Submission of Supplemental Projects for Inclusion in the Local Plan

Met-Ed Transmission Zone M-3 Process
Middletown Junction-Smith Street #1 115 kV New Customer

Need Number: ME-2023-005

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 1/3/2024

Previously Presented: Need Meeting – 5/18/2023

Solution Meeting – 07/20/2023

Project Driver(s):

Customer Service

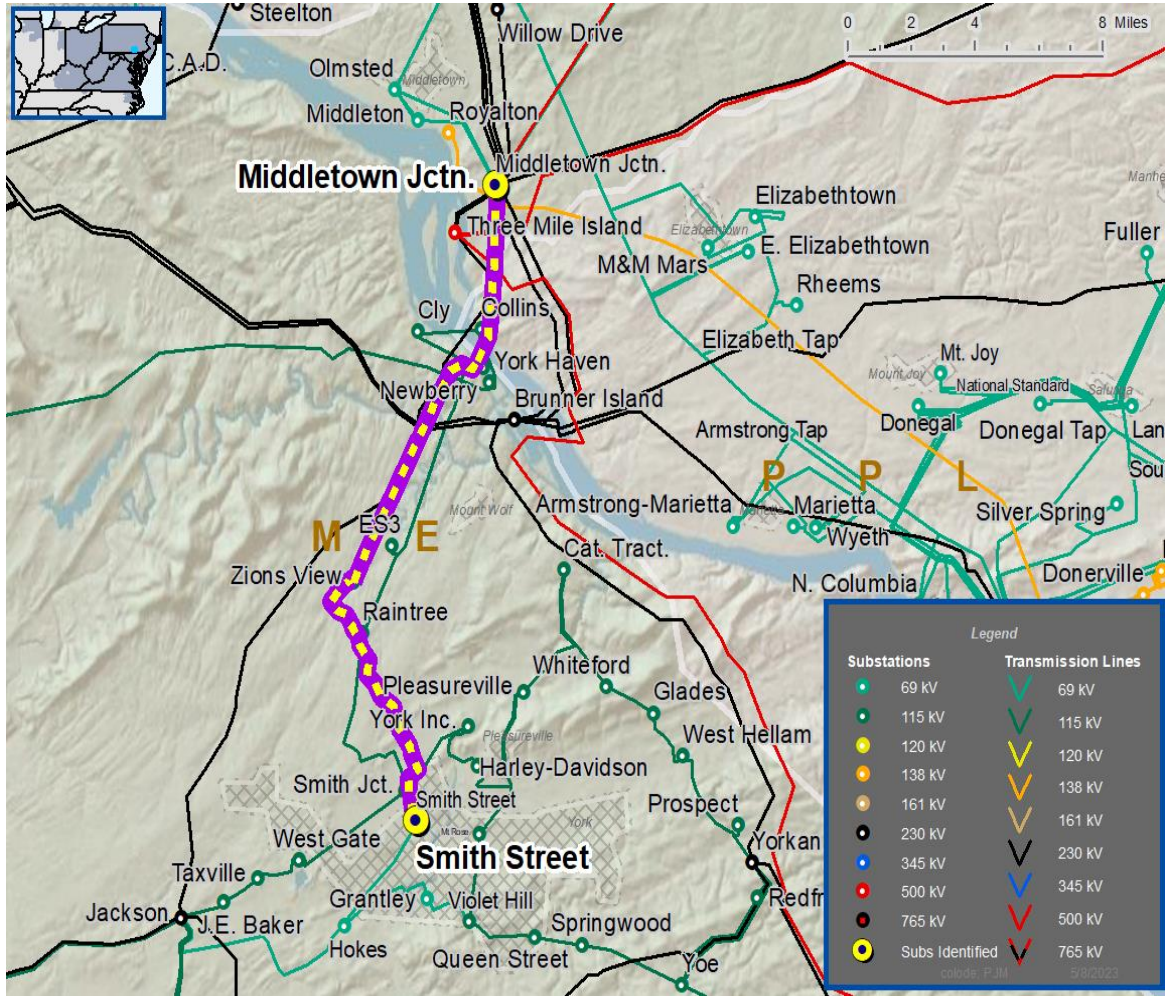
Specific Assumption Reference(s)

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 115 kV delivery point near the Middletown Junction-Smith Street #1 115 kV line. The anticipated load of the new customer connection is 12 MVA.

Requested in-service date is 05/31/2024.



Met-Ed Transmission Zone M-3 Process
Middletown Junction-Smith Street #1 kV New Customer- Solution

Need Number: ME-2023-005

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

Selected Solution:

115 kV Transmission Line Tap

- Install three SCADA controlled transmission line switches
- Construct approximately 0.2 miles of transmission line using 556 ACSR 26/7 from tap point to customer substation
- Install one 115 kV revenue metering package at customer substation
- Modify relay settings at Middletown Junction and Smith Street substations

Estimated Project Cost: $4.9M

Projected In-Service: 7/3/2024

Supplemental Project ID: s3017

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

Met-Ed Transmission Zone M-3 Process
Hokes Ring Bus

Need Number: ME-2023-003

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Previously Presented: Need Meeting 4/20/2023
Solution Meeting 11/16/2023

Project Driver:

Operational Flexibility and Efficiency

Specific Assumption Reference:

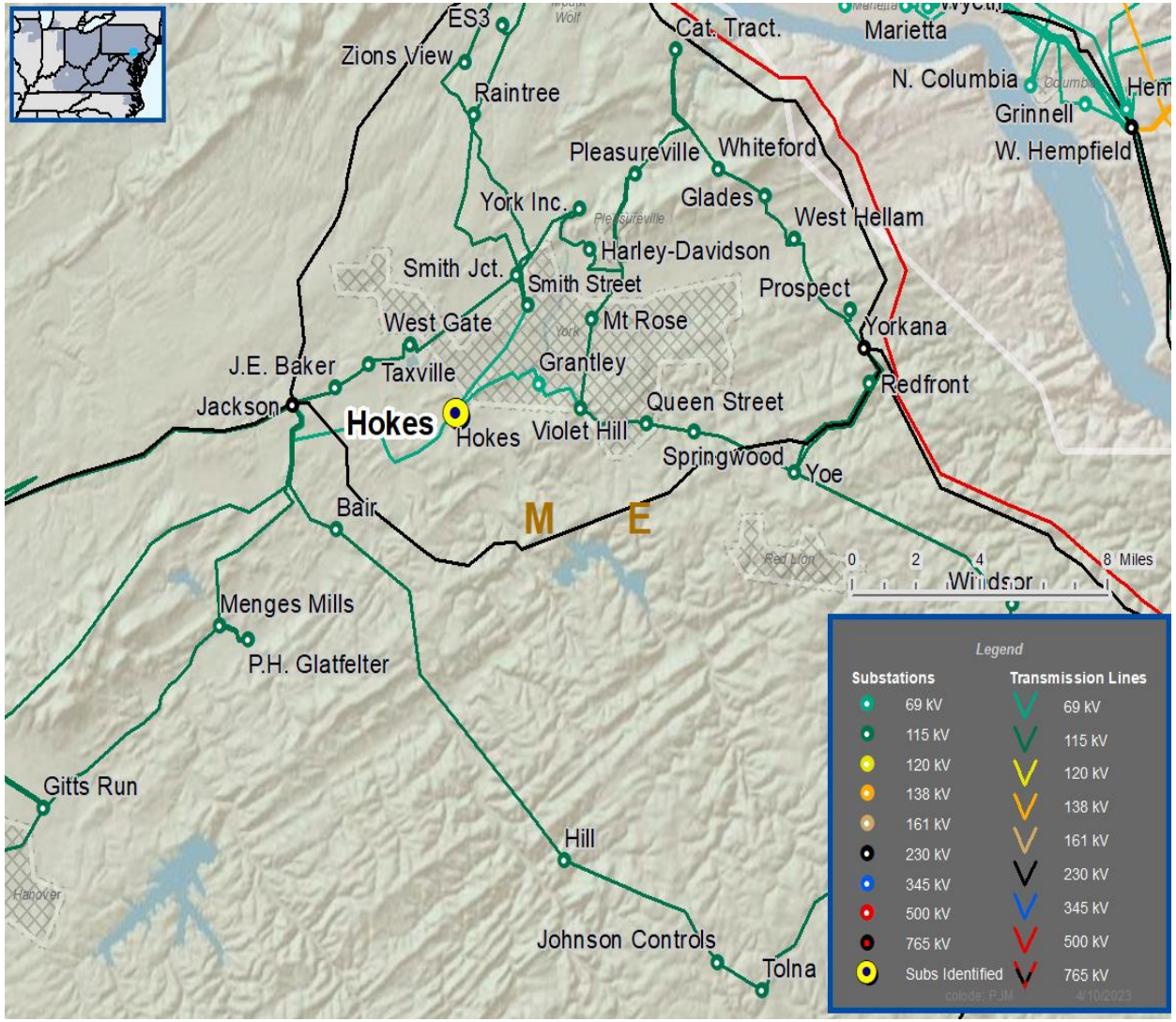
System Performance Projects

- 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

Problem Statement:

The loss of Hokes Substation results in the loss of approximately 23 MW of load and approximately 2650 customers.
Substation consists of:

- Three 69 kV transmission lines
- Two 69-13.2 kV distribution transformers



Met-Ed Transmission Zone M-3 Process
Hokes Ring Bus

Need Number: ME-2023-003

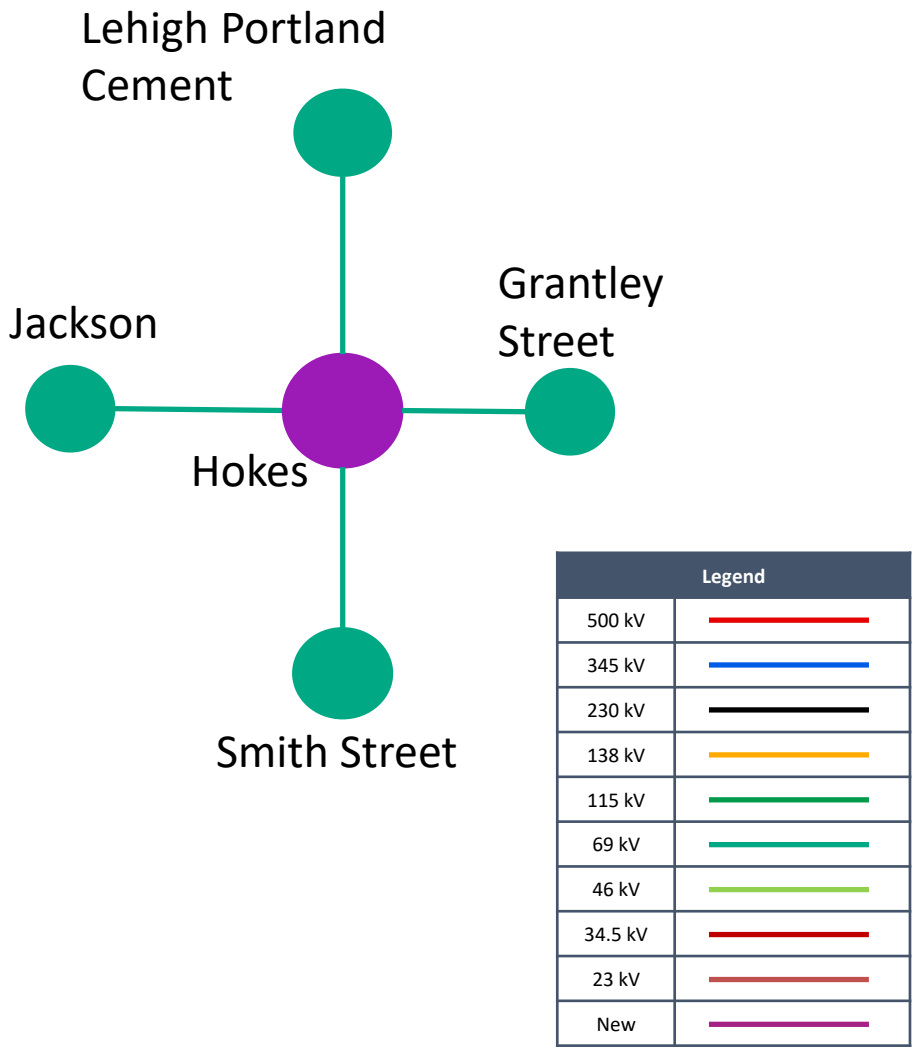
Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Selected Solution:

- Convert Hokes Substation into a six-breaker ring bus
- Upgrade terminal equipment to transmission line ratings and adjust relay settings

Transmission Line Ratings:

- Hokes – Lehigh Portland Cement 69 kV Line
  - Before Proposed Solution: 50 / 50 MVA (SN/SE)
  - After Proposed Solution: 53 / 64 MVA (SN/SE)
- Hokes – Smith Street 69 kV Line
  - Before Proposed Solution: 43 / 44 MVA (SN/SE)
  - After Proposed Solution: 139 / 169 MVA (SN/SE)
- Hokes – Jackson 69 kV Line
  - Before Proposed Solution: 51 / 62 MVA (SN/SE)
  - After Proposed Solution: 139 / 169 MVA (SN/SE)
- Hokes – Violet Hill 69 kV Line
  - Before Proposed Solution: 51 / 66 MVA (SN/SE)
  - After Proposed Solution: 74 / 90 MVA (SN/SE)



Estimated Project Cost: $24.1M

Projected In-Service: 6/1/2025

Supplemental Project ID: s3263.1

Met-Ed Transmission Zone M-3 Process
North Lebanon – Fredericksburg 69 kV Line

Need Number: ME-2023-007

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Previously Presented: Need Meeting 05/18/2023
Solution Meeting 11/16/2023

Project Driver:

Performance and Risk, Operational Flexibility and Efficiency

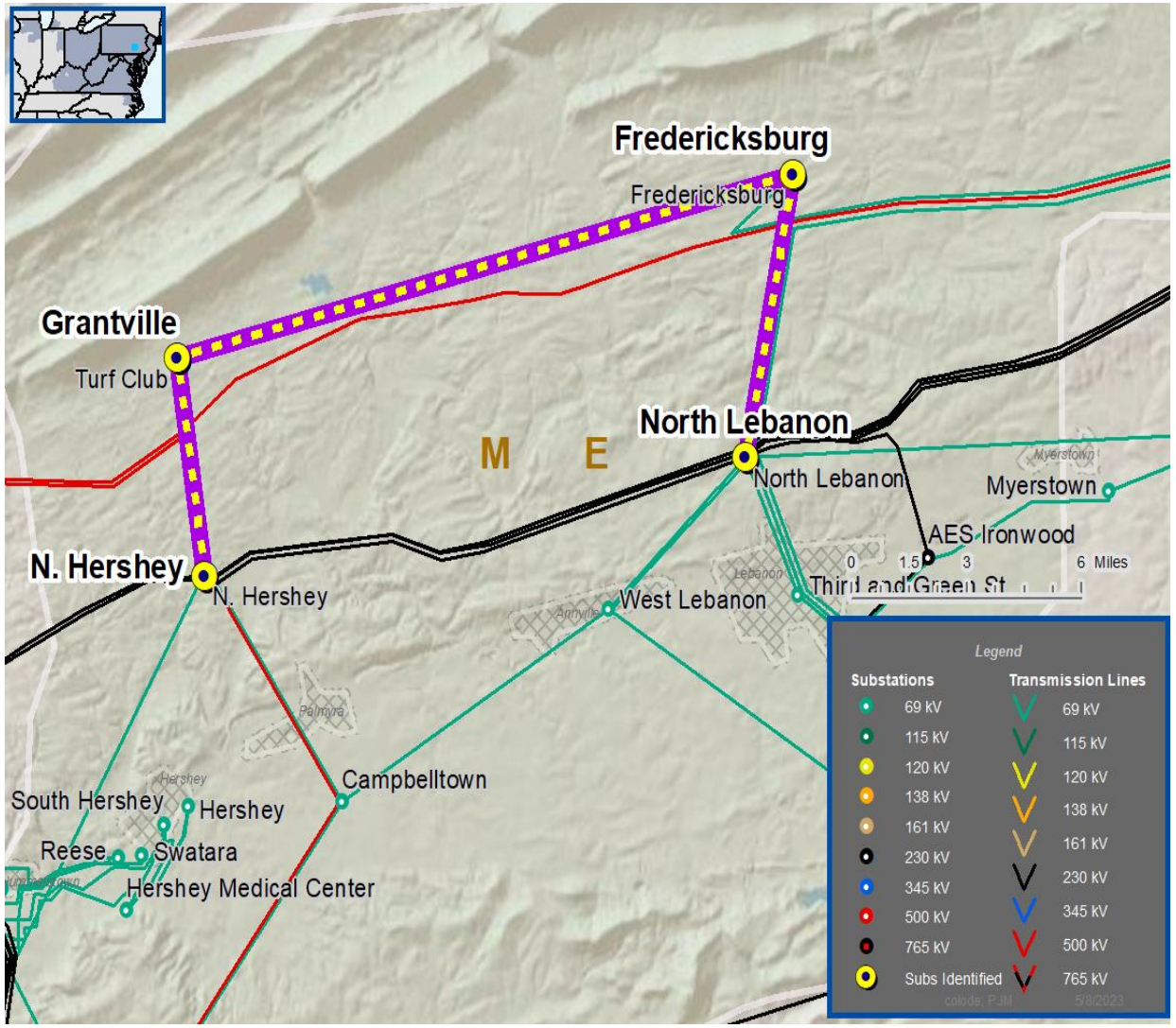
Specific Assumption Reference:

System Performance Projects

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

Problem Statement:

A N-1-1 outage of the North Hershey – Grantville 69 kV and North Lebanon – Fredericksburg 69 kV lines can lead to a potential voltage collapse resulting in a loss of service to 80 MW of load and 10,600 customers.



Met-Ed Transmission Zone M-3 Process
North Lebanon – Fredericksburg 69 kV Line

Need Number: ME-2023-007

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Selected Solution:

Rebuild North Lebanon – Fredericksburg 73 69 kV Line as double circuit.

At North Lebanon Substation

- Add 69 kV breaker
- Replace limiting terminal equipment

At Fredericksburg Substation

- Add 69 kV breaker

Transmission Line Ratings:

- North Lebanon-Fredericksburg 69 kV Line
  - Before Proposed Solution: 82/103 MVA (SN/SE)
  - After Proposed Solution: 139/169 MVA (SN/SE)

Estimated Project Cost: $13.6 M

Projected In-Service: 12/31/2026

Supplemental Project ID: s3264.1

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

Met-Ed Transmission Zone M-3 Process
Northkill – Rehrersburg 69 kV Line

Need Number: ME-2023-008

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Previously Presented: Need Meeting 06/15/2023

Solution Meeting 11/16/2023

Project Driver:

System Performance Projects

Specific Assumption Reference:

Add/Expand Bus Configuration

- Accommodate Future Transmission Facilities

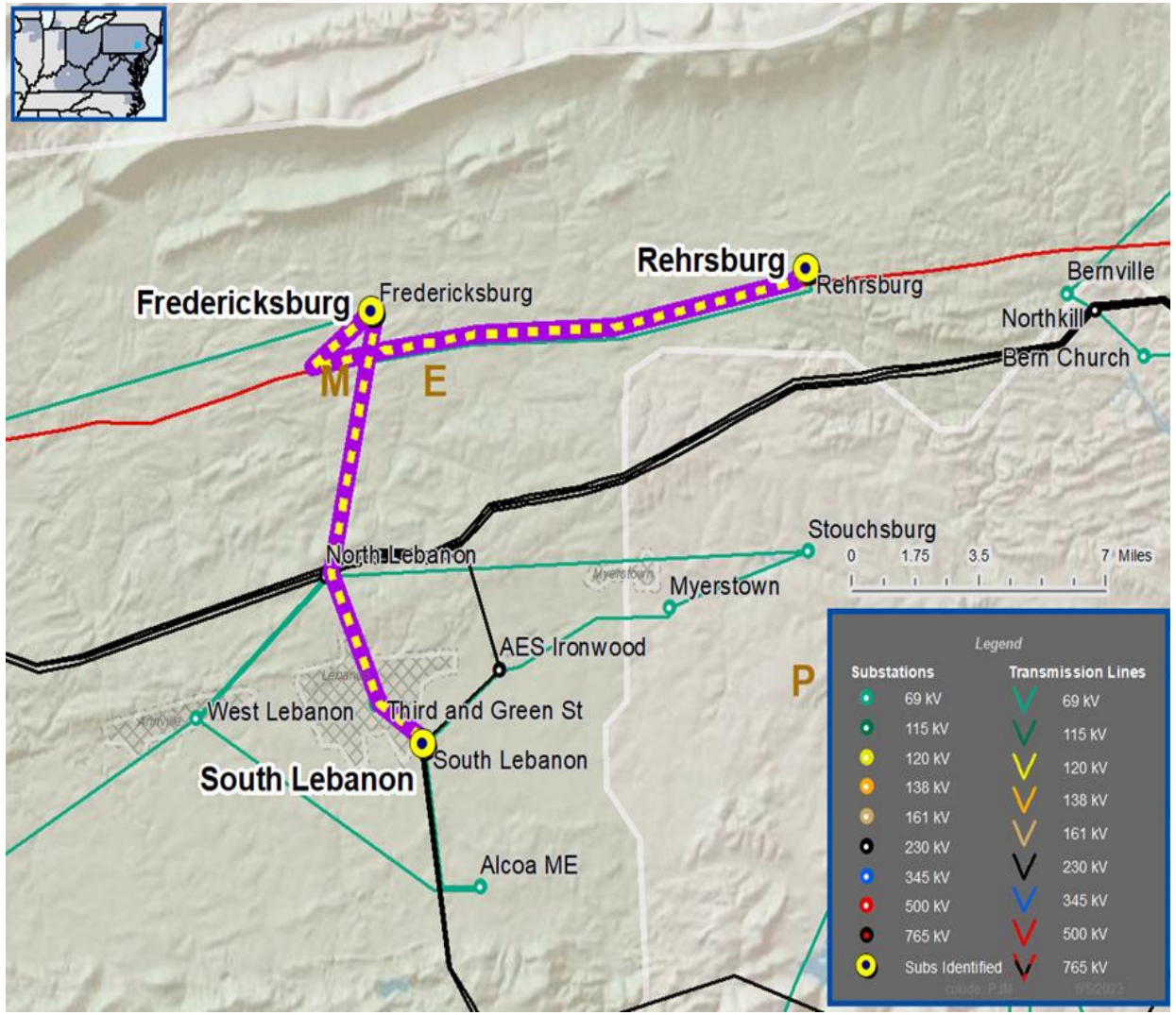
Build New Transmission Line

- Network Radial Lines
- Contingency constrained facilities

Automatic Sectionalizing Schemes

Problem Statement:

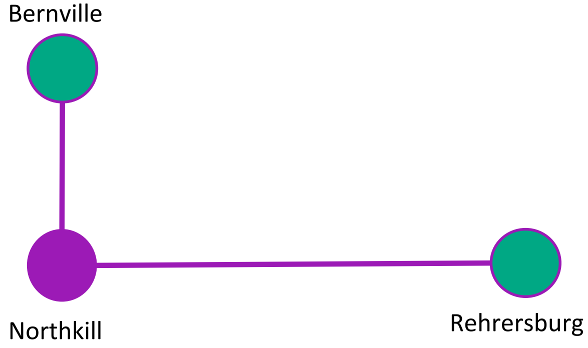
The Rehrersburg Substation is fed radially off the Frystown – South Lebanon 69 kV Line. An N-1 outage of this line forces an outage of Rehrersburg Substation, causing a loss of 10.1 MW and 1,230 customers.



Met-Ed Transmission Zone M-3 Process
Northkill – Rehrersburg 69 kV Line

Need Number: ME-2023-008

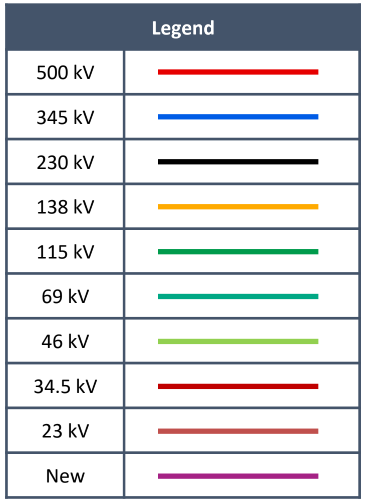
Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024



Selected Solution:
- Construct new 69 kV line from Structure #37 on the S. Lebanon –Frystown/Rehrersburg 83 69 kV Line to the Northkill Substation (Approximately 8.9 miles). (s3300.1)
- Create a new line terminal and add a fourth 69 kV breaker at Northkill Substation.
- Install two (2) sets of 69 kV disconnect switches with SCADA control and Auto-Transfer Scheme.
- Install 1 set of 69 kV disconnect switches with SCADA control on the tap to Rehrersburg Substation. (s3300.2)
- Rebuild the Bernville-Northkill 845 69 kV Line (0.84 mi) to double circuit construction.
- New line will share ~0.94 miles of common structure with newly rebuilt 825 line (s3300.3)

Tranmission Line Ratings:

- Rehrersburg T– South Lebanon 69 kV Line
  - Before Proposed Solution: 55 / 56 MVA (SN/SE)
  - After Proposed Solution: 74 / 90 MVA (SN/SE)
- Rehrersburg T– Frystown 69 kV Line
  - Before Proposed Solution: 55 / 56 MVA (SN/SE)
  - After Proposed Solution: 74 / 90 MVA (SN/SE



Estimated Project Cost: $24.13M

Projected In-Service: 12/01/2026

Supplemental Project ID: s3300.1, s3300.2, s3300.3

Met-Ed Transmission Zone M-3 Process

Campbelltown 69 kV Ring Bus

Need Number: ME-2019-034

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Previously Presented: Need Meeting – 05/31/2019

Solution Meeting – 02/15/2024

Supplemental Project Driver:

Operational Flexibility and Efficiency

Specific Assumption References:

System Performance Projects

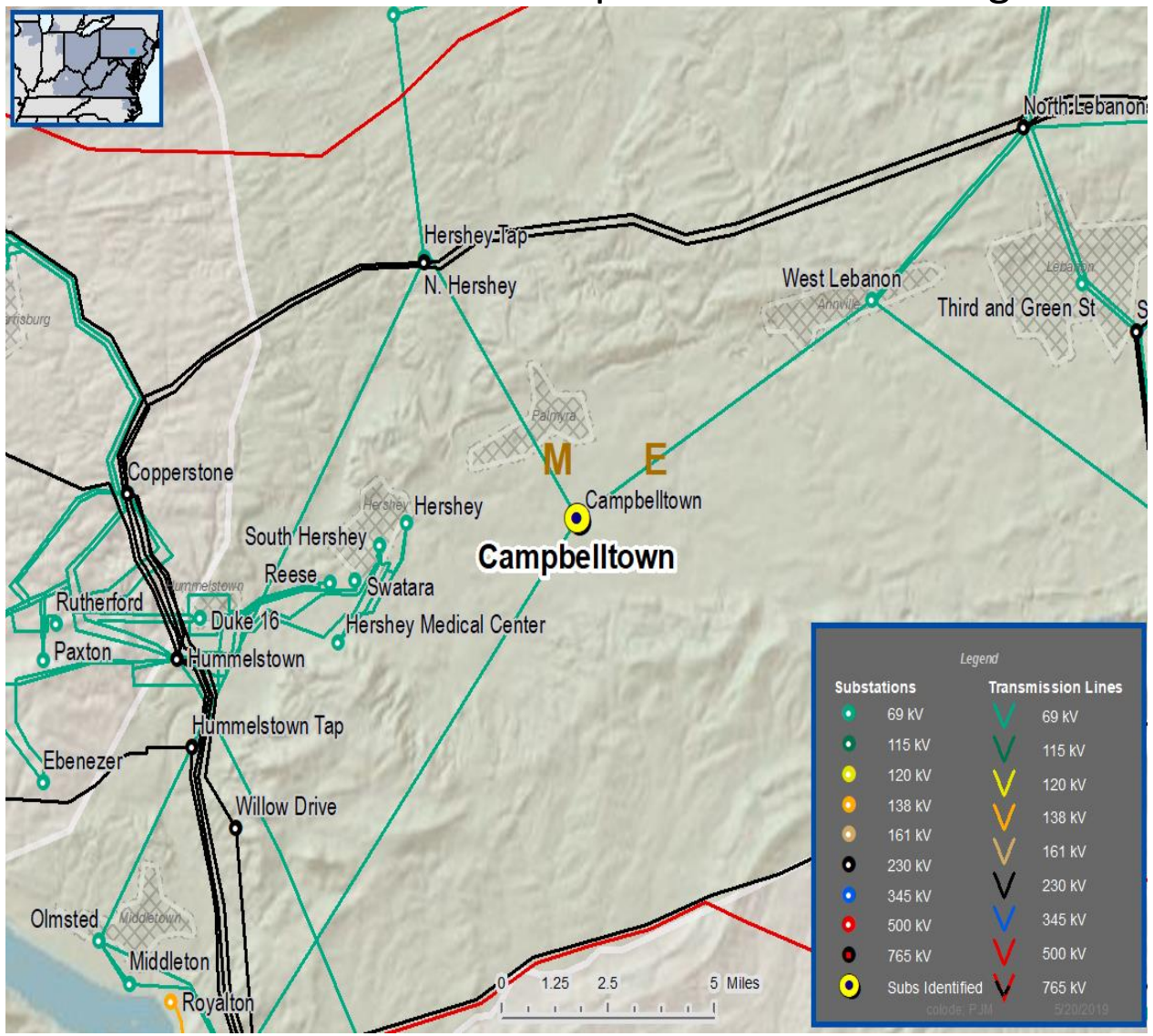
- Load at risk in planning and operational scenarios

