

Subregional RTEP Committee - Mid-Atlantic FirstEnergy Supplemental Projects

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: JCPL-2024-007

Process Stage: Need Meeting 02/15/2024

Project Driver:

Equipment Material Condition, Performance and Risk

Specific Assumption References:

System Performance Global Factors

- System reliability and performance
- Substation / line equipment limits

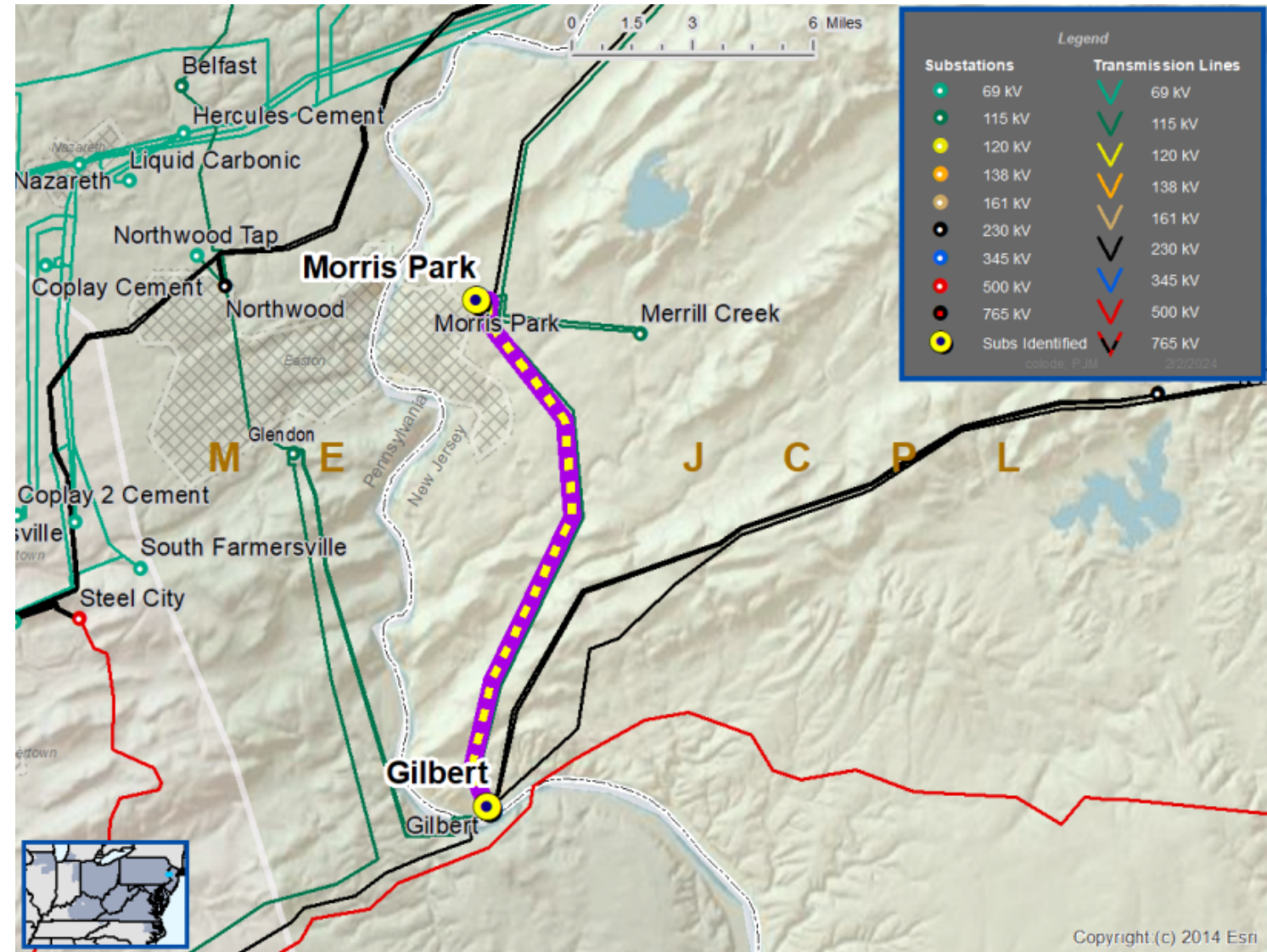
Upgrade Relay Schemes

- 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cases the protection equipment cannot be repaired due to a lack of replacement parts and available expertise in the outdated technology.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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JCPL Transmission Zone M-3 Process
Misoperation Relay Project

