Subregional RTEP Committee – Western
FirstEnergy Supplemental Projects

April 16, 2021

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
GM Powertrain – Jackman 138 kV

Need Number: ATSI-2021-008

Process Stage: Need Meeting – 04/16/2021

Supplemental Project Driver(s):

Equipment Material Condition, Performance, and Risk

Infrastructure Resilience

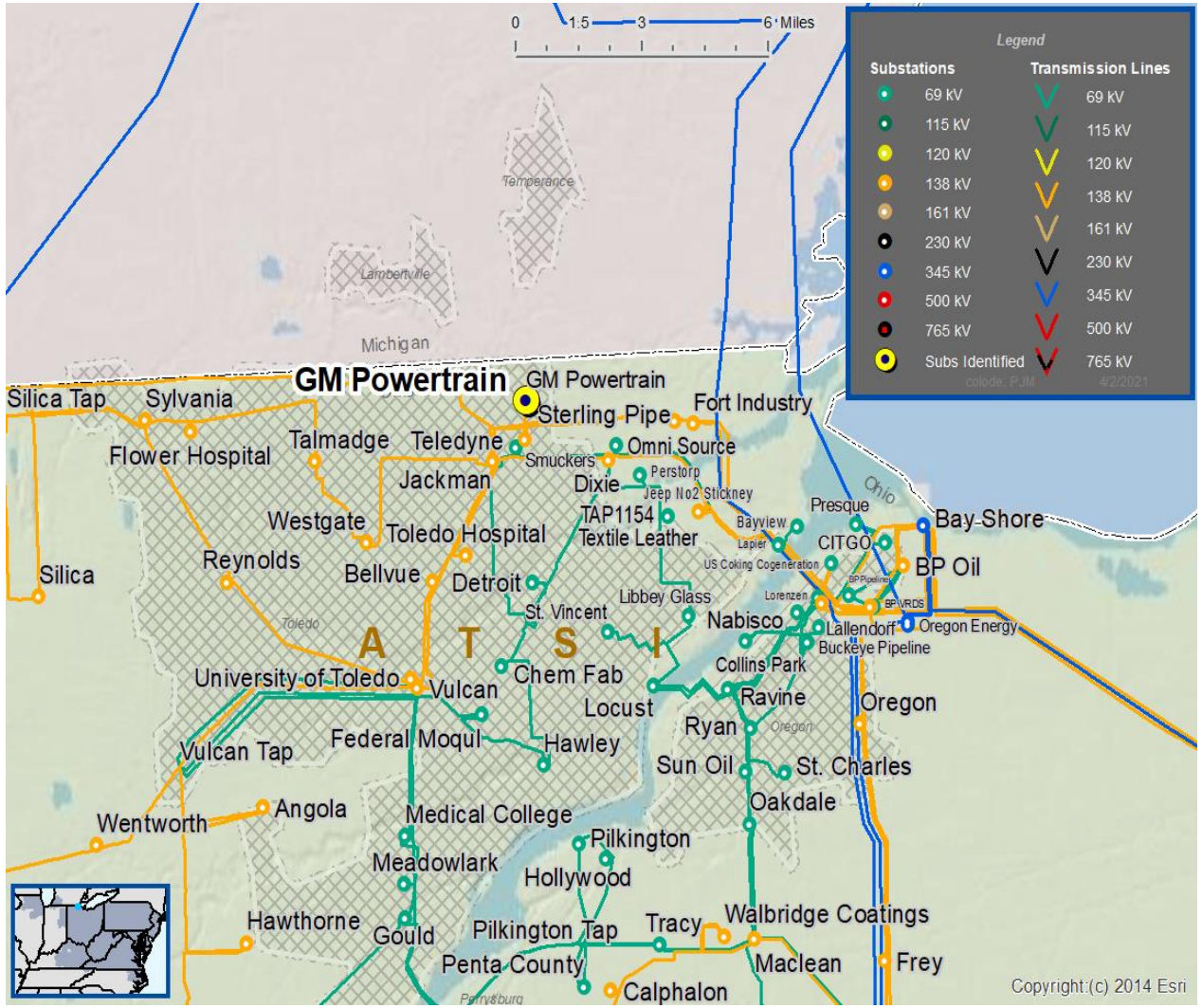
Specific Assumption Reference(s):

