Subregional RTEP Committee – Western
FirstEnergy Supplemental Projects

July 8, 2022

ATSI Transmission Zone M-3 Process
Cedar St – Frisco #1 69 kV Line - New Customer

Need Number: ATSI-2021-018

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan – 3/18/2022

Previously Presented: Need Meeting 07/16/2021
Solutions Meeting – 08/16/2021

Supplemental Project Driver(s):
Customer Service

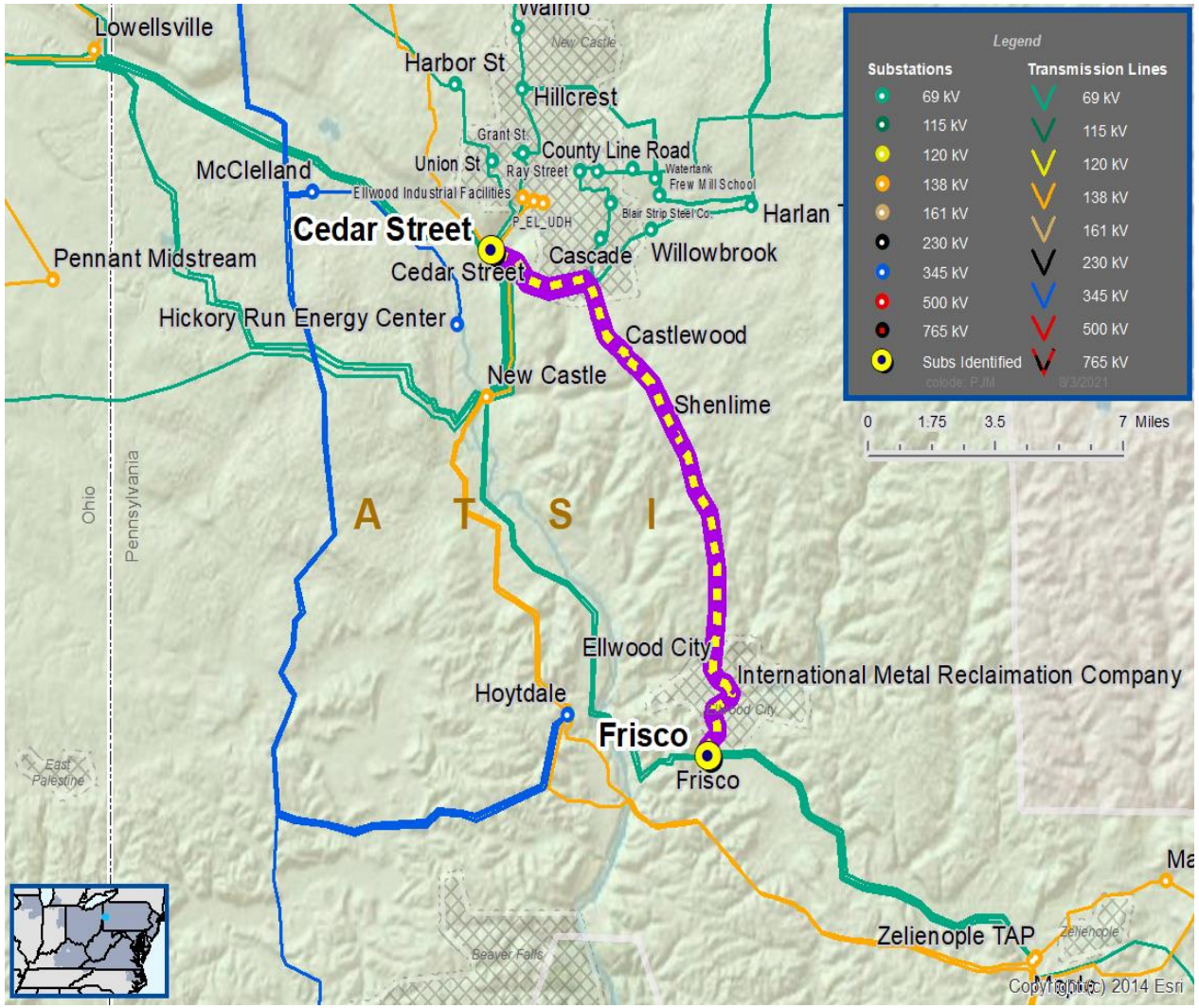
Specific Assumption Reference(s)

Customer connection request evaluated per FirstEnergy's "Requirements for Transmission Connected Facilities" document and "Transmission Planning Criteria" document.

Problem Statement

New Customer Connection – A customer requested 69 kV transmission service for approximately 4 MVA of total load near the Cedar St – Frisco #1 69 kV Line.

Requested In-Service Date: May 1, 2022



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ATSI Transmission Zone M-3 Process
Cedar St – Frisco #1 69 kV Line - New Customer

Need Number: ATSI-2021-018

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan – 3/18/2022

Proposed Solution:

- Tap the Cedar St – Frisco #1 69 kV Line between Cedar St and Inmetco
- Install two network 69 kV disconnect switches
- Install one 69 kV tap switch
- Construct ~1 span of 69 kV into new substation
- Adjust relaying at Cedar St and Frisco substations

Alternatives Considered:

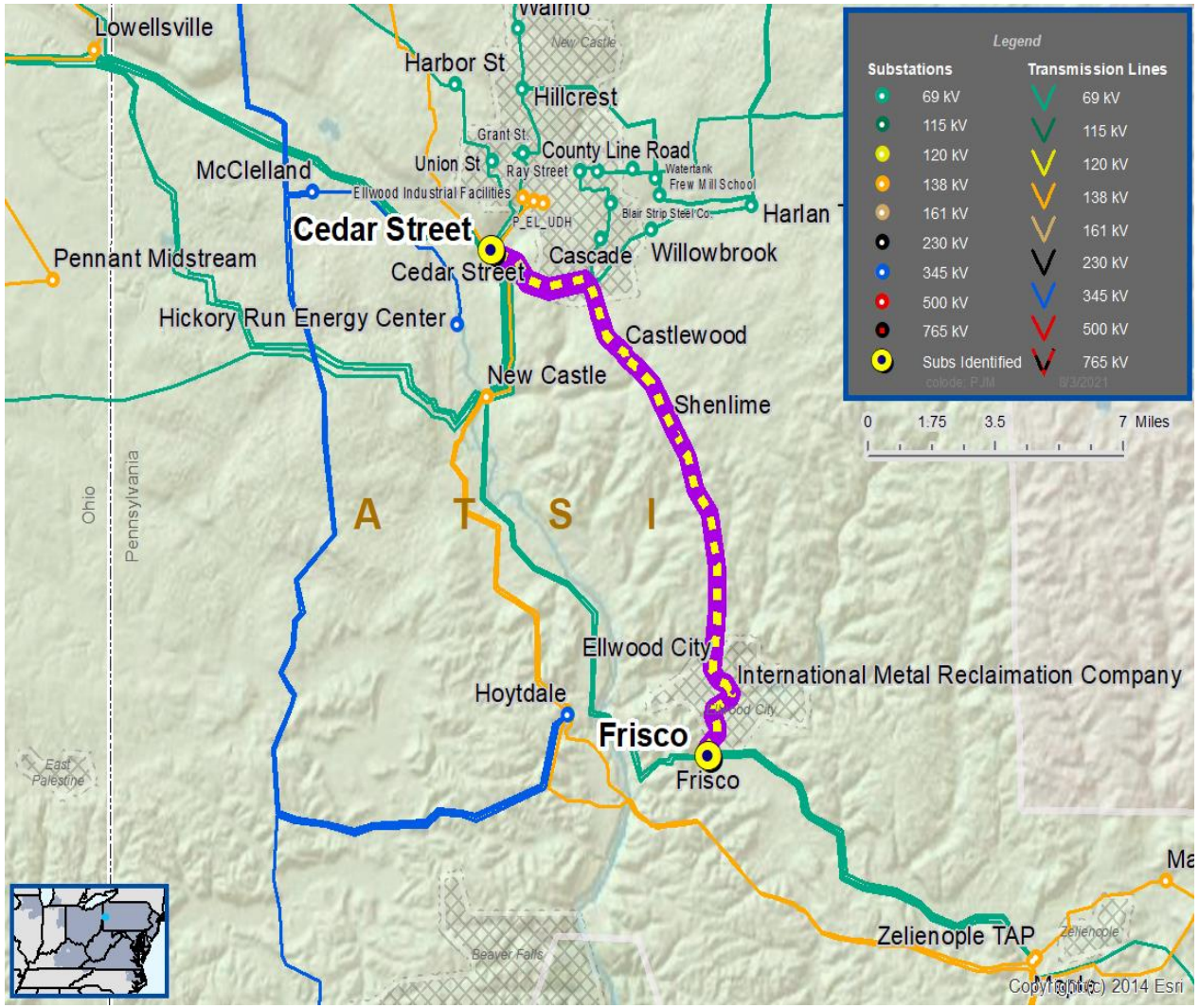
- Tap the Cedar St – Frisco #2 69 kV Line

Estimated Project Cost: $1.4M

Projected In-Service: 05/01/2022

Supplemental Project ID: s2647

Model: 2020 RTEP model for 2025 Summer (50/50)



ATSI Transmission Zone M-3 Process
London-Tangy 138 kV Line - New Customer

Need Number: ATSI-2021-017

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan – 3/18/2022

Previously Presented: Need Meeting – 07/16/2021
Solution Meeting – 08/16/2021

Supplemental Project Driver(s):
Customer Service

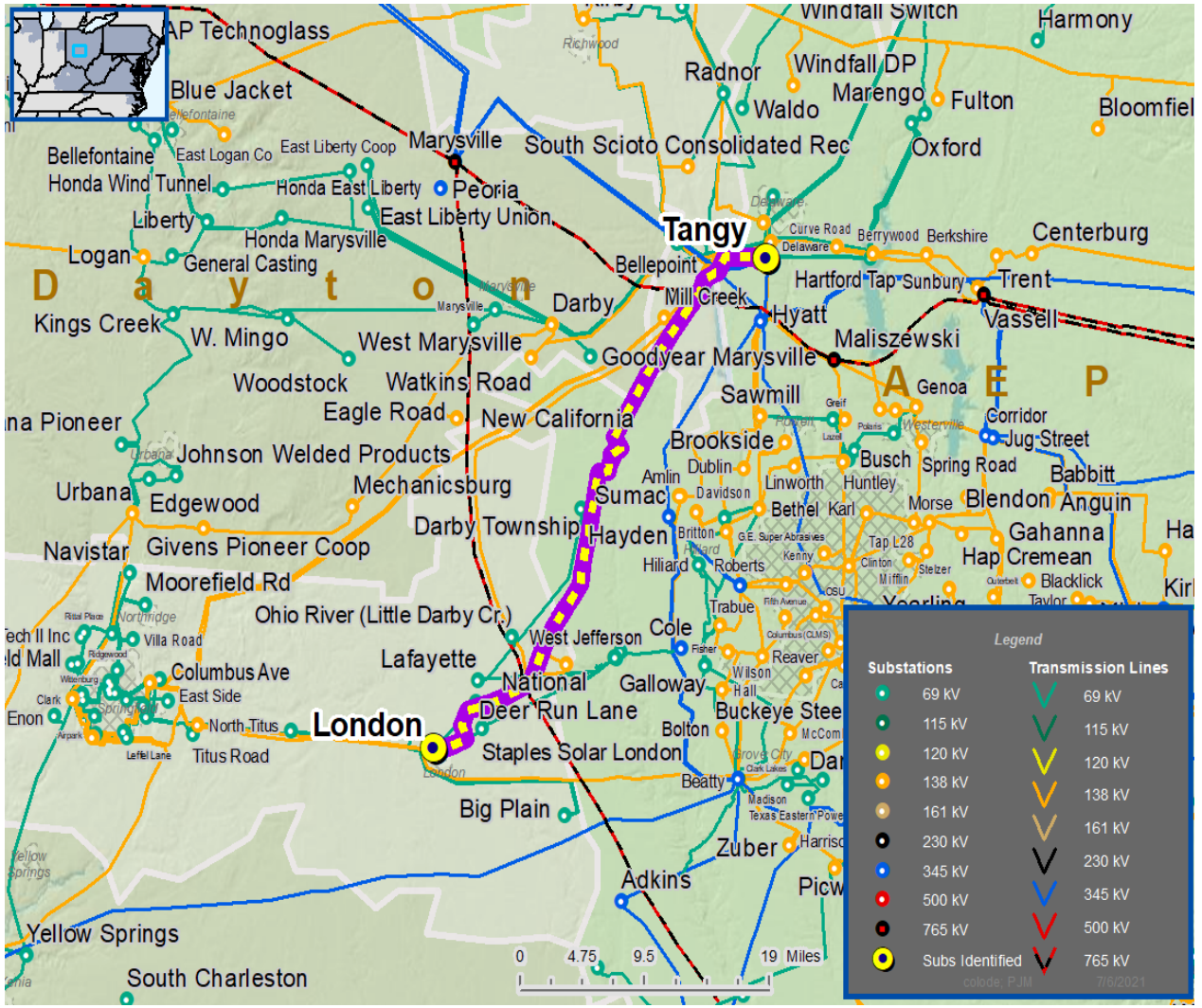
Specific Assumption Reference(s)

Customer connection request evaluated per FirstEnergy's "Requirements for Transmission Connected Facilities" document and "Transmission Planning Criteria" document.

Problem Statement

New Customer Connection – A customer requested 138 kV transmission service for approximately 23 MVA of total load near the London-Tangy 138 kV Line.

Requested In-Service Date: April 30, 2022



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ATSI Transmission Zone M-3 Process
London-Tangy 138 kV Line - New Customer

Need Number: ATSI-2021-017

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan – 3/18/2022

Proposed Solution:

Mitchell Delivery Point 138 kV Transmission Line Tap

- Construct a 138 kV tap (approximately 1-2 spans) off the London-Tangy 138 kV Line. Tap location is approximately 15 miles from the Tangy Substation.
- Add two SCADA control switches at transmission line tap location and one tap switch
- Adjust relay settings at London and Tangy substations

Alternatives Considered:

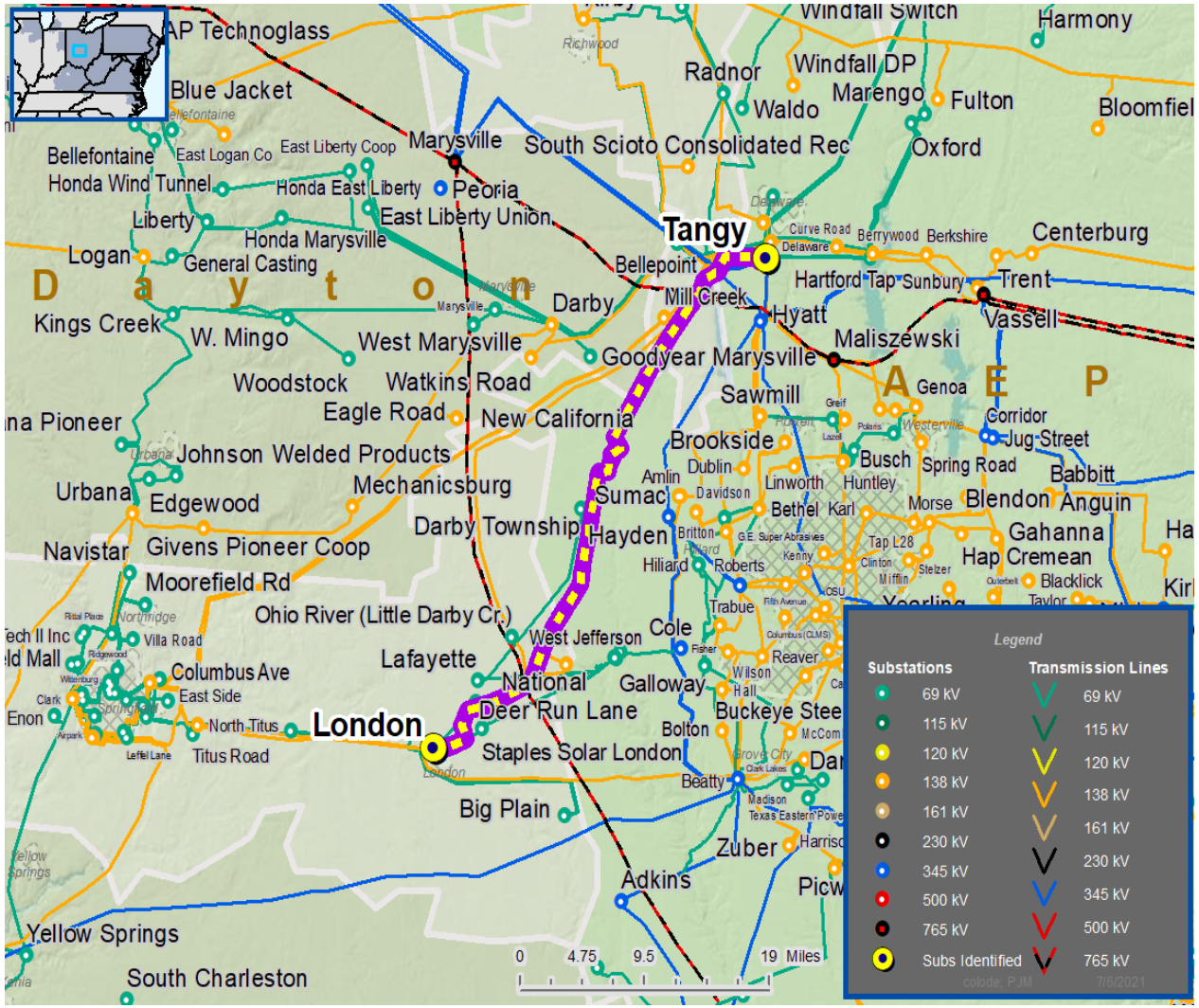
- No alternatives considered for this project

