# 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

# JCPL Transmission Zone M-3 Process Misoperation Relay Project

**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cases the protection equipment cannot be repaired due to a lack of replacement parts and available expertise in the outdated technology.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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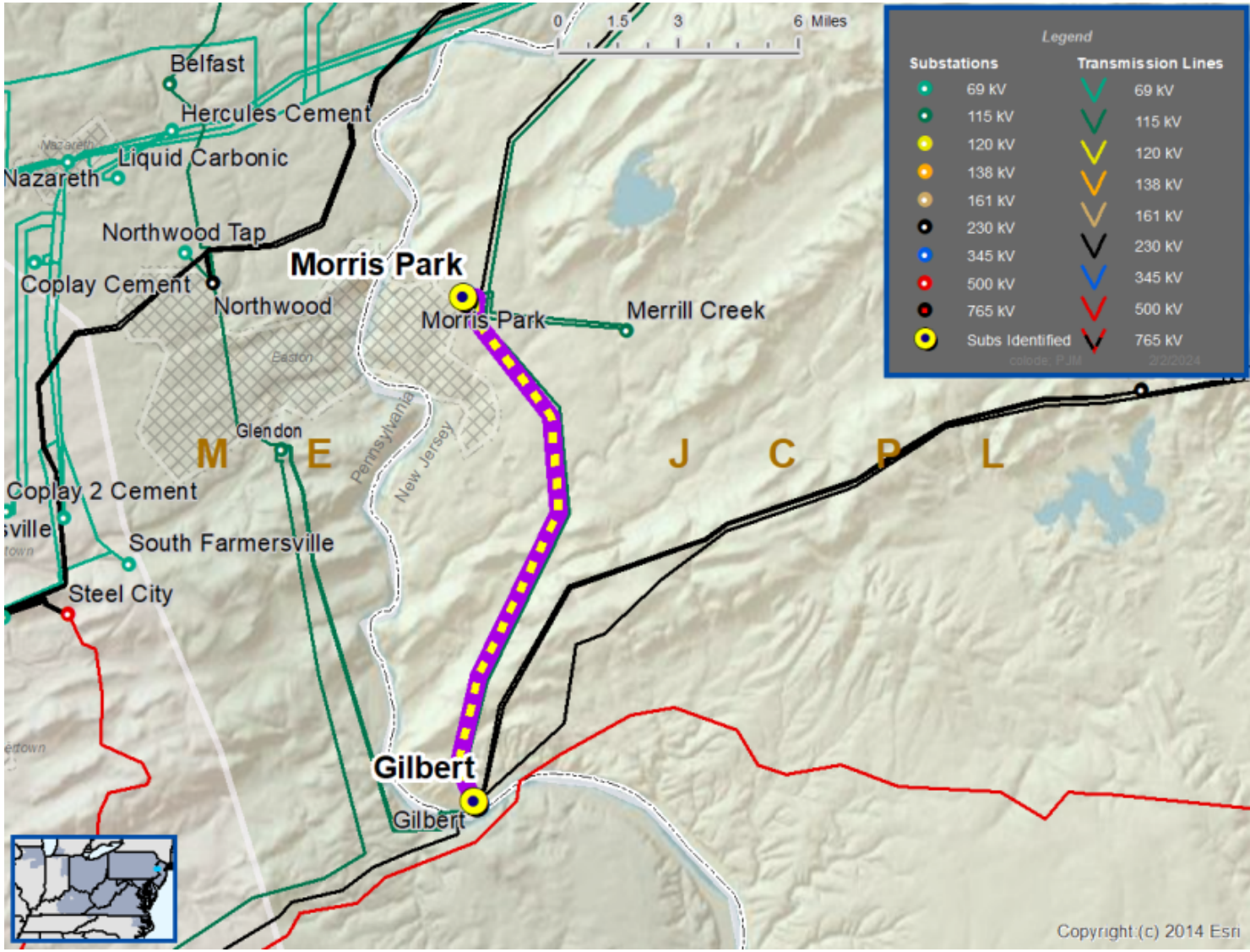

# JCPL Transmission Zone M-3 Process Misoperation Relay Project

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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 |