Global Factors

- Increasing negative trend in maintenance findings and/or costs
- Failure risk, to the extent caused by asset design characteristics, or historical industry/ company performance data, or application design error
- Expected service life (at or beyond) or obsolescence

Substation Condition Rebuild/Replacement

- Circuit breakers and other fault interrupting devices
- Switches



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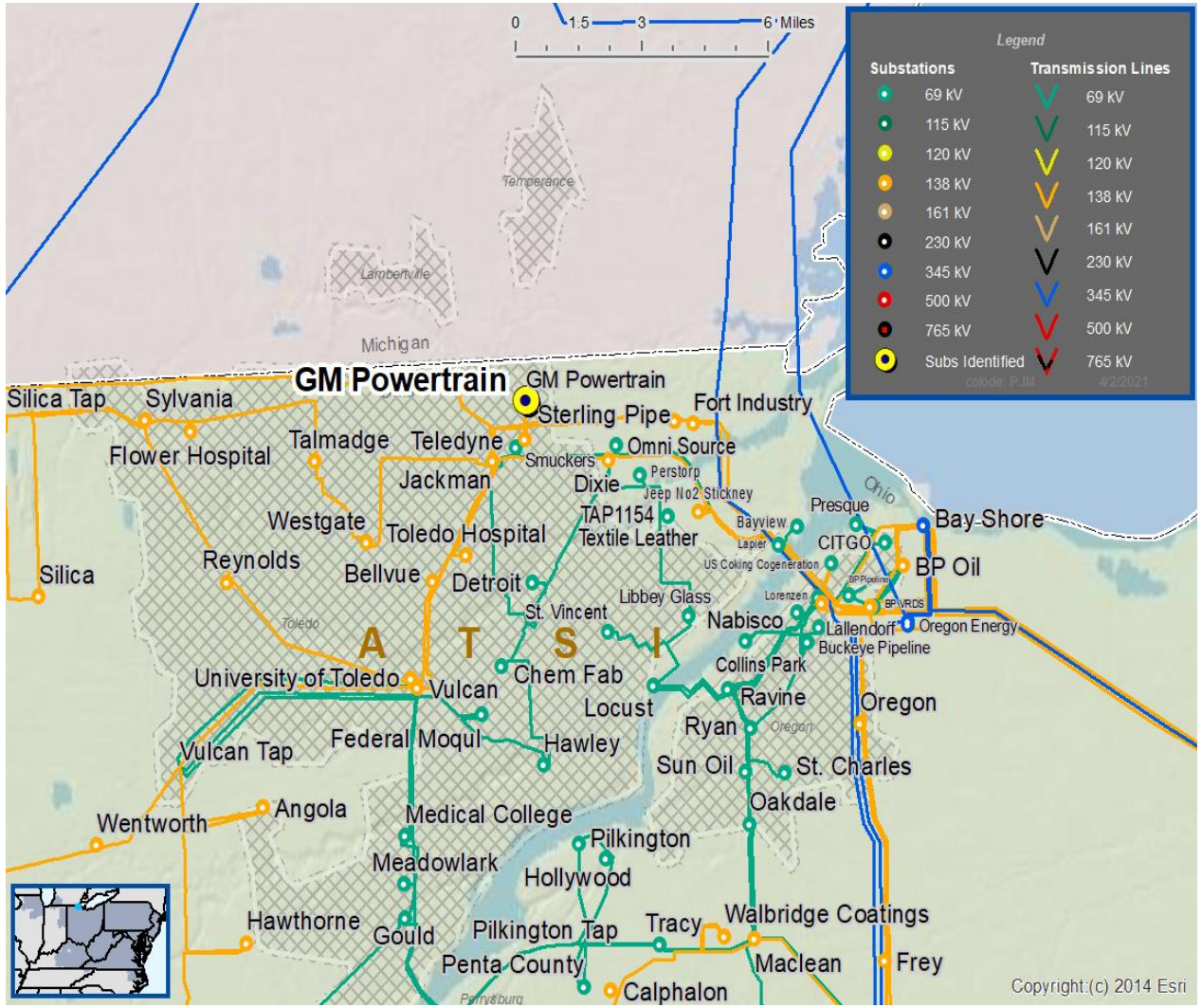
ATSI Transmission Zone M-3 Process
GM Powertrain – Jackman 138 kV