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Need Number	Transmission Line / Substation Locations	Existing Line Rating (SN / SE / WN / WE)	Existing Conductor Rating (SN / SE / WN / WE)
JCPL-2024-007	Gilbert – Morris Park 115 kV S919 Line	118 / 152 / 168 / 189	184 / 223 / 208 / 264

Need Numbers: JCPL-2024-009

Process Stage: Need Meeting 02/15/2024

Project Driver:

Equipment Material Condition, Performance and Risk

Specific Assumption Reference:

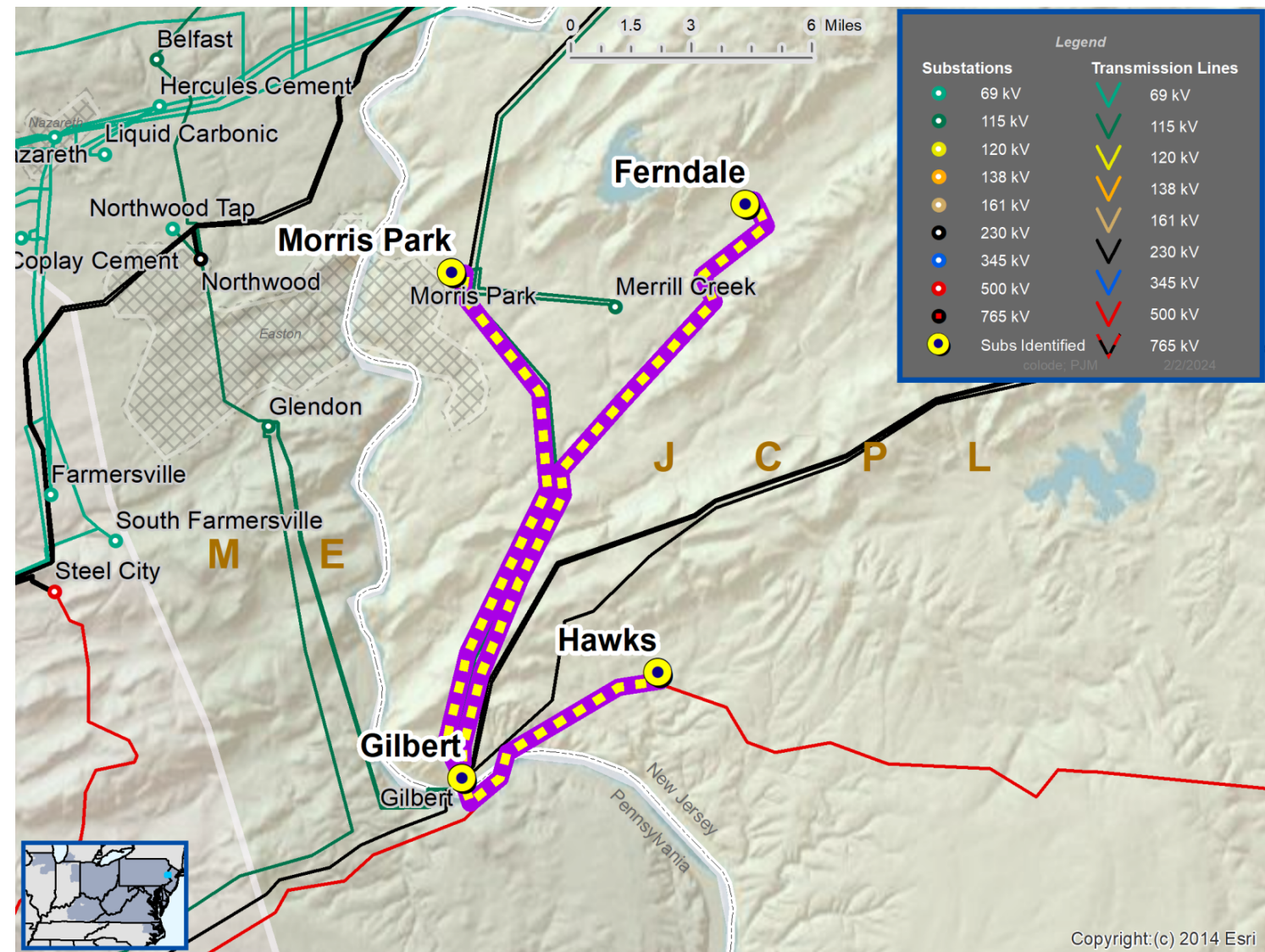
System Performance Projects Global Factors