# JCPL Transmission Zone M-3 Process
# Automatic Restoration Projects

**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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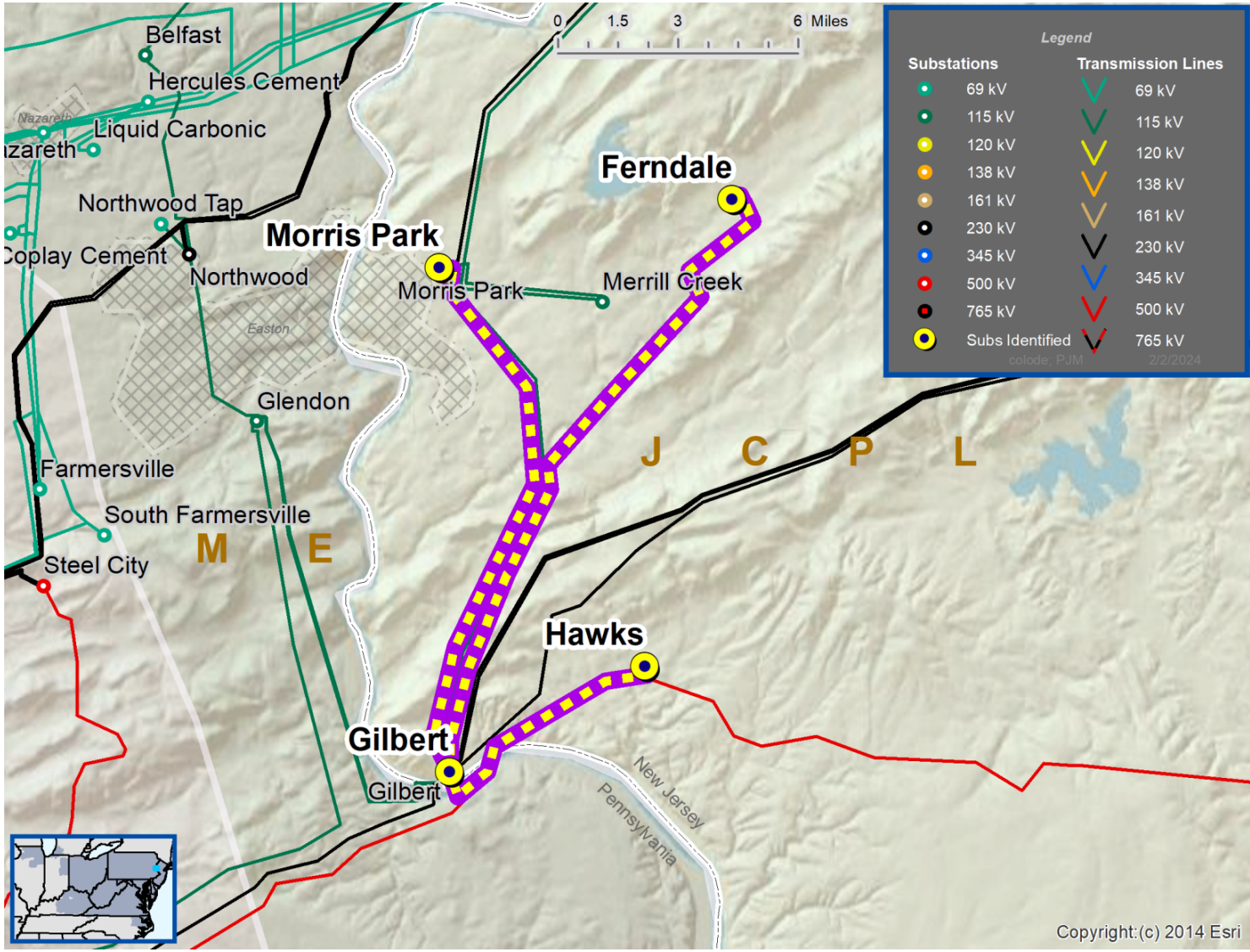

# JCPL Transmission Zone M-3 Process Misoperation Relay Project

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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-2024-009 | 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):**