Need Number: ATSI-2021-008

Process Stage: Need Meeting – 04/16/2021

Problem Statement

- Breakers B-13295, B-13296, B-13297, and associated disconnect switches at GM Powertrain
  - Increasing maintenance concerns; hydraulic fluid issues, deteriorated operating mechanisms and increasing maintenance trends
  - Breaker B-13295 is 52 years old, Breaker B-13296 is 52 years old, and Breaker B-13297 is 48 years old
- Breaker B-13329 and associated disconnect switches at Jackman
  - Increasing maintenance concerns; hydraulic pump issues, valve issues, deteriorated operating mechanisms and increasing maintenance trends
  - Breaker B-13329 is 48 years old



ATSI Transmission Zone M-3 Process
West Akron Transfer Breaker B-22

Need Number: ATSI-2021-010
Process Stage: Need Meeting – 04/16/2021

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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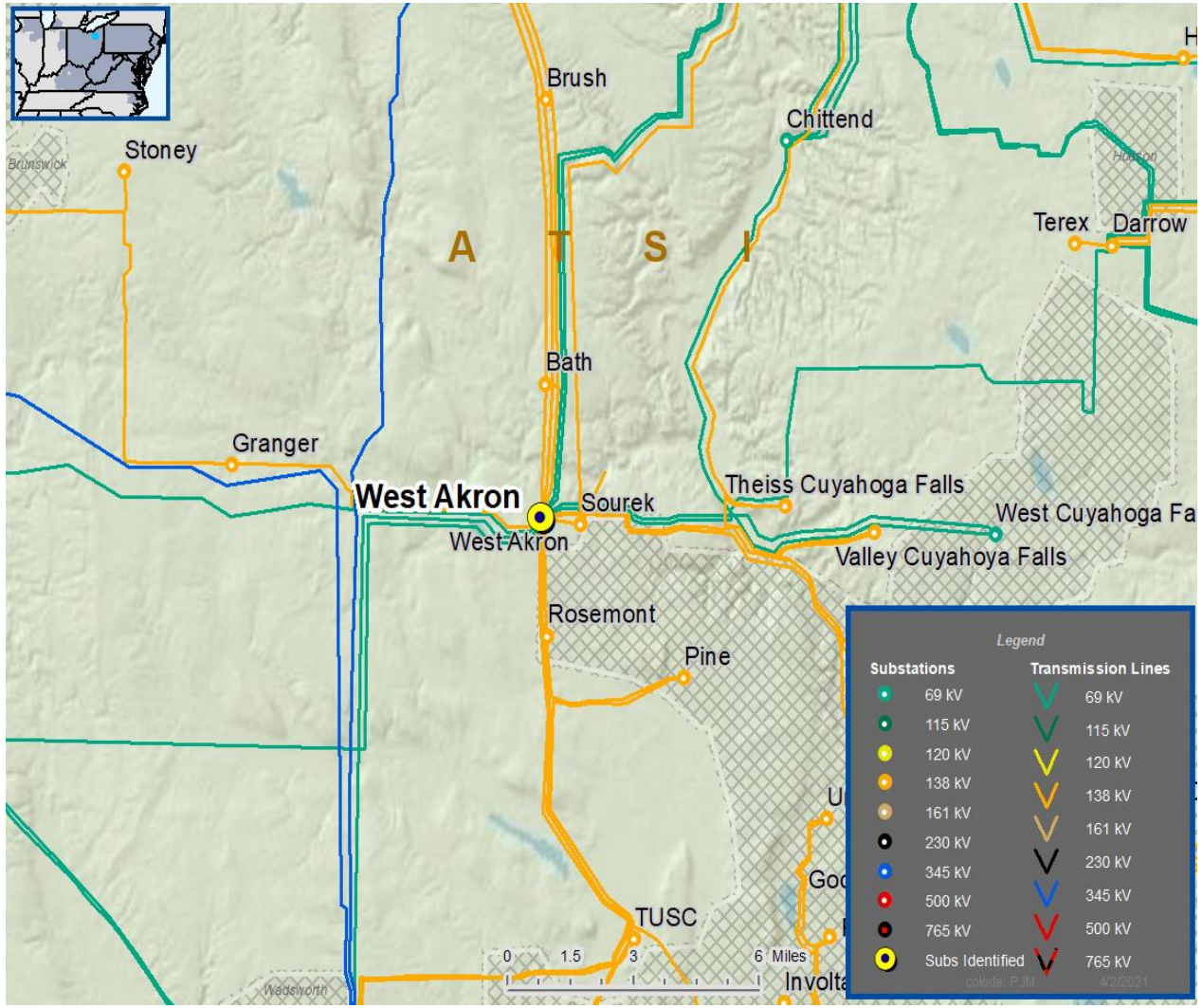


