

Subregional RTEP Committee – Western FirstEnergy Supplemental Projects

October 14, 2022

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-2022-027
Process Stage: Need Meeting – 10/14/2022

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

- Specific Assumption Reference(s):**
 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 Milton (Newton Falls) 69 kV Line is approximately 27.3 miles in length:

- Assessment found 70 of 343 wood poles had defects that could negatively affect reliability. Defects included decay, top rot and multiple woodpecker holes.
- 313 wood poles nearing end of life; Original poles date 1970 (50+ years at construction).
- 23 maintenance records including 13 pole replacements in last 5 years indicating upward trend in maintenance.
- There are four delivery points with approximately 6,500 customers and 45 MVA of peak load served
- Since 2017, the Milton (Newton Falls) 69 kV Line had six (6) momentary and five (5) sustained outages



Need Number: ATSI-2022-028
Process Stage: Need Meeting – 10/14/2022

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

Specific Assumption Reference(s)

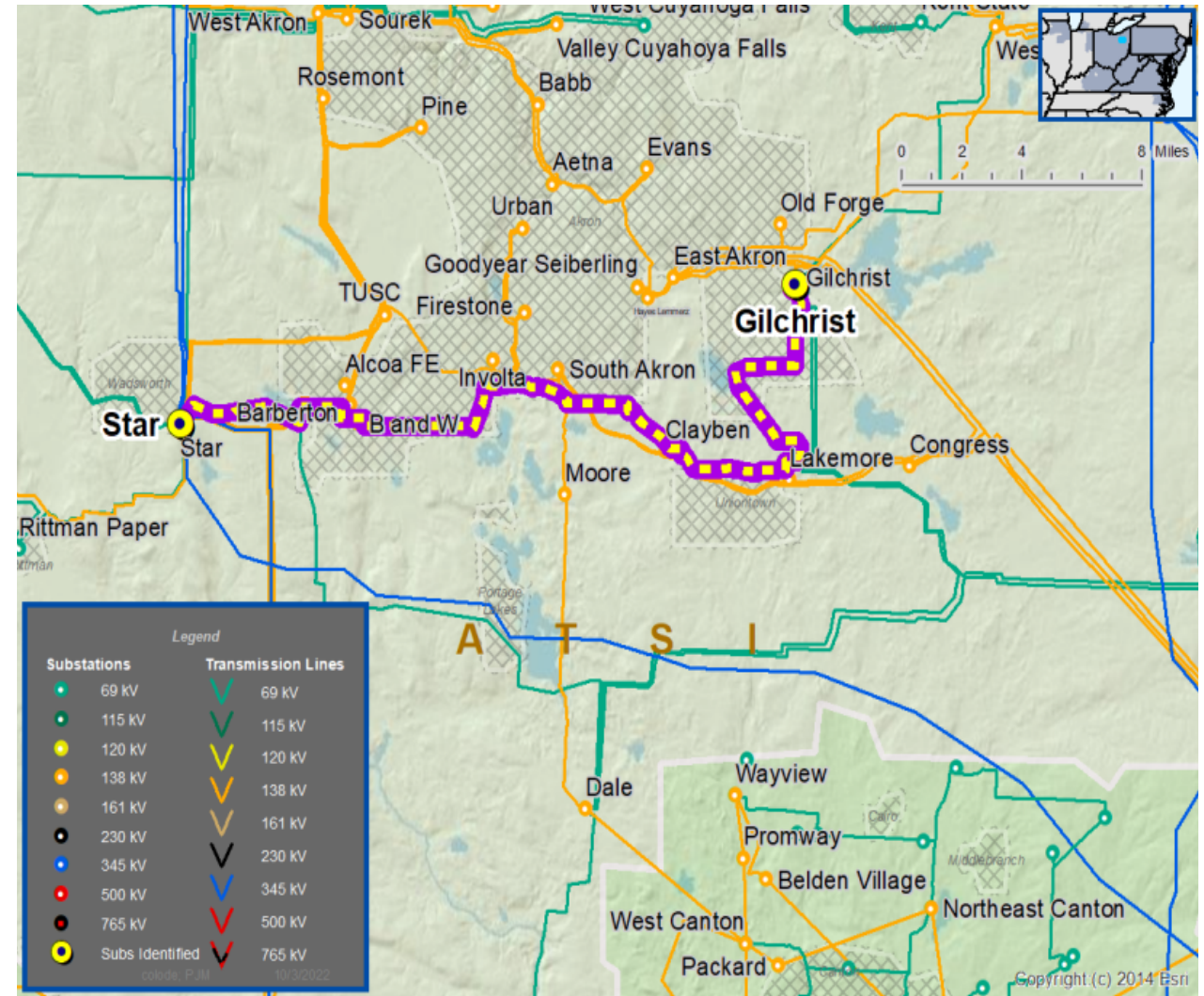
Line Condition Rebuild / Replacement

- 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:

- 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.



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-2022-011
Process Stage: Solutions Meeting – 10/14/2022
Previously Presented: Need Meeting – 05/19/2022

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

Specific Assumption Reference(s):

Global Considerations

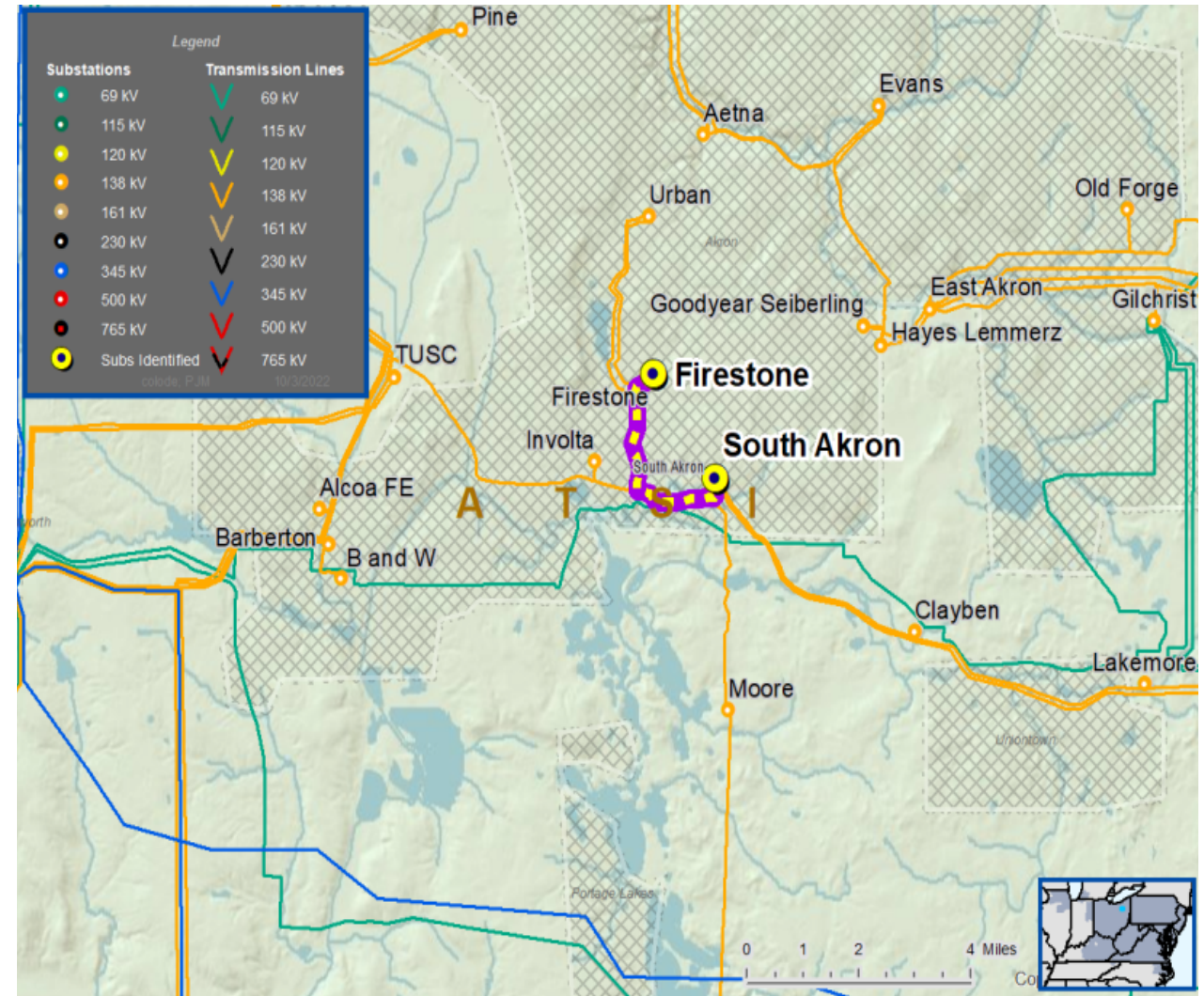
- System reliability and performance
- Substation / line equipment limits