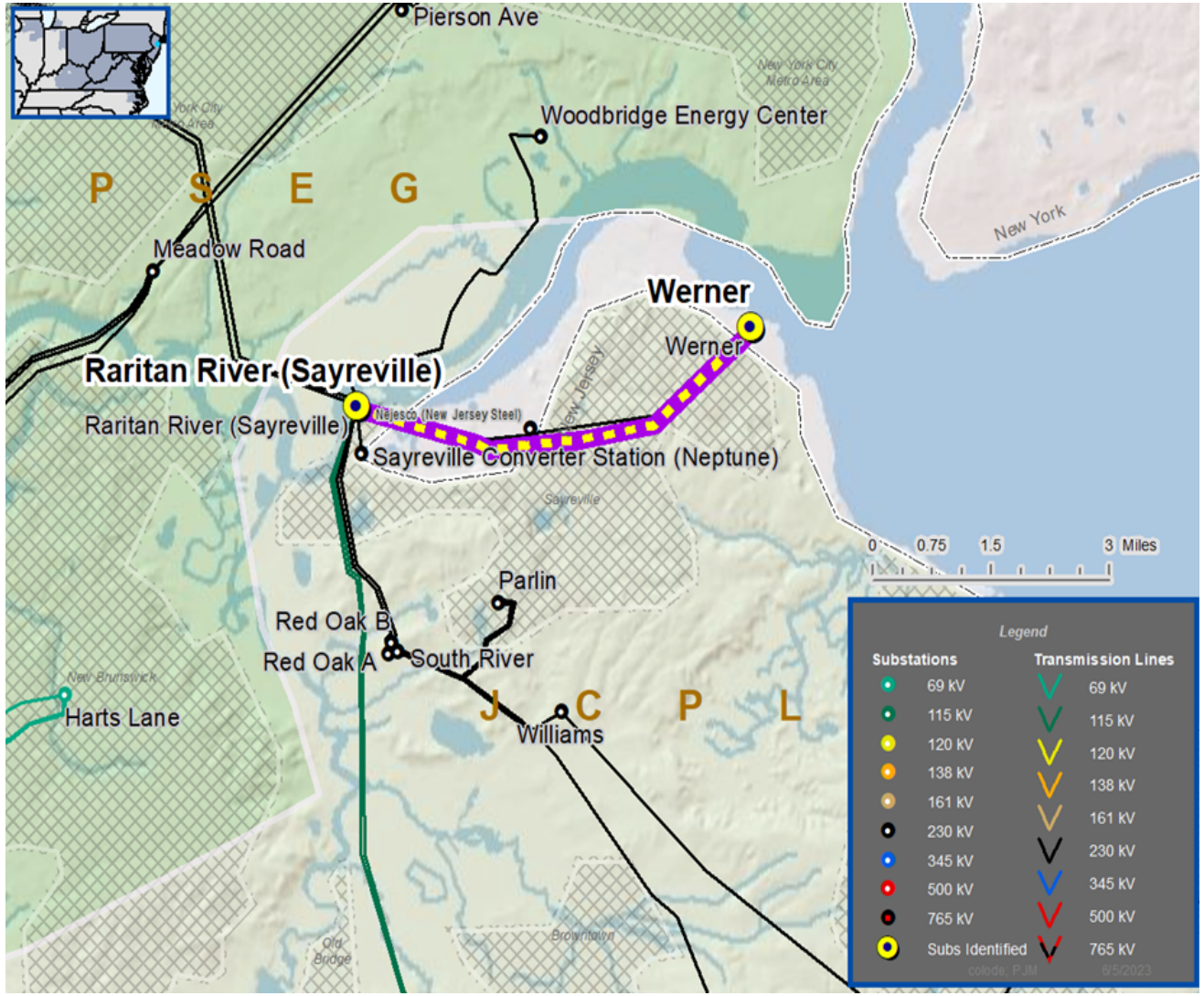
New customer connection request will be evaluated per FirstEnergy's "Requirements for Transmission Connected Facilities" document and "Transmission Planning Criteria" document.