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

Problem Statement:

- There is a lack of automatic restoration of 34.5 kV lines following tripping events without the intervention of Transmission Operators.
- Manual restoration increases the risk of system constraints on adjacent facilities, especially for critical lines as identified by Transmission Operations.
- Obsolete electromechanical relay schemes. In many cases, the protection equipment cannot be repaired due to a lack of replacement parts and available expertise in the outdated technology.
- Proper operation of the protection scheme requires all the separate components perform adequately during a fault.
- Transmission line ratings are limited by terminal equipment.

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Need Number	Transmission Line / Substation Locations	Existing Line Rating (SN / SE / WN / WE)	Existing Conductor Rating (SN / SE / WN / WE)
JCPL-2024-009	Gilbert – 34.5 kV C29 Line	26 / 33 / 37 / 41	37 / 38 / 42 / 42
	Gilbert – Morris Park 34.5 kV A27 Line	37 / 38 / 42 / 42	44 / 53 / 50 / 63
	Gilbert – Hawks 34.5 kV V750 Line	26 / 32 / 30 / 38	27 / 32 / 30 / 38

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

JCPL Transmission Zone M-3 Process Raritan River – Werner (D30) 115 kV Customer Connection

Need Number: JCPL-2023-004

Process Stage: Solution Meeting – 02/15/2024

Previously Presented: Need Meeting - 6/15/2023

Project Driver(s):

Customer Service

Specific Assumption Reference(s):

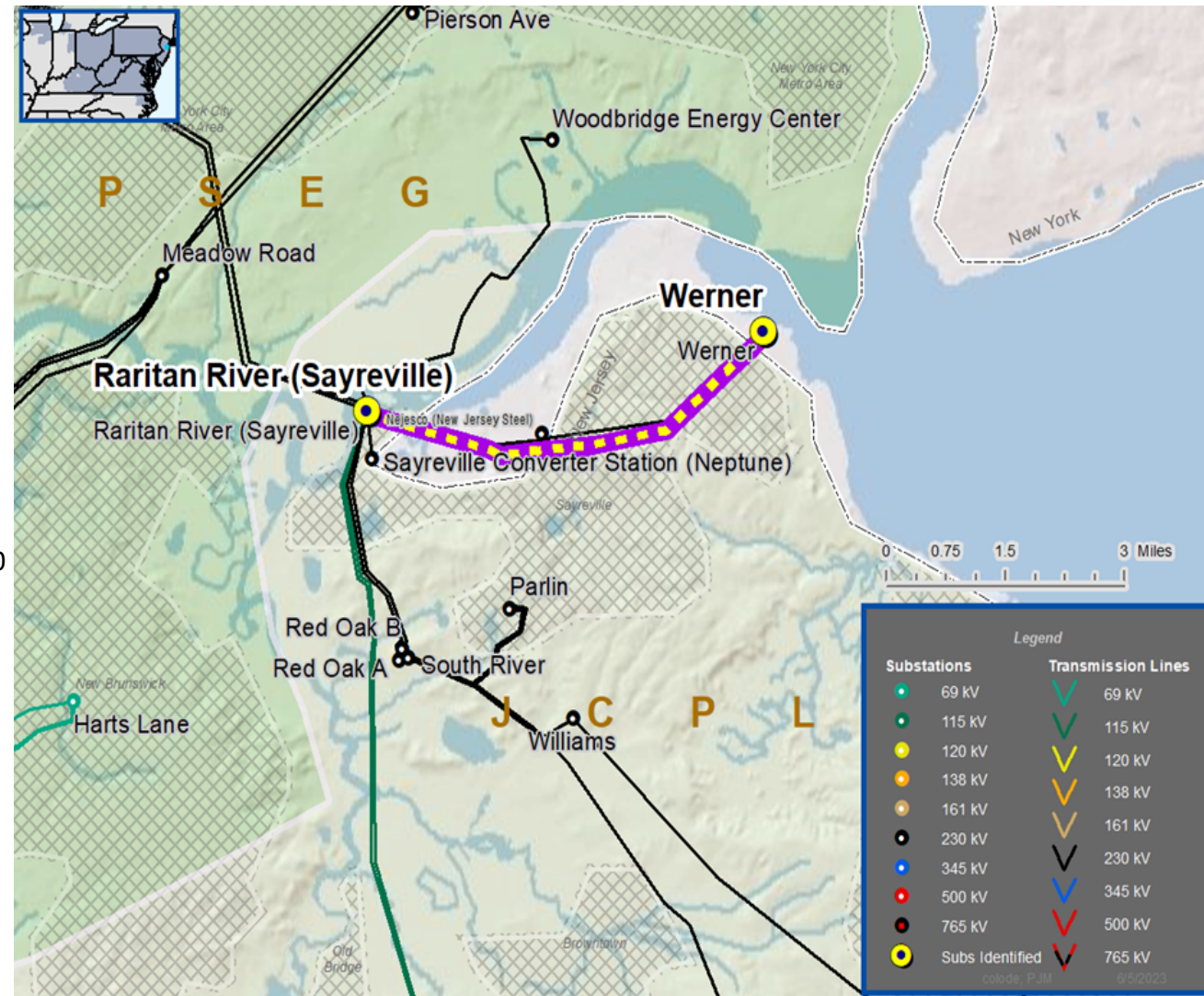
New customer connection request will be evaluated per FirstEnergy's "Requirements for Transmission Connected Facilities" document and "Transmission Planning Criteria" document.

