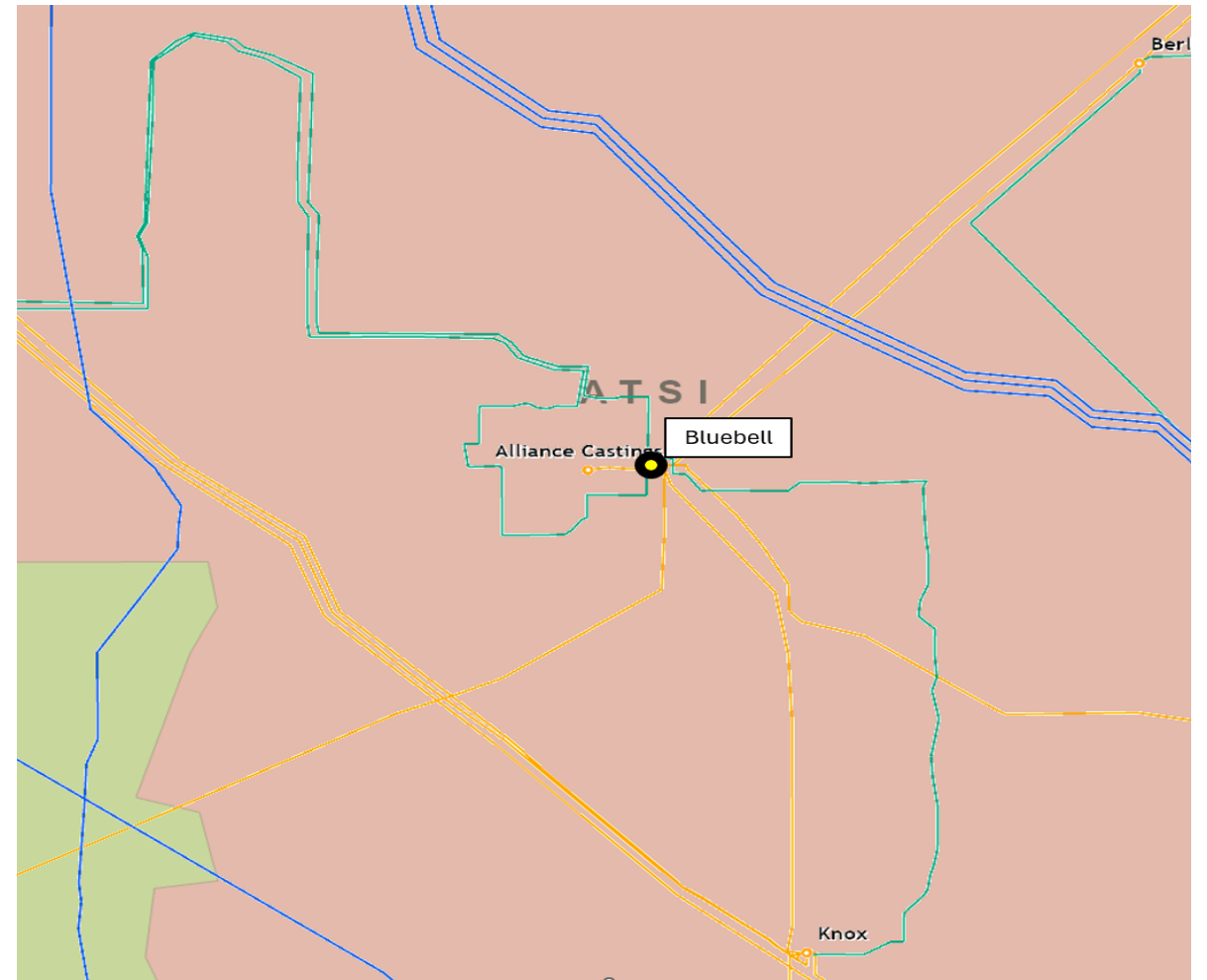
- Existing line rating: 76 / 90 / 87 / 100 MVA (SN/SE/WN/WE)
- Existing conductor rating: 76 / 92 / 87 / 111 MVA (SN/SE/WN/WE)

Randolph - Hartville 69 kV Branch

- Existing line rating: 51 / 66 / 73 / 76 MVA (SN/SE/WN/WE)
- Existing conductor rating: 58 / 73 / 76 / 98 MVA (SN/SE/WN/WE)

Bluebell - PTC Alliance 69 kV Line:

