

Subregional RTEP Committee – Western FirstEnergy Supplemental Projects

November 17, 2023

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



ATSI Transmission Zone M-3 Process Dowling New Customer Connection

Need Number: ATSI-2023-023

Process Stage: Need Meeting – 11/17/2023

Project Driver(s):

Customer Service

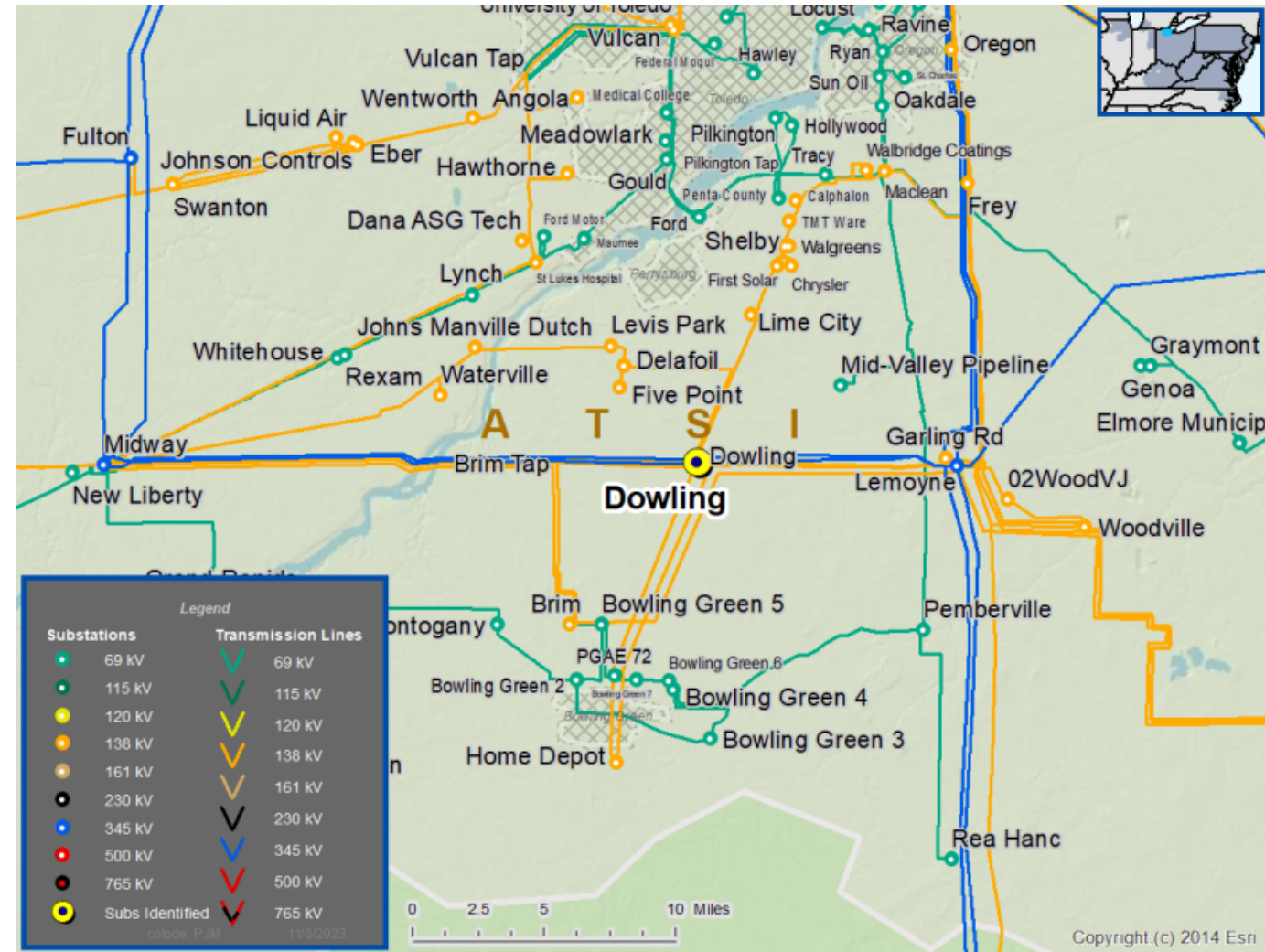
Specific Assumption Reference(s)

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 - has requested a new 138 kV delivery point from the Dowling Substation. The anticipated load of the new customer connection is 220 MW.

Requested in-service date is 11/30/2025.



Need Numbers: ATSI-2023-027

Process State: Need Meeting 11/17/2023

Project Driver:

Equipment Material Condition, Performance and Risk

Specific Assumption Reference:

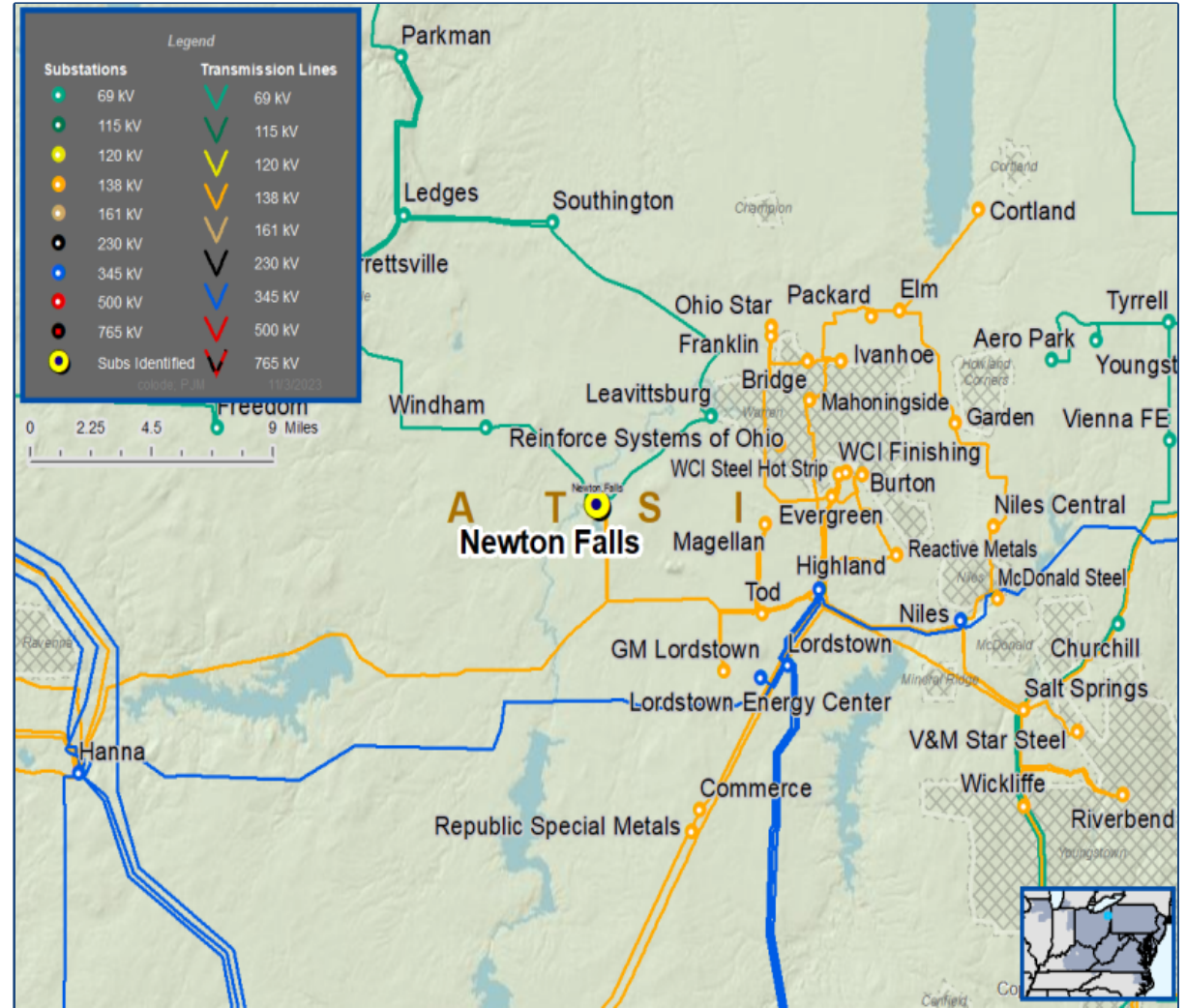
System Performance Projects Global Factors

- Substation/line equipment limits
- Substation Condition Rebuild/Replacement
 - Circuit breakers and other fault interrupting devices

Problem Statement:

- The 69 kV Oil Circuit Breaker B-30, associated disconnect switches and protective relaying at Newton Falls Substation has increasing maintenance concerns due to its condition.
- Transmission line ratings are limited by terminal equipment.