Estimated Project Cost: $1.4 M

Projected In-Service: 4/30/2022

Supplemental Project ID: s2648

Model: 2020 Series 2025 Summer RTEP 50/50



ATSI Transmission Zone M-3 Process
Lloyd Substation

Need Number: ATSI-2021-014

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan – 3/18/2022

Previously Presented: Need Meeting – 06/15/2021
Solution Meeting – 08/16/2021

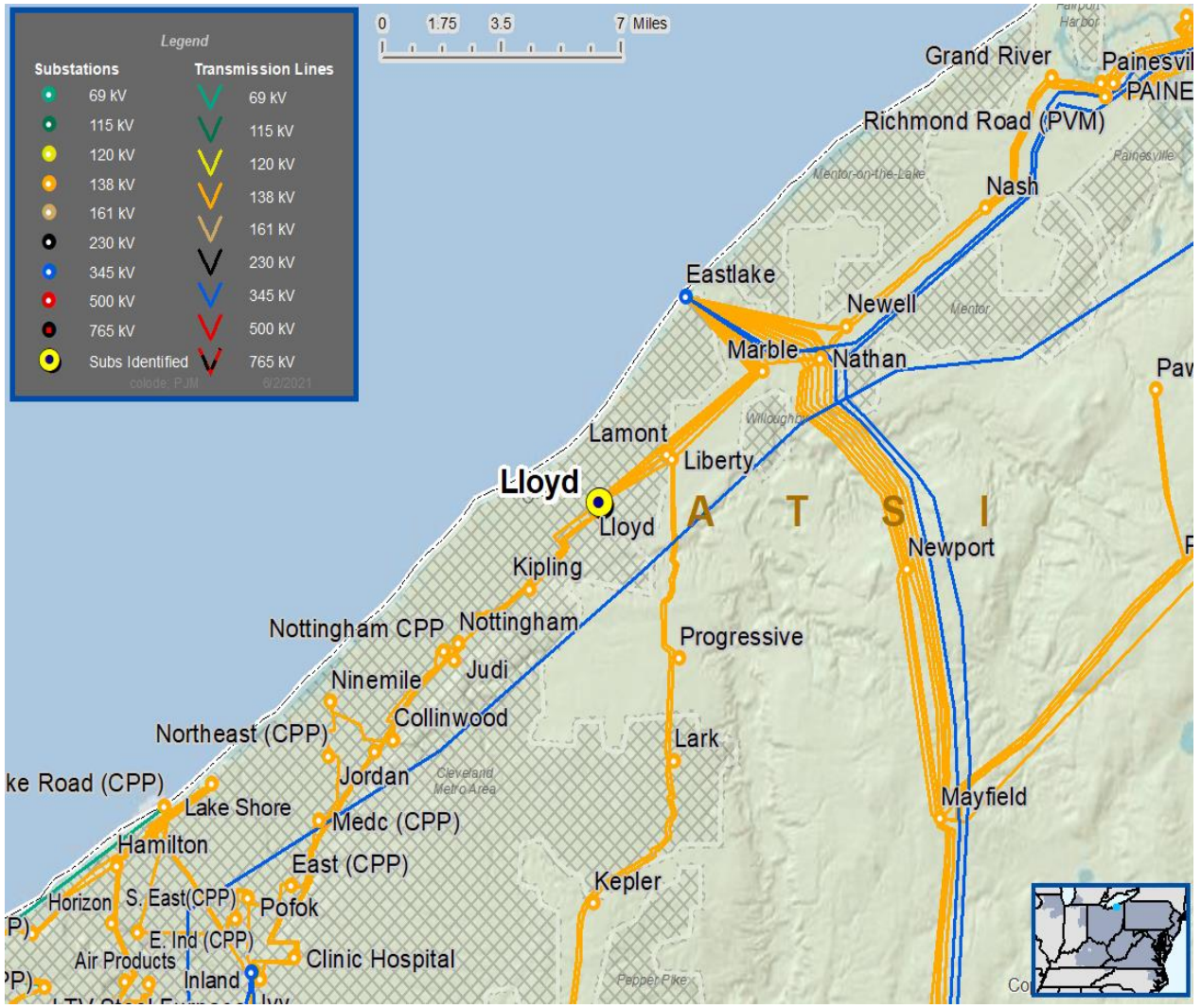
Supplemental Project Driver(s):
Customer Service

Specific Assumption Reference(s)

Modification of existing customer connection request evaluated per FirstEnergy's "Requirements for Transmission Connected Facilities" document and "Transmission Planning Criteria" document

Problem Statement

- The B-phase of existing 138-36 kV Lloyd transformer #2 has failed.



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ATSI Transmission Zone M-3 Process
Lloyd Substation

Need Number: ATSI-2021-014

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan – 3/18/2022

Proposed Solution:

Move Existing 138-36 kV Transformer

- Move the existing #3 transformer from Nathan Substation to the open bay position at Lloyd Substation in order to feed the distribution load. Retire the failed #2 Lloyd transformer in place.

Transformer Ratings:

- **Failed #2 Lloyd Transformer**
  - 55 MVA SN / 66 MVA SE
- **Existing #3 Nathan Transformer**
  - 72 MVA SN / 81 MVA SE

Alternatives Considered:

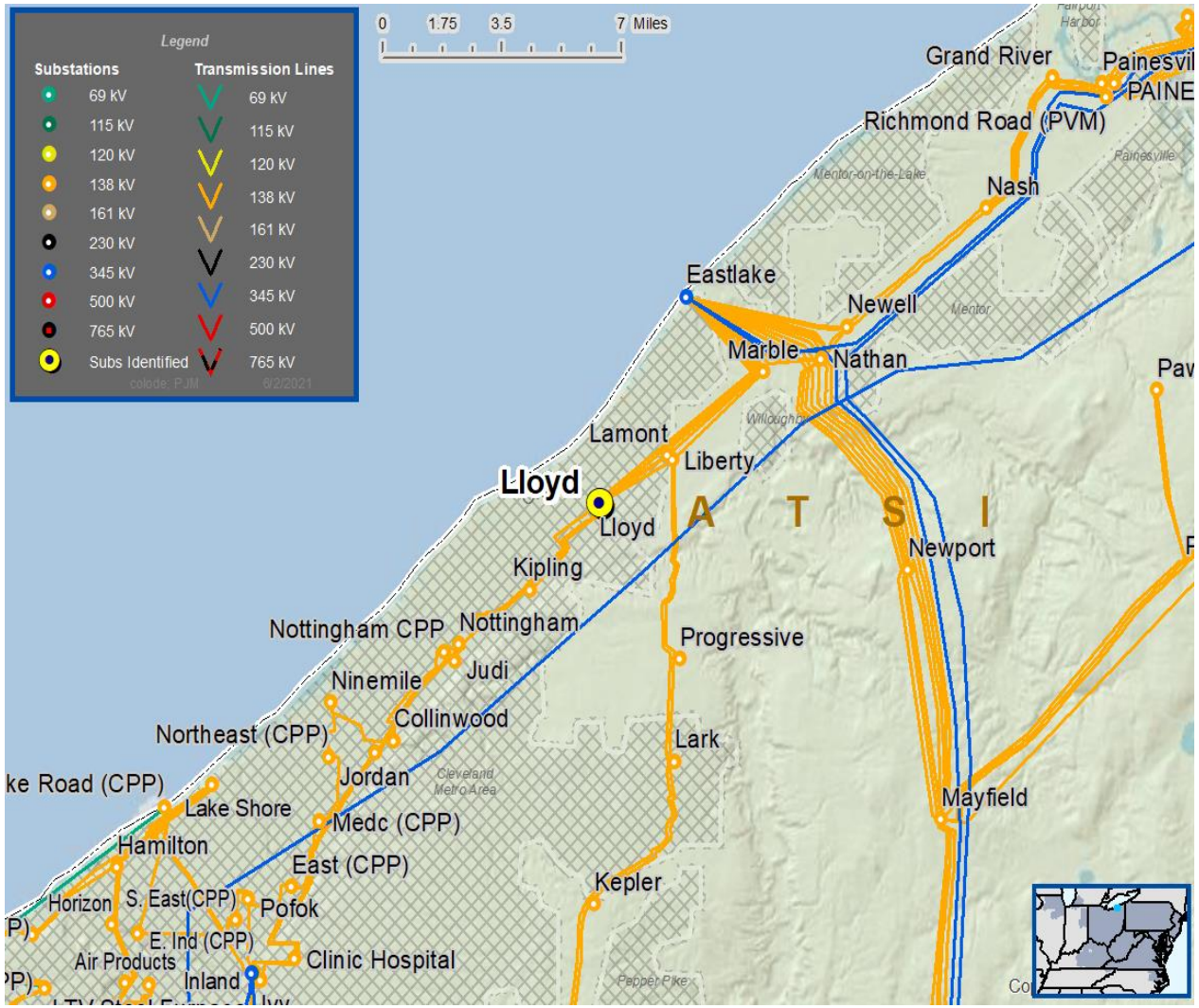
- New transformer installation at Lloyd Substation

Estimated Project Cost: $0.0

Projected In-Service: 12/31/2021

Supplemental Project ID: s2649

Model: 2019 Series 2024 Summer RTEP 50/50



ATSI Transmission Zone M-3 Process
Relay Misoperation Solution

Need Number: ATSI-2019-073

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan – 3/18/2022

Previously Presented: Need Meeting – 11/22/2019
Solution Meeting – 03/19/2020
Re-Present Solution Meeting – 08/16/2021

Project Driver:
Equipment Material Condition, Performance and Risk

Specific Assumption References:
Global Factors

- System reliability and performance
- Substation / line equipment limits

Upgrade Relay Schemes

- Relay schemes that have a history of misoperation
- Obsolete and difficult to repair communication equipment (DTT, Blocking, etc.)
- Communication technology upgrades
- Bus protection schemes

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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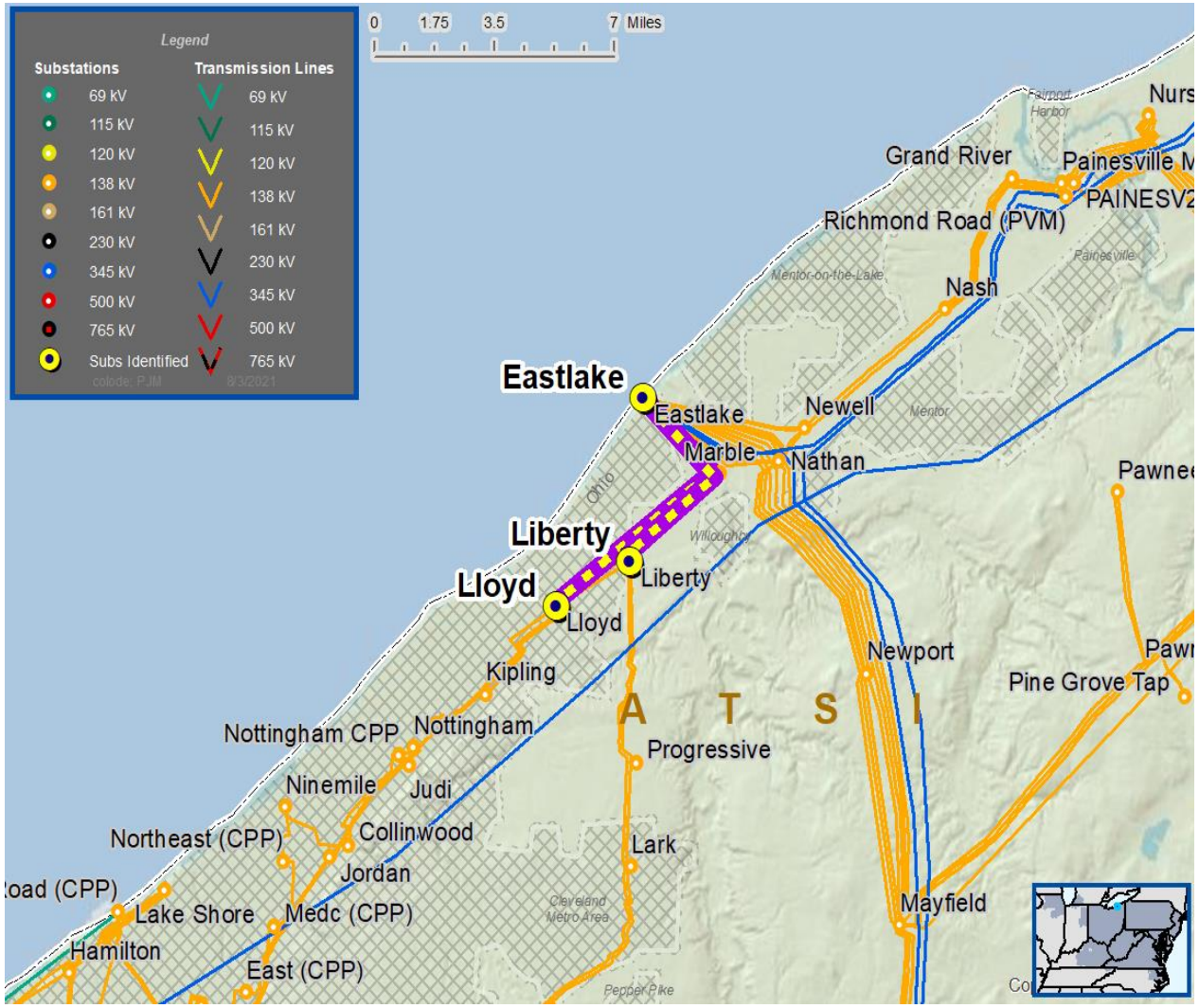

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ATSI-2019	Transmission Line / Substation Locations	Existing Line/Terminal Equipment MVA Rating (SN / SE)	Existing Conductor/Transformer MVA Rating (SN / SE)	Limiting Terminal Equipment
-073	Eastlake-Lloyd 138 kV Q12 Line 1. Eastlake – Liberty 2. Lamont – Lloyd	1. 273 / 287 2. 103 / 132	1. 273 / 332 2. 148 / 151	Substation Conductor, Relay, CTs @ Lloyd

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ATSI Transmission Zone M-3 Process
Relay Misoperation Solution

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ATSI-2019	Transmission Line / Substation Locations	New MVA Line Rating (SN / SE)	Proposed Solution	Estimated Costs ($ M)	Target ISD
-073 (s2228)	Eastlake-Lloyd 138 kV Q12 Line 1. Eastlake – Liberty 2. Lamont – Lloyd	1. 273 / 332 2. 147 (WN) / 164 (WE)	At Eastlake replace the Q-12 circuit breaker, line disconnect switch, relaying, line terminal arresters, and line CVTs. At Lloyd remove the Q12 line relaying due to Lloyd TR#2 moving to the Q11 bay position.	1.1	03/03/2023

Supplemental Project ID: s2228

ATSI Transmission Zone M-3 Process
Maple – Pine Y-192 69 kV New Customer

Need Number: ATSI-2021-012

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan – 7/8/2022

Previously Presented: Need Meeting – 05/21/2021
Solutions Meeting – 11/19/2021

Supplemental Project Driver(s):
Customer Service

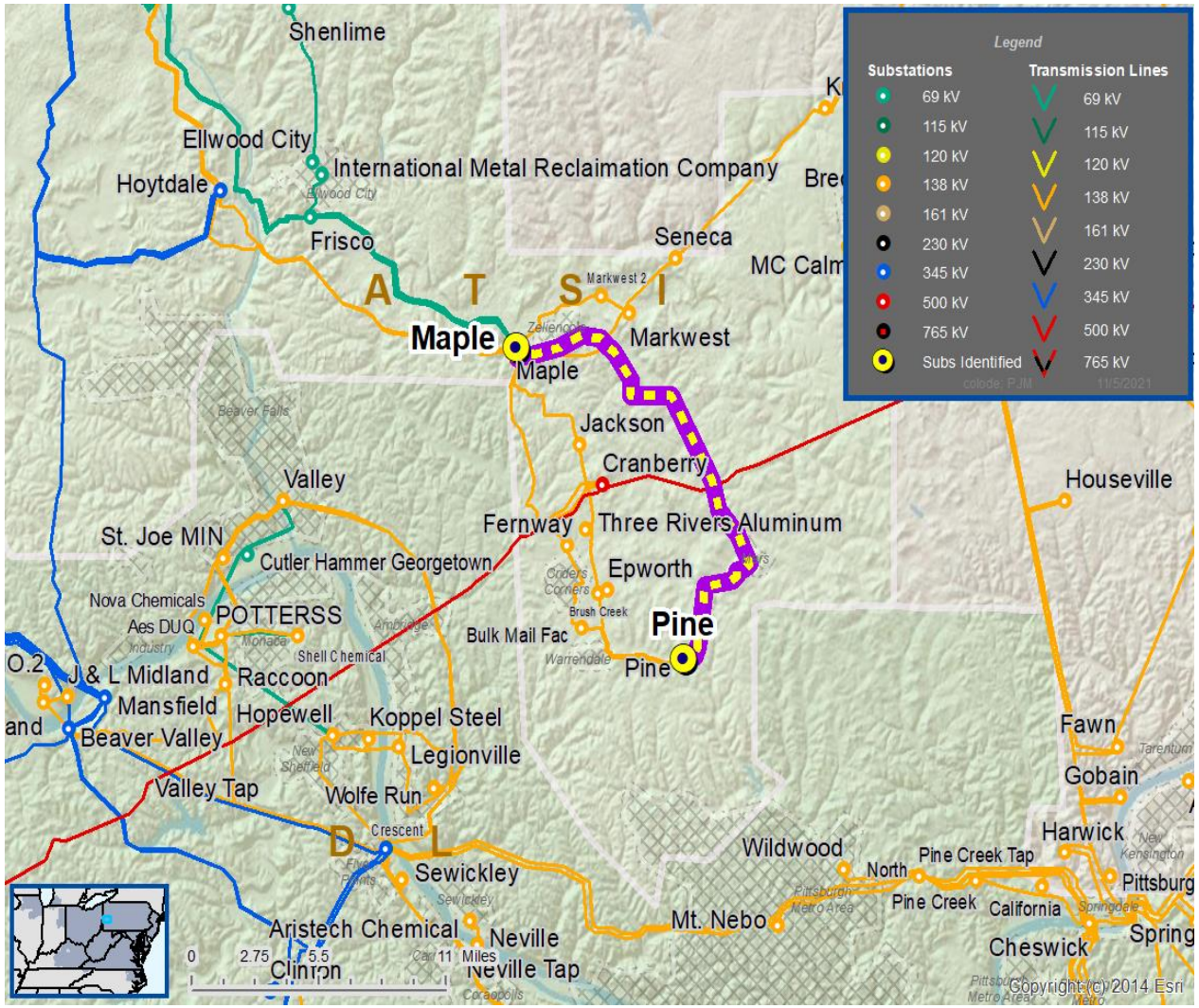
Specific Assumption Reference(s)

Customer connection requests will be evaluated per FirstEnergy's "Requirements for Transmission Connected Facilities" document and "Transmission Planning Criteria" document.