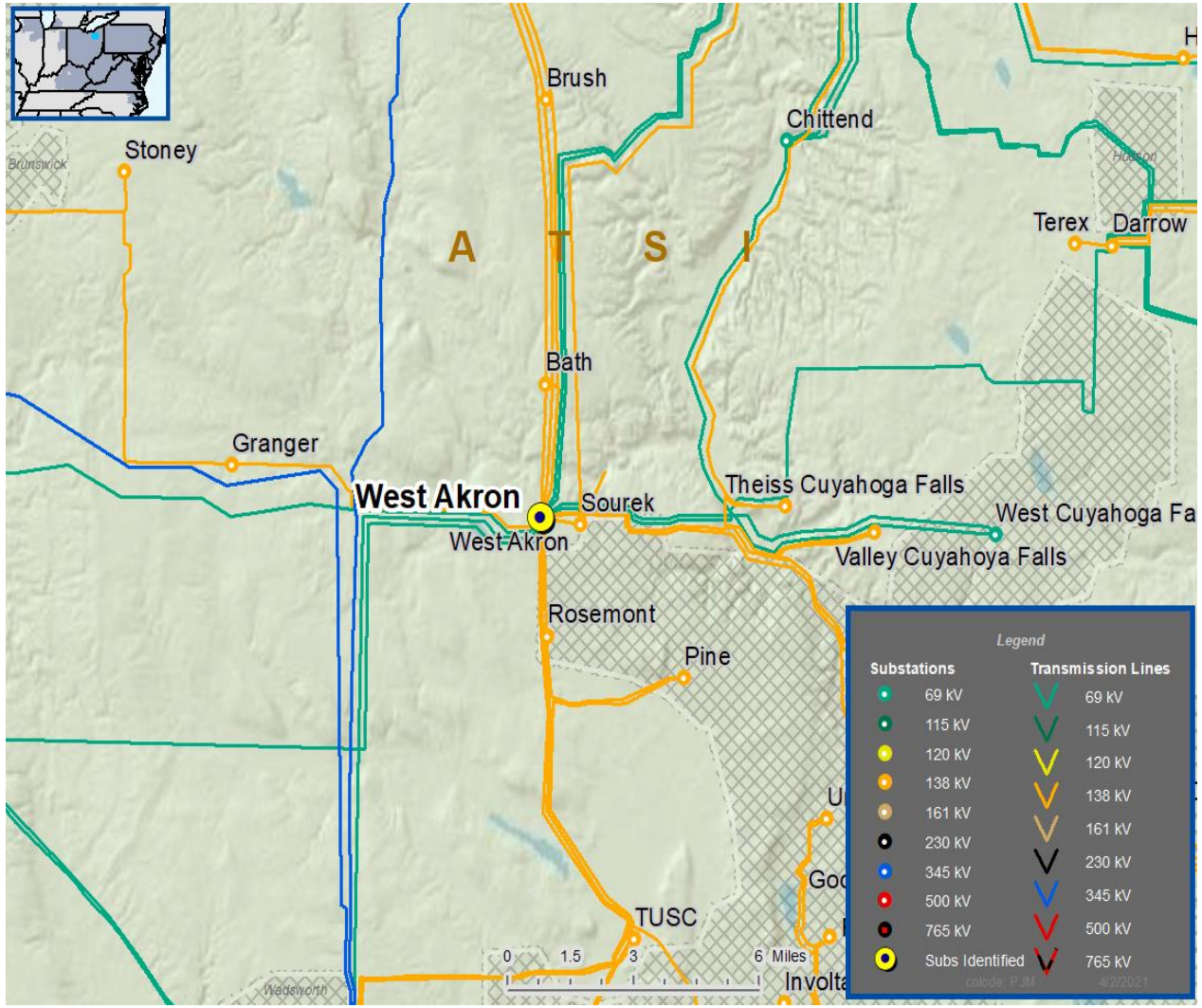
ATSI Transmission Zone M-3 Process
West Akron Transfer Breaker B-22