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Need #	Transmission Line / Substation Locations	Existing Line Rating (SN / SE / WN / WE)	Existing Conductor Rating (SN / SE / WN / WE)
ATSI-2023-027	Newton Falls – NF Muni Tap 69 kV Line Section	76 / 92 / 87 / 93	76 / 92 / 87 / 111

Need Numbers: ATSI-2023-028

Process State: Need Meeting 11/17/2023

Project Driver:

Equipment Material Condition, Performance and Risk

Specific Assumption Reference:

System Performance Projects Global Factors

- Substation/line equipment limits

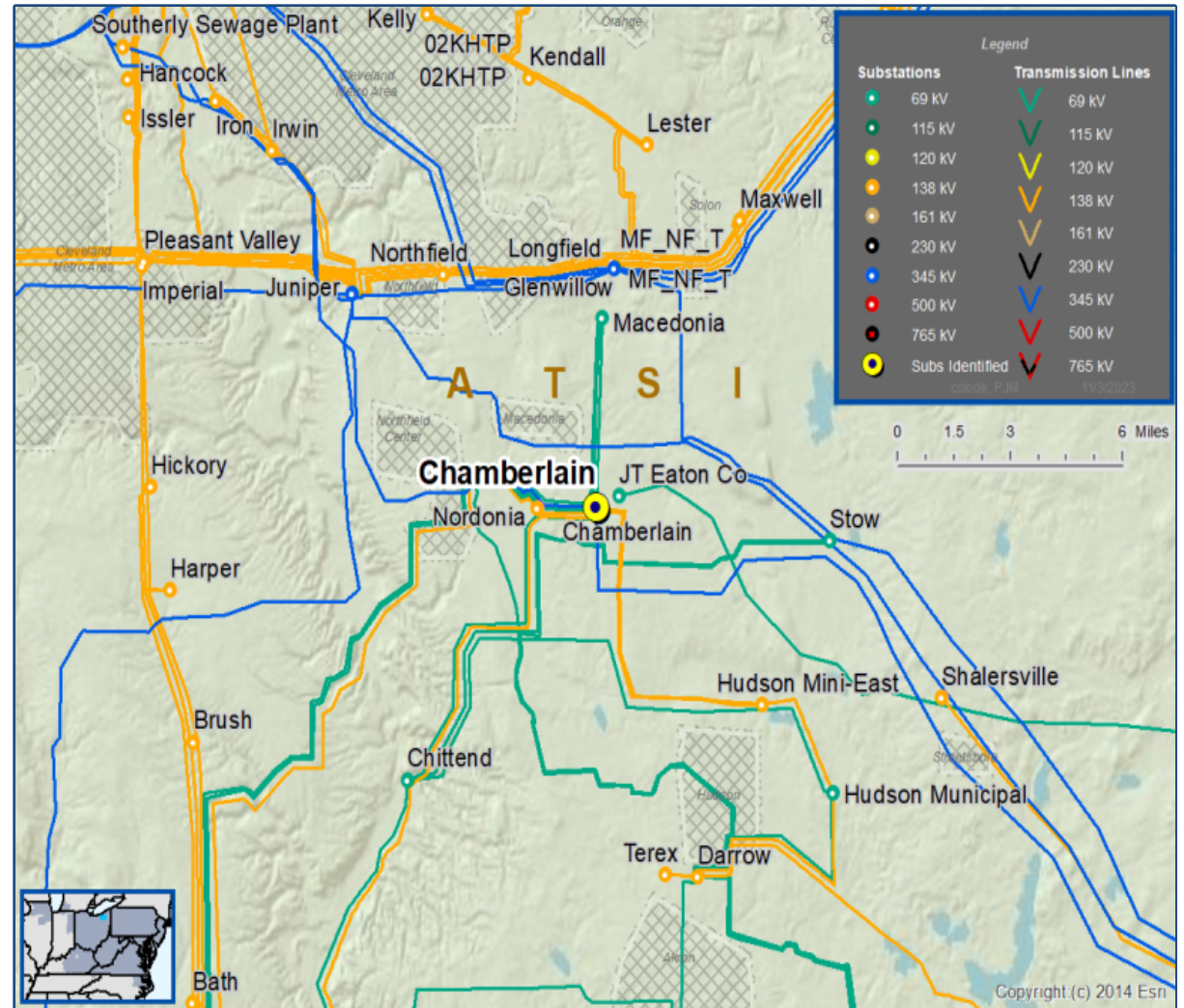
Substation Condition Rebuild/Replacement

- Circuit breakers and other fault interrupting devices

Problem Statement:

- The 69 kV Oil Circuit Breakers B-31, B-39 and B-74, associated disconnect switches and protective relaying at Chamberlin Substation are having increasing maintenance concerns due to their condition.
- Transmission line ratings are limited by terminal equipment.

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Need #	Transmission Line / Substation Locations	Existing Line Rating (SN / SE / WN / WE)	Existing Conductor Rating (SN / SE / WN / WE)
ATSI-2023-028	Chamberlin – Plastic Materials Tap 69 kV Line Section	82 / 103 / 108 / 124	110 / 134 / 127 / 162
	Chamberlin - Verizon Tap 69 kV Line Section	95 / 100 / 100 / 100	95 / 115 / 109 / 139
	Chamberlin 138/69 kV Transformer #2	163 / 163 / 163 / 163	164 / 174 / 199 / 208

Need Numbers: ATSI-2023-036

Process State: Need Meeting 11/17/2023

Project Driver:

Equipment Material Condition, Performance and Risk

Specific Assumption Reference:

System Performance Projects Global Factors

- Substation/line equipment limits

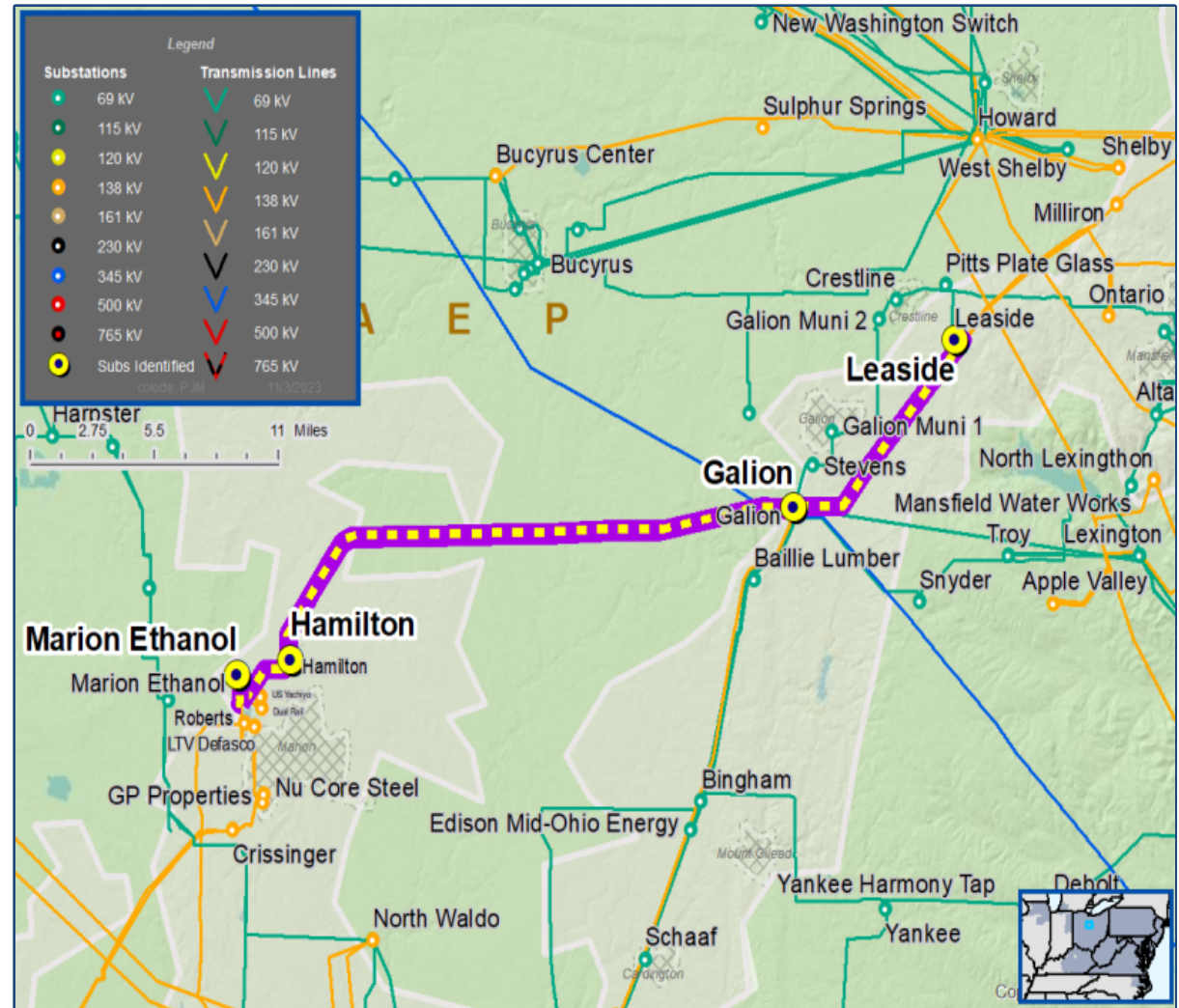
Substation Condition Rebuild/Replacement