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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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-2022-011	Firestone-South Akron 138 kV Line	195/209	233/282	Wavetrap, relay, and substation conductor

Need Number: ATSI-2022-011
Process Stage: Solutions Meeting – 10/14/2022
Previously Presented: Need Meeting – 05/19/2022

Proposed Solution:

- At Firestone Substation – replace wave traps, line CCVTs, line and breaker failure relays, carrier sets, and line tuners for the South Akron 138 kV line exit
- At South Akron Substation – replace wave traps, line drops, line CCVTs, line and breaker failure relays, carrier sets, and line tuners for the Firestone 138 kV line exit

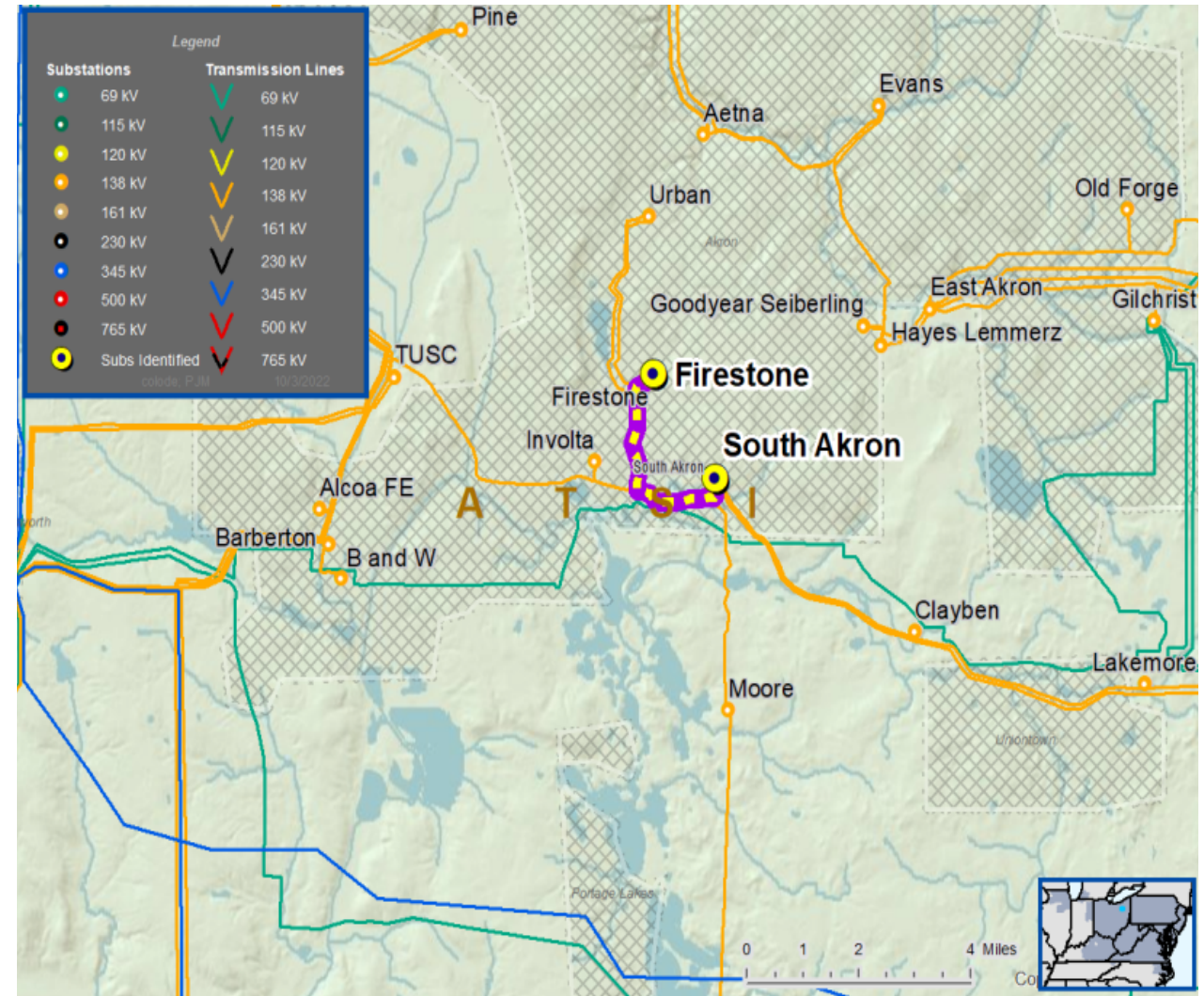
Transmission Line Ratings:

- Firestone-South Akron 138 kV Line
 - Before Proposed Solution: 195 MVA SN / 209 MVA SE, 210 MVA WN / 210 MVA WE
 - After Proposed Solution: 221 MVA SN / 262 MVA SE, 263 MVA WN / 300 MVA WE
- Maintain existing condition and risk of failure.

Estimated Project Cost: \$2.2 M

Projected IS Date: 06/01/2023

Status: Conceptual



Re-Present 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

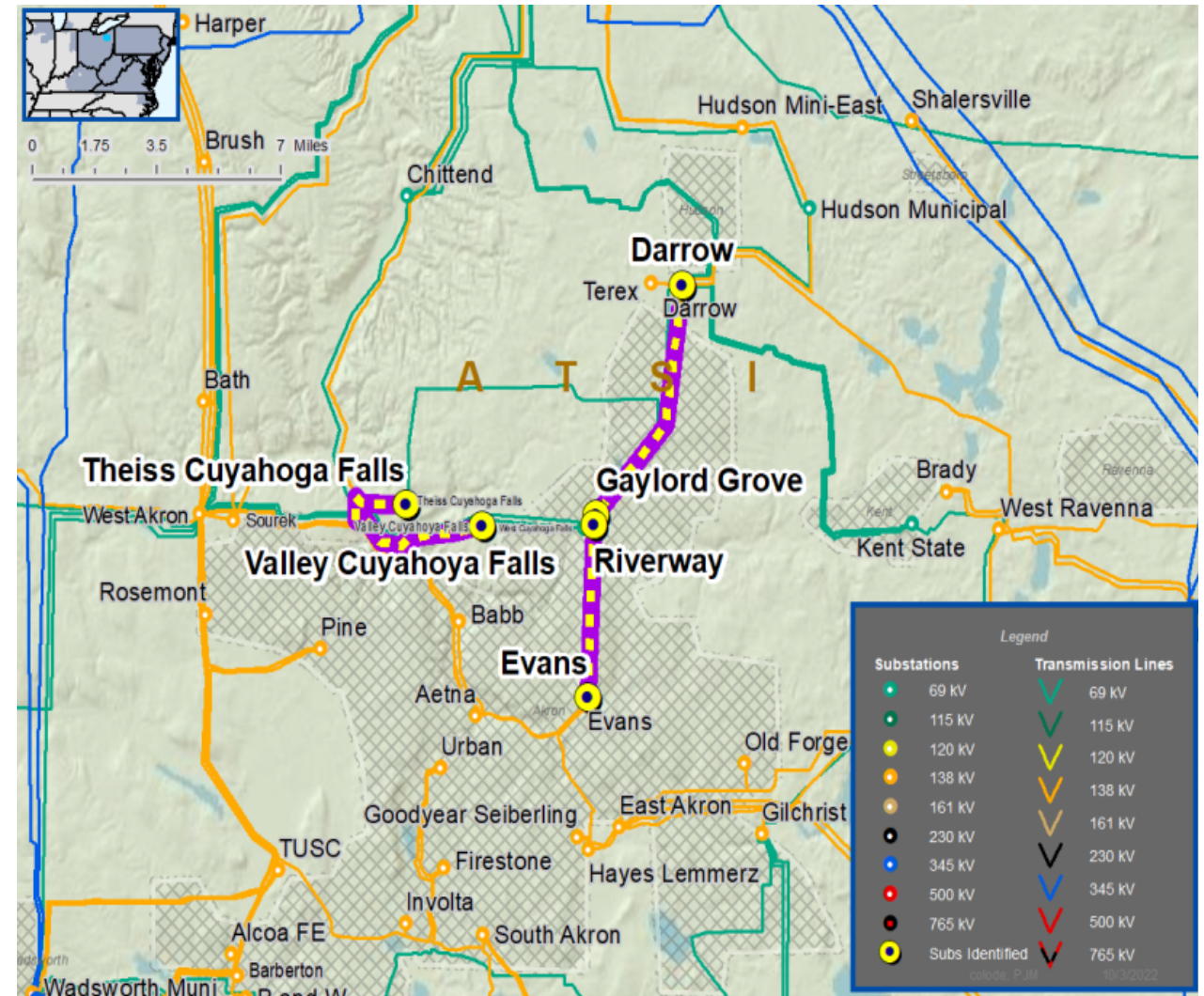
Need Number: ATSI-2019-010 (s2387)
Process Stage: Re-Present Meeting – 10/14/2022
Previously Presented: Need Meeting – 01/11/2019
 Solutions Meeting – 11/22/2019