Problem Statement:

New Customer Connection – A customer requested a delivery point for approximately 22 MVA of capacity; location is near the Raritan River – Werner D30 115 kV Line.

Requested in-service date:

12/31/2024



JCPL Transmission Zone M-3 Process

Raritan River – Werner (D30) 115 kV Customer Connection

Need Number: JCPL-2023-004
Process Stage: Solution Meeting – 02/15/2024

Proposed Solution:

Raritan River – Werner (D30) 115 kV Line:

- Construct approximately 1.5 miles of new 115 kV transmission line from the tap point to the customer’s substation.
- Install two main line switches and one tap switch. Switches to be SCADA controlled.
- Modify relay settings at Raritan River Substation and Werner Substation.

Alternatives Considered:

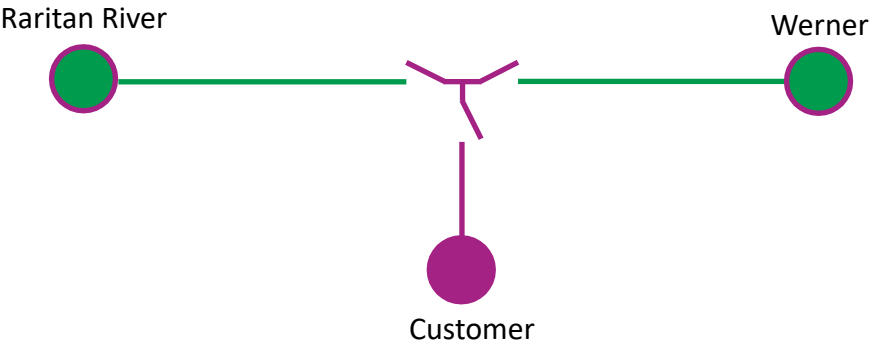
No alternatives were considered due to the proximity of the customer’s facility to the Raritan River – Werner 115 kV Line.

Estimated Project Cost: \$5.8M

Projected In-Service: 10/15/2025

Project Status: Engineering

Model: 2023 RTEP model for 2028 Summer (50/50)



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

Need Number: JCPL-2023-037

Process Stage: Solution Meeting 02/15/2024

Previously Presented: Need Meeting 11/16/2023

Project Driver:

Equipment Material Condition, Performance and Risk

Operational Flexibility and Efficiency

Specific Assumption Reference:

System Performance Projects Global Factors

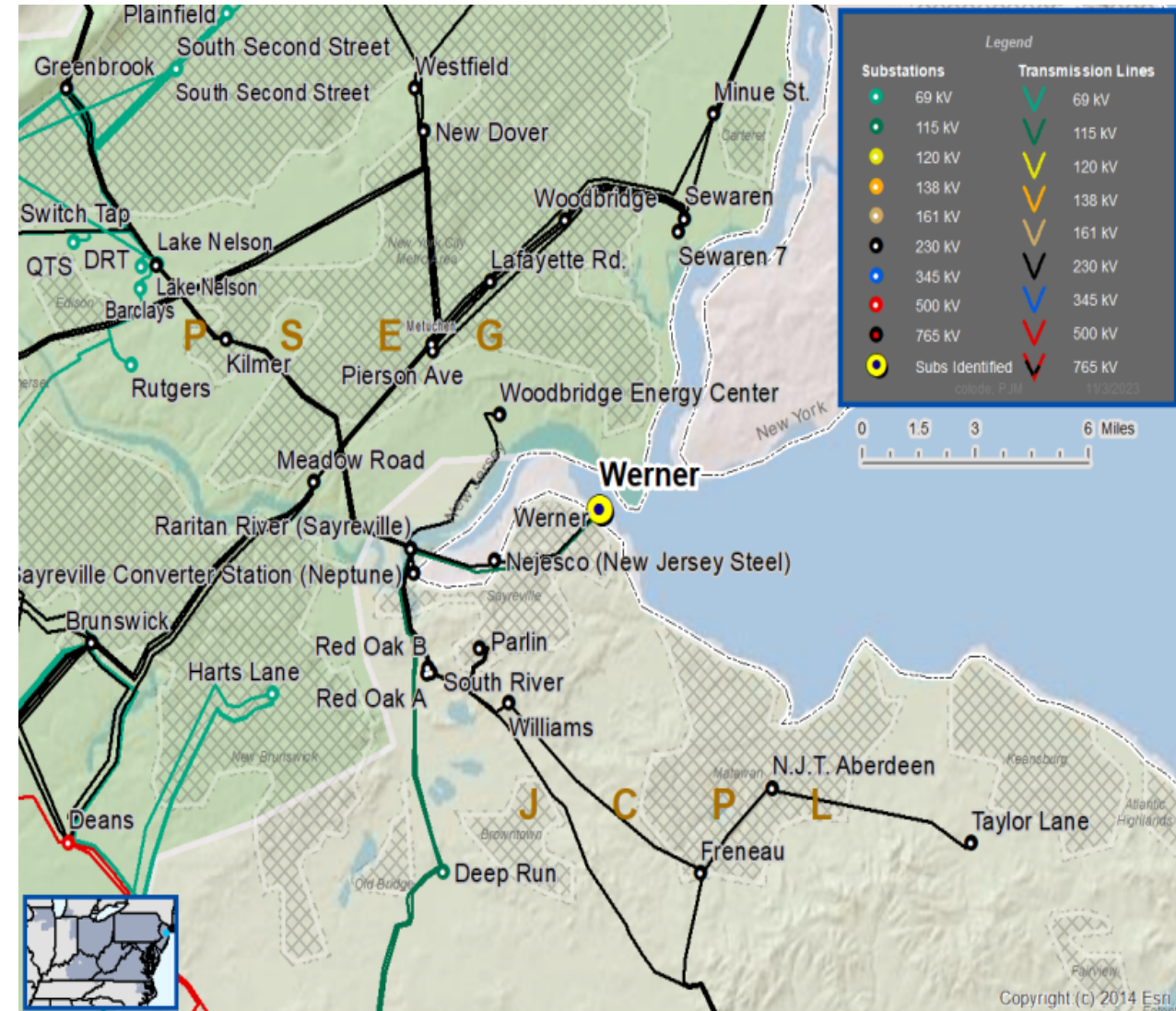
- System reliability and performance
- Reliability of Non-Bulk Electric System (Non-BES) Facilities

Add/Replace Transformers

Past System Reliability/Performance

Problem Statement:

- The 115-34.5 kV No. 12 Transformer at Werner Substation was manufactured approximately 60 years ago and is approaching end of life.
 - Transformer is constructed with type U bushings
 - Type U bushing designs have been documented to dramatically increase the risk of bushing failures.
- Existing Transformer Ratings:
 - 92/120/121/132 MVA (SN/SSTE/WN/WSTE)



Need Number: JCPL-2023-037

Process Stage: Solution Meeting 02/15/2024

Proposed Solution:

- Replace the 115-34.5 kV No. 12 Transformer at EH Werner Substation with a 125 MVA unit.
- Upgrade transformer relaying.