- Existing line rating: 80 / 95 / 90 / 95 MVA (SN/SE/WN/WE)
- Existing conductor rating: 80 / 96 / 90 / 114 MVA (SN/SE/WN/WE)



Solutions

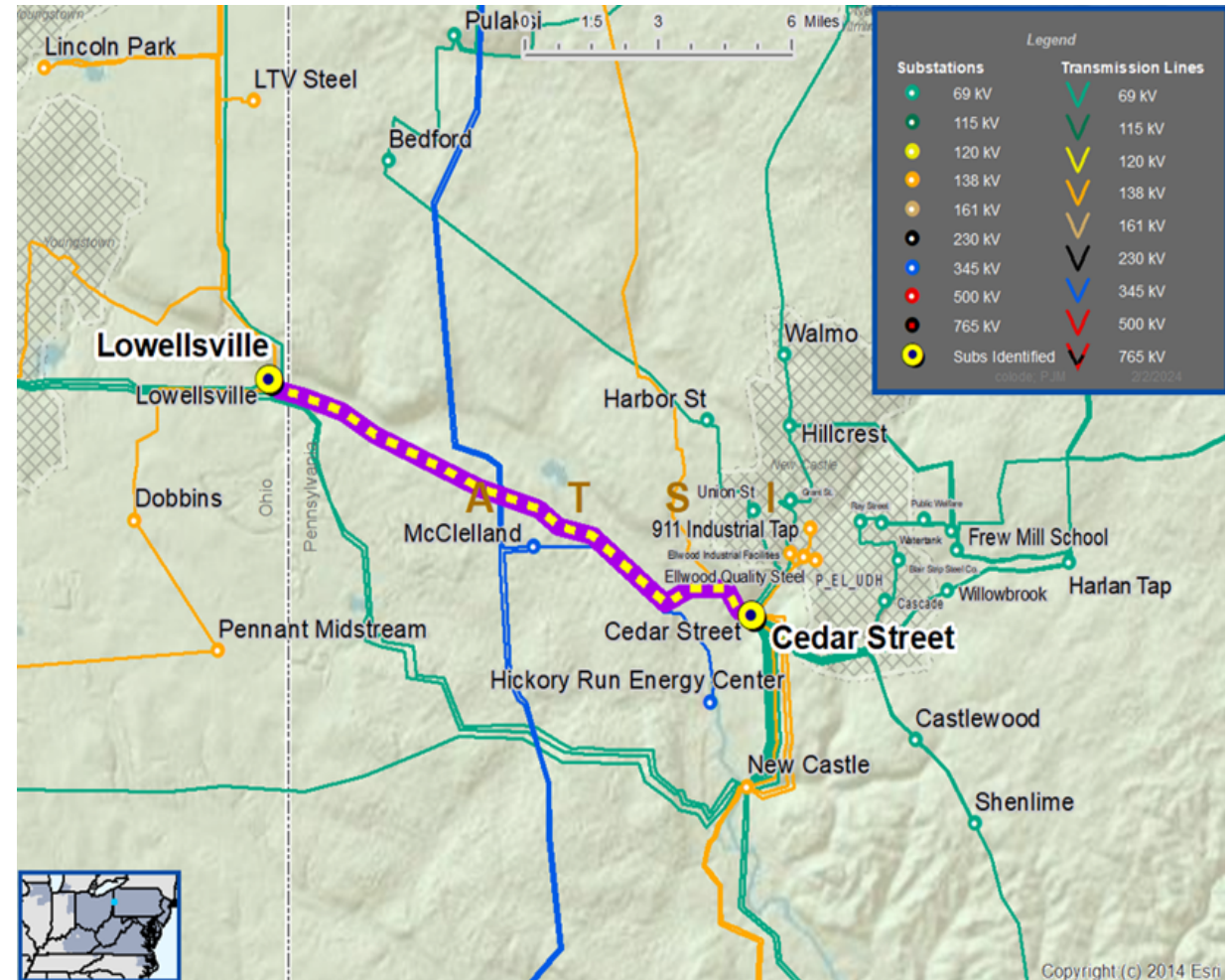
Stakeholders must submit any comments within 10 days of this meeting in order to provide time necessary to consider these comments prior to the next phase of the M-3 process

Need Number: ATSI-2024-017
Process Stage: Solution Meeting SRRTEP-W - 03/19/2026
Previously Presented: Need Meeting 02/16/2024

Project Driver:
 Equipment Material Condition, Performance & Risk, Infrastructure Resilience

Specific Assumption References:
 Global Factors - 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 costs - Transmission line ratings are limited by terminal equipment.