**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

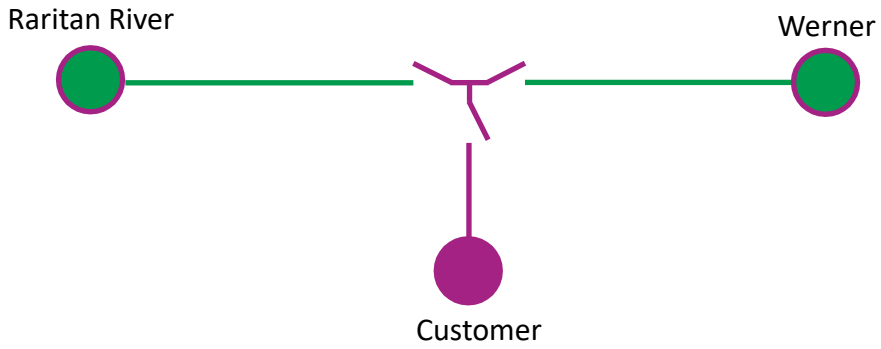
**Need Number:** JCPL-2023-004

**Process Stage:** Solution Meeting – 02/15/2024

**Proposed Solution:**

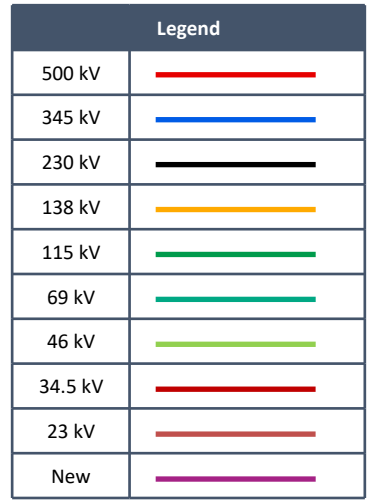
**Raritan River – Werner (D30) 115 kV Line:**

- 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)

# JCPL Transmission Zone M-3 Process
# EH Werner Substation

**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:**

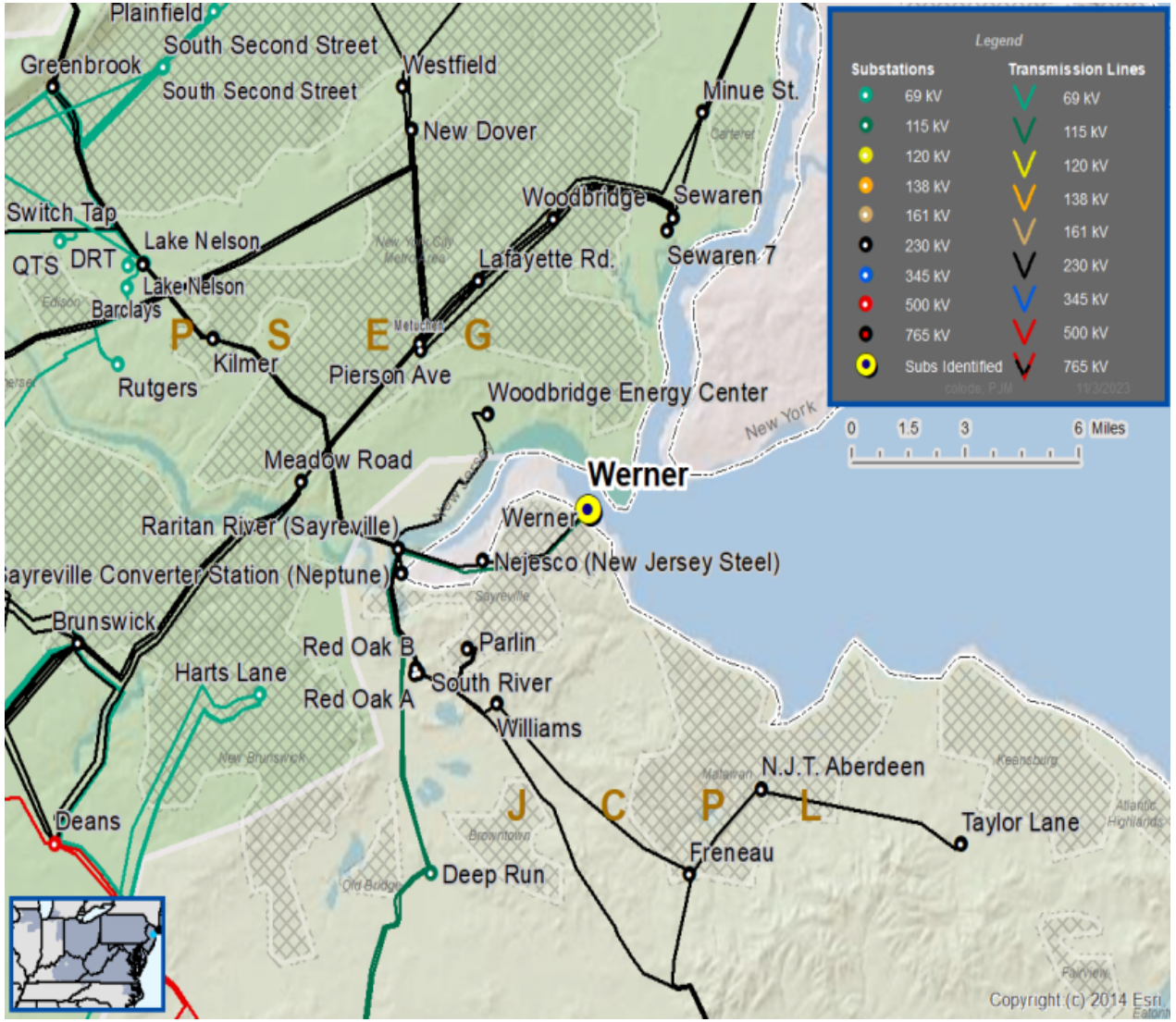
System Performance Projects Global Factors
- System reliability and performance
- Reliability of Non-Bulk Electric System (Non-BES) Facilities