Transformer Ratings:

- EH Werner 115-34.5 kV No. 12 Transformer:
 - Before Proposed Solution: 92/120/121/132 MVA (SN/SSTE/WN/WSTE)
 - After Proposed Solution: 148/158/190/192 MVA (SN/SSTE/WN/WSTE)

Alternatives Considered:

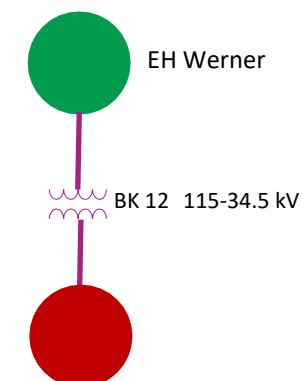
- Maintain transformer in existing condition with elevated risk of failure.

Estimated Project Cost: \$6.4M

Projected In-Service: 12/31/2024

Project Status: Engineering

Model: 2023 RTEP model for 2028 Summer (50/50)



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

Need Number: JCPL-2023-055

Process Stage: Solution Meeting 02/15/2024

Previously Presented: Need Meeting 11/16/2023

Project Driver:

Equipment Material Condition, Performance and Risk

Operational Flexibility and Efficiency

Specific Assumption Reference:

System Performance Projects Global Factors

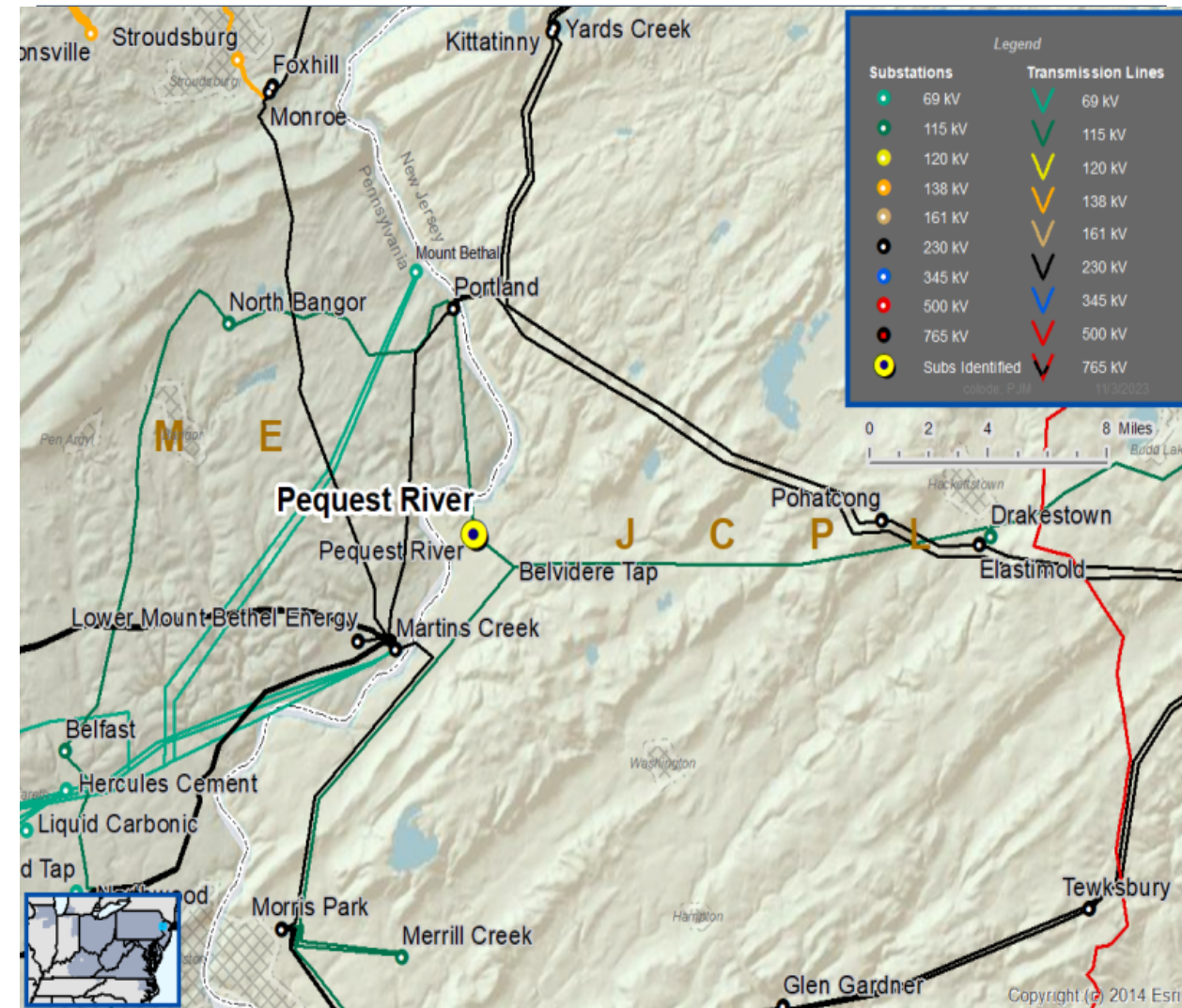
- System reliability and performance
- Reliability of Non-Bulk Electric System (Non-BES) Facilities