- Circuit breakers and other fault interrupting devices

Problem Statement:

- The 138 kV Oil Circuit Breakers B-52, B-55, B-58, B-59 and B-60, Circuit Switchers CS-136 and CS-137, associated disconnect switches and protective relaying at Galion Substation are having increasing maintenance concerns due to their condition.
- Transmission line ratings are limited by terminal equipment.

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Need #	Transmission Line / Substation Locations	Existing Line Rating (SN / SE / WN / WE)	Existing Conductor Rating (SN / SE / WN / WE)
ATSI-2023-036	Galion - Leaside 138 kV Line	251 / 290 / 250 / 306	251 / 290 / 250 / 306
	Galion – Hamilton Tap 138 kV Line Section	195 / 209 / 217 / 229	200 / 242 / 226 / 286
	Galion – Marion Ethanol Tap 138 kV Line Section	160 / 192 / 180 / 228	160 / 192 / 180 / 228
	Galion 345/138 kV Transformer #3	458 / 478 / 478 / 478	606 / 695 / 735 / 828
	Galion 345/138 kV Transformer #4	400 / 478 / 478 / 478	618 / 729 / 743 / 864

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 Numbers: ATSI-2023-019

Process State: Solution Meeting 11/17/2023

Previously Presented: Need Meeting 09/15/2023

Project Driver:

Equipment Material Condition, Performance and Risk

Specific Assumption Reference:

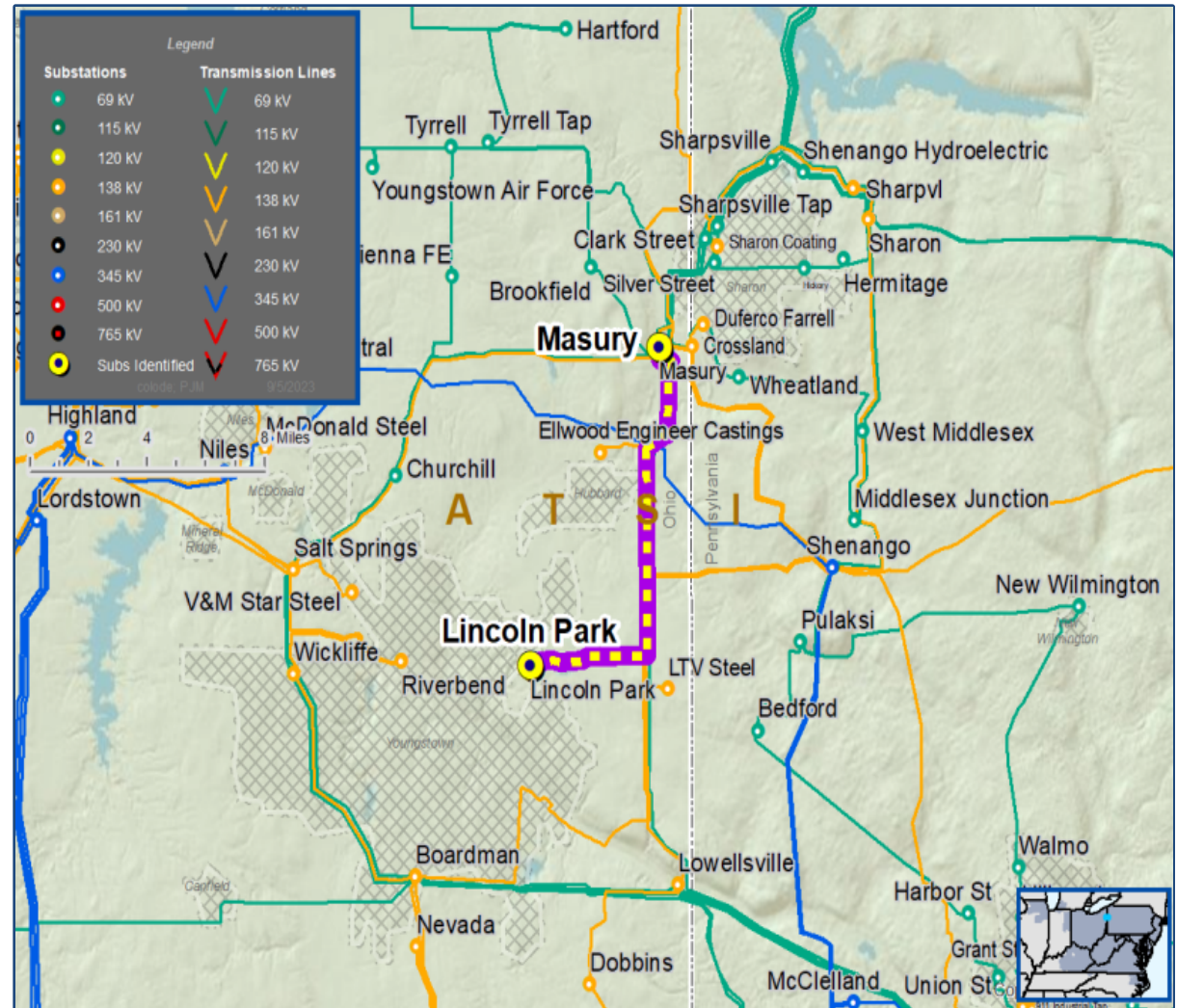
System Performance Projects Global Factors

- System reliability and performance
- Substation/line equipment limits
- Upgrade Relay Schemes
- Obsolete and difficult to repair communication equipment (DTT, Blocking, etc.)
- Communication technology upgrades

Problem Statement:

- FirstEnergy has identified protection schemes using a certain vintage of relays and communication equipment that have a history of misoperation.
- Proper operation of the protection scheme requires all the separate components perform adequately during a fault.
- In many cases the protection equipment cannot be repaired due to a lack of replacement parts and available expertise in the outdated technology.
- Transmission line ratings are limited by terminal equipment.