Need Number: ATSI-2021-010

Process Stage: Need Meeting – 04/16/2021

Problem Statement

- West Akron 138 kV Breaker Transfer Breaker B-22 and associated disconnect switches
  - Oil Circuit Breaker (OCB) with increasing maintenance concerns; compressor issues, deteriorated operating mechanisms and increasing maintenance trends
  - Breaker B-22 is 40 years old



ATSI Transmission Zone M-3 Process
Eastlake 138 kV Substation

Need Number: ATSI-2021-011

Process Stage: Need Meeting – 04/16/2021

Supplemental Project Driver(s):

Equipment Material Condition, Performance and Risk

Infrastructure Resilience

Specific Assumption Reference(s):

Global Factors

- Increasing negative trend in maintenance findings and/or costs
- Failure risk, to the extent caused by asset design characteristics, or historical industry/ company performance data, or application design error
- Expected service life (at or beyond) or obsolescence

Substation Condition Rebuild/Replacement

- Circuit breakers and other fault interrupting devices
- Switches

Problem Statement

- Breakers B-19, B-35, B-22, B-25, B-24, B-28, B-27, and associated disconnect switches at Eastlake:
  - Increasing maintenance concerns; compressor issues, valve issues, heater issues, deteriorated operating mechanisms, and increasing maintenance trends
  - Breaker B-19 is 50 years old; Breaker B-35 is 41 years old; Breakers B-22, B-25, B-24, and B-28 are 49 years old; and Breaker B-27 is 47 years old