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

Specific Assumption Reference(s)

Global Considerations

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



Need Number: ATSI-2019-010 (~~s2387~~)
Process Stage: Re-present Meeting – 10/14/2022
Previously Presented: Need Meeting – 01/11/2019
 Solutions Meeting – 11/22/2019

Problem Statement

Valley & Thiess 138 kV Substation Area

The Valley and Thiess 138 kV substations are presently co-owned by FE and Cuyahoga Falls Municipality with transmission service from the ATSI Babb-Chamberlin 138 kV line.

- A transmission line outage of the double circuit networked 138 kV tap (approximately 1 mile) to Valley substation could result in approximately 86 MW and 25,000 Customers interrupted for an extended period of time.
- The loss of the Chamberlin-Thiess 138 kV line, followed by the loss of the Babb-Valley 138 kV line (N-1-1) could result in approximately 106 MW and 25,000 customers interrupted for an extended period of time.

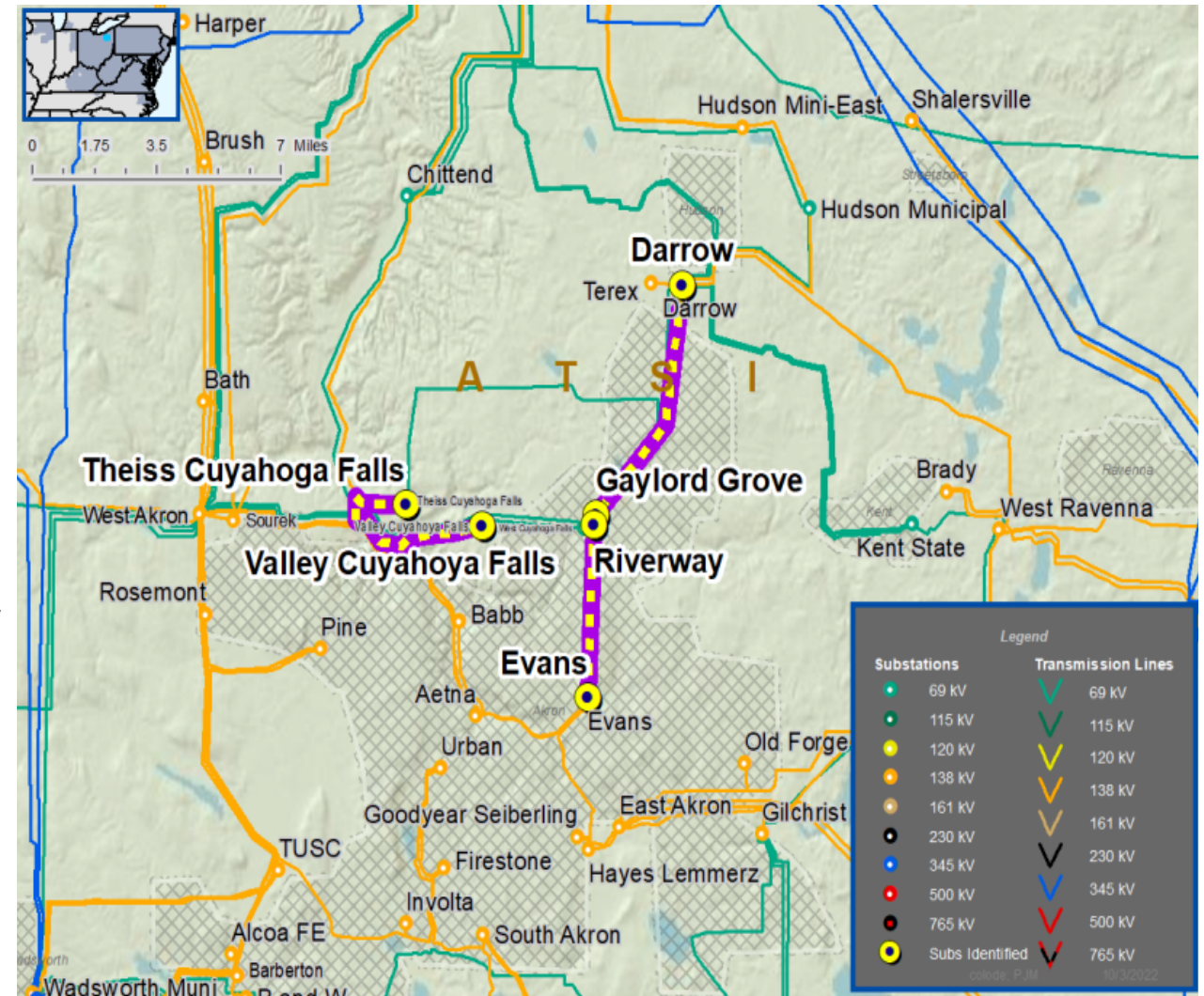
Evans & Darrow 138 kV Substation Area

- The loss of the Babb-Evans 138 kV line, followed by the loss of the East Akron-Evans 138 kV line (N-1-1) results in approximately 25 MW and 4,834 customers interrupted.
- The loss of the Chamberlin-Hudson Muni 138 kV line, followed by the loss of the Brady-Hanna 138 kV line (N-1-1), results in approximately 61 MW and 18,800 customers interrupted. Post-contingency voltage drops below 0.92 p.u. in the Darrow substation area.