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ATSI Transmission Zone M-3 Process Masury 138 kV Misoperation Relays

Need #	Transmission Line / Substation Locations	Existing Line Rating (SN / SE)	Existing Conductor Rating (SN / SE)
ATSI-2023-019	Masury – Elwood Tap 138 kV Line	164 / 191	187 / 191
	Lincoln Park – Elwood Tap 138 kV Line	155 / 155	187 / 191

Need Numbers: ATSI-2023-019

Process State: Solution Meeting 11/17/2023

Previously Presented: Need Meeting 09/15/2023

Proposed Solution:

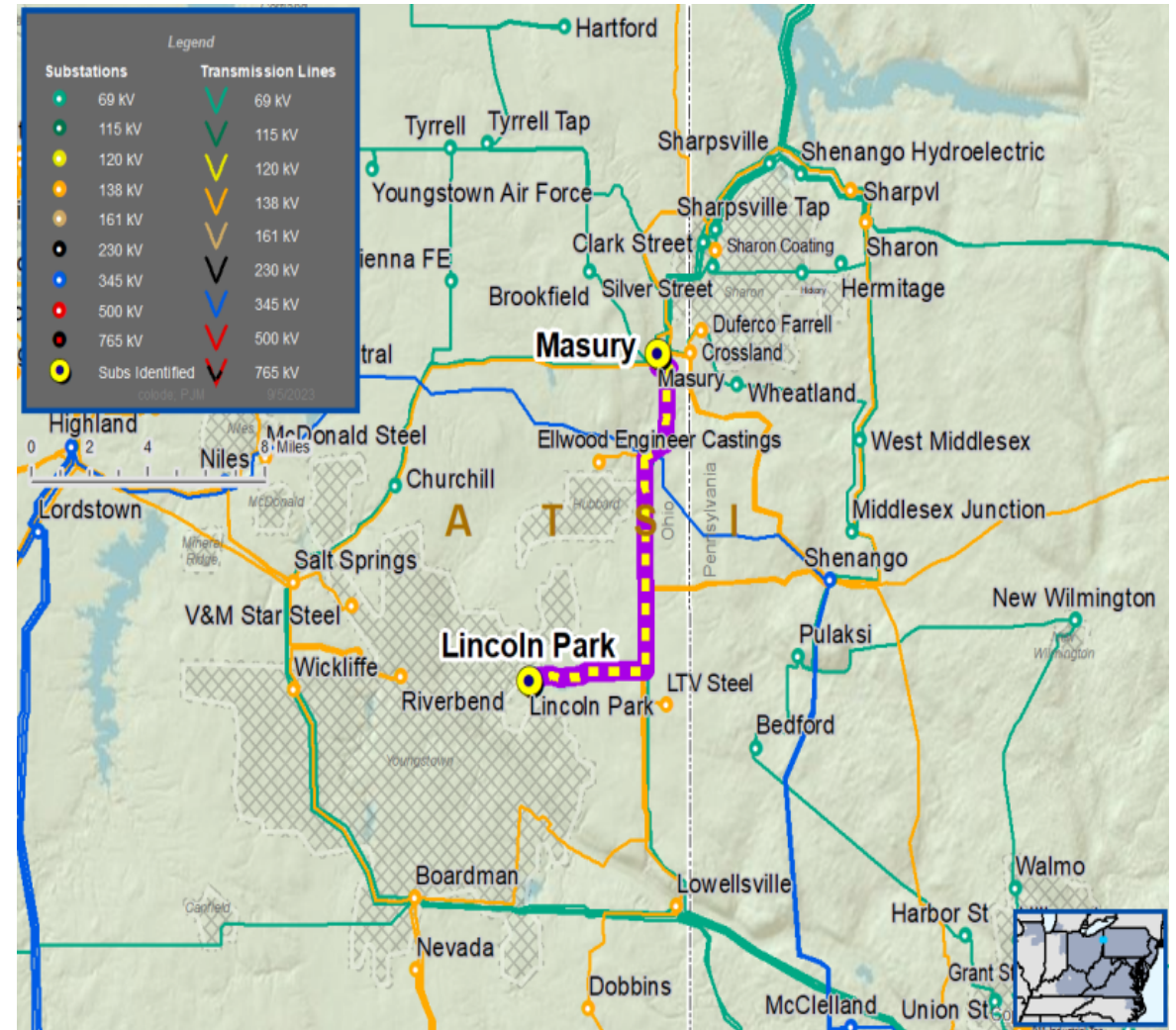
Masury Substation

- Replace relaying on Lincoln Park line terminal with microprocessor relays.
- Replace (2) 138 kV breakers for Lincoln Park and Shenango lines.
- Replace (2) associated disconnect switches.

Lincoln Park Substation

- Replace relaying on Masury line terminal with microprocessor relays.
- Replace (2) 138 kV breakers for Masury Line.
- Replace (4) associated disconnect switches.

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ATSI Transmission Zone M-3 Process Masury 138 kV Misoperation Relays

Need Numbers: ATSI-2023-019

Process State: Solution Meeting 11/17/2023

Previously Presented: Need Meeting 09/15/2023

Transmission Line Ratings:

Need #	Transmission Line / Substation Locations	Existing Line Ratings (SN / SE / WN / WE)	New Line Ratings (SN / SE / WN / WE)
ATSI-2023-019	Masury – Elwood Tap 138 kV Line Section	164 / 191 / 211 / 211	187 / 191 / 211 / 211
	Lincoln Park – Elwood Tap 138 kV Line Section	155 / 155 / 155 / 155	187 / 191 / 211 / 211

Alternatives Considered:

- Maintain existing condition and risk of misoperation of protective relays.

Estimated Project Cost: \$3.4M

Projected In-Service: 12/31/2025

Status: Conceptual

Need Numbers: ATSI-2023-020

Process State: Solution Meeting 11/17/2023

Previously Presented: Need Meeting 10/20/2023

Project Driver:

Equipment Material Condition, Performance and Risk

Specific Assumption Reference:

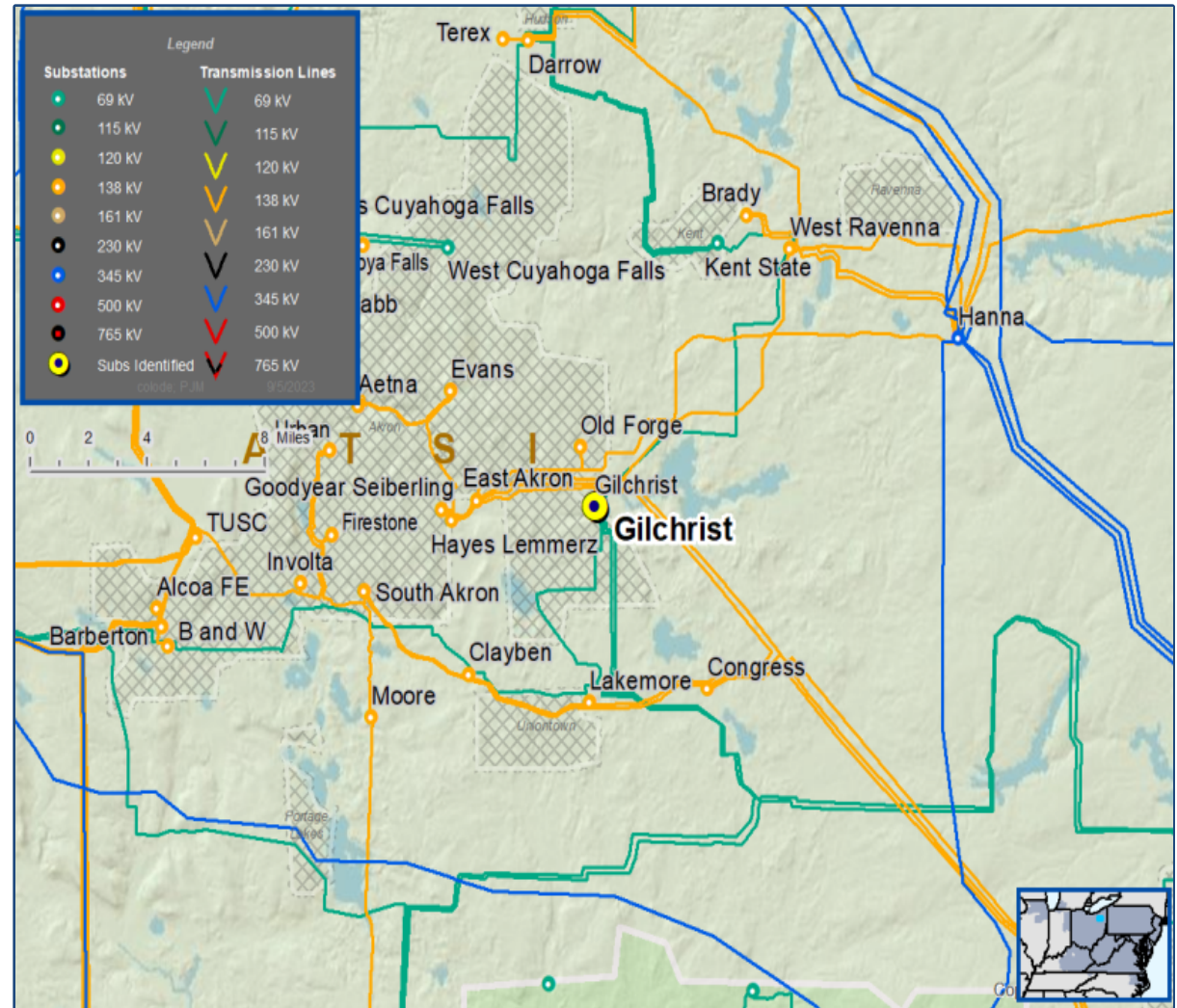
System Performance Projects Global Factors