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

ATSI Transmission Zone M-3 Process
Eastlake – Lloyd Q13 138 kV Line Misoperation

Need Number: ATSI-2020-024

Process Stage: Solution Meeting – 04/16/2021

Previously Presented: Need Meeting – 08/14/2020

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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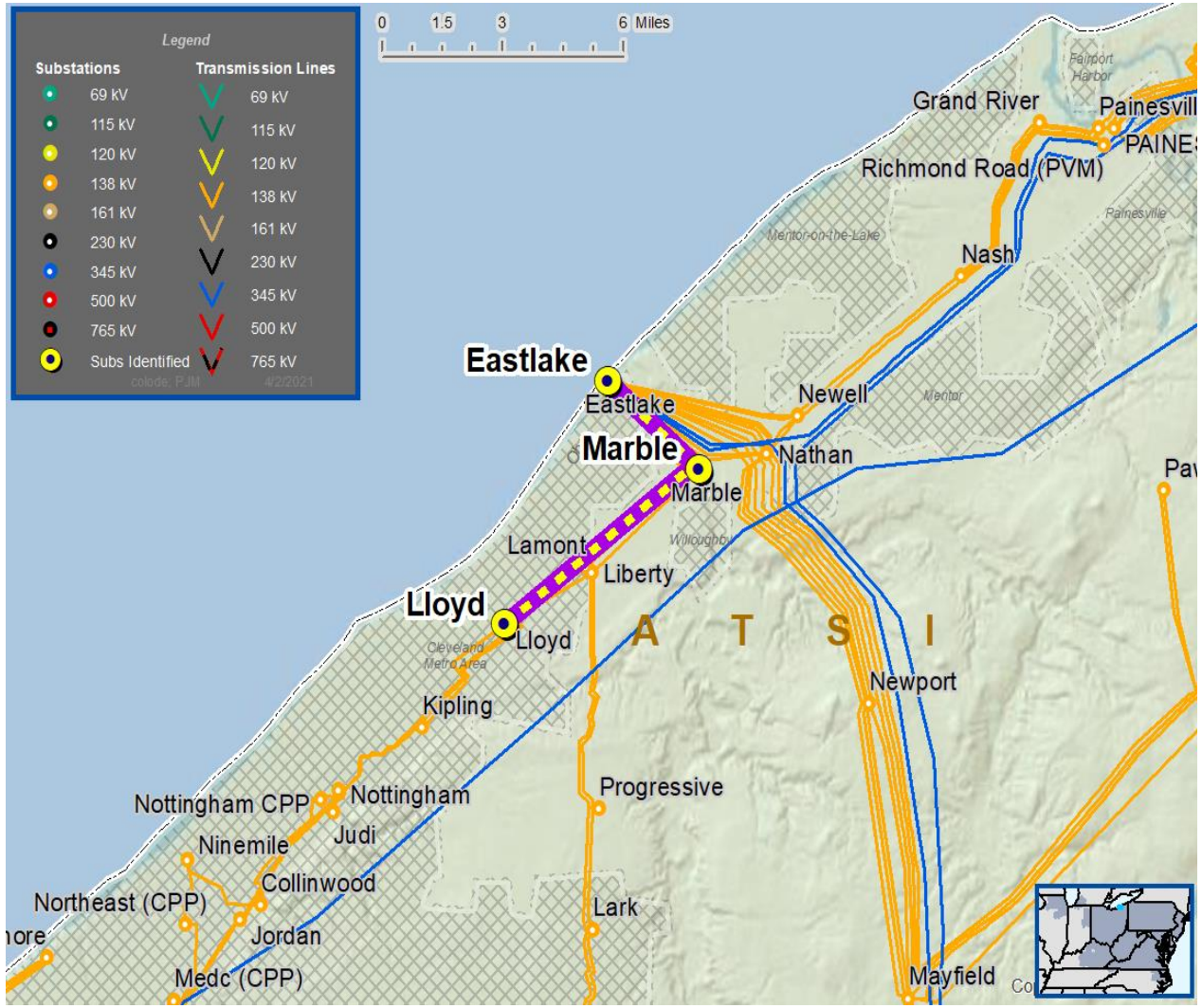

ATSI Transmission Zone M-3 Process
Eastlake – Lloyd Q13 138 kV Line Misoperation

Proposed Solution:

ATSI-2020	Transmission Line / Substation Locations	New MVA Line Rating (SN / SE)	Scope of Work	Estimated Cost ($ M)	Target ISD
ATSI-2020-024	Eastlake – Lloyd Q13 138 kV Line 1. Eastlake – Marble	278 / 339 315 (WN) / 401 (WE)	Eastlake-Lloyd 138kV Q-13: Replace the line relaying and replace Terminal Equipment such as : Breakers, associated disconnects, Wave Traps, CCVTs, and Line Tuners as needed.	1.0	3/4/2022

Alternatives Considered: Maintain existing condition

Project Status: Conceptual

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

ATSI Transmission Zone M-3 Process
New Customer Substation

Need Number: ATSI-2021-007

Process State: Solutions Meeting 04/16/2021

Previously Presented: 03/19/2021

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 due to a thermal overload identified on the West Pittsburg #1 23-8.32 kV transformer. The anticipated load of the new customer connection is 4 MVA.