Problem Statement:
 The Cedar St - Lowellville South 69 kV Line was constructed in 1960 and is approximately 9.5 miles in length. This line was constructed utilizing wood poles with a total of 100 structures.
 Assessment found 89 of 101 wood poles had defects that could negatively affect reliability. Defects included decay, top rot and multiple woodpecker holes. Since 2019, the Cedar St - Lowellville South 69 kV Line had three sustained outages.





ATSI Transmission Zone M-3 Process Cedar Street - Lowellville South 69 kV Line

Need Number: ATSI-2024-017
Process Stage: Solution Meeting SRRTEP-W - 03/19/2026

Proposed Solution:

Cedar Street - Lowellville South 69 kV Line:

- Rebuild the Cedar St - Lowellville South 69 kV Line using new conductor (9.6-miles). Upgrade disconnect switches, station conductor, and relays at Cedar St and Lowellville stations.

Transmission Line Ratings:

- Before Proposed Solution: 65 / 68 / 72 / 72 MVA (SN/SE/WN/WE)
- After Proposed Solution: 111 / 134 / 125 / 159 MVA (SN/SE/WN/WE)

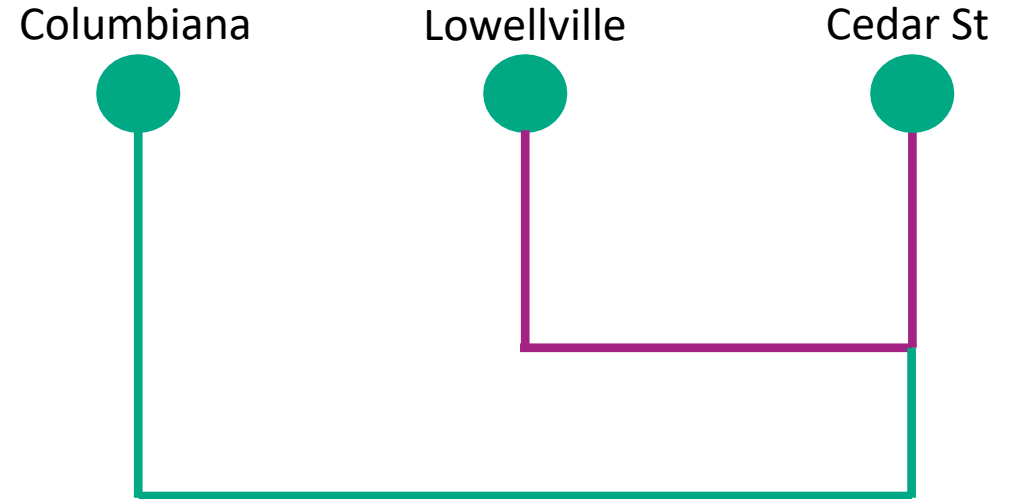
Transmission Conductor Ratings:

- Before Proposed Solution: 65 / 68 / 87 / 87 MVA (SN/SE/WN/WE)
- After Proposed Solution: 111 / 134 / 125 / 159 MVA (SN/SE/WN/WE)

Alternatives Considered:

Maintain existing line with elevated risk of customer outages and reliability events.

Estimated Project Cost: \$30.79 M
Projected In-Service: 10/05/2029
Status: Conceptual
Model: 2024 RTEP model for 2029 Summer & Winter (50/50)



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

Need Number: ATSI-2023-024
Process Stage: Solution Meeting SRRTEP-W - 03/19/2026
Previously Presented: Need Meeting 10/20/2023

Project Driver:
 Equipment Material Condition, Performance & Risk, Infrastructure Resilience, Operational Flexibility and Efficiency

Specific Assumption References:

Global Considerations

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

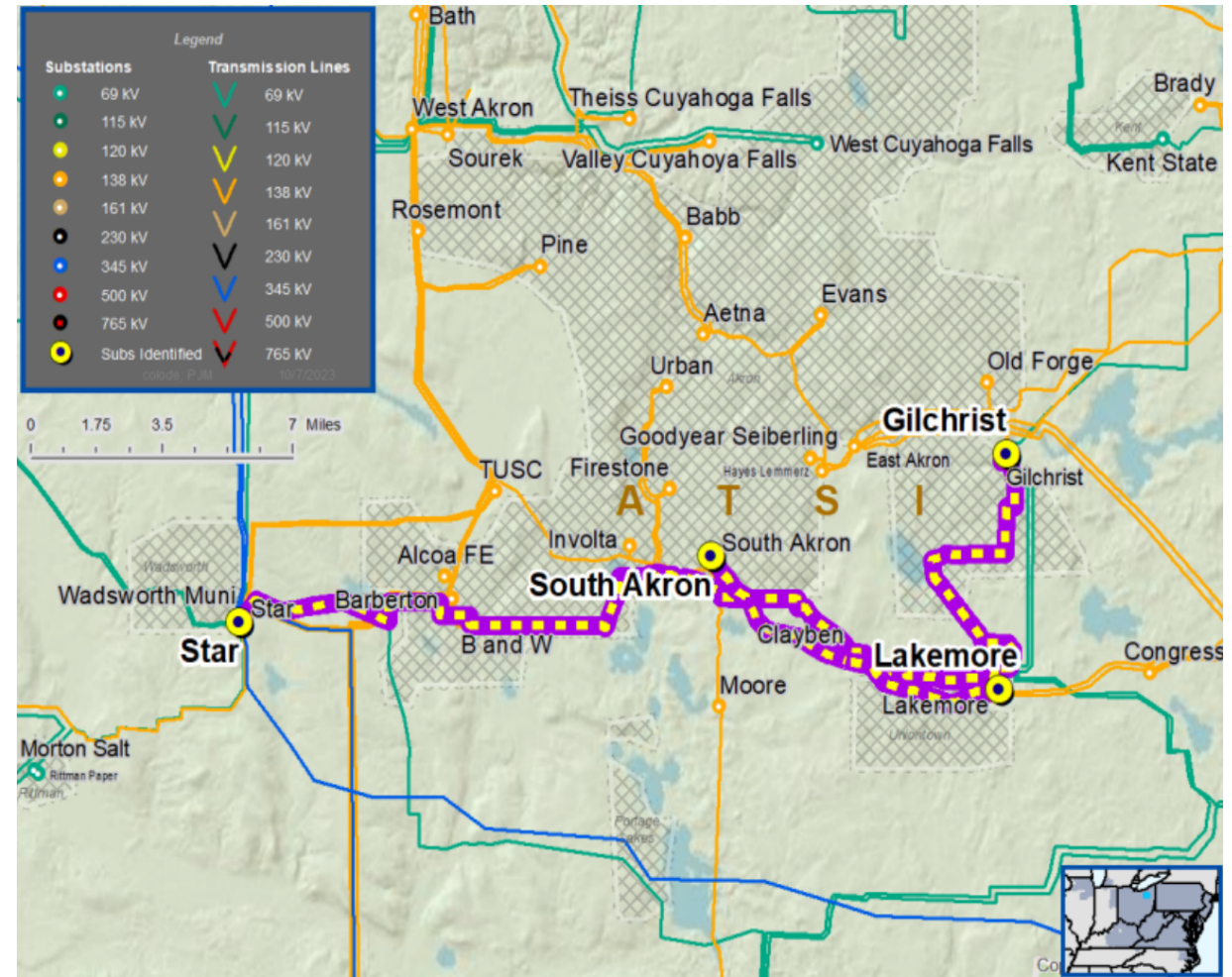
Add/Expand Bus Configuration

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

Problem Statement:

The Gilchrist – Star 69 kV Line is approximately 26 miles and serves four (4) delivery points. A line fault will cause approximately 45 MW consequential loss of load and approximately 15,100 customers at risk. Since 2020, the Gilchrist – Star 69 kV Line has experienced a total of 2 momentary outages and 4 sustained outages. The Lakemore – South Akron 138 kV Line is approximately 8 miles and serves (1) delivery point.

A line fault will cause approximately 47 MW consequential loss of load and approximately 5,000 customers at risk. Since 2020, the Lakemore – South Akron 138 kV Line has experienced a 1 sustained outage.





ATSI Transmission Zone M-3 Process Akron/Summit County Area

Need Number: ATSI-2023-024
Process Stage: Solution Meeting SRRTEP-W - 03/19/2026

Proposed Solution:

North Clayben 138 kV and 69 kV Ring Bus:

Build a new substation (North Clayben) as a 138/69 kV substation adjacent to the Clayben Substation, a 138-12.4 kV substation.

- Build a three breaker 69 kV ring bus.
- Build a four breaker 138 kV ring bus.
- Loop the Lakemore-South Akron (future Glenmount) 138 kV Line in/out of the new substation.
- Loop the Gilchrist-Star 69 kV Line in/out of the new substation.