- System reliability and performance
- Substation/line equipment limits
- Upgrade Relay Schemes
- Obsolete and difficult to repair communication equipment (DTT, Blocking, etc.)
- Communication technology upgrades

Problem Statement:

- FirstEnergy has identified protection schemes using a certain vintage of relays and communication equipment that have a history of misoperation.
- Proper operation of the protection scheme requires all the separate components perform adequately during a fault.
- In many cases the protection equipment cannot be repaired due to a lack of replacement parts and available expertise in the outdated technology.
- Transmission line ratings are limited by terminal equipment.

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ATSI Transmission Zone M-3 Process Gilchrist - Hartville 69 kV Misoperation Relays

Need #	Transmission Line / Substation Locations	Existing Line Rating (SN / SE)	Existing Conductor Rating (SN / SE)
ATSI-2023-020	Hartville – Trelleborg Tap 69 kV Line	76 / 76	76 / 92
ATSI-2023-020	Gilchrist - Burger-Rubbermaid Tap 69 kV Line	76 / 92	76 / 92

Need Numbers: ATSI-2023-020

Process State: Solution Meeting 11/17/2023

Previously Presented: Need Meeting 10/15/2023

Proposed Solution:

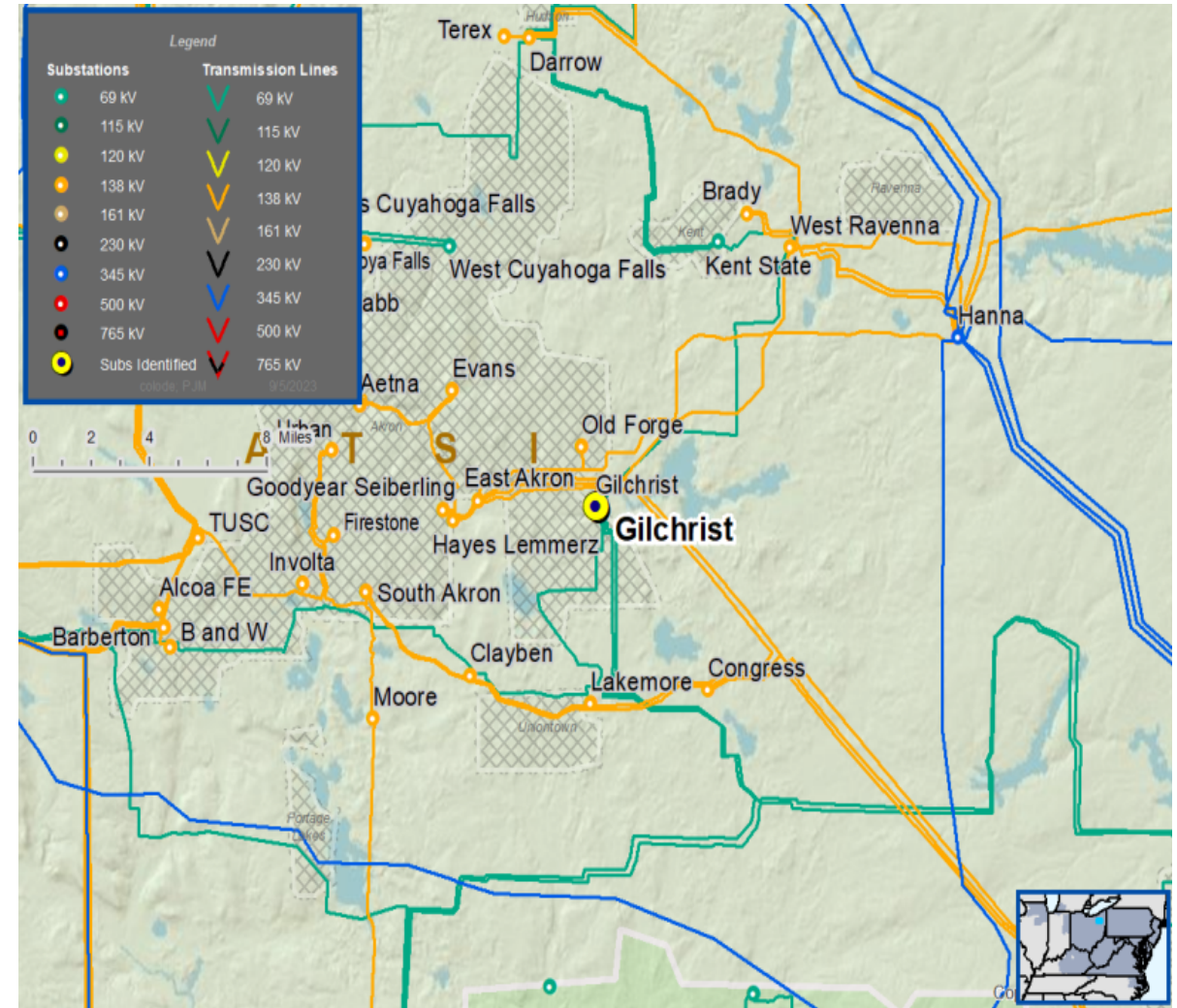
Gilchrist Substation

- Replace one circuit breaker, associated disconnect switches and relaying for Hartville line terminal.

Hartville Substation

- Replace one circuit breaker, associated disconnect switches and relaying for Gilchrist line terminal.

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ATSI Transmission Zone M-3 Process Gilchrist - Hartville 69 kV Misoperation Relays

Need Numbers: ATSI-2023-020

Process State: Solution Meeting 11/17/2023

Previously Presented: Need Meeting 09/15/2023

Transmission Line Ratings:

Need #	Transmission Line / Substation Locations	Existing Line Ratings (SN / SE / WN / WE)	New Line Rating (SN / SE / WN / WE)
ATSI-2023-020	Hartville – Trelleborg Tap 69 kV Line	76 / 76 / 76 / 76	76 / 92 / 87 / 111
	Gilchrist - Burger-Rubbermaid Tap 69 kV Line	76 / 92 / 87 / 101	76 / 92 / 87 / 111

Alternatives Considered:

- Maintain existing condition and risk of misoperation of protective relays.

Estimated Project Cost: \$1.6M

Projected In-Service: 6/1/2026

Status: Conceptual

Need Number: ATSI-2023-023
Process Stage: Solution Meeting –11/17/2023
Previously Presented: Need Meeting – 10/20/2023

Supplemental Project Driver(s):