Problem Statement

New Customer Connection – Penn Power Distribution has requested a new 69 kV delivery point near the Maple – Pine 69 kV Line due to a thermal overload identified on the Mars #2 69-12.47 kV transformer. The anticipated load of the new customer connection is 8.7 MVA.

Requested In-Service Date: 06/01/2022



ATSI Transmission Zone M-3 Process
Maple – Pine Y-192 69 kV New Customer

Need Number: ATSI-2021-012

Process Stage: Solutions Meeting – 11/19/2021

Previously Presented: Need Meeting – 05/21/2021

Proposed Solution:

- Tap the Maple – Pine Y-192 69 kV line between Callery and Concast Metals
- Install one network 69 kV disconnect switch with SCADA
- Construct ~1 span of 69 kV into new substation

Alternatives Considered:

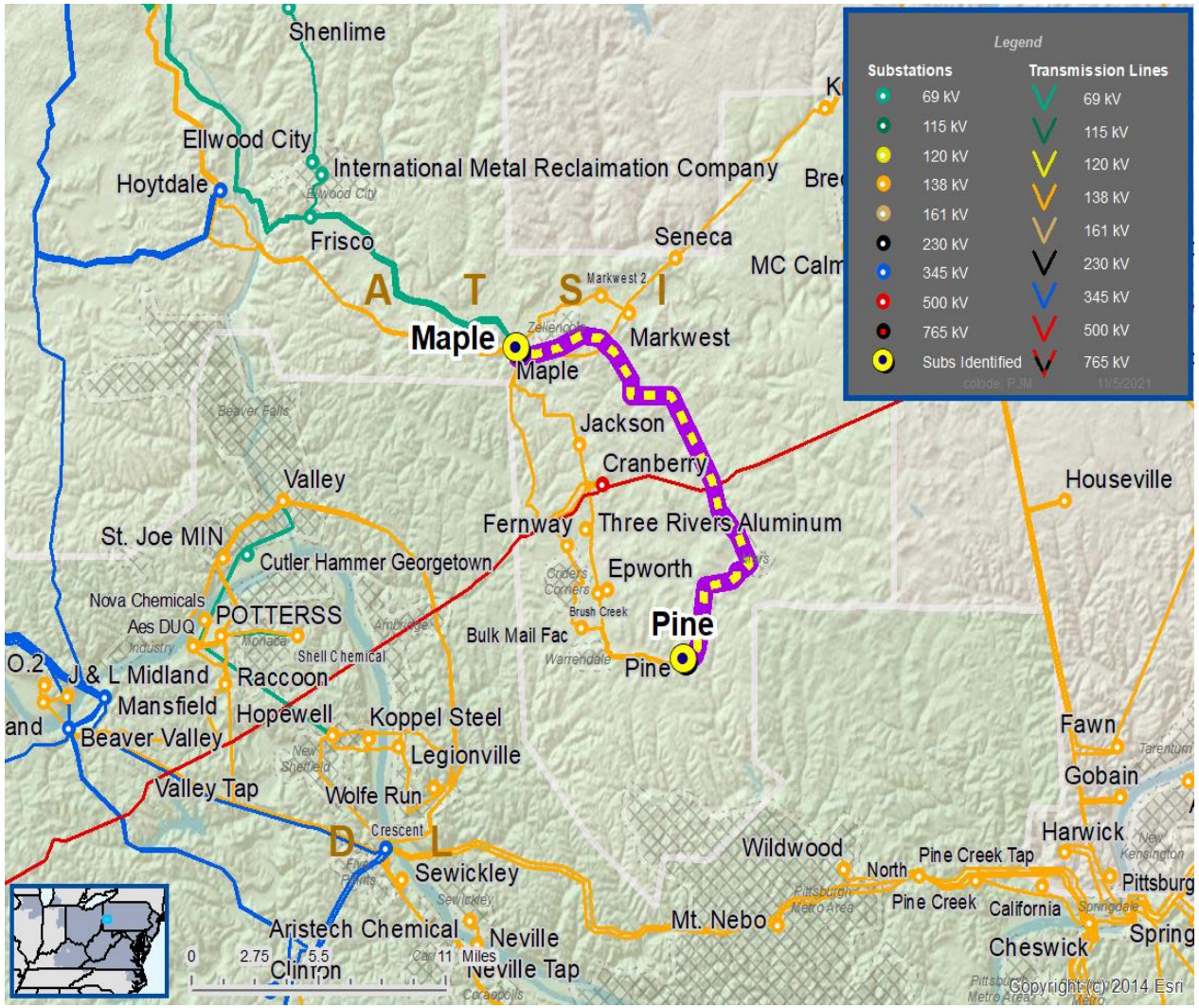
- No alternatives were considered

Estimated Project Cost: $0.8M

Projected In-Service: 06/30/2022

Supplemental Project ID: s2804

Model: 2020 RTEP model for 2025 Summer



ATSI Transmission Zone M-3 Process
Relay Misoperation Projects

Need Number: ATSI-2021-025 and ATSI-2021-026

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan – 7/8/2022

Previously Presented: Need Meeting - 10/15/2021

Solution Meeting – 02/18/2022

Project Driver:

Equipment Material Condition, Performance and Risk

Specific Assumption References:

Global Factors

- System reliability and performance
- Substation / line equipment limits

Upgrade Relay Schemes

- Relay schemes that have a history of misoperation
- Obsolete and difficult to repair communication equipment (DTT, Blocking, etc.)
- Communication technology upgrades
- Bus protection schemes

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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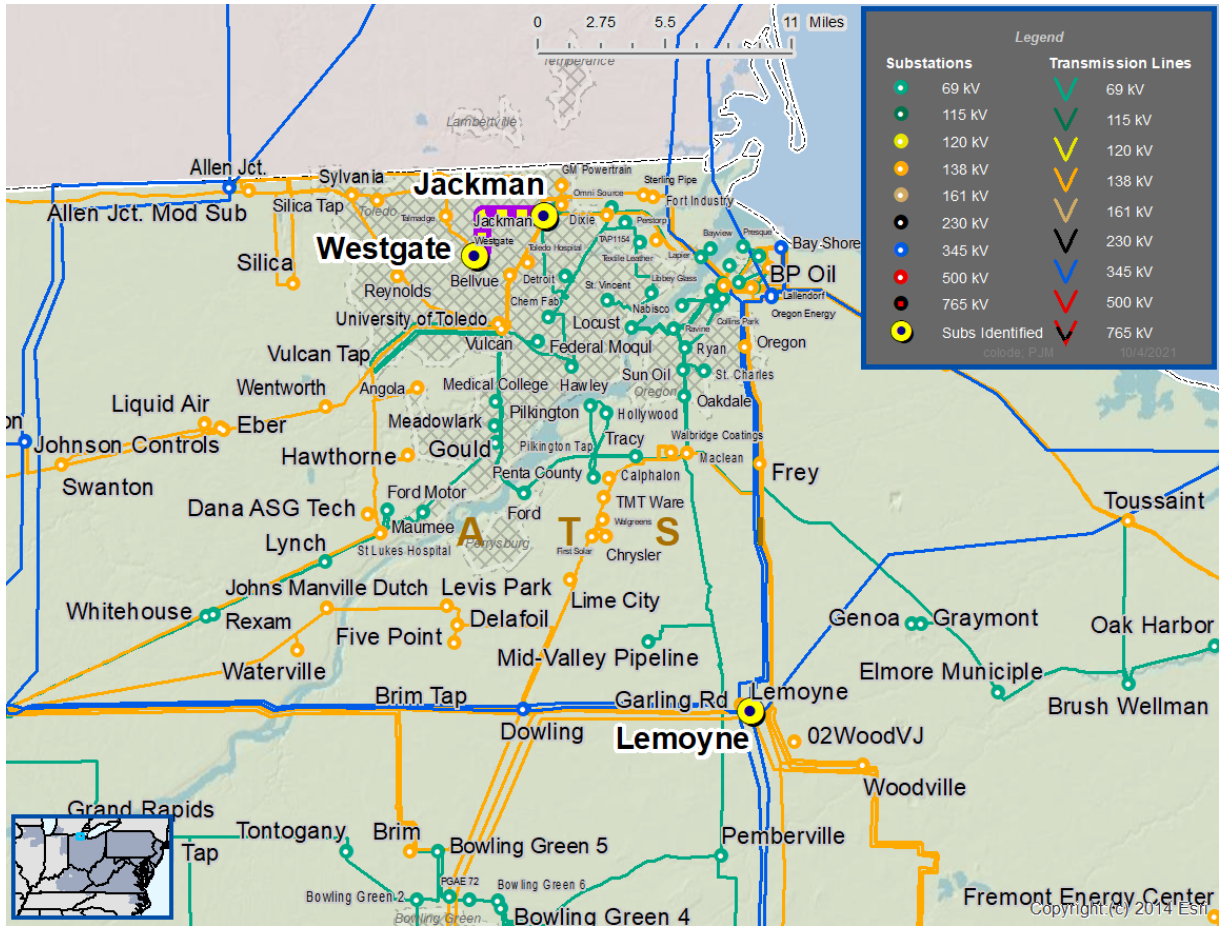

ATSI Transmission Zone M-3 Process
Relay Misoperation Projects

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Need Number	Transmission Line / Substation Locations	Existing Line / Terminal Equipment MVA Rating (SN / SE)	Existing Conductor / Transformer MVA Rating (SN / SE)	Limiting Terminal Equipment
ATSI-2021-025	Jackman-Westgate 138 kV	278 / 343 327 (WN) / 396 (WE)	278 / 343 327 (WN) / 420 (WE)	Substation Conductor
ATSI-2021-026	Lemoyne-Troy 345 kV 1. Lemoyne terminal	1,146 / 1,208 1,309 (WN) /1,352 (WE)	1,542 / 1,878 1,746 (WN) / 2,225 (WE)	CTs, Circuit breaker B1, Substation Conductor, and disconnect switches

ATSI Transmission Zone M-3 Process
Relay Misoperation Projects

Selected Solution:

Need Number	Transmission Line / Substation Locations	New MVA Line Rating (SN / SE)	Scope of Work	Supplemental Project ID	Estimated Cost ($ M)	Target ISD
ATSI-2021-025	Jackman-Westgate 138 kV	278 / 343 327 (WN) / 420 (WE)	• Replace Jackman-Westgate line relaying with primary and backup line relays • Replace 138 kV breakers at Westgate and Jackman substations with associated disconnect switches • Replace line traps, CCVTs • Replace substation conductor to exceed transmission line ratings	s2697	$2.5	4/1/2022
ATSI-2021-026	Lemoyne-Troy 345 kV 1. Lemoyne terminal	1,542 / 1,878 1,746 (WN) / 2,225 (WE)	• Replace 2000 A breaker with 3000 A • Replace live parts of disconnect switches to increase amperage rating to 3000 A • Replace substation conductor to exceed transmission line ratings	s2698	$1.8	3/30/2022

Model: 2020 RTEP model for 2025 Summer (50/50)

ATSI Transmission Zone M-3 Process
Delta – Wauseon 138 kV New Customer

Need Number: ATSI-2021-019

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan – 10/11/2022

Previously Presented: Re-Present Solution Meeting – 03/18/2022
Solution Meeting – 08/16/2021
Need Meeting – 07/16/2021

Supplemental Project Driver(s):
Customer Service

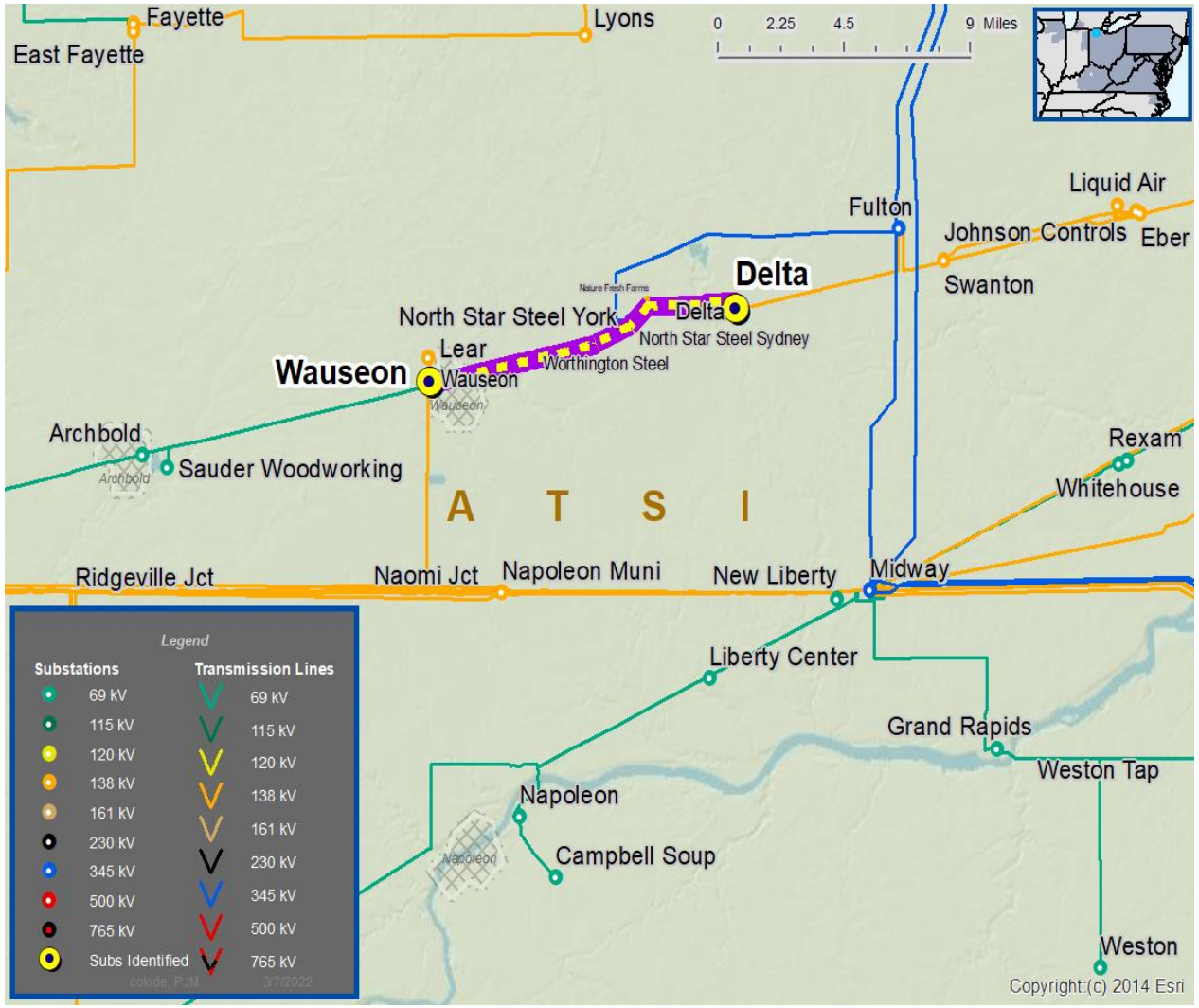
Specific Assumption Reference(s)

Customer connection request evaluated per FirstEnergy's "Requirements for Transmission Connected Facilities" document and "Transmission Planning Criteria" document.

Problem Statement

New Customer Connection – A customer requested 138 kV transmission service for approximately 20 MVA of total load near the Delta – Wauseon 138 kV line.