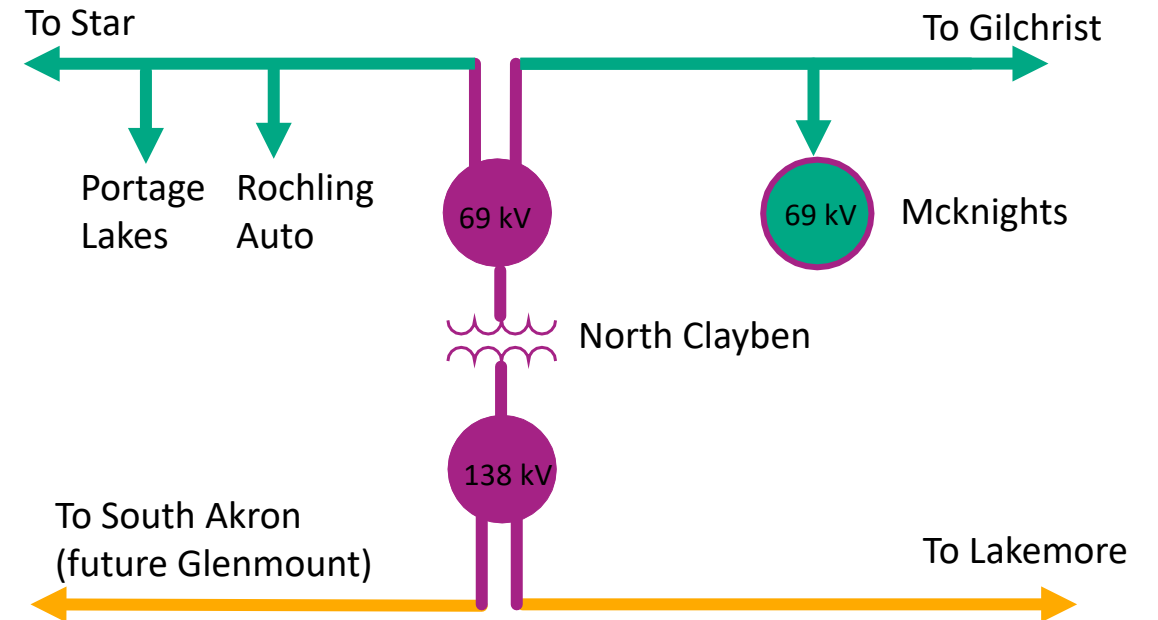
Re-terminate the Clayben Substation distribution high side into the 138 kV breaker position in the new substation.

Add automatic sectionalizing to McKnights Substation.

The line project will separate the Gilchrist-Star 69 kV Line and Lakemore-South Akron (future Glenmount) 138 kV line, and create the following lines:

- North Clayben-Gilchrist 69 kV Line ~9.8 miles
- North Clayben-Star 69 kV Line ~14.8 miles
- North Clayben-Lakemore 138 kV Line ~4.1 miles
- North Clayben-South Akron (future Glenmount) 138 kV Line ~4.0 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 Akron/Summit County Area

Need Number: ATSI-2023-024
Process Stage: Solution Meeting SRRTEP-W - 03/19/2026

Proposed Solution (Cont'):

Transmission Line Ratings:

North Clayben - Rochling Auto 69 kV Line

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

North Clayben - Mcknights 69 kV Line

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

North Clayben - Lakemore 138 kV Line

- Before Proposed Solution: N/A
- After Proposed Solution: 157 / 196 / 198 / 255 MVA (SN/SE/WN/WE)