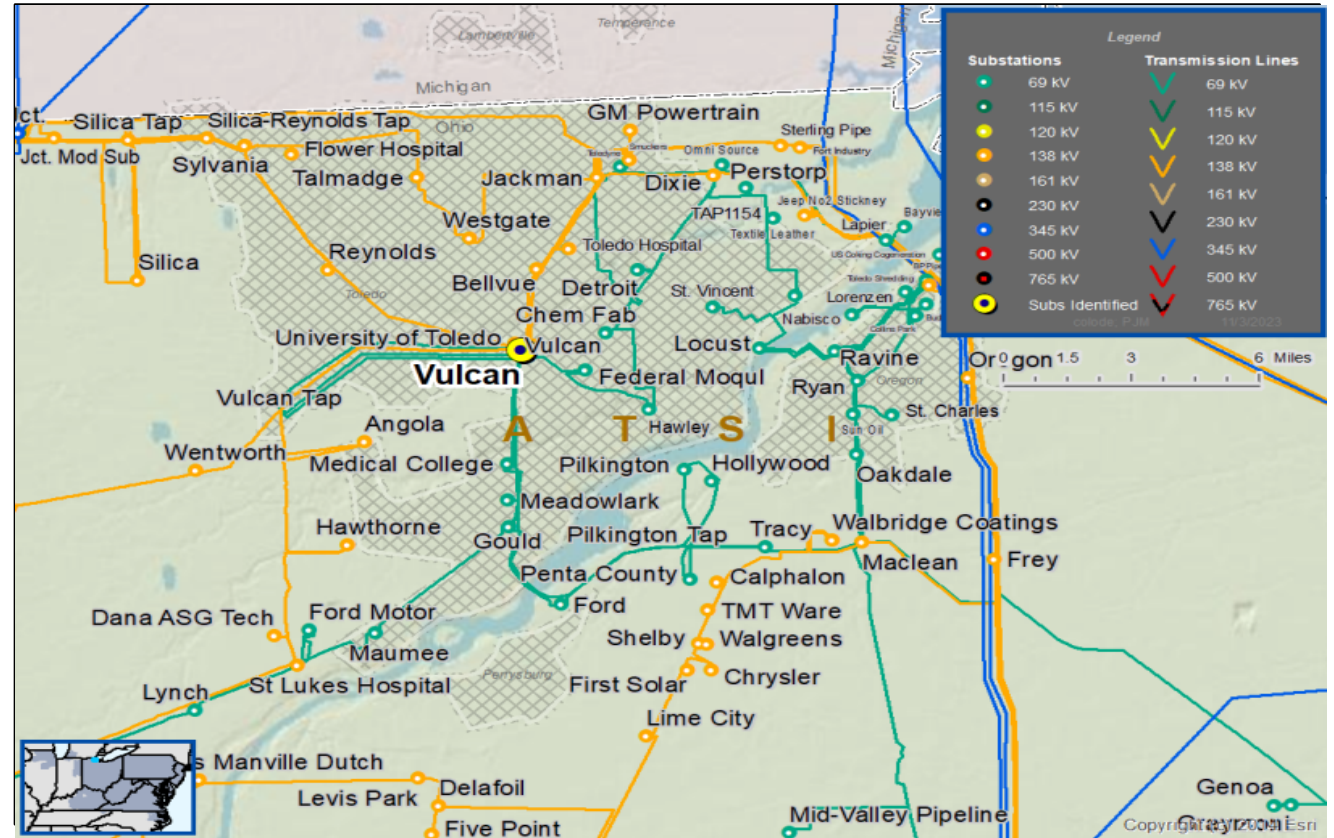
*Equipment Material Condition, Performance, and Risk
 Operational Flexibility and Efficiency
 Infrastructure Resilience*

Specific Assumption Reference(s)

- Substation / Line equipment limits
- System reliability and performance
- Reliability of Non-Bulk Electric System (Non-BES) Facilities

Problem Statement

The Vulcan 138/69 kV Transformer has been experiencing increased loading during the summer peak seasons requiring Transmission System Operators to mitigate the risk of thermal violations through operational switching.



Need Number: ATSI-2023-023
Process Stage: Solution Meeting –11/17/2023
Previously Presented: Need Meeting – 10/20/2023

Proposed Solution:

Vulcan 138/69 kV Transformer Terminal Upgrades

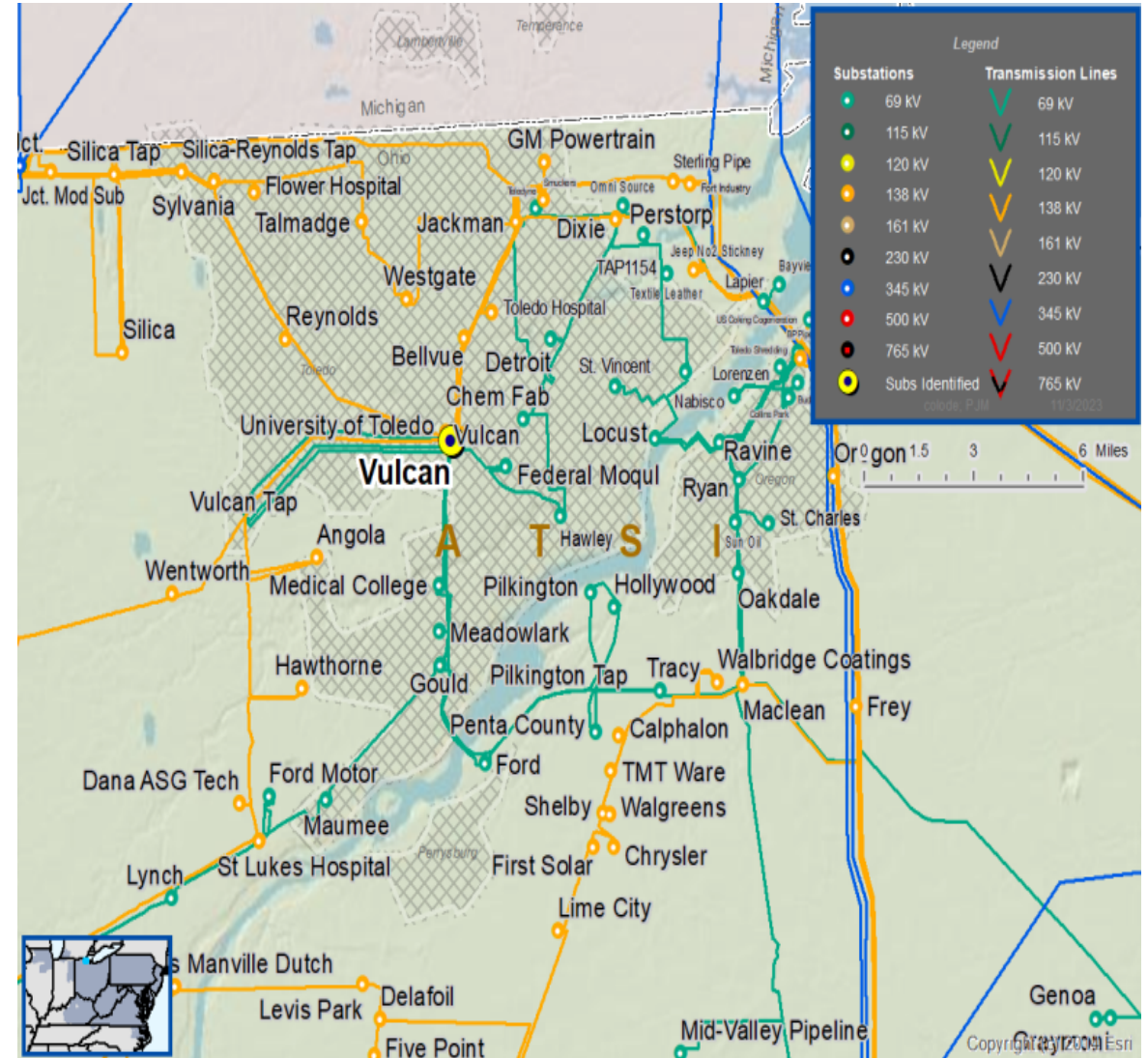
- Replace substation conductor including the breaker leads and transformer leads

Alternatives Considered:

- Maintain existing condition and continue to rely on Transmission Operators to manage the loading on the transformer through operational switching.