Requested in-service date is 12/1/2021

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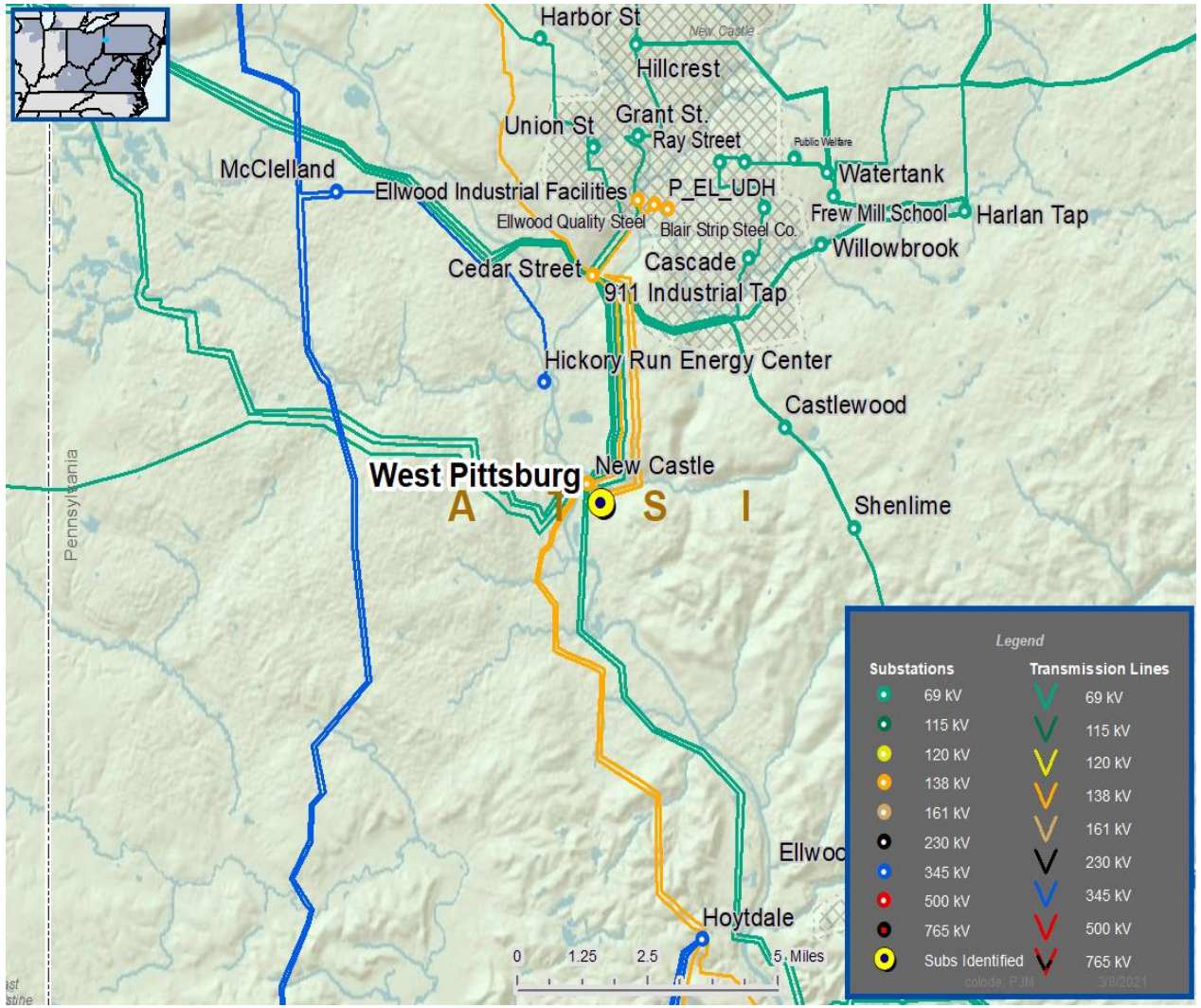


ATSI Transmission Zone M-3 Process
New Customer Substation

Need Number: ATSI-2021-007

Process State: Solutions Meeting 04/16/2021

Previously Presented: 03/19/2021

Proposed Solution:

- Tap the Frisco – New Castle Y-205 69 kV line between New Castle and Cemex Cement
- Install two 69 kV disconnect switches with SCADA
- Construct ~1 span of 69 kV into new substation
- Replace two 69 kV disconnect switches at Frisco substation
- Adjust relaying at Frisco and New Castle substations

Alternatives Considered:

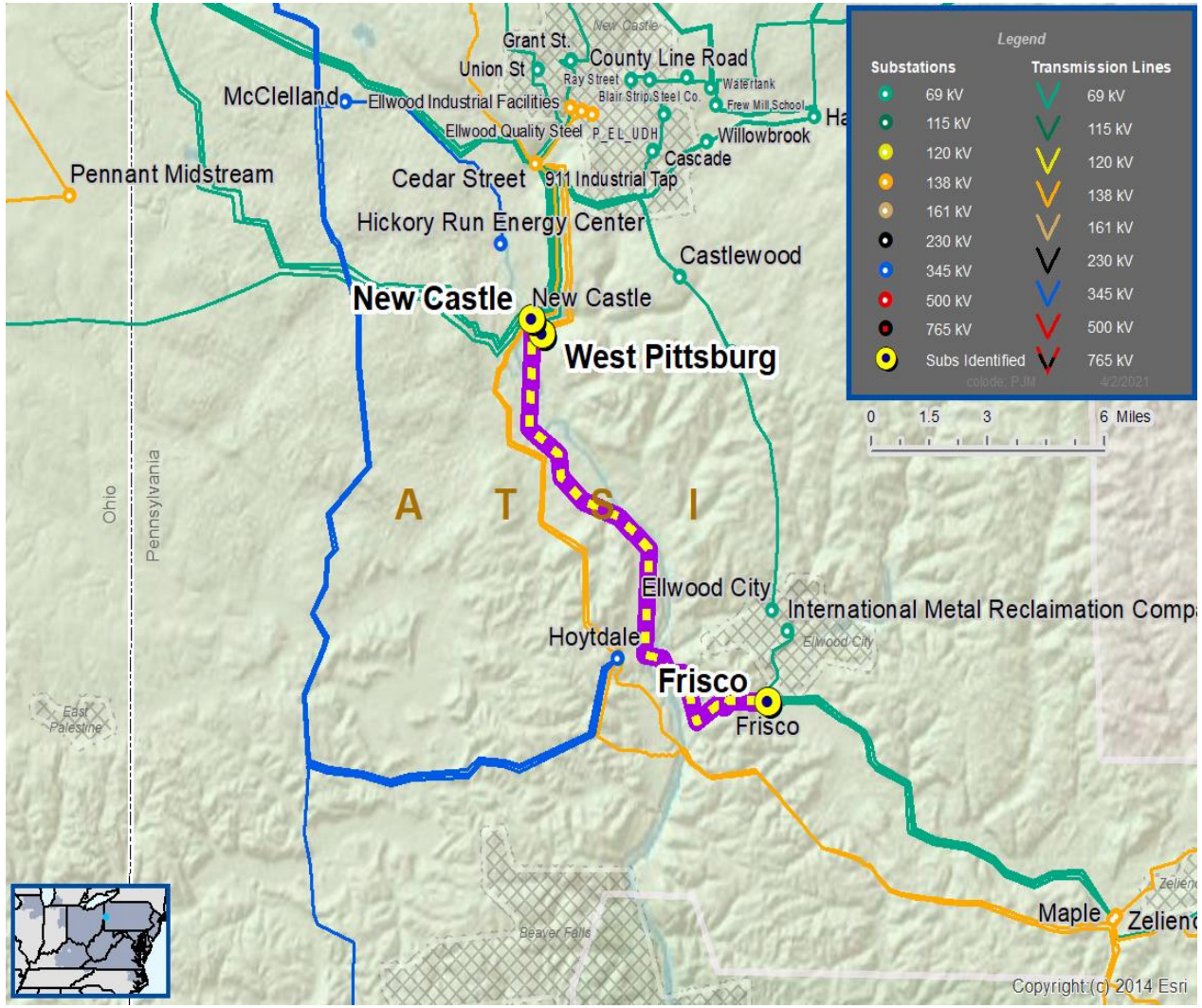
- No alternatives considered for this project

Estimated Project Cost: $1.05M

Projected In-Service: 12/01/2021

Project Status: Conceptual

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



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

04/06/2021 – V1 – Original version posted to pjm.com