System Performance

Over the past five years:

- The Chamberlin-Thiess 138 kV line has experienced ~~five~~ **one** (~~5~~ **1**) outage (~~3~~ **1** sustained, ~~2~~ **0** momentary)
- The Thiess-Valley 138 kV line has experienced ~~one~~ **two** (~~1~~ **2**) outages (~~1~~ **2** sustained, ~~0~~ **0** momentary)
- The Chamberlin-Hudson Muni 138 kV line has experienced ~~four~~ **three** (~~4~~ **3**) outages (2 sustained, ~~2~~ **1** momentary)
- The Babb-Evans 138 kV line has experienced one (1) outage (~~1~~ **0** sustained, ~~0~~ **1** momentary)
- The Babb-Valley 138 kV line has experienced one (1) outage (1 sustained, 0 momentary)





Need Number: ATSI-2019-010 (s2387)
Process Stage: Re-present Meeting – 10/14/2022
Previously Presented: Need Meeting – 01/11/2019
 Solutions Meeting – 11/22/2019

Proposed Solution:

FE Identified Scope (\$36.3M):

New 138 kV Line & Sub 5 Expansion

- Build FE Sub 5 (Riverway) 138 kV four (4) breaker ring bus adjacent to the ~~CF Sub 5~~ AMPT Gaylord Grove substation
- ~~Cuyahoga Falls Muni to expand CF Sub 5 substation to a 138/23 kV substation~~
- Convert Evans 138 kV substation into five (future 6) breaker ring bus
- Convert the proposed Darrow five (future 6) breaker ring bus (s1708) into six breaker ring bus
- Build a new 138 kV line from Evans to new FE Sub5 (Approximately 4.4 miles)
- Build a new 138 kV line from Darrow to new FE Sub5 (Approximately 6.6 miles)
- Add a 28 MVAR 138 kV capacitor bank at Theiss substation.