Add/Replace Transformers

Past System Reliability/Performance

Problem Statement:

- The 115-34.5 kV No. 2 Transformer at Pequest River Substation was manufactured approximately 50 years ago and is approaching end of life.
 - Most recent DGA results showed elevated ethane gas levels compared with IEEE Standards
- Existing Transformer Ratings:
 - 65/69 MVA (SN/SSTE)



Need Number: JCPL-2023-055

Process Stage: Solution Meeting 02/15/2024

Proposed Solution:

- Replace the 115-34.5 kV No. 2 Transformer at Pequest River with a 90 MVA unit.
- Upgrade transformer relaying.

Transformer Ratings:

- Pequest River 115-34.5 kV No. 2 Transformer:
 - Before Proposed Solution: 65/69/82/94 MVA (SN/SSTE/WN/WSTE)
 - After Proposed Solution: 137/172/168/175 MVA (SN/SSTE/WN/WSTE)

Alternatives Considered:

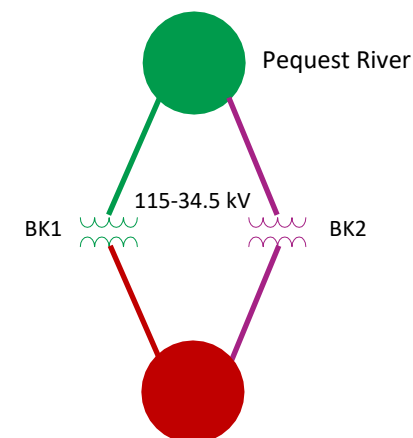
- Maintain transformer in existing condition with elevated risk of failure.

Estimated Project Cost: \$4.23M

Projected In-Service: 5/1/2025

Project Status: Engineering

Model: 2023 RTEP model for 2028 Summer (50/50)



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

Need Number: JCPL-2023-059

Process Stage: Solution Meeting – 02/15/2024

Previously Presented: Need Meeting – 11/16/2023

Project Driver(s):

Customer Service

Specific Assumption Reference(s):