Requested In-Service Dates: 10 MVA by November 1, 2021
10 MVA increase by November 1, 2026



ATSI Transmission Zone M-3 Process
Delta – Wauseon 138 kV New Customer

Need Number: ATSI-2021-019

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan - 10/11/2022

Selected Solution:

New 138 kV Customer

- Construct a 138 kV tap off the Delta – Wauseon 138 kV line to the customer substation. The customer substation tap location is approximately a 0.9 mile extension from the existing structures to the new customer substation.
- Add MOAB and SCADA to two new switches on the Delta – Wauseon 138 kV line.
- Upgrade 336 ACSR TL Drop at Lemoyne Substation (Dowling Line Exit)

Line Ratings:

Delta-Wauseon 138 kV Line: No ratings change

Dowling-Lemoyne 138 kV Line:

Before proposed project: 160/192 MVA SN/SE

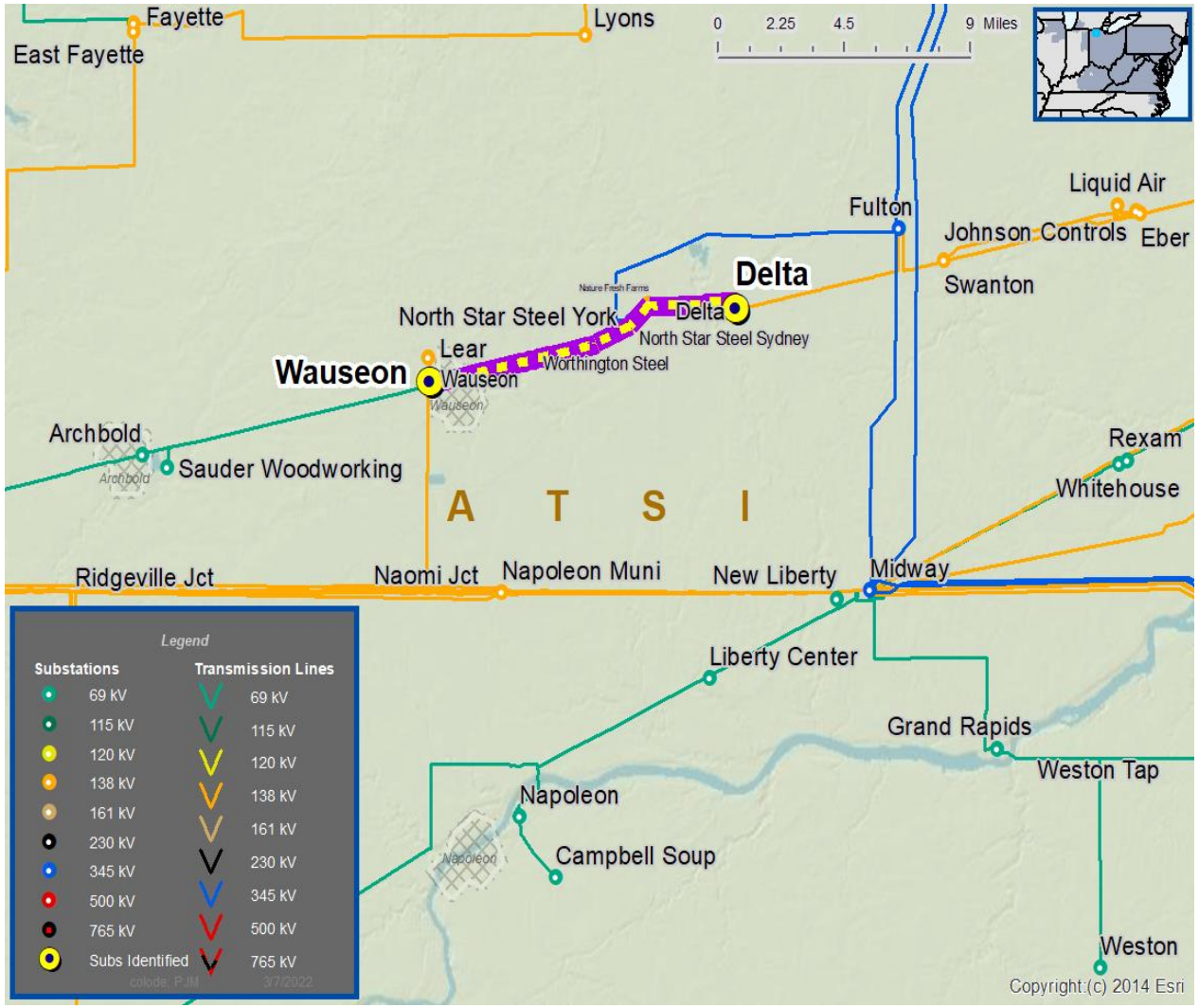
After proposed project: 252/291 MVA SN/SE

Estimated Project Cost: $2.1M

Projected In-Service: 06/01/2022

Supplemental Project ID: s2696

Model: 2020 Series 2025 Summer RTEP 50/50



ATSI Transmission Zone M-3 Process
Evergreen Substation

Need Number: ATSI-2019-011

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan – 10/11/2022

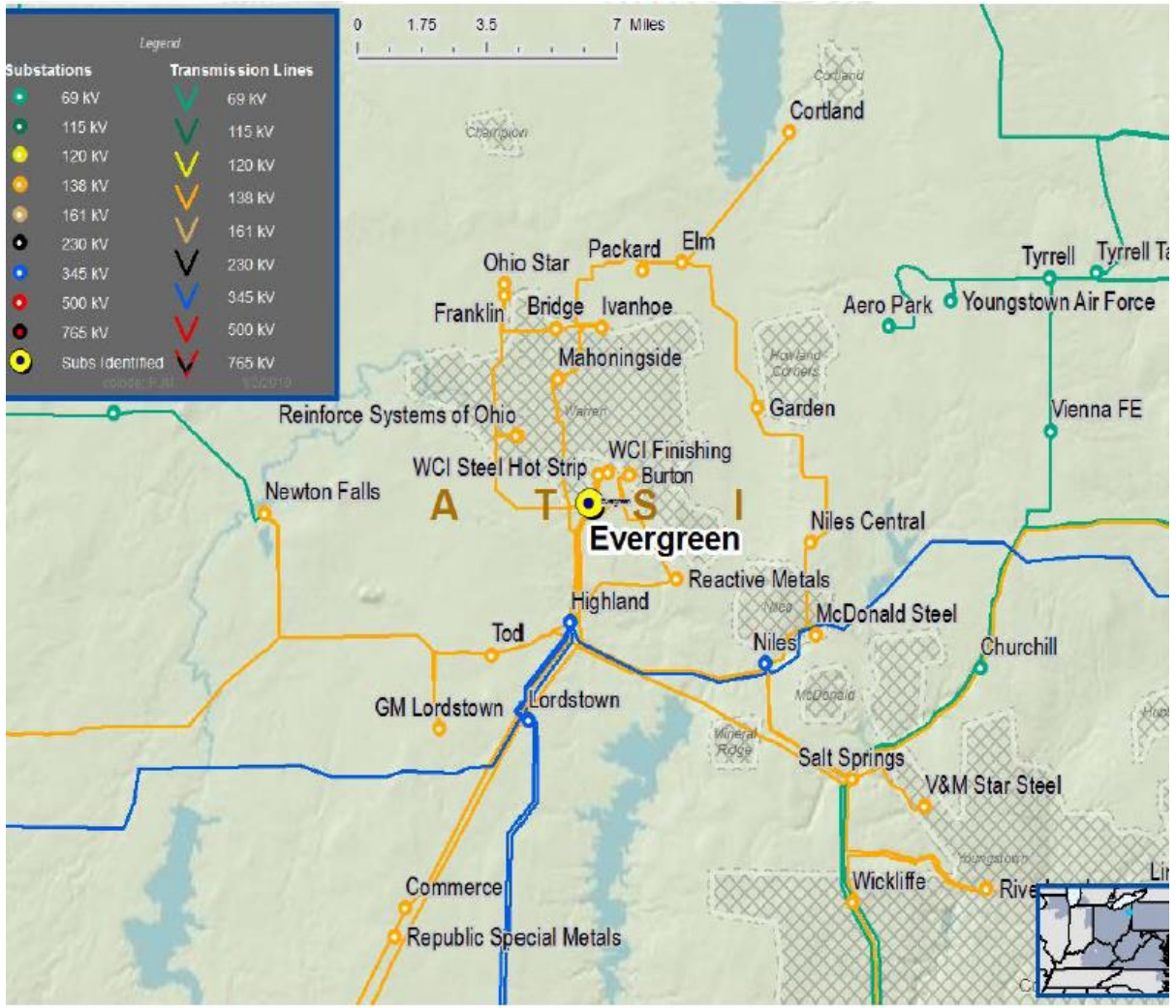
Previously Presented: Re-Present Solutions Meeting – 07/22/2022
Needs Meeting 01/14/2019
Solutions Meeting 03/25/2019

Project Driver(s):
Equipment Material, Condition, Performance and Risk
Operational Flexibility and Efficiency
Infrastructure Resilience

Specific Assumption Reference(s)
Global Considerations
- System reliability and performance
- Substation / Line equipment limits

Upgrade Relay Schemes
- Bus protection schemes
- Relay schemes that have a history of mis-operation

Problem Statement
Evergreen Substation 138 kV Equipment and Protection
- BES bus protection is presently performed by a complex scheme that has a history of causing mis-operations at other substations. The scheme uses distributed electromechanical relays to exclude a bus fault rather than detecting the bus fault directly.



ATSI Transmission Zone M-3 Process
Evergreen Substation

Need Number: ATSI-2019-011

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan - 10/11/2022

Selected Solution:

Evergreen 138 kV Relay Upgrades

- Replace bus protection scheme with dual differential protection.
- Replace bus PTs due to condition
- Replace 3 breakers (B23, B24, and B27 bus transfer) due to condition and insufficient lack of sufficient CTs for proper system to support standard, redundant bus protection
- Add a new 138 kV bus tie breaker, disconnect switches, and relaying to eliminate exposure of the transmission system related to customer-owned equipment failures/faults in the substation

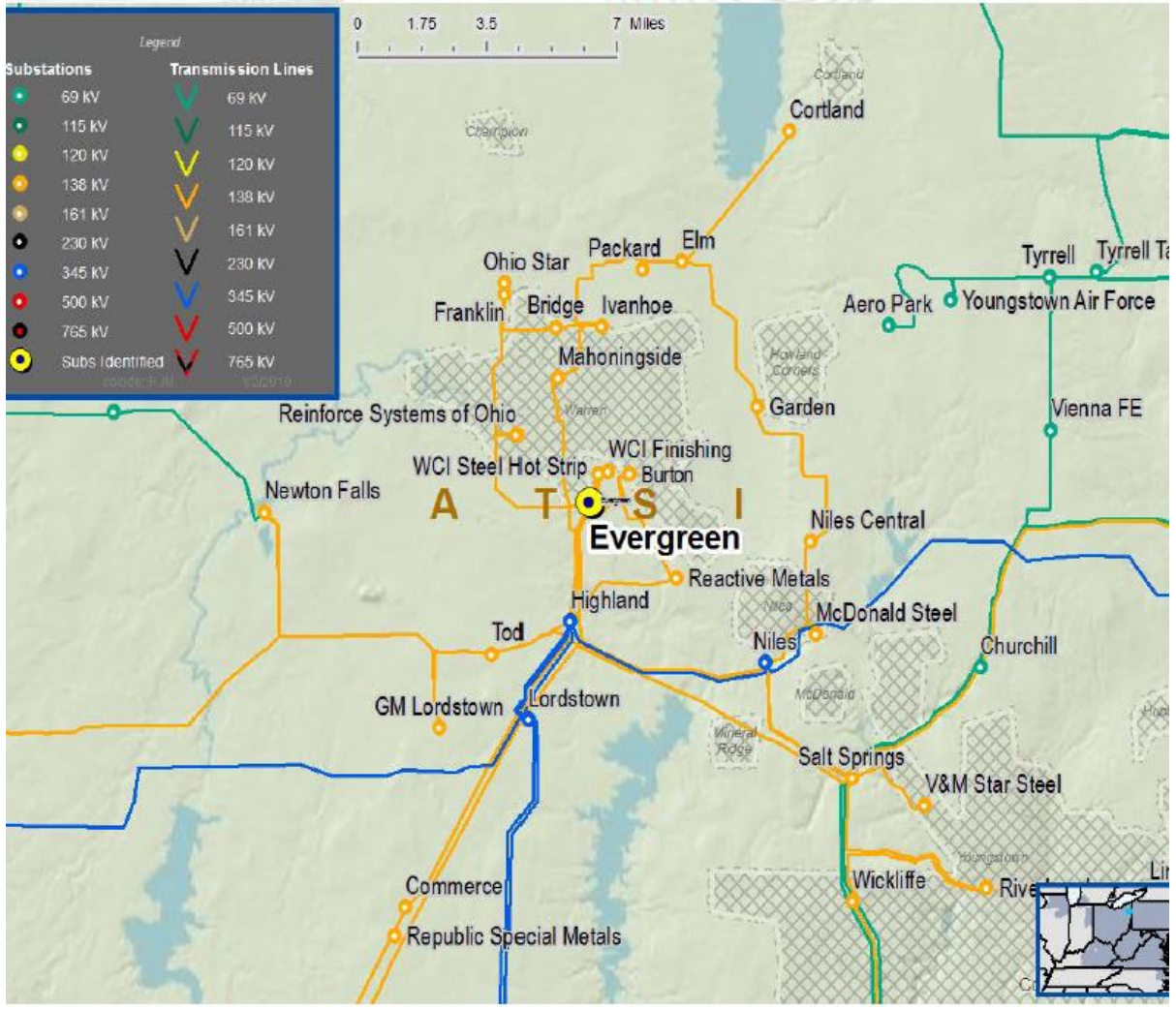
Transmission Line Ratings:

- Evergreen-Ivanhoe 138 kV Line
  - Before Proposed Solution: 226 MVA WN / 249 MVA WE
  - After Proposed Solution: 226 MVA WN / 286 MVA WE
- Evergreen-Niles 138 kV Line
  - Before Proposed Solution: 224 MVA SN / 293 MVA SE
  - After Proposed Solution: 278 MVA SN / 339 MVA SE

Estimated Project Cost: $4.2M

Projected IS Date: 12/08/2023

Supplemental Project ID: s1954



ATSI Transmission Zone M-3 Process
Delta/Wauseon Area

Need Number: ATSI-2021-027

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan – 10/11/2022

Previously Presented: Need Meeting – 11/30/2021
Solution Meeting – 07/12/2022

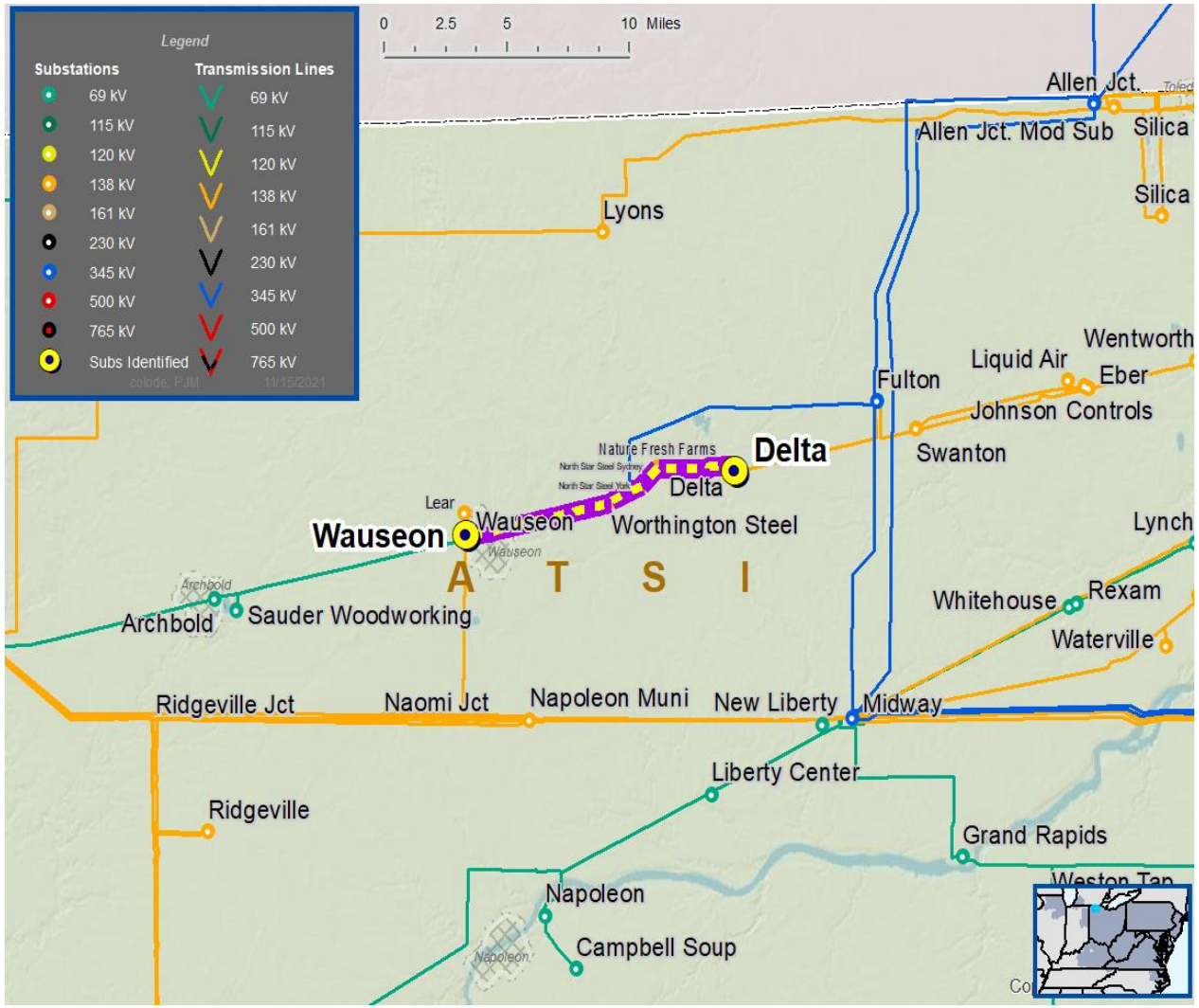
Supplemental Project Driver(s):
Operational Flexibility and Efficiency
Infrastructure Resilience

Specific Assumption Reference(s)

- System Reliability and Performance
- Load at risk in planning and operational scenarios
- Load and/or customers at risk on single transmission lines