AMPT Identified Scope (\$29.0M):

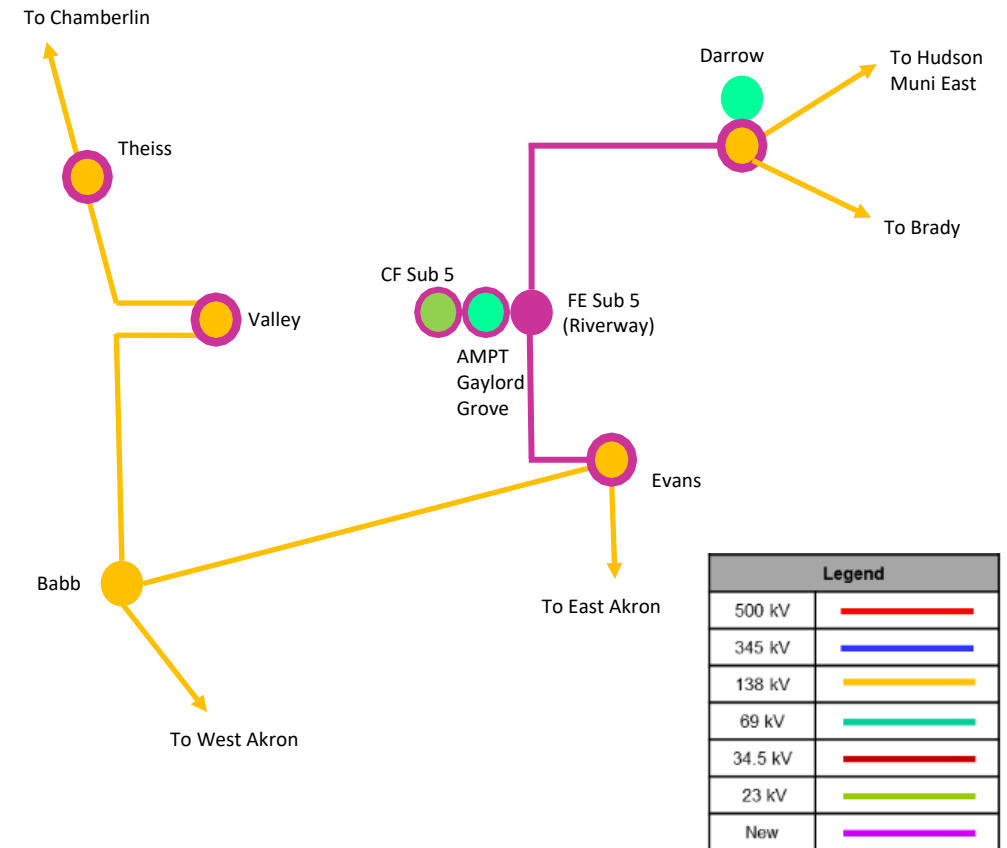
- At Valley 138/23.8 kV Substation - Install two (2) 138 kV CBs and associated equipment to separate AMPT's 138 kV facilities from FE's 138 kV ring bus. Relocate two (2) existing 138/23.8 kV transformers to accommodate the new 138 kV CBs. Install new panels in a new AMPT control house. **(\$6.3 M)**
- Construct a greenfield 138/69/23 kV station called "Gaylord Grove", located next to FE's proposed Riverway 138 kV station and Cuyahoga Falls existing Substation 5. Install two (2) 138/69 kV 170 MVA transformers, two (2) 138 kV CBs, five (5) 69 kV CBs using 69 kV bus rated to 2000A. **(\$22.7 M)**

Cuyahoga Falls Scope (\$0.0 M)

- Install two (2) 69/23 kV transformers, two (2) 23 kV low side transformer CBs and other associated equipment to connect from Gaylord Grove 69 kV yard to Cuyahoga Falls' Substation 5 23 kV station. *These facilities are distribution and not included in the overall project costs.*