Add/Expand Bus Configuration

- Reduce the amount of exposed potential local load loss during contingency conditions
- Eliminate simultaneous outages to multiple networked elements

Problem Statement:

- The loss of Campbelltown Substation results in the loss of approximately 40 MW of load and approximately 8,800 customers.
- Campbelltown Substation consists of:
  - Three networked 69 kV transmission lines
  - Two distribution transformers connected to the bus with switches
  - No bus tie breaker



Met-Ed Transmission Zone M-3 Process
Campbelltown 69 kV Ring Bus

Need Number: ME-2019-034

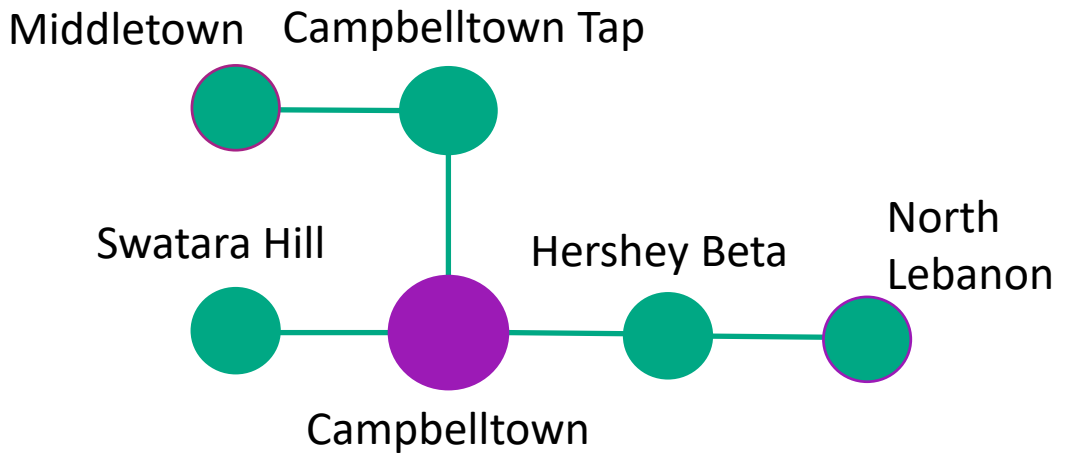
Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Selected Solution:

- Convert Campbelltown into a five breaker 69 kV ring bus
- At Campbelltown Substation:
  - Replace two 69 kV circuit breakers and associated disconnect switches
  - Install two new 69 kV circuit breakers and associated disconnect switches
  - Relocate one existing 69 kV circuit breaker and associated disconnect switches
  - Install new bus conductor
  - Install four standard transmission line relay panels
  - Replace substation conductor

- At North Lebanon Substation:
  - Replace one 69 kV circuit breaker
  - Replace one 69 kV disconnect switch
  - Install one standard transmission line relay panel
  - Replace substation conductor

- At Middletown Substation:
  - Replace one 69 kV circuit breaker
  - Replace one 69 kV disconnect switch
  - Install one standard transmission line relay panel
  - Replace substation conductor



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

Met-Ed Transmission Zone M-3 Process
Campbelltown 69 kV Ring Bus

Need Number: ME-2019-034

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Selected Solution (continued):

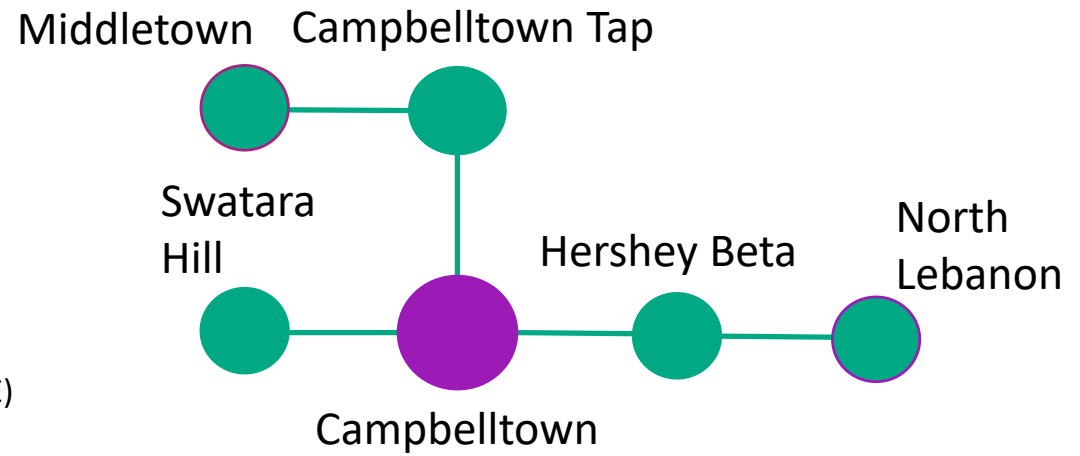
Transmission Line Ratings:

- Campbelltown – Swatara #70 69 kV Line
  - Before Proposed Solution: 71 / 90 / 85 / 109 MVA (SN/SE/WN/WE)
  - After Proposed Solution: 74 / 90 / 85 / 109 MVA (SN/SE/WN/WE)
- Campbelltown – Campbelltown Tap #72 69 kV Line
  - Before Proposed Solution: 82 / 103 / 108 / 124 MVA (SN/SE/WN/WE)
  - After Proposed Solution: 139 / 169 /158 / 201 MVA (SN/SE/WN/WE)

Estimated Project Cost: $10.0M

Projected In-Service: 6/1/2026

Supplemental Project ID: s3287.1



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

Met-Ed Transmission Zone M-3 Process
Carpenter Technology – South Reading 69 kV Line

Need Number: ME-2019-043
Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Previously Presented: Need Meeting 07/31/2019
Solution Meeting 2/15/2024

Project Driver:

Equipment Material Condition, Performance and Risk

Specific Assumption Reference:

Line Condition Rebuild/Replacement

- Age/condition of wood pole transmission line structures
- Age/condition of steel tower or steel pole transmission line structures
- Age/condition of transmission line conductors

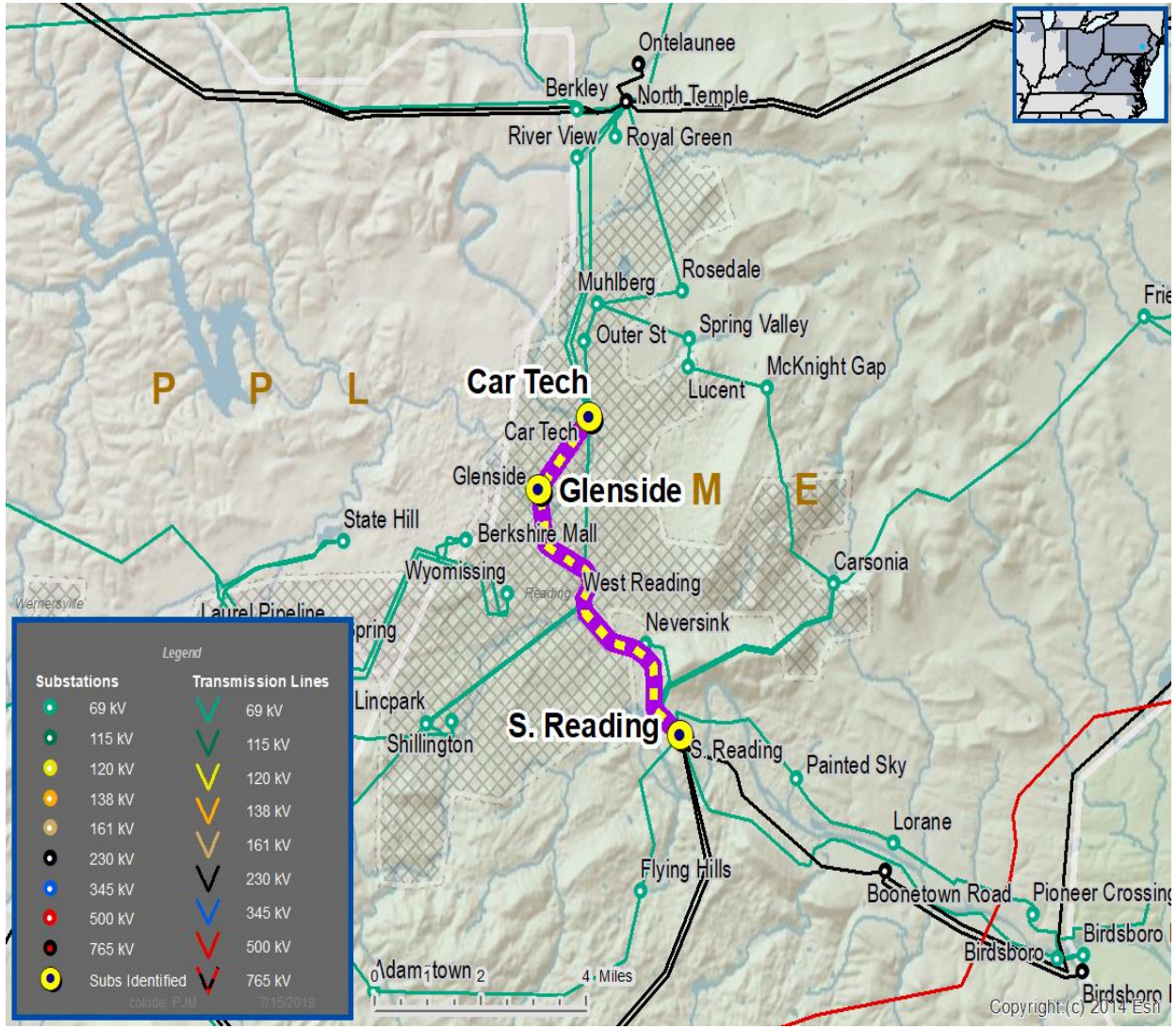
System Performance Projects

- Substation/line equipment limits

Problem Statement:

The Carpenter Technology – South Reading 69 kV Line is exhibiting deterioration.

- Total line distance is approximately 5.9 miles.
- 125 out of 151 structures failed inspection (83% failure rate).
- Failure reasons include age, woodpecker holes, and sound.
- Transmission line ratings are limited by terminal equipment
  - Carpenter Technology – Glenside 69 kV Line
    - Existing line rating: 82/103 MVA (SN/SE)
    - Existing conductor rating: 102/124 MVA (SN/SE)
  - Glenside – South Reading 69 kV Line
    - Existing line rating: 82/103 MVA (SN/SE)
    - Existing conductor rating: 102/124 MVA (SN/SE)



Met-Ed Transmission Zone M-3 Process
Carpenter Technology – South Reading 69 kV Line

Need Number: ME-2019-043
Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Selected Solution:
Rebuild approximately 5.9 miles of the Carpenter Technology – South Reading 69 kV Line.
At South Reading Substation:
- Replace 69 kV breaker, line-side disconnect and line relaying
- Install surge arresters

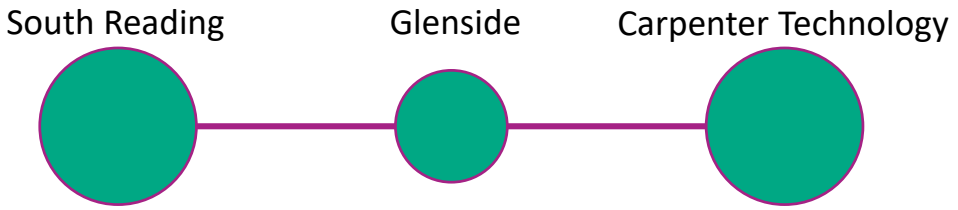
At Carpenter Technology Substation:
- Replace 69 kV line-side disconnect and line relaying

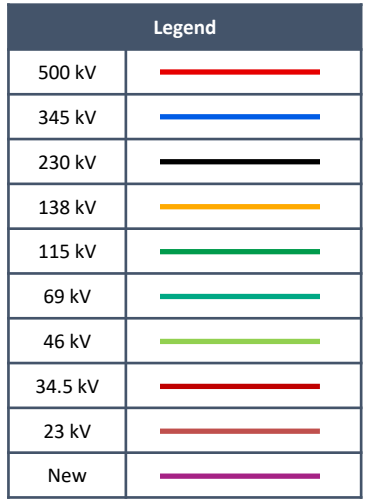
At Glenside Substation:
- Replace 69 kV motor-operated airbreak switches, disconnects and CCVTs

Transmission Line Ratings:
- Carpenter Technology – Glenside 69 kV Line:
  - Before Proposed Solution: 82 / 103 / 108 / 124 MVA (SN/SE/WN/WE)
  - After Proposed Solution: 102 / 124 / 118 / 150 MVA (SN/SE/WN/WE)
- Glenside – South Reading 69 kV Line:
  - Before Proposed Solution: 82 / 103 / 108 / 124 MVA (SN/SE/WN/WE)
  - After Proposed Solution: 102 / 124 / 118 / 150 MVA (SN/SE/WN/WE)

Estimated Project Cost: $15.2M

Projected In-Service: 05/29/2026
Supplemental Project ID: s3288.1





Met-Ed Transmission Zone M-3 Process
Birdsboro – Birdsboro Extrusions 69 kV Line

Need Number: ME-2023-011

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Previously Presented: Need Meeting 11/16/2023
Solution Meeting 02/15/2024

Project Driver:

Increased System Reliability

Specific Assumption Reference:

System Performance Projects

Add/Expand Bus Configuration

- Accommodate Future Transmission Facilities

Build New Transmission Line

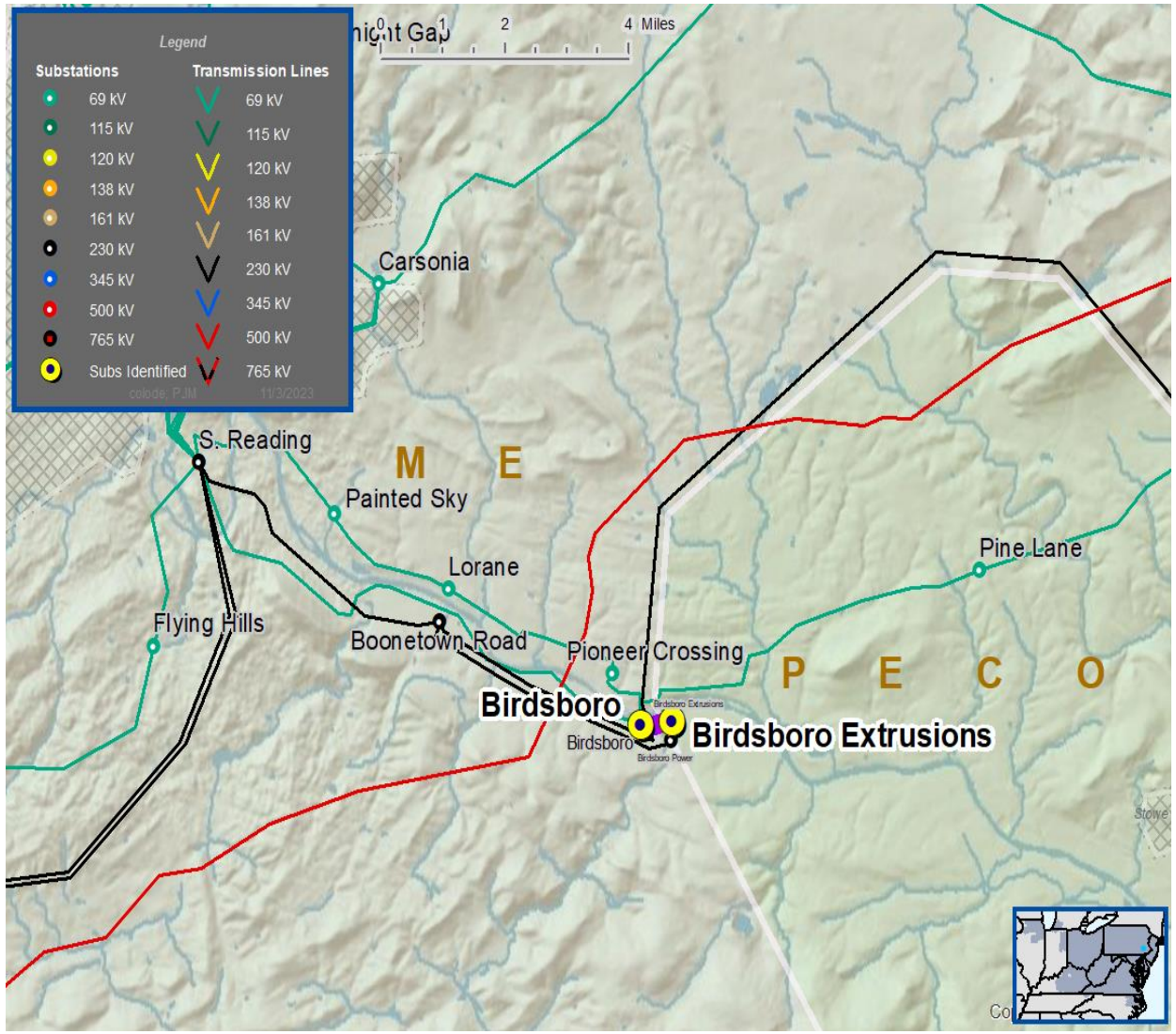
- Network Radial Lines
- Contingency constrained facilities

Automatic Sectionalizing Schemes

Problem Statement:

An N-1-1 contingency can lead to an overload of the Birdsboro – Birdsboro Extrusions 69 kV Line up to 111%.

Existing 69 kV line rating between Birdsboro Substation and Birdsboro Extrusions Substation is 71/90 MVA (SN/SE).



Met-Ed Transmission Zone M-3 Process
Birdsboro – Birdsboro Extrusions 69 kV Line

Need Number: ME-2023-011

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 6/24/2024

Selected Solution:

- Rebuild and reconductor approximately 0.5 miles of the Birdsboro – Birdsboro Extrusions 69 kV Line.
- At Birdsboro Substation:
  - Replace 69 kV circuit breaker
  - Replace four 69 kV disconnect switches
  - Replace existing line drop and bus conductor
  - Replace existing line and breaker relaying
- At South Reading Substation:
  - Adjust relay settings

Transmission Line Ratings:

- Birdsboro – Birdsboro Extrusions 69 kV Line
  - Before Proposed Solution: 71 / 90 / 85 / 103 MVA (SN/SE/WN/WE)
  - After Proposed Solution: 111 / 134 /125 / 159 MVA (SN/SE/WN/WE)

Estimated Project Cost: $2.1M

Projected In-Service: 12/10/2025

Supplemental Project ID: s3289.1

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

Met-Ed Transmission Zone M-3 Process
Violet Hill No. 6 115-69 kV Transformer

Need Number: ME-2024-003

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

Previously Presented: Solution Meeting – 04/18/2024
Need Meeting – 02/15/2024

Project Driver:

Operational Flexibility and Efficiency

Equipment Material Condition, Performance, and Risk

Specific Assumption Reference:

System Performance Projects
- Add/Replace Transformers
- Upgrade relay schemes

End of Life Criteria
- Transformers at or beyond expected service life
- Outdated or obsolete technology and equipment

Problem Statement:

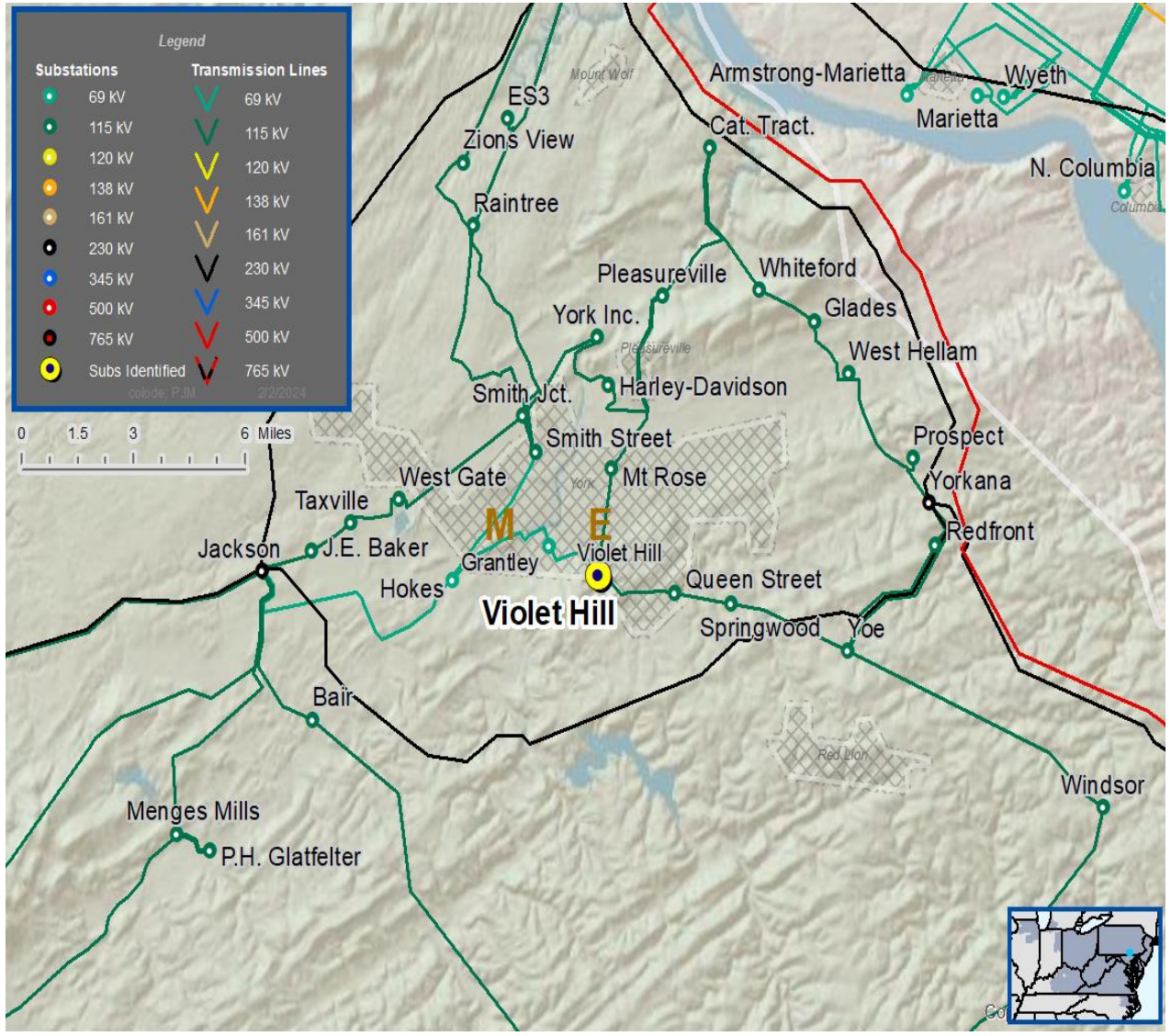
The existing No. 6 115-69 kV Transformer at Violet Hill is 66 years old and is approaching end of life. The transformer is experiencing increased corrective maintenance costs. Maintenance history demonstrates that the transformer has oil leaks and paper degradation.

The Violet Hill 69 kV breaker '6B32' and the electromechanical relaying is 55 years old. The relaying equipment has a history of misoperation and is approaching end of life.

The transformer is limited by terminal equipment.

Existing Ratings

84/111 MVA SN/SSTE 109/125 MVA WN/WSTE



Met-Ed Transmission Zone M-3 Process
Violet Hill No. 6 115-69 kV Transformer

Need Number: ME-2024-003

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

Previously Presented: Solution Meeting – 4/18/2024

Need Meeting – 02/15/2024

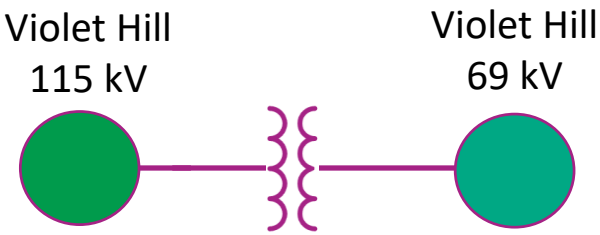
Selected Solution:

- At Violet Hill Substation:
  - Replace the 115-69 kV Transformer #6 with a new 125 MVA transformer
  - Replace 69 kV circuit breaker with new 3000 A, 72 kV breaker
  - Replace (3) 69 kV breaker disconnect switches with new 2000 A, 69 kV switches
  - Replace 69 kV strain bus conductor
  - Replace 115 kV strain bus conductor
  - Replace 69 kV disconnect switch on the transformer
  - Replace transformer relaying with standard FE relay panel
  - Upgrades will meet or exceed the transformer ratings of 116/125/125/133 MVA (SN/SE/WN/WE)
- Violet Hill 69 kV Tie 6 Bank Line:
  - Rebuild line to meet ratings of new substation equipment

Estimated Project Cost: $6.1M

Projected In-Service: 5/1/2028

Supplemental Project ID: s3330.1



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

Met-Ed Transmission Zone M-3 Process
South Reading Substation

Need Number: ME-2023-021

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

Previously Presented: Solution Meeting – 4/30/2024

Need Meeting – 12/05/2023

Project Driver:

Operational Flexibility and Efficiency

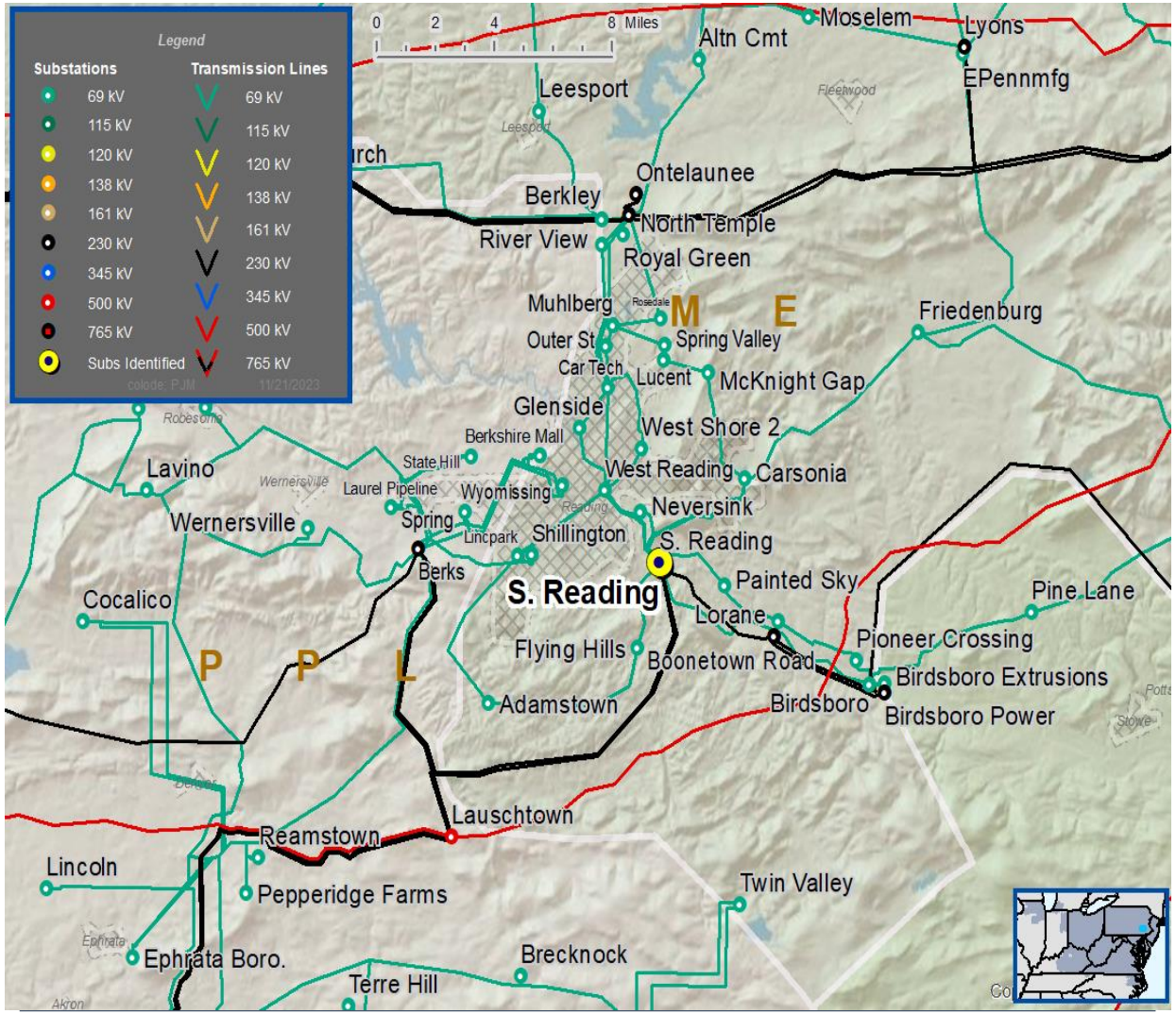
Specific Assumption Reference:

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

Problem Statement:

South Reading Substation contains multiple 230 kV networked elements and two 230 – 69 kV transformers. Multiple stuck breaker contingencies or a fault on the 230 kV bus at South Reading results in the loss of South Reading Substation.