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)



# JCPL Transmission Zone M-3 Process
# EH Werner Substation

**Need Number:** JCPL-2023-037

**Process Stage:** Solution Meeting 02/15/2024

**Proposed Solution:**

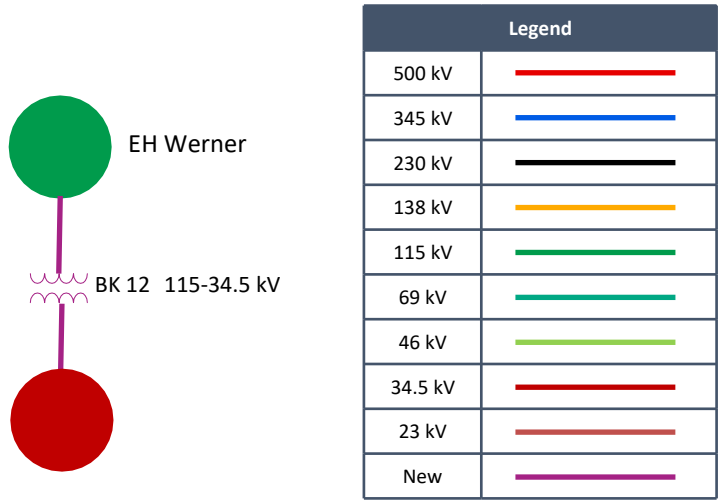
- Replace the 115-34.5 kV No. 12 Transformer at EH Werner Substation with a 125 MVA unit.
- Upgrade transformer relaying.