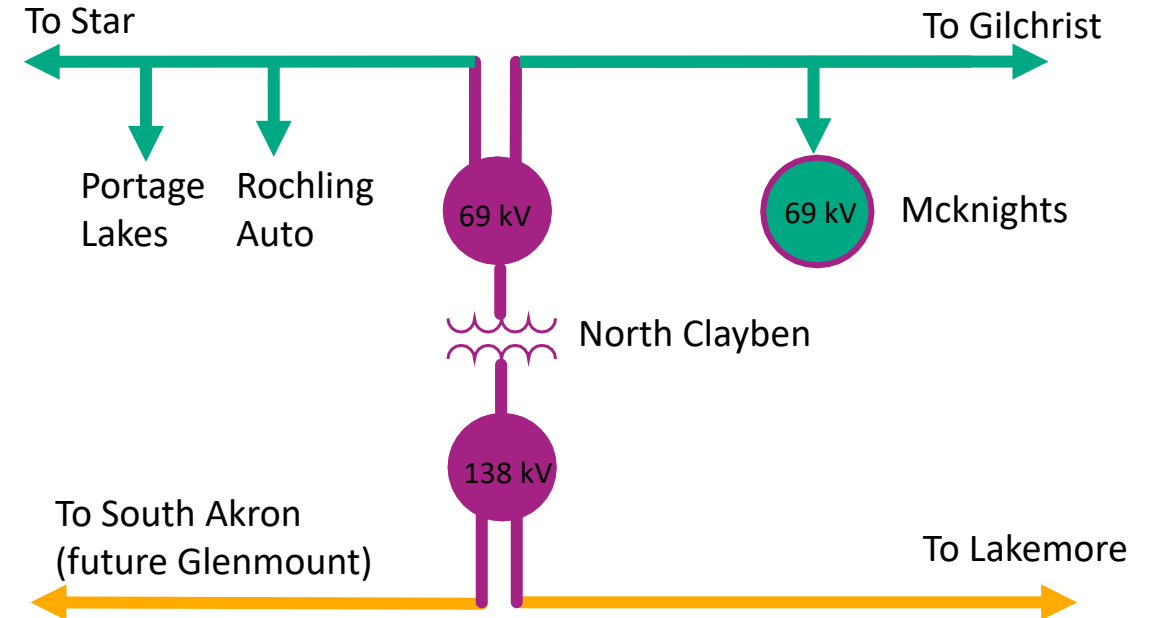
North Clayben - South Akron (future Glenmount) 138 kV Line

- Before Proposed Solution: N/A
- After Proposed Solution: 157 / 196 / 198 / 255 MVA (SN/SE/WN/WE)

Alternatives Considered:

Expand Lakemore Substation into 138/69/12.4 kV substation and loop Gilchrest-Star 69 kV Line into Lakemore Substation

Estimated Project Cost: \$36.49M
Projected In-Service: 06/01/2029
Status: Conceptual
Model: 2024 RTEP model for 2029 Summer & Winter (50/50)



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

Changes to the Existing Supplemental Projects

s2298 was posted in the 2020 local plan. Originally presented as need on 05/22/2020 and Solution on 07/17/2020 SRRTEP Western meetings.

Original Solution Presented on 07/17/2020:

Convert Barberton Substation into Double Bus-Double Breaker configuration. Install new control building.

Revised Solution:

Convert Barberton Substation into a breaker-and-a-half configuration. Install new control building.

Reason for Scope Change:

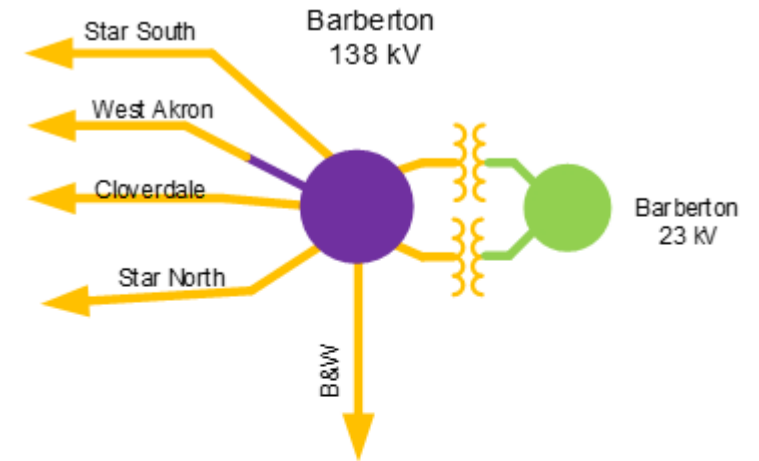
- The Barberton Substation was originally proposed to be converted to a Double Bus-Double Breaker configuration.
- A breaker-and-a-half (BAAH) configuration was evaluated at that time but was not selected due to insufficient available space. Subsequently, the Construction & Outage Planning team determined that additional real estate could be acquired to provide for a BAAH configuration.
- As a result, the project scope has been updated to convert the Barberton Substation to a breaker-and-a-half (BAAH) bus configuration.

There are no transmission line ratings changes due to this update.

Estimated Project Cost: ~~\$14.7M~~ \$24.38M

Projected In-Service Date: ~~12/30/2023~~ 12/1/2028

Status: Conceptual



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

03/04/2025– V1 – Original version posted to pjm.com

03/13/2025 – V2 – updated Need number on slide 6 and update map on slide 7