Met-Ed Transmission Zone M-3 Process
South Reading Substation

Need Number: ME-2023-021

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

Previously Presented: Solution Meeting – 2/06/2024

Need Meeting – 12/05/2023

Selected Solution:

- Convert South Reading 230 kV into a ten (10) breaker Double Breaker – Double Bus configuration.
- At South Reading 230 kV Substation:
  - Install (8) 230 kV 3000 A circuit breakers
  - Install (21) 230 kV disconnect switches
  - Install dual conductor for strain bus
  - Reconductor No.4 and No.8 bus to meet TL rating of 547/667 MVA (SN/SE)
  - Install new control house for relay panels
  - Install (21) relay panels

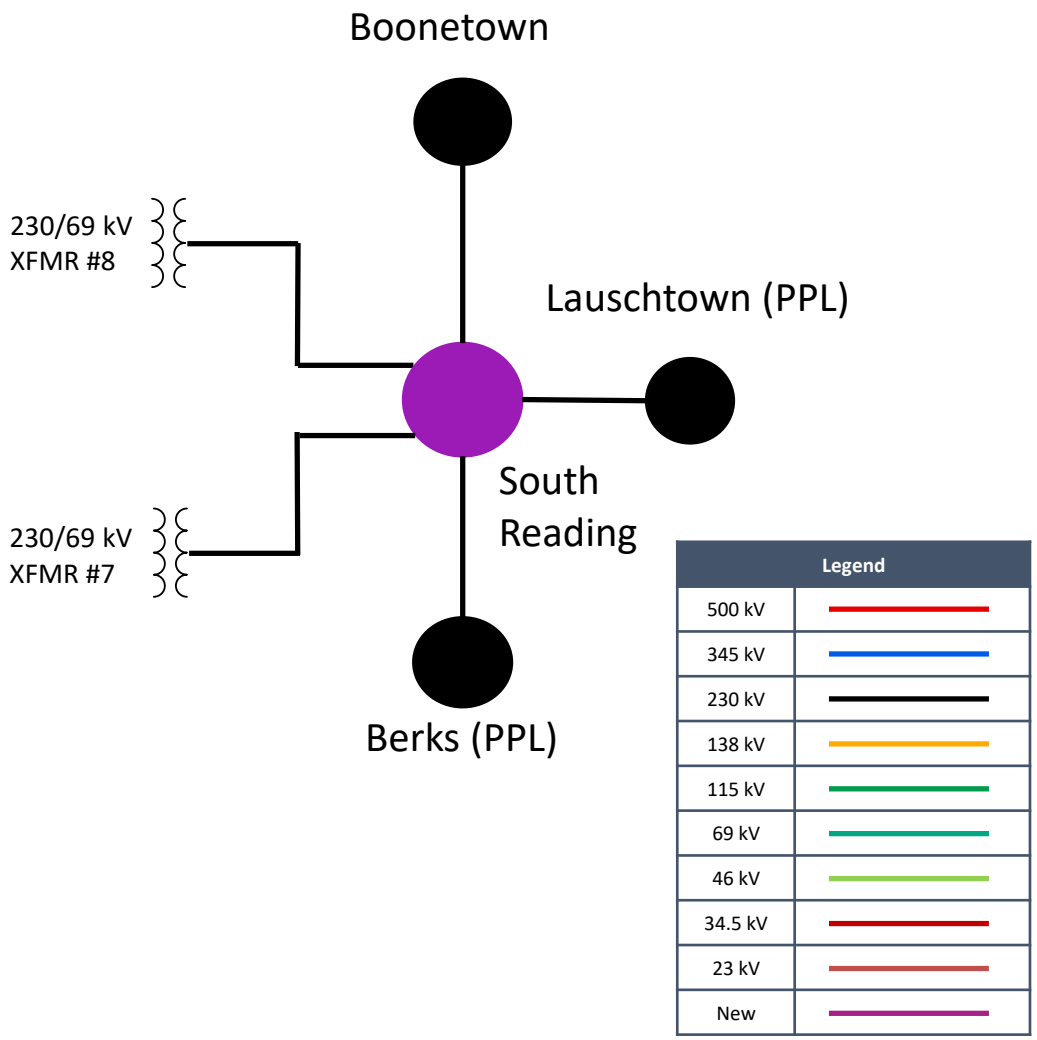
Transmission Line Ratings:

- Boonetown – South Reading 230 kV Line
  - Before Proposed Solution: 445/ 531 MVA (SN/SE)
  - After Proposed Solution: 546 / 666 MVA (SN/SE)
- Lauschtown – South Reading 230 kV Line
  - Before Proposed Solution: 494 / 621 MVA (SN/SE)
  - After Proposed Solution: 546 / 666 MVA (SN/SE)
- Berks – South Reading 230 kV Line
  - Before Proposed Solution: 520 / 621 MVA (SN/SE)
  - After Proposed Solution: 546 / 666 MVA (SN/SE)

Estimated Project Cost: $9.85M

Projected In-Service: 6/1/2025

Supplemental Project ID: s3331.1



Met-Ed Transmission Zone M-3 Process
South Reading 230-69 kV Transformer #7

Need Numbers: ME-2023-023

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

Previously Presented: Solution Meeting 04/30/2024

Need Meeting 12/05/2023

Project Driver:

Equipment Material Condition, Performance and Risk

Operational Flexibility and Efficiency

Specific Assumption Reference:

System Performance Projects Global Factors

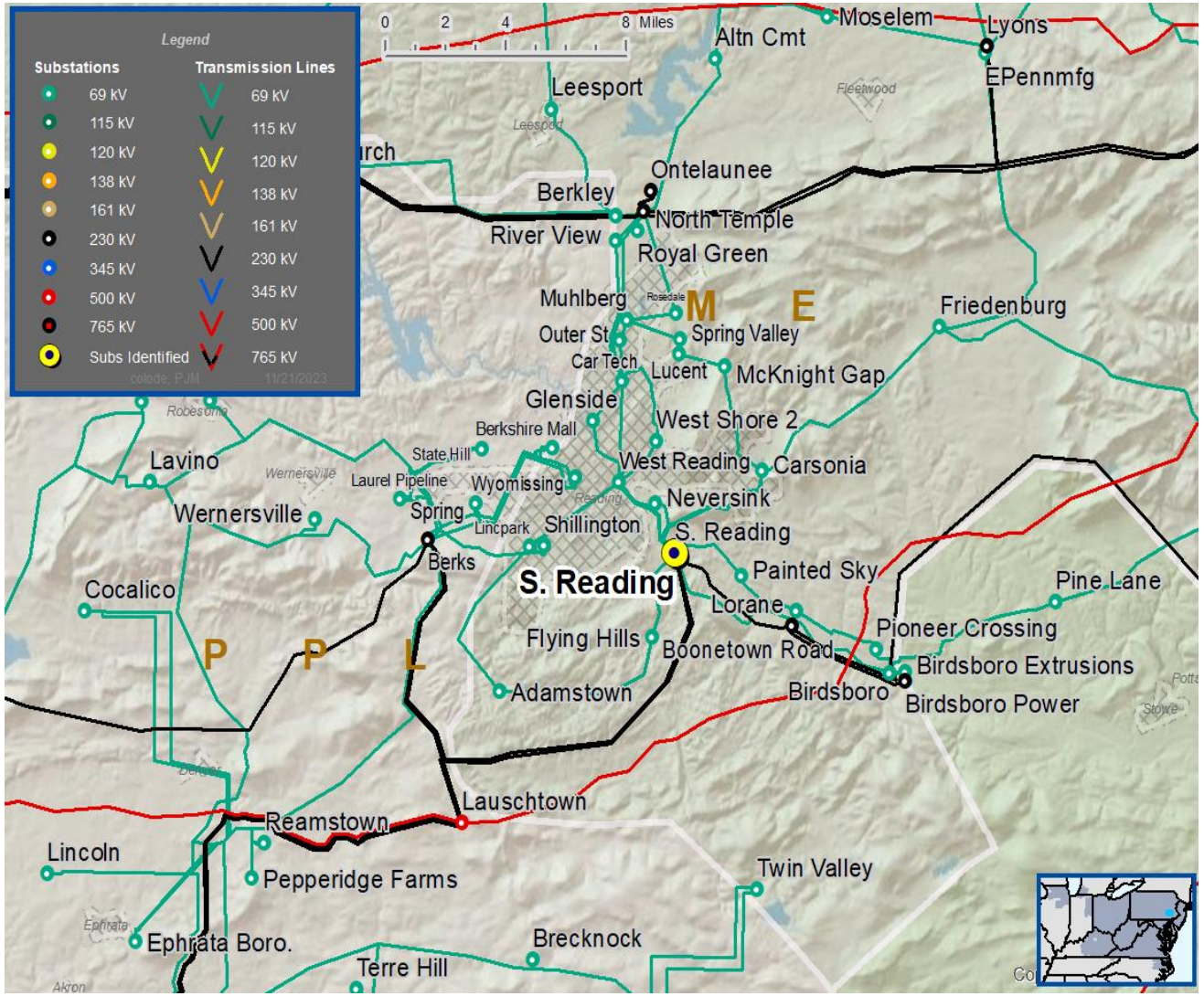
- System reliability and performance

Add/Replace Transformers

Past System Reliability/Performance

Problem Statement:

- The South Reading #7 Transformer 230-69 kV is approximately 50 years old.
- The transformer has elevated methane and ethane gases above IEEE limits
- Existing transformer ratings:
  - 273/343/419 MVA SN/SE/SLD
  - 340/398/448 MVA WN/WE/WLD



Met-Ed Transmission Zone M-3 Process
South Reading 230-69 kV Transformer #7

Need Numbers: ME-2023-023

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

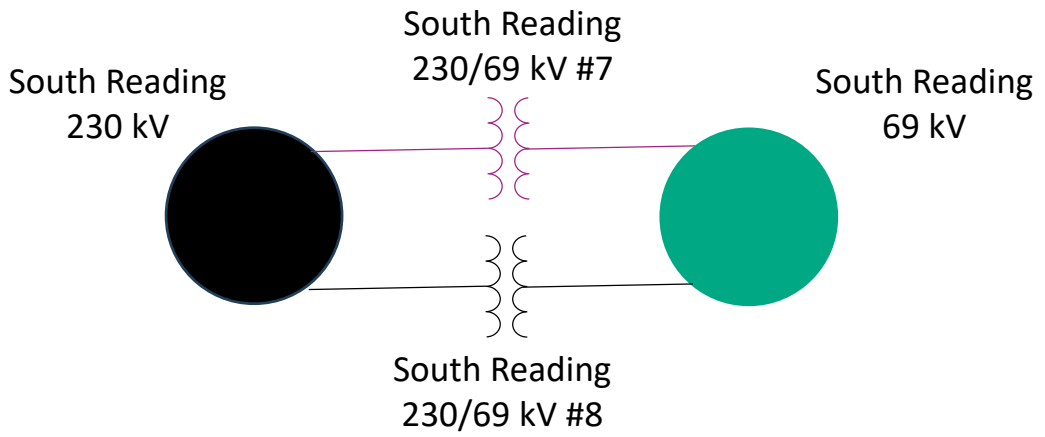
Selected Solution:

- Replace the existing #7 bank 230/69 kV with a 230/69 kV, 135/180/224 MVA transformer
- Replace the existing ground bank transformer and ground bank switch
- Replace limiting conductor and electromechanical relays to exceed transformer rating

Estimated Project Cost: $6.10 M

Projected In-Service: 12/31/2026

Supplemental Project ID: s3332.1



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

Met-Ed Transmission Zone M-3 Process
South Reading 230-69 kV Transformer #8

Need Numbers: ME-2023-024

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

Previously Presented: Solution Meeting 04/30/2024

Need Meeting 12/05/2023

Project Driver:

Equipment Material Condition, Performance and Risk

Operational Flexibility and Efficiency

Specific Assumption Reference:

System Performance Projects Global Factors

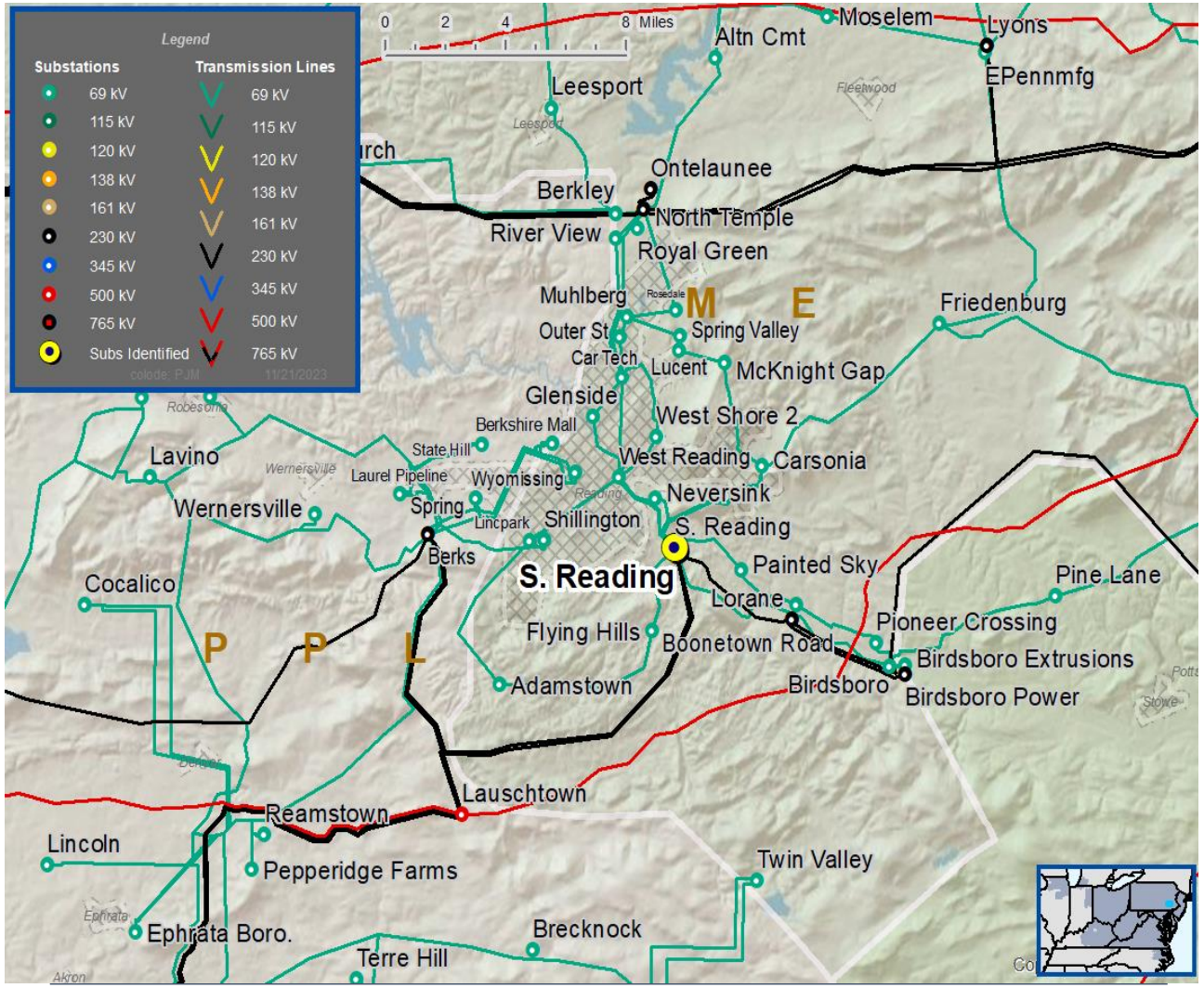
- System reliability and performance

Add/Replace Transformers

Past System Reliability/Performance

Problem Statement:

- The South Reading #8 230-69 kV Transformer is approximately 41 years old.
- The transformer is exhibiting issues with its cooling system, annunciator, oil leaks, and bushings.
- The transformer has elevated ethane gas levels above IEEE limits.
- Existing transformer ratings:
  - 278/358/423 MVA SN/SE/SLD
  - 345/401/448 MVA WN/WE/WLD



Met-Ed Transmission Zone M-3 Process
South Reading 230-69 kV Transformer #8

Need Numbers: ME-2023-024

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

Previously Presented: Solution Meeting 04/30/2024

Need Meeting 12/05/2023

Selected Solution:

- Replace the existing South Reading 230-69 kV #8 Transformer
- Replace limiting conductor and disconnect switches
- Replace relaying at South Reading Substation

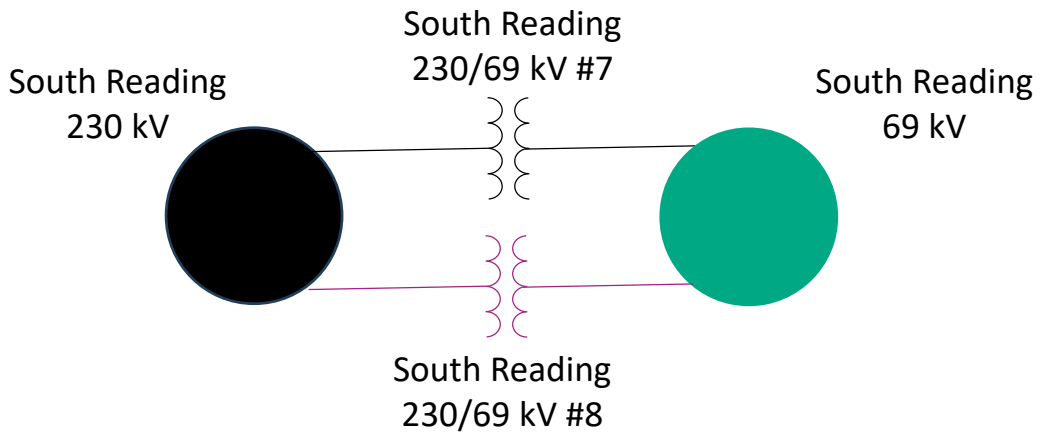
Transformer Ratings:

- Before Proposed Solution: 249 / 300 / 312 / 347 MVA (SN/SSTE/WN/WSTE)
- After Proposed Solution: 328 / 400 / 371 / 474 MVA (SN/SSTE/WN/WSTE)

Estimated Project Cost: $8.80M

Projected In-Service: 6/1/2025

Supplemental Project ID: s3333.1



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

Met-Ed Transmission Zone M-3 Process
Smith Street Transformers

Need Number: ME-2024-001

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

Previously Presented: Solution Meeting 05/16/2024

Need Meeting 01/18/2024

Project Driver:

Operational Flexibility and Efficiency

Equipment Material Condition, Performance, and Risk

Specific Assumption Reference:

System Performance Projects

- Add/Replace Transformers

End of Life Criteria

- Transformers at or beyond expected service life
- Outdated or obsolete technology and equipment

Problem Statement:

The #1 115-69 kV Transformer at Smith Street Substation is 59 years old and is approaching end of life. The transformer has experienced multiple fan failures, low pressure alarms and oil leaks that have been difficult to repair due to the condition of the transformer.

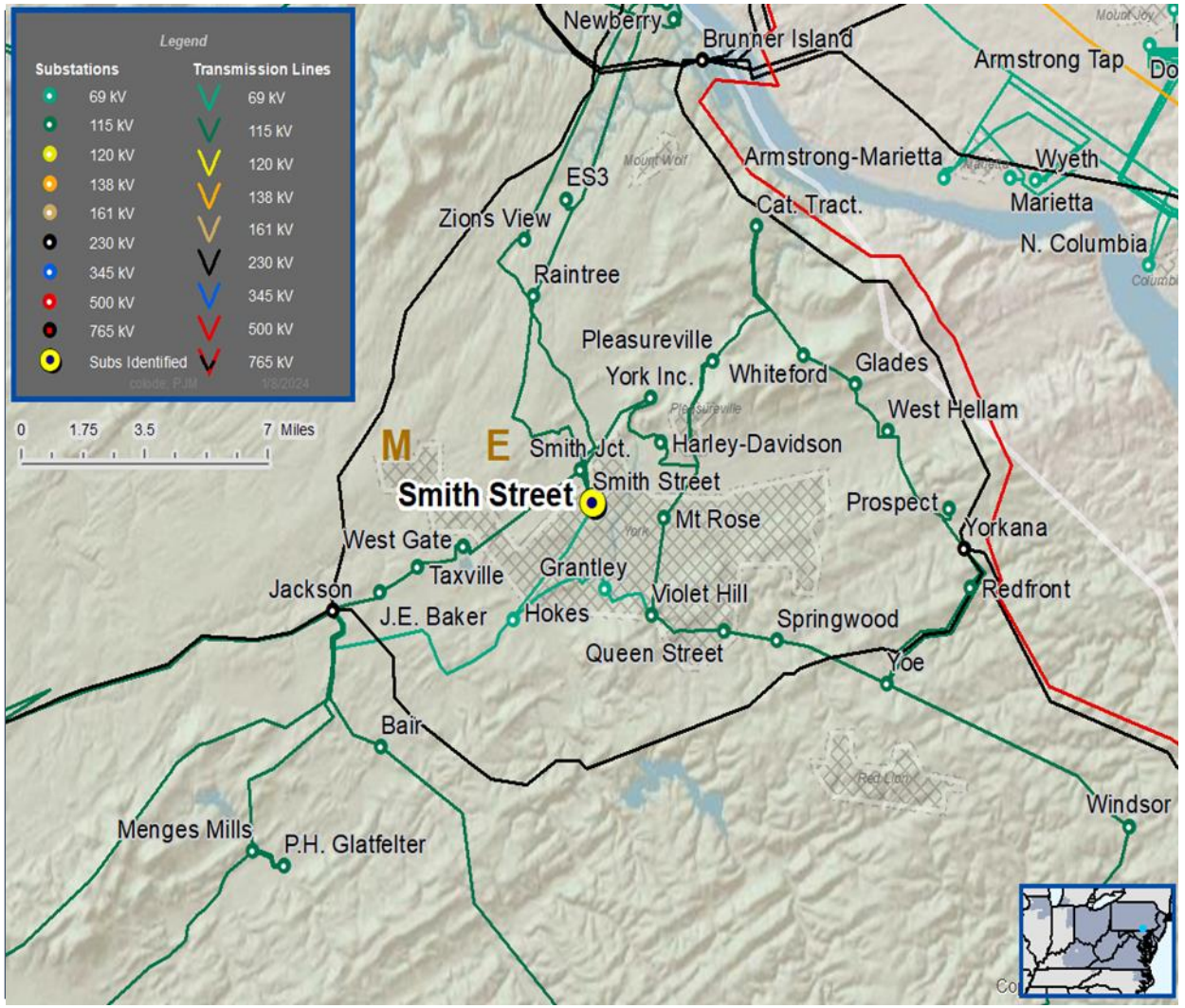
Existing #1 transformer ratings:

- 30/33/39/41 MVA (SN/SLTE/WN/WLTE)

The #3A 115-69-13.2 kV Transformer at Smith Street Substation is 73 years old and is approaching end of life. The transformer has experienced multiple oil leaks that have been difficult to repair due to the condition of the transformer.

Existing #3A transformer ratings:

- 65/72/88/94 MVA (SN/SLTE/WN/WLTE)



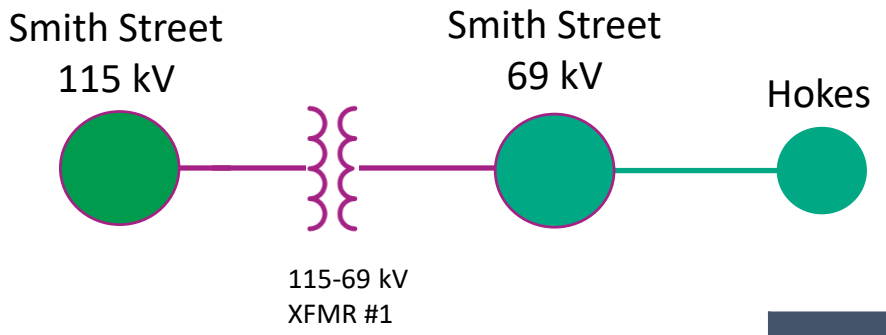
Met-Ed Transmission Zone M-3 Process
Smith Street 115/69 kV Transformer #1

Need Number: ME-2024-001

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

Selected Solution:

- At Smith Street Substation:
  - Replace the 115-69 kV Transformer #1 with new 50 MVA Xfmr
  - Install new relaying with standard FE relay package
  - Install new 69 kV 3000 A circuit breaker
  - Install (2) 72 kV 2000 A disconnect switches
  - Install (1) Xfmr 115 kV 2000 A disconnect switch on high side
  - Upgrades should meet or exceed transformer ratings of 30/40/39/48 MVA (SN/SE/WN/WE)
- Hokes – Smith Street 69 kV Line
  - Re-terminate line into Smith Street



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

Transformer Ratings:

- 140/185/233 MVA SN/SE/SLD
- 182/222/233 MVA WN/WE/WLD

Estimated Project Cost: $6.6M

Projected In-Service: 6/1/2024

Supplemental Project ID: s3337.1

Met-Ed Transmission Zone M-3 Process
Baldy 69 kV

Need Number: ME-2023-010

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

Previously Presented: Solution Meeting –10/19/2023

Need Meeting – 09/14/2023

Project Driver:

Performance and Risk, Operational Flexibility and Efficiency

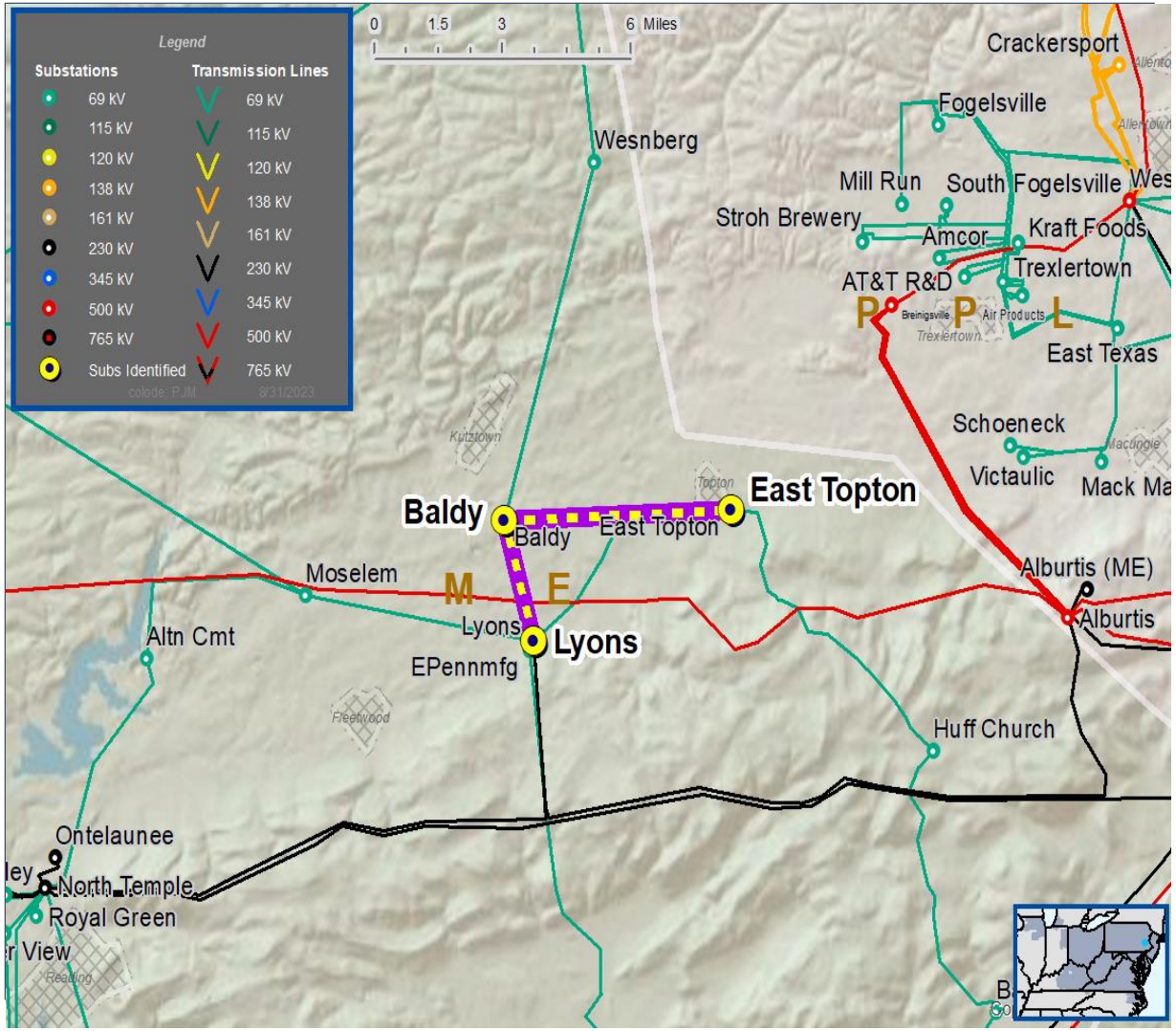
Specific Assumption Reference:

System Performance Projects

- System reliability and performance
- Reliability of Non-Bulk Electric System (Non-BES) Facilities

Problem Statement:

An N-1-1 outage of Baldy – Lyons 69 kV Line and Baldy – East Topton 69 kV Line can lead to a voltage collapse resulting in loss of service to 10,688 customers or 70 MW of load



Met-Ed Transmission Zone M-3 Process
Baldy 69 kV

Need Number: ME-2023-010

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

Previously Presented: Solution Meeting –10/19/2023

Need Meeting – 09/14/2023

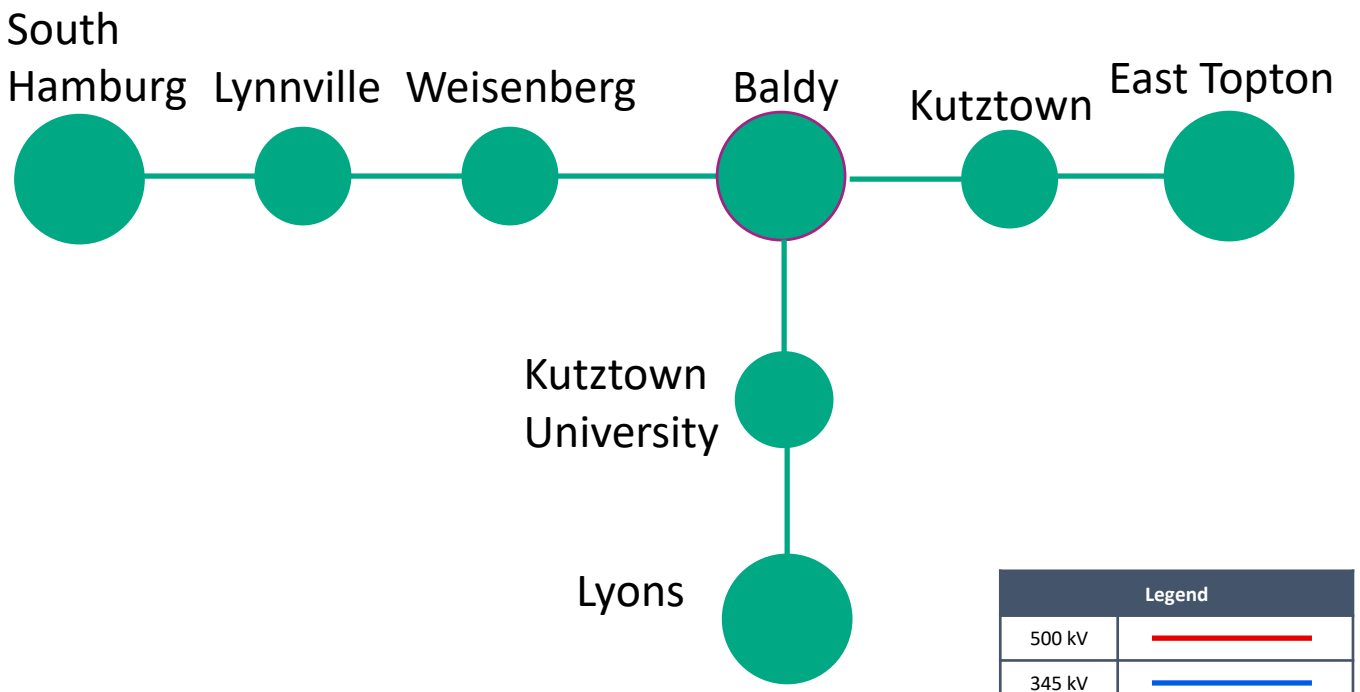
Selected Solution:

- Install a 69 kV, 19.8 MVAR effective cap bank at Baldy 69 kV Substation

Estimated Project Cost: $1.1M

Projected In-Service: 12/30/2024

Supplemental Project ID: s3338.1



Met-Ed Transmission Zone M-3 Process
Hamilton 115 kV Ring Bus

Need Number: ME-2019-033

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

Previously Presented: Solutions Meeting 10/19/2023

Needs Meeting 05/31/2019

Project Driver:

Operational Flexibility and Efficiency

Specific Assumption Reference:

Global Considerations

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

Add/Expand Bus Configuration

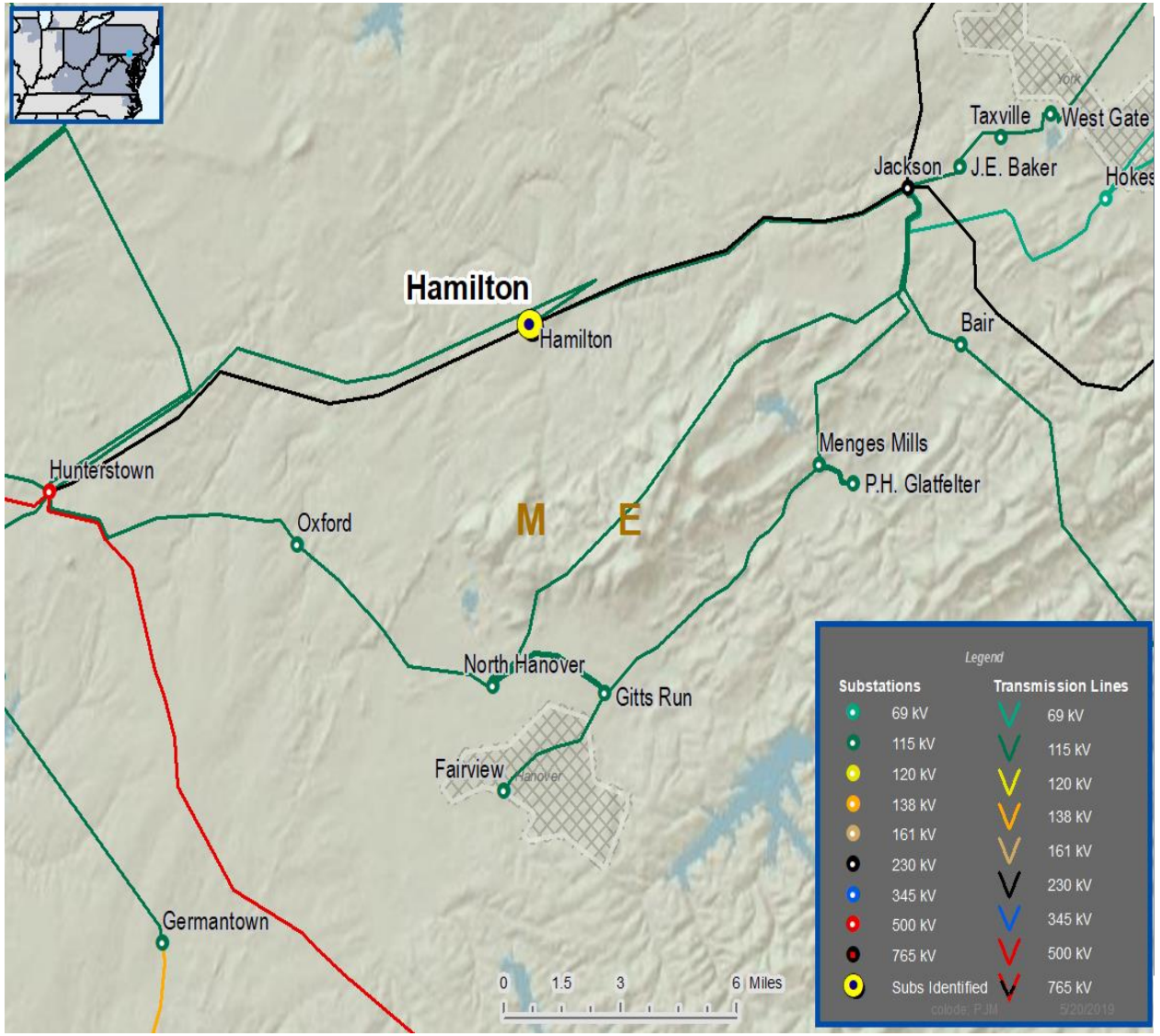
- Reduce the amount of exposed potential local load loss during contingency conditions
- Eliminate simultaneous outages to multiple networked elements

Problem Statement:

The loss of Hamilton 115 kV Substation results in loss of approximately 30 MW of load and approximately 3600 customers.

The Substation consists of:

- Two (2) 115 kV lines
- Two (2) distribution transformers with high side disconnect switches
- One (1) generator connected with a high side disconnect switch



Met-Ed Transmission Zone M-3 Process
Hamilton 115 kV Ring Bus

Need Number: ME-2019-033

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

Previously Presented: Solutions Meeting 10/19/2023

Needs Meeting 05/31/2019

Selected Solution:

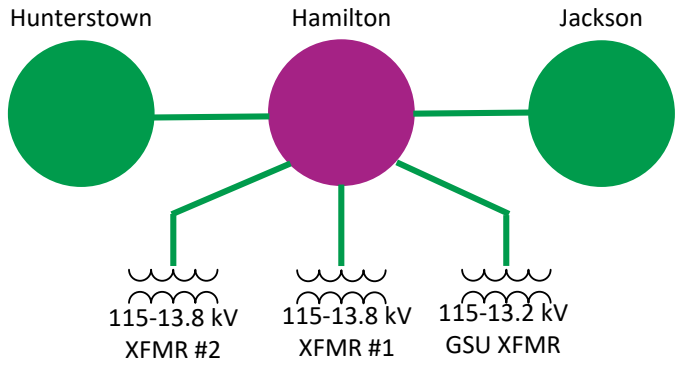
Convert Hamilton Substation into a 115 kV five (5) breaker ring bus

- Remove all 115 kV equipment and structures, excluding:
  - Three (3) transformer disconnect switches
  - Hamilton – Jackson 115 kV dead-end structure
- Install four (4) 115 kV breakers & associated disconnect switches and CVTs
- Relocate one (1) existing breaker and two (2) 115 kV line disconnect switches
- Upgrade relaying

Estimated Project Cost: $7.70M

Projected In-Service: 06/01/2025

Supplemental Project ID: s3339.1



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

Met-Ed Transmission Zone M-3 Process
Yorkana 230 kV Substation

Need Number: ME-2022-005

Process State: Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

Previously Presented: Solution Meeting 10/31/2023

Need Meeting 9/6/2022

Project Driver:

Operational Flexibility and Efficiency

Specific Assumption Reference:

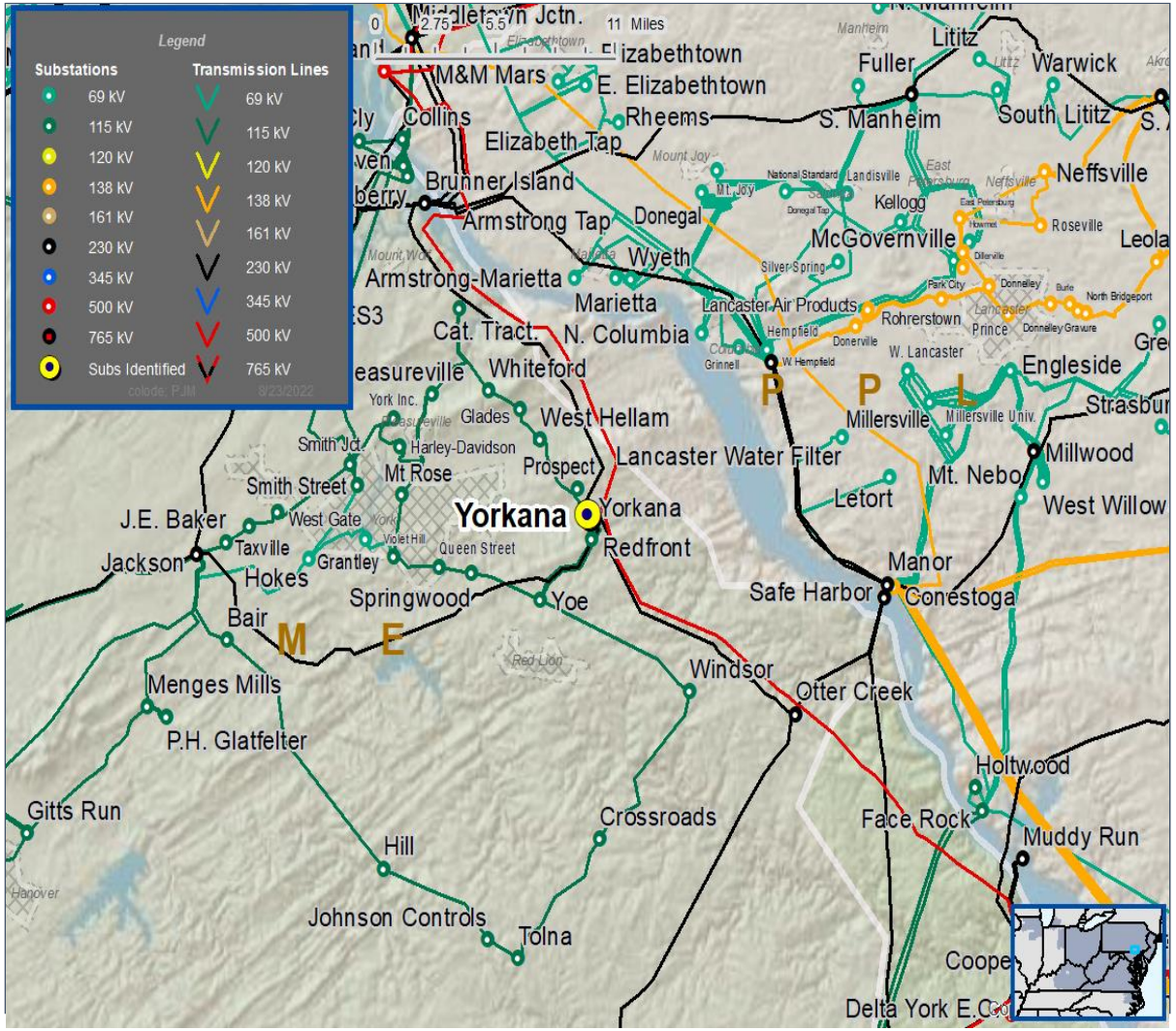
System Performance Projects

- Add/Expand Bus Configuration
- Eliminate simultaneous outages to multiple networked elements

Problem Statement:

The Yorkana 230 kV substation is configured as a four-breaker ring bus consisting of three 230 kV lines and two 230/115 kV transformers. One of the transformers is tapped on a 230 kV line terminal. Taking an outage of the transformer would require also taking an outage of the 230 kV line.