**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)

# JCPL Transmission Zone M-3 Process
# Pequest River Substation

**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:**

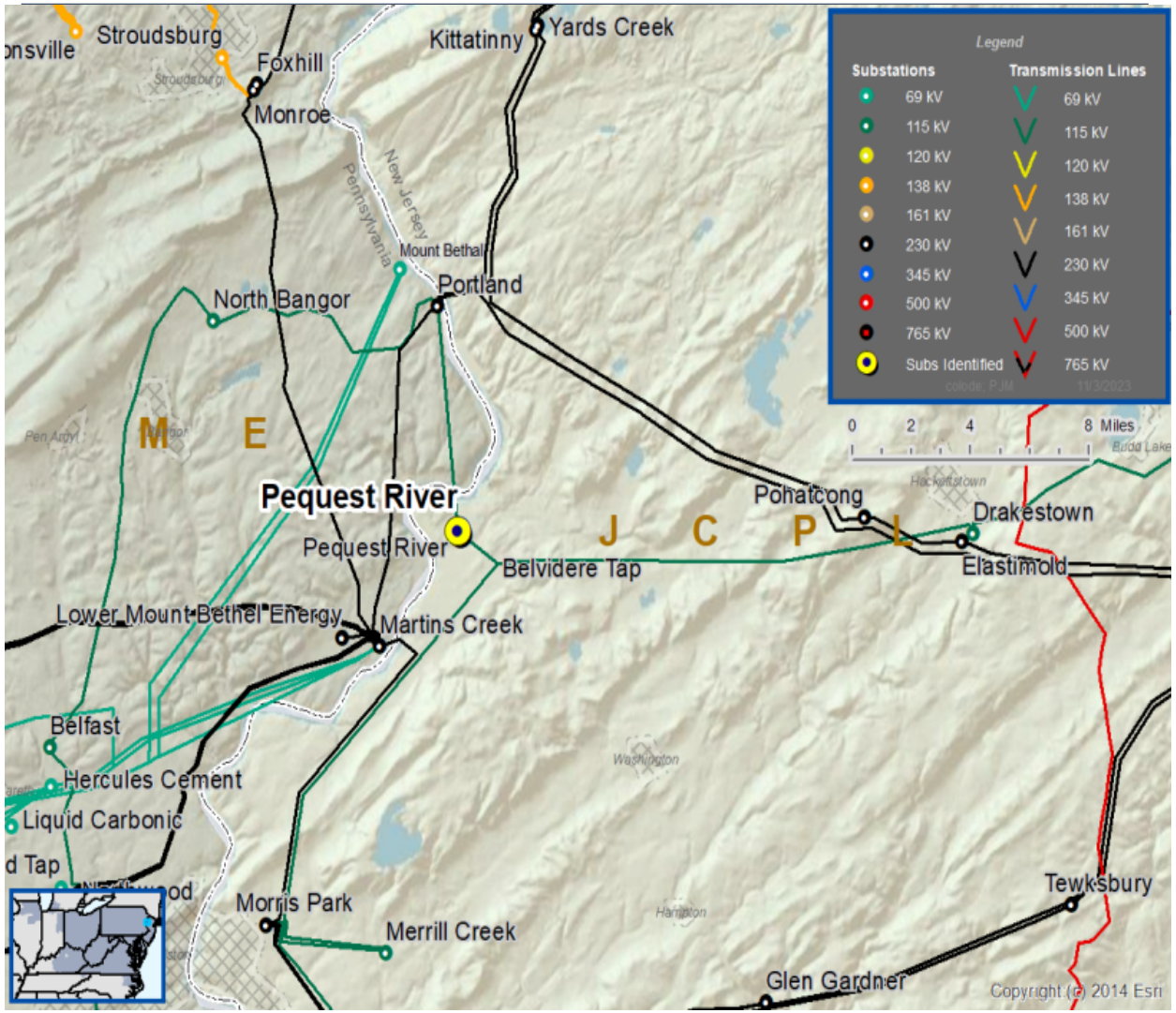
System Performance Projects Global Factors
- System reliability and performance
- Reliability of Non-Bulk Electric System (Non-BES) Facilities

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)



# JCPL Transmission Zone M-3 Process
# Pequest River Substation

**Need Number:** JCPL-2023-055

**Process Stage:** Solution Meeting 02/15/2024

**Proposed Solution:**

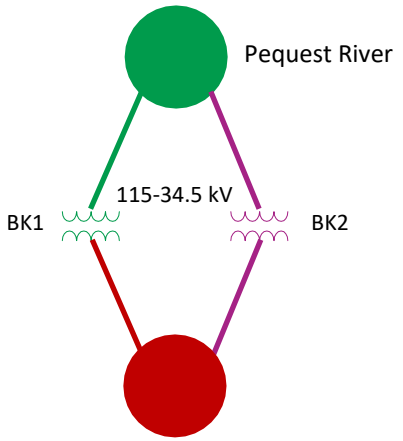
- Replace the 115-34.5 kV No. 2 Transformer at Pequest River with a 90 MVA unit.
- Upgrade transformer relaying.