Add/Expand Bus Configuration

- Loss of substation bus adversely affects transmission system performance
- Reduce amount of exposed potential local load loss during contingency conditions.
- Accommodate future transmission facilities



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ATSI Transmission Zone M-3 Process
Delta/Wauseon Area

Need Number: ATSI-2021-027

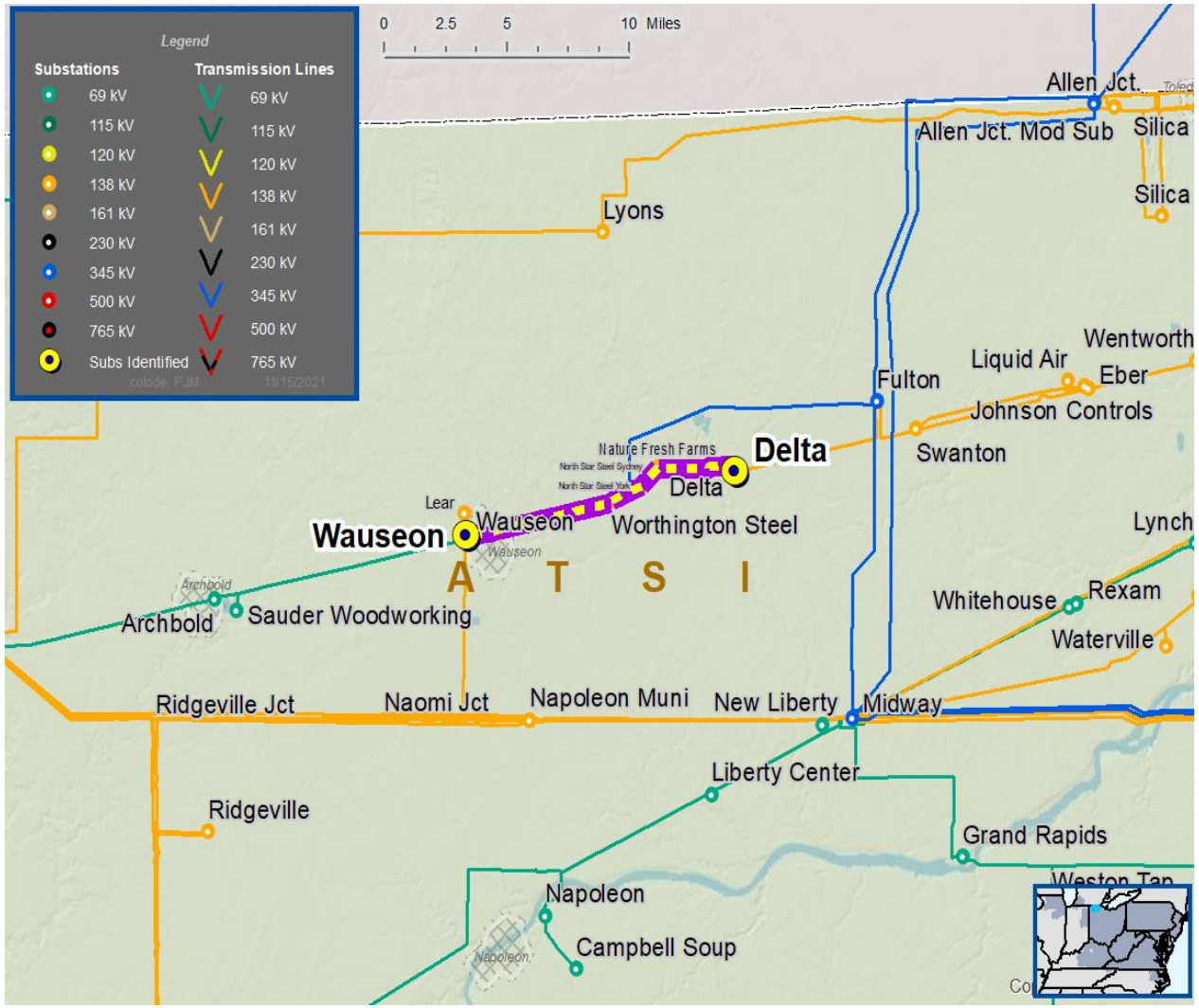
Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan - 10/11/2022

Add/Replace Transformers

- System concerns related to loss of an existing transformer or other contingency scenarios at a specific voltage level(s)

Problem Statement

- The Delta/Wauseon area is a concentrated load pocket with future load growth expected. Existing customers planning for future load growth, and new transmission load connections in progress with load expected to grow to approximately 500 MVA and 9,000 customers in the near term.
- Under an N-1-1 contingency, post-contingency voltage on 138 kV busses is near emergency minimum of 0.92 p.u. with approximately 200 MVA and 9,000 customers at risk. Under same contingency set, and area capacitor bank off, low voltages with near voltage collapse on the 138 kV system in the area.
- Also, under an N-1-1 contingency results in voltage near criteria limits on a radial 345 kV line with approximately 300 MVA of load at risk.



ATSI Transmission Zone M-3 Process
Delta/Wauseon Area

Need Number: ATSI-2021-027

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan - 10/11/2022

Selected Solution:

- Install two 345 kV circuit breakers at Melbourne 345 kV Substation
- Install two 345-138 kV transformers
- Construct a four breaker (future 6) 138 kV ring bus at Melbourne Substation
- Loop in the Delta-Wauseon 138 kV line into Melbourne 138 kV Substation
- Install two 138 kV line switches, one near Lear tap and one near Worthington tap
- Install one 138 kV circuit breaker at Delta 138 kV Substation

Line Ratings:

Wauseon-Melbourne 138 kV Line:

After proposed project: 278/343 MVA SN/SE

Delta-Melbourne 138 kV Line:

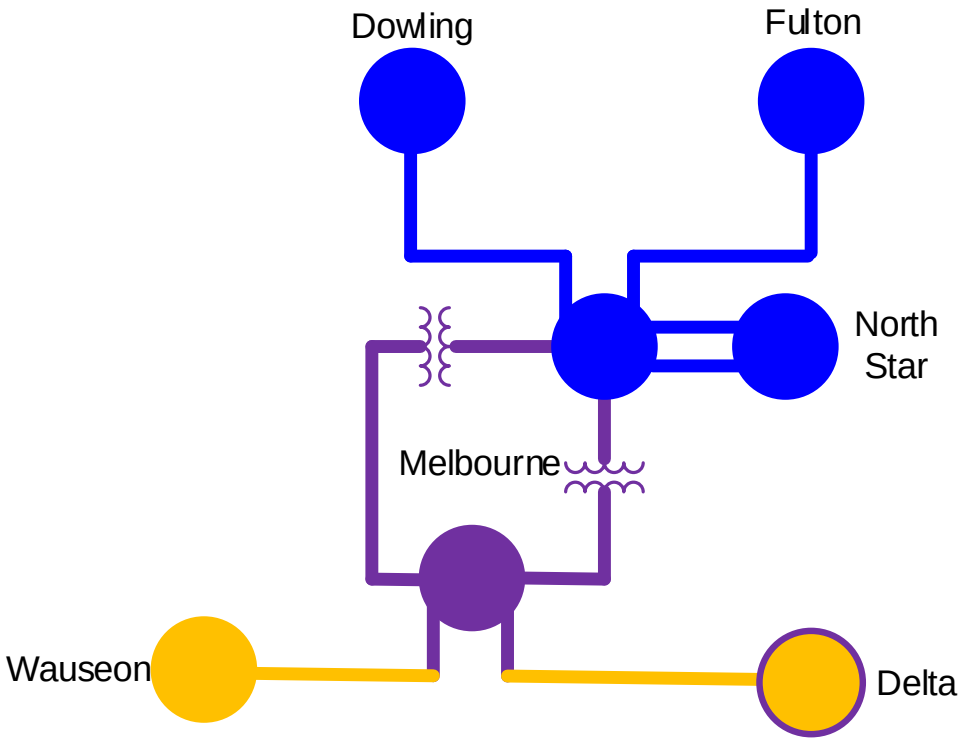
After proposed project: 278/343 MVA SN/SE

Estimated Project Cost: $25.1M

Projected In-Service: 12/01/2025

Supplemental Project ID: s2756

Model: 2021 Series 2026 Summer RTEP 50/50



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

ATSI Transmission Zone M-3 Process
Carbon Limestone (Lowellville) 69 kV New Customer

Need Number: ATSI-2022-002

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan – 10/11/2022

Previously Presented: Need Meeting – 03/18/2022
Solution Meeting –07/22/2022

Supplemental Project Driver(s):
Customer Service

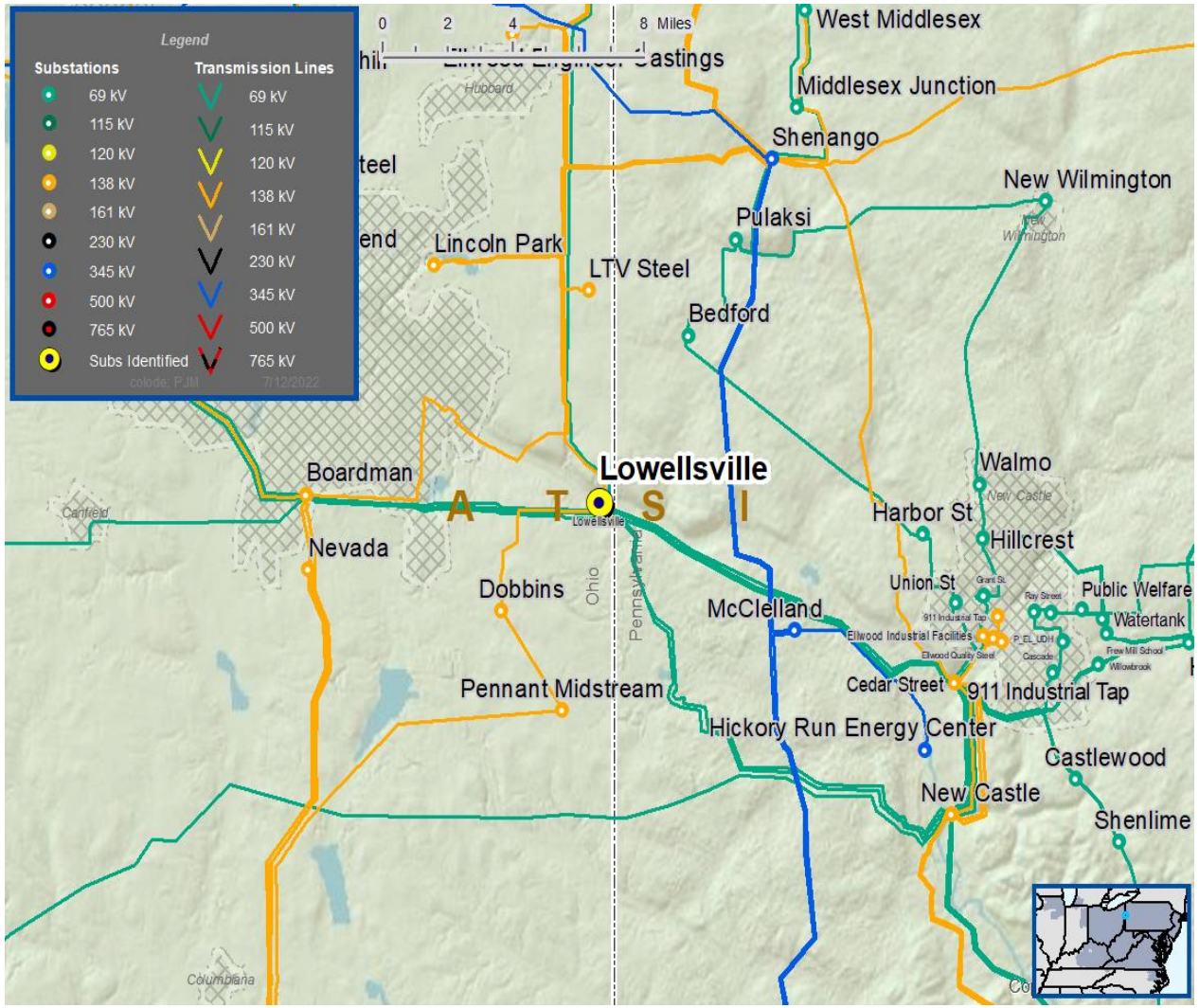
Specific Assumption Reference(s)

Customer connection request evaluated per FirstEnergy's "Requirements for Transmission Connected Facilities" document and "Transmission Planning Criteria" document.

Problem Statement

New Customer Connection – A customer requested 69 kV transmission service for approximately 15 MVA of total load near the Carbon Limestone (Lowellville) 69 kV line.

Requested In-Service Date: December 30, 2022



ATSI Transmission Zone M-3 Process
Lowellville-Carbon Limestone 69 kV New Customer- Solution

Need Number: ATSI-2022-002

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan - 10/11/2022

Selected Solution:

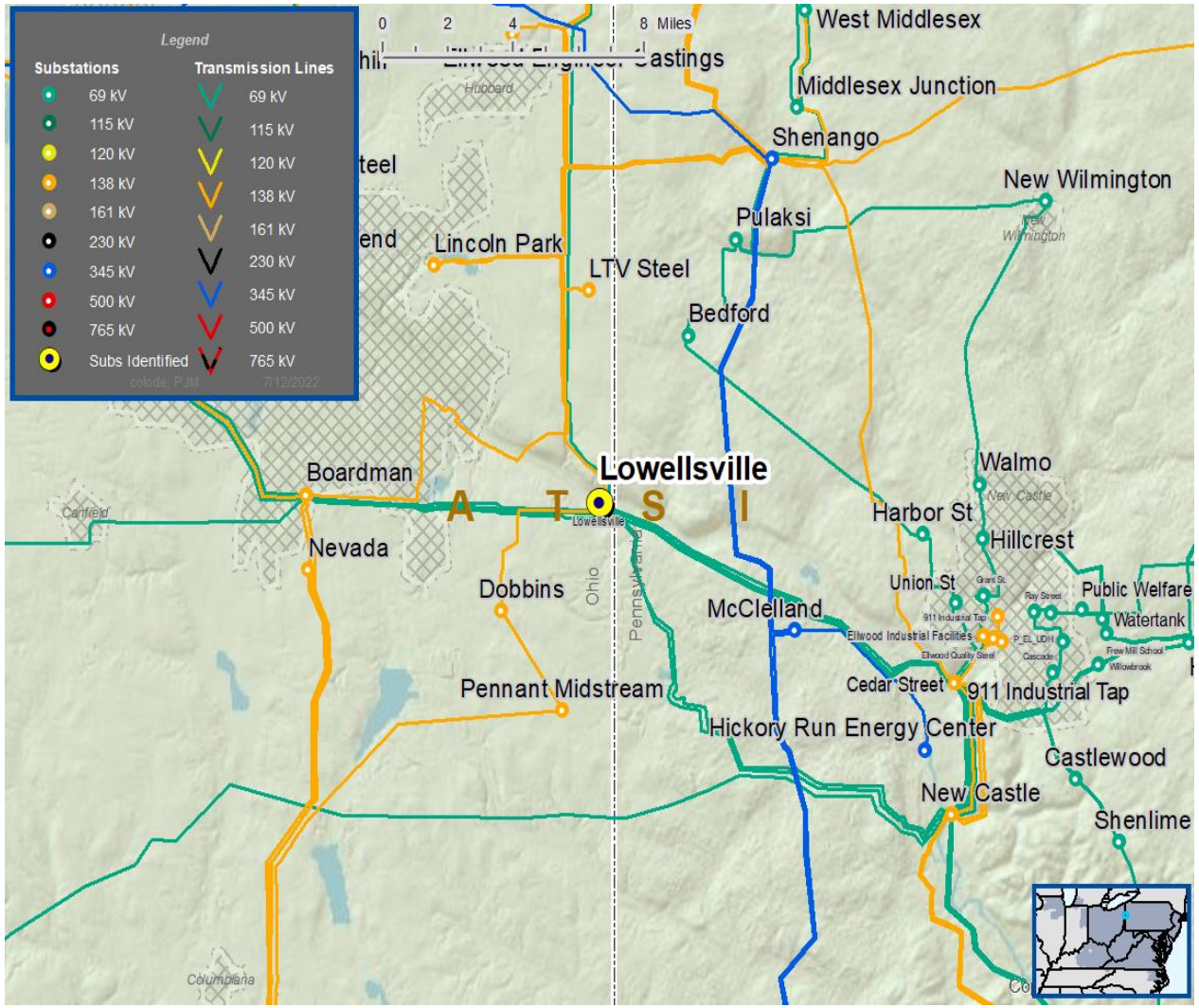
69 kV Transmission Line Tap

- Install one SCADA controlled transmission line switch
- Adjust relay settings at Lowellville substation