A fault on the transformer or line would result in loss of both facilities. A faulted circuit breaker could result in loss of two 230 kV lines and a transformer.



Met-Ed Transmission Zone M-3 Process
Yorkana 230 kV Substation

Need Number: ME-2022-005

Process State: Submission of Supplemental Projects for Inclusion in the Local Plan 9/17/2024

Selected Solution:

Yorkana 230kV Substation

- Expand 230kV Ring Bus to a five-breaker ring bus
  - Install 1 new 230kV circuit breaker
  - Relocate the Brunner Island 230kV terminal

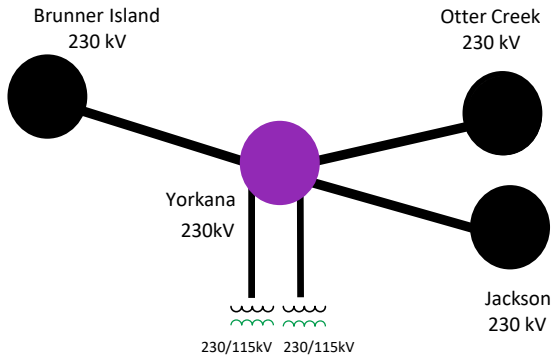
Transmission Line Rating:

- Brunner Island – Yorkana 230kV 1055 Line:
  - Before and after Proposed Solution: 647/801 MVA (SN/SE)
- Jackson – Yorkana 230kV 1052 Line:
  - Before and after Proposed Solution: 627/775 MVA (SN/SE)
- Otter Creek – Yorkana:
  - Before and after Proposed Solution: 647/801 MVA (SN/SE)

Estimated Project Cost: $3.70 M

Projected In-Service: 6/1/2025

Supplemental Project ID: s3340.1



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

Met-Ed Transmission Zone M-3 Process
North Temple – Allentown Cement 69 kV Line Customer Connection

Need Number: ME-2024-010

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

Previously Presented: Solution Meeting – 6/13/2024

Need Meeting – 5/16/2024

Project Driver(s):

Customer Service

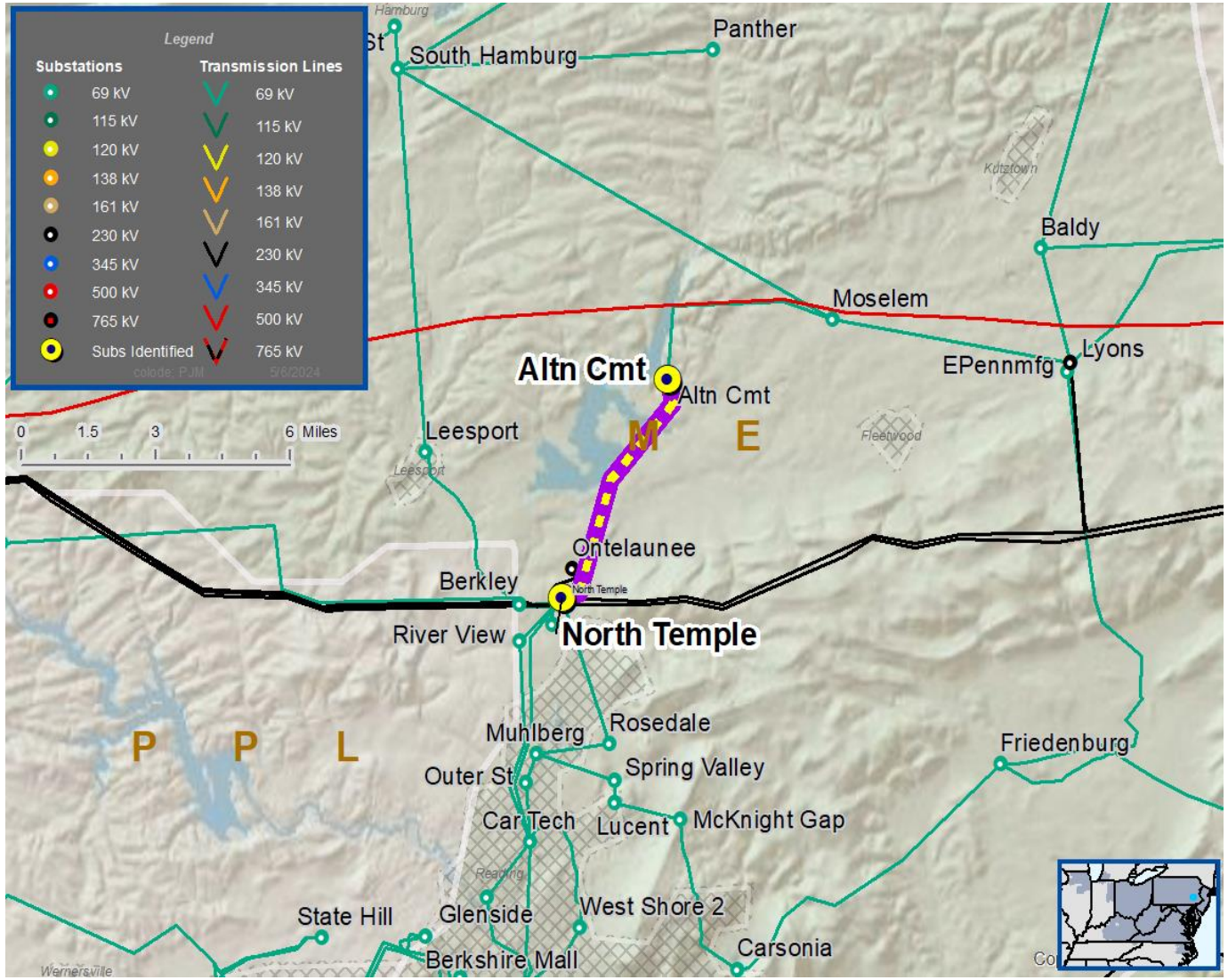
Specific Assumption Reference(s)

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 – Met-Ed distribution requested 69 kV service for a load of approximately 13 MVA near the North Temple – Allentown Cement 69 kV Line. The service request location is approximately three miles from North Temple Substation.

Requested in-service date is 6/1/2025



Met-Ed Transmission Zone M-3 Process
North Temple – Allentown Cement 69 kV Line Customer Connection

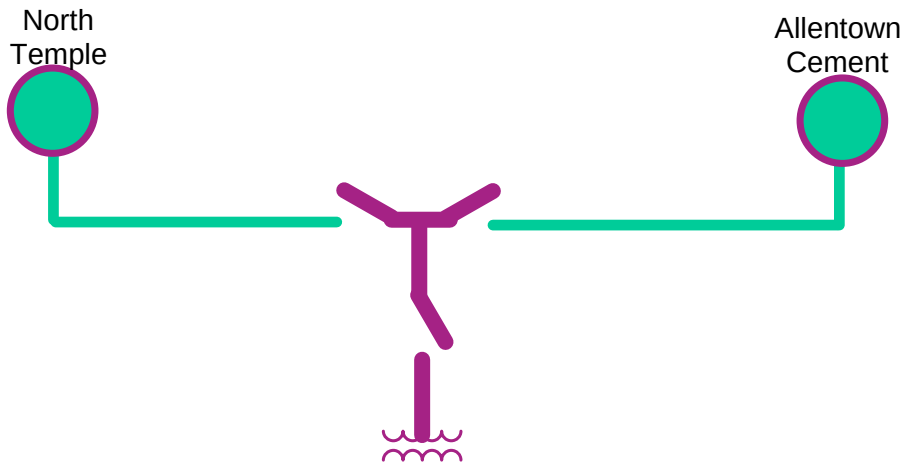
Need Number: ME-2024-010

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

Selected Solution:

69 kV Transmission Line Tap

- Install three SCADA controlled transmission line switches
- Construct approximately 1-2 spans of transmission line from tap point to customer substation
- Install one 69 kV revenue metering package at customer substation
- Modify relay settings at North Temple and Allentown Cement substations



Estimated Project Cost: $0.70M

Projected In-Service: 6/1/2025

Supplemental Project ID: s3434.1

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

Met-Ed Transmission Zone M-3 Process
Hunterstown – North Hanover 115 kV Line Customer Connection

Need Number: ME-2024-011

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

Previously Presented: Solution Meeting – 6/13/2024

Need Meeting – 5/16/2024

Project Driver(s):

Customer Service

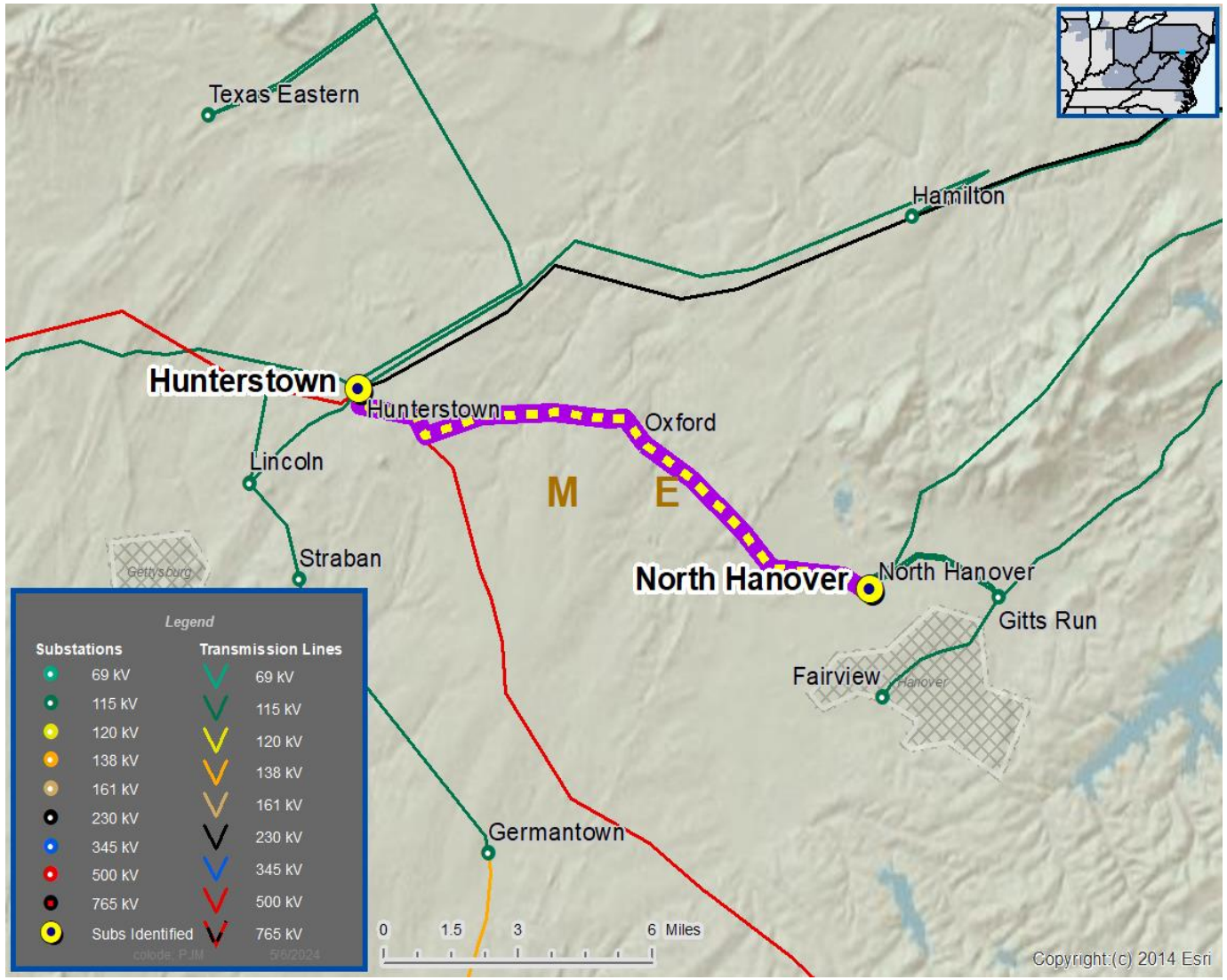
Specific Assumption Reference(s)

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 – Met-Ed distribution requested 115 kV service for load of approximately 22 MVA near the Hunterstown – North Hanover 115 kV Line. The service request location is approximately two miles from North Hanover Substation.

Requested in-service date is 1/11/2027



Met-Ed Transmission Zone M-3 Process
Hunterstown – North Hanover 115 kV Line Customer Connection

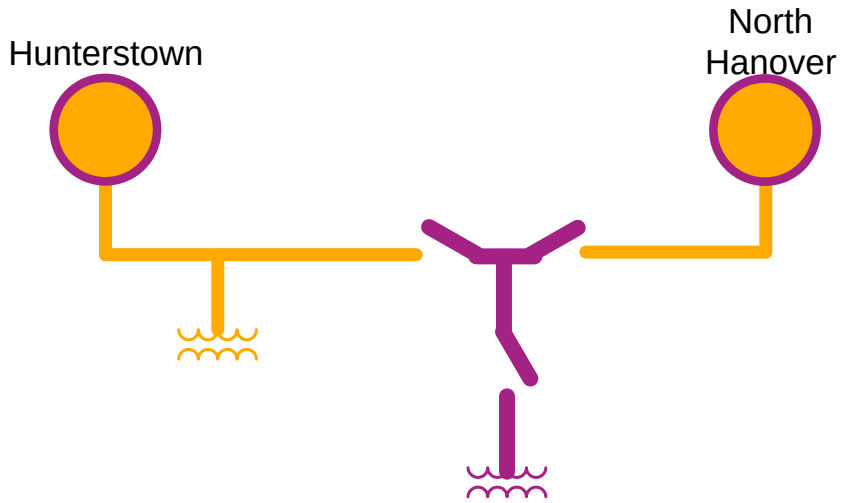
Need Number: ME-2024-011

Process Stage: Submission of Supplemental Projects for Inclusion in the Local Plan – 9/23/2024

Selected Solution:

115 kV Transmission Line Tap

- Install three SCADA controlled transmission line switches
- Construct approximately 1-2 spans of transmission line from tap point to customer substation
- Install one 115 kV revenue metering package at customer substation
- Modify relay settings at North Hanover and Hunterstown substations



Estimated Project Cost: $1.70M

Projected In-Service: 1/11/2027

Supplemental Project ID: s3435.1

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

Questions?

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

1/3/2024 – V1 – s3017 added to Local Plan
6/24/2024 – V2 – Local Plan for s3263.1, s3264.1, s3300.1, s3300.2, s3300.3, s3287.1, s3288.1, s3289.1
9/17/2024 – V3 – s3330.1 - s3333.1 and s3337.1 - s3340.1 added to Local Plan
9/23/2024 – V4 – s3434.1, s3435.1 added to Local Plan
9/27/2024 – V5 – Updated solution slide for s3333.1