**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.




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

**Estimated Project Cost:** $4.23M

**Projected In-Service:** 5/1/2025

**Project Status:** Engineering

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

# 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
**Previously Presented:** Need Meeting – 11/16/2023

**Project Driver(s):**

*Customer Service*

**Specific Assumption Reference(s):**

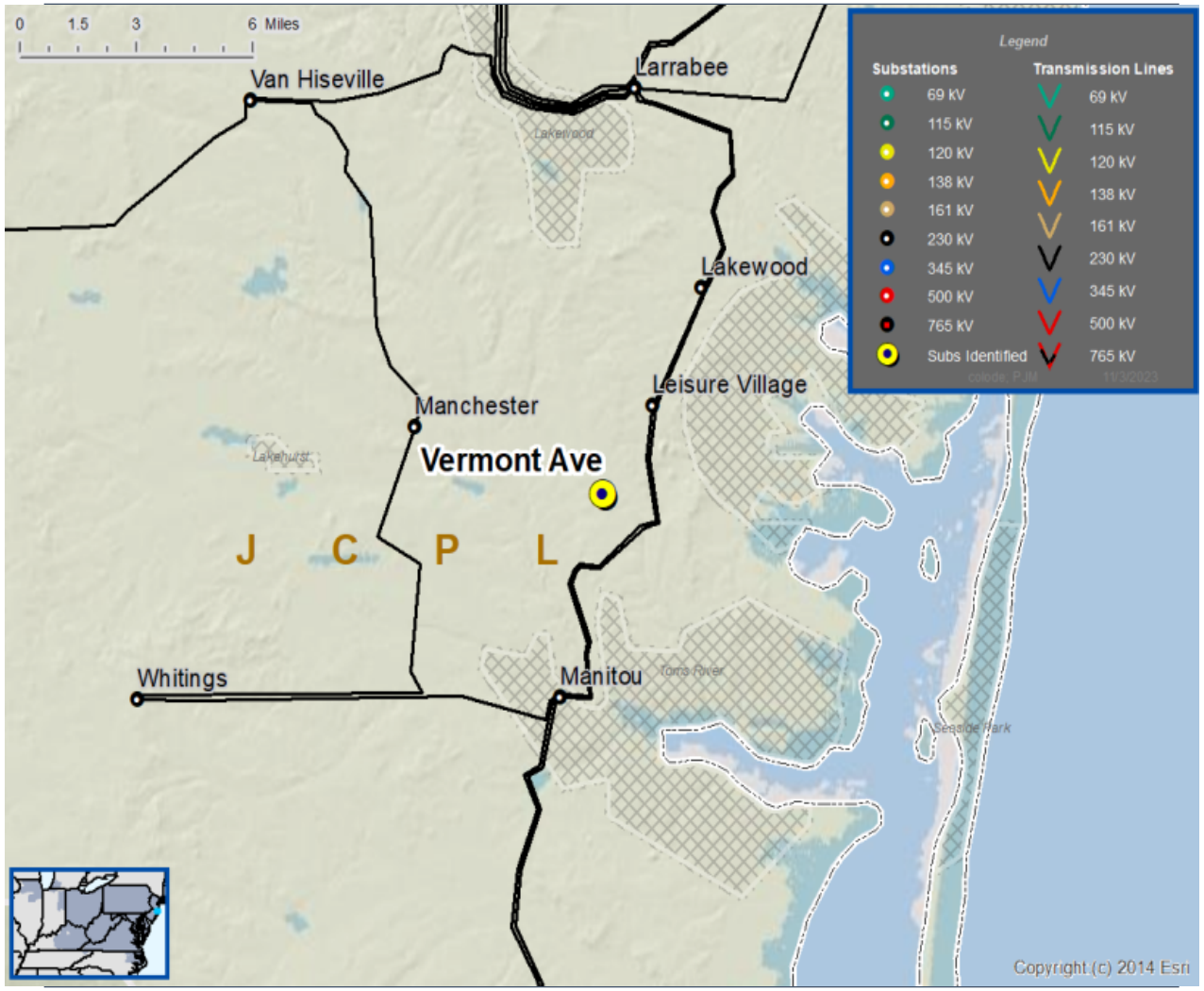
New customer connection request will be evaluated per FirstEnergy's "Requirements for Transmission Connected Facilities" document and "Transmission Planning Criteria" document.

**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:**

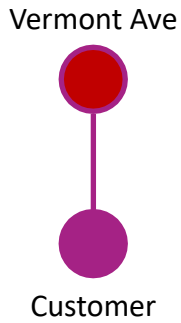
No alternatives were considered due to the proximity of the customer's facility to the Vermont Ave Substation.

**Estimated Project Cost:** $0.3M

**Projected In-Service:** 03/31/2026

**Project Status:** Engineering

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




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


Planning
Community

# 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