Estimated Project Cost: $0.1M

Projected In-Service: 09/02/2022

Supplemental Project ID: s2757



ATSI Transmission Zone M-3 Process
East Archbold – Stryker 69 kV New Customer

Need Number: ATSI-2021-003

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan – 10/11/2022

Previously Presented: Need Meeting – 01/15/2021
Solution Meeting – 07/22/2022

Supplemental Project Driver(s):
Customer Service

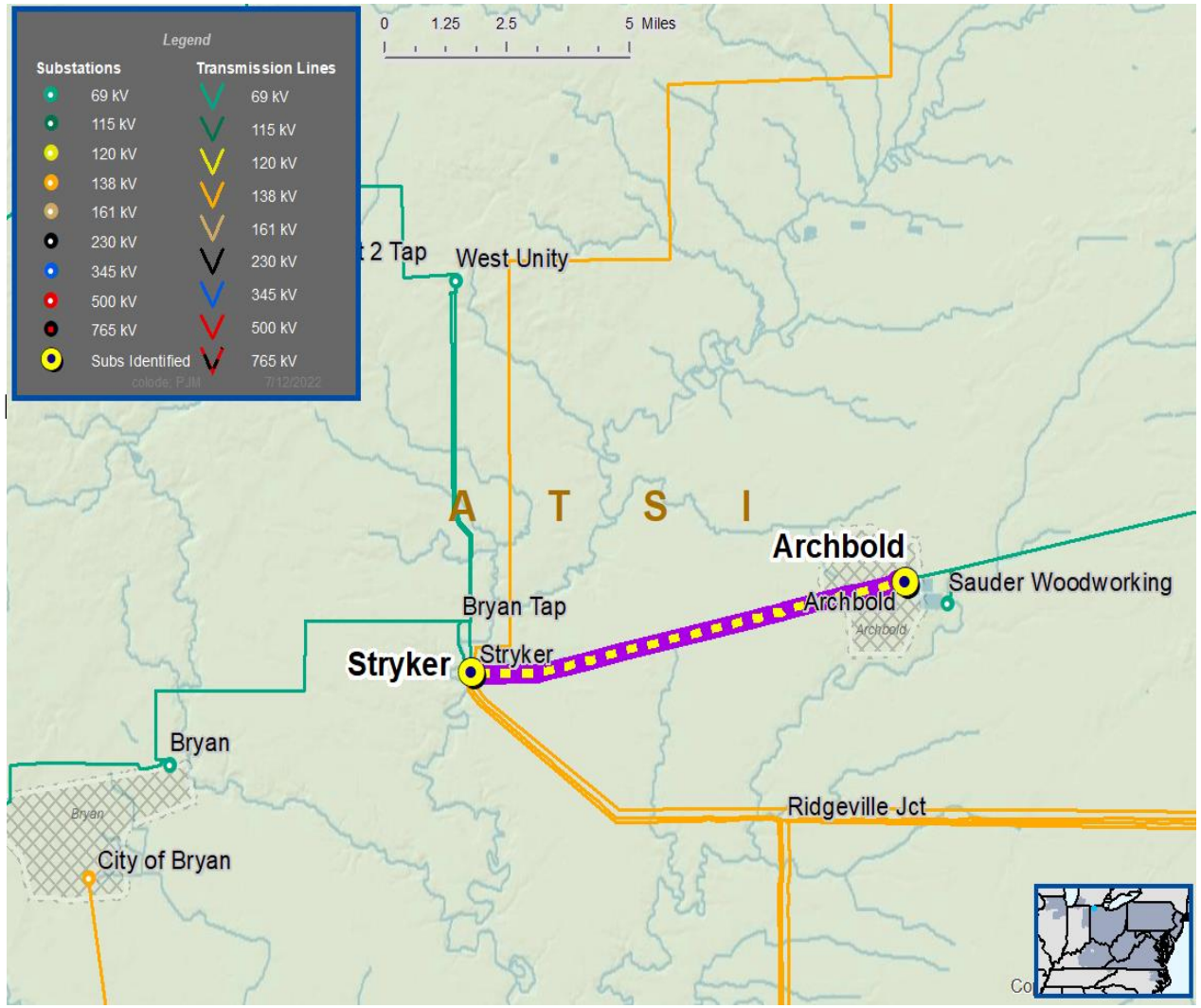
Specific Assumption Reference(s)

Customer connection requests will be evaluated per FirstEnergy's "Requirements for Transmission Connected Facilities" document and "Transmission Planning Criteria" document.

Problem Statement

New Customer Connection – A customer requested 69 kV transmission service for approximately 5.6 MVA of total load near the East Archbold – Stryker 69 kV line.

Requested In-Service Date: May 1, 2021



ATSI Transmission Zone M-3 Process
East Archbold – Stryker 69 kV New Customer

Need Number: ATSI-2021-003

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan - 10/11/2022

Selected Solution:

New 69 kV Customer

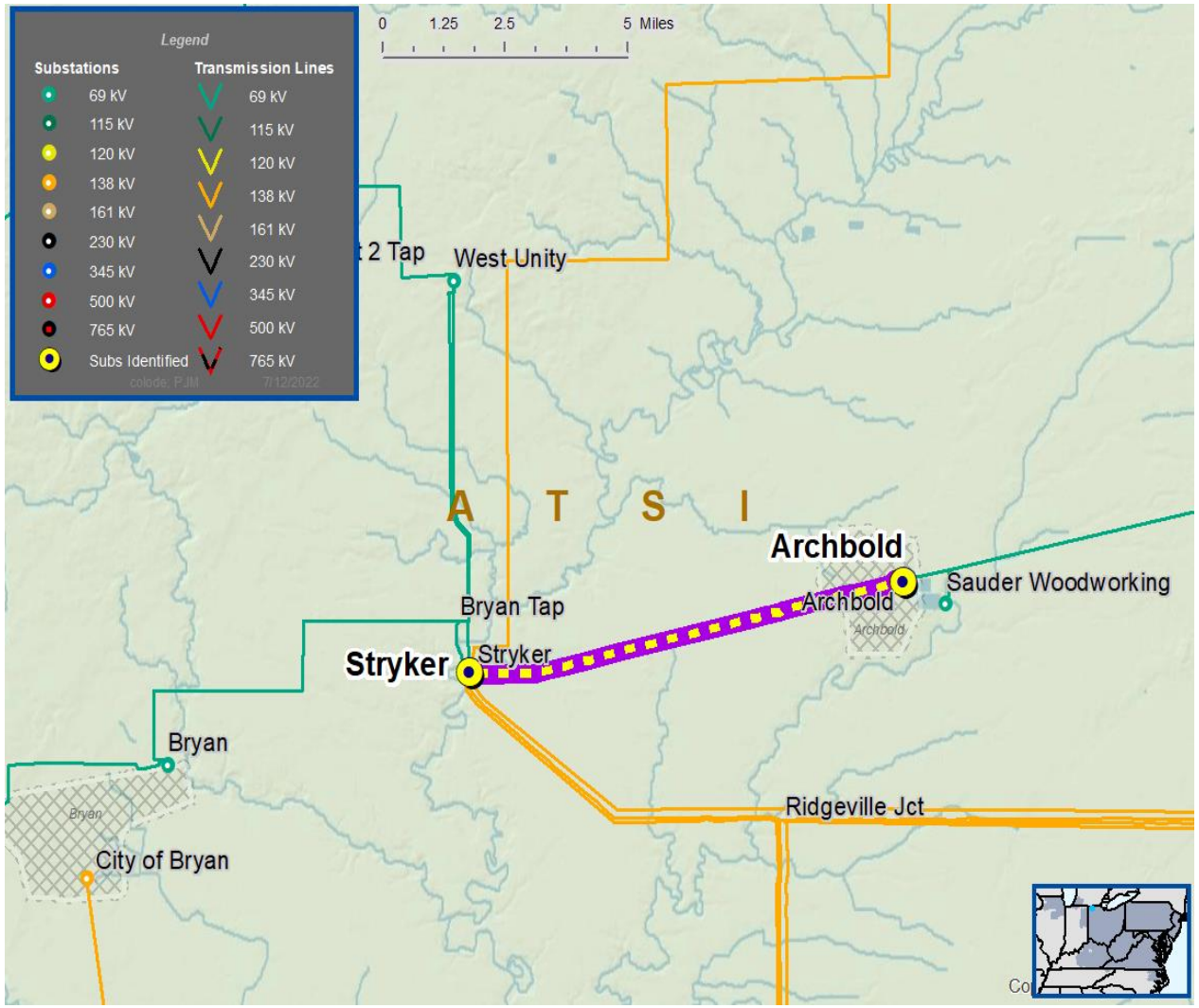
- Construct a 69 kV tap (approximately 0.1 miles) off the East Archbold – Stryker 69 kV line to the customer substation. The customer substation tap location is approximately 6 miles from Stryker substation.
- Add two SCADA control switches at transmission line tap location and one tap switch
- Revise relay settings at East Archbold and Stryker Substations

Estimated Project Cost: $1.7M

Projected In-Service: 12/01/2022

Supplemental Project ID: s2758

Model: 2019 Series 2024 Summer RTEP 50/50



ATSI Transmission Zone M-3 Process
Leroy Center - Mayfield Q2 138 kV

Need Number: ATSI-2021-015
Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan – 10/11/2022
Previously Presented: Need Meeting – 08/16/2021
Solution Meeting – 07/22/2022

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

Specific Assumption Reference(s):
Global Factors

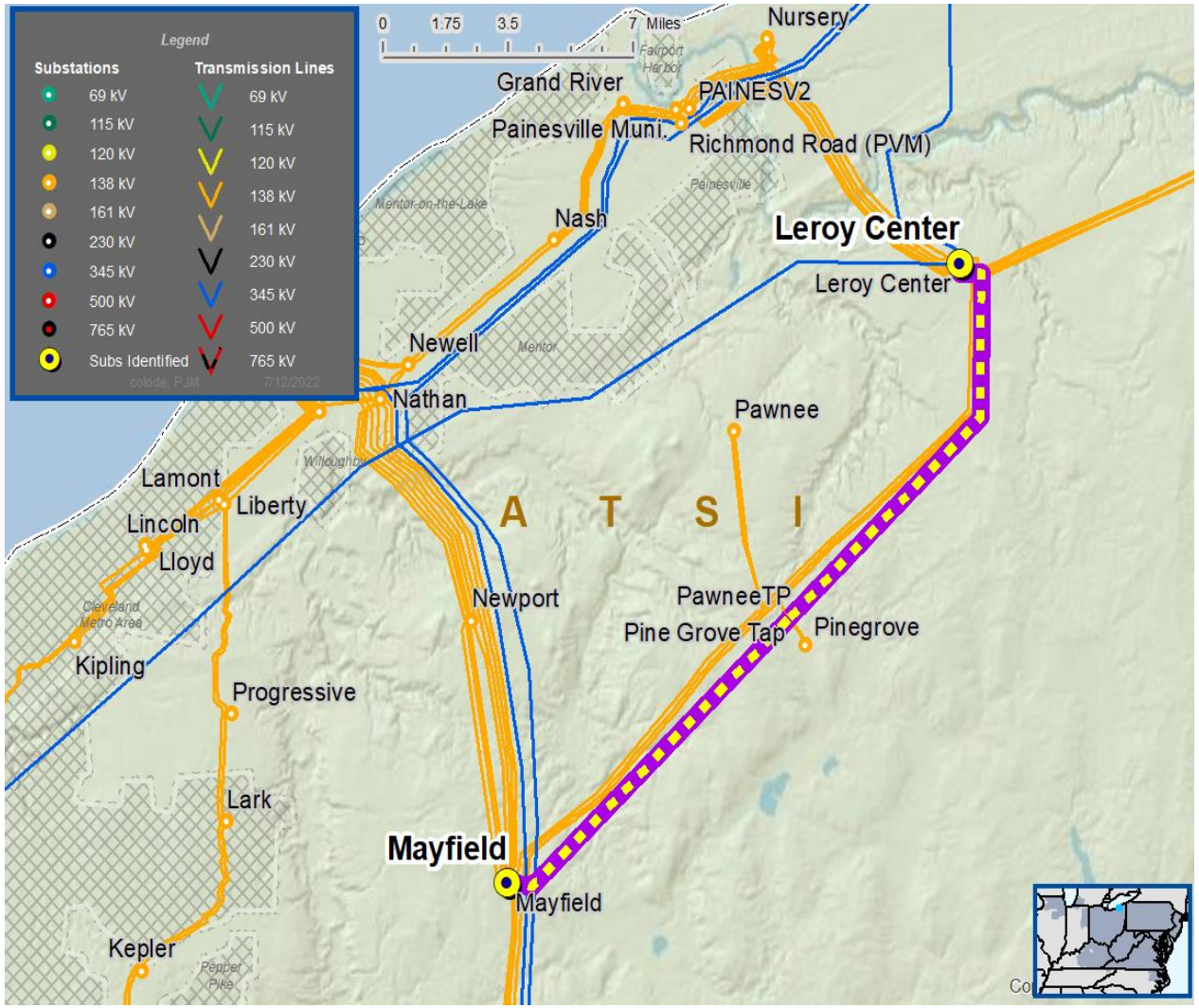
- System Reliability and Performance
- Load at risk in planning and operational scenarios
- Increase line loading limits
- Age/condition of transmission line conductors

Line Condition Rebuild/Replacement

- Transmission lines with loading at 80% or greater
- End of Life Methodology

Problem Statement

- The Leroy Center – Mayfield Q2 138 kV line loads to 95% under contingency conditions in the 2020 RTEP Case.
- The Leroy Center – Mayfield Q2 138 kV line has the potential to feed 7,017 customers and 20 MW at the Pawnee Substation, back up feed to LC-MF Q1 138 kV line.



Continued on next slide…

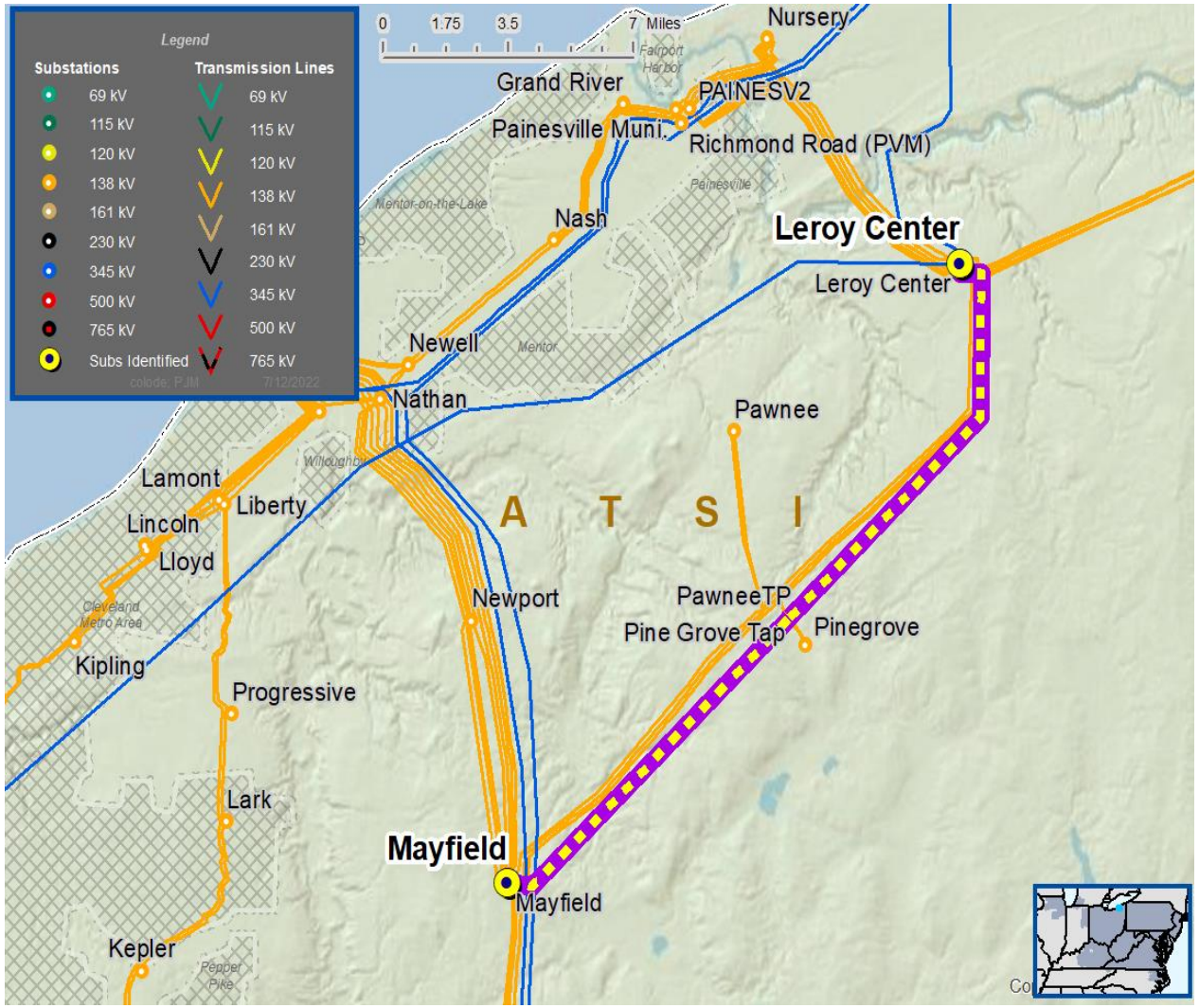
ATSI Transmission Zone M-3 Process
Leroy Center - Mayfield Q2 138 kV

Need Number: ATSI-2021-015

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan - 10/11/2022

Problem Statement Continued…

- The existing conductor is 4/0 CU and can cause protection issues due to not being able to handle the short circuit current for faults.
- Age/condition of transmission line conductors and hardware (mid 1940s).
- The Leroy Center – Mayfield Q2 138 kV line has experienced one (1) sustained outage in the past five years.



ATSI Transmission Zone M-3 Process
Leroy Center - Mayfield Q2 138 kV

Need Number: ATSI-2021-015

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan - 10/11/2022

Selected Solution:

- Reconductor the Leroy Center-Mayfield Q2 138 kV Line (~16 miles) from Leroy Center - Pawnee Tap and Pawnee Tap - Mayfield with 336 ACSS. Replace tower structures, insulators and hardware as needed to address condition items and support new conductor.