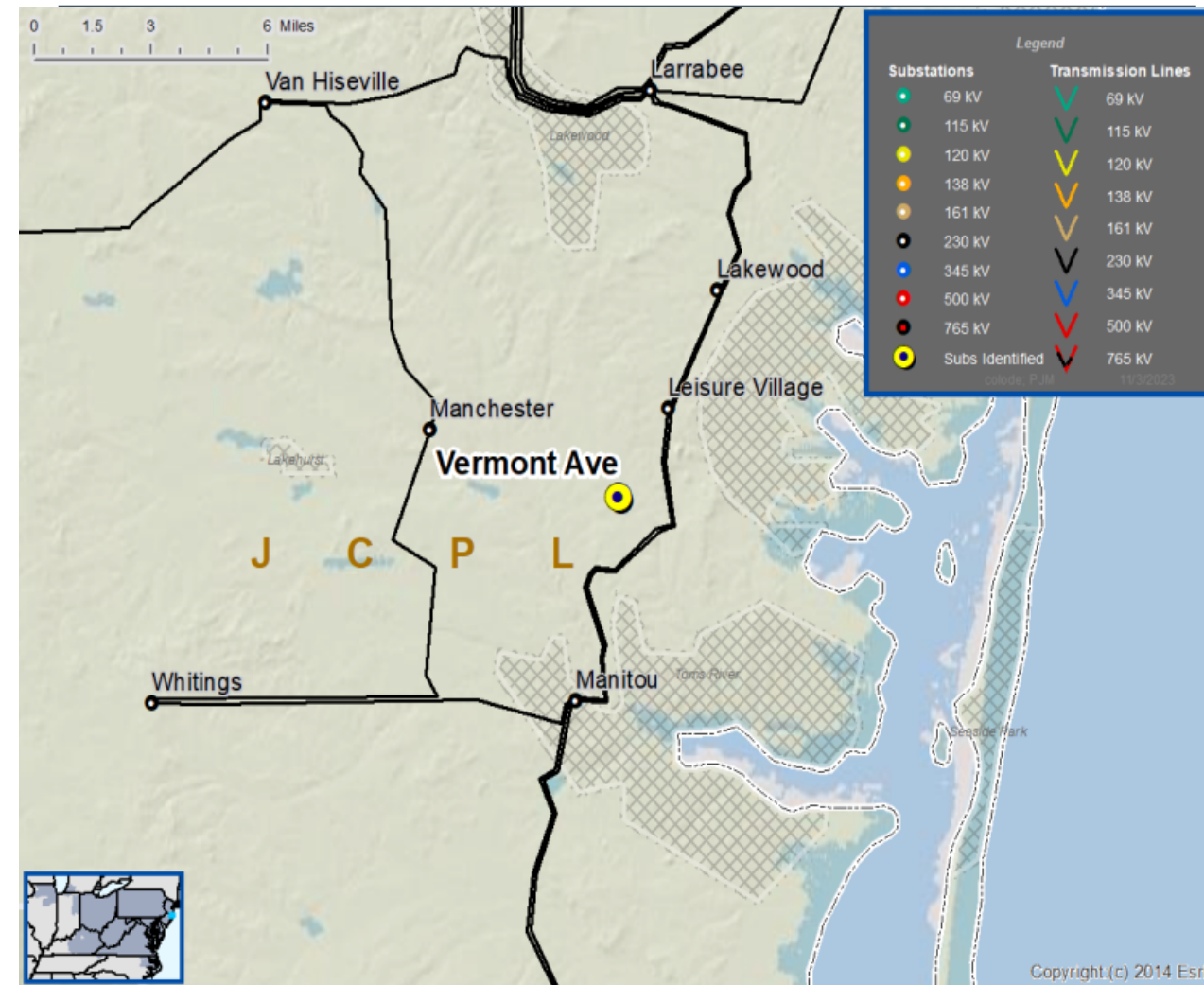
New customer connection request will be evaluated per FirstEnergy's "Requirements for Transmission Connected Facilities" document and "Transmission Planning Criteria" document.

Problem Statement:

New Customer Connection – A customer has requested 34.5 kV service for a load of approximately 10 MVA near Vermont Ave Substation.

Requested in-service date:

05/01/2025



JCPL Transmission Zone M-3 Process Vermont Ave 34.5 kV Customer Connection

Need Number: JCPL-2023-059

Process Stage: Solution Meeting – 02/15/2024

Proposed Solution:

- Install a new 34.5 kV breaker, disconnect switch and relaying to connect to the existing 34.5 kV bus at Vermont Ave Substation.
- Modify relay schemes/settings on the Leisure Village – South Lakewood 34.5 kV F214 Line.
- Modify relay schemes/settings on the Larrabee – Metedeconk 34.5 kV E213 Line.

Alternatives Considered:

No alternatives were considered due to the proximity of the customer's facility to the Vermont Ave Substation.

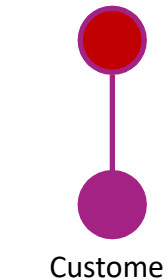
Estimated Project Cost: \$0.3M

Projected In-Service: 03/31/2026

Project Status: Engineering

Model: 2023 RTEP model for 2028 Summer (50/50)

Vermont Ave



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



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

2/2/2024 – V1 – Original version posted to pjm.com