Total Estimated Project Cost: ~~\$44M~~ 65.3M

ATSI Transmission Zone M-3 Process Cuyahoga Falls 138 kV Planning Area- Solution





ATSI Transmission Zone M-3 Process Cuyahoga Falls 138 kV Planning Area- Solution

Need Number: ATSI-2019-010 (s2387)
Process Stage: Re-present Meeting – 10/14/2022
Previously Presented: Need Meeting – 01/11/2019
 Solutions Meeting – 11/22/2019

Transmission Line Ratings:

- Darrow-FE Sub 5 138 kV Line
 - After Proposed Solution: 278 MVA SN / 339 MVA SE
- Evans-FE Sub 5 138 kV Line
 - After Proposed Solution: 278 MVA SN / 339 MVA SE

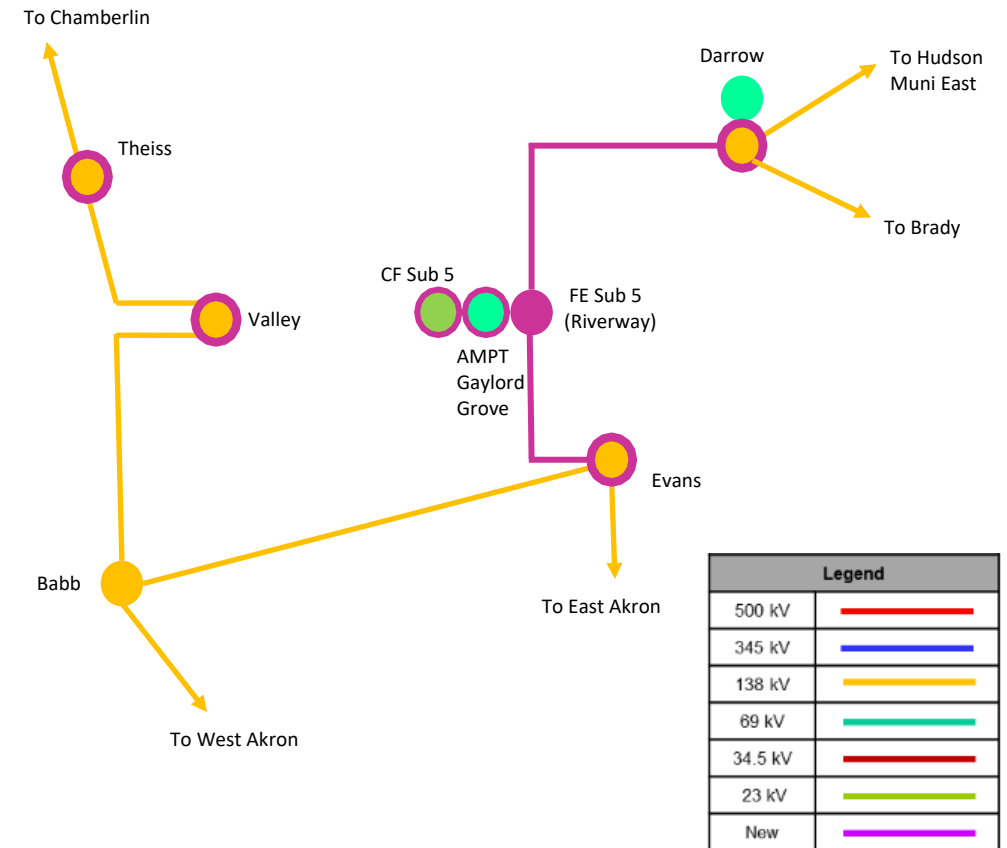
Alternatives Considered:

- Bring a third 138 kV transmission line into Valley substation. This alternative was not selected due to lack of route diversity, limited substation expansion, limited easement rights, and siting concerns.
- Build Gaylord Grove as a 138/23 kV substation. This alternative was not selected due to siting concerns, and ability to address City’s requirement for 69 kV service.

Projected In-Service: 06/01/2025

Project Status: Pre-Engineering (FE), Pre-Engineering (AMPT)

Model: 2018 Series 2023 Summer RTEP 50/50



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

10/04/2022 – V1 – Original version posted to pjm.com