



# 2018 Supplemental Projects

## West - 1

# ATSI

Previously presented on 1/8/2018 SRRTEP

**Problem Statement :**

Customer Service

- Illuminating Company Customer, Southerly Sewage, requires a new substation due to operating and maintenance concerns with the existing customer substation.
- No initial load increase.

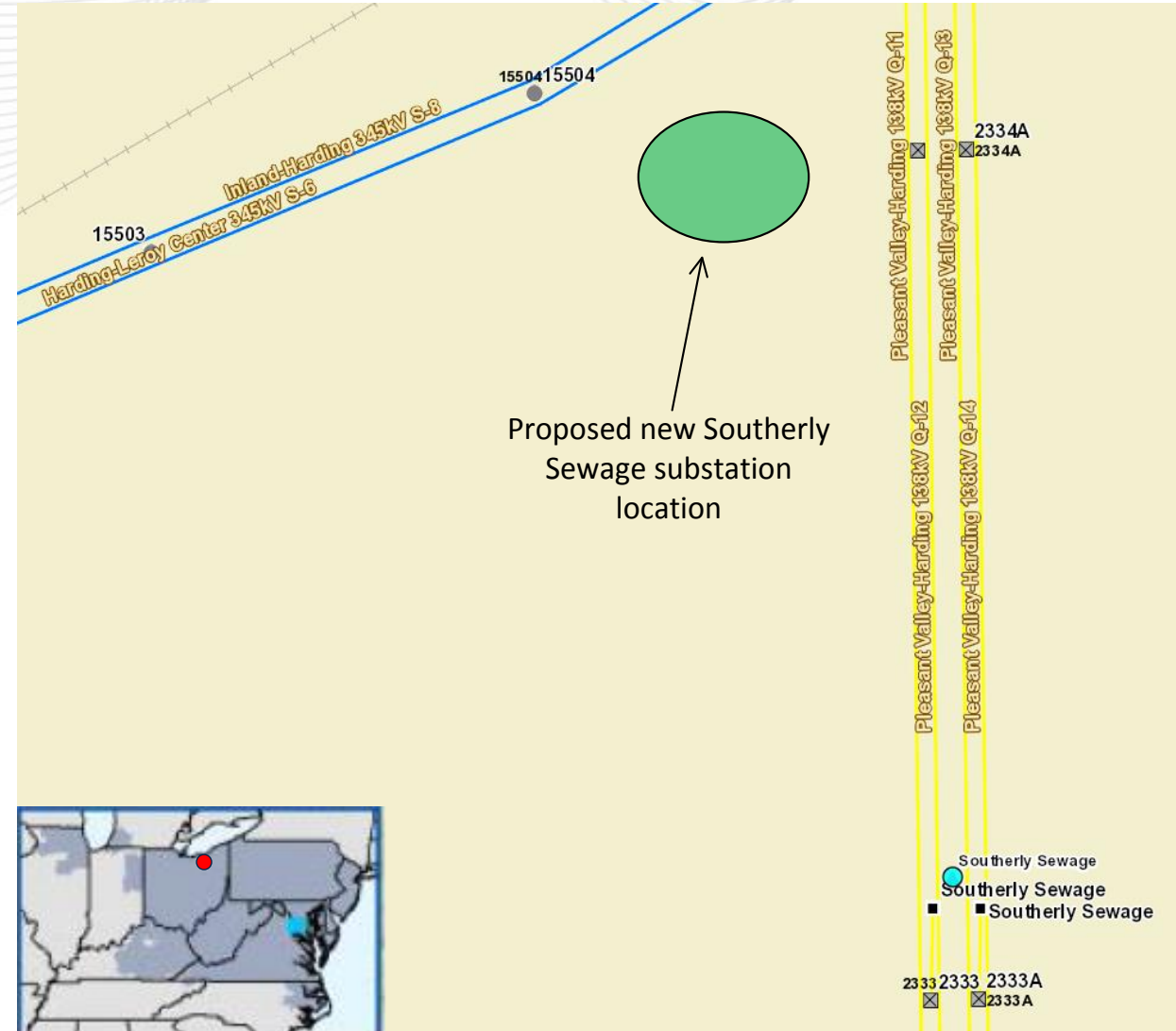
**Selected Solution:**

- Construct a new four (4) breaker 138kV ring bus substation (Southerly Sewage) that will connect to the Harding-Pleasant Valley Q11 138kV line and retire the existing customer substation. **(\$1465)**

**Estimated Project Cost:** \$9.3M (Reimbursable)

**Projected IS Date:** 06/15/2019

**Status:** Conceptual



Previously presented on 1/8/2018 SRRTEP

**Problem Statement (Scope and Need/Drivers):**

Customer Service

- Support customer's load increase.

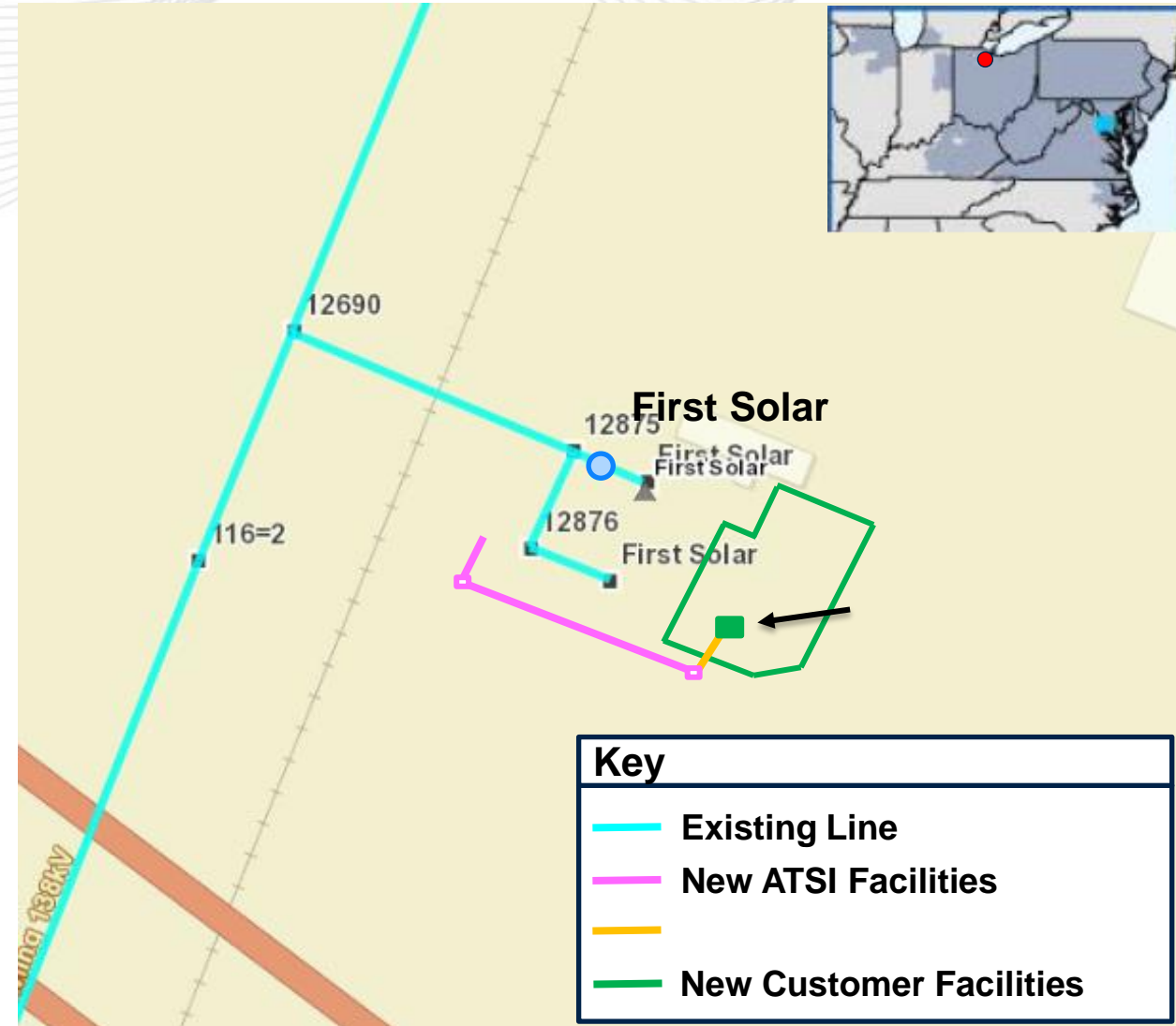
**Selected Solution:**

- Install new line tap on the Chrysler-Dowling 138kV circuit with 336 kcmil ACSR. **(S1466)**

**Estimated Project Cost:** \$0.4M (Reimbursable)

**Projected IS Date:** 03/01/2018

**Status:** Engineering





Previously presented on 1/8/2018 SRRTEP

**Problem Statement (Scope and Need/Drivers):**

Customer Service

- Support customer’s substation reconfiguration.
- Customer to retire in place two existing transformers.
- No increase in customer load.

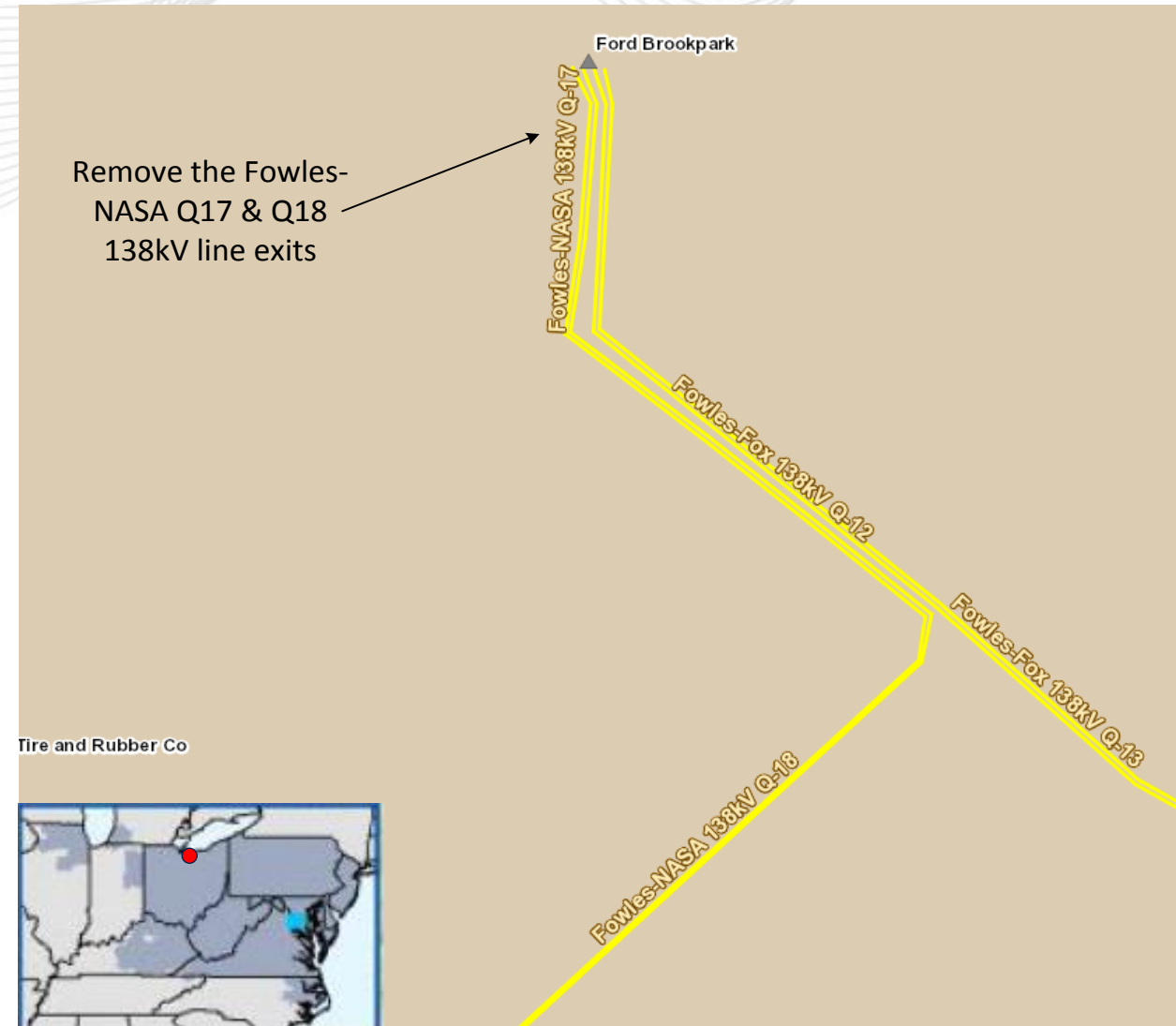
**Selected Solution:**

- Remove the Q17 & Q18 Fowles-NASA 138kV lines; by-pass existing customer Ford Brookpark substation. Maintain the Q13 & Q12 Fowles-Fox 138kV Lines for transmission service to customer substation. **(S1467)**

**Estimated Project Cost:** \$0.4M (Reimbursable)

**Projected IS Date:** 05/31/2018

**Status:** Conceptual



# ATSI Transmission Zone: Supplemental New four breaker ring bus near Nash

Previously presented on 1/8/2018 SRRTPEP

**Problem Statement (Scope and Need/Drivers):**  
Operational Flexibility and Efficiency

- Minimize significant local load loss for the common tower outage of Eastlake-Leroy Center Q15 and Q16 138kV lines.
- Improve operational flexibility during maintenance and restoration efforts.

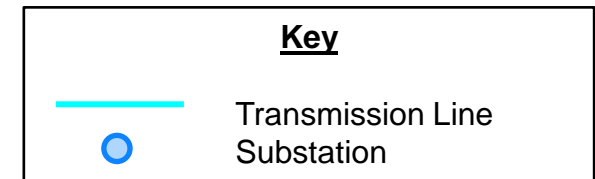
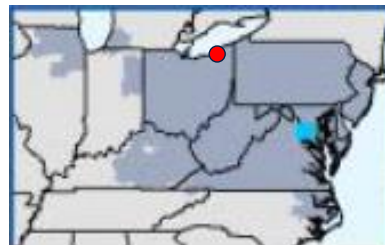
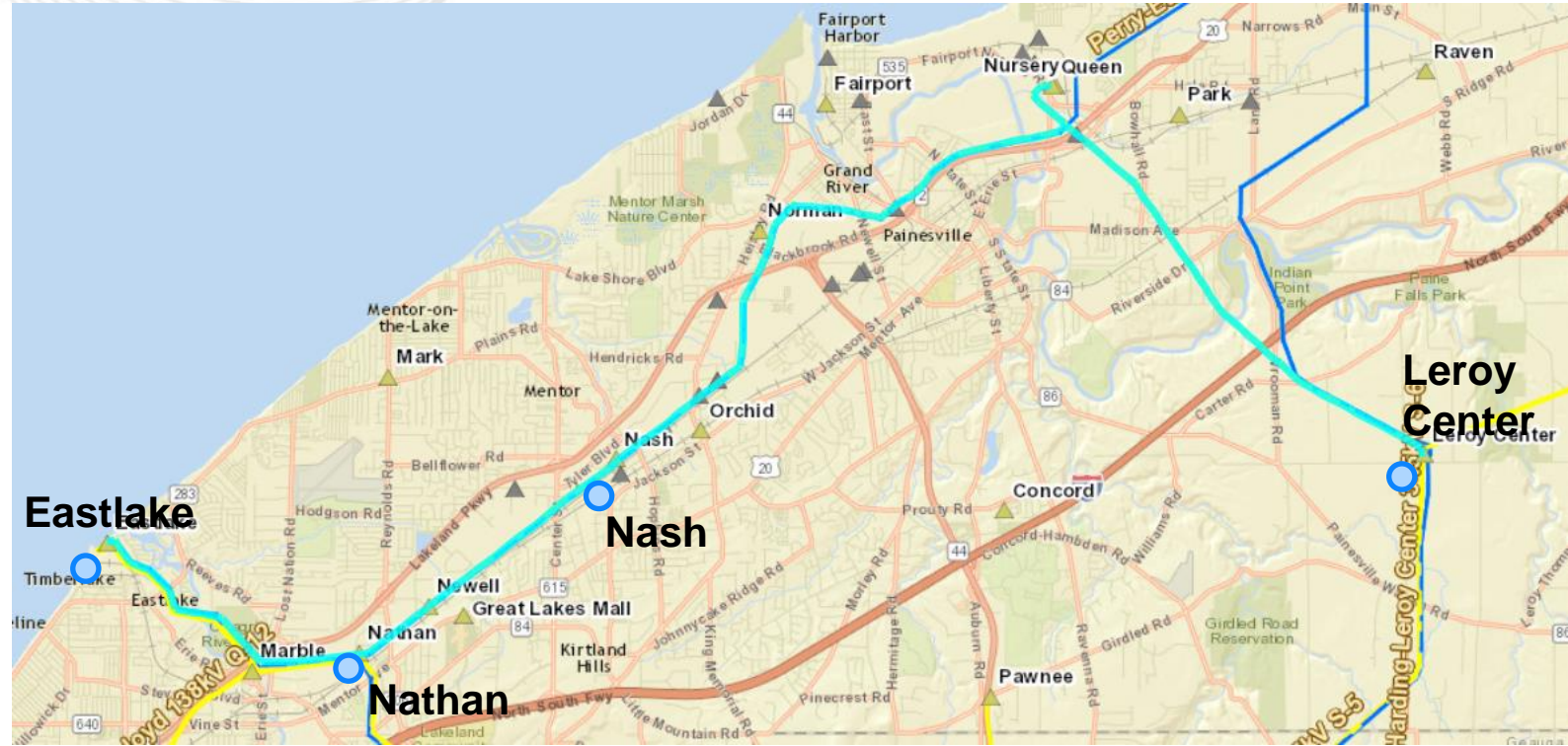
**Selected Solution:**

Construct a four (4) breaker 138kV ring bus substation near the existing Nash substation. Loop and terminate the Eastlake-Leroy Center Q15 and Q16 138kV lines through the new ring bus. (**\$1468**)

**Estimated Project Cost:** \$8.6M

**Projected IS Date:** 06/01/2019

**Status:** Conceptual



Previously presented on 1/8/2018 SRRTEP

**Problem Statement (Scope and Need/Drivers):**

Operational Flexibility and Efficiency

- Minimize local load loss for the common tower outage of Eastlake-Leroy Center Q15 and Q16 138kV lines.

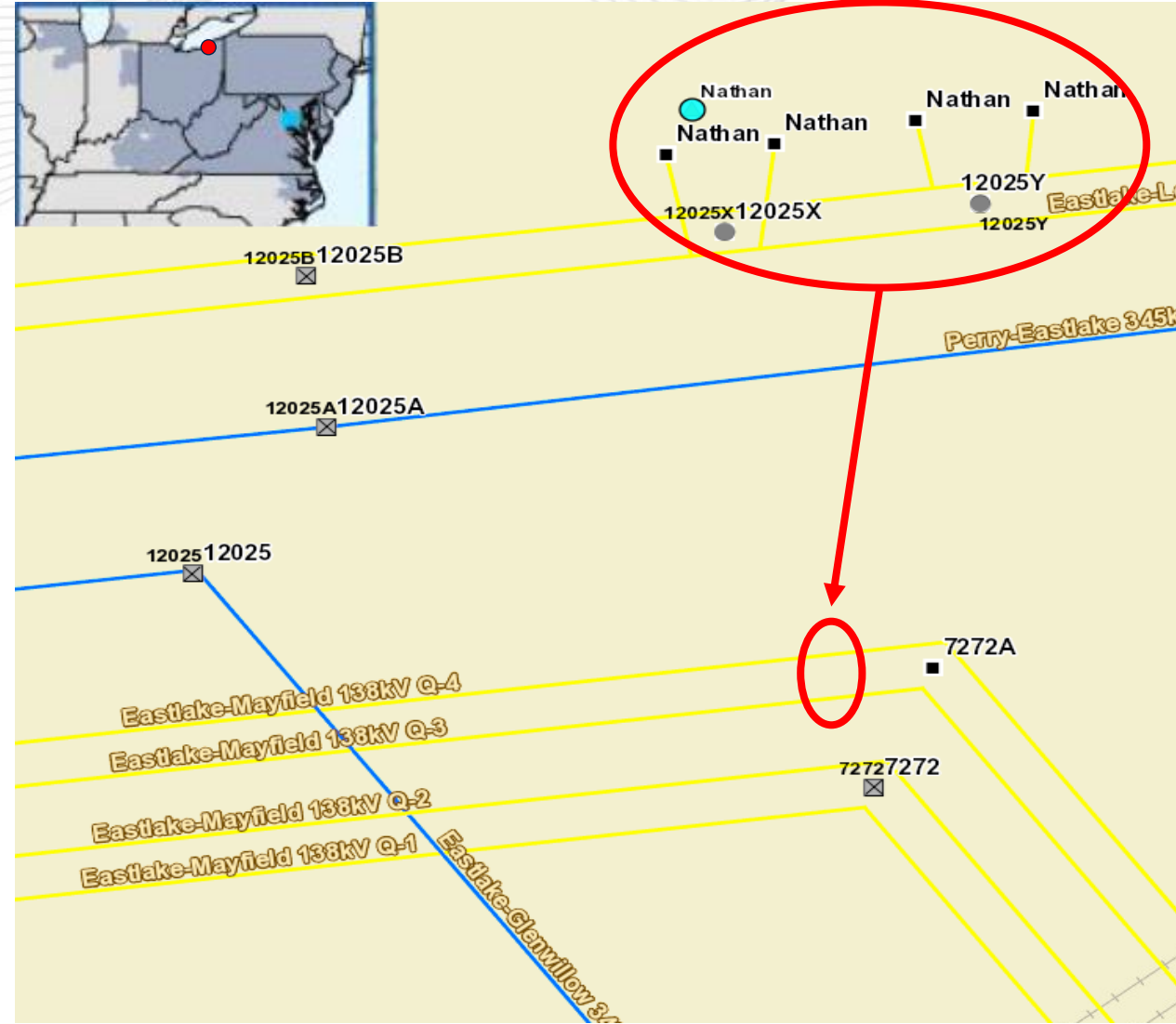
**Selected Solution:**

- Construct new line taps to Nathan substation from the Eastlake-Mayfield Q3 and Q4 138kV lines. Transfer Nathan substation from the Eastlake-Leroy Center Q15 and Q16 138kV Lines to the Eastlake-Mayfield Q3 and Q4 138kV lines. (**\$1469**)

**Estimated Project Cost:** \$2.3M

**Projected IS Date:** 12/31/2018

**Status:** Conceptual







# ATSI Transmission Zone: Supplemental Stevens 69 kV Ring Bus

Previously presented on 1/8/2018 SRRTEP

## Problem Statement (Scope and Need/Drivers):

### Operational Flexibility and Efficiency

- Improve operational flexibility during maintenance and restoration efforts.
- Reduce amount of potential local load loss under contingency conditions.

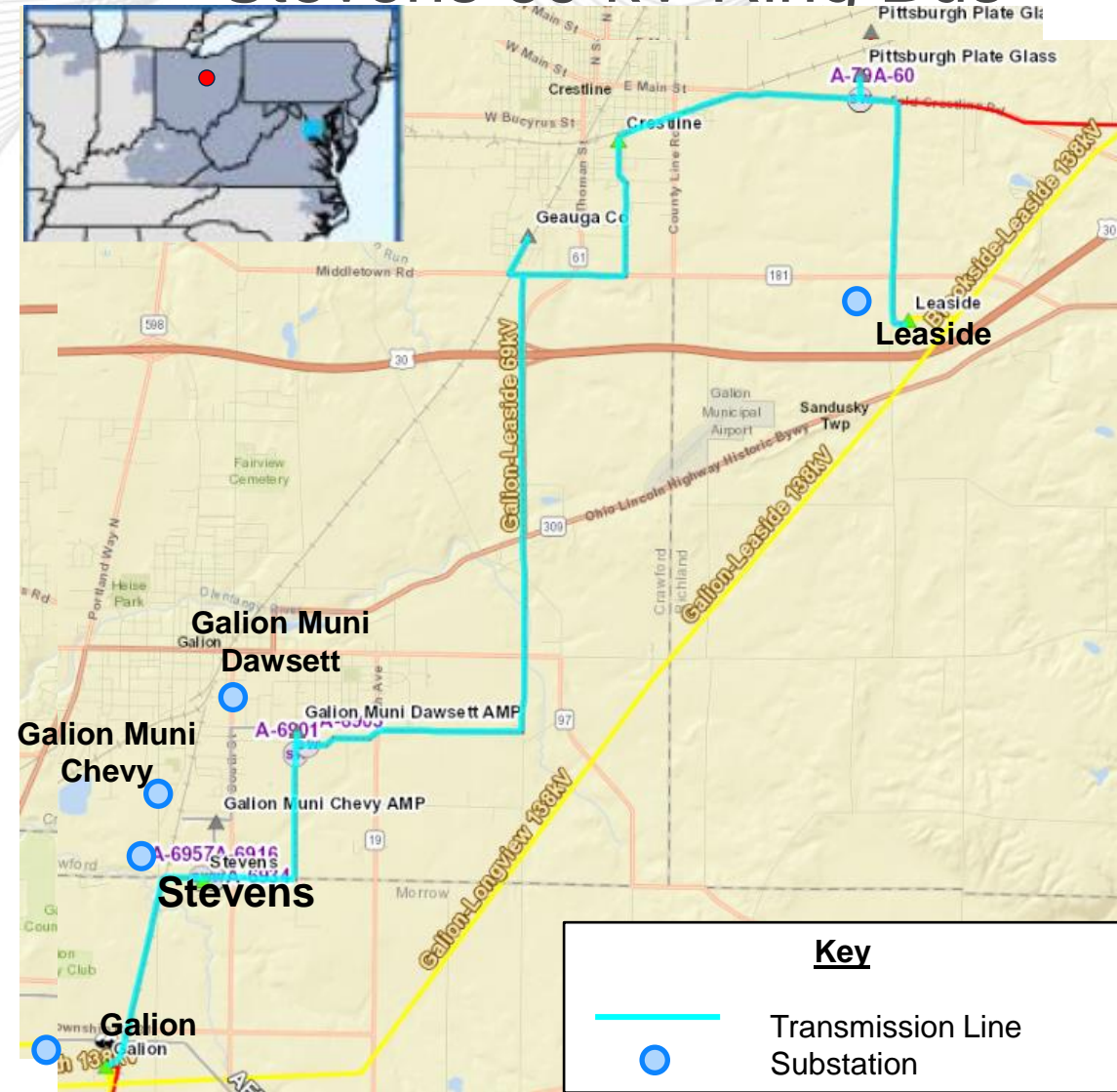
## Selected Solution:

- Convert Stevens 69kV substation to a four (4) breaker ring bus. Reconfigure Stevens substation to include terminals for: Galion-Stevens 69 kV, Stevens-Leaside 69 kV, Stevens-Galion Muni (Chevy) 69 kV, and Stevens transformer to make the Station layout support line-load-line configuration. (**\$1470**)

**Estimated Project Cost:** \$5.6M

**Projected IS Date:** 12/31/2018

**Status:** Conceptual



# ATSI Transmission Zone: Supplemental Tyrrell – Ring Bus and Add 69 kV Cap Banks

Previously presented on 1/8/2018 SRRTEP

## Problem Statement (Scope and Need/Drivers):

### Operational Flexibility and Efficiency

- Improve operational flexibility during maintenance and restoration efforts.
- Reduce amount of potential local load loss under contingency conditions.

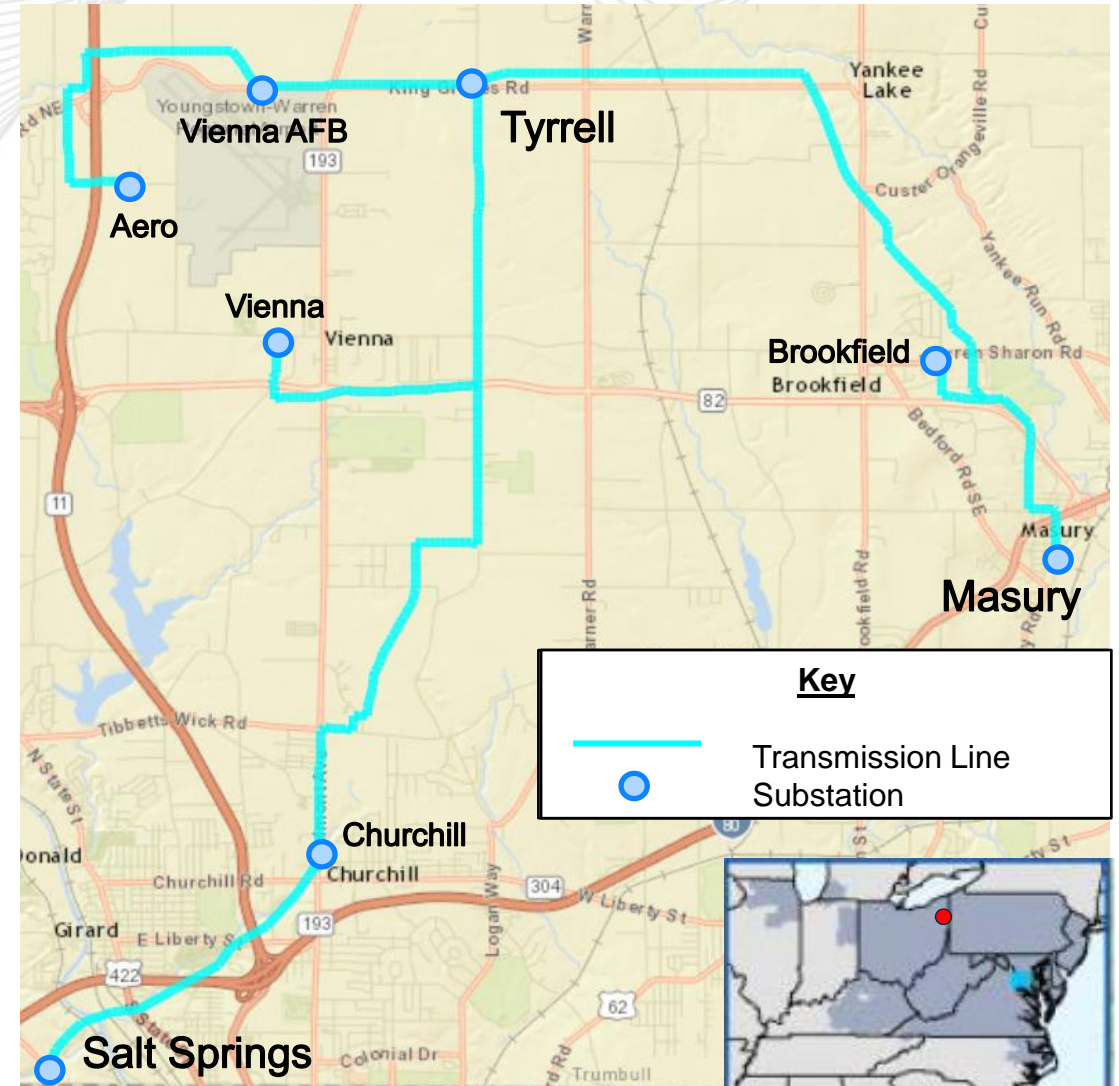
## Selected Solution:

- Convert Tyrrell 69 kV substation into a four (4) breaker, future five (5), for future cap bank(s). (**S1471.1**)
- Incorporate the radial tap to Vienna Air Force Base and Aero sub into dedicated ring bus position (**S1471.2**)
- Reconfigure the line exits at Tyrrell substation for Masury-Tyrrell 69kV line, Tyrrell-Salt Springs 69kV line, Tyrrell-Aero (radial), and Tyrrell transformer to make the substation layout support line-load-line configuration. (**S1471.3**)

**Estimated Project Cost:** \$6.1M

**Projected IS Date:** 06/01/2019

**Status:** Conceptual





# ATSI Transmission Zone: Supplemental Ford Road 69 kV Ring Bus

Previously presented on 1/8/2018 SRRTEP

## Problem Statement (Scope and Need/Drivers):

### Operational Flexibility and Efficiency

- Improve operational flexibility during maintenance and restoration efforts.
- Reduce amount of potential local load loss under contingency conditions.

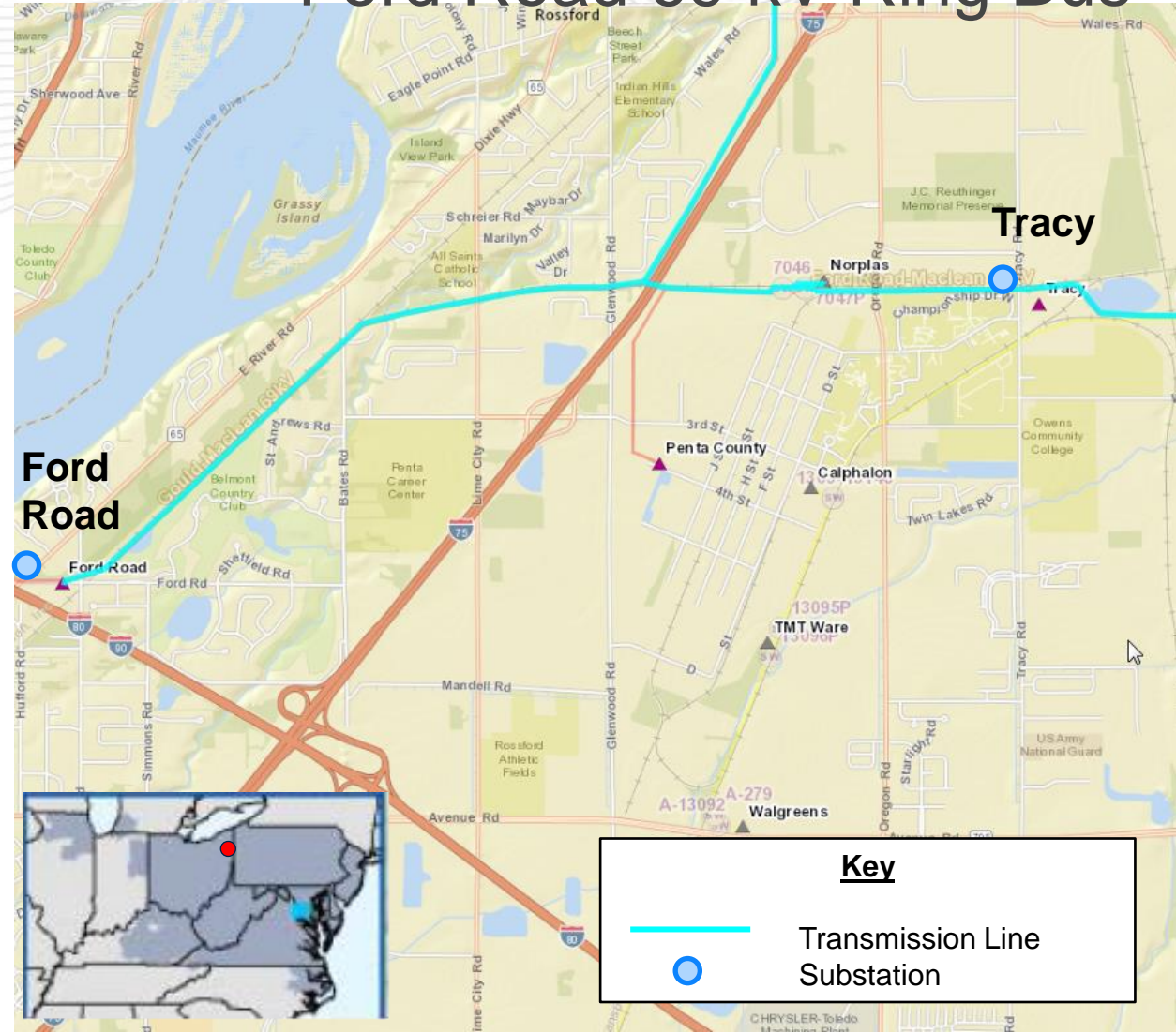
## Selected Solution:

- Convert Ford Road substation to a four (4) breaker ring bus (**\$1472.1**)
- Reconfigure the line exits at Ford Road substation for: Ford Road-Maclean 69 kV, Ford Road-Vulcan 69 kV, 69 kV capacitor bank, and Ford Road transformer to make the Substation layout support line-load-line configuration. (**\$1472.2**)

**Estimated Project Cost:** \$5.0M

**Projected IS Date:** 12/31/2018

**Status:** Conceptual





# ATSI Transmission Zone: Supplemental Vulcan - Add high-side breaker to transformer #10

Previously presented on 1/8/2018 SRRTEP

## Problem Statement (Scope and Need/Drivers):

### Operational Flexibility and Efficiency

- Improve operational flexibility during maintenance and restoration efforts.
- Reduce amount of potential local load loss under contingency conditions.
- Eliminate the simultaneous outages to three or more system elements.

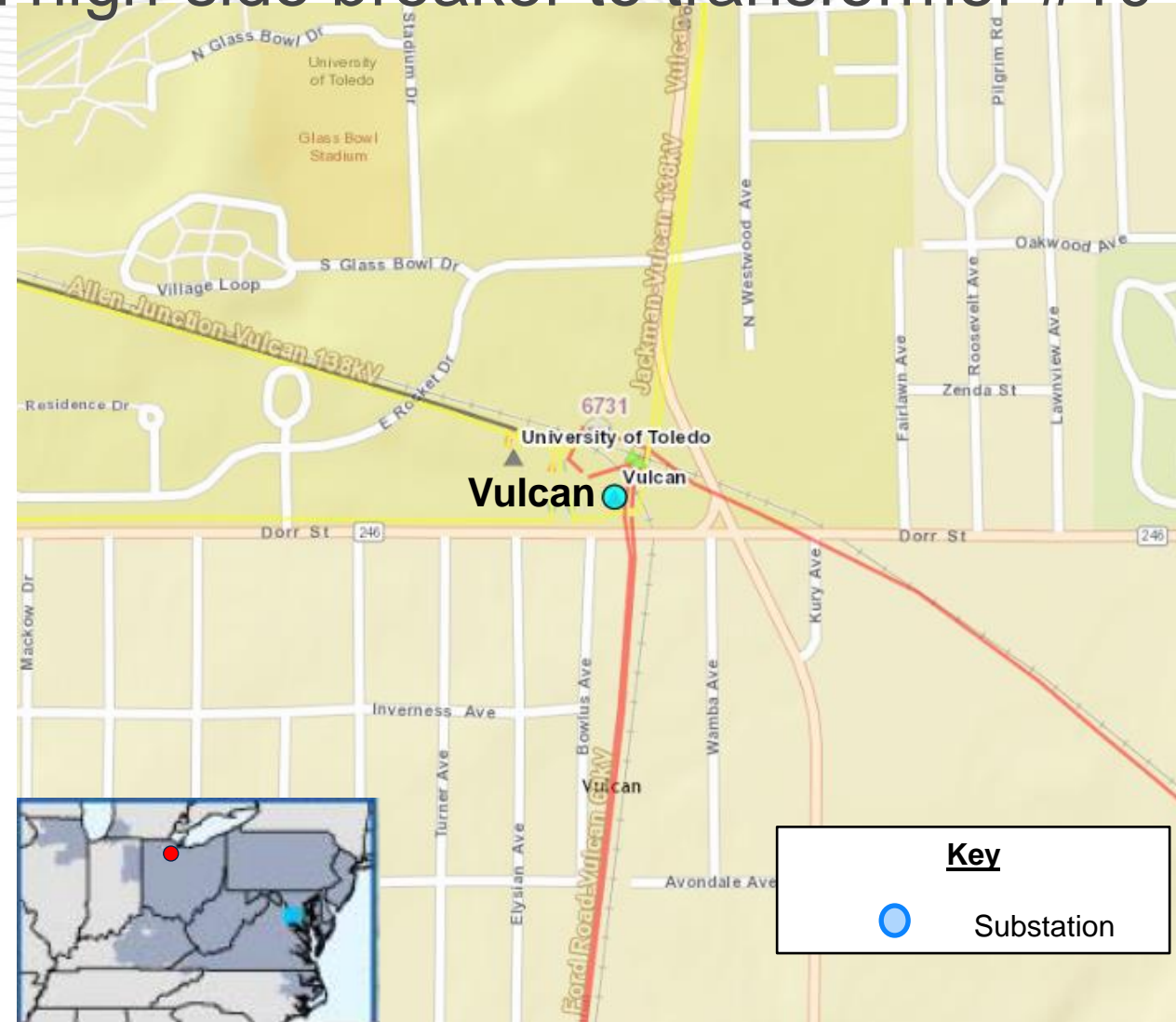
### Selected Solution:

- Add new 138 kV breaker on high-side of the Vulcan #10 138/69 kV transformer. (**\$1473**)

**Estimated Project Cost:** \$0.6M

**Projected IS Date:** 5/1/2018

**Status:** Conceptual



Key	
	Substation

# ATSI Transmission Zone: Supplemental Leffels Lane 69 kV Ring Bus

Previously presented on 1/8/2018 SRRTEP

## Problem Statement (Scope and Need/Drivers):

### Operational Flexibility and Efficiency

- Improve operational flexibility during maintenance and restoration efforts.
- Reduce amount of potential local load loss under contingency conditions.
- Eliminate the simultaneous outages to three or more system elements.

### Selected Solution:

- Convert Leffels Lane substation to a four (4) breaker ring bus. (**\$1474.1**)
- Reconfigure Leffels Lane substation to include terminals for: Clark-Leffels Lane 69kV, Leffels Lane-East Springfield 69kV, Leffels Lane transformer #1, and Leffels Lane transformer #2 to make the Substation layout support line-load-line configuration. (**\$1474.2**)

Estimated Project Cost: \$4.5M

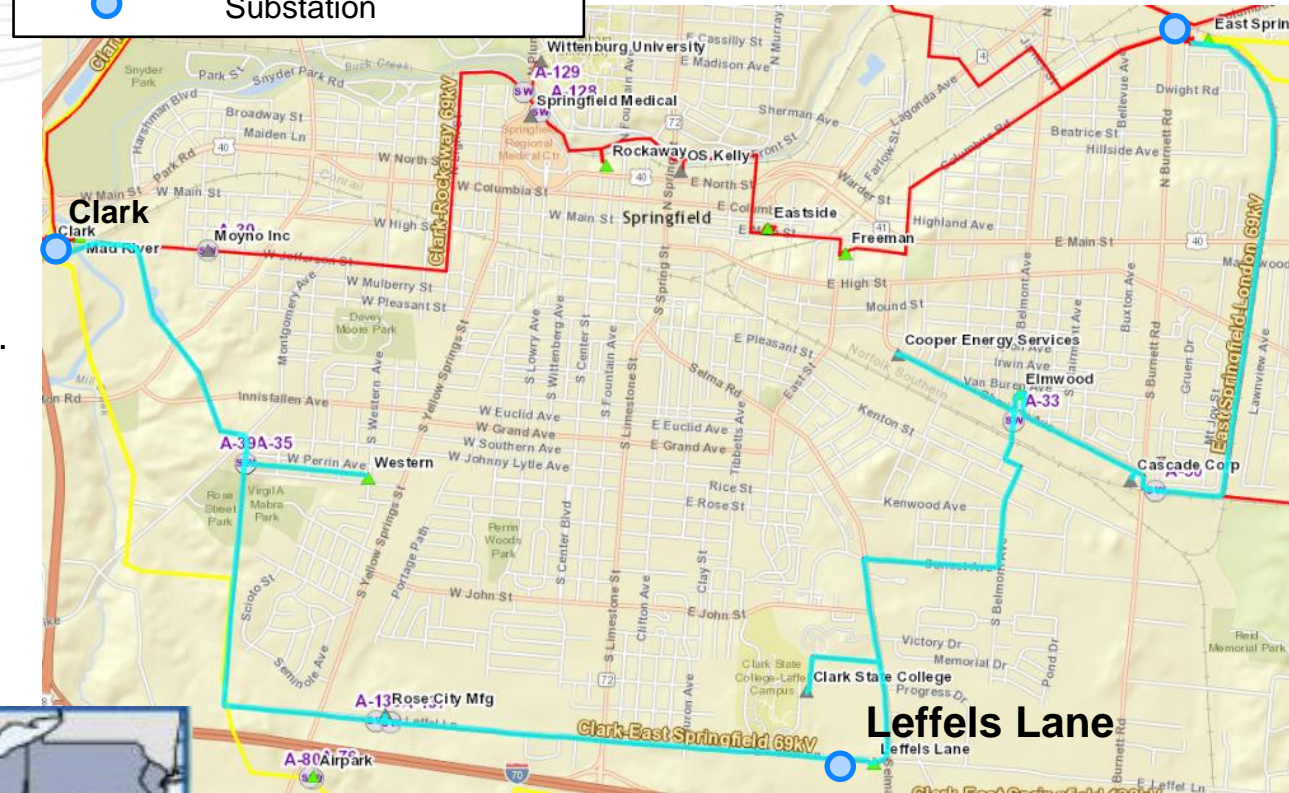
Projected IS Date: 05/01/2018

Status: Conceptual

**Key**

Transmission Line

Substation







# ATSI Transmission Zone: Supplemental Dilworth Garretttsville Area Upgrades

Previously presented on 1/8/2018 SRRTEP

## Problem Statement (Scope and Need/Drivers):

### Operational Flexibility and Efficiency

- Improve operational flexibility during maintenance and restoration efforts.
- Reduce amount of potential local load loss under contingency conditions.
- Eliminate the simultaneous outages to three or more system elements.

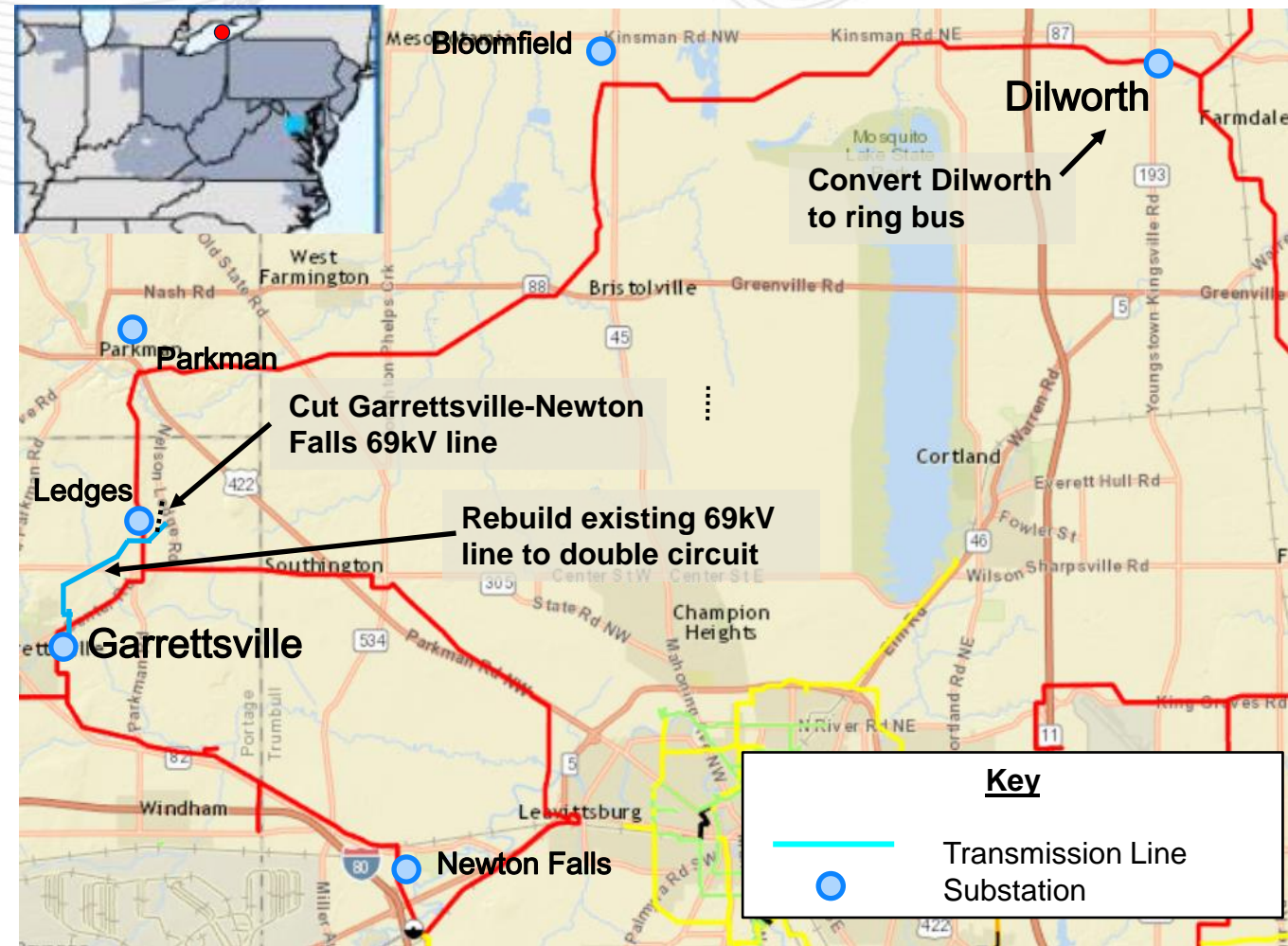
## Selected Solution:

- Convert Dilworth substation to a five (5) breaker ring bus (**\$1475.1**)
- Rebuild 3.2 miles of 69 kV single circuit 336 ACSR between Garretttsville and Ledges as double circuit 477 ACSS to establish the Garretttsville-Dilworth and Garretttsville-Newton Falls 69 kV Lines (**\$1475.2**)
- Install 14.4 MVAR capacitor at Parkman substation (**\$1475.3**)

**Estimated Project Cost:** \$7.7M

**Projected IS Date:** 12/31/2018

**Status:** Conceptual



Previously presented on 1/8/2018 SRRTEP

## Problem Statement (Scope and Need/Drivers):

### Operational Flexibility and Efficiency

- Improve operational flexibility during maintenance and restoration efforts.
- Reduce amount of potential local load loss under contingency conditions.

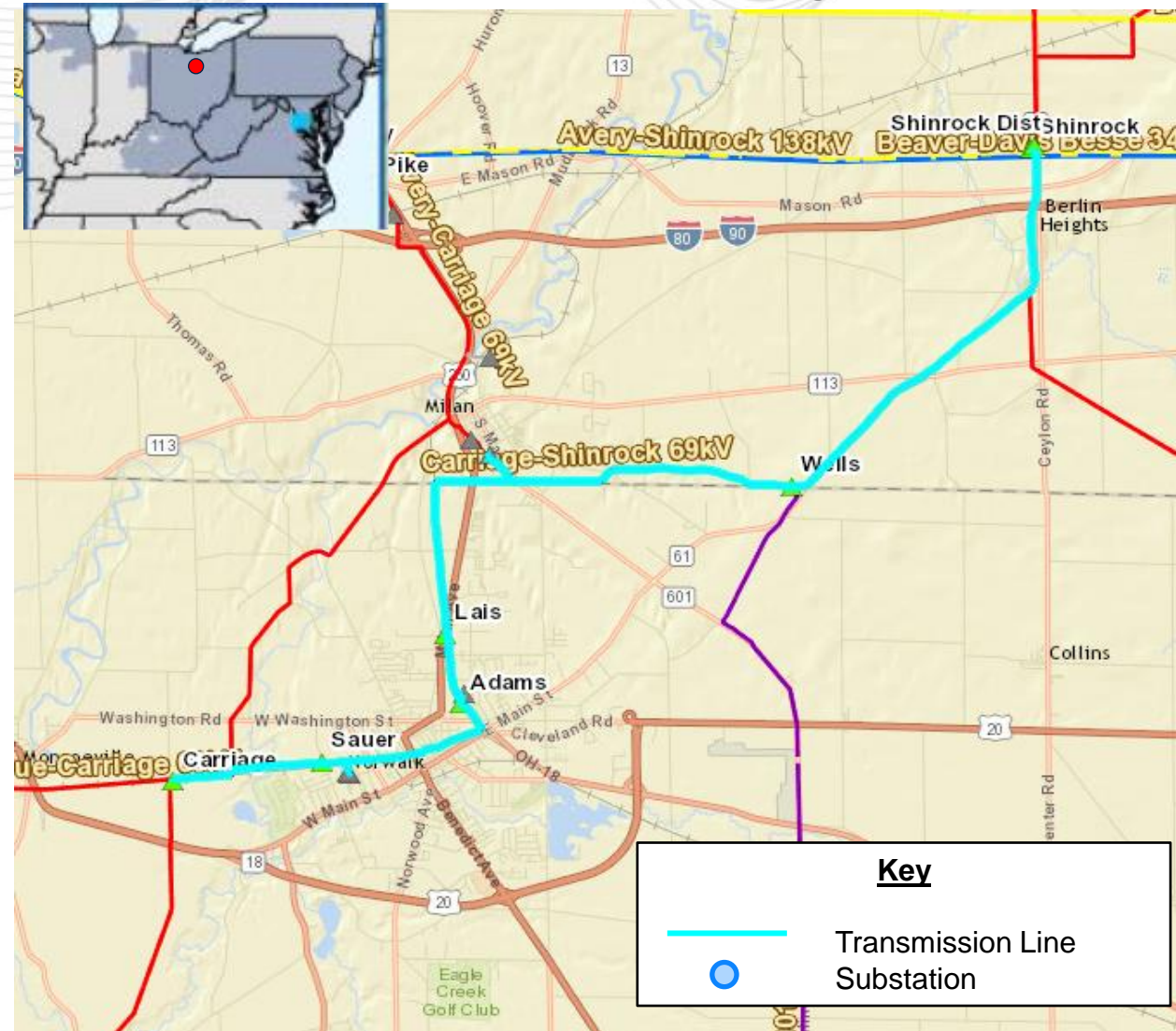
### Selected Solution:

- Convert Adam substation to a four (4) breaker / future five (5) ring bus. (**\$1476.1**)
- Reconfigure Adams substation to include terminals for: Carriage-Adams 69kV, Adams-Shinrock 69kV, Adams transformers #1 and #2 to make the Substation layout to support line-load-line configuration. (**\$1476.2**)

**Estimated Project Cost:** \$6.2M

**Projected IS Date:** 12/01/2018

**Status:** Conceptual





Previously presented on 1/8/2018 SRRTEP

**Problem Statement (Scope and Need/Drivers):**  
Equipment Material Condition, Performance and Risk

- Improve system reliability and performance.
- Remove obsolete and deteriorated equipment.
- Upgrade to current FE Standards

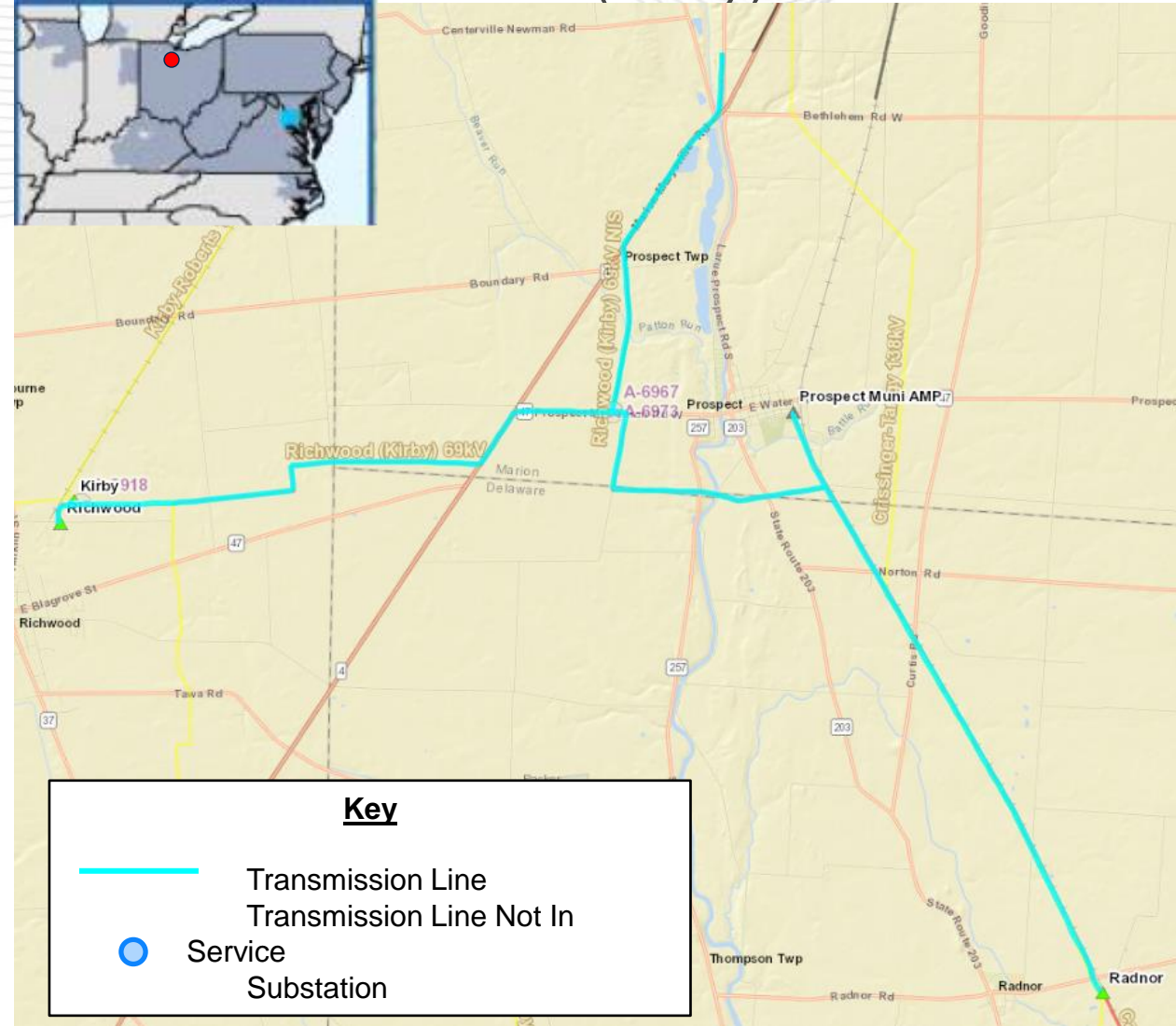
**Selected Solution:**

- Rebuild 12.6 miles of single circuit 3/0 ACSR Kirby-Radnor 69 kV line with 336 ACSR and replace existing two-way switch with two (2) separate one-way switches. (**S1477**)

**Estimated Project Cost:** \$14.3M

**Projected IS Date:** 05/01/2019

**Status:** Conceptual



Previously presented on 1/8/2018 SRRTEP

**Problem Statement (Scope and Need/Drivers):**  
Equipment Material Condition, Performance and Risk

- Improve system reliability and performance
- Remove obsolete & deteriorated equipment.
- Upgrade to current FE Standards

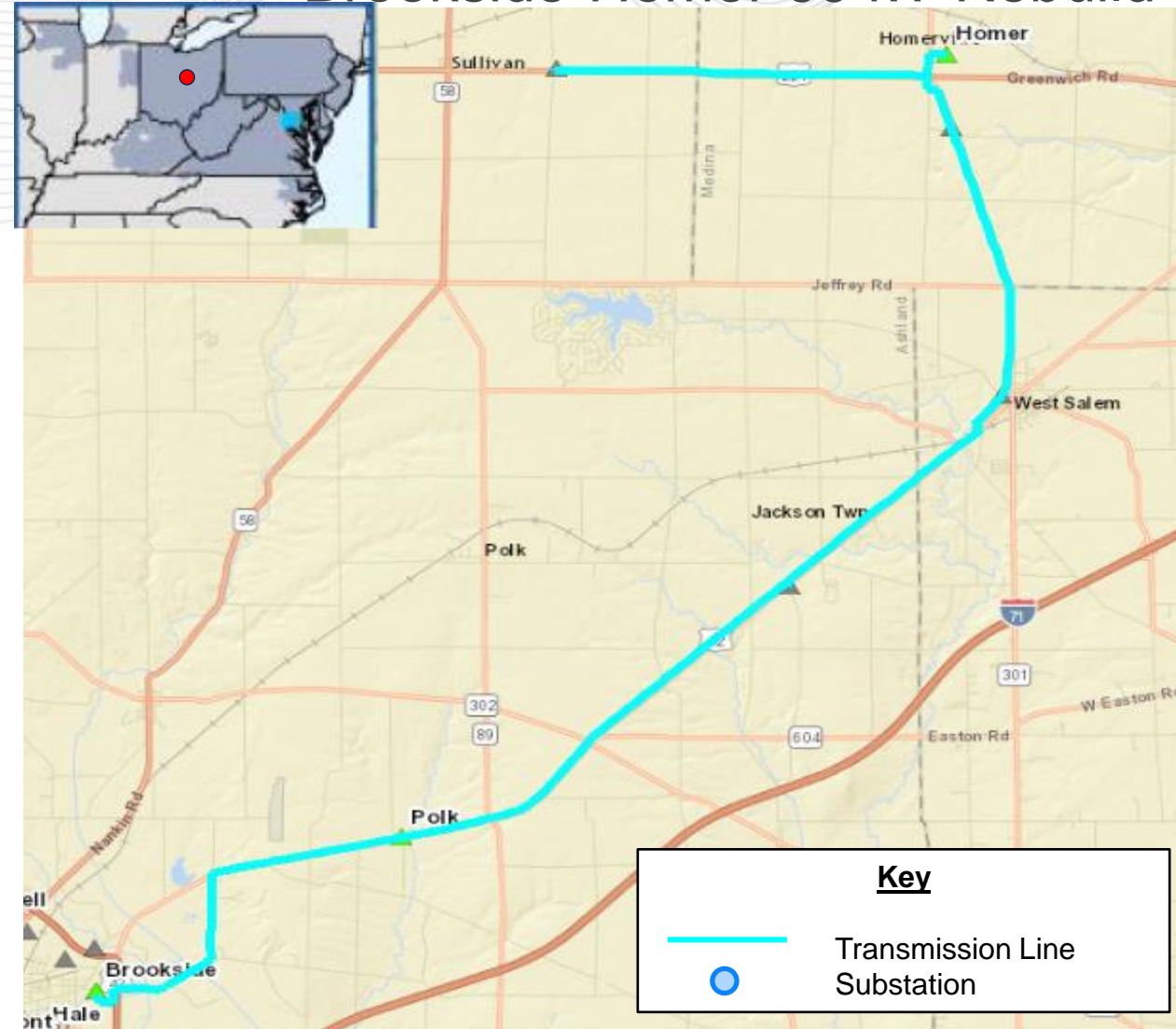
**Selected Solution:**

- Rebuild the Brookside-Homer 69 kV (29.6 miles) mix of conductor sizes (1/0, 2/0, 3/0 and 336 ACSR conductors) as single circuit 69 kV with 477 ACSR but designed for future capability of double circuit 138/69 kV. (**\$1478**)

**Estimated Project Cost:** \$27.4M

**Projected IS Date:** 06/01/2018

**Status:** Construction





# ATSI Transmission Zone: Supplemental Lemoyne-Midway 138 kV line

Previously presented on 1/8/2018 SRRTEP

**Problem Statement (Scope and Need/Drivers):**  
Equipment Material Condition, Performance and Risk

- Improve degraded equipment performance.
- Remove obsolete and deteriorated equipment.
- Upgrade to current FE Standards

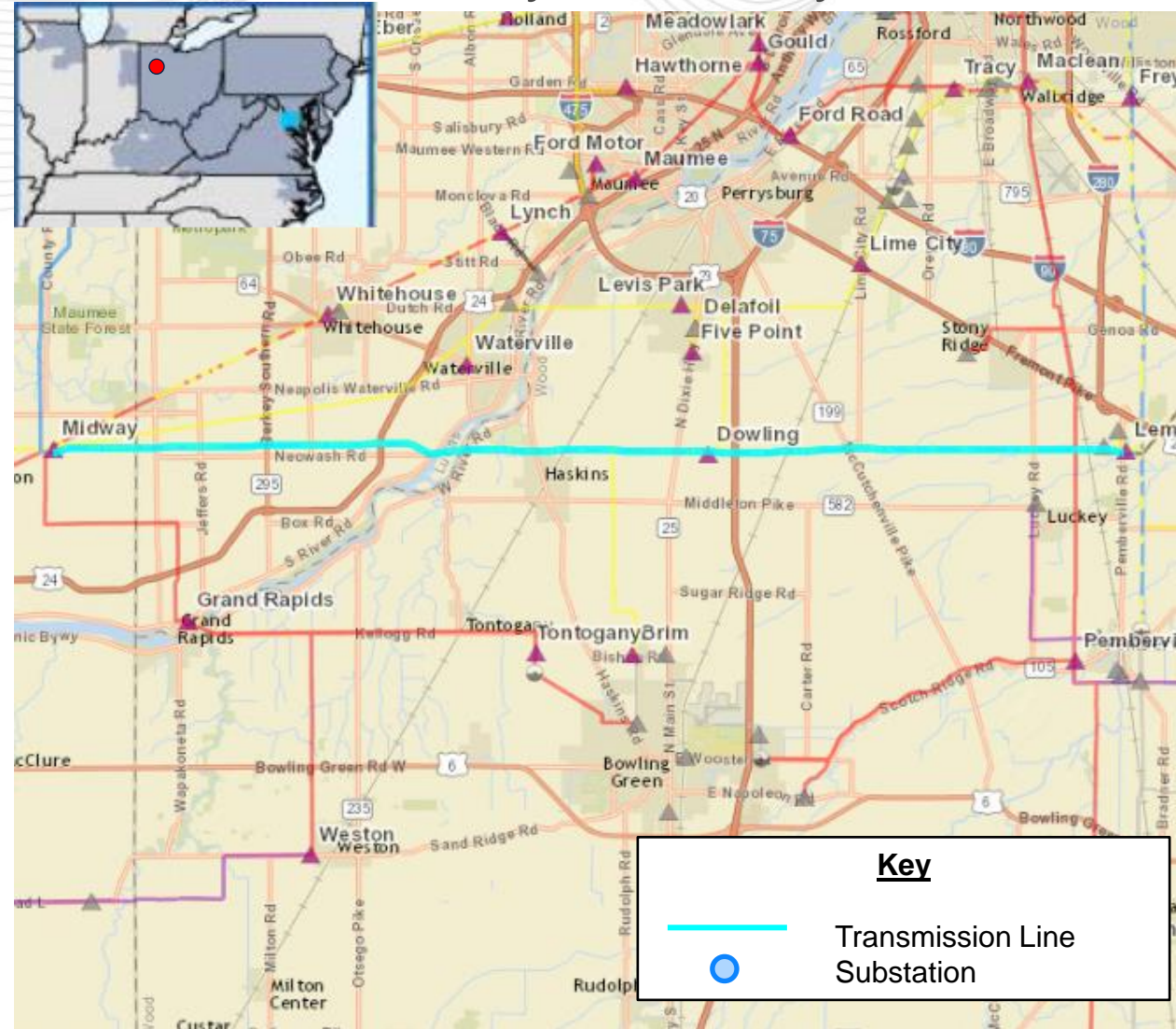
**Selected Solution:**

- Rebuild Lemoyne-Midway 138 kV line with 477 kcmil ACSS (24.5 miles). (**\$1479**)

**Estimated Project Cost:** \$17.6M

**Projected IS Date:** 12/1/2018

**Status:** Construction



## Previously Presented: 5/21/2018 SR RTEP

### Problem Statement:

#### Customer Service

- Provide 138 kV service to new customer
- Customer load 46 MWs

### Selected Solution:

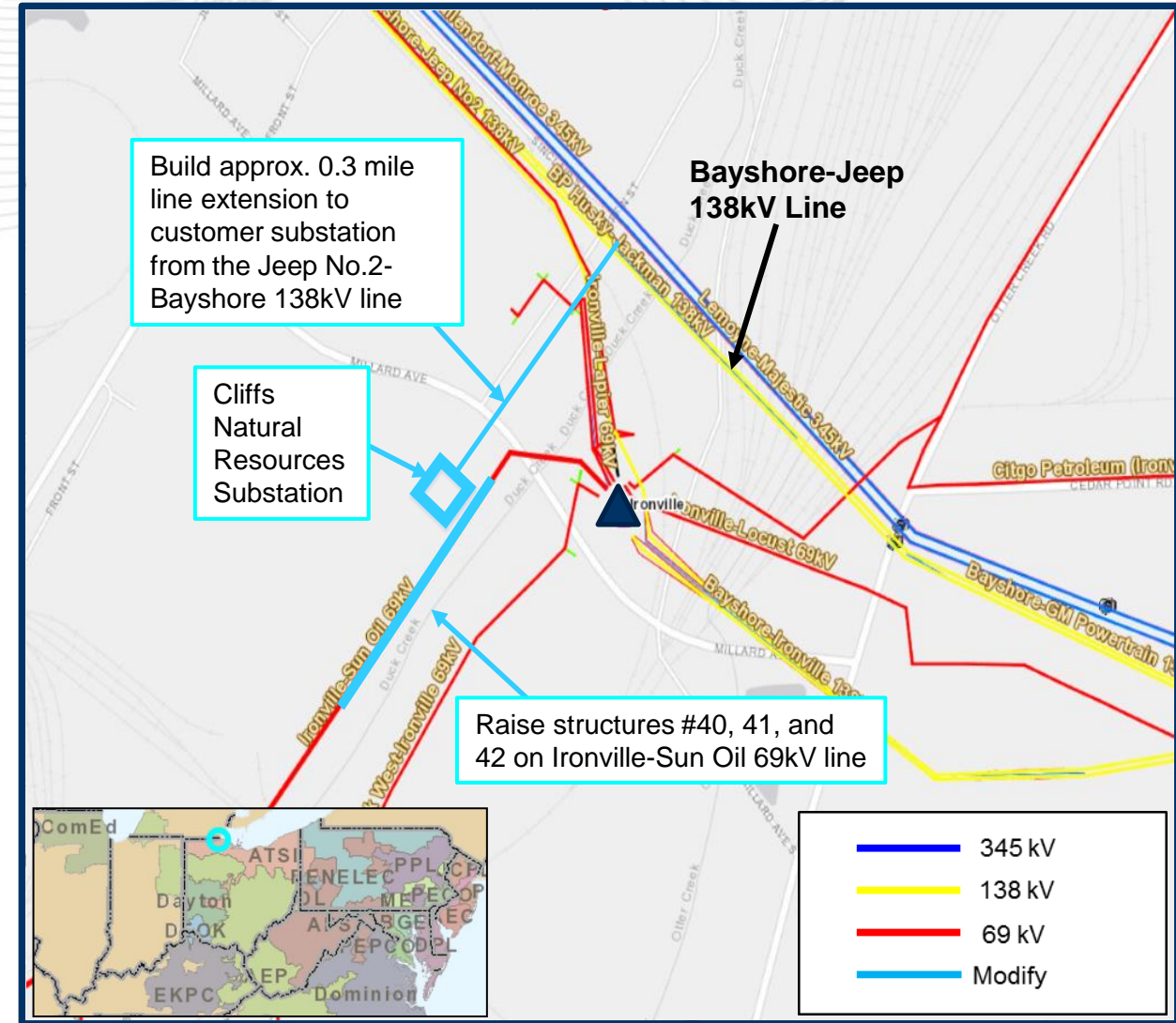
Cliffs Natural Resource Substation - Provide 138 kV Service (**\$1649**)

- Tap the existing Bayshore-Jeep #2 138kV circuit to the new Cliffs Natural Resource Substation (approx. 0.3 miles).
- Raise the line from tower #40 to tower #43 on the Ironville-Sun Oil 69kV line to increase clearances. (Reimbursable)
- Install SCADA Control at the in line switches of the tap connection. (Reimbursable)

**Estimated Project Cost:** \$0.9M

**Projected IS Date:** 9/01/2019

**Status:** Engineering







# ATSI Transmission Zone: Supplemental Brush Creek 138kV Substation

Previously Presented: 5/21/2018  
SRRTEP

## Problem Statement:

### Customer Service

- Pennsylvania Corrective Action Plan (PA CAP) project for improved reliability
- Provides capacity relief for the area
- Customer load 3 MWs

## Selected Solution:

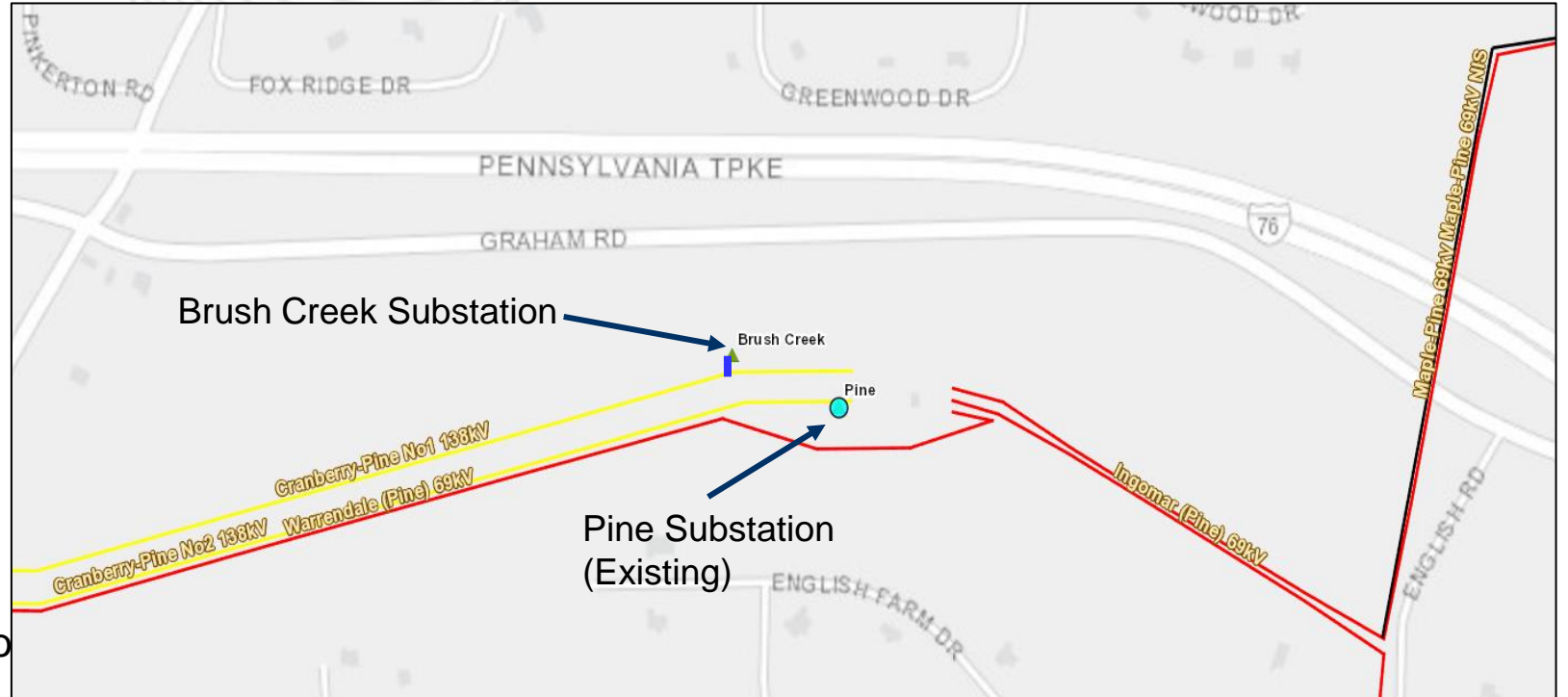
Brush Creek 138 kV Substation – Provide 138kV Service

- Tap the existing Cranberry-Pine #1 138 kV Line to connect a new 138-12.47 kV distribution Mod Sub next to the existing transmission line. **(\$1650)**

**Estimated Project Cost:** \$0.1M

**Projected IS Date:** 09/30/2018

**Status:** Construction



- Conceptual 138kV Route
- Existing 138 kV Line
- Existing 69 kV Line





# ATSI Transmission Zone: Supplemental North Titus Substation

Previously Presented: 5/21/2018 SRRETP

## Problem Statement:

### Customer Service

- Provide 138 kV service to new customer
- Customer requested redundant feeds and ring for reliability (Reimbursable)
- Customer load 19 MWs

## Selected Solution:

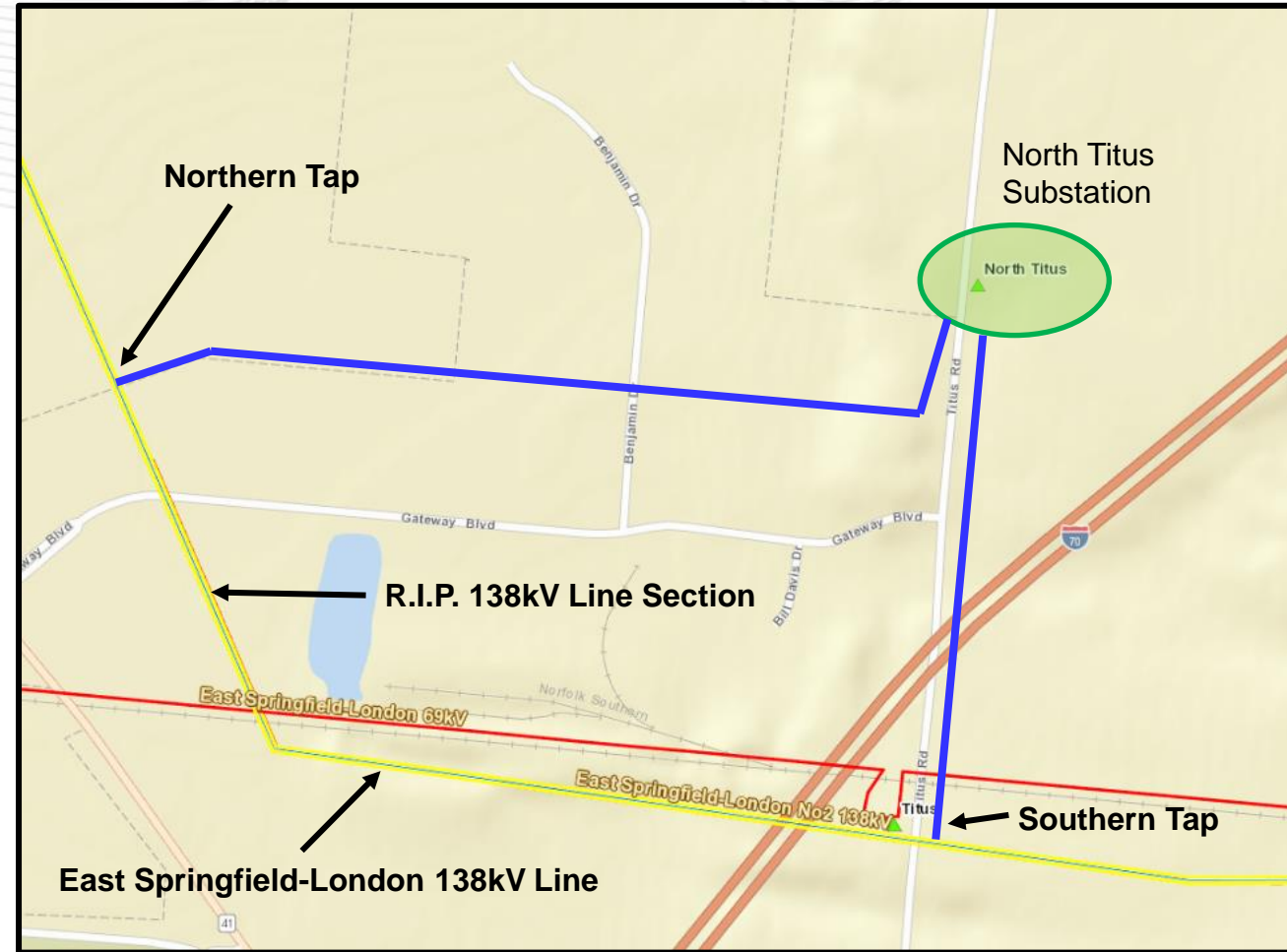
*North Titus Substation - Provide 138 kV Service (\$1651)*

- Build new 3-breaker 138kV ring bus (Reimbursable)
- Build new ~1 mile of 795 ACSR from northern tap location (Reimbursable)
- Build new ~0.5 miles of 795 ACSR from southern tap location
- Retire-In-Place 138kV line section between Northern and Southern tap locations.

**Estimated Project Cost:** \$2.0 M

**Projected IS Date:** 10/01/2018

**Status:** Construction



- Conceptual 138kV Route
- Existing 138 kV Line
- Existing 69 kV Line

# ATSI Transmission Zone: Supplemental Ellwood Quality Steel #2 Substation

Previously Presented: 5/21/2018 SRRTEP

## Problem Statement:

### Customer Service

- Provide 138 kV service to new customer
- Customer load 15 MWs

## Selected Solution:

Ellwood Quality Steel #2 Substation - Provide 138 kV Service (**\$1652**)

- Tap the existing New Castle-Cedar Street 138 kV radial line extension.
- 8 new spans of 336.4 ACSR

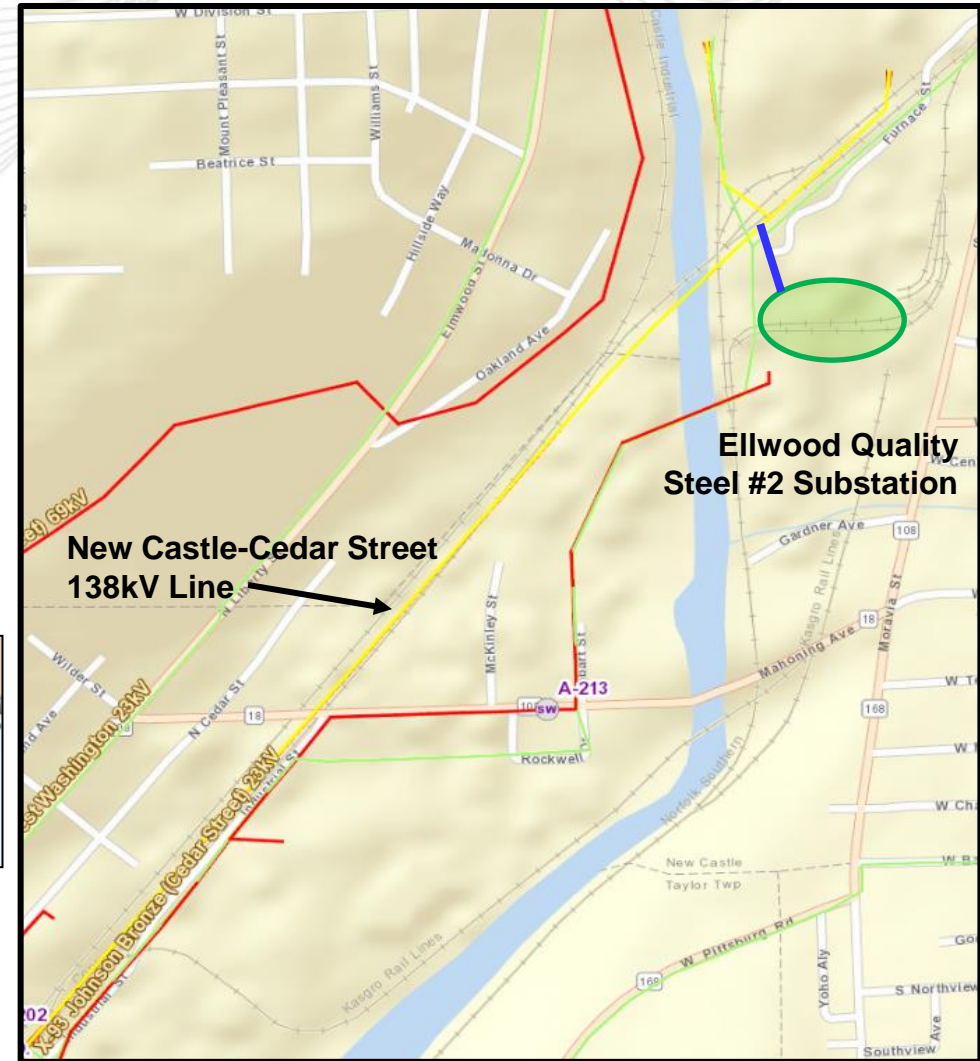
**Estimated Project Cost: \$1.0 M**

**Projected IS Date: 9/1/2018**

**Status: Engineering**



- Conceptual 138kV Route
- Existing 138 kV Line
- Existing 69 kV Line





# ATSI Transmission Zone: Supplemental Envelope 1 Substation

**Previously Presented: 5/21/2018 SRRTEP**

**Problem Statement:**

Customer Service

- Provide 69 kV service to new customer
- Customer load 4 MWs

**Selected Solution:**

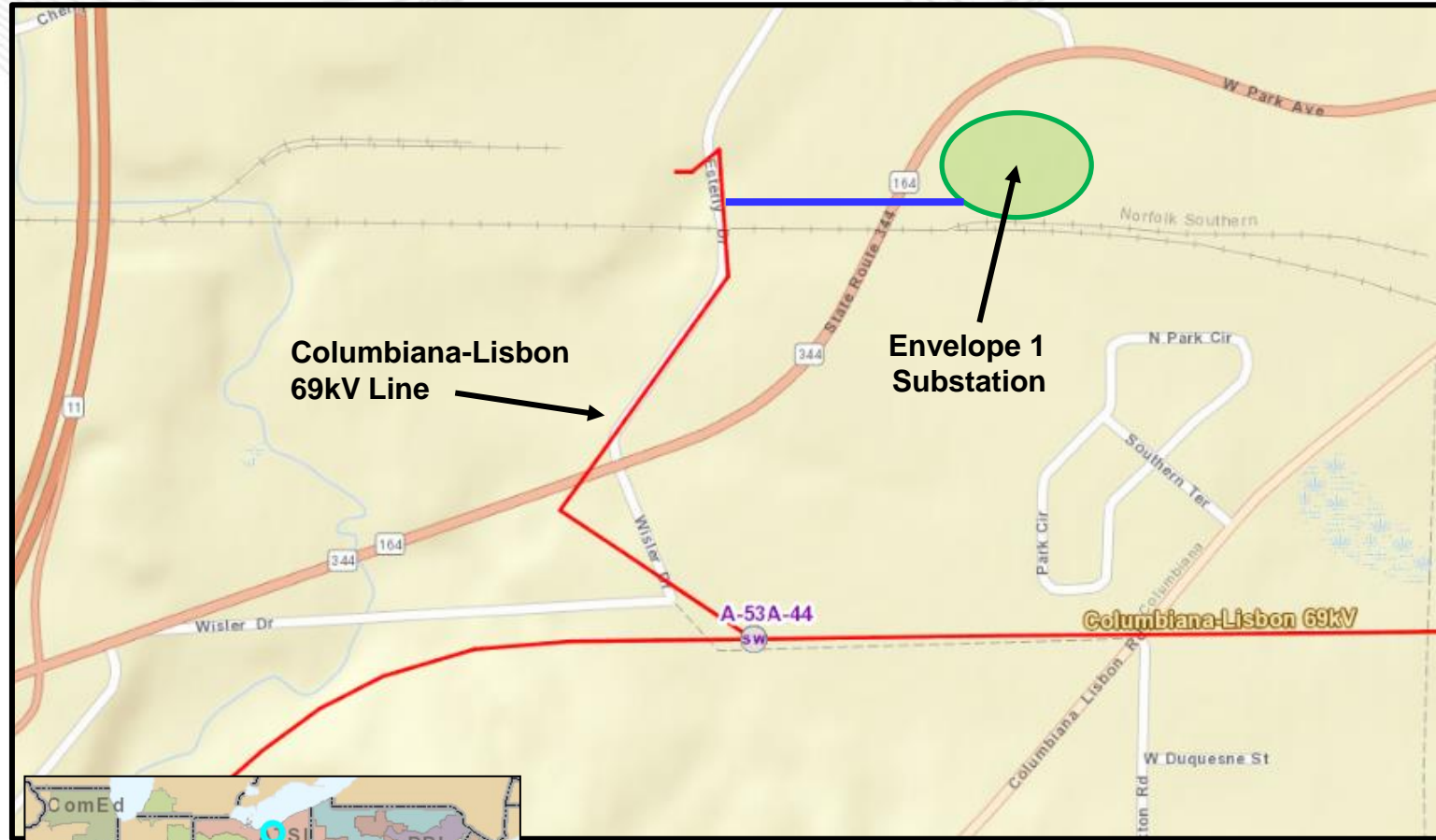
Envelope 1 Substation - Provide 69 kV Service **(\$1653)**

- Tap the existing Columbiana-Lisbon 69 kV radial line extension.
- Build 5 spans of 477 ACSR 69 kV Line

**Estimated Project Cost:** \$0.6 M

**Projected IS Date:** 12/31/2018

**Status:** Engineering



- Conceptual 138kV Route
- Existing 138 kV Line
- Existing 69 kV Line





# ATSI Transmission Zone: Supplemental Ironville – Collins Park West 69kV Line Re-conductor

Previously Presented: 5/21/2018 SRTEP

## Problem Statement (Scope and Need/Drivers):

### Equipment Material Condition, Performance and Risk

- Improve system reliability and performance.
- Remove obsolete and deteriorated equipment.
- Upgrade to current FE Standards

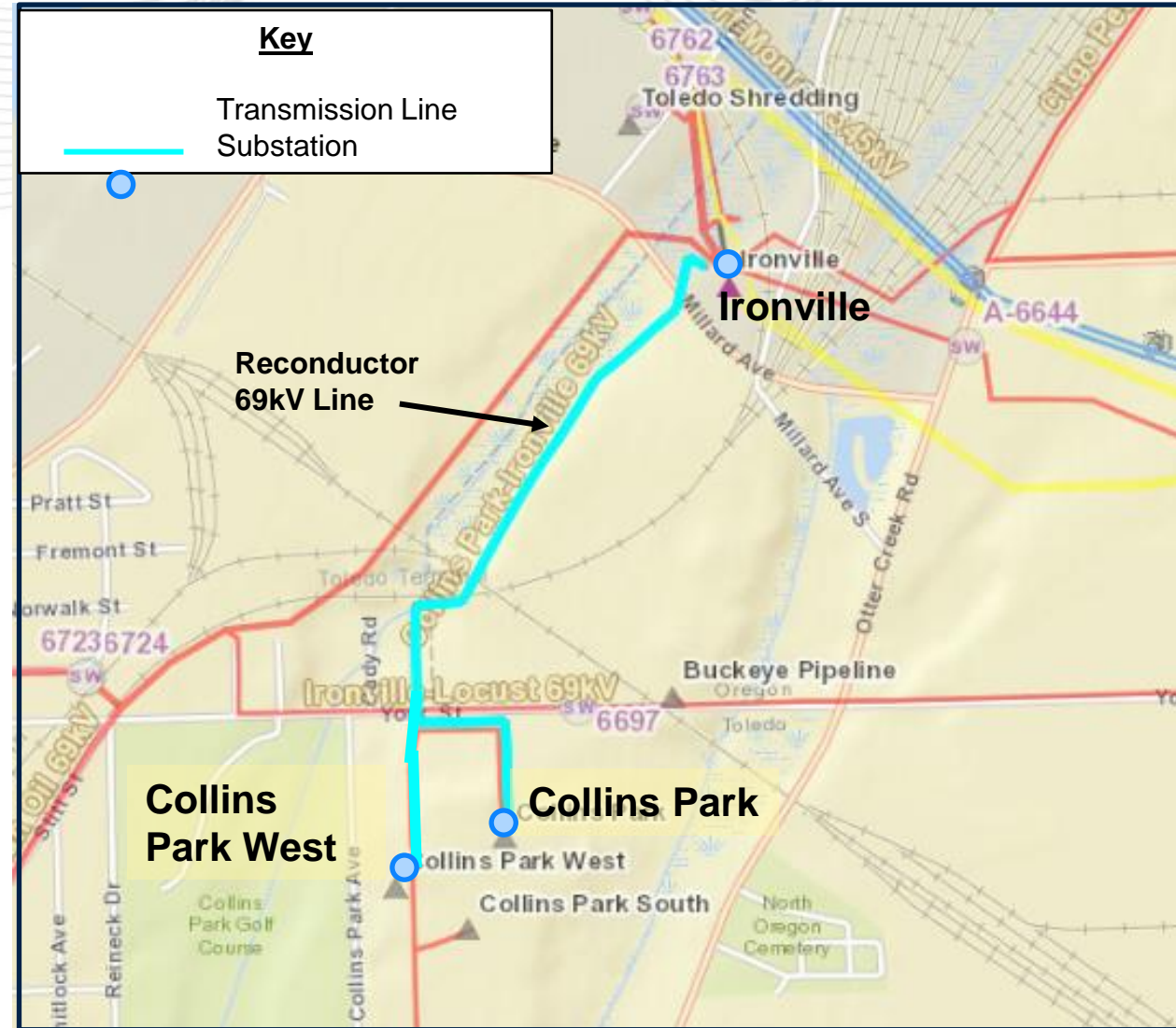
## Selected Solution (S1654):

- Reconductor the existing 397.5 ACSR Ironville-Collins Park West 69 kV line, including the Collins Park 69kV Tap, with 477 ACSR (0.9 miles).
- Old Line Ratings MVA: 82 SN / 104 SE
- New Line Ratings MVA: 99 SN / 119 SE
- Rehab / Replace poles as required.

Estimated Project Cost: \$1.6M

Projected IS Date: 9/19/2018

Status: Construction



# ATSI Transmission Zone: Supplemental 138 kV Line Extension to Customer Substation

**Previously Presented: 8/31/2018 SRRTEP**

**Problem Statement (Scope and Need/Drivers):**

Customer Service

- Provide 138 kV service to new customer.
- Customer proposed load is approximately 35 MWs

**Selected Solution:**

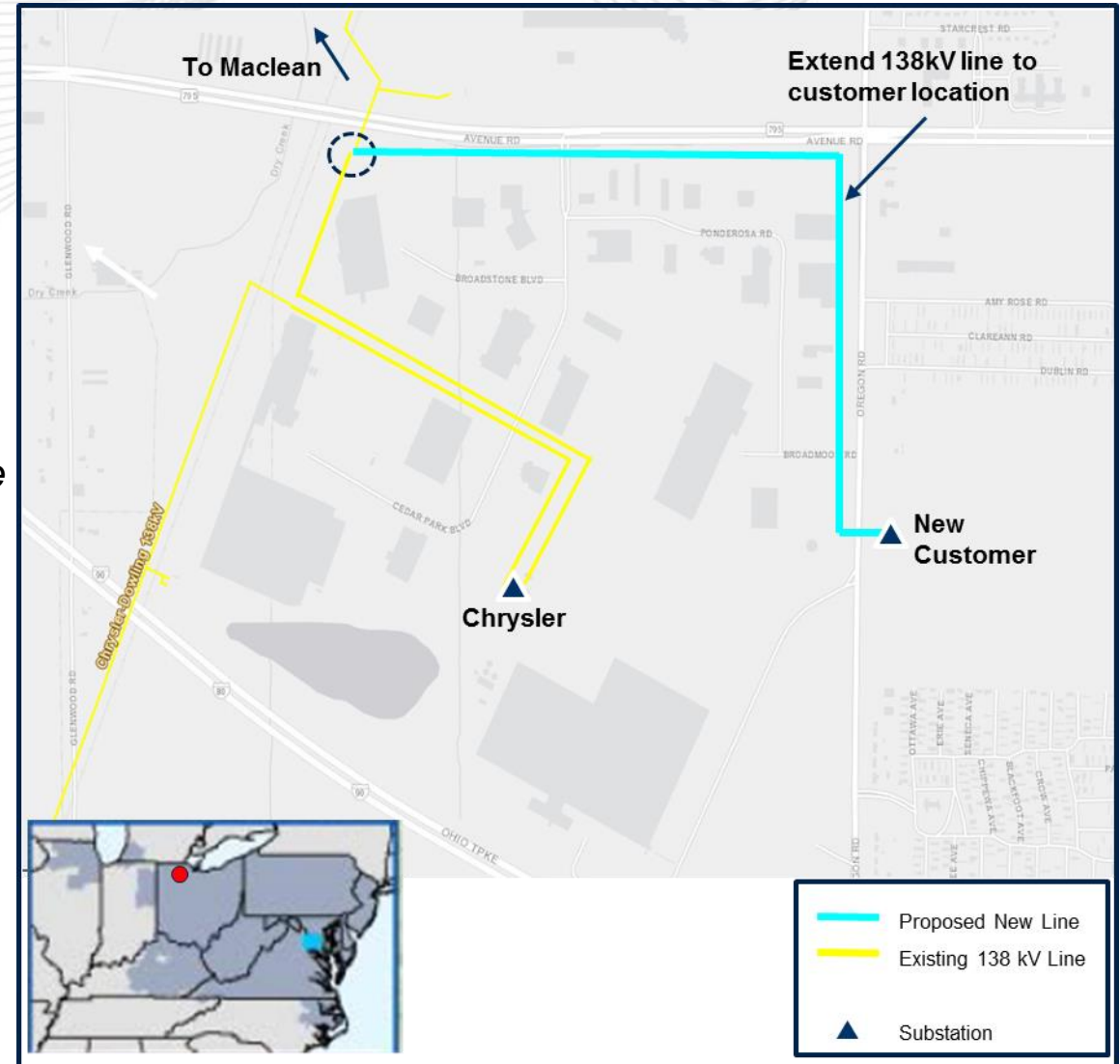
*138 kV Line Extension to Customer Substation (Substation Name TBD) (S1694)*

- Tap the Chrysler-Maclean 138 kV line and build a new 138kV line extension approximately 1.5 miles to new customer substation.
- Line extension conductor 336 ACSR (161 MVA SN)

**Estimated Project Cost:** \$3.5 M

**Projected IS Date:** 04/30/2019

**Status:** Conceptual





Previously Presented: 8/31/2018 SRRTEP

## Problem Statement (Scope and Need/Drivers):

### Operational Flexibility and Efficiency

- Improve operational flexibility during maintenance and restoration efforts.
- Reduce the amount of local load loss (Approximately 55 MWs) under contingency conditions.
- Mitigate non-planning criteria voltage concerns on the > 100 kV system under contingency (P6) condition; system back-feed condition.
  - Loss of Medina-West Medina 138kV and Star #5 138/69kV transformer (results in path end outage of Star-Seville 138kV Line at Star)
    - Results in the low voltage (0.84 p.u.) and potential local voltage collapse at multiple substations: West Medina, Ryan, Seville Muni, and Seville substations.

## Selected Solution:

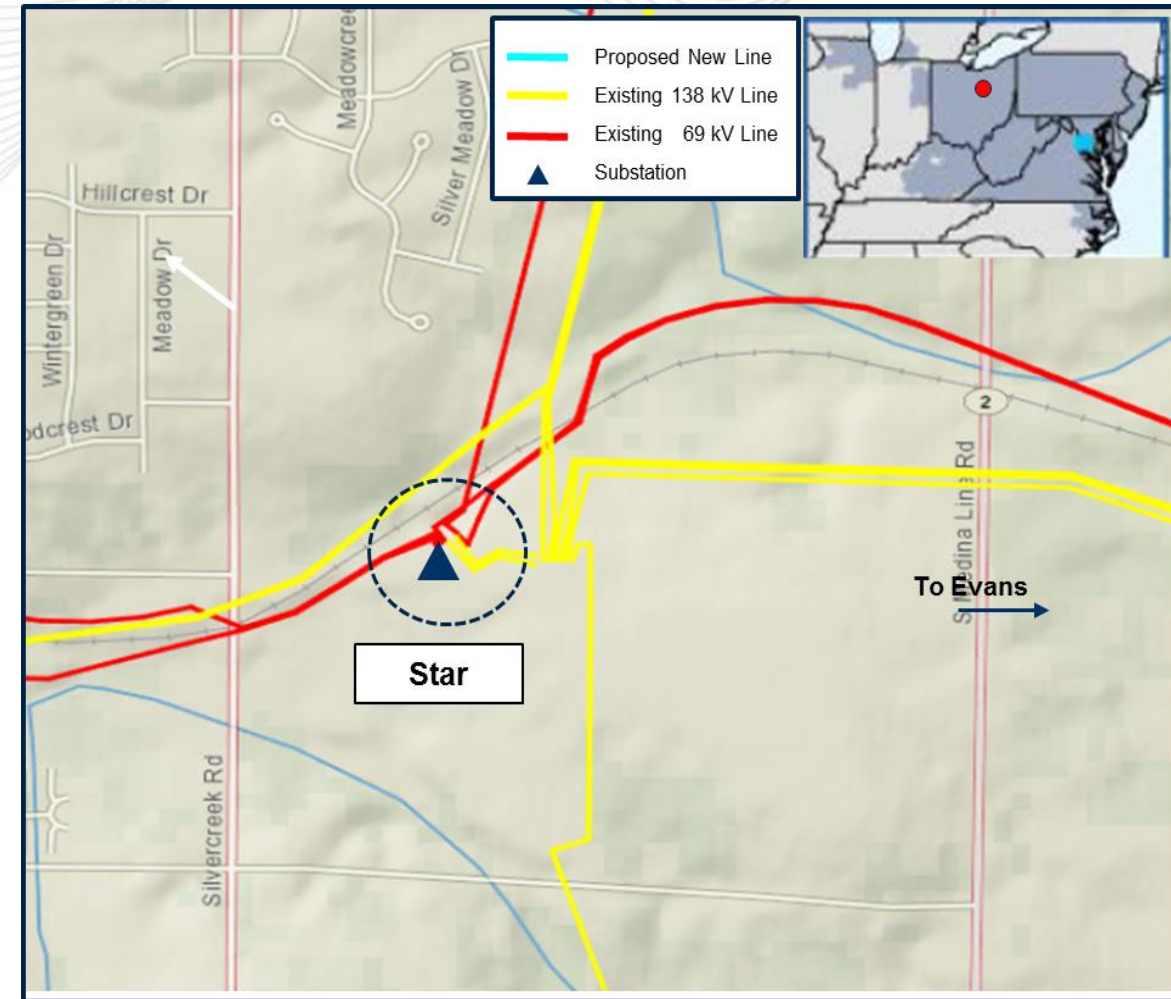
### Star 138 kV Substation Project (S1695)

- Expand the existing 138 kV substation at Star substation by adding three (3) 138 kV breakers to complete a breaker and half configuration.
- Reconfigure transformer and line exit configurations to improve contingency loss impact by separating line and 138/69 kV transformer connections.

**Estimated Project Cost:** \$3.3 M

**Projected IS Date:** 12/31/2019

**Status:** Conceptual



**Previously Presented: 8/31/2018 SRRTEP**

**Problem Statement (Scope and Need/Drivers):**

Operational Flexibility and Efficiency

- Improve operational flexibility during maintenance and restoration efforts
- Reduce amount of potential local load loss (Approximately 99 MWs) under contingency conditions
- Mitigate non-planning criteria voltage concerns on the < 100 kV system under contingency (P6) conditions.
  - Loss of Crissinger-Roberts 138 kV and Crissinger-Tangy 138 kV Lines
  - Results in potential local voltage collapse on the 34.5 kV sub-transmission system.

**Selected Solution:**

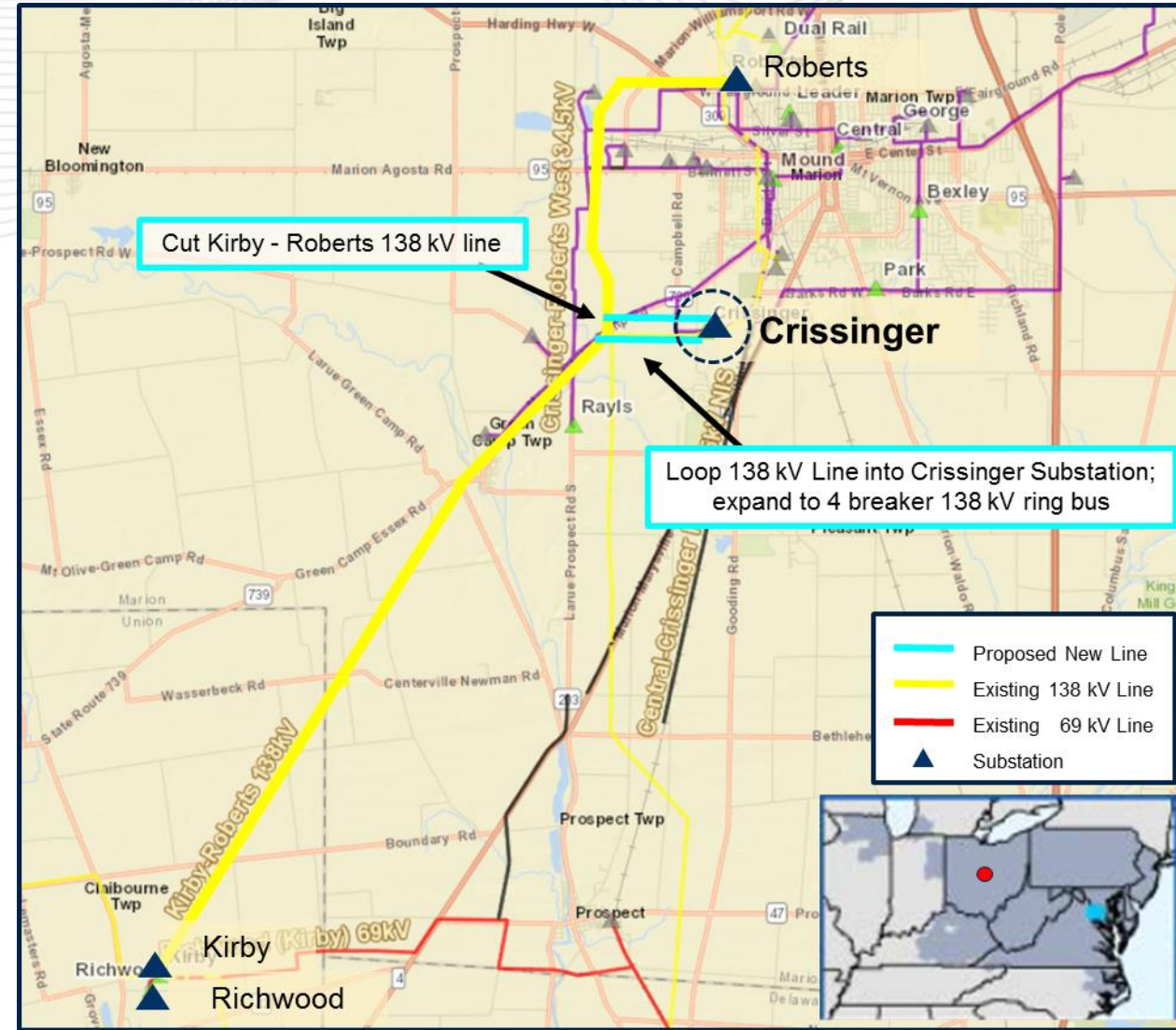
**Crissinger 138 kV Ring Bus Expansion (\$1696)**

- Expand existing Crissinger substation from a four (4) breaker to a six (6) breaker 138 kV ring bus.
- Cut and extend the Kirby-Roberts 138 kV line to Crissinger substation. (Approximately 1.0 mile)
- Reconfigure Crissinger substation to include terminals for:
  - Crissinger – Kirby 138 kV Line and Crissinger – Roberts #1 138 kV Line
  - Crissinger – Roberts #2 138 kV Line and Crissinger – Tangy 138 kV Line

**Estimated Project Cost:** \$5.8 M

**Projected IS Date:** 12/31/2019

**Status:** Engineering





**Previously Presented: 8/31/2018 SRRTEP**

**Problem Statement (Scope and Need/Drivers):**

Operational Flexibility and Efficiency

- Improve system protection, coordination, and fault location under existing three-terminal line configuration.
- Improve operational flexibility during maintenance and restoration efforts.
- Reduce the amount of local load loss under (P6) contingency conditions.
  - Loss of Allen Junction-Lyons 138 kV and Richland-Stryker-Napoleon 138 kV line
  - Results in potential 69 kV low voltage or local voltage collapse on the Stryker 69 kV system with load at risk approaching 65 MWs.

**Selected Solution:**

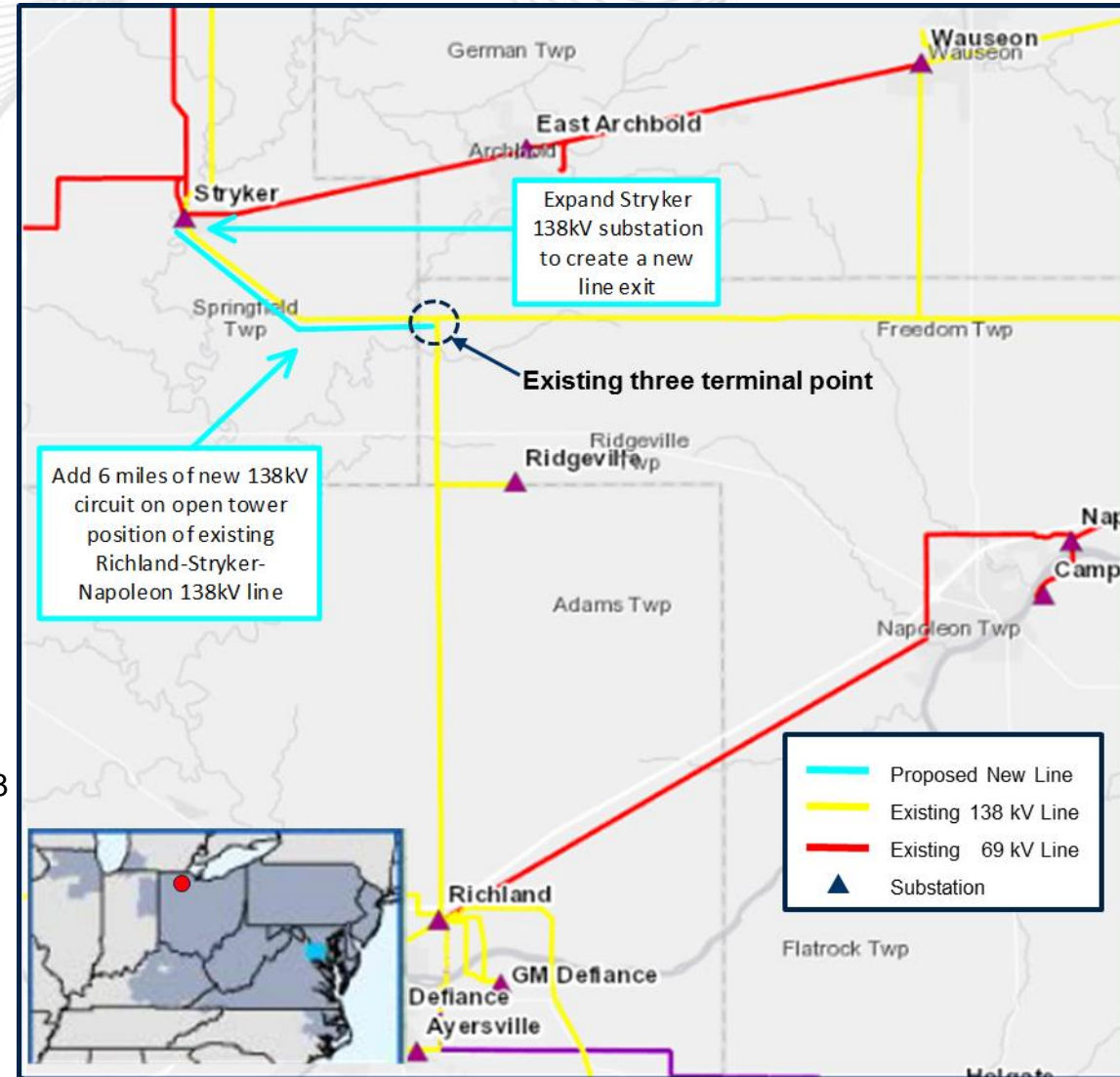
**Richland-Stryker-Napoleon 138 kV Three-Terminal Line Elimination Project (\$1697)**

- Eliminate three terminal point on the Richland-Stryker-Napoleon 138 kV line.
- Add 6.0 miles of new 336 ACSR conductor to open tower position of Richland-Stryker-Napoleon 138 kV line.
- Reconfigure the existing Stryker tap location to create:
  - Richland – Stryker 138 kV line
  - Stryker – Napoleon 138 kV line
- Expand the existing 138 kV Stryker substation to incorporate a new line exit; install new 138 kV circuit breaker

**Estimated Project Cost:** \$4.2 M

**Projected IS Date:** 12/31/2019

**Status:** Engineering



Previously Presented: 8/31/2018 SRRTEP

## Problem Statement (Scope and Need/Drivers):

### Operational Flexibility and Efficiency

- Improve system protection, coordination, and fault location under existing three-terminal line configuration.
- Improve operational flexibility during maintenance and restoration efforts.
- Reduce the amount of local load loss under (P6) contingency conditions.
  - Loss of Delta-Fulton 138 kV and Richland-Wauseon-Midway 138 kV line
  - Results in potential low voltage or local voltage collapse on the Wauseon 69 kV system with load at risk approaching 97 MWs.

## Selected Solution:

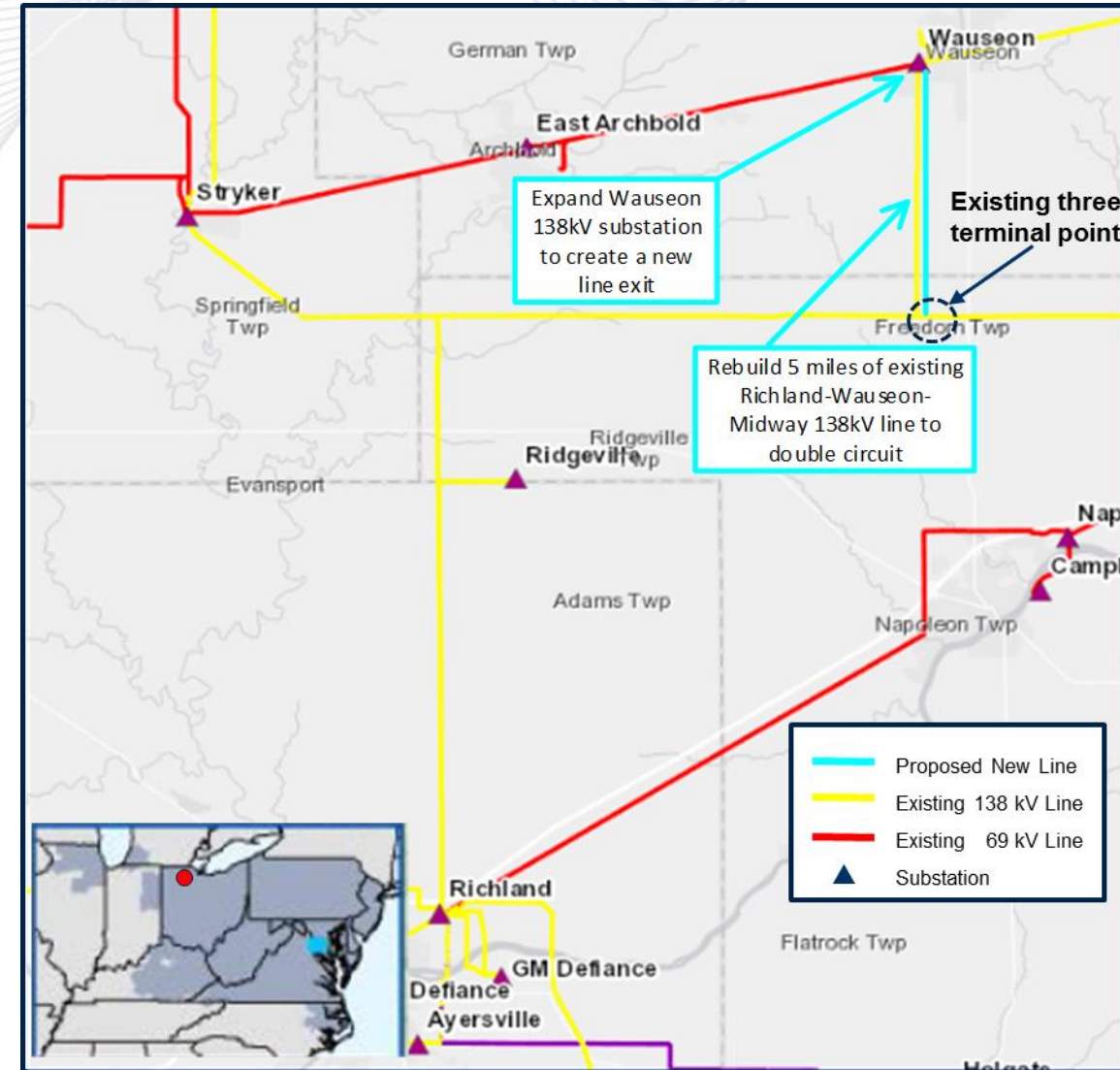
### Richland-Wauseon-Midway 138 kV Three-Terminal Line Elimination Project (\$1698)

- Rebuild 5.0 miles of existing Richland-Wauseon-Midway 138 kV line to double circuit with 336.4 ACSR conductor
- Reconfigure the existing Wauseon tap location to create:
  - Richland – Wauseon 138 kV line
  - Wauseon – Midway 138 kV line
- Expand the existing 138 kV substation at Wauseon to incorporate a new line exit; install new 138 kV circuit breaker

**Estimated Project Cost:** \$7.7 M

**Projected IS Date:** 06/01/2020

**Status:** Conceptual





Previously Presented: 8/31/2018 SRRTEP

## Problem Statement (Scope and Need/Drivers):

### Operational Flexibility and Efficiency

- Improve system protection, coordination, and fault location under existing three-terminal line configuration.
- Improve operational flexibility during maintenance and restoration efforts.
- Reduce the amount of local load loss (Approximately 65 MWs) under contingency loss of the Angola-Eber-Vulcan 138kV (“B\_LINE1\_WR\_016”).

## Selected Solution:

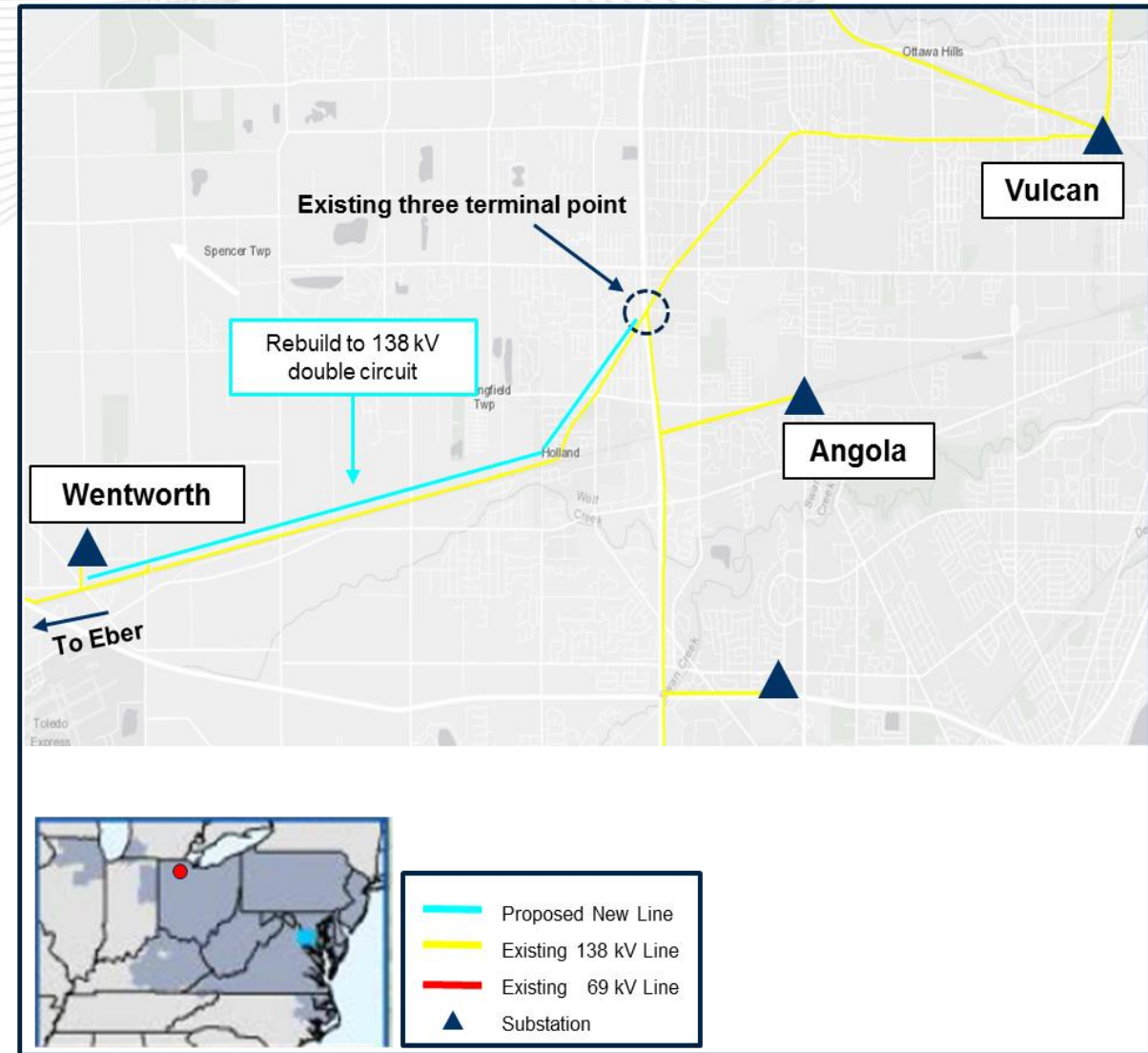
### Angola-Eber-Vulcan 138 kV Three-Terminal Line Elimination Project (\$1700)

- Eliminate three terminal point on the Angola-Eber-Vulcan 138 kV line.
- Rebuild approximately 2.0 miles from the Angola tap location to Wentworth substation to 138 kV double circuit with 954 ACSR conductor.
- Reconfigure the existing Angola tap location to create:
  - Vulcan – Wentworth 138 kV line
  - Wentworth – Eber 138 kV line
  - Wentworth – Angola 138 kV line
- Expand the existing 138 kV Wentworth substation to five (5) breaker (future 6-breaker) ring bus

**Estimated Project Cost:** \$13.4 M

**Projected IS Date:** 12/31/2020

**Status:** Conceptual



Previously Presented: 8/31/2018 SRRTEP

## Problem Statement (Scope and Need/Drivers):

### Operational Flexibility and Efficiency

- Improve system protection, coordination, and fault location under existing three-terminal line configuration.
- Improve operational flexibility during maintenance and restoration efforts.
- Reduce the amount of local load loss (Approximately 33 MWs) under contingency loss of the East Fayette transformer or the East Fayette-Edon 138kV line.
- Improve system voltage after post contingency switching (0.80 p.u.) close normally open point at Edon substation on the 69kV system.

## Selected Solution:

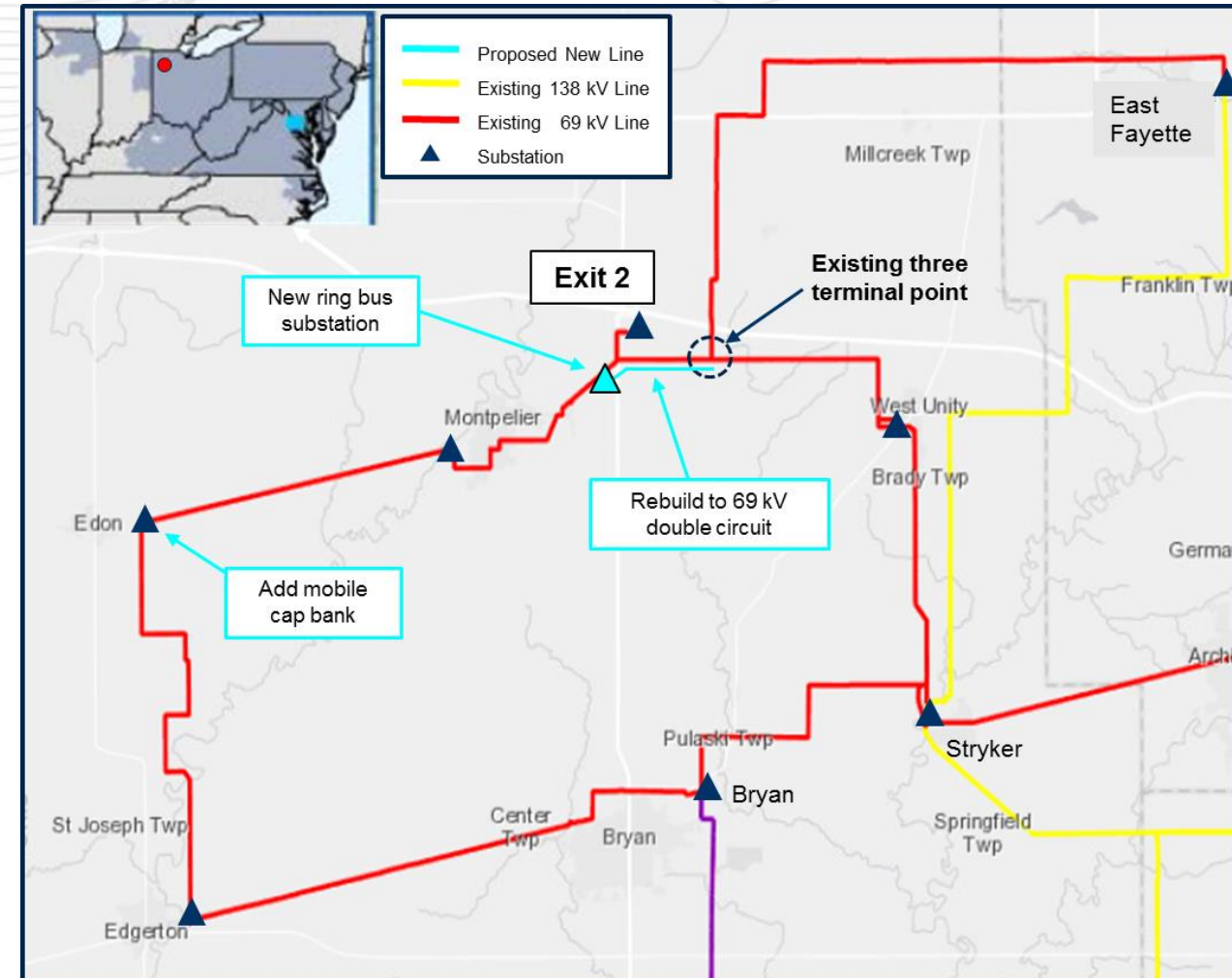
### New Snyder 69 kV Substation Project (\$1701)

- Network radial 69 kV system with new switching station (Snyder)
- Build Snyder substation, a new three (3) breaker (future 6-breaker) 69 kV ring bus located near Exit 2 substation. The new switching station to create:
  - East Fayette-Exit 2 – Snyder 69 kV line
  - Stryker-West Unity – Snyder 69 kV line
  - Bryan-Edon – Snyder 69 kV line
- Rebuilt existing 69 kV line (approximately 2.6 miles) from three terminal line point to new Snyder substation.
- Install 20 MVAR mobile capacitor bank at Edon substation.

**Estimated Project Cost:** \$13.2M

**Projected IS Date:** 06/01/2020

**Status:** Engineering





Previously Presented: 8/31/2018 SRRTEP

## Problem Statement (Scope and Need/Drivers):

### Operational Flexibility and Efficiency

- Improve system protection, coordination, and fault location under existing four-terminal line configuration. Line exposure is greater than 28 miles.
- Improve operational flexibility during maintenance and restoration efforts.
- Provide additional load and voltage support for the Woodville 34.5 kV system.

## Selected Solution:

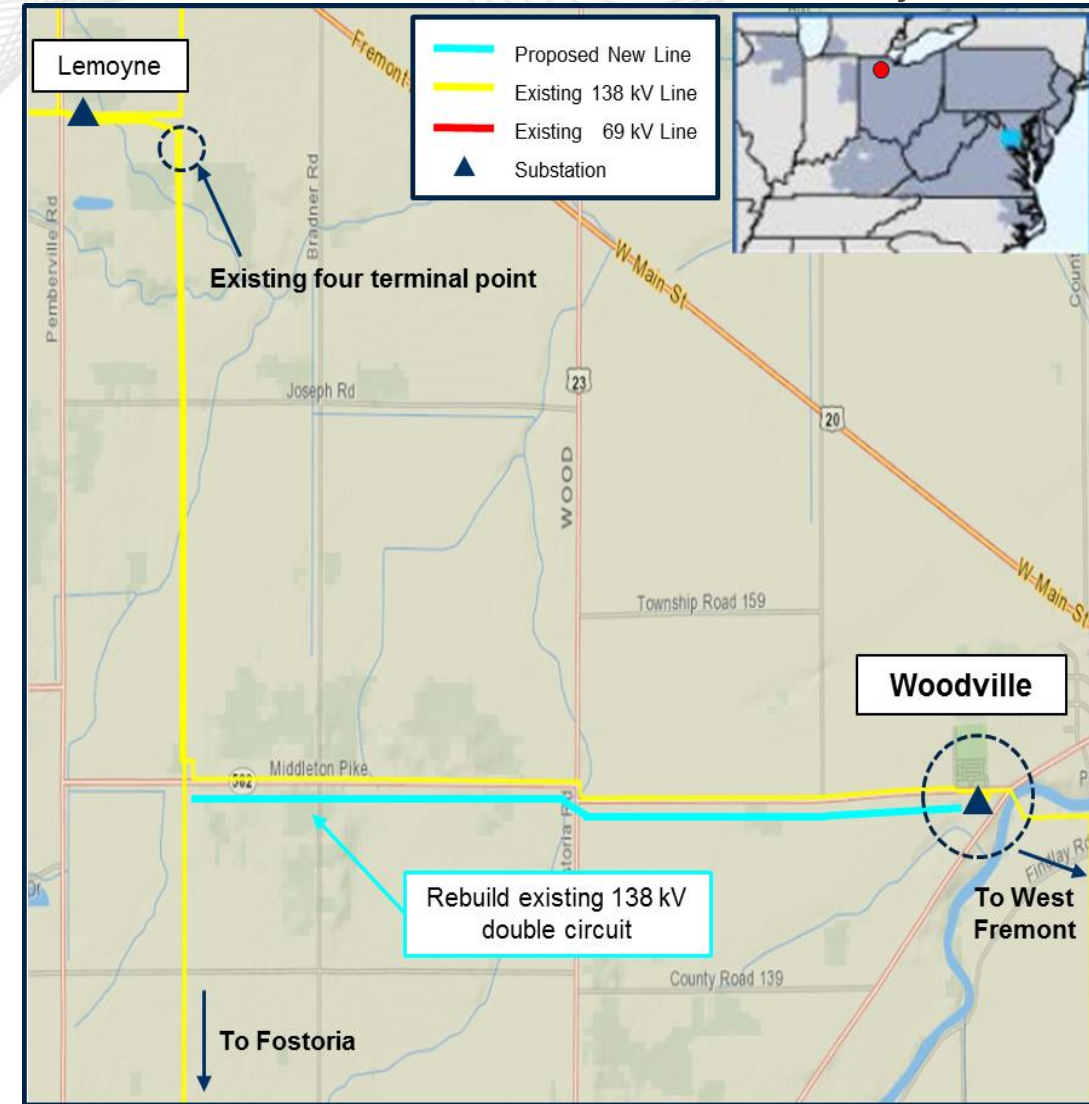
### Lemoyne-Woodville-Fostoria 138 kV Four-Terminal Line Elimination Project (\$1702)

- Eliminate four terminal point on the Lemoyne-Woodville-Fostoria 138 kV line.
- Rebuild approximately 3.1 miles of existing 138 kV line to double circuit with 477 ACSR conductor.
- Expand the existing 138 kV Woodville substation to a five (5) breaker (future 6-breaker) ring bus.
- Reconfigure the existing Woodville tap location and Woodville substation to create:
  - Lemoyne-Woodville 138 kV line
  - Woodville-Fostoria 138 kV line
  - Woodville-West Fremont 138 kV line

**Estimated Project Cost:** \$11.3 M

**Projected IS Date:** 06/01/2020

**Status:** Conceptual





**Previously Presented: 8/31/2018 SR RTEP**

**Problem Statement (Scope and Need/Drivers):**

Operational Flexibility and Efficiency

- Improve operational flexibility during maintenance and restoration efforts.
- Improve system protection, coordination, and fault location under existing three-terminal line configuration.
- Reduce the amount of local load loss (Approaching 87MWs) under contingency conditions.
- Mitigate non-planning criteria voltage concerns on the < 100 kV system under contingency (P6) condition.
  - Loss of Midway-Lemoyne 138 kV and Midway-Bowling Green 2 69 kV line
  - Results in potential low voltage or local voltage collapse in Bowling Green and other local distribution substations with load at risk approaching 87 MWs.

**Selected Solution:**

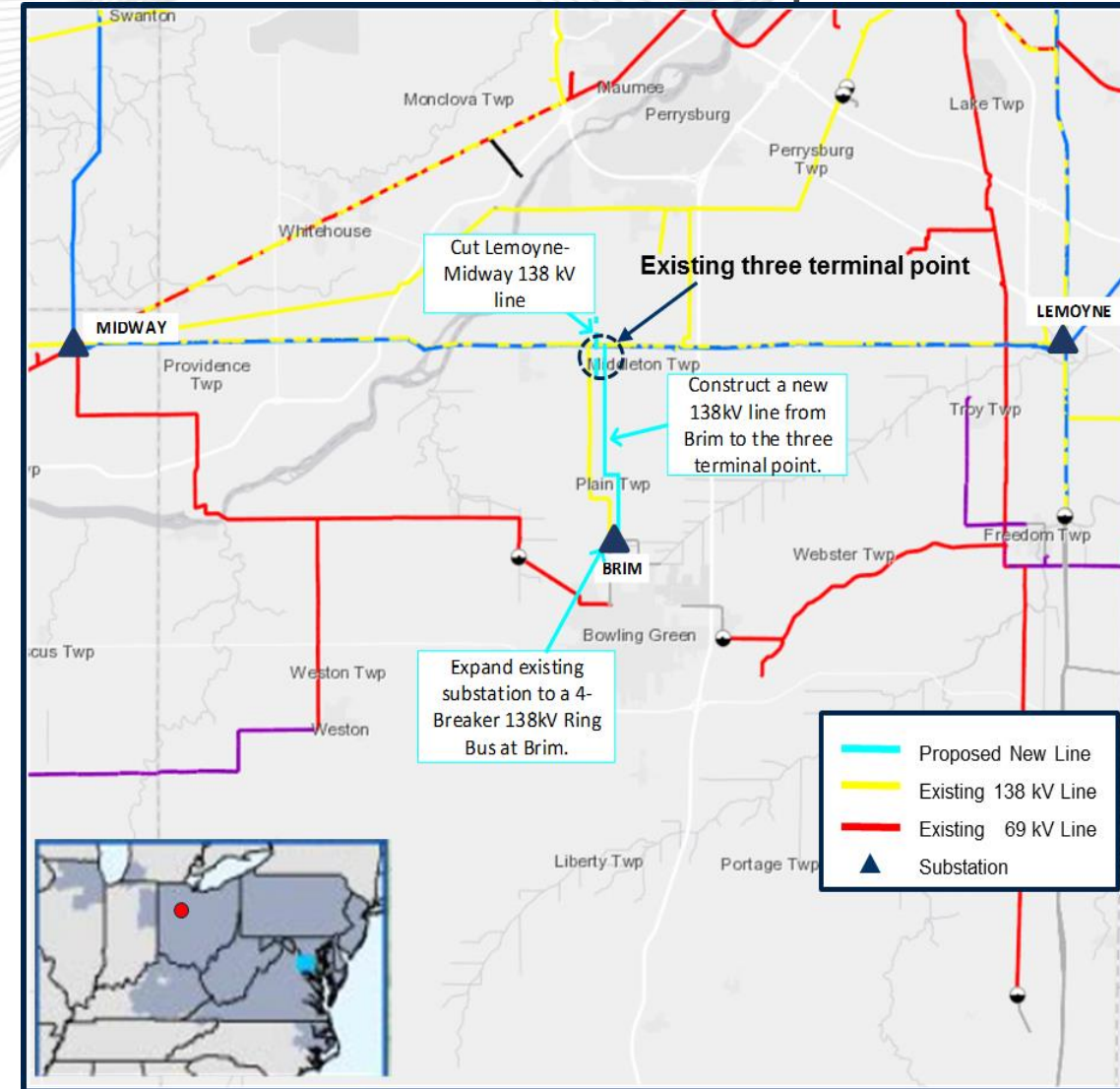
**Brim 138/69 kV Substation Expansion (S1703)**

- Eliminate the three terminal point on the Lemoyne-Midway 138 kV line.
- Construct a new diverse route 138 kV line (Approximately 5 miles) from Brim substation to a location near the three terminal point with 336 ACSS conductor.
- Add four (4) breaker 138 kV ring bus at Brim substation
- Add a 2<sup>nd</sup> 138/69 kV transformer.

**Estimated Project Cost:** \$19.9 M

**Projected IS Date:** 6/1/2020

**Status:** Engineering



Previously Presented: 8/31/2018 SRRTEP

**Problem Statement (Scope and Need/Drivers):**

Operational Flexibility and Efficiency

- Improve operational flexibility during maintenance and restoration efforts.
- Reduce the amount of local load loss (Approaching 45 MWs) under contingency conditions.
- Mitigate non-planning criteria thermal concerns on the < 100 kV system under contingency (P6) condition.
  - Loss of Cloverdale-Harmon #1 138 kV and Cloverdale-Harmon #2 138 kV line
  - Results in potential thermal overload (Approximately 130% of its 56 MVA SE rating) on the Cloverdale-Harmon 69 kV Line.

**Selected Solution:**

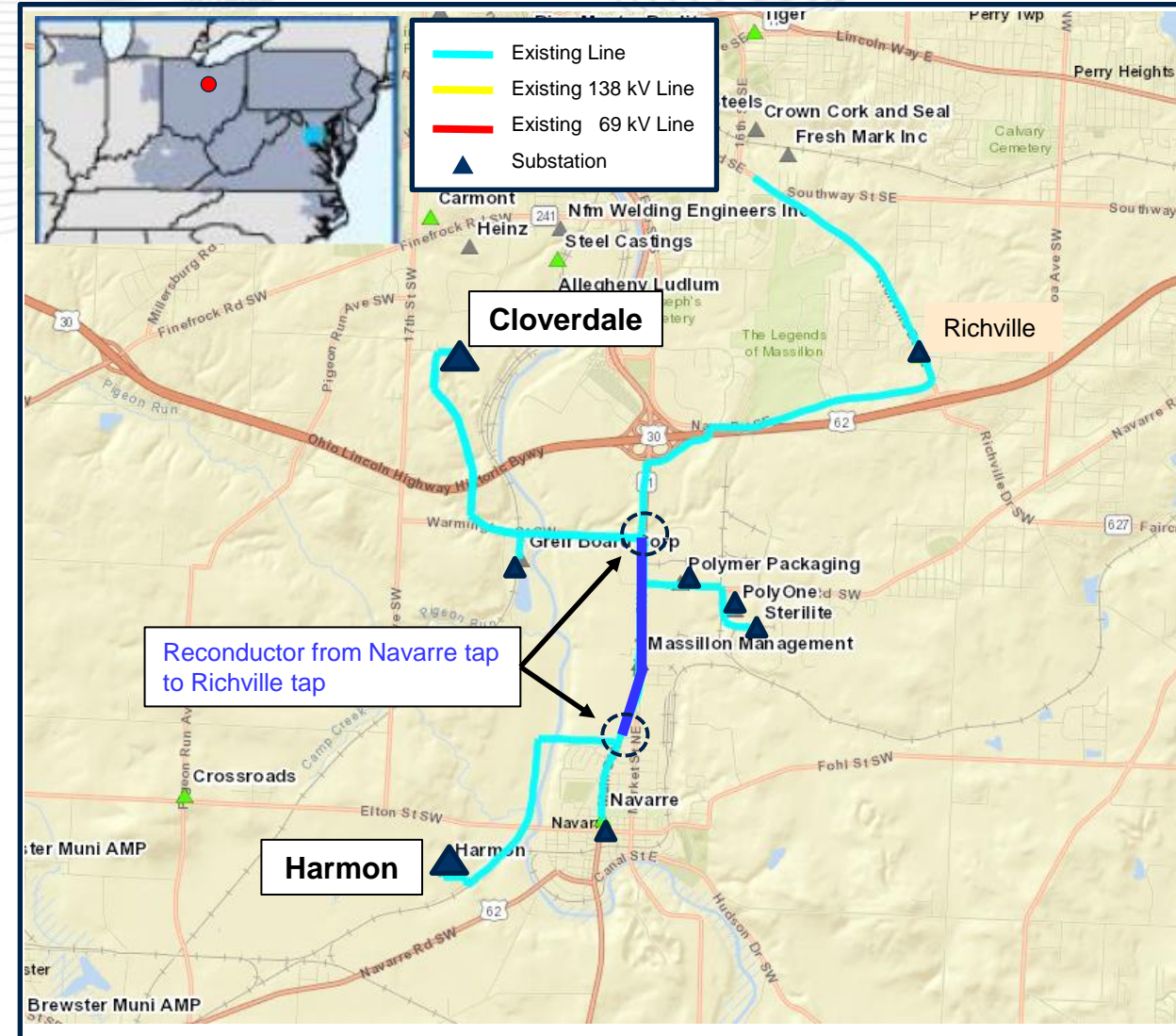
**Cloverdale-Harmon No1 69 kV Line Section Reconductor Project (S1704)**

- Rebuild a portion of the Cloverdale-Harmon 69 kV line (approximately 1.4 miles) from Navarre tap to Richville tap with 477 ACSR conductor, replace line switch with 1200A switch.
- Existing Conductor: 3/0 Conductor
- Future Conductor: 477 ACSR
- Old Rating 47 MVA SN    New Rating 100 MVA SN

**Estimated Project Cost:** \$2.3 M

**Projected IS Date:** 04/15/2020

**Status:** Conceptual





# ATSI Transmission Zone: Supplemental Ryan 69 kV Ring Bus Project

Previously Presented: 8/31/2018 SRRTEP

## Problem Statement (Scope and Need/Drivers):

### Operational Flexibility and Efficiency

- Improve operational flexibility during maintenance and restoration efforts.
- Reduce the amount of local load loss (Approximately 45 MWs) under contingency conditions.
- Mitigate non-planning criteria thermal and voltage concerns on the < 100 kV system under contingency (P6 and Maintenance) condition.
  - Loss of Locust-Ryan 69kV line and Maclean-Sun Oil #1 69kV line
  - Results in potential local voltage collapse near Ryan and Sun Oil Substations.
  - Loss of Dixie-Locust 69 kV line and Ironville breaker failure on Ironville-Locust 69kV line.
  - Results in potential thermal overload (103% of its 132 MVA SE rating) on the Maclean-Sun Oil #1 69 kV line.

## Selected Solution:

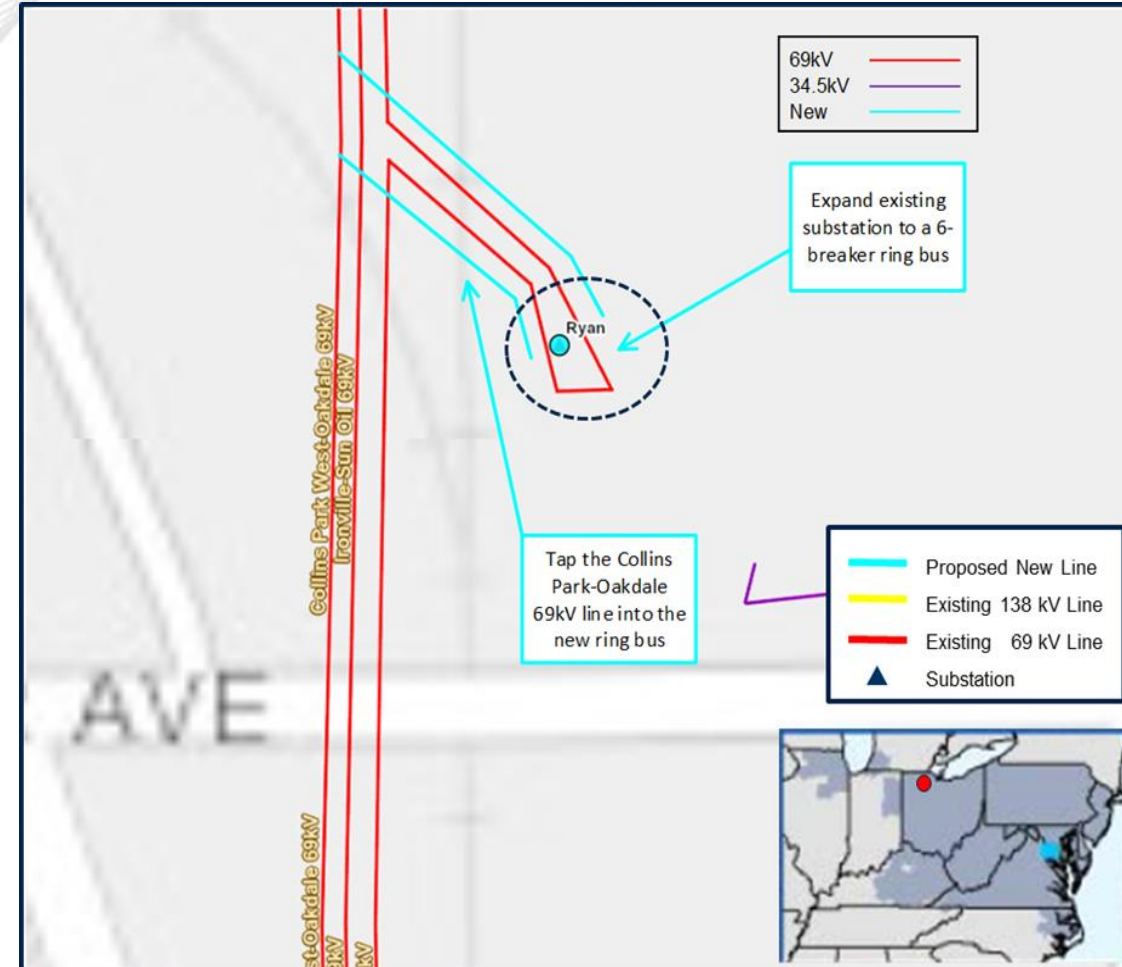
### Ryan 69 kV Ring Bus Project (S1705)

- Expand the existing 69 kV substation at Ryan to a 6-breaker ring bus.
- Reconfigure the existing Sun Oil-Locust Street 69 kV line exits for the ring bus configuration.
- Tap and terminate the Collins Park-Oakdale 69 kV line into the new ring bus substation (Approximately 300 feet) with 636 AA conductor.

Estimated Project Cost: \$10.8 M

Projected IS Date: 3/1/2020

Status: Engineering



# ATSI Transmission Zone: Supplemental Talmadge 138 kV Ring Bus Project

**Previously Presented: 8/31/2018 SRRTEP**

**Problem Statement (Scope and Need/Drivers):**

Operational Flexibility and Efficiency

- Improve operational flexibility during maintenance and restoration efforts.
- Reduce the amount of local load loss (Approximately 87 MWs) under (P2) contingency conditions (bus or breaker failure) at Talmadge substation.

**Selected Solution:**

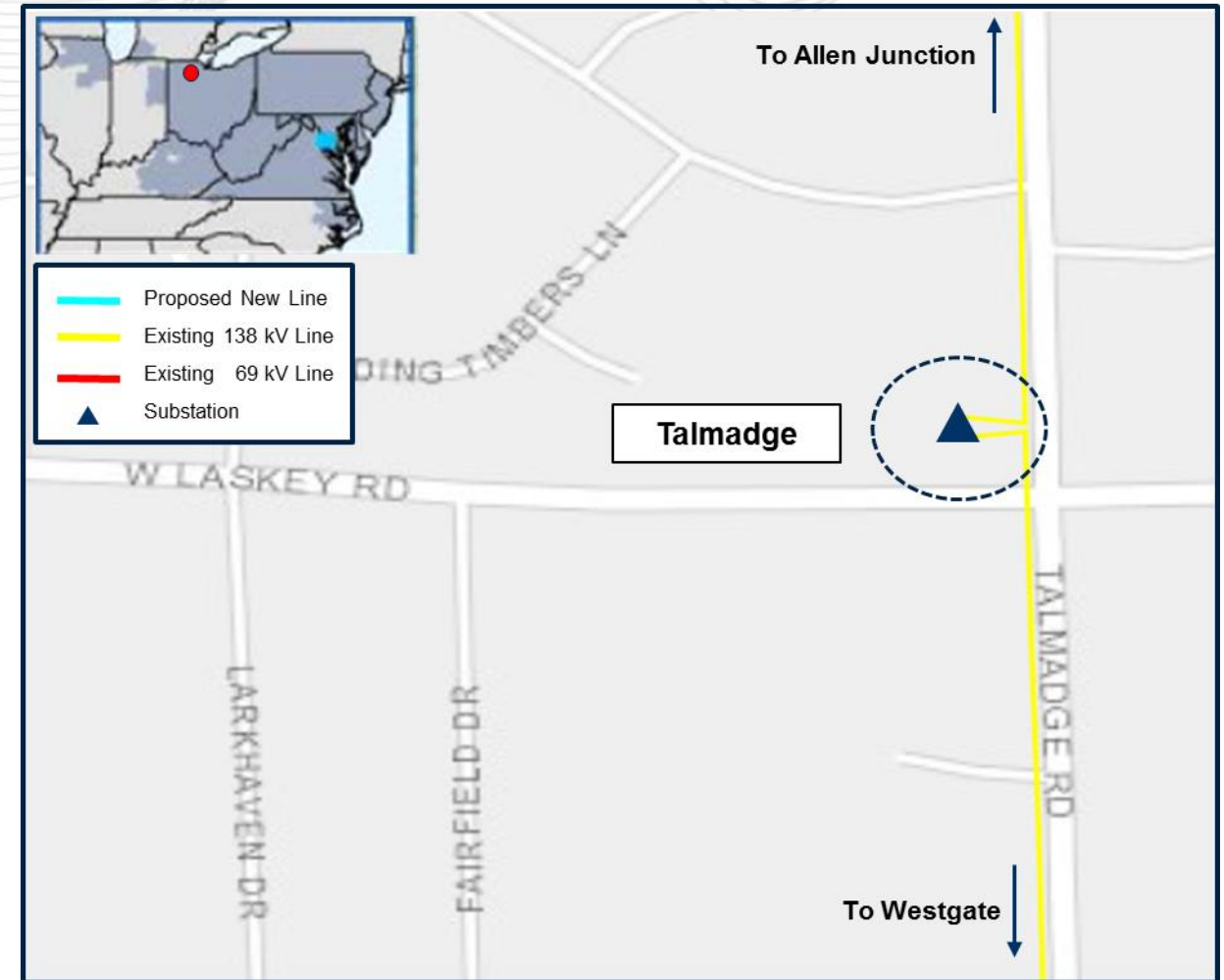
*Talmadge 138 kV Ring Bus Project (\$1706)*

- Expand the existing 138 kV substation at Talmadge to a 4-breaker ring bus.
- Reconfigure Talmadge substation to include terminals for:
  - Talmadge-Westgate 138 kV line
  - Talmadge-Allen Junction 138 kV line
  - Three (3) load connection 138-12.5 kV transformers
- Add new control building to accommodate expansion.

**Estimated Project Cost:** \$6.1 M

**Projected IS Date:** 12/31/2020

**Status:** Conceptual





Previously Presented: 8/31/2018 SRRTEP

## Problem Statement (Scope and Need/Drivers):

### Operational Flexibility and Efficiency

- Improve operational flexibility during maintenance and restoration efforts.
- Reduce the amount of local load loss (Approximately 33 MWs) under (P2) contingency conditions (bus or breaker failure) at Dixie substation.
- Strengthen 138 kV system voltage under contingency (P6) condition; backfeed condition.
  - Loss of Bayshore-Jeep #2 138 kV and Dixie-Jackman 138 kV line
  - Results in lower 138 kV system voltage (0.91 p.u.) under backfeed condition.

## Selected Solution:

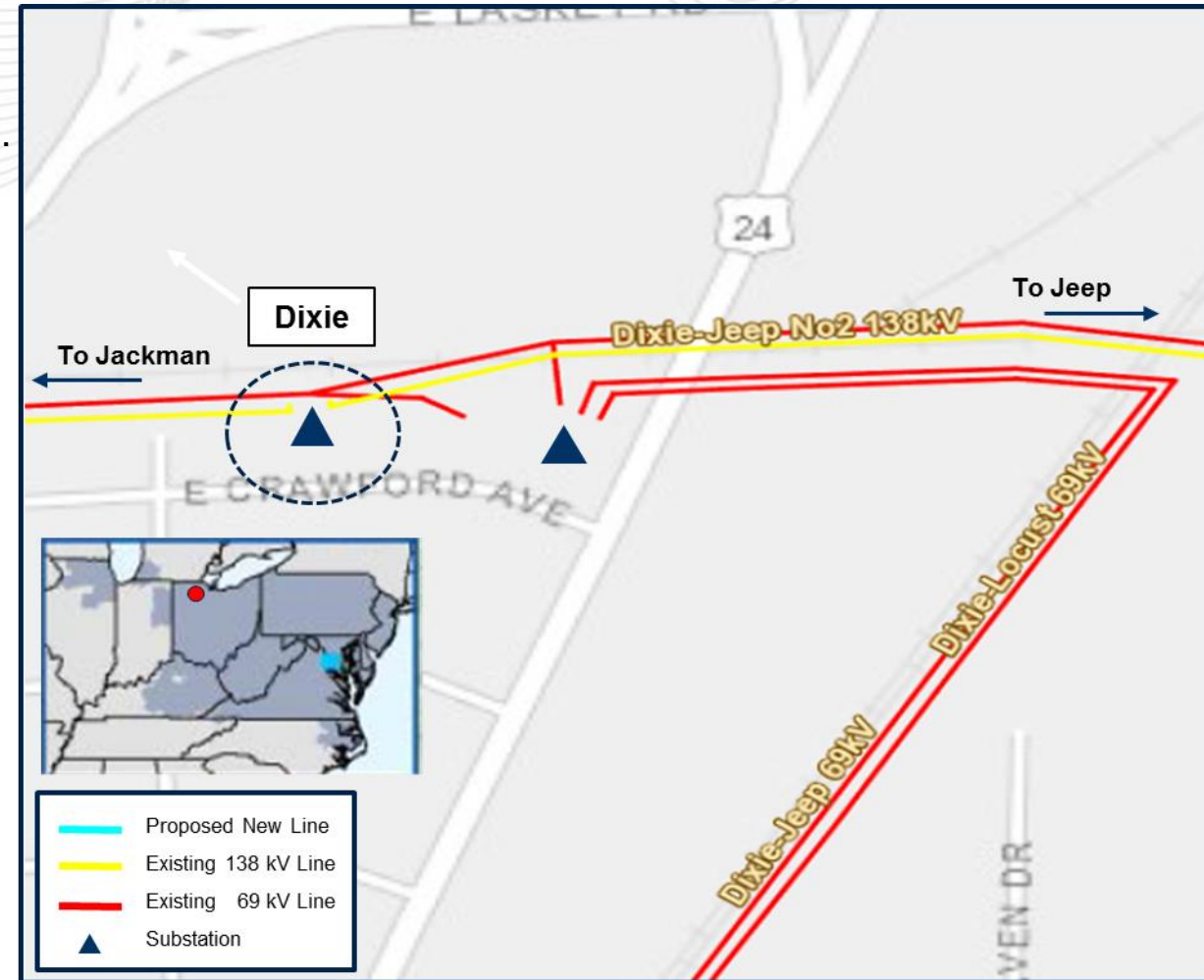
### Dixie 138 kV Ring Bus Project (\$1707)

- Expand the existing 138 kV substation at Dixie to a 6-breaker ring bus.
- Reconfigure Dixie substation to include terminals for:
  - Dixie-Jeep 138 kV line
  - Dixie-Jackman 138 kV line
  - One (1) 138/69 kV transformer
  - Two (2) load connection 138-12.5 kV transformers and a mobile 28 MVAR cap bank

**Estimated Project Cost:** \$7.7 M

**Projected IS Date:** 6/1/2020

**Status:** Engineering



# ATSI Transmission Zone: Supplemental Darrow 138 kV Ring Bus Project

Previously Presented: 8/31/2018 SRRTEP

## Problem Statement (Scope and Need/Drivers):

### Operational Flexibility and Efficiency

- Improve operational flexibility during maintenance and restoration efforts.
- Reduce the amount of local load loss (Approximately 65 MWs) under contingency conditions.
- Eliminate the loss of three or more network elements under contingency conditions.
  - Darrow transformer #1, transformer #2 and 138 kV Bus for a P1 / P2 contingency.
- Mitigate non-planning criteria thermal concerns on the < 100 kV system under contingency (P6) conditions.
  - Loss of Hanna-Shalersville 138 kV and Darrow 138kV bus, breaker or transformer failure.
  - Results in potential thermal overload (Approximately 102% of its 92 MVA SE rating) on the Kent-Ravenna 69 kV Line.

## Selected Solution:

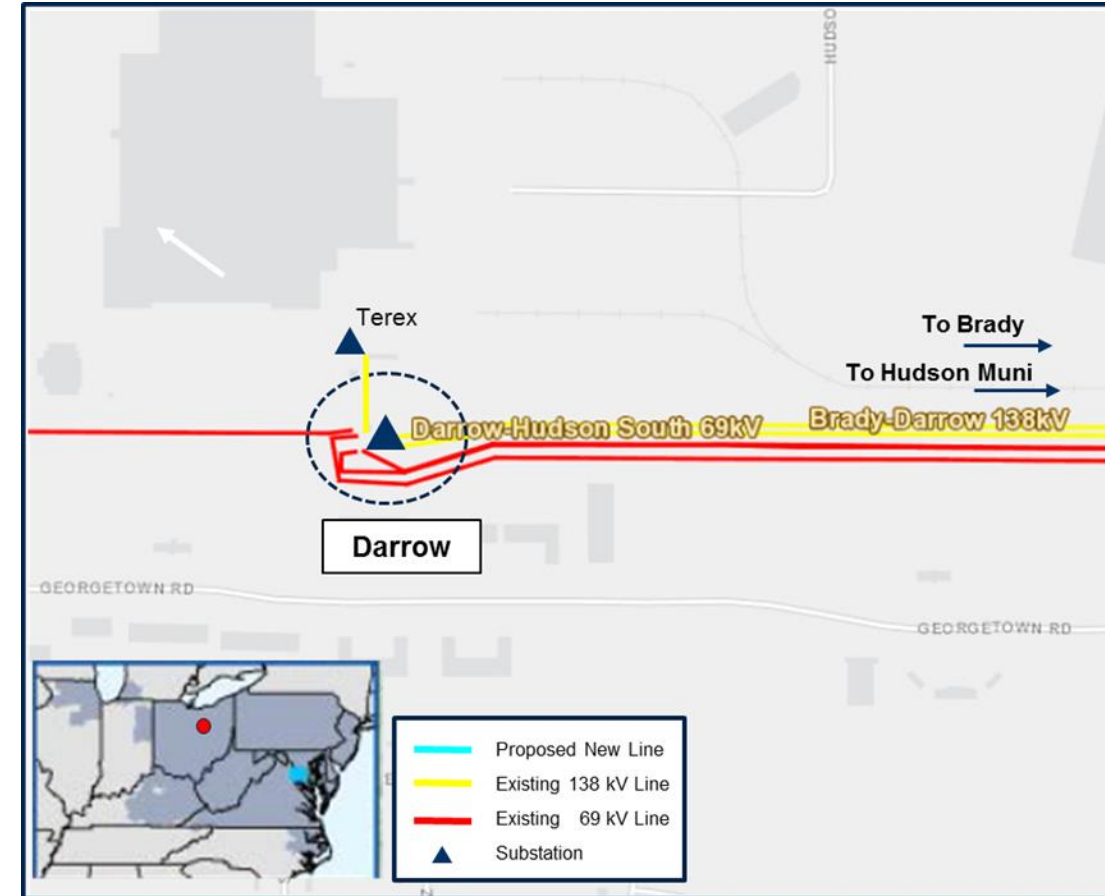
### Darrow 138 kV Ring Bus Project (S1708)

- Expand the existing 138 kV substation at Darrow to a 5-breaker (future 6 breaker) ring bus.
- Reconfigure Darrow substation to include terminals for:
  - Darrow-Hudson Muni 138 kV line, Darrow-Brady 138 kV line & Darrow-Terex 138 kV line
  - Two (2) 138/69 kV transformers

**Estimated Project Cost:** \$8.1 M

**Projected IS Date:** 5/23/2020

**Status:** Engineering





Previously Presented: 8/31/2018 SRRTEP

## Problem Statement (Scope and Need/Drivers):

### Operational Flexibility and Efficiency

- Improve operational flexibility during maintenance and restoration efforts.
- Reduce the amount of local load loss (Approximately 28 MWs) under P1 contingency loss of the radial West Akron-Aetna 138kV line; provide additional load and voltage support for the Akron downtown 23 kV system.

## Selected Solution:

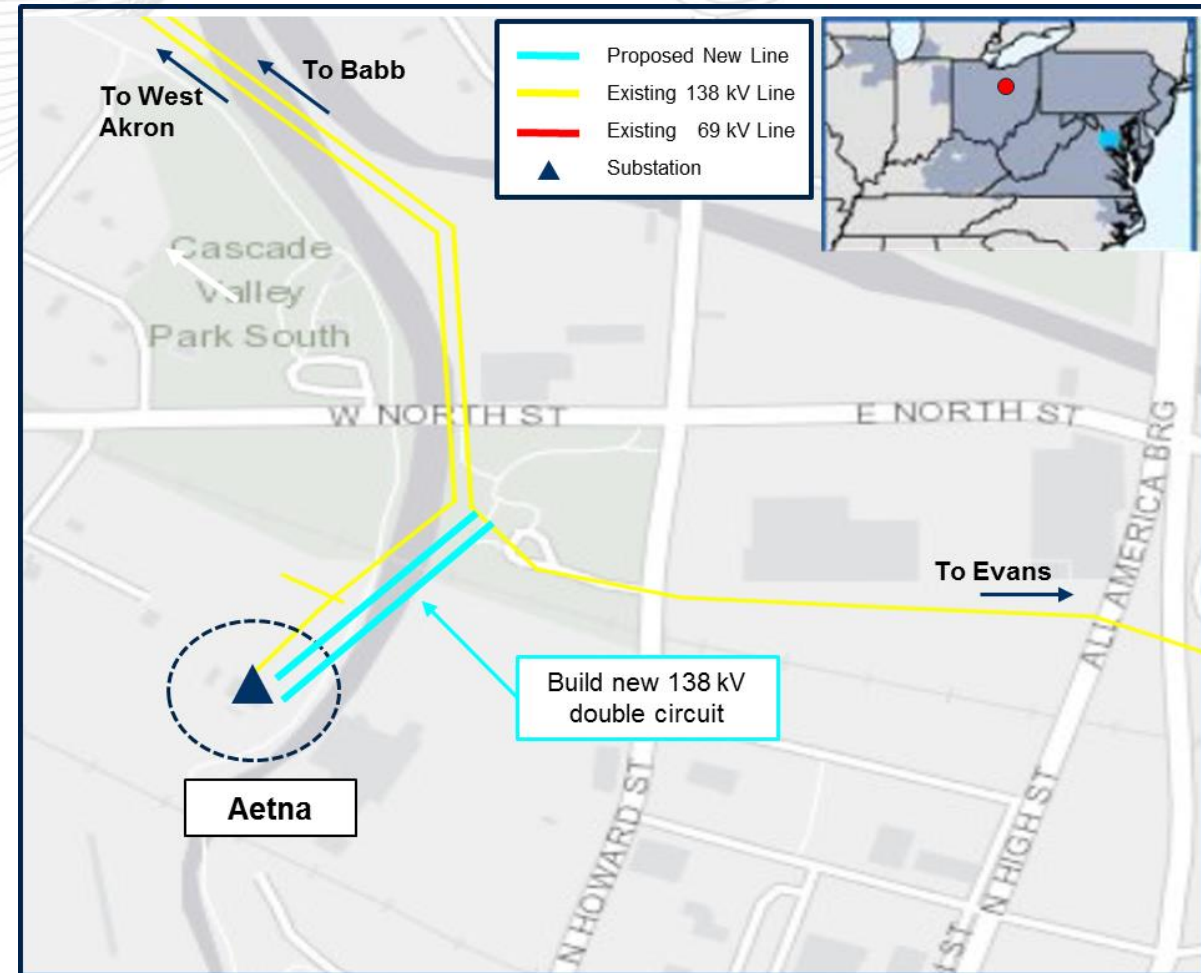
### Aetna 138 kV Ring Bus Project (S1709)

- Network radial 138 kV line feed into planning area.
- Expand the existing 138 kV substation at Aetna to a 5-breaker (future 6 breaker) ring bus; extend the Babb-Evans 138 kV line approximately 0.1 miles as a double circuit in/out of Aetna substation.
- Reconfigure Aetna substation to include terminals for:
  - Aetna-West Akron 138 kV line
  - Aetna-Babb 138 kV line
  - Aetna-Evans 138 kV line
  - One (1) 138-23 kV transformer and one (1) 138/22.86 kV transformer.

**Estimated Project Cost:** \$6.5 M

**Projected IS Date:** 12/31/2021

**Status:** Conceptual



# ATSI Transmission Zone: Supplemental Seville 69 kV Ring Bus Project

**Previously Presented: 8/31/2018 SR RTEP**

## Problem Statement (Scope and Need/Drivers):

### Operational Flexibility and Efficiency

- Improve operational flexibility during maintenance and restoration efforts.
- Reduce the amount of local load loss (Approximately 30 MWs) under P1 contingency loss of the radial Star-Rittman 69kV line

## Selected Solution:

### Seville 69 kV Ring Bus Project (S1710)

- Network radial 69 kV line feed into planning area.
- Expand the existing 138/69 kV substation at Seville to a 4-breaker 69 kV ring bus; extend the Seville-Star 69 kV line (Approximately 300 feet) into Seville substation.
- Add a 138 kV circuit breaker to the existing 138/69 kV transformer.
- Replace mobile capacitor bank with permanent capacitor bank.
- Reconfigure Seville substation to include terminals for:
  - Seville-Homer 69 kV line
  - Seville-Star 69 kV line
  - One (1) 69 kV capacitor bank

**Estimated Project Cost:** \$4.4 M

**Projected IS Date:** 12/31/2020

**Status:** Conceptual





Previously Presented: 8/31/2018 SRRTEP

## Problem Statement (Scope and Need/Drivers):

### Operational Flexibility and Efficiency

- Improve operational flexibility during maintenance and restoration efforts.
- Reduce amount of potential local load loss under contingency conditions.
- Mitigate non-planning criteria voltage concerns on the < 100 kV system under contingency (P2 / P6) condition; radial Brookside-Wellington 138 kV line feeds Wellington substation; loss of source for 69 kV system at Wellington and Brookside substations.
  - Loss of Brookside-Wellington 138 kV line via Brookside line, stuck breaker, or bus outage.
  - Results in potential low voltage (0.83 p.u.) on the Wellington 69 kV system

## Selected Solution:

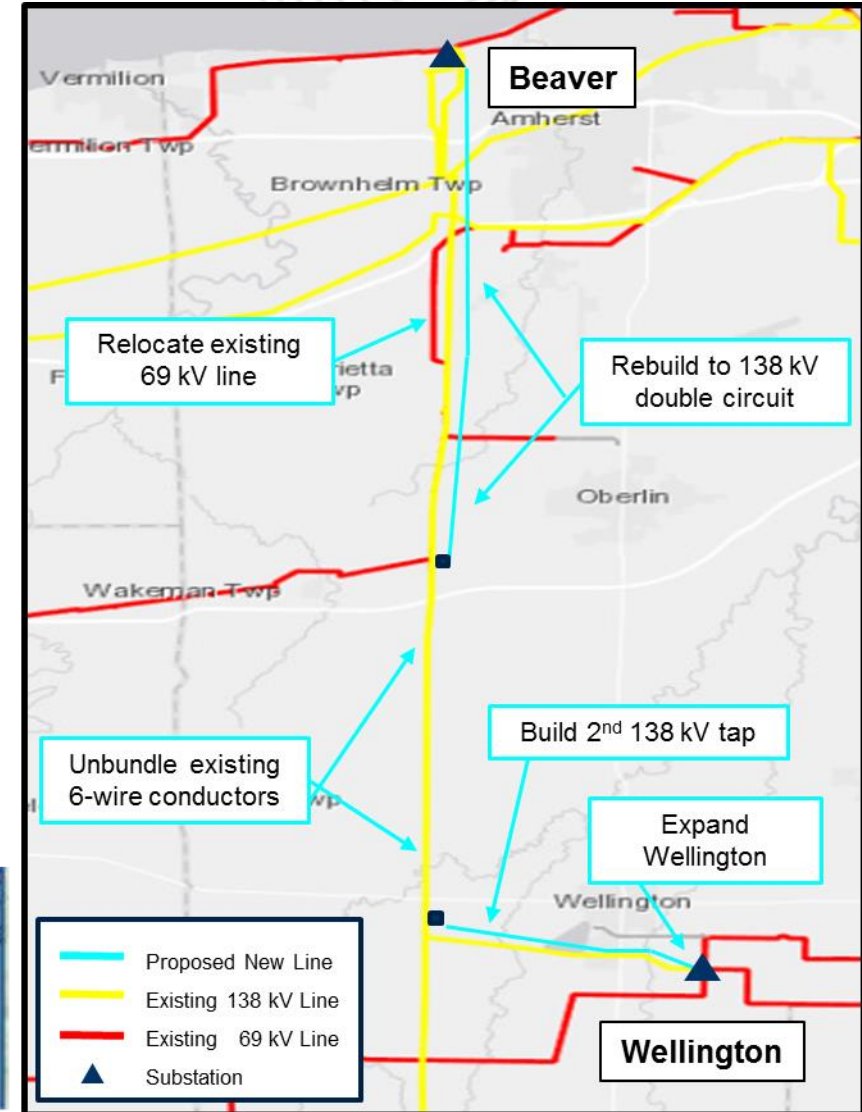
### Rebuild Beaver-Wellington 138 kV line to 138 kV double circuit (S1711)

- Rebuild a part of the existing 138 kV line as a double circuit (~ 4 miles).
- Unbundle existing 138 kV six-wire to make two circuits on remaining sections ( ~ 12 miles).
- Move existing 69 kV circuit from existing 138 kV tower line to a new 69 kV line in existing ROW (~ 3 miles)
- Build 2<sup>nd</sup> 138 kV line tap to Wellington substation on new pole structures (~ 4 miles).
- Create 138 kV 4-Breaker Ring Bus at Wellington substation.
- Add 2<sup>nd</sup> 138/69 kV transformer at Wellington substation.
- Expand 69 kV breaker configuration to accommodate the new 138/69 kV transformer and line exits.

Estimated Project Cost: \$20 M

Projected IS Date: 12/31/2020

Status: Engineering



Previously Presented: 8/31/2018 SRRTEP

**Problem Statement (Scope and Need/Drivers):**

Operational Flexibility and Efficiency

- Improve operational flexibility during maintenance and restoration efforts.
- Reduce amount of potential local load loss (Approximately 35 MWs worse case) under multiple (P1) contingency conditions on the 69 kV system.
  - Loss of the Cedar Street-Cascade (Walmo) 69 kV normally open radial line.
- Improve relay coordination and network normally open 69 kV lines.

**Selected Solution:**

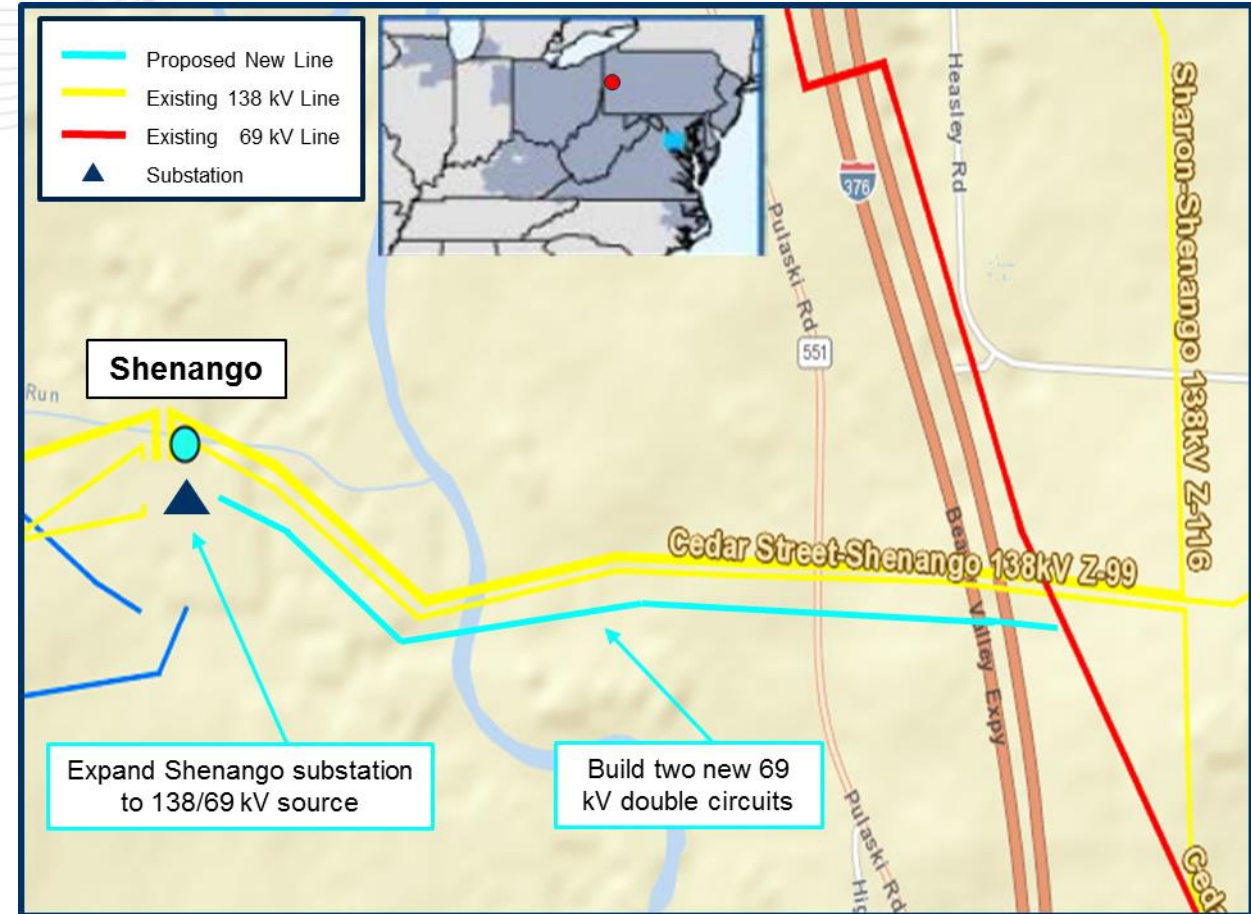
**Shenango 69 kV Switching Station (S1712)**

- Network radial 69 kV system by constructing two double circuit 477 ACSR 69 kV lines (~ 1.2 miles) to create four (4) new 69 kV circuits from the new Shenango 69 kV station
  - Shenango-Masury 69 kV line
  - Shenango-Sharon 69 kV line
  - Shenango-Cedar Street #1 69 kV line
  - Shenango-Cedar Street #2 69 kV line
- Install two (2) 138/69 kV transformers at Shenango.
- Expand Shenango substation to create a six (6) breaker 69 kV ring bus.

**Estimated Project Cost:** \$16.3 M

**Projected IS Date:** 12/31/2021

**Status:** Conceptual







# ATSI Transmission Zone: Supplemental Pine-Cranberry #3 138 kV Line

Previously Presented: 8/31/2018 SRRTEP

## Problem Statement (Scope and Need/Drivers):

### Operational Flexibility and Efficiency

- Improve operational flexibility during maintenance and restoration efforts.
- Reduce amount of potential local load loss under contingency conditions.
- Resolve PJM issued PCLLRWs for the local area.
- Mitigate non-planning criteria voltage concerns on the < 100 kV system under contingency (P2 / P6) condition.
  - Loss of Cranberry-Pine #1 and #2 138 kV lines into Pine substation
  - Results in potential local voltage collapse on the Pine 69kV system and increases thermal loading on the Maple-Pine 69kV support line.

## Selected Solution:

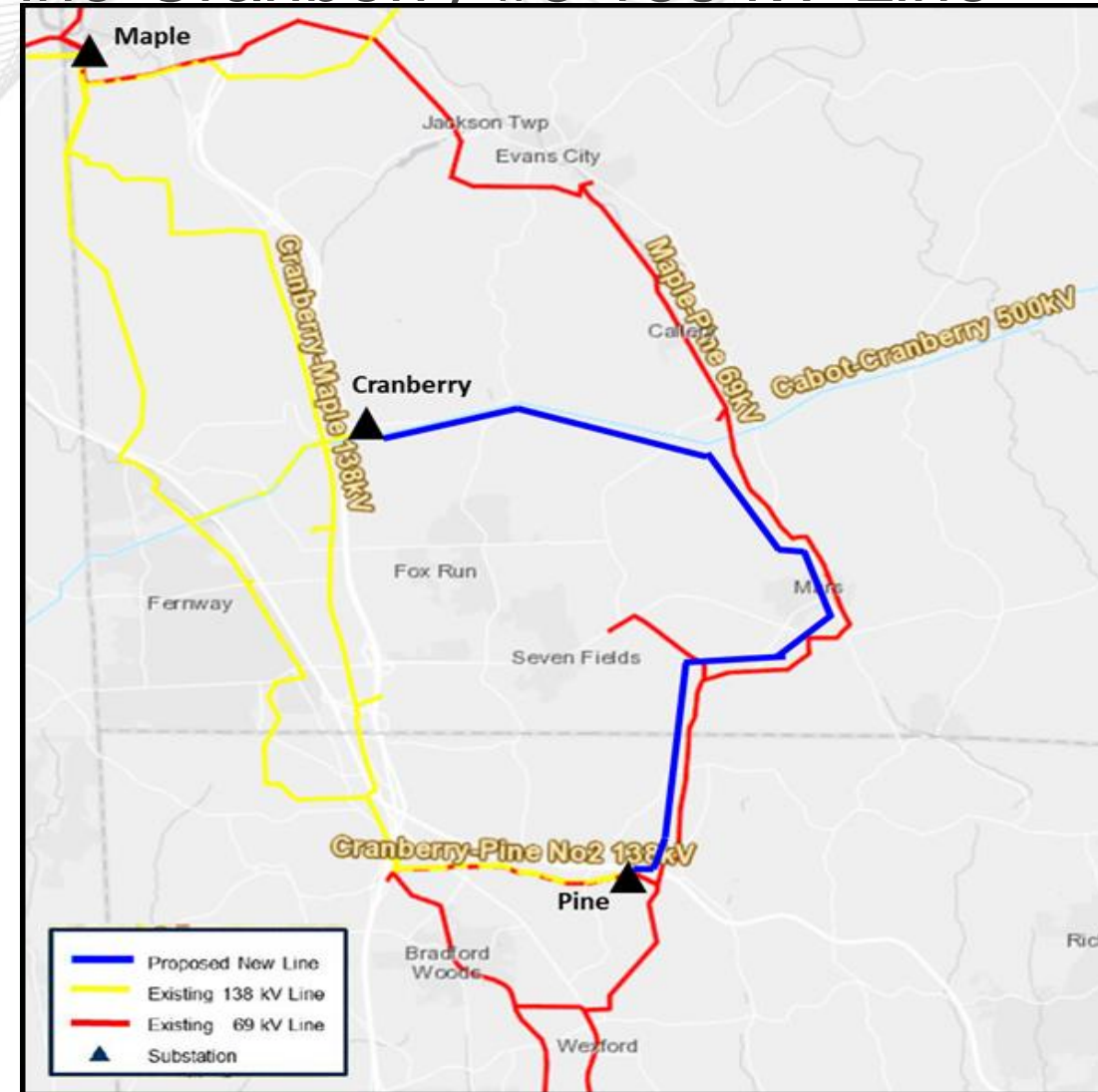
### Pine-Cranberry #3 138 kV Line (S1713)

- Convert Pine substation into a breaker and a half configuration and allow for new 138 kV line terminal
- Extend existing Cranberry 138 kV breaker and a half scheme to allow for a new 138 kV line terminal
- Build 138 kV Line (477 ACSR) within the Cabot-Cranberry 500 kV line ROW (~ 4.0 miles)
- Build 138 kV Line (477 ACSR) on the existing Maple-Pine 69 kV line open tower position. (~ 7.0 miles)

Estimated Project Cost: \$27.0 M

Projected IS Date: 05/23/2021

Status: Conceptual







**Previously Presented: 8/31/2018 SRRTEP**

**Problem Statement (Scope and Need/Drivers):**  
Equipment Material Condition, Performance and Risk

- Improve system reliability and performance
- Remove obsolete and deteriorated equipment.
  - 61 year old construction
  - 88% Inspection rejection rate.
  - Approximately 16 repair records over the past 3 years.
- Upgrade to current standards

**Selected Solution:**

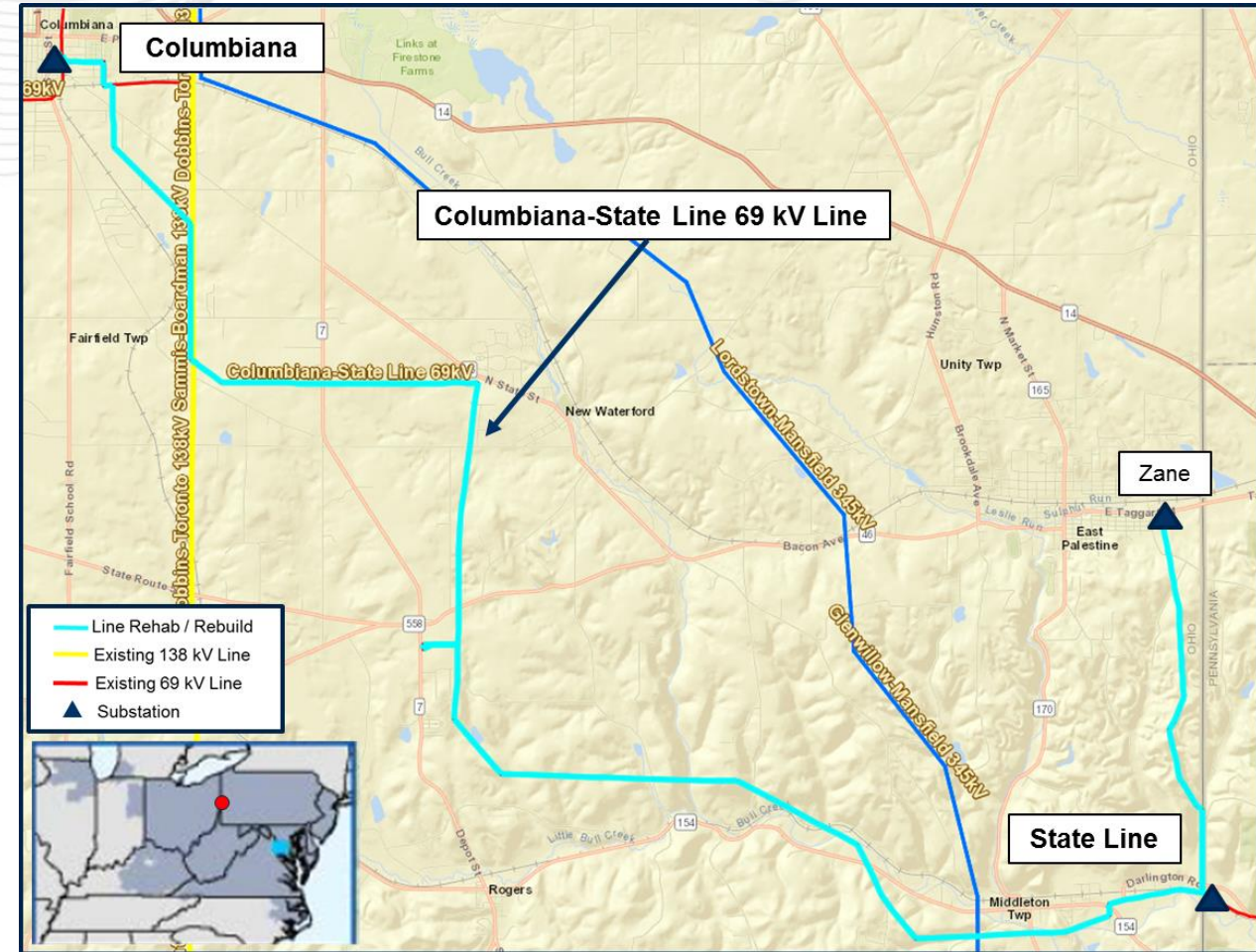
**Columbiana-State 69 kV line rebuild (\$1715)**

- Rebuild the existing Columbiana-State Line 69 kV line (Approximately 19 miles).
- Existing Conductor: Mixed conductor 336 ACSR & 605 ACSR
- Future Conductor: 477 ACSR
- Old Rating 71 MVA SN    New Rating 100 MVA SN
- Replace line switches as necessary

**Estimated Project Cost:** \$16.7M

**Projected IS Date:** 12/31/2020

**Status:** Engineering





## Previously Presented: 8/31/2018 SRTEP

### Problem Statement (Scope and Need/Drivers):

#### Equipment Material Condition, Performance and Risk

- Improve system reliability and performance
- Remove obsolete and deteriorated equipment.
  - 64 year old construction.
  - 87% Inspection rejection rate.
  - Six (6) line switches greater than 50 years old.
  - Approximately 20 repair records over the past 4 years.
- Upgrade to current standards

### Selected Solution:

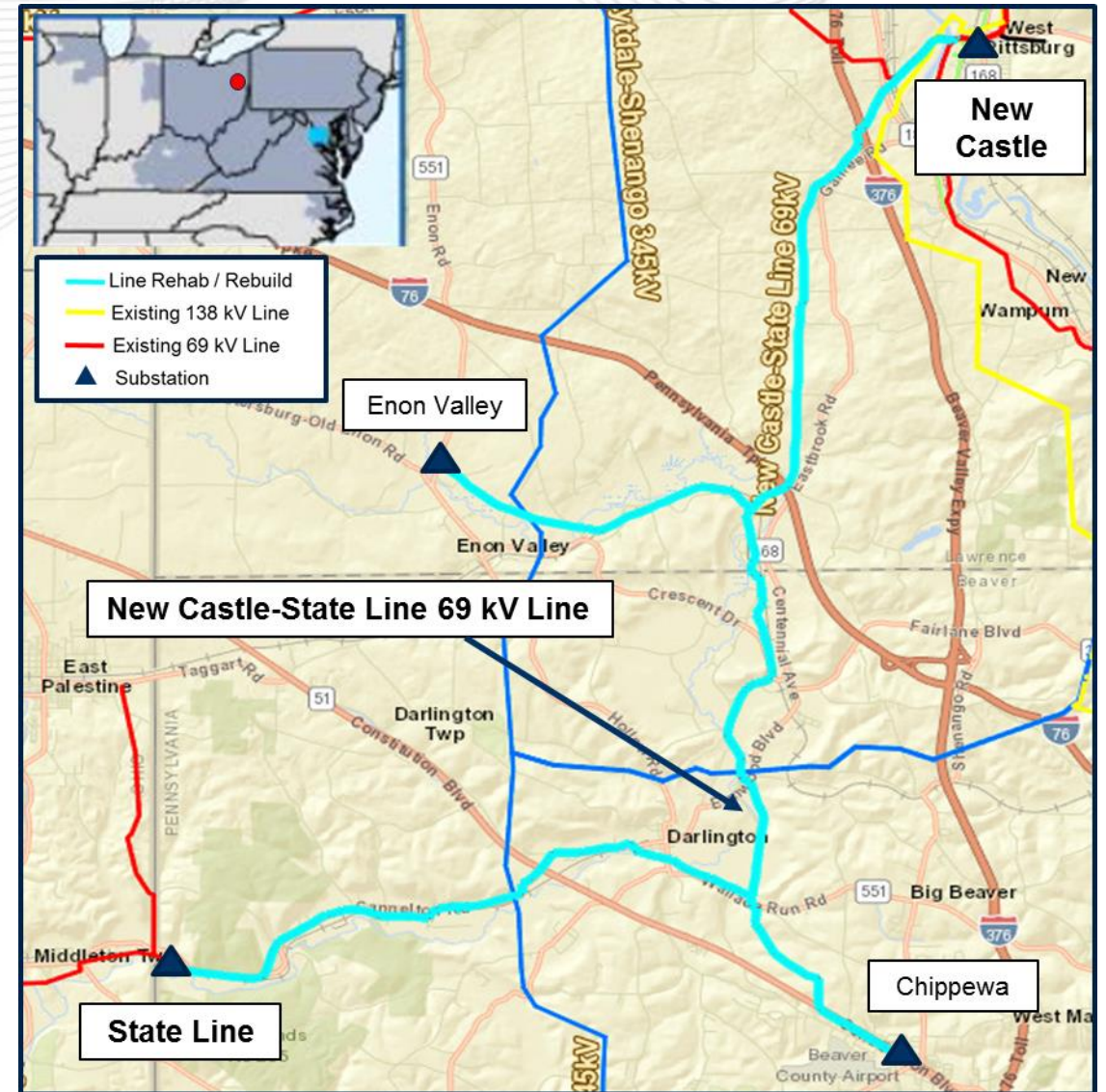
#### New Castle-State 69 kV line rebuild (S1716)

- Rebuild the existing New Castle-State Line 69 kV line (Approximately 24 miles).
- Existing Conductor: 336 ACSR
- Future Conductor: 477 ACSR
- Old Rating 71 MVA SN    New Rating 100 MVA SN
- Replace line switches as necessary

**Estimated Project Cost:** \$29.2M

**Projected IS Date:** 12/31/2019

**Status:** Engineering







# ATSI Transmission Zone: Supplemental Chippewa 69 kV Ring Bus

Previously Presented: 8/31/2018 SRRTEP

## Problem Statement (Scope and Need/Drivers):

### Operational Flexibility and Efficiency

- Improve operational flexibility during maintenance and restoration efforts.
- Improve reliability to customers; circuit line exposure is approximately 24 miles.
- Reduce amount of potential local load loss (Approximately 36 MWs) under (P1) contingency conditions.
  - Loss of the New Castle-State Line 69 kV line.

## Selected Solution:

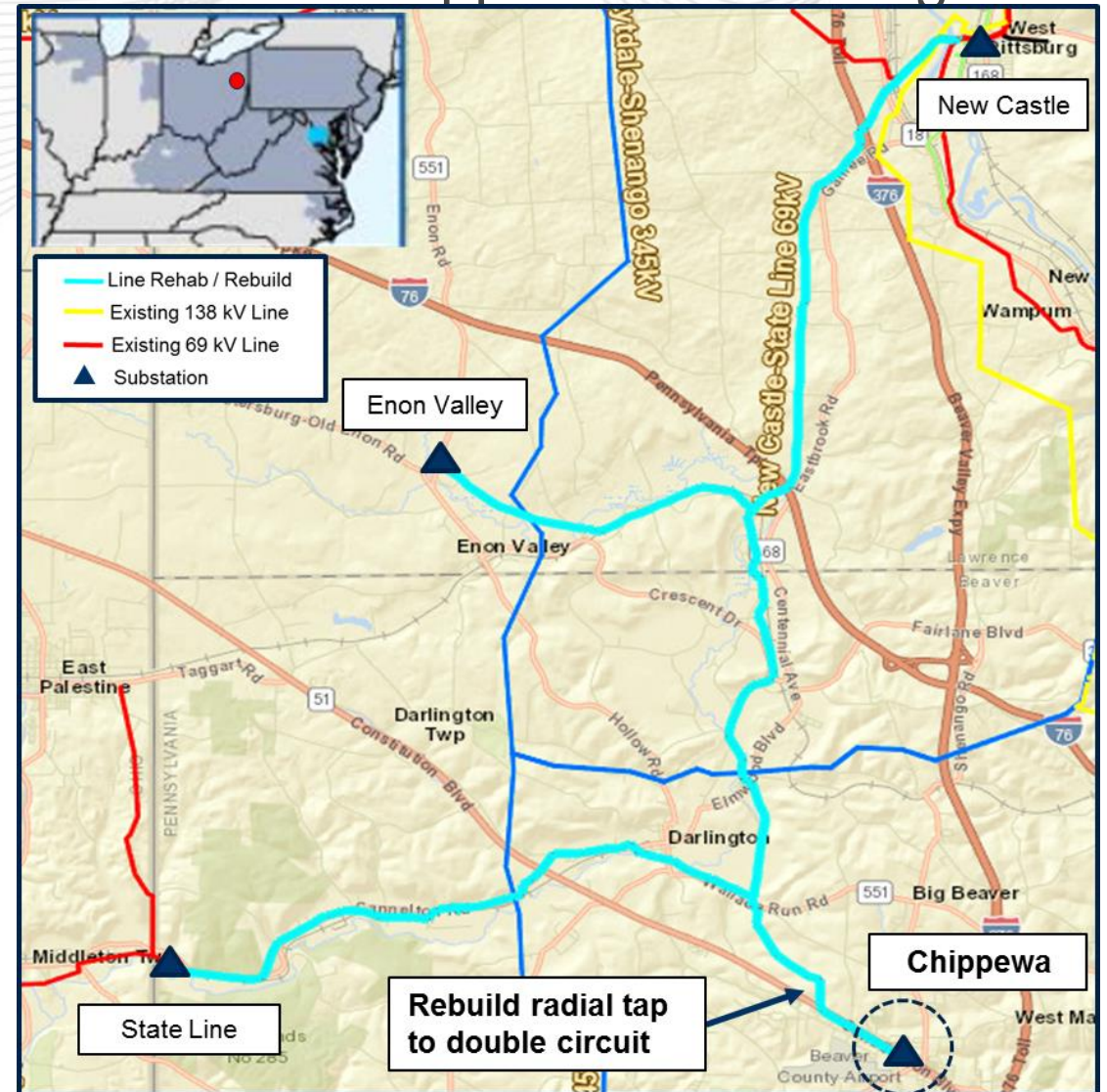
### Chippewa 69 kV Ring Bus (\$1717)

- Construct a 5-breaker ring bus at Chippewa substation
- Install one 12.6 MVAR cap at Chippewa
- Rebuild approximately 2.5 miles of 477 ACSR to double circuit 69 kV line to convert radial tap to networked line and load at Chippewa substation.
- New Castle-State Line 69 kV line is being rebuilt under separate project to 477 ACSR
  - Old Rating 71 MVA SN    New Rating 100 MVA SN

Estimated Project Cost: \$9.1 M

Projected IS Date: 6/1/2021

Status: Conceptual







# ATSI Transmission Zone: Supplemental Holloway-Nottingham-Knox 138 kV line rebuild

Previously Presented: 8/31/2018 SRRTEP

## Problem Statement (Scope and Need/Drivers): Equipment Material Condition, Performance and Risk

- Improve system reliability and performance
- Remove obsolete and deteriorated equipment.
  - 53 to 82 year old construction.
  - 57% Inspection rejection rate.
  - Approximately 29 repair records over the past 3 years; increasing trend
- Upgrade to current standards
- Support shale gas load growth area; multiple (6) transmission service connections.

## Selected Solution:

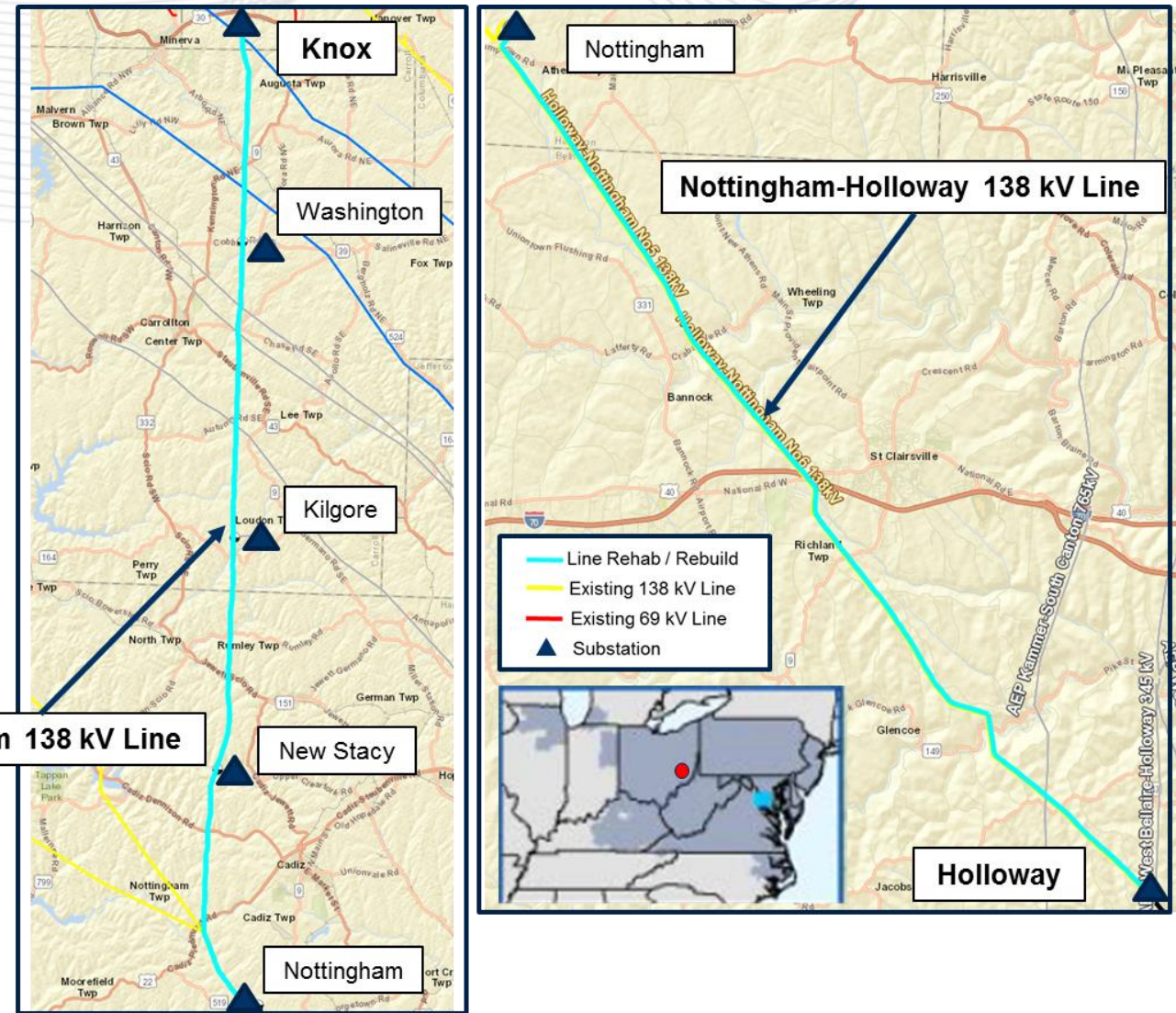
### Holloway-Nottingham-Knox 138 kV line rebuild (\$1718)

- Rebuild the existing Knox-Nottingham 138 kV Line (Approximately 44 miles).
- Rebuild the existing Nottingham-Holloway 138 kV Line (Approximately 21 miles)
- Existing Conductor: Mixed conductor 795 ACSR & 477 ACSR
- Future Conductor: 795 ACSR
- Old Rating 158 MVA SN    New Rating 275 MVA SN

**Estimated Project Cost:** \$79.9M

**Projected IS Date:** 06/01/2021

**Status:** Engineering







# ATSI Transmission Zone: Supplemental E. Springfield 138 kV Breaker

## Problem Statement: Short Circuit

The E.Springfield 138kV Breaker B61 becomes overdutied.

## Driver:

S1210: Loop the Clark-Urbana 138kV line (~5 miles) and East Springfield-Tangy 138kV line (~3,5 miles) into the existing 69kV Broadview Substation with 336 ASCR conductor; Add two (2) 138/69kV transformers at Broadview substation.

## Recommended Solution:

*E.Springfield 138kV Breaker B61*

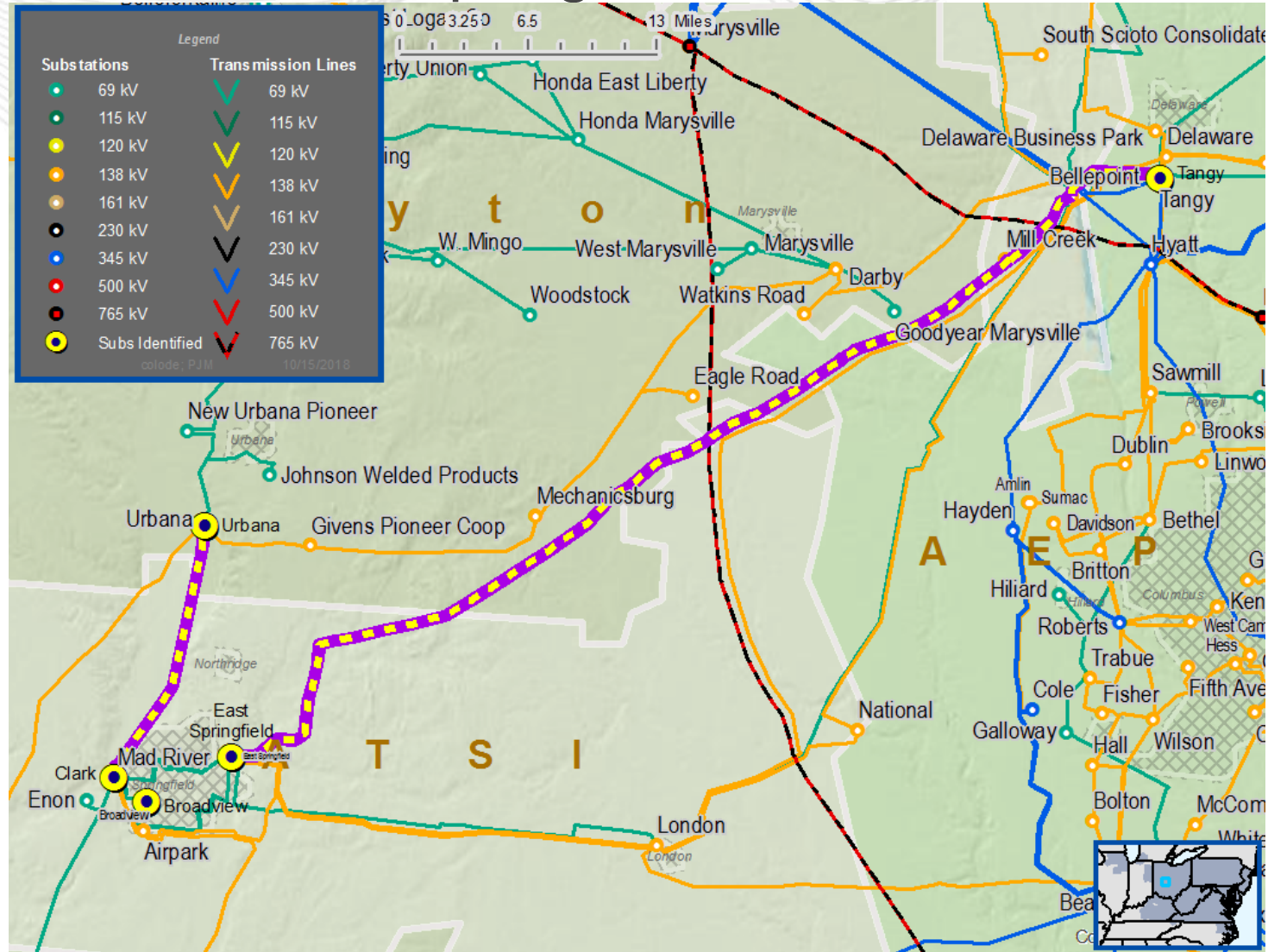
- Replace the E.Springfield 138kV breaker B61 with a 40kA breaker (s1210.2).

**Estimated Project Cost:** \$0.534 M

**Required IS Date:** 12/31/2019

**Projected IS Date:** 12/31/2019

**Status:** Scoping



# APS



## Previously Presented: 7/27/2018 SRRTEP

### Problem Statement (Immediate Need): Customer Service

- Provide 138 kV service to new customer
- Customer load 14 MW

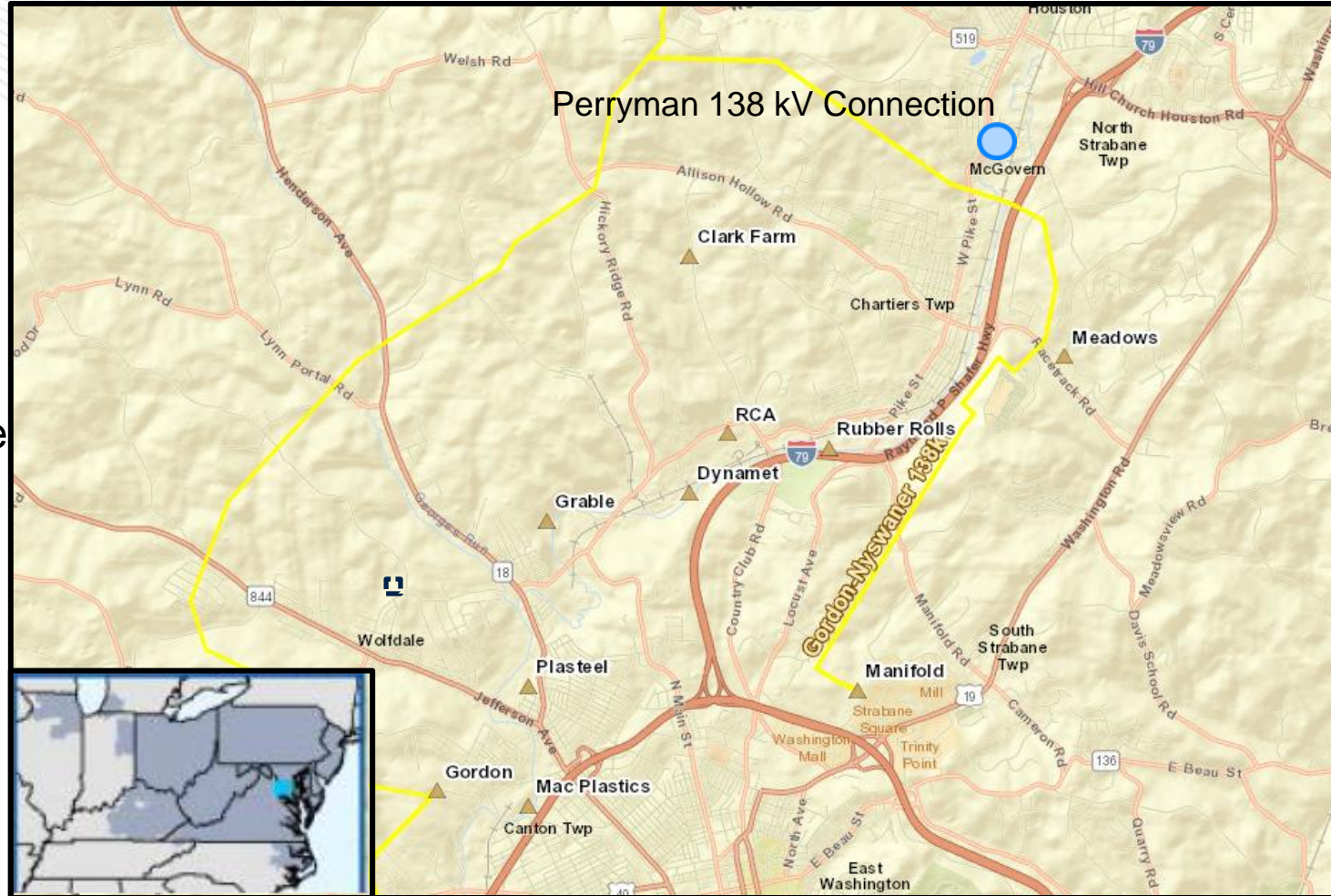
### Selected Solution:

*Perryman Company- Provide 138 kV Service (\$1682)*

- Tap the existing Manifold – Gordon 138 kV line
- Install 2 – 138 kV Line Switches
- Install 138 kV Wavetrapp at tap
- Install 138 kV Tap Switch
- Construct ~500 ft of 336 ACSR 138 kV line to Customer Substation
- **Estimated Project Cost: \$0.13 M**

**Projected IS Date: 9/01/2019**

**Status: Conceptual**



# ComEd



Previously presented on 1/8/2018 SRRTEP

**Problem Statement:**

Need Additional 34kV transformation capacity in Lena area.  
Lena contain one 138-34kV transformer. A transformer failure requires Freeport station to pick up all the Lena load. Second transformer allows Lena to support all load for a transformer failure.

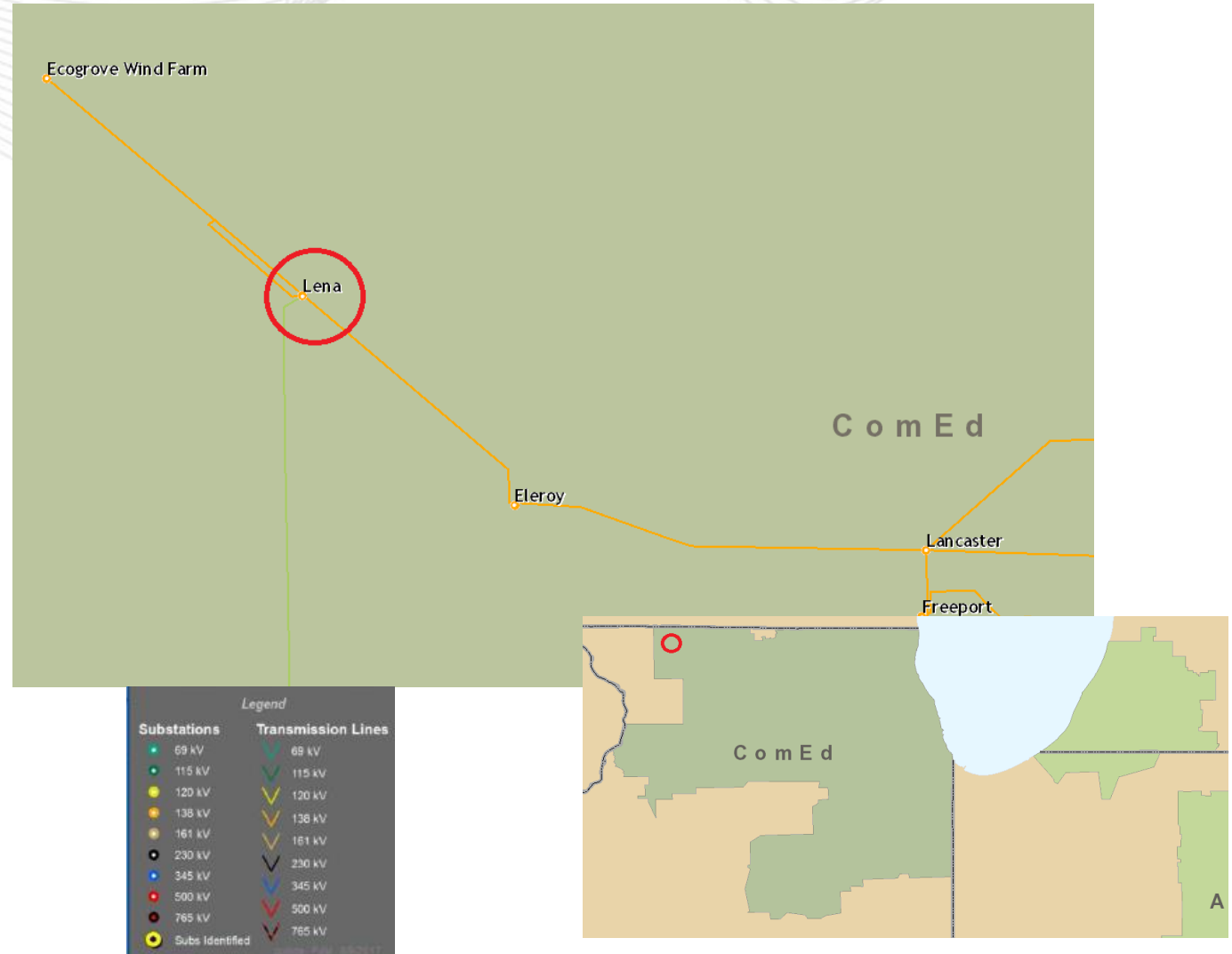
**Selected Solution:**

Install a new 138-34kV transformer with high side and low side breakers at Lena, Expand the 34kV switchgear, Replace line circuit switchers with 138kV breakers, Install new 138kV bus tie breaker (**\$1480.1**)  
Normally close 138kV line 11904 into Lena, the 11904 circuit switcher is normally open and Normally open the new 138kV bus tie breaker (**\$1480.2**)

**Estimated Cost:**      \$0      Transmission  
   \$7.1M Distribution

**Projected In-service:** 6/1/2019

**Project Status:** Engineering



Previously presented on 1/8/2018 SRRETP

**Problem Statement:**

138kV line 17714 (Burnham - Wildwood) wave trap needs to be replaced due to material condition.

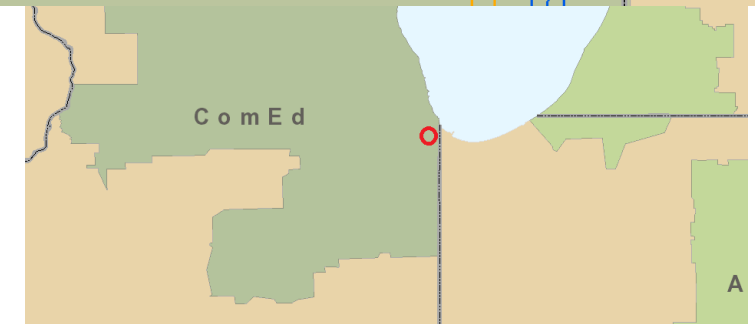
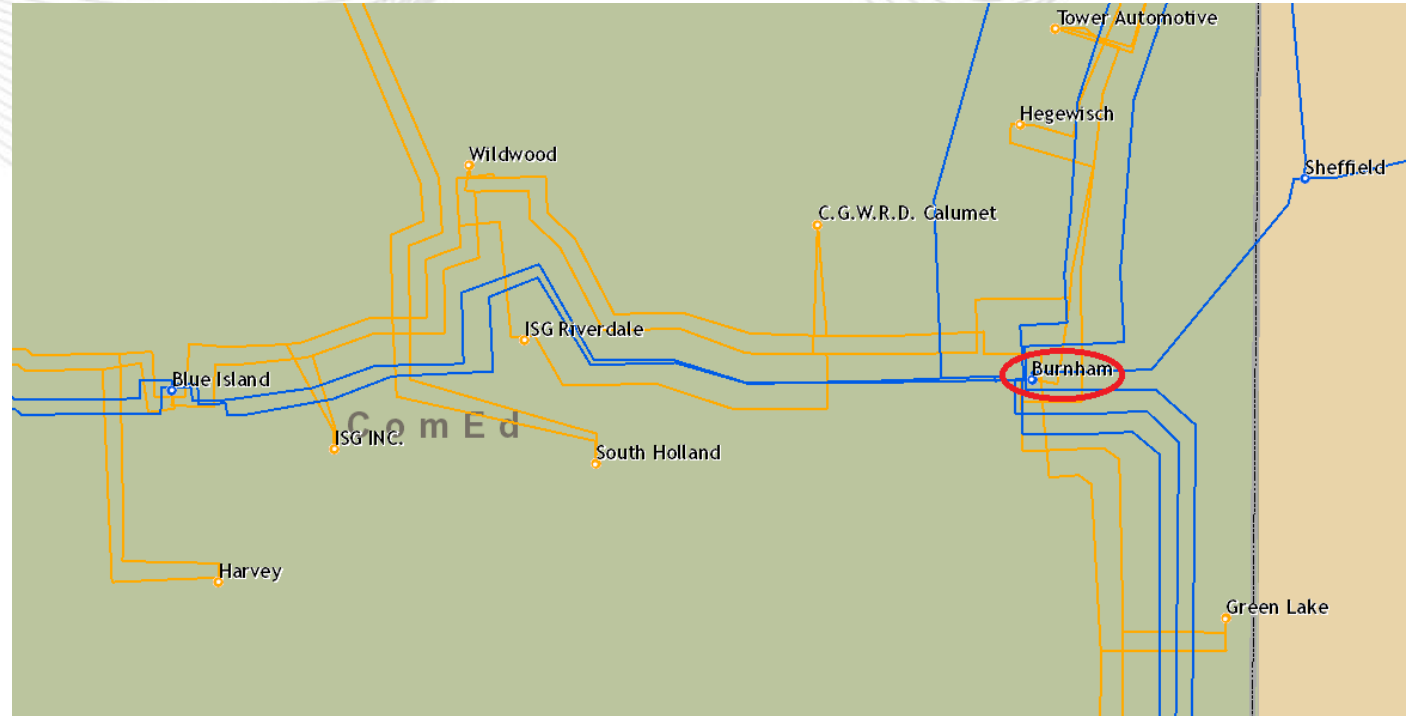
**Selected Solution:**

Replace the wave trap at the Burnham substation for 138kV line 17714 (Burnham - Wildwood) **(\$1481)**

**Estimated Cost:** \$50K

**Projected In-service:** 12/31/2018

**Project Status:** Engineering





Previously presented on 1/8/2018 SRRTEP

### Problem Statement:

Replacing obsolete electromechanically relays with microprocessor relays

- Improved performance
- Add SCADA connectivity
- Allow real time data gathering of relay events
- Replacement relays may be difficult to obtain

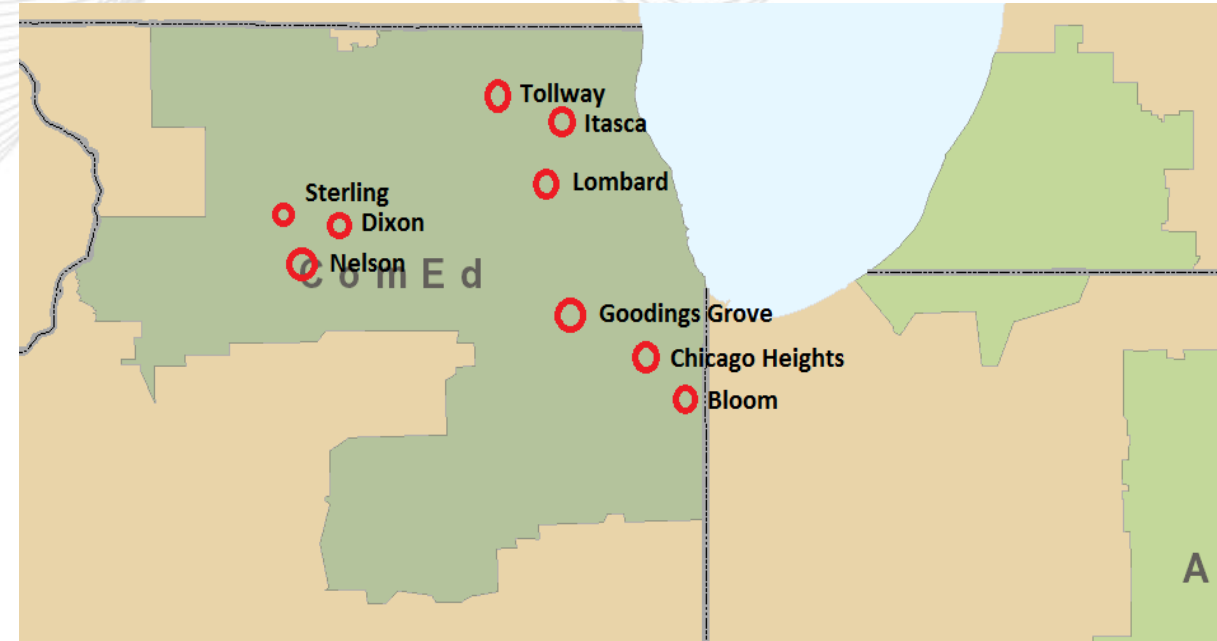
### 138kV Lines to be updated

11603 (Goodings Grove)	12016 (Lombard)	12016 (Itasca)	12411 (Dixon)
12411 (Sterling)	15508 (Nelson)	15508 (Dixon)	18513 (Tollway)
7306 (Bloom)	7306 (Chicago Heights)	6701 (Congress)	6702 (Congress)

### Selected Solution:

Update relay packages at various location:

- Update relay packages for the 138kV Line 11603 (Goodings Grove -Crestwood), the upgrade is at Goodings Grove (**\$1482.1**)
- Update relay packages for the 138kV Line 12411 (a three terminal line from Maryland, Dixon, and Sterling), the upgrade is at Dixon and Sterling. (**\$1482.3**)
- Update relay packages for the 138kV Line 12016 (Lombard - Itasca), the upgrade is at Lombard and Itasca. (**\$1482.2**)
- Update relay packages for the 138kV Line 15508 (a three terminal line from Nelson, Dixon, and Kewanee), the upgrade is at Nelson and Dixon. (**\$1482.4**)
- Update relay packages for the 138kV Line 18513 (a three terminal line from Tollway, Rockford Energy Center and Dundee), the upgrade is at Tollway. (**\$1482.5**)
- Update relay packages for the 138kV Line 7306 (Bloom - Chicago Heights), The upgrade is at Bloom and Chicago Heights. (**\$1482.6**)
- Update relay packages for the 138kV Line 6701 (Congress - Medical Center), Upgrade is at Congress. (**\$1482.7**)
- Update relay packages for the 138kV Line 6702 (Congress - Medical Center), Upgrade is at Congress. (**\$1482.8**)



### Estimated Cost:

Transmission \$320K per terminal

**Projected In-service: 6/1/2018**

**Project Status: Engineering**



Previously presented on 1/8/2018 SR RTEP

**Problem Statement:**

138kV line 17714 (Burnham - Wildwood) relays need to be upgraded for NERC PRC-023 Compliance

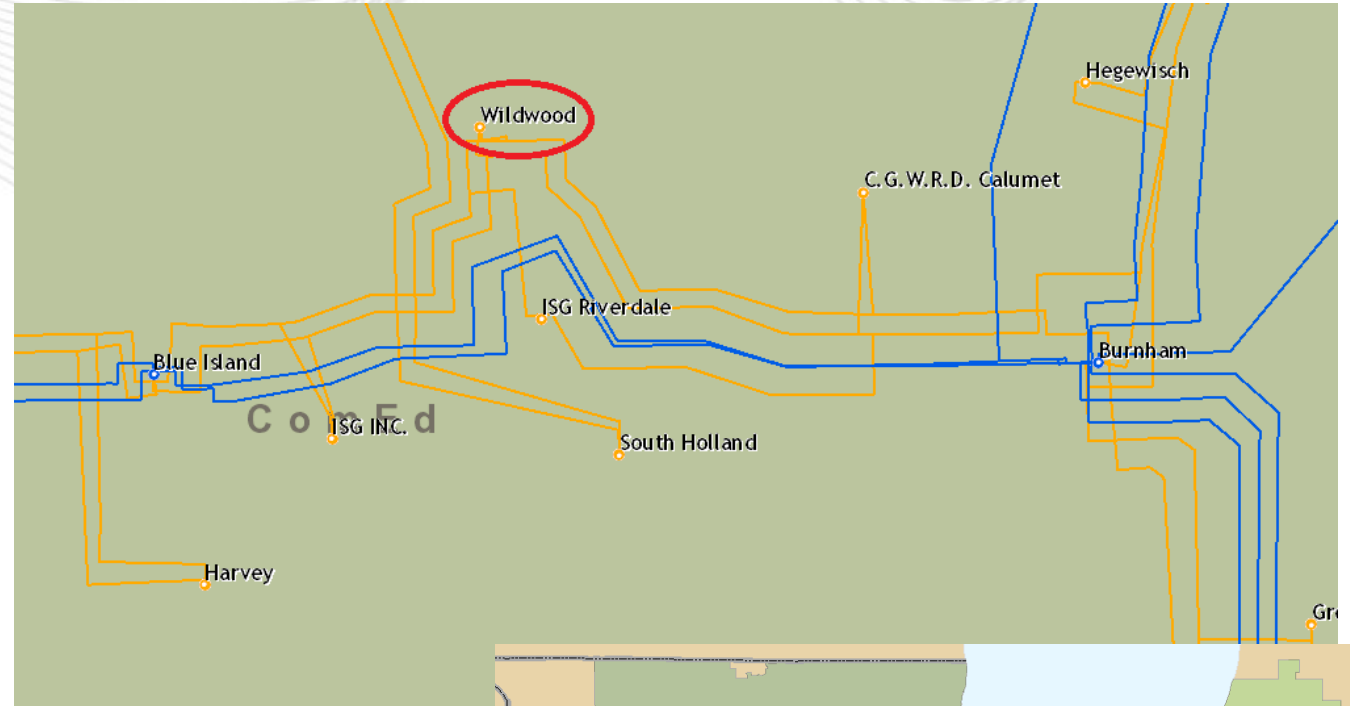
**Selected Solution:**

Update 138kV line 17714 (Burnham - Wildwood) relays at Wildwood (**\$1483**)

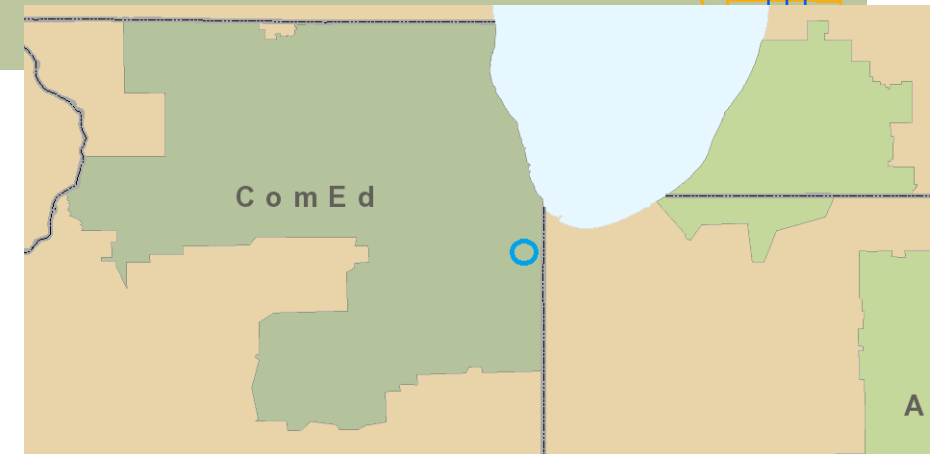
**Estimated Cost:** Transmission \$320K

**Projected In-service:** 6/1/2018

**Project Status:** Engineering



Legend	
Substations	Transmission Lines
69 kV	69 kV
115 kV	115 kV
120 kV	120 kV
138 kV	138 kV
161 kV	161 kV
230 kV	230 kV
345 kV	345 kV
500 kV	500 kV
765 kV	765 kV
Subs Identified	





*Previously presented on 2/14/2018 SRRTEP*

**Problem Statement:**

Glidden substation does not comply with ComEd standards  
 Single breaker failure will trip the entire station.  
 Transformer failure trips two transformers.  
 Transformer maintenance requires de-energization of the 138kV bus and two transformers

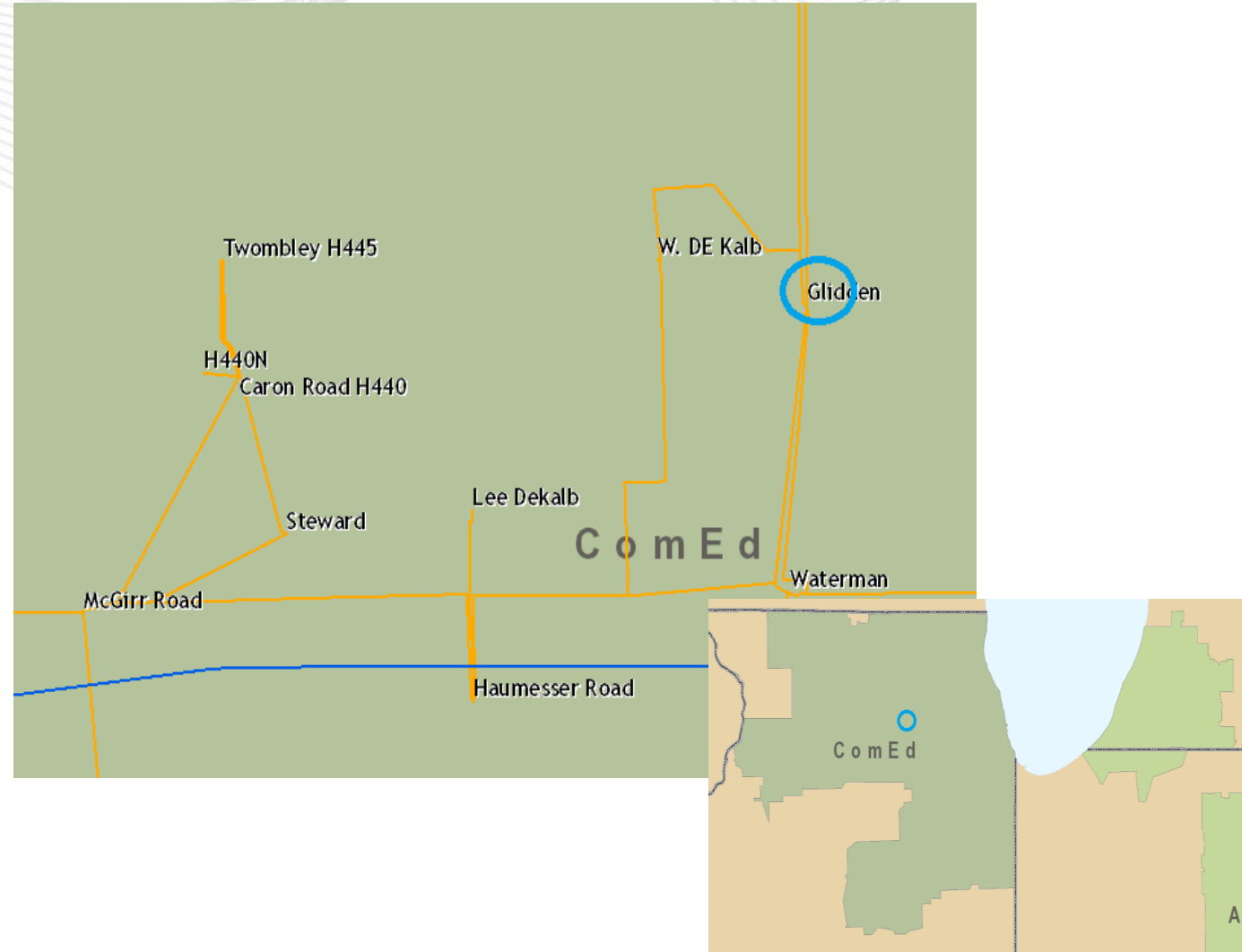
**Selected Solution:**

Expand Glidden substation from a straight bus to a ring bus  
 Install seven 138kV breakers to create a ring bus  
 Install four transformer high side breakers. **(\$1552)**

**Estimated Cost:** \$21M

**Projected In-service:** 12/31/2020

**Project Status:** Engineering



*Previously presented on 2/14/2018 SRRTEP*

**Problem Statement:**

Tertiary cap banks no longer installed on tertiary windings.  
Tertiary cap bank failures stress the 345-138kV transformers and have caused transformer failures in the past.

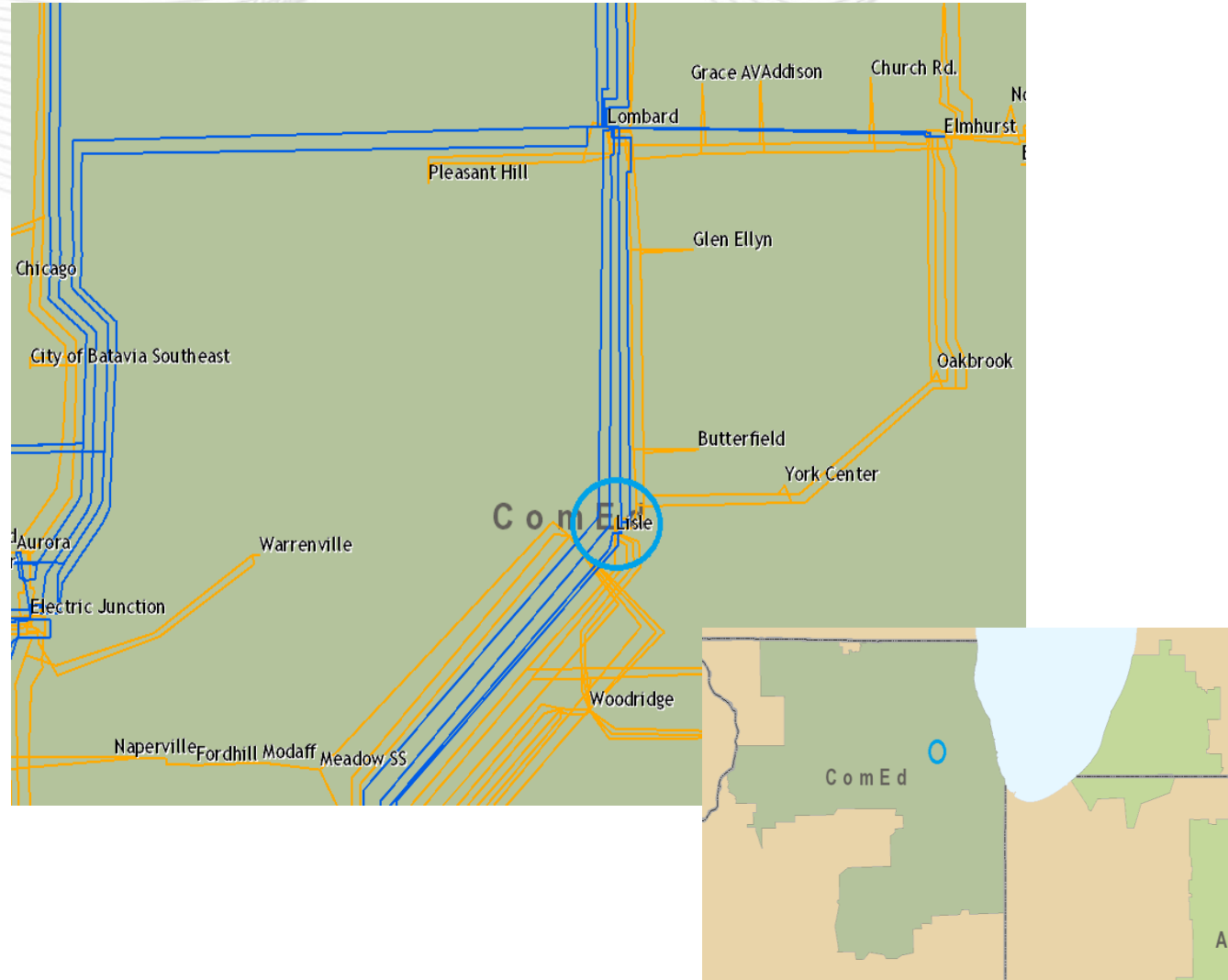
**Selected Solution:**

Remove Lisle tertiary capacitor banks and install 138 kV capacitor banks; Increase the thermal capability of the 345-138kV autotransformer. **(S1553)**

**Estimated Cost:** \$6M

**Projected In-service:** 12/31/2018

**Project Status:** Engineering





*Previously presented on 2/14/2018 SRRTEP*

**Problem Statement:**

Ameren (MISO) is retiring the Oglesby substation

- Oglesby is currently tapped off of 138kV line 7713
  - Line 7713 is a three terminal line

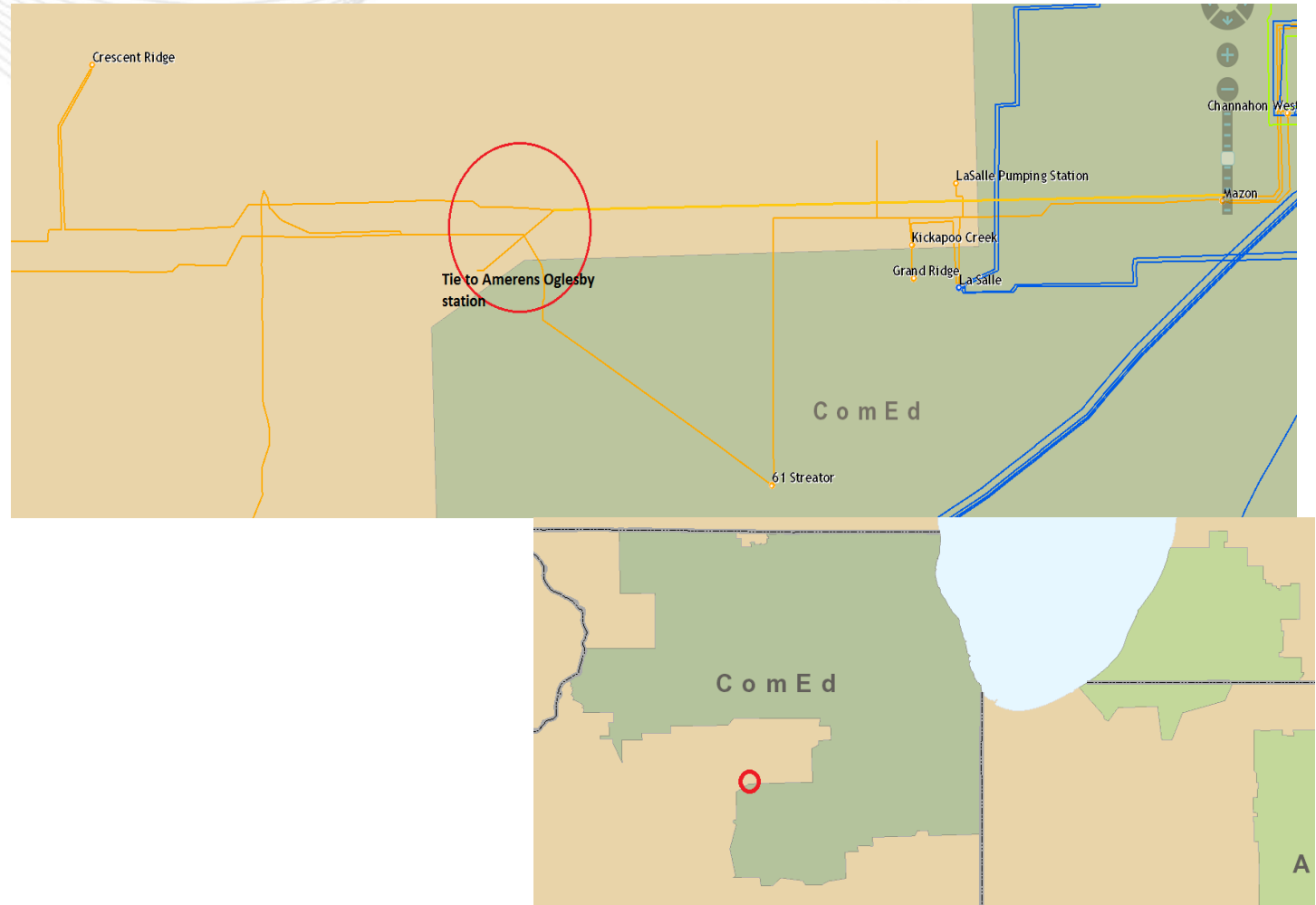
**Selected Solution:**

Cut 138kV line 7713 (Crescent Ridge- Mazon - Oglesby) in and out of the new Ameren Oglesby substation (Requires additional structures to facilitate the installation of the new substation and the cutting in and out of the existing 138kV line 7713) (**\$1554**)

**Estimated Cost:** \$1M for ComEd

**Projected In-service:** 12/31/2021

**Project Status:** Conceptual



*Previously presented on 2/14/2018 SRRTEP*

**Problem Statement:**

Replacing obsolete electromechanically relays with microprocessor relays

- Improved performance
- Add SCADA connectivity
- Allow real time data gathering of Transmission events

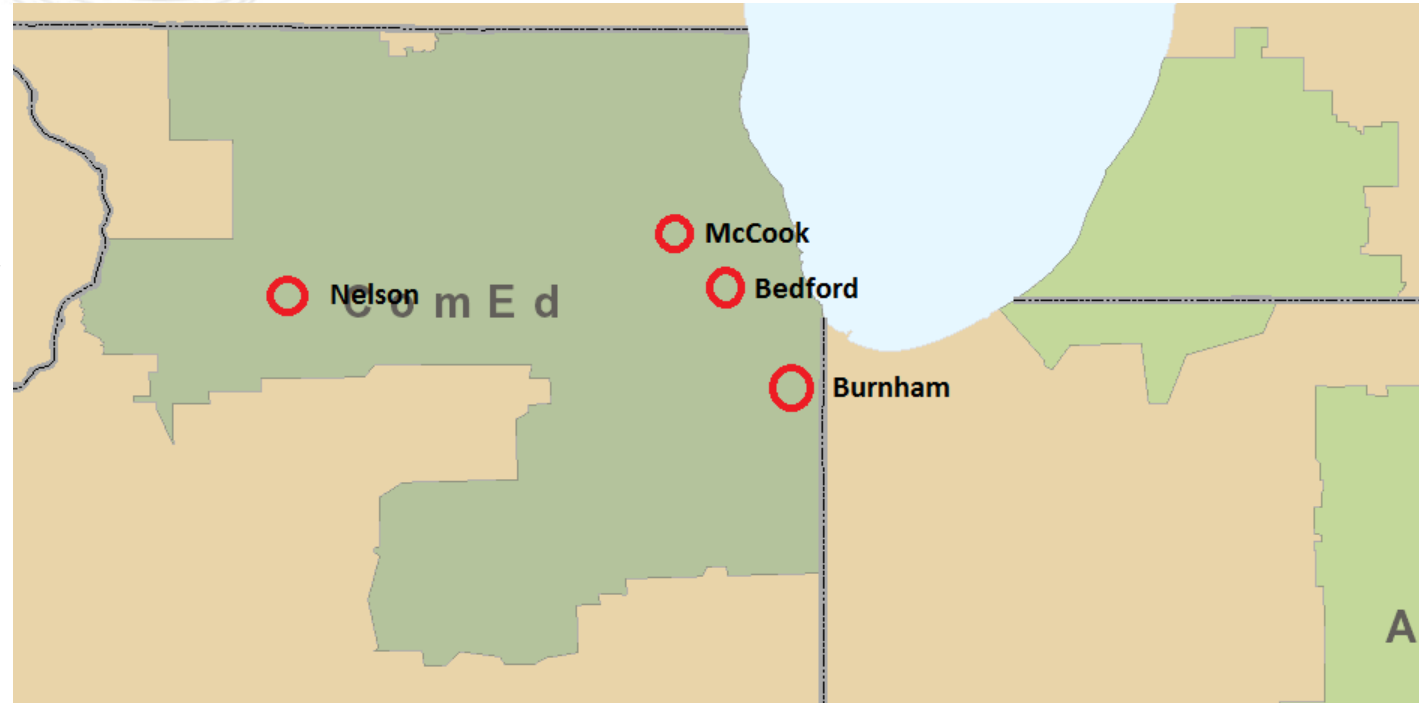
**Selected Solution:**

- Update relay packages at Nelson and Rockfalls on the 138kV line 15518 (Nelson-Rockfalls-Garden Plain) - \$0.64M (**\$1555.1**)
- Update relay packages at Bedford Park and Argonne on the 138kV line 5104 (McCook-Bedford Park-Burr Ridge) - \$0.64M (**\$1555.2**)
- Update relay packages at Burnham and Chicago Heights on the 138kV line 7307 (Burnham-Chicago Heights) - \$0.64M (**\$1555.3**)

**Estimated Cost:** Transmission \$320K per terminal

**Projected In-service:** 12/31/2018

**Project Status:** Engineering



*Previously presented on 2/14/2018 SRRTEP*

**Problem Statement:**

138kV line 17712 wave trap needs to be replaced due to material condition.

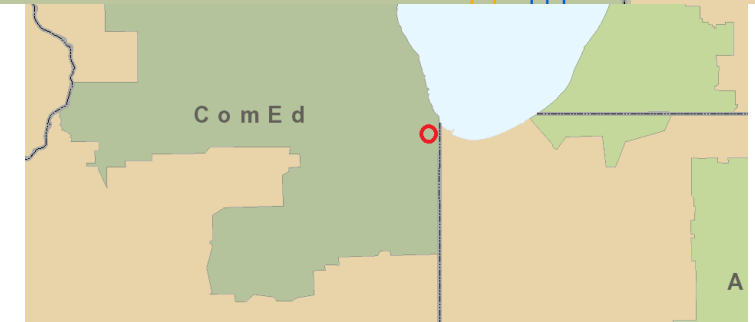
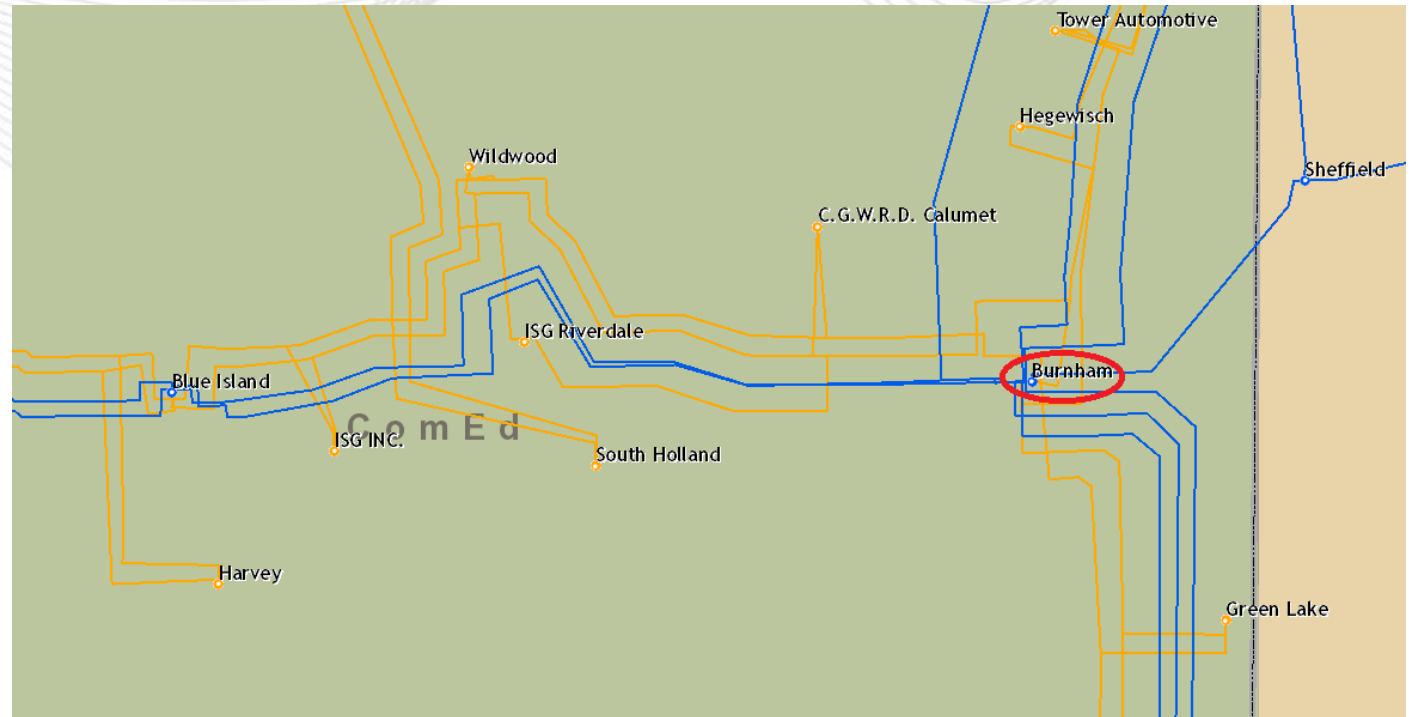
**Selected Solution:**

Replace the wave trap at the Burnham substation for 138kV line 17712 (Wildwood – Burnham-Hegewisch) (**\$1556**)

**Estimated Cost:** \$50K

**Projected In-service:** 12/31/2018

**Project Status:** Engineering





## Previously Reviewed at 2/8/2018 TEAC

### Problem Statement:

Lisle 345kV bus is currently configured as two separate straight buses with no line breakers and one transformer high side breakers

- A line fault will trip 345-138kV transformer on the same bus
- A transformer fault will trip the 345kV transmission line on the same bus for three of the four transformers

### Selected Solution:

Install a 345kV red/blue bus tie and breaker at Lisle 345KV substation, Close the new and existing red/blue bus ties creating a large hybrid ring bus so each bus contains a transmission line and a transformers; Install four 345kV line breakers and two 345kV high side transformer breakers; Third transformer high side breaker will be installed with the transformer is replaced (S1529)

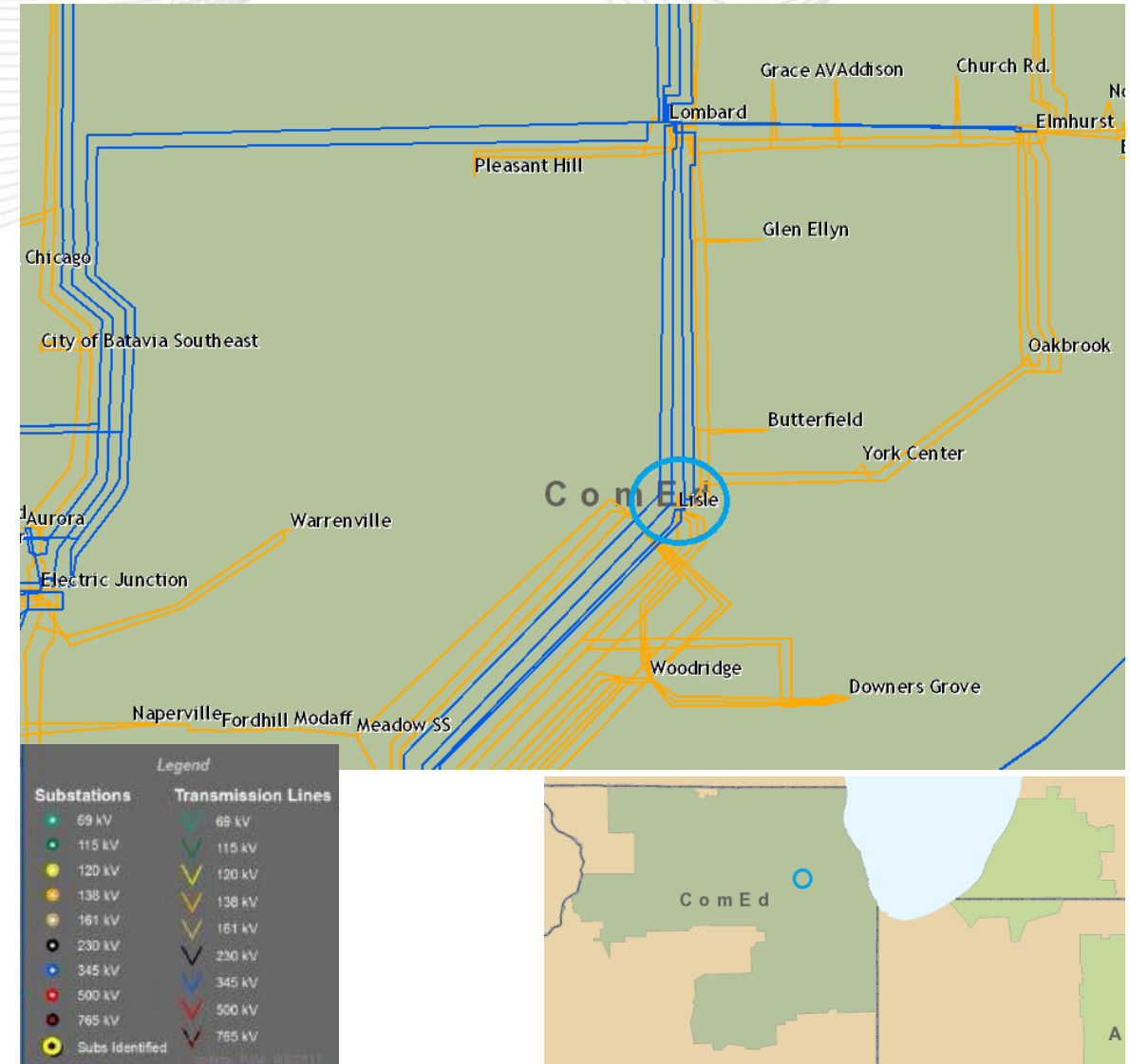
**Estimated Cost:** \$30M

### Alternatives:

- Rebuild Lisle 345kV as a breaker and a half using GIS equipment
  - Not enough land for open air construction
 Estimated Cost of \$45M + land purchase

**Projected In-service:** 12/31/2019

**Project Status:** Engineering



## Previously Reviewed at 2/8/2018 TEAC

### Problem Statement:

Wayne 345-138kV auto-transformer 84

- Westinghouse 7-million series shell form
- Susceptible to static electrification
- Cannot be re-blocked
- Acoustic testing show high vibration and sharp increases in frequencies associated with looseness in the core assembly.
- Low ability to withstand through fault

Transformer 84 shares a bus position with 345kV line 14419 (Wayne-Aurora E.C.)

Tertiary cap banks no longer allowed.

Tertiary cap bank failures stress the 345-138kV transformers and have caused transformer failures in the past.

### Selected Solution:

Replace Wayne 345-138kV transformer; Finish ring bus on red 345kV bus - Install two 345kV breakers;;Retire Tertiary cap bank and Install 138kV cap bank (S1530)

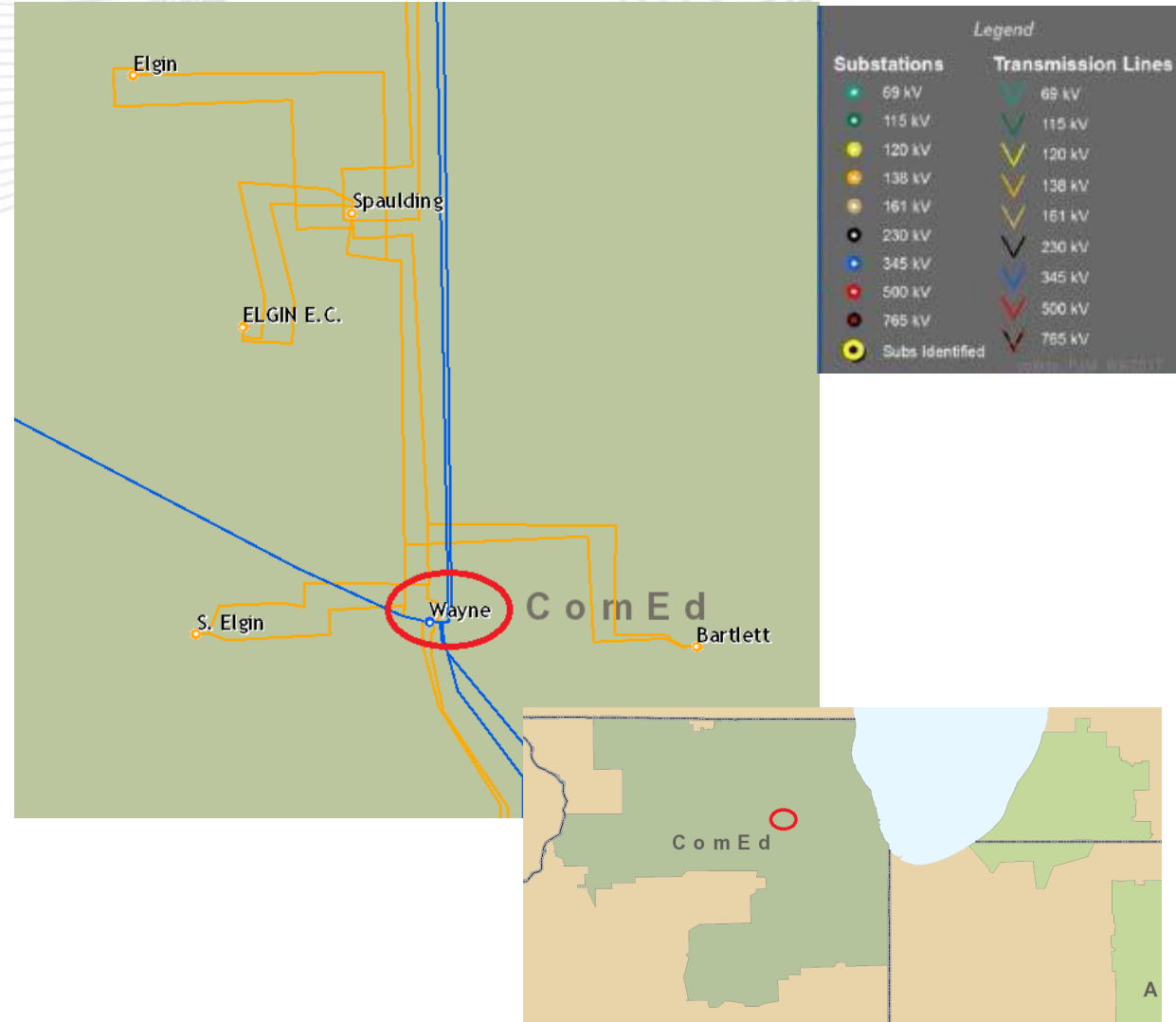
**Estimated Cost:** \$15M

### Alternatives:

- No feasible alternatives

**Projected In-service:** 12/31/2019

**Project Status:** Engineering



## Previously Presented: 7/27/2018 SRRTEP

### Problem Statement:

2017 emergent project to replace failed 138kV line 11712 breaker moved Chicago Heights transformer 79 from line 11712 to line 7306  
 Transformer 79 is still connected to a transmission line  
 Chicago Heights substation is a straight bus with multiple elements on the same bus

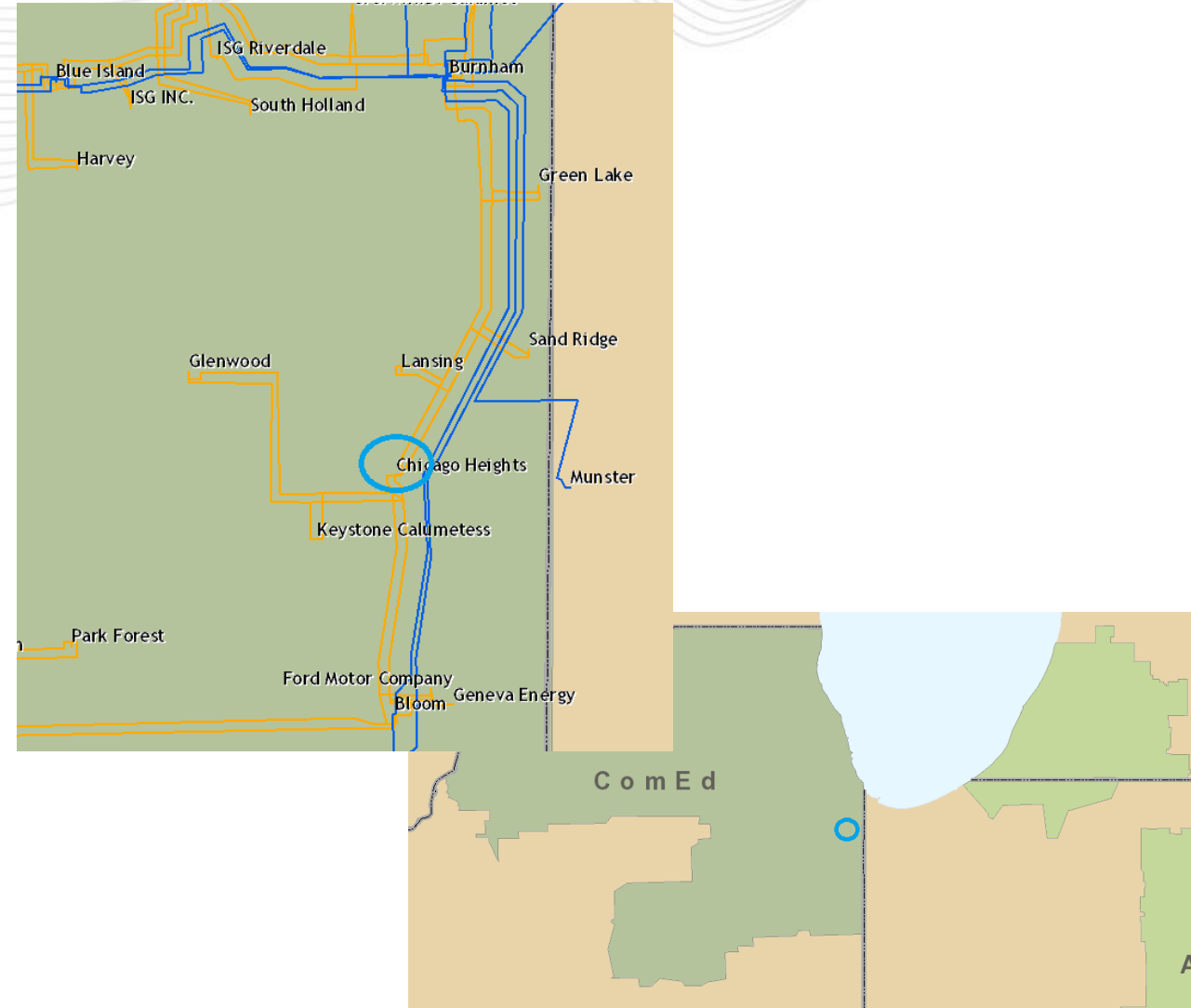
### Selected Solution:

Install new 138kV bus tie breaker at Chicago Heights Station and  
 Install new transformer high side breaker and move transformer connection from 138KV line 7306 (from TSS 179 Bloom to TSS 73 Chicago Heights) to the 138kV bus (**\$1685**)

**Estimated Cost:** \$2.25M Transmission cost and \$2.25M Distribution cost

**Projected In-service:** 12/31/2018

**Project Status:** Engineering





**Previously Presented: 7/27/2018 SRRTEP**

**Problem Statement:**

Continued load growth in the Elk Grove Village area requires additional 34kV capacity.

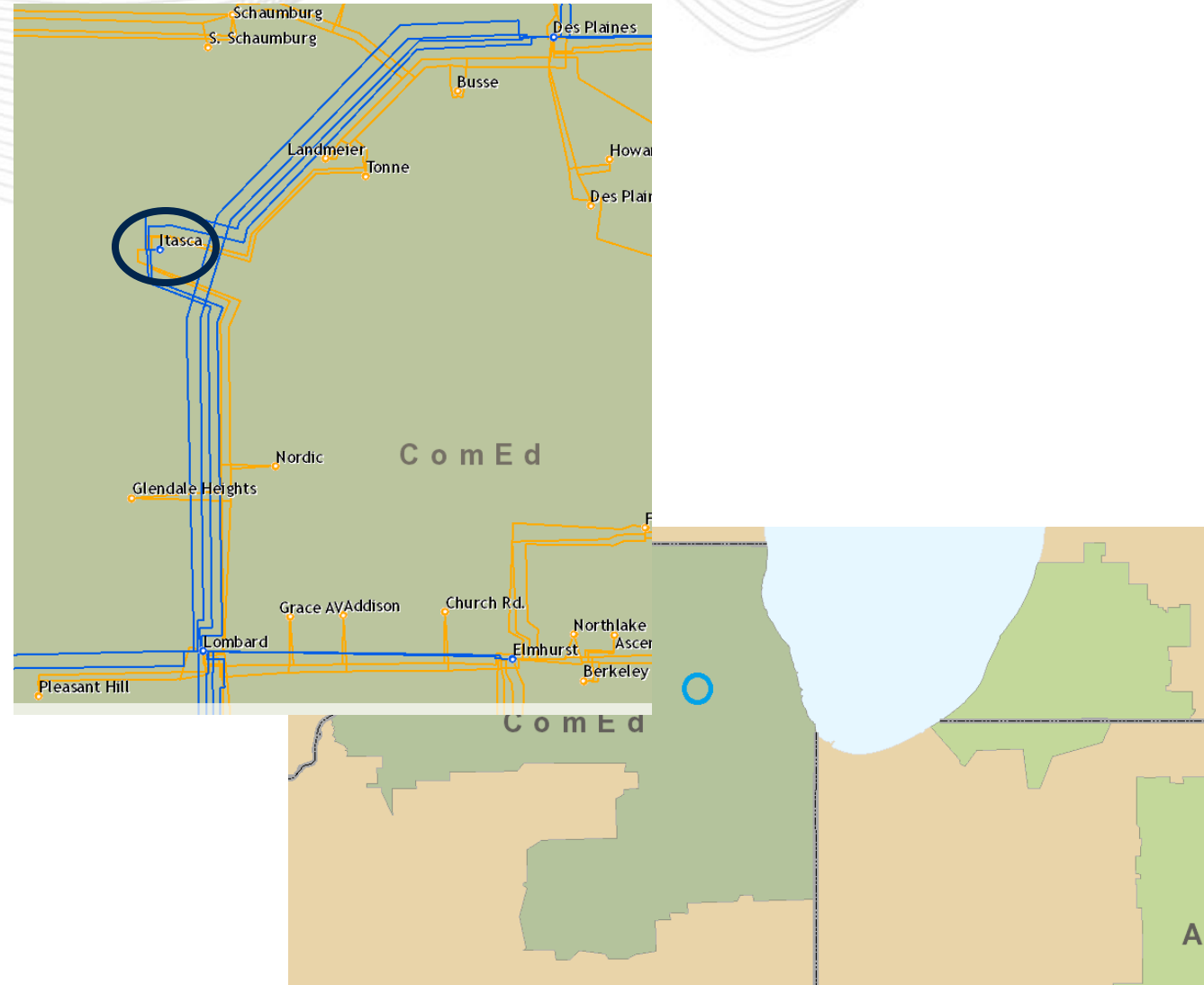
**Selected Solution:**

Install third 138kV to 34kV transformer at Itasca station.  
 Move 138kV line 12015 (from TSS 120 Lombard to TSS 101 Itasca) to the 138kV Itasca bus extension (**\$1686**)

**Estimated Cost:** \$2.2M Transmission

**Projected In-service:** 6/1/2019

**Project Status:** Engineering





# RMU/ComEd

Previously Presented: 3/9/2018 SRRTEP

**Problem Statement:**

Rochelle Municipal Utilities (RMU) currently has two 138 kV lines serving its load; the TSS 169 (McGirr Road)/TSS 186 (Steward) – H440 (Caron Road) 138 kV line and the RMU H445 (Twombley) – Steward 138kV line. These lines are fairly close together and are electrically from the same source; they both run south to north. A severe storm could potentially take out both lines simultaneously, which would result in an unacceptably long outage during line reconstruction. For example, on Nov. 17th, 2013, a tornadic wind shear took down 22 poles on the transmission system at the same time a ComEd planned outage had RMU down to one line, resulting in a system interruption.

**Selected Solution:**

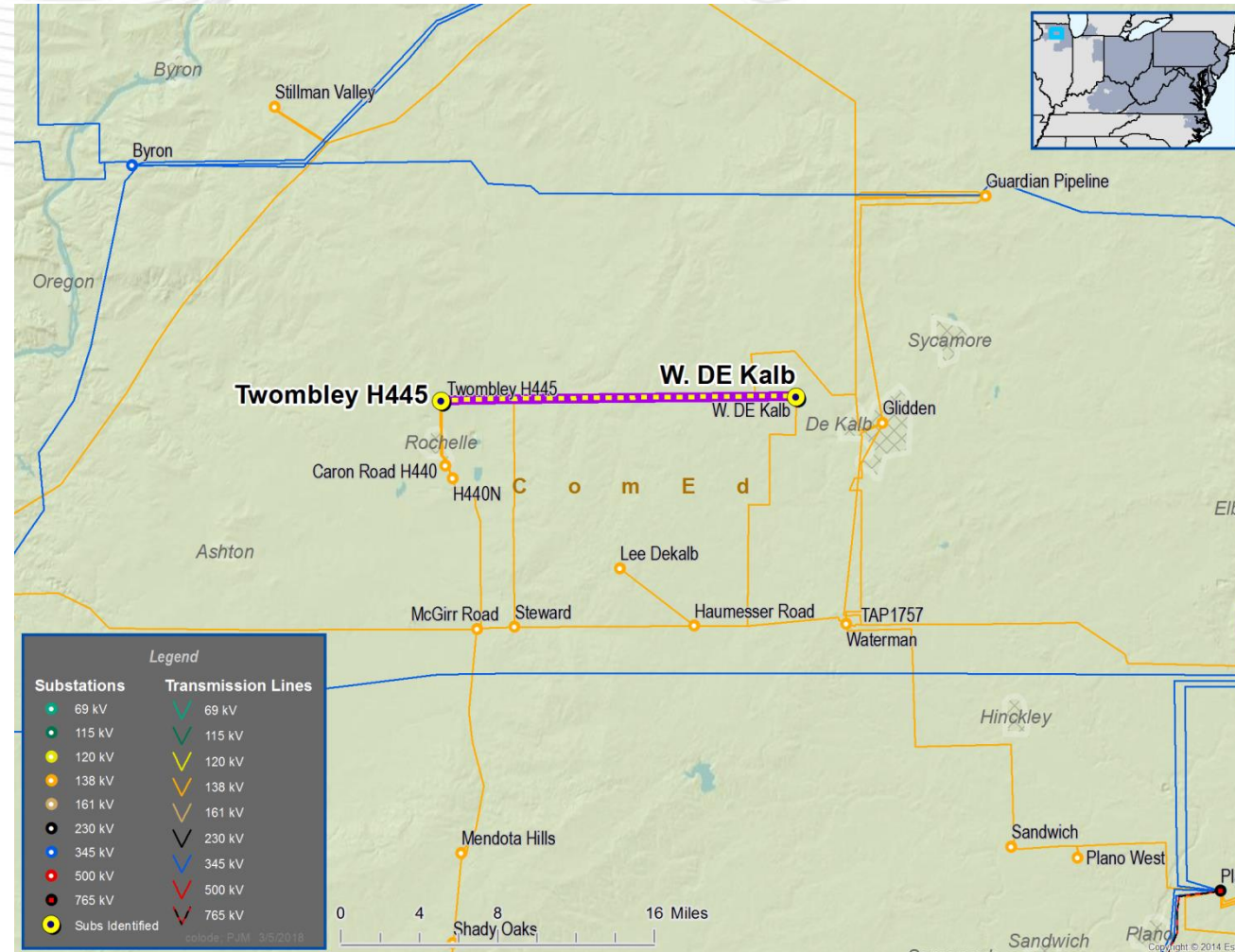
Construct a new line from the Twombley Road substation to a tap of the West DeKalb to Glidden 138 kV line just outside the West DeKalb 138 kV substation. **(\$1533.1)**

ComEd side work at West DeKalb to accommodate the Connection. **(\$1533.2)**

**Estimated Cost:** \$18M (\$17M RMU & \$1M ComEd)

**Projected In-service:** 10/1/2021

**Project Status:** Engineering





# DEOK

Previously presented on 1/8/2018 SR RTEP

**Problem Statement:**

Augustine had a single transformer with two secondary windings each feeding individual distribution buses. When that transformer failed its emergency replacement did not have the full capacity of the failed transformer. More capacity is needed for the substation.

Driver : Operational Flexibility and Efficiency, Risk

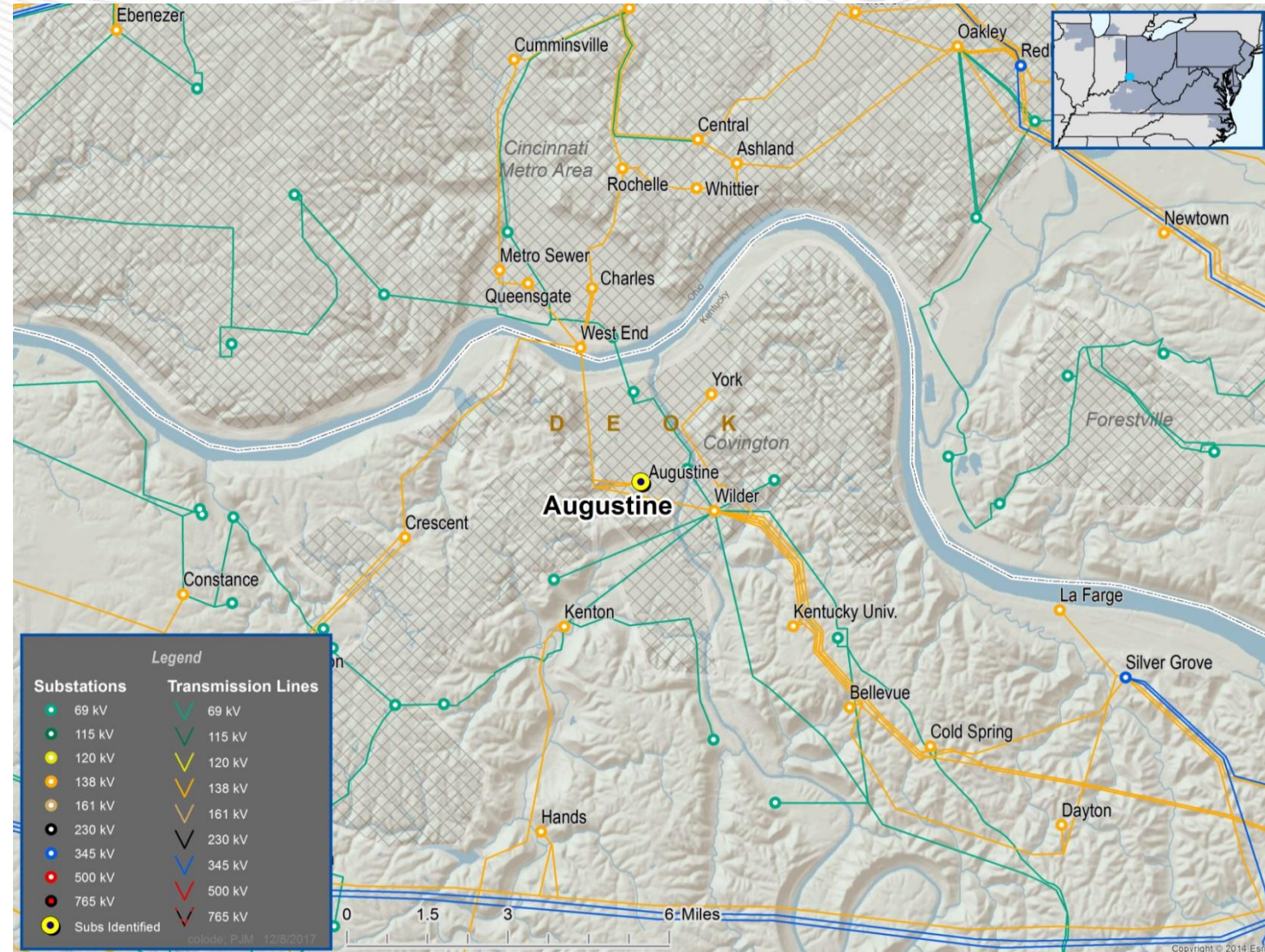
**Selected Solution:**

Add a second 138/13 kV, 22 MVA transformer to feed the Augustine bus. Reconfigure the substation so that the load is distributed across the three transformer/buses. (**\$1484**)

**Estimated Cost:** \$0.35M

**Projected In-service:** 12/1/2018

**Project Status:** Engineering





Previously presented on 1/8/2018 SRRTEP

**Problem Statement:**

The 138 kV feeder between Warren and Nickel substations is aged and in deteriorating condition (1940's era). The feeder has seen an increase in outages in the recent past due to its condition.

Driver: Equipment Material Condition, Performance and Risk

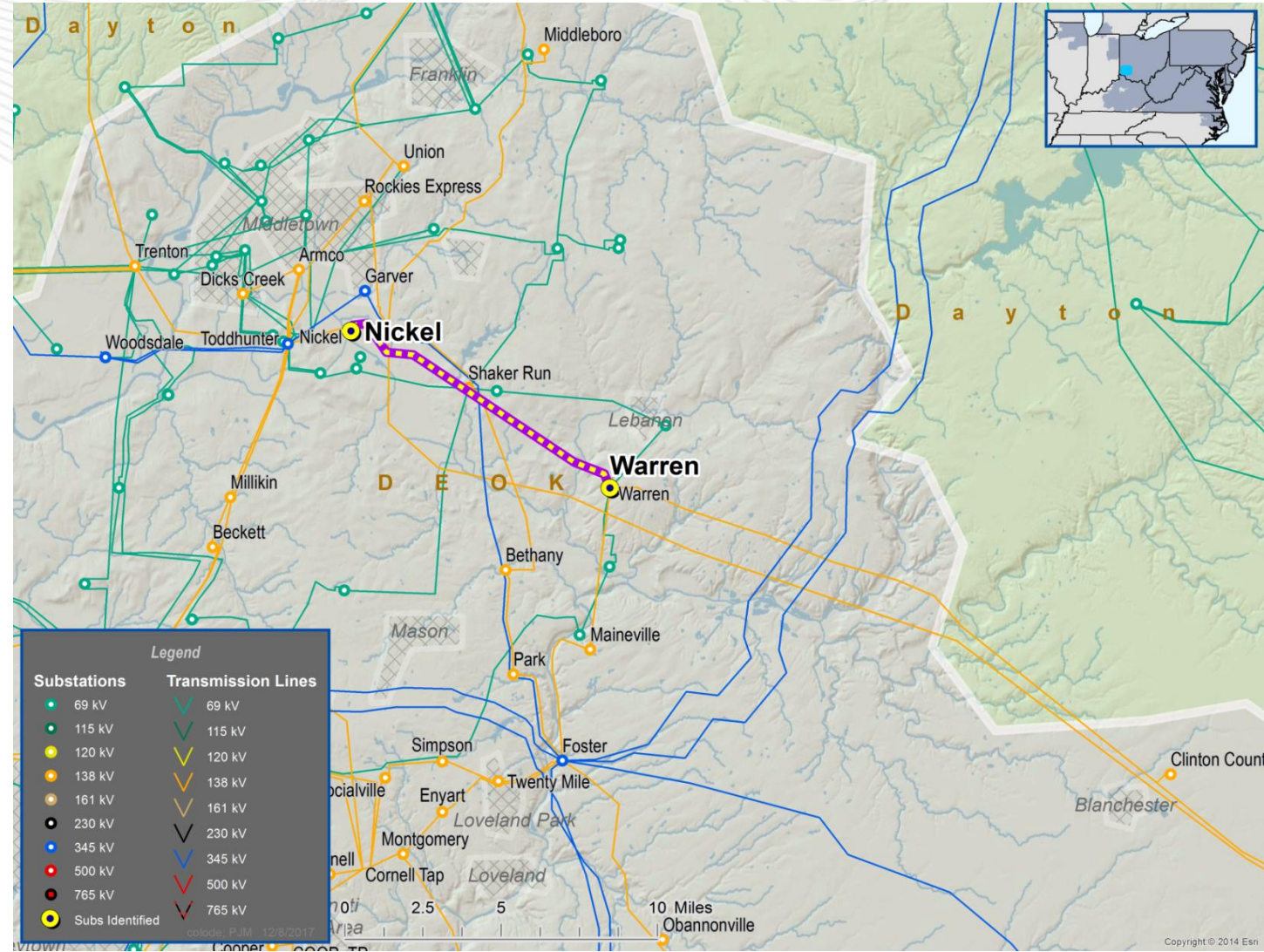
**Selected Solution:**

Rebuild 5.8 miles of feeder between Warren and Nickel 138kV substations with 76 new structures, hardware, and conductor. Capacity of the line will increase from 198MVA to 300MVA. (**\$1485**)

**Estimated Cost:** \$15M

**Projected In-service:** 12/1/2018

**Project Status:** Engineering





Previously Presented: 3/9/2018 SR RTEP

**Problem Statement:**

The breakers at each end of a 138kV line connecting Beckjord and Red Bank are vintage 1973 and 1981 respectively, obsolete, oil filled breakers.

Driver : Equipment Condition, Performance and Risk

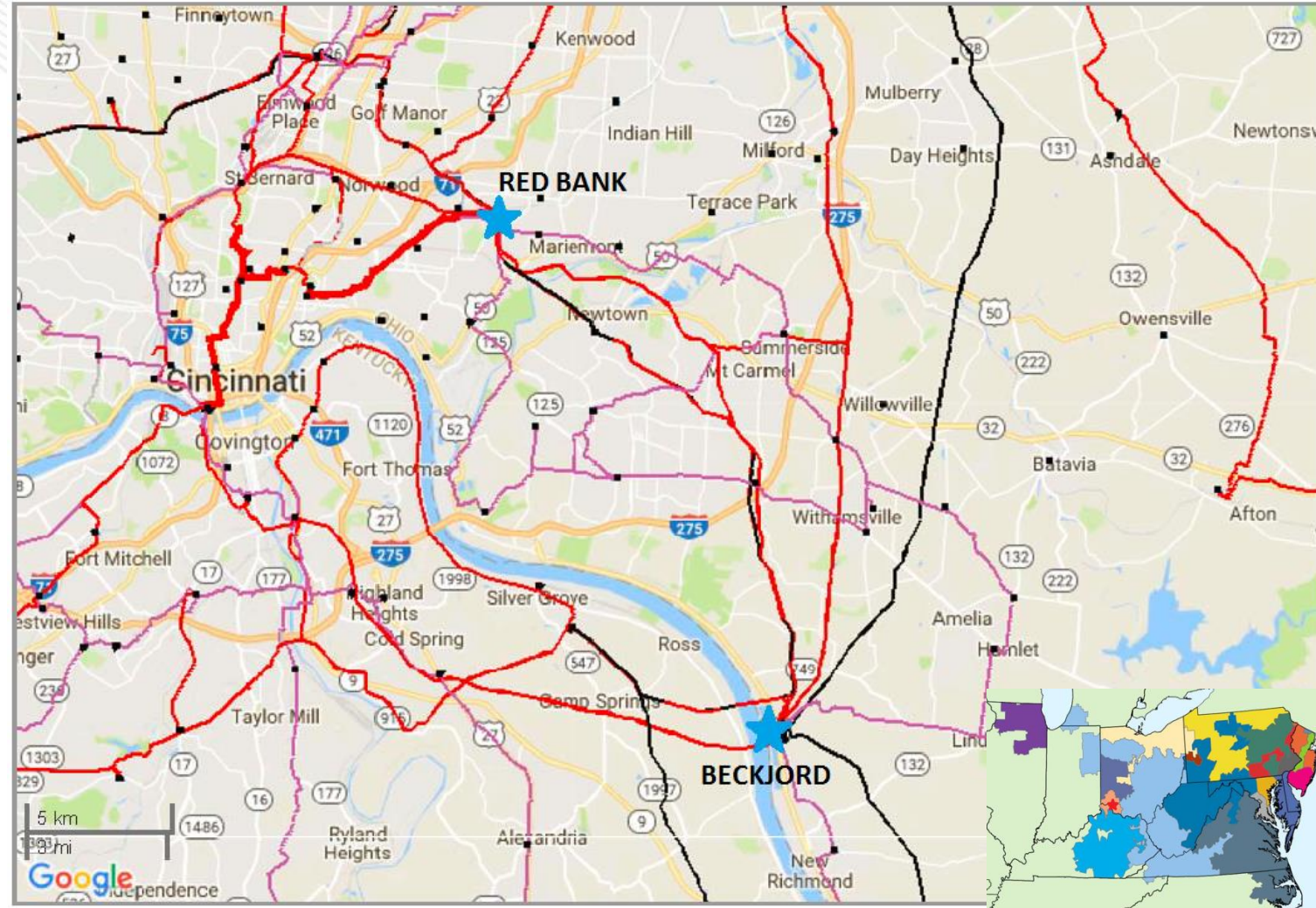
**Selected Solution:**

Replace the breakers, breaker disconnects, and metering equipment at Beckjord and Redbank 138kV. The Beckjord – Red Bank 138KV Branch rating will increase to 340 MVA (conductor limited). **(\$1534)**

**Estimated Cost:** \$1.86 M

**Projected In-service:** 12/31/2018

**Project Status:** Scoping



Previously Presented: 3/9/2018 SRRTEP

**Problem Statement:**

Load growth requires expanding Dixie substation.

Driver : Customer Service

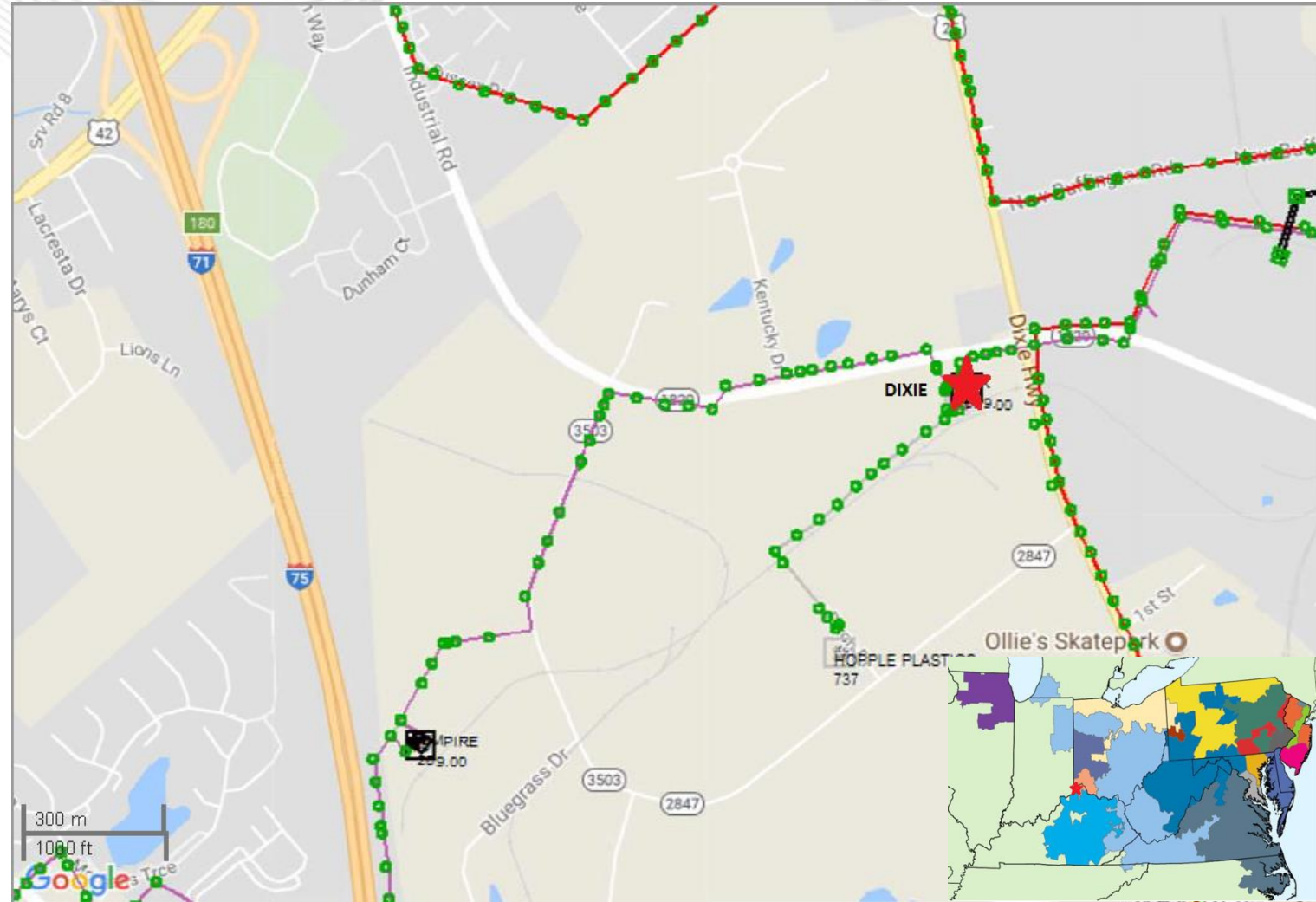
**Selected Solution:**

Install a 69/13 kV 10 MVA transformer, bus work and breakers at Dixie 69KV substation to support two new distribution feeders. **(S1535)**

**Estimated Cost:** \$0 M

**Projected In-service:** 12/31/2018

**Project Status:** Scoping





Previously Presented: 3/9/2018 SR RTEP

**Problem Statement:**

The 13kV switchgear at Ebenezer is obsolete and in deteriorating condition. Space limitations for new gear require 69/13kV TB4 to be moved.

Driver : Equipment Condition, Performance and Risk

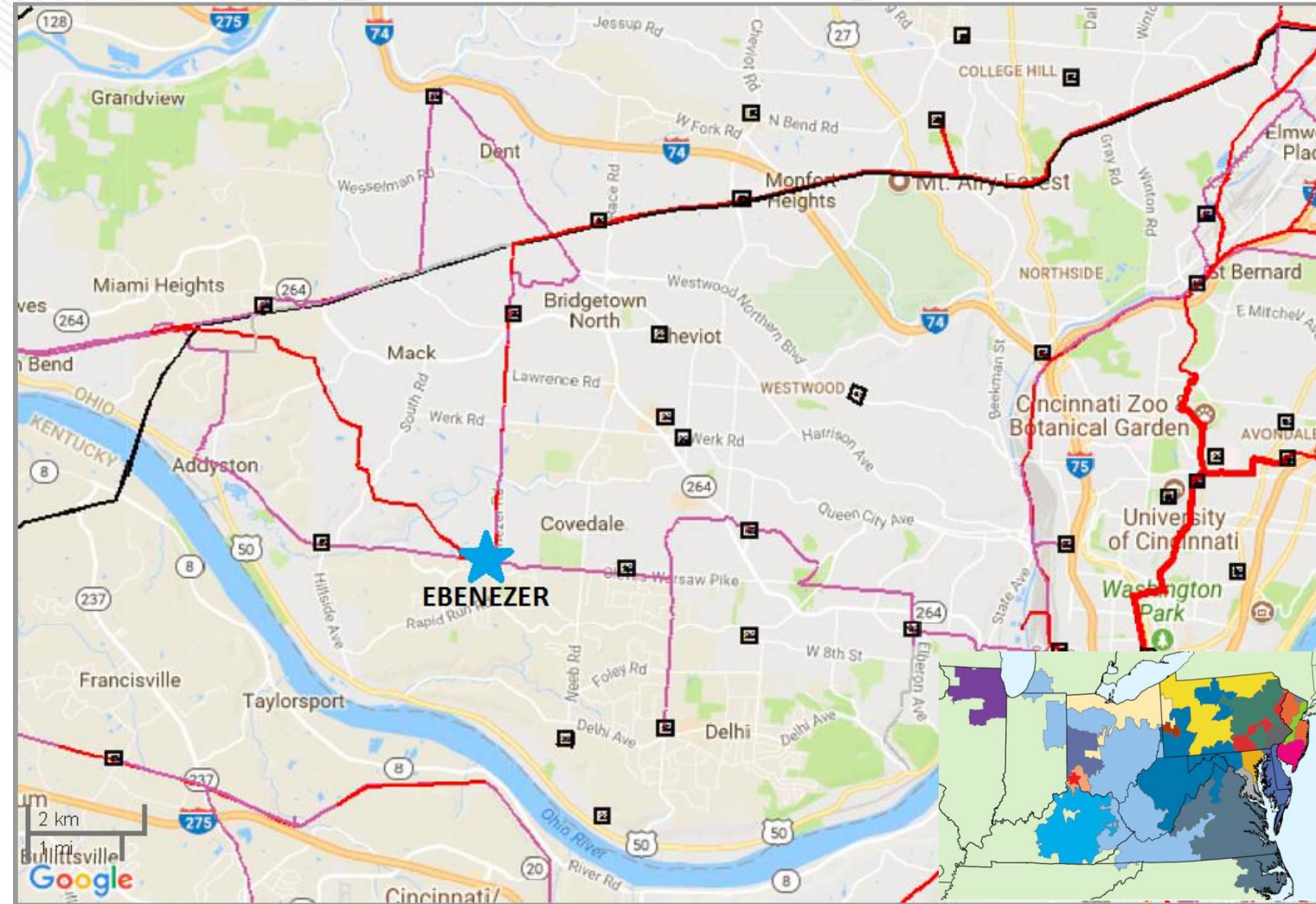
**Selected Solution:**

Replace the 13kV switchgear at Ebenezer and 69/13kV TB4 with a new transformer. (**\$1536**)

**Estimated Cost:** \$0 M

**Projected In-service:** 12/31/2018

**Project Status:** Scoping





Previously Presented: 3/9/2018 SR RTEP

**Problem Statement:**

The 69 kV feeder between Evendale and Port Union substations is aged and in deteriorating condition (1950's era).

Driver: Equipment Material Condition, Performance and Risk

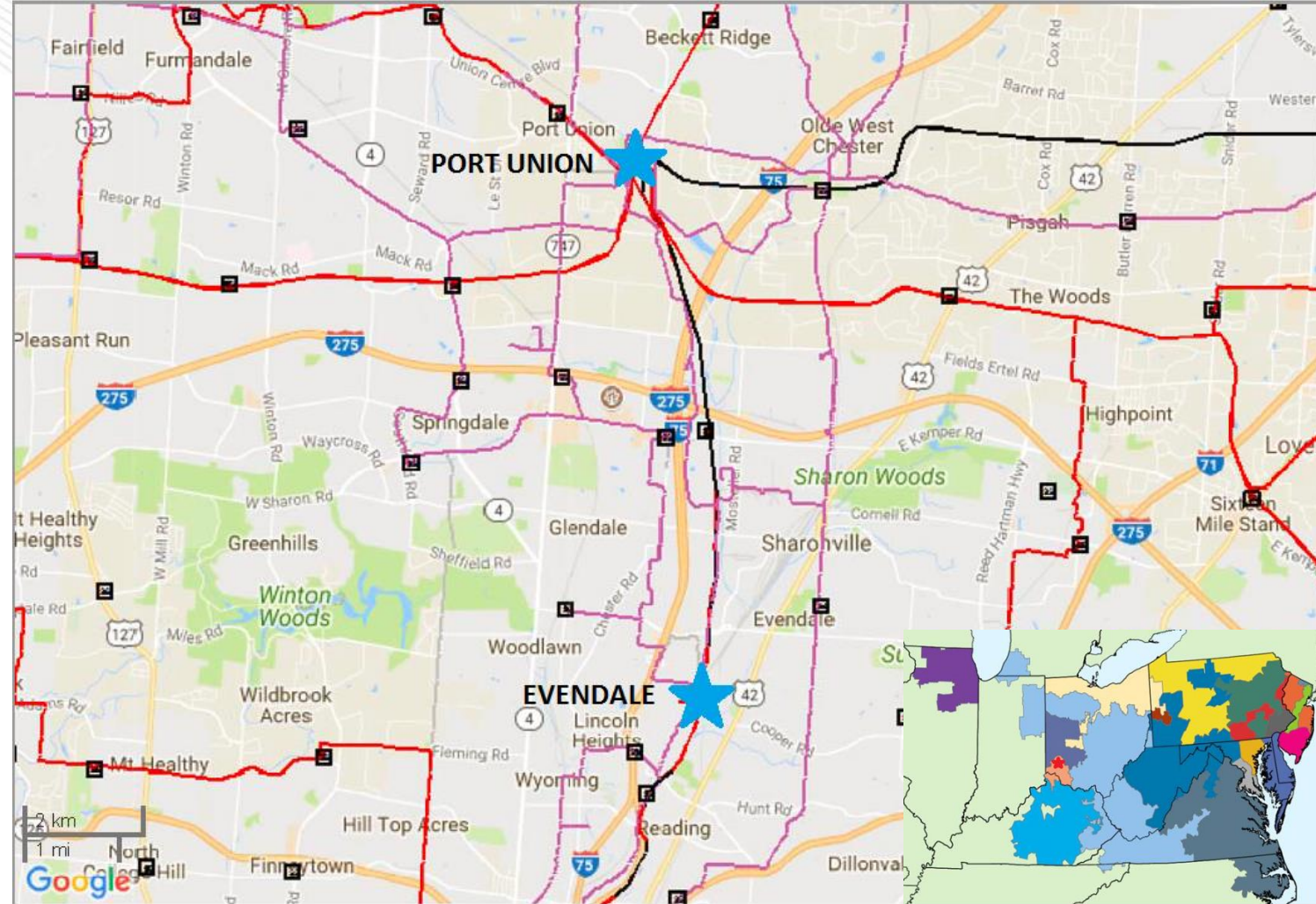
**Selected Solution:**

Rebuild 9.5 miles of feeder between Evendale and Port Union 69kV substations with new structures, hardware, switches and conductor. Capacity will increase from 97 MVA to 114 MVA (through bus limited). (**\$1537**)

**Estimated Cost:** \$10.8 M

**Projected In-service:** 12/1/2018

**Project Status:** Scoping



Previously Presented: 3/9/2018 SRRTEP

**Problem Statement:**

A distribution feeder suffers low voltage and overload when one of the two end sources is lost.

Driver : Customer Service

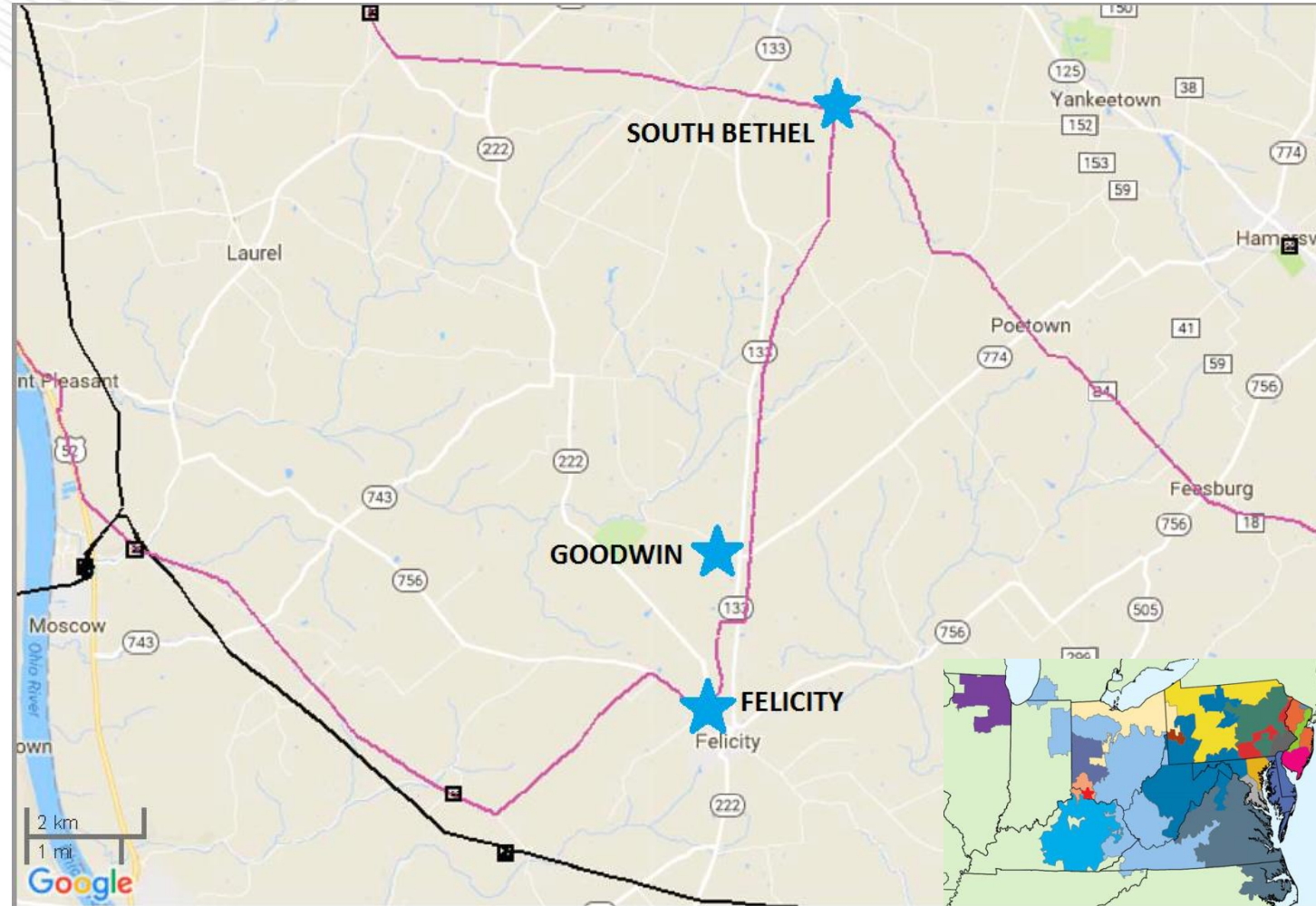
**Selected Solution:**

Build a new 69/13kV distribution Goodwin substation separating the South Bethel – Felicity 69KV feeder into two segments. Install a 69/13 kV 10 MVA transformer, bus work and breakers to support the distribution feeders. (**\$1538**)

**Estimated Cost:** \$0 M

**Projected In-service:** 12/31/2018

**Project Status:** Scoping





Previously Presented: 3/9/2018 SRRTEP

**Problem Statement:**

The 69 kV feeder between Locust and Todd substations is aged and in deteriorating condition (1950's era).

**Driver:** Equipment Material Condition, Performance and Risk

**Selected Solution:**

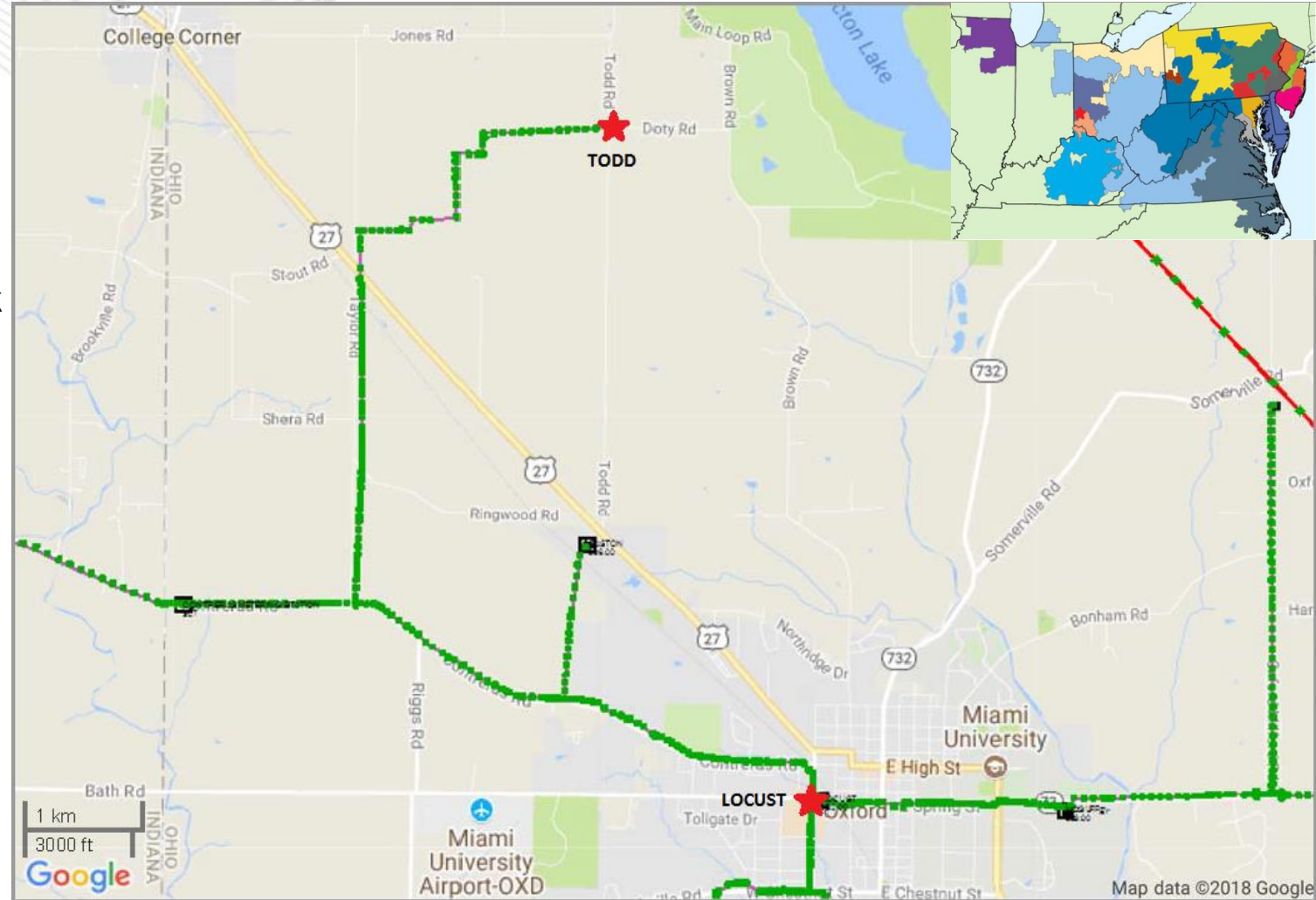
Rebuild 6.4 miles of 69kV feeder between Locust and Todd substations with 54 new structures, hardware, and conductor. Capacity of the line will increase from 56 MVA to 117 MVA.

**(\$1539)**

**Estimated Cost:** \$7.5 M

**Projected In-service:** 12/1/2018

**Project Status:** Scoping





Previously Presented: 3/9/2018 SR RTEP

**Problem Statement:**

There is high winter loading and low voltage on a New Richmond 13kV distribution feeder.

Driver : Customer Service

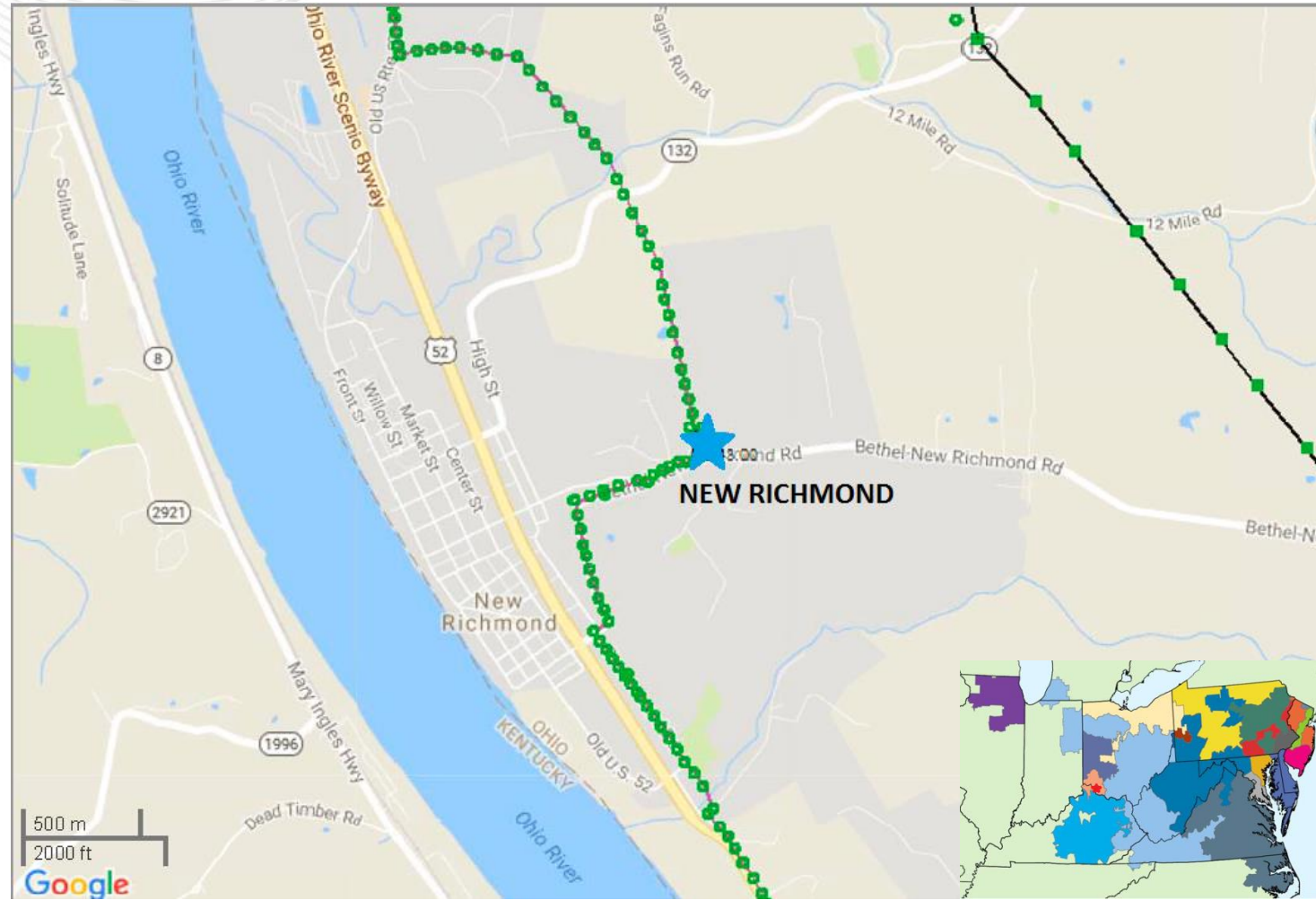
**Selected Solution:**

Split the feeder into three segments all terminating at New Richmond 69KV substation. Install a 69/13 kV 10 MVA transformer, bus work and breakers to support two new distribution feeders. **(S1540)**

**Estimated Cost:** \$0 M

**Projected In-service:** 12/31/2018

**Project Status:** Scoping



Previously Presented: 3/9/2018 SRRTEP

**Problem Statement:**

Distribution load at Oakbrook substation is predicted to grow due to new commercial development.

Driver : Customer Service

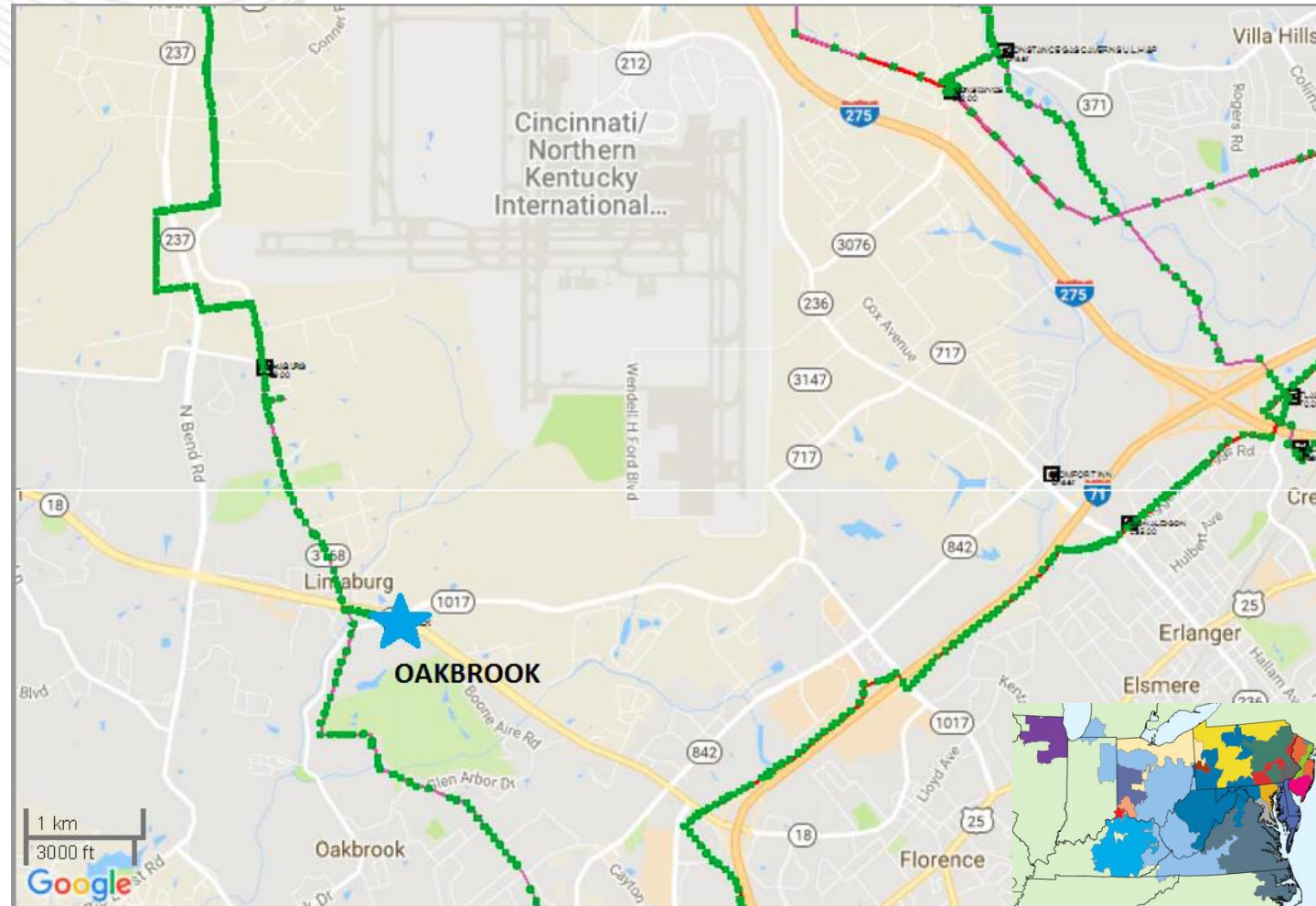
**Selected Solution:**

Install a 69/13 kV 10 MVA transformer, bus work and breakers at Oakbrook to support two new distribution feeders. (**\$1541**)

**Estimated Cost:** \$0 M

**Projected In-service:** 12/31/2018

**Project Status:** Scoping





Previously Presented: 3/9/2018 SRRTEP

**Problem Statement:**

The tie breaker between Redbank 138kV buses one and two is a vintage 1975, obsolete, oil filled breaker and is stuck open (will not stay closed).

Driver : Equipment Condition, Performance and Risk

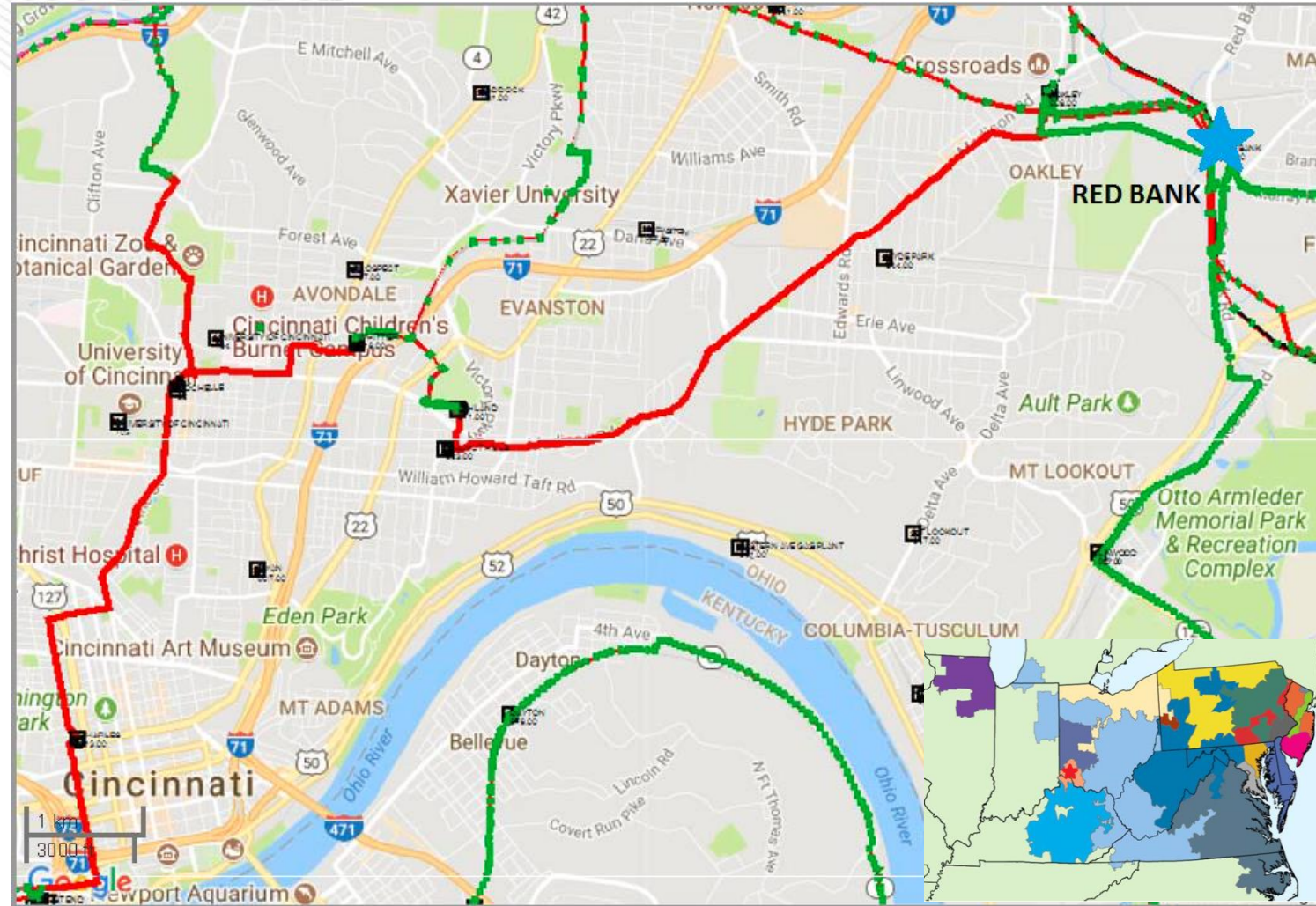
**Selected Solution:**

Replace the tie breaker between Redbank 138kV buses .  
(S1542)

**Estimated Cost:** \$1M

**Projected In-service:** 12/31/2018

**Project Status:** Scoping





Previously Presented: 3/9/2018 SRRTEP

**Problem Statement:**

The 69 kV feeder between Summerside substation to the customer tap at Senco is aged and in deteriorating condition (1970's era).

Driver: Equipment Material Condition, Performance and Risk

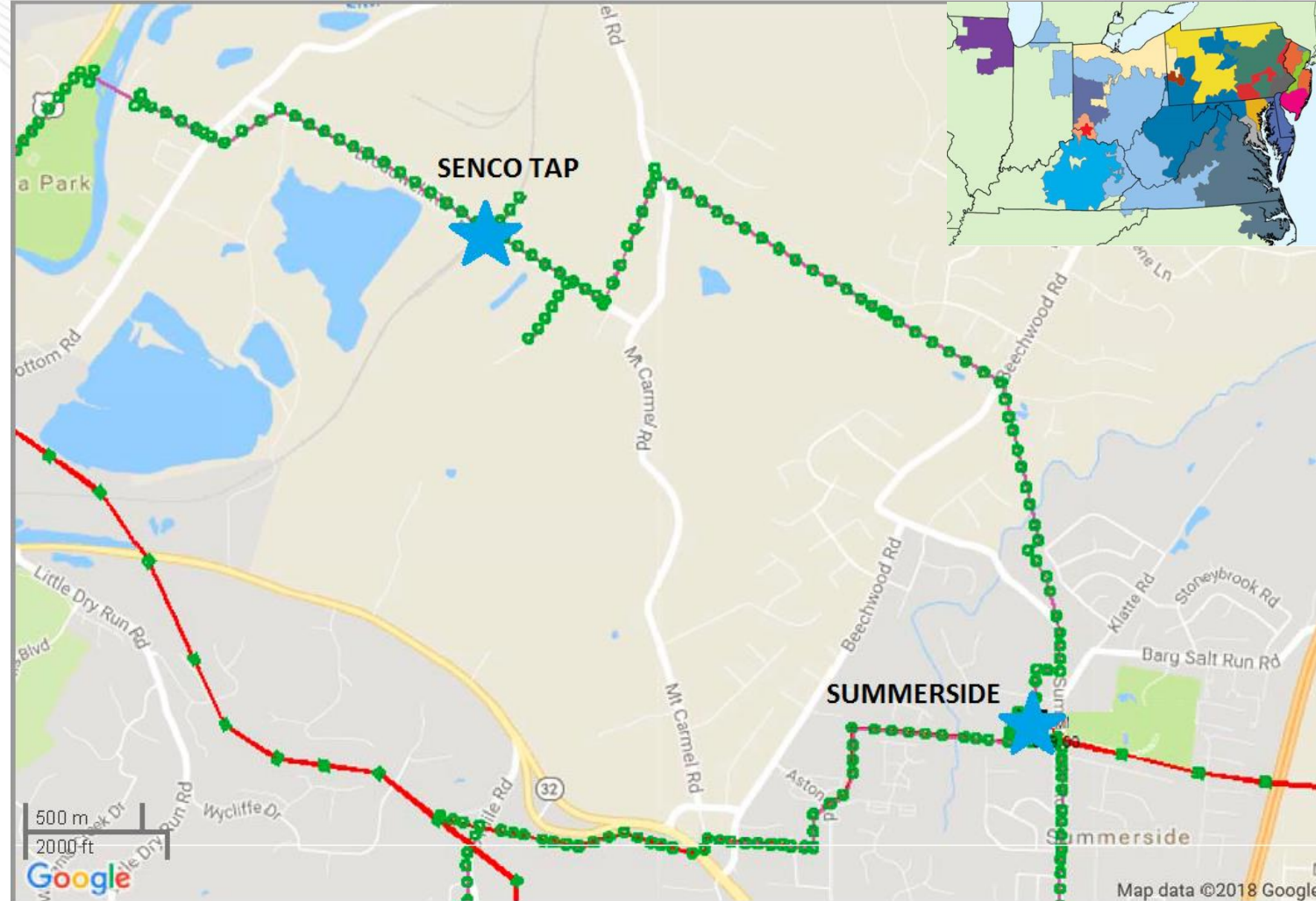
**Selected Solution:**

Rebuild 2.9 miles of 69kV feeder between Summerside substation and the Senco tap with 54 new structures, hardware, and conductor. Capacity of the line will increase from 99 MVA to 160 MVA. (**\$1543**)

**Estimated Cost:** \$2.95 M

**Projected In-service:** 12/1/2018

**Project Status:** Scoping







**Previously Presented: 3/27/2018 SRTEP**

**Problem Statement:**

The 69 kV feeder between Princeton and Port Union substations is aged and in deteriorating condition (1950's era).

**Driver:** Equipment Material Condition, Performance and Risk

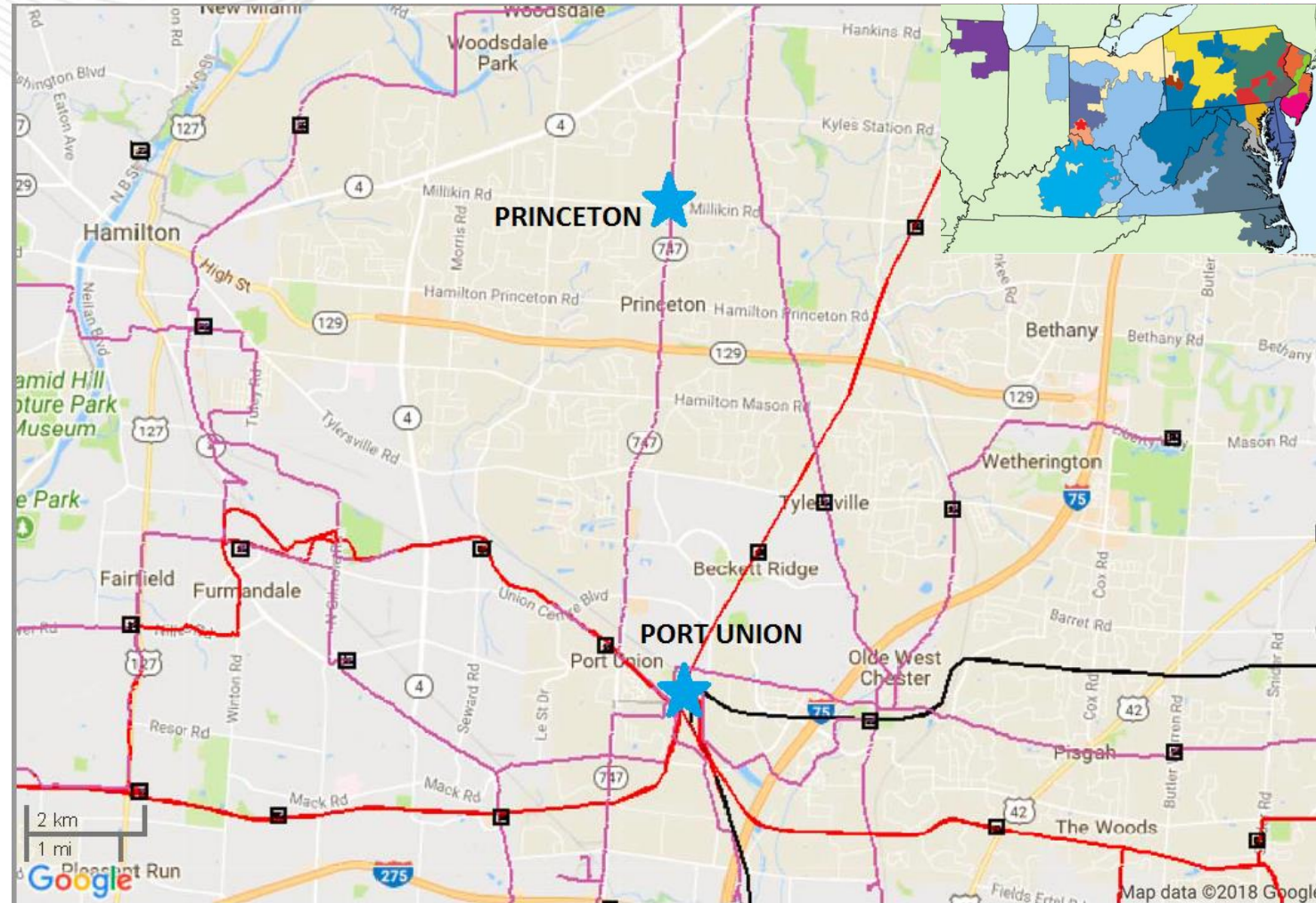
**Selected Solution:**

Rebuild 5.8 miles of feeder between Princeton and Port Union substations with 161 new structures, hardware, and conductor. Capacity of the line will increase from 99 MVA to 121 MVA (terminal eq. limited). (**\$1587**)

**Estimated Transmission Cost:** \$7.5 M

**Projected In-service:** 12/1/2018

**Project Status:** Scoping





## Previously Presented: 8/31/2018 SRRTEP

### Problem Statement:

Continued load growth in the Mt. Zion area requires additional capacity.

**Driver:** Customer Service

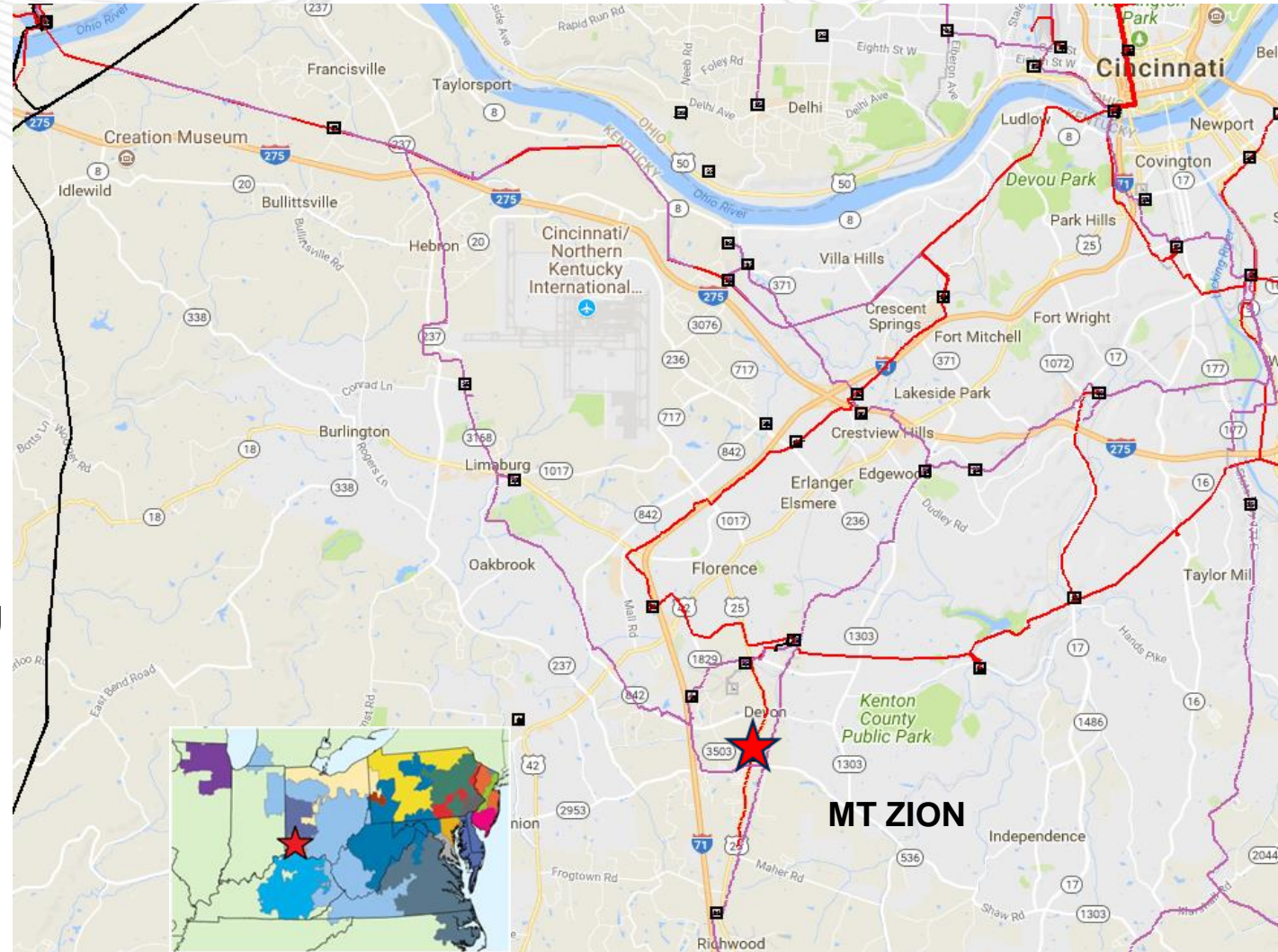
### Selected Solution:

Expand the Mt. Zion Substation installing equipment to support two additional distribution circuits including the installation of a 138/13 kV transformer. The transmission scope includes installing a 138 kV circuit breaker, breaker disconnects and bus work, relocating transmission structure, replacing CCVTs, adding relaying, and installing a 138 kV line switch. (**\$1739**)

**Estimated Cost:** \$2.12 M (transmission assets only)

**Projected In-service:** 12-31-2019

**Project Status:** Engineering





**Previously Presented: 8/31/2018 SR RTEP**

**Problem Statement:**

Continued load growth in the Donaldson area requires additional capacity. With the current substation arrangement any of five breaker, seven transformer, or four bus faults have the potential to trip nine transmission to distribution transformers on the feeder from Buffington to Florence to Donaldson to Crescent.

**Driver:** Customer Service, Operational Flexibility, Resilience

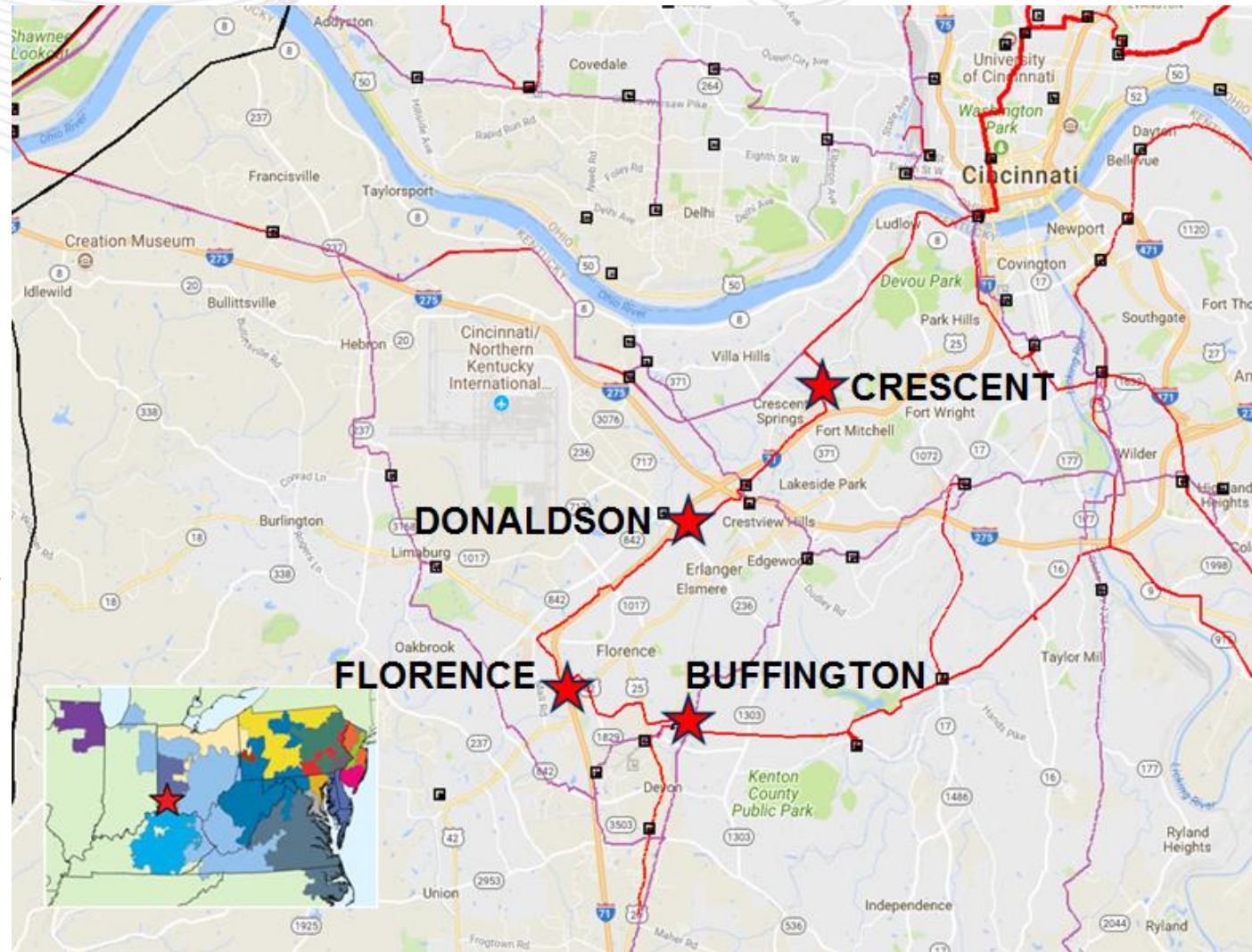
**Selected Solution:**

Expand the Donaldson Substation installing equipment to support four additional distribution circuits including two 138/13 kV transformers. The transmission scope includes installing a 4-breaker 138 kV ring bus with four new 138 kV breakers, associated breaker disconnects, new bus work, new structure, new CCVTs, relaying, and line disconnects. (**\$1740**)

**Estimated Cost:** \$4.14 M (transmission assets only)

**Projected In-service:** 12-31-2019

**Project Status:** Engineering





## Previously Presented: 8/31/2018 SR RTEP

### Problem Statement:

Buffington 139/69/13 kV 100/100/35 MVA Transformer TB1 is 60 years old and has shown increasing levels of acetylene and ethylene gasses over the past three years. TB1's tertiary winding is connected to a 3 phase grounding/regulating transformer which exposes TB1 to distribution faults. If TB1 has to be replaced in an emergency situation it would take an extended length of time. The existing transformer foundation will not accept the replacement transformer.

**Driver:** Equipment Condition, Resilience

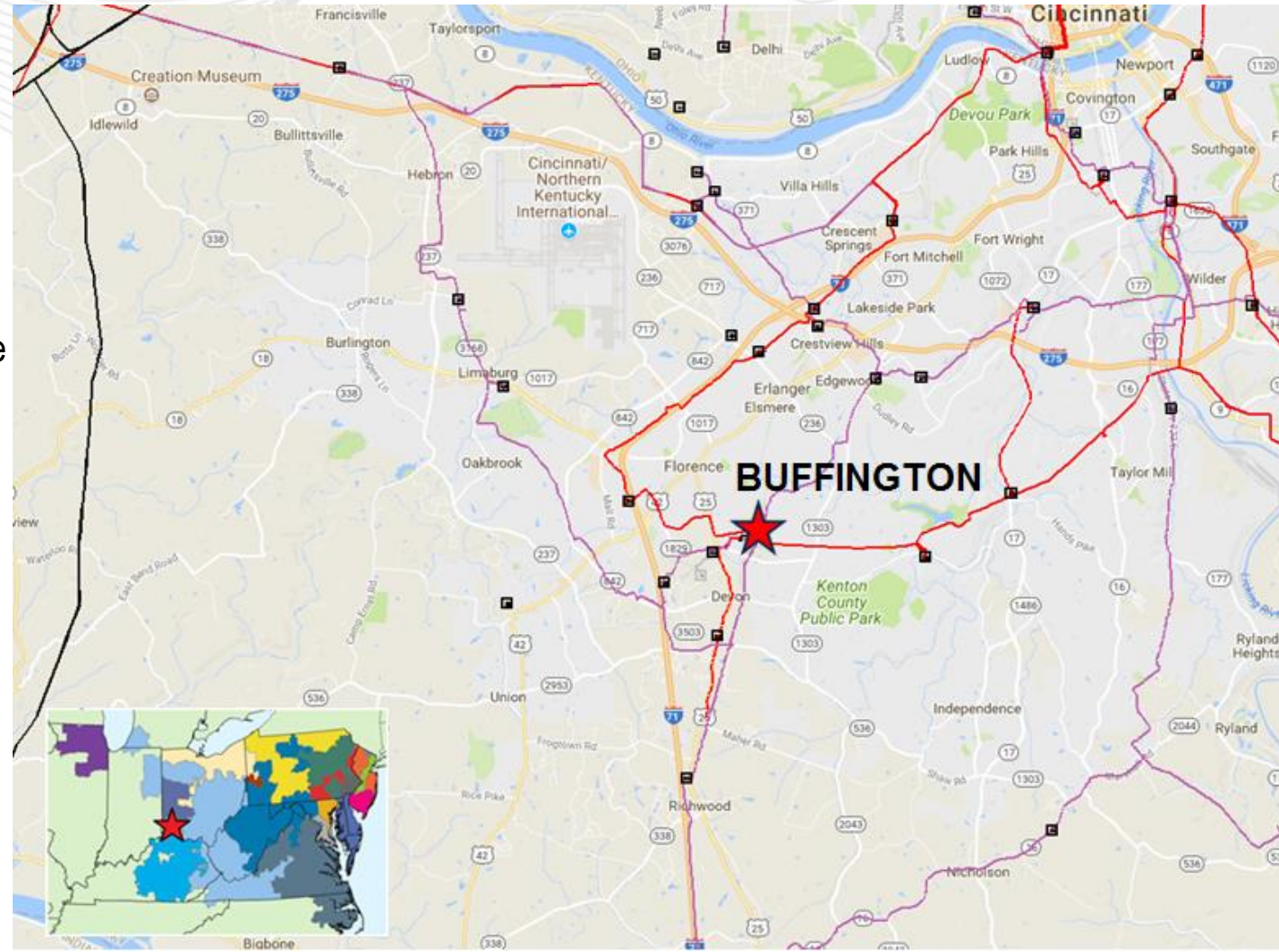
### Selected Solution:

Remove the 3 phase grounding/regulating transformer. Replace TB1 with a 138/69 kV 150 MVA transformer with no tertiary winding. (**\$1741**)

**Estimated Cost:** \$2.90 M

**Projected In-service:** 12-31-2020

**Project Status:** Scoping





**Previously Presented: 8/31/2018 SR RTEP**

**Problem Statement:**

Villa 69/13 kV 22.4 MVA transformer TB2 feeding Bus 2 is 52 years old. The in-oil tap changer is arcing and requires more maintenance than the newer style vacuum tap changers. This transformer also has a throat connected low side (enclosed bus work) which makes replacement difficult in case of emergency. Distribution is replacing 13 kV Bus 2 switchgear. TB2 needs to be moved for the switchgear replacement. The 69 kV circuit from Buffington to Villa to Kenton substations is connected in a 3-terminal configuration at Villa. A fault on any leg of the circuit, any of five breaker failures, or two transformer faults will result in the loss of the entire circuit, interrupting service to Villa TB2 and the Thomas More Substation.

**Driver:** Equipment Condition, Operational Flexibility, Resilience

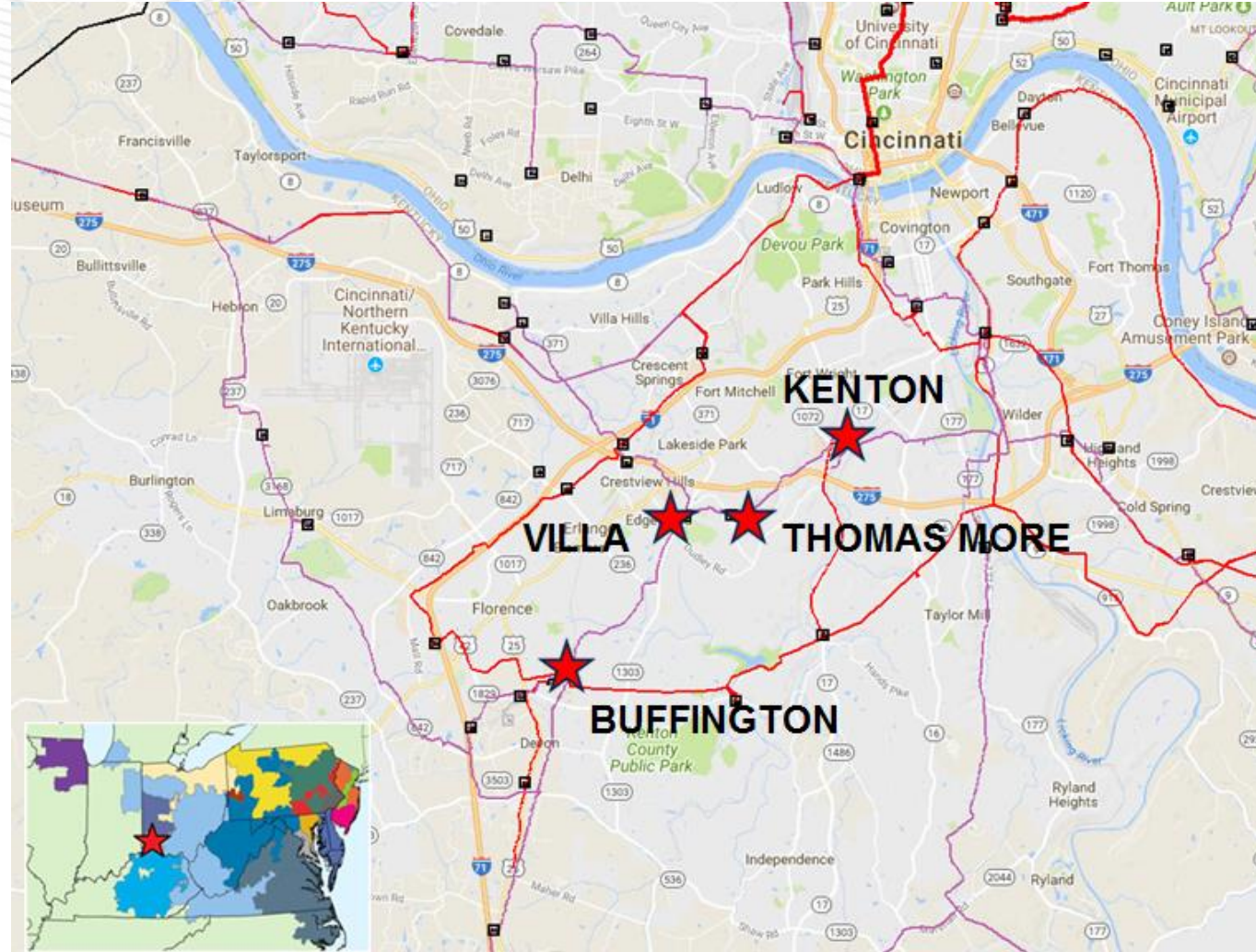
**Selected Solution:**

Replace TB2 with a transformer of the same capacity. Reconfigure Villa into a 4-breaker 69 kV ring bus with three new 69 kV breakers, associated breaker disconnects, new bus work, new structure, relaying, and line disconnects. (**\$1742**)

**Estimated Cost:** \$4.34 M (transmission assets only)

**Projected In-service:** 12-31-2019

**Project Status:** Engineering





## Previously Presented: 8/31/2018 SRRTEP

### Problem Statement:

Distribution is replacing switchgear on Trenton buses 1 and 2. 69/13 kV 20 MVA TB7 feeds the bus 2 switchgear was installed in 1958 and has shown increasing levels of both acetylene and ethylene over the past four years. It is throat connected on the low side (enclosed bus work) which makes replacement difficult in case of emergency and frequently overheats due to cooling issues. It's current location will not work with the new substation configuration.

**Driver:** Equipment Condition

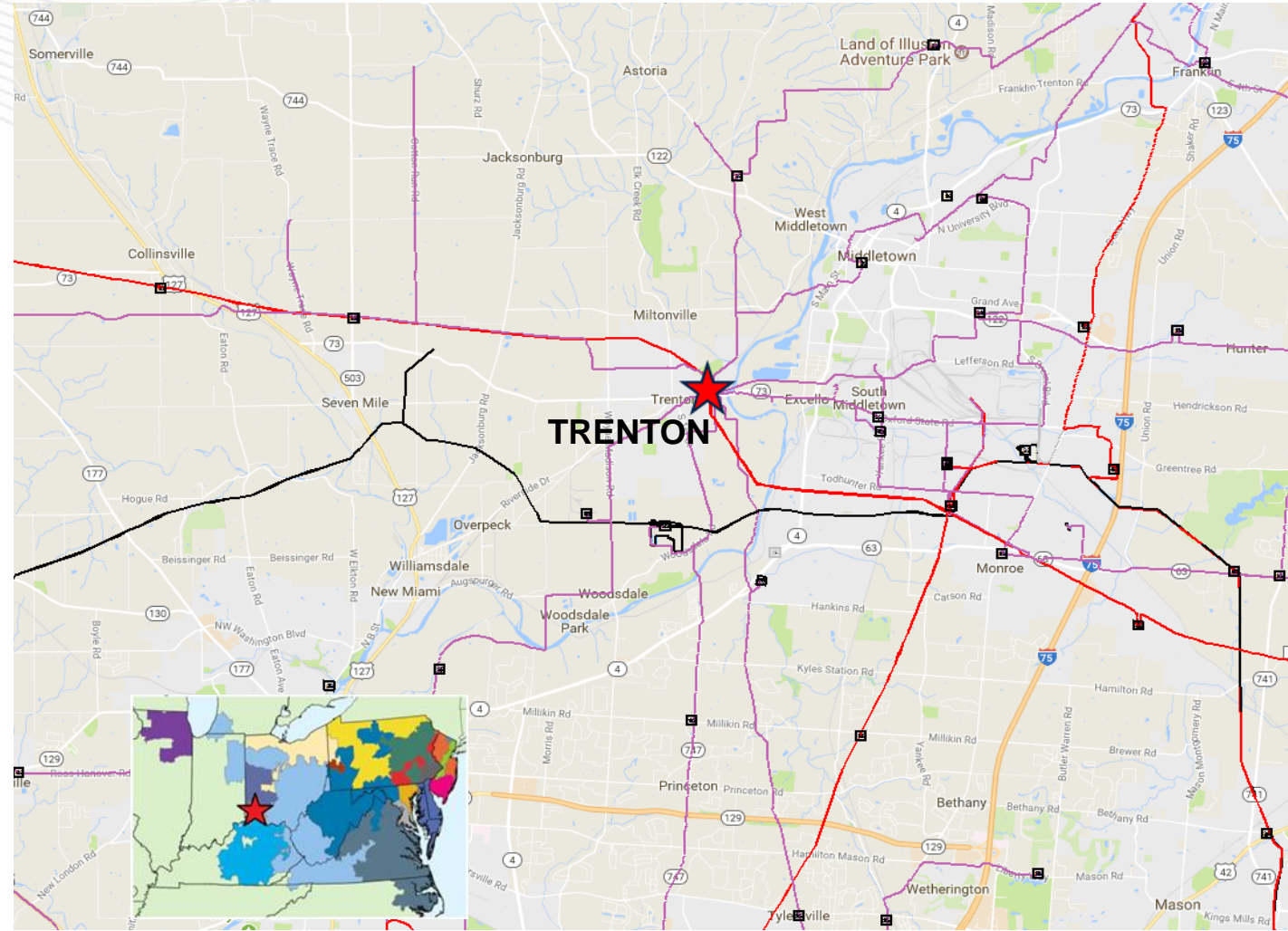
### Selected Solution:

Replace TB7 with a 138/13 kV 22.4MVA transformer connecting to the 138 kV bus. Install a 138 kV breaker with breaker disconnects to connect TB7. Install/replace relaying for both the breaker and transformer. (**\$1743**)

**Estimated Cost:** \$0 M

**Projected In-service:** 12-31-2019

**Project Status:** Engineering



**Previously Presented: 8/31/2018 SR RTEP**

**Problem Statement:**

Remington Substation has two 138 kV buses, each serving switched distribution transformers. A feeder is connected to Bus 1 with a switch. Bus 1 is connected to Bus 2 with a tie breaker. A feeder is connect to Bus 2 with a breaker. The bus tie breaker is oil filled and obsolete. The failure of the breaker will interrupt all loads supplied by Remington, Wards Corner and Feldman substations.

**Driver:** Equipment Condition, Operational Flexibility, Resilience

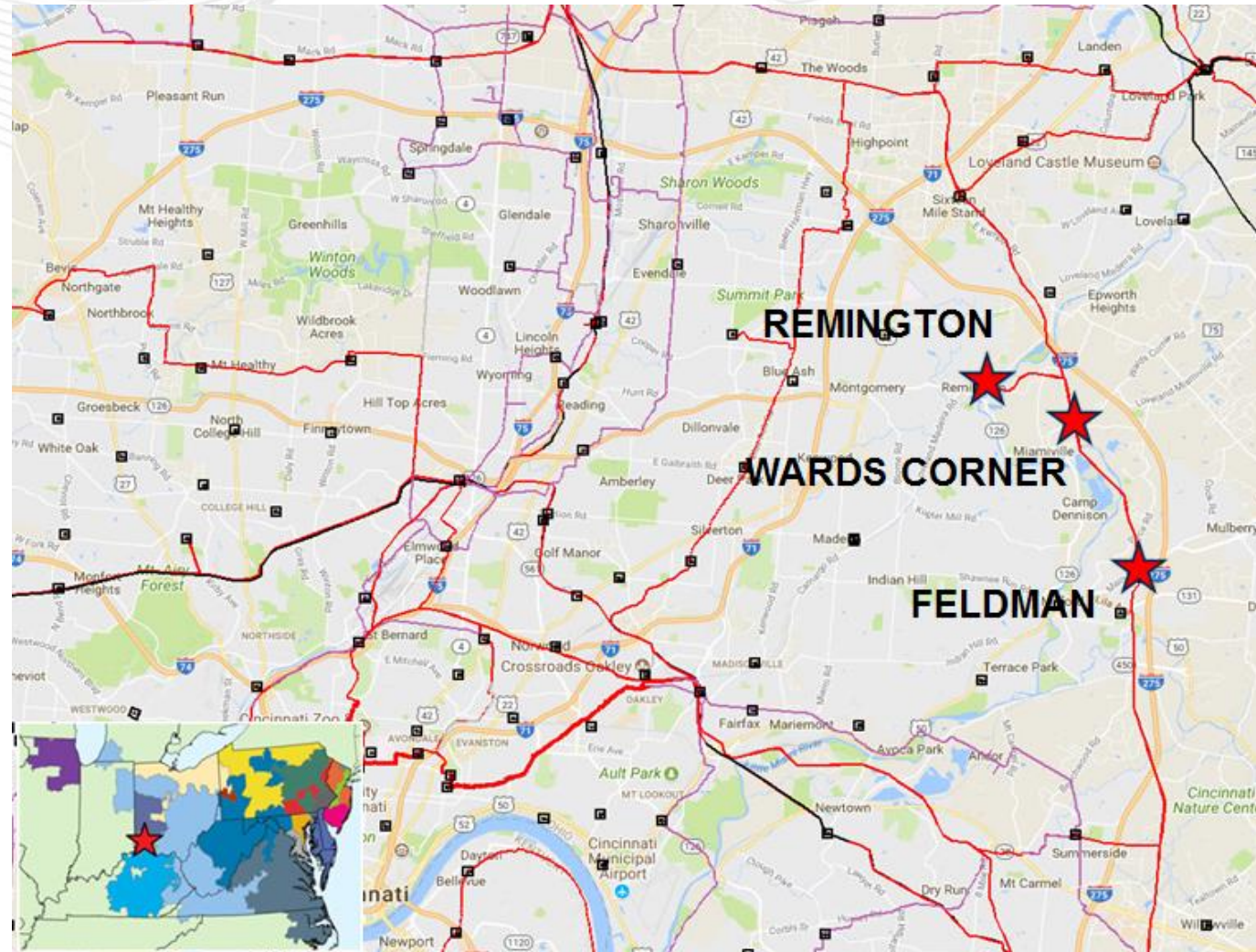
**Selected Solution:**

Replace the bus tie circuit breaker. Install three additional 138 kV circuit breakers, associated breaker disconnects, new bus work, new structure and relaying to reconfigure the substation into 4-position ring bus. **(\$1744)**

**Estimated Cost:** \$4.95 M

**Projected In-service:** 12-31-2019

**Project Status:** Engineering





Previously Presented: 8/31/2018 SR RTEP

**Problem Statement:**

Ebenezer TB6 is a 138/69/33 kV 140/140/56 MVA transformer that feeds both a 69 kV transmission bus, and with a tertiary winding feeds a 33 kV distribution bus. The 33 kV winding exposes the transformer to faults from the distribution system. The transformer is 47 years old, and has been trending upwards with acetylene and ethylene gasses. Ebenezer Substation has two 138 kV buses. A feeder is connected to Bus 1 with a breaker. Bus 1 is connected to Bus 2 with a tie breaker. A feeder is connect to Bus 2 with a breaker. The bus tie breaker is oil filled and obsolete. The failure of the tie breaker will interrupt service to 138/13 kV TB3, 138/69 kV TB5, TB6 (total of 222 MVA of capacity), and interrupt the 138 kV path between Miami Fort Generating Station and Terminal Substation.

**Driver:** Equipment Condition, Operational Flexibility, Resiliency

**Selected Solution:**

Replace TB6 with a 138/69 kV 150 MVA transformer to feed the 69 kV bus. Install a new 138/33 kV 22.4 MVA transformer to feed the 33 kV bus. Replace the tie breaker and feeder breakers, and with 3 additional breakers form a six-breaker ring bus. The project includes the installation of associated breaker disconnects, new bus work, new structure, and relaying. **(\$1745)**

**Estimated Transmission Cost:** \$9.0 M

**Projected In-service:** 12-31-2020

**Project Status:** Scoping





**Previously Presented: 5/21/2018 SR RTEP**

**Problem Statement:**

The 69 kV feeder between Symmes and Northgreen substations is aged and in deteriorating condition (1950's era).

**Driver:** Equipment Material Condition, Performance and Risk