Estimated Project Cost: \$1.0M

Projected In-Service: 3/28/2024
Status: Engineering



Need Numbers: ATSI-2023-029

Process State: Solution Meeting 11/17/2023

Previously Presented: Need Meeting 10/20/2023

Project Driver:

Equipment Material Condition, Performance and Risk

Specific Assumption Reference:

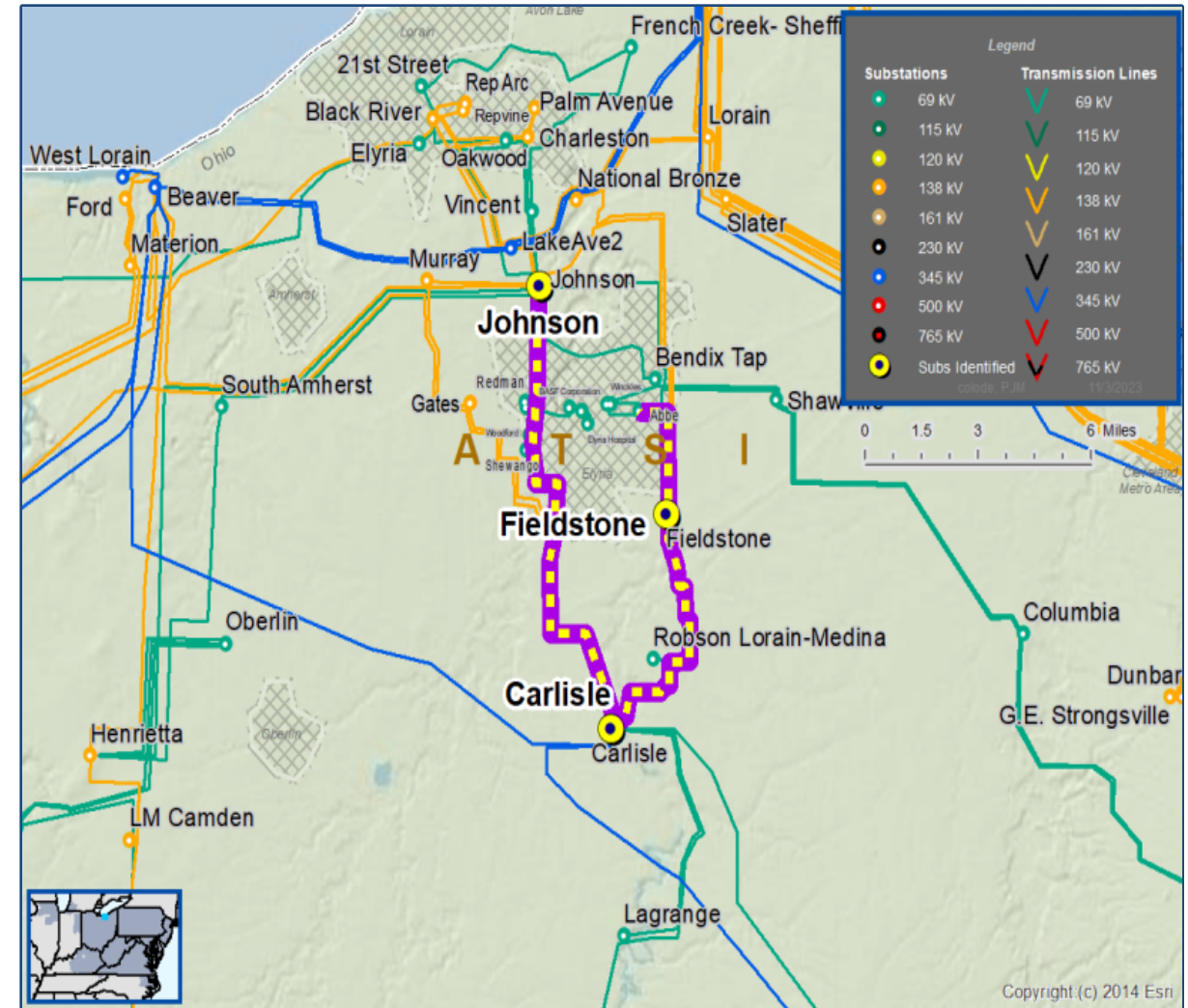
System Performance Projects Global Factors

- System reliability and performance
- Substation/line equipment limits
- Upgrade Relay Schemes
- Obsolete and difficult to repair communication equipment (DTT, Blocking, etc.)
- Communication technology upgrades

Problem Statement:

- FirstEnergy has identified protection schemes using a certain vintage of relays and communication equipment that have a history of misoperation.
- Proper operation of the protection scheme requires all the separate components perform adequately during a fault.
- In many cases the protection equipment cannot be repaired due to a lack of replacement parts and available expertise in the outdated technology.
- Transmission line ratings are limited by terminal equipment.

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ATSI Transmission Zone M-3 Process Carlisle – Johnson 138 kV Misoperation Relays

Need #	Transmission Line / Substation Locations	Existing Circuit Ratings (SN / SE / WN / WE)	Existing Conductor Ratings (SN / SE / WN / WE)
ATSI-2023-029	Carlisle – Fieldstone Tap 138 kV Line Section	233 / 282 / 263 / 333	233 / 282 / 263 / 333
	Fieldstone Tap – Johnson 138 kV Line Section	225 / 282 / 263 / 333	233 / 282 / 263 / 333

Need Numbers: ATSI-2023-029

Process State: Solution Meeting 11/17/2023

Previously Presented: Need Meeting 10/20/2023

Proposed Solution:

At Carlisle Substation

- Replace (1) 138 kV Oil Circuit Breaker.
- Replace (3) 138 kV disconnect switches.
- Replace associated relaying with microprocessor relays.
- Remove wave-trap and replace power line carrier communications with fiber communications.

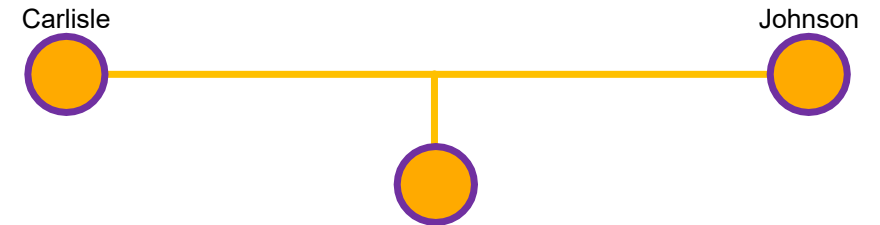
At Fieldstone Substation

- Remove wave-trap.

At Johnson Substation

- Replace (1) 138 kV disconnect switch.
- Remove wave-trap and replace power line carrier communications with fiber communications.
- Connect fiber to existing microprocessor relays.

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



ATSI Transmission Zone M-3 Process Carlisle – Johnson 138 kV Misoperation Relays

Need Numbers: ATSI-2023-029

Process State: Solution Meeting 11/17/2023

Previously Presented: Need Meeting 10/20/2023

Transmission Line Ratings:

Need #	Transmission Line / Substation Locations	Existing Circuit Ratings (SN / SE / WN / WE)	New Circuit Ratings (SN / SE / WN / WE)
ATSI-2023-029	Carlisle – Fieldstone Tap 138 kV Line Section	233 / 282 / 263 / 333	233 / 282 / 263 / 333
	Fieldstone Tap – Johnson 138 kV Line Section	225 / 282 / 263 / 333	233 / 282 / 263 / 333

Alternatives Considered:

- Maintain existing condition and risk of misoperation of protective relays.

Estimated Project Cost: \$2.2M

Projected In-Service: 6/30/2025

Status: Engineering

Need Numbers: ATSI-2023-041

Process State: Solution Meeting 11/17/2023

Previously Presented: Need Meeting 10/20/2023

Project Driver:

Equipment Material Condition, Performance and Risk

Specific Assumption Reference:

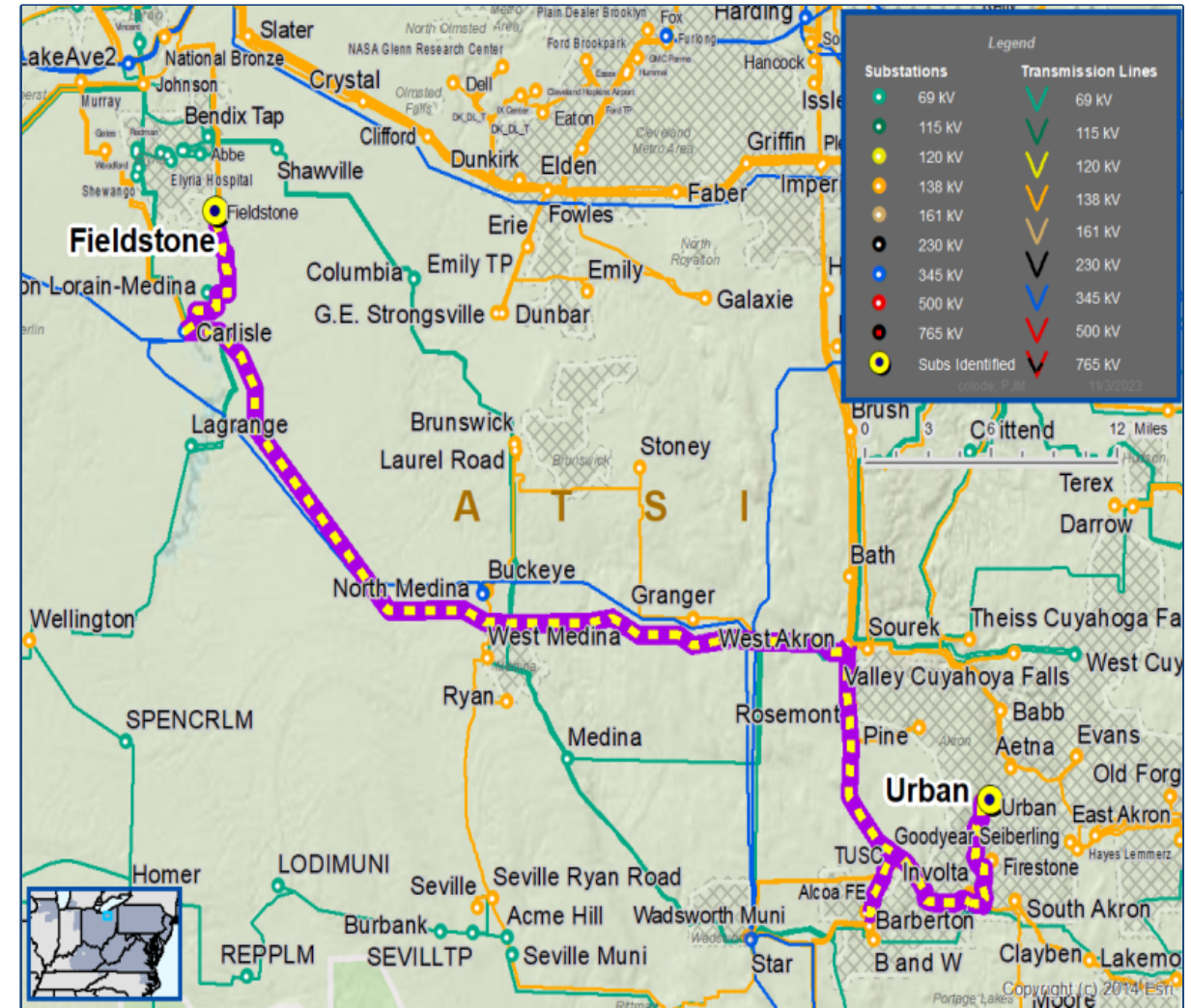
System Performance Projects Global Factors

- System reliability and performance
- Substation/line equipment limits
- Upgrade Relay Schemes
- Obsolete and difficult to repair communication equipment (DTT, Blocking, etc.)
- Communication technology upgrades

Problem Statement:

- FirstEnergy has identified protection schemes using a certain vintage of relays and communication equipment that have a history of misoperation.
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- In many cases the protection equipment cannot be repaired due to a lack of replacement parts and available expertise in the outdated technology.
- Transmission line ratings are limited by terminal equipment.

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ATSI Transmission Zone M-3 Process Firestone – Urban 138 kV Misoperation Relays

Need #	Transmission Line / Substation Locations	Existing Circuit Ratings (SN / SE / WN / WE)	Existing Conductor Ratings (SN / SE / WN / WE)
ATSI-2023-041	Firestone – Urban 138 kV Line	189 / 241 / 237 / 249	233 / 282 / 263 /333

Need Numbers: ATSI-2023-041

Process State: Solution Meeting 11/17/2023

Previously Presented: Need Meeting 10/20/2023

Proposed Solution:

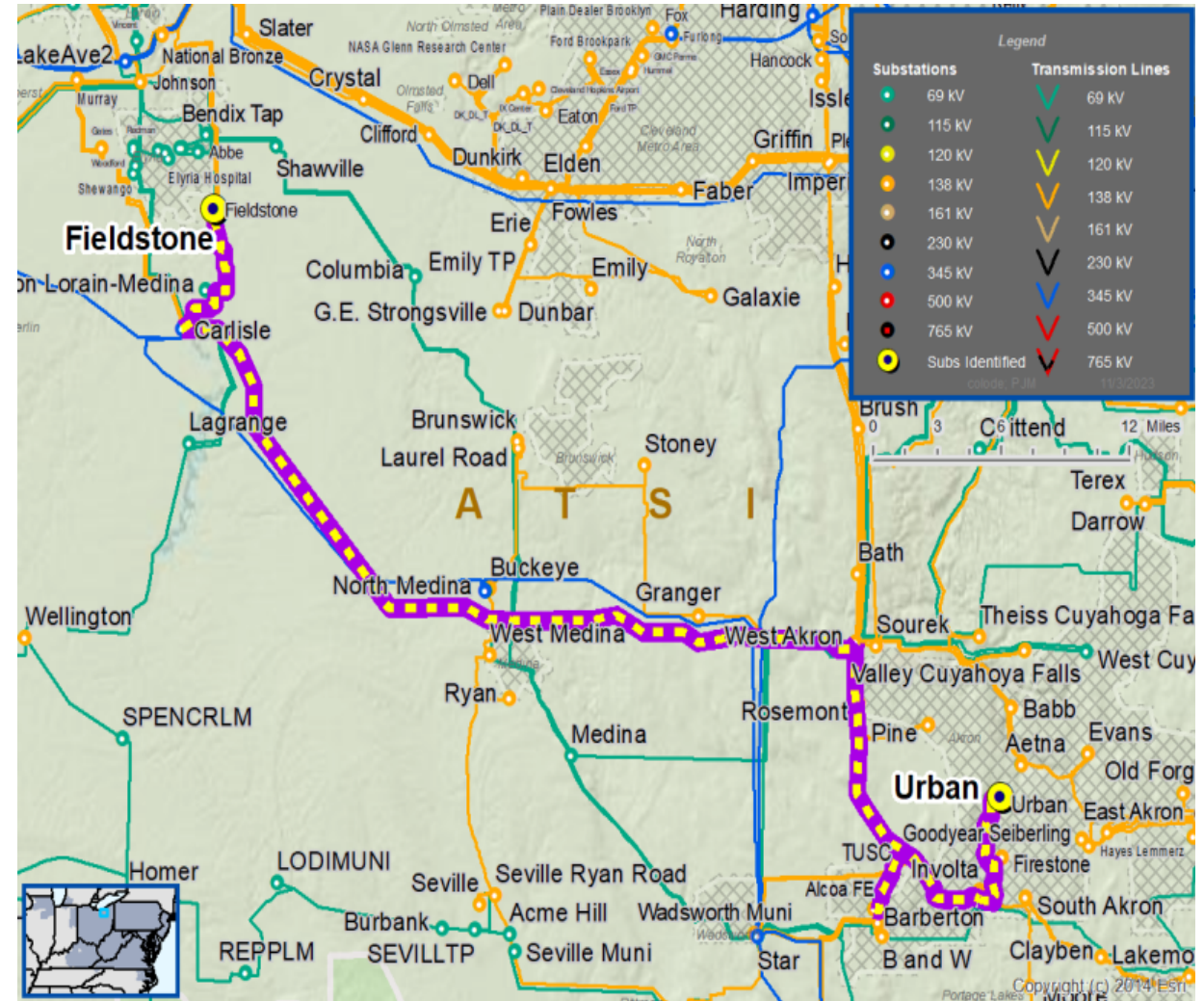
At Firestone Substation

- Replace associated relaying with microprocessor relays.
- Replace wave-trap and power line carrier equipment.

At Urban Substation

- Replace (1) 138 kV Oil Circuit Breaker.
- Replace (3) 138 kV disconnect switches.
- Replace associated relaying with microprocessor relays.
- Replace wave-trap and power line carrier equipment.

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ATSI Transmission Zone M-3 Process Firestone – Urban 138 kV Misoperation Relays

Need Numbers: ATSI-2023-041

Process State: Solution Meeting 11/17/2023

Previously Presented: Need Meeting 10/20/2023

Transmission Line Ratings:

Need #	Transmission Line / Substation Locations	Existing Circuit Ratings (SN/ SE / WN / WE)	Existing Conductor Ratings (SN / SE / WN / WE)
ATSI-2023-041	Firestone – Urban 138 kV Line	189 / 241 / 237 / 249	233 / 282 / 263 / 333

Alternatives Considered:

- Maintain existing condition and risk of misoperation of protective relays.

Estimated Project Cost: \$2.5M

Projected In-Service: 5/15/2026

Status: Engineering

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

11/7/2023 – V1 – Original version posted to pjm.com