Transmission Line Ratings:

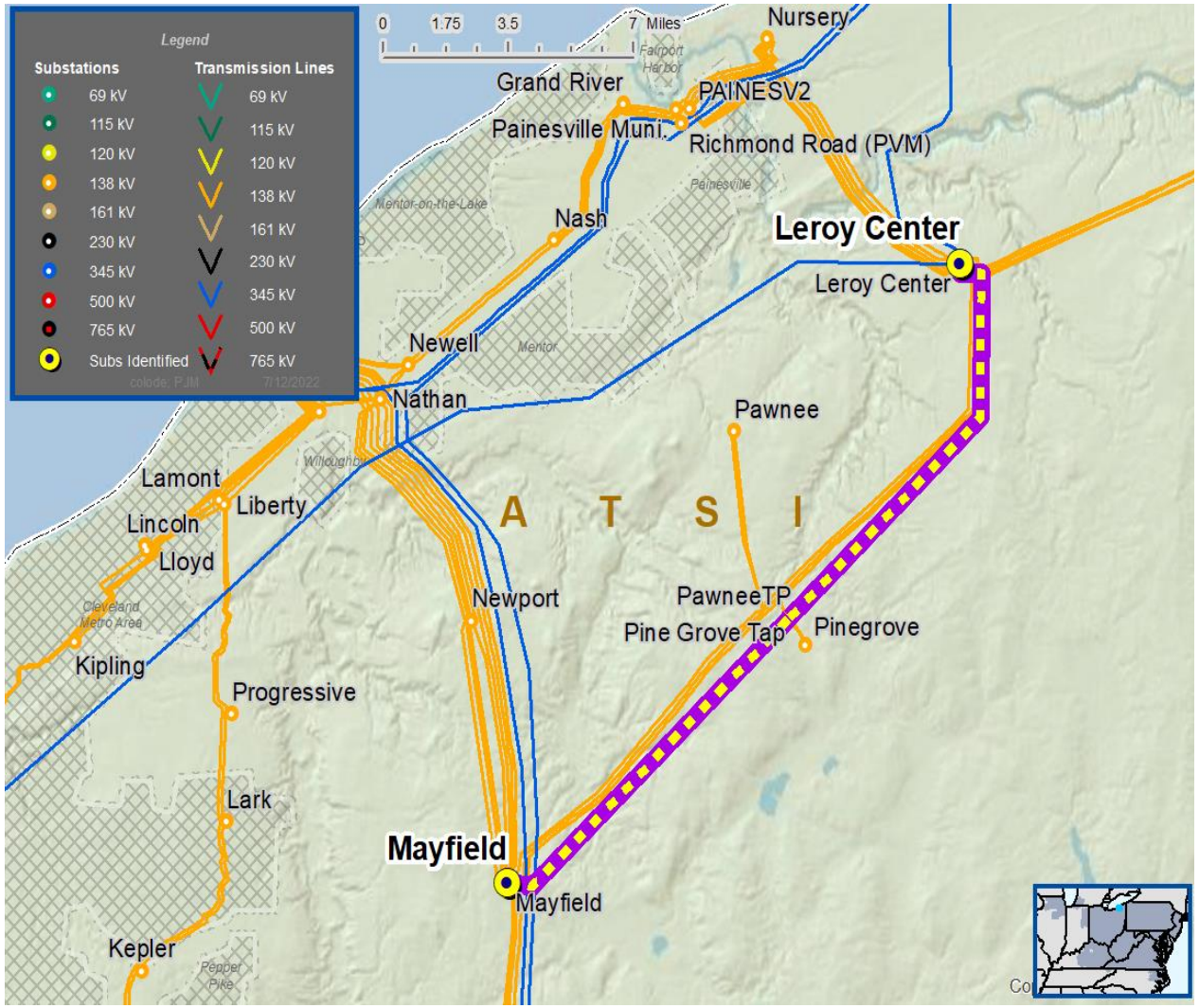
- Leroy Center - Mayfield Q2 138 kV Line
  - Before Proposed Solution: 115 MVA SN/ 115 MVA SE
  - After Proposed Solution: 252 MVA SN / 291 MVA SE

Estimated Project Cost: $14.9M

Projected In-Service: 06/01/2026

Supplemental Project ID: s2759

Model: 2020 Series 2025 Summer RTEP 50/50



ATSI Transmission Zone M3 Process
Amherst, OH

Need Number: AMPT-2021-005

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan – 10/11/2022

Previously Presented: Need Meeting – 11/19/2021

Solution Meeting – 2/18/2022

Supplemental Project Driver(s): Customer Service

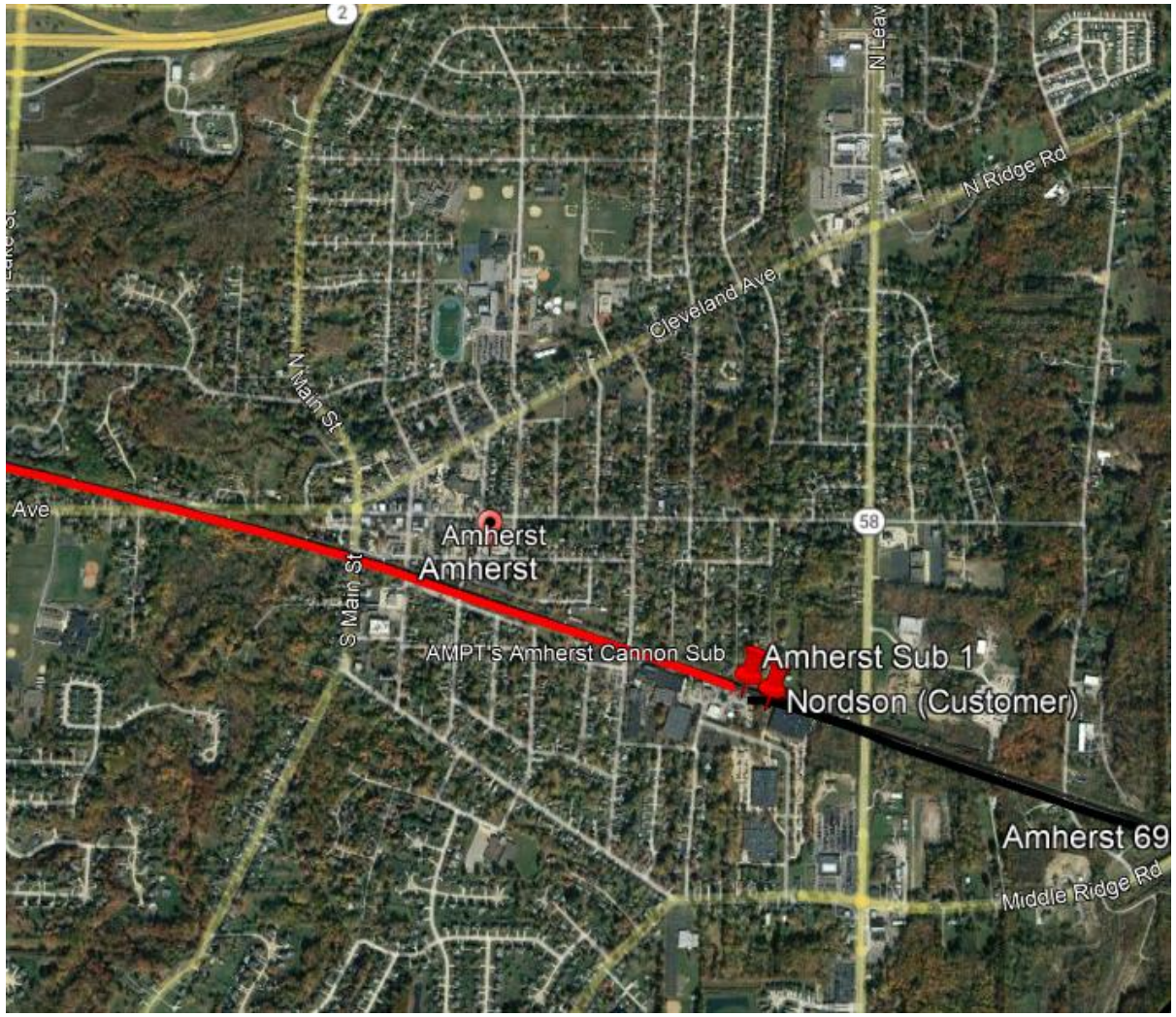
Specific Document

Problem Statement:

AMPT's Amherst Tap is an approximately 1.85 mile segment of a 2.85 mile radial tap supplied from ATSI's Henrietta-Johnson 69 kV line. Two stations are served off the Tap – Woodings and Cannon.

The City of Amherst has requested a 2nd supply to support the load (approximately 28 MVA). The radial supply presents a single point of failure that jeopardizes reliability for the City.

AMPT's Transmission Facilities Interconnection Requirements specify looped facilities for loads exceeding 5 MVA or 35 MW-mile thresholds.



ATSI Transmission Zone M3 Process
Amherst, OH

Need Number: AMPT-2021-005

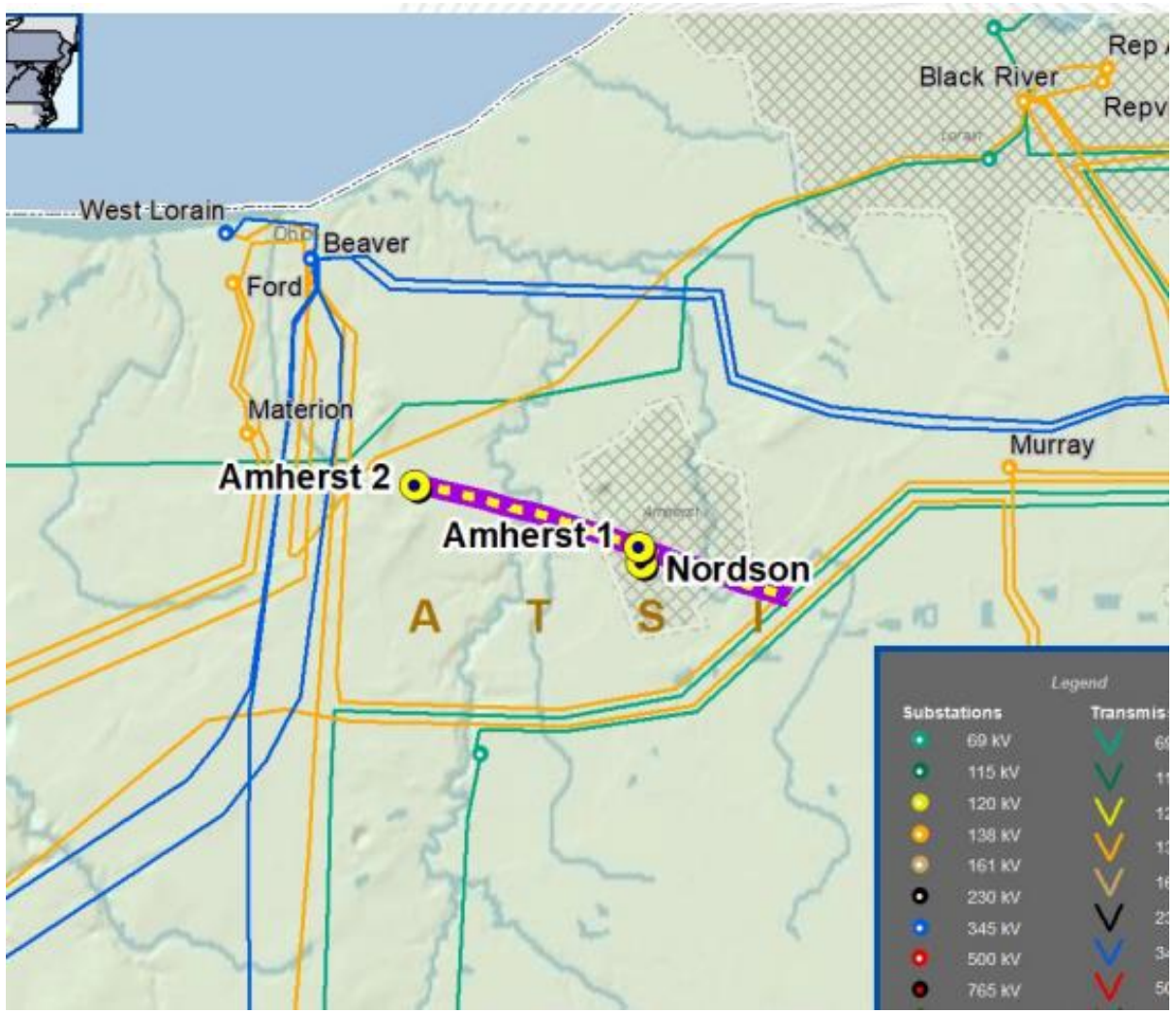
Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan - 10/11/2022

Selected Solution:

AMPT Identified Scope

- Construct a greenfield 138 kV double circuit line for approximately 0.4 miles using 954 54/7 kcmil ACSS conductor and tap into the existing Beaver-Black River (ATSI) 138 kV line.
- At Woodings (Amherst Sub #2) 69/12 kV Substation - Expand the sub with the installation of three (3) 138 kV circuit breakers; Install one (1) 138/69/12kV 130 MVA transformer; upgrade the 69 kV bus to 2000A, install two (2) 69 kV circuit breakers
- At Cannon (Sub #1) 69/12 kV Substation - Install one (1) 69 kV breaker towards Nordson; Replace 600A bus disconnect switch with one rated at 1200A

ATSI Identified Scope ($2.8 M)
- Design and construct tap structure(s) at tap location
- Upgrade line relaying with new panel at Black River
- Upgrade line relaying with new panel at Beaver
- Install/complete fiber connection to Beaver and Black River substations
- Provide/install four (4) 69 kV revenue metering equipment packages at Amherst Muni substations



Need Number: AMPT-2021-005

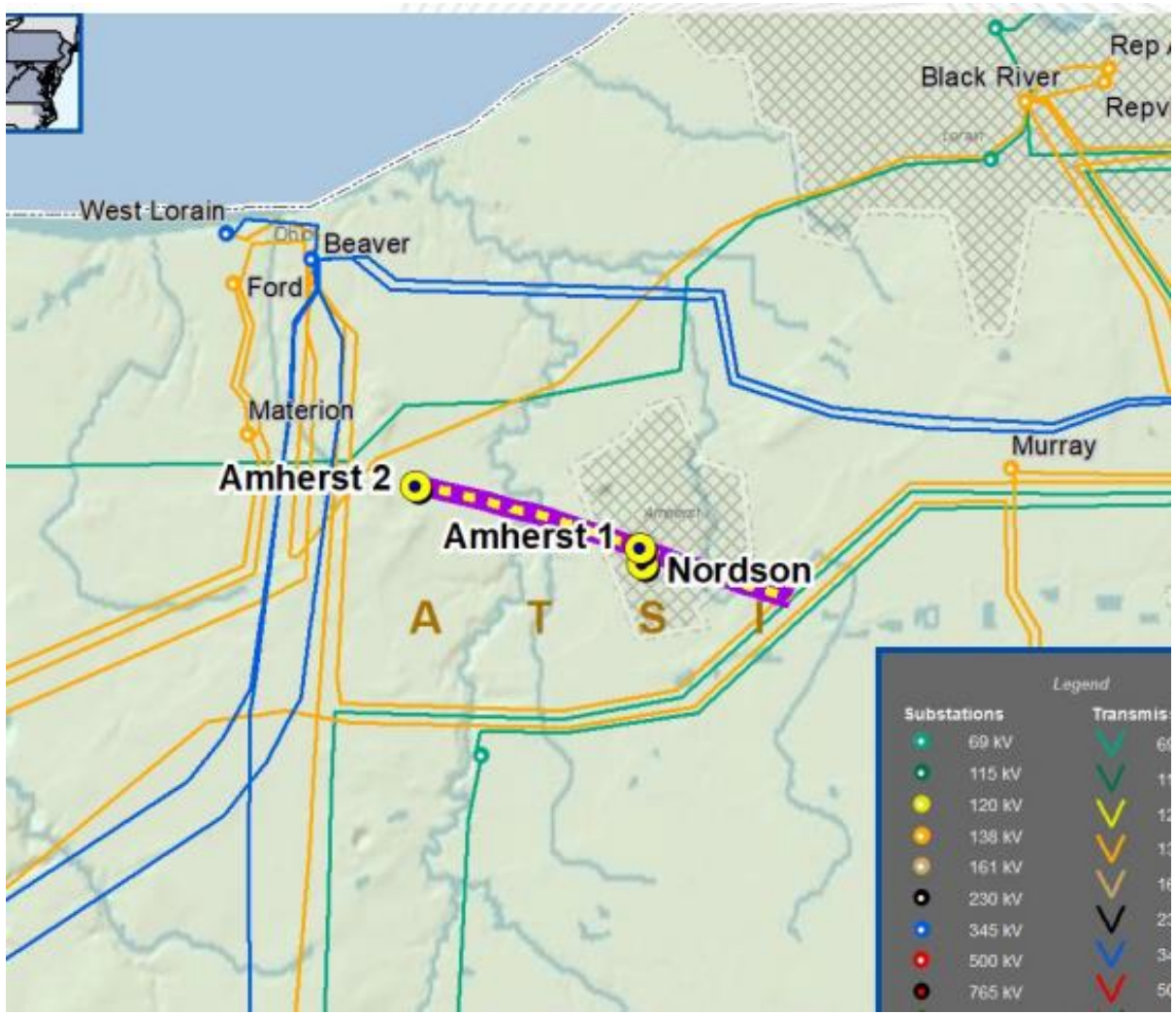
Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan - 10/11/2022

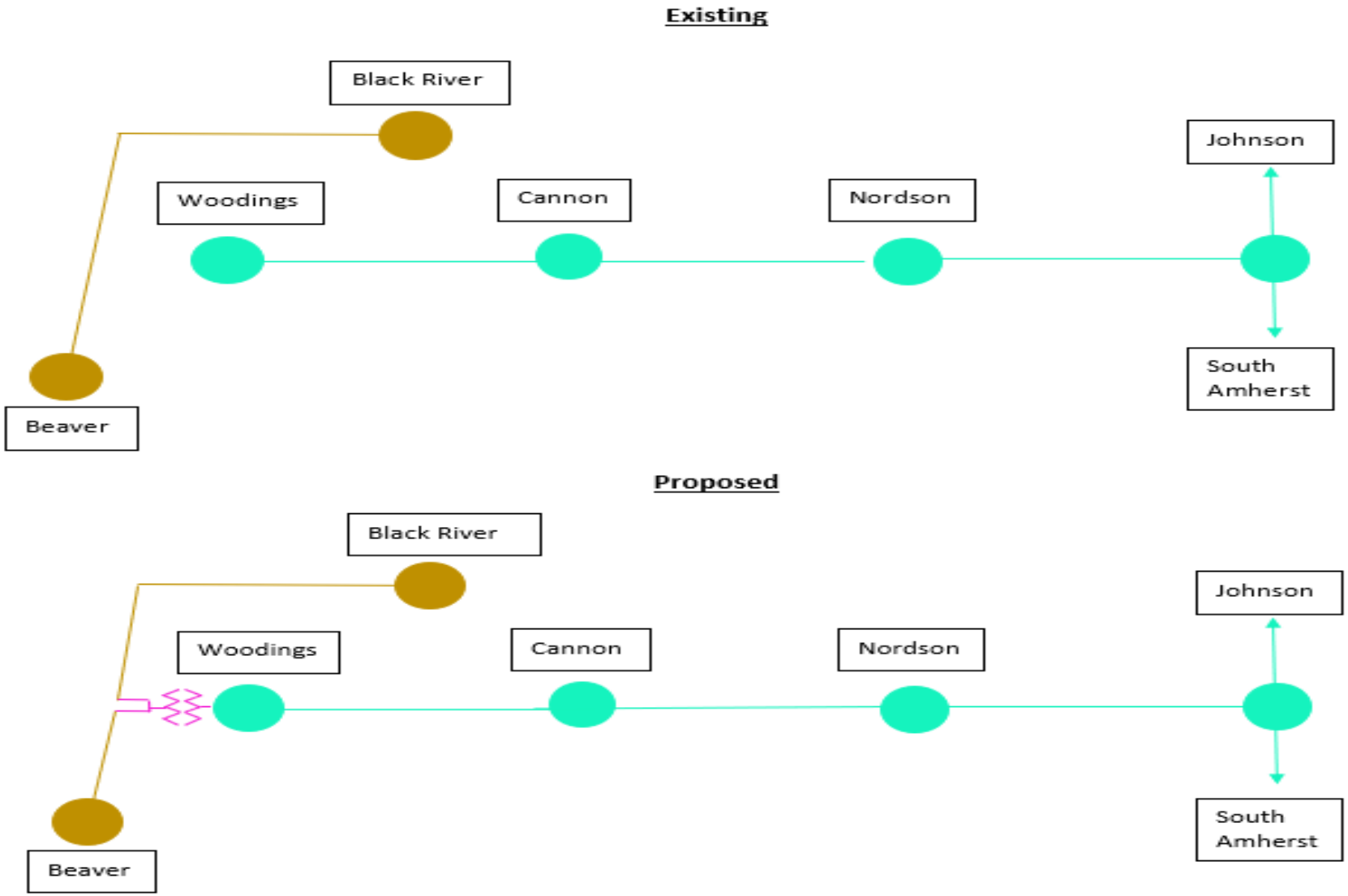
Selected Solution (Continued):

Total Estimated ATSI Transmission Cost: $2.8 M

Projected In-Service: 12/31/2023

Supplemental Project ID: s2671.1





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

ATSI Transmission Zone M3 Process
Rye Beach Road, Greenfield – Shinrock 69 kV line

Need Number: AMPT-2021-001

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan - 10/11/2022

Previously Presented: Solution Meeting – 6/15/2022
Need Meeting – 5/21/2021

Supplemental Project Driver(s): Customer Service

Specific Assumption Reference(s): AMPT Transmission Facilities Interconnection Requirements Document

Problem Statement:

Rye Beach Road 69kV Substation (AMP Transmission)
The existing interconnection is a 0.15 mile single radial tap from the ATSI Greenfield-Shinrock 69kV line to the Rye Beach Road (Huron Muni) substation.

Current peak load at Rye Beach Road is 26 MW, projected to increase to 38 MW by 10/1/21 and 40 MW by 10/1/22.

Also, AMPT Interconnection requirements specify a need for a second source for loads 5 MVA and above.

ATSI Transmission Zone M3 Process
Rye Beach Road, Greenfield – Shinrock 69 kV line

Need Number: AMPT-2021-001

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan - 10/11/2022

Selected Solution:

AMPT Identified Scope

- At Rye Beach Road (Huron Muni) 69/12 kV Substation - Expand the current 69 kV station to a 4-CB ring bus arrangement to accommodate a 2nd 69 kV circuit (toward Shinrock). Build the new 69 kV ring bus to 2000A ratings; Install four (4) 69 kV circuit breakers; Install one (1) 69 kV circuit switcher; install ten (10) 69 kV bus disconnect switches (2000A);
- Relocate existing FE revenue metering at the substation as a result of the system reconfiguration.

FE Identified Scope **($2.8 M)**

- Build approximately 0.2 miles 69 kV line into AMPT's Rye Beach Road substation in a separate right of way using 556 kcmil ACSR conductor.
- Loop in/out the Greenfield-Shinrock 69 kV line into AMPT's Rye Beach Road Substation.
- FE will install two dead-end structures just outside of the AMPT's substation, for the new and existing line, this structure will be the point of interconnection (POI).
- The FE facilities/lines will terminate at the dead-end structure.
- FE will install two 1200 A motor-operated switches on the new and existing line at the dead-end structures.
- Adjust relay settings at Shinrock Substation
- Replace existing Greenfield (Shinrock Line) relay with a standard line relaying panel

ATSI Transmission Zone M3 Process
Rye Beach Road, Greenfield – Shinrock 69 kV line

Selected Solution (Continued):

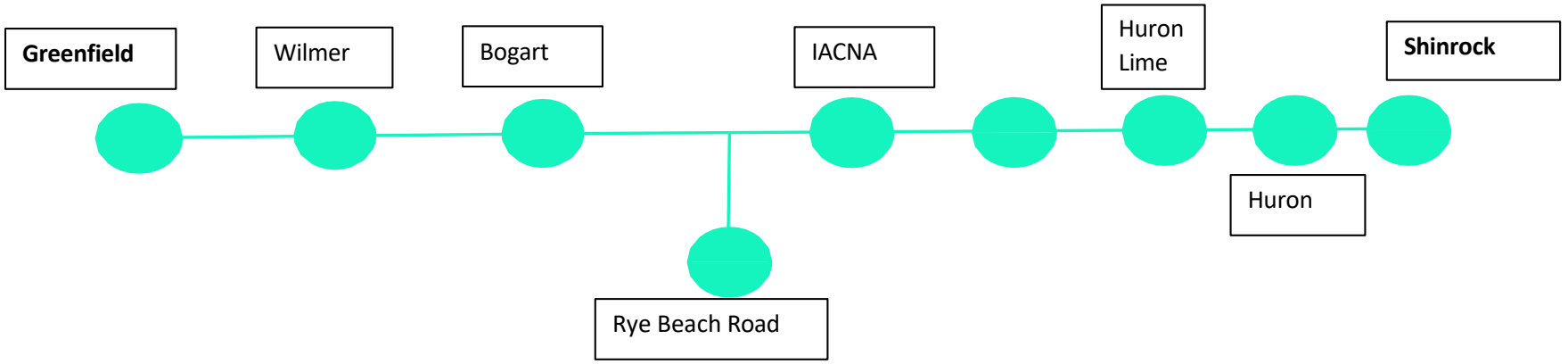
Total ATSI Estimated Transmission Cost: $2.8 M

Projected In-Service: 06/01/2025

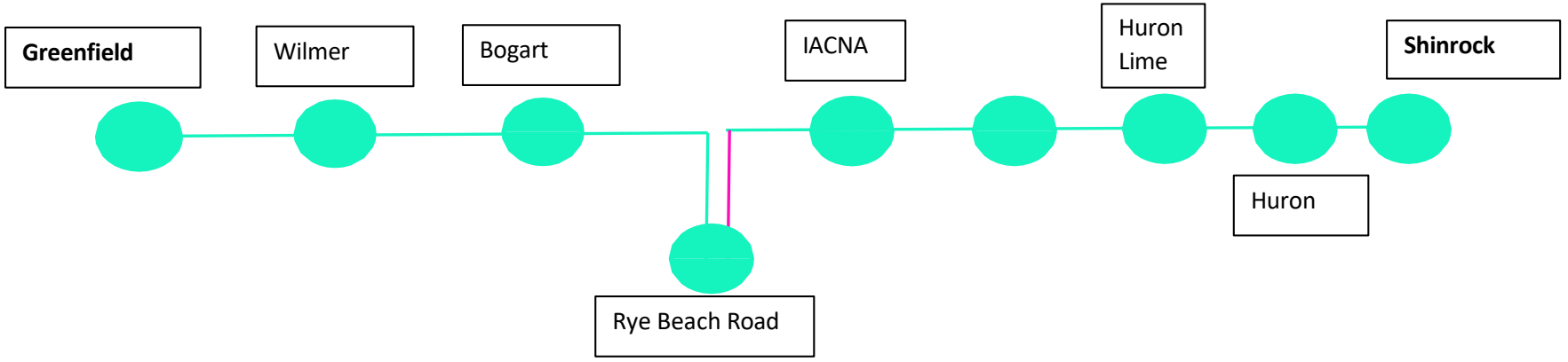
Project Status: Scoping (AMPT) Conceptual (FE)

Supplemental Project ID: s2749.2

Existing



Proposed



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

ATSI Transmission Zone M3 Process
Pioneer, OH

Need Number: AMPT-2022-001

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan

Previously Presented: Need Meeting – 1/21/2022

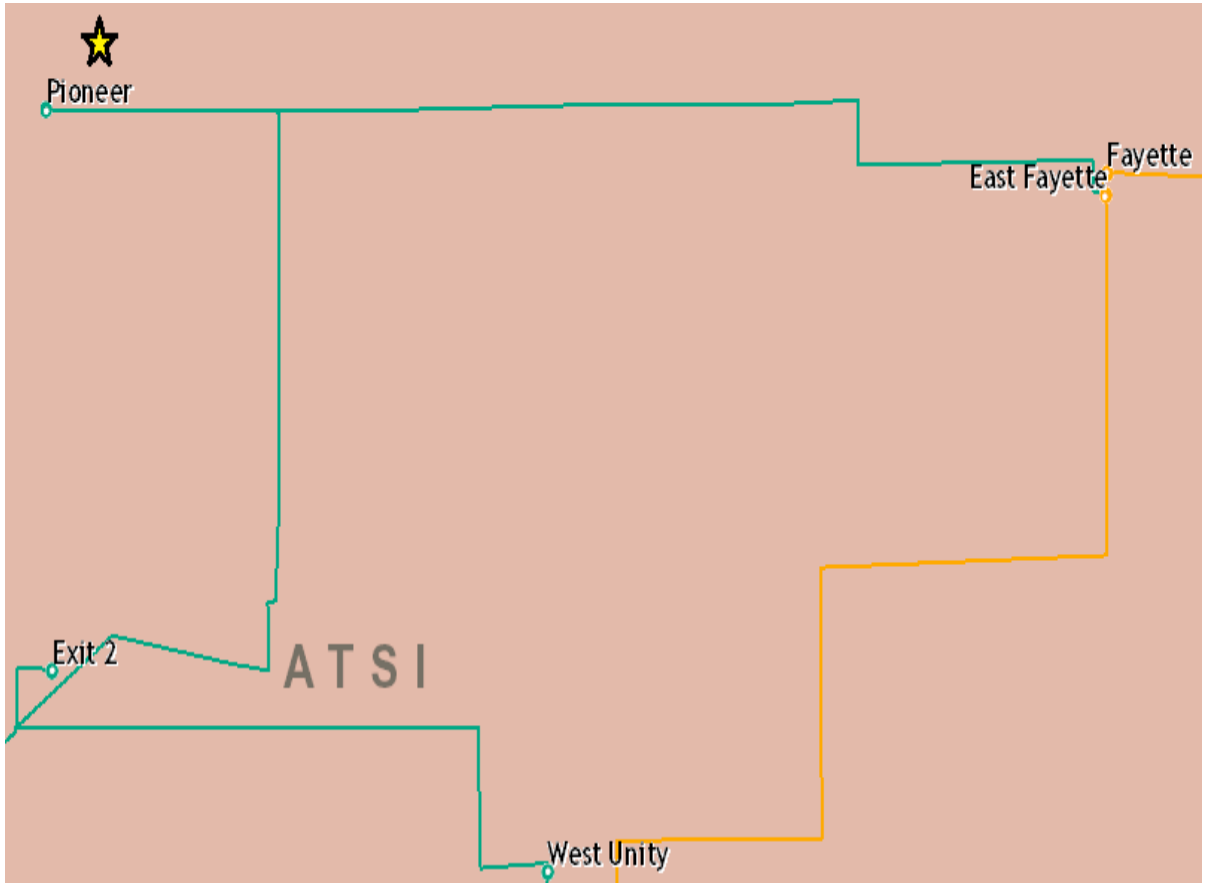
Solution Meeting – 6/15/2022

Supplemental Project Driver(s): Customer Service

Specific Assumption Reference(s): AMPT Transmission Facilities Interconnection Requirements Document

Problem Statement:

New Customer Connection - The Village of Pioneer has requested a new 69 kV service point near the AMPT tap off ATSI's East Fayette-Exit 2 69 kV line. This request was made to support a new retail customer with an anticipated load of approximately 16 MVA..



- SRRTEP – Western ATSI Local Plan - 2022

ATSI Transmission Zone M3 Process
Pioneer, OH

Need Number: AMPT-2022-001

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan

Selected Solution:

FE Identified Scope **($0.25M)**

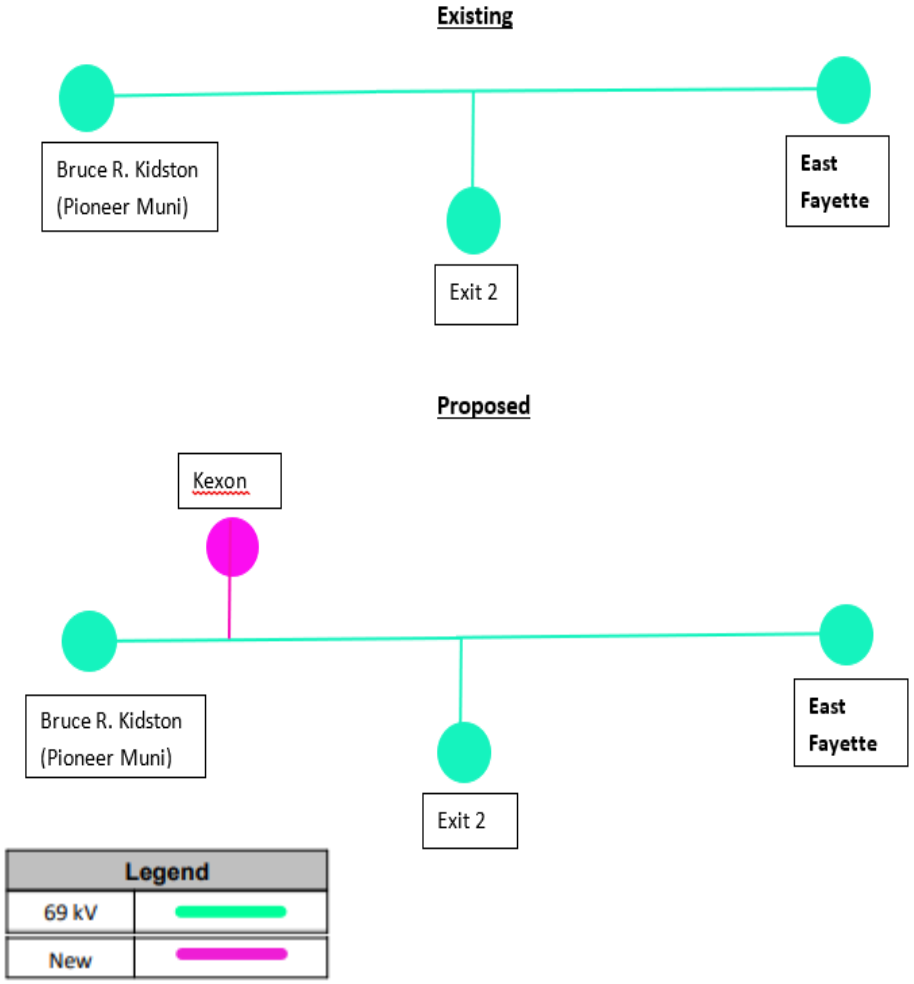
- Provide two (2) 69 kV revenue metering equipment packages for the new Kexon Delivery Point.
- Revise relay settings at East Fayette and Snyder substations.

Total ATSI Estimated Transmission Cost: $0.25 M

Projected In-Service: 10/31/2023

Project Status: Engineering

Supplemental Project ID: s2806.1



Revision History

3/18/2022 – V1 – Original version posted to pjm.com (s2647, s2648, s2649 & s2228)

7/8/2022 – V2 – Addition of s2696, s2697 & s2698.

10/11/2022 – V3 – Addition of s2696, s1954, s2756, s2757. s2758, s2759, s2671.1 & s2749.2

10/26/2022 – V4 – Correction of ATSI-2021-012 supplemental ID from s2696 to s2804

12/01/2022 – V5 – Addition of AMPT project AMPT-2022-001 (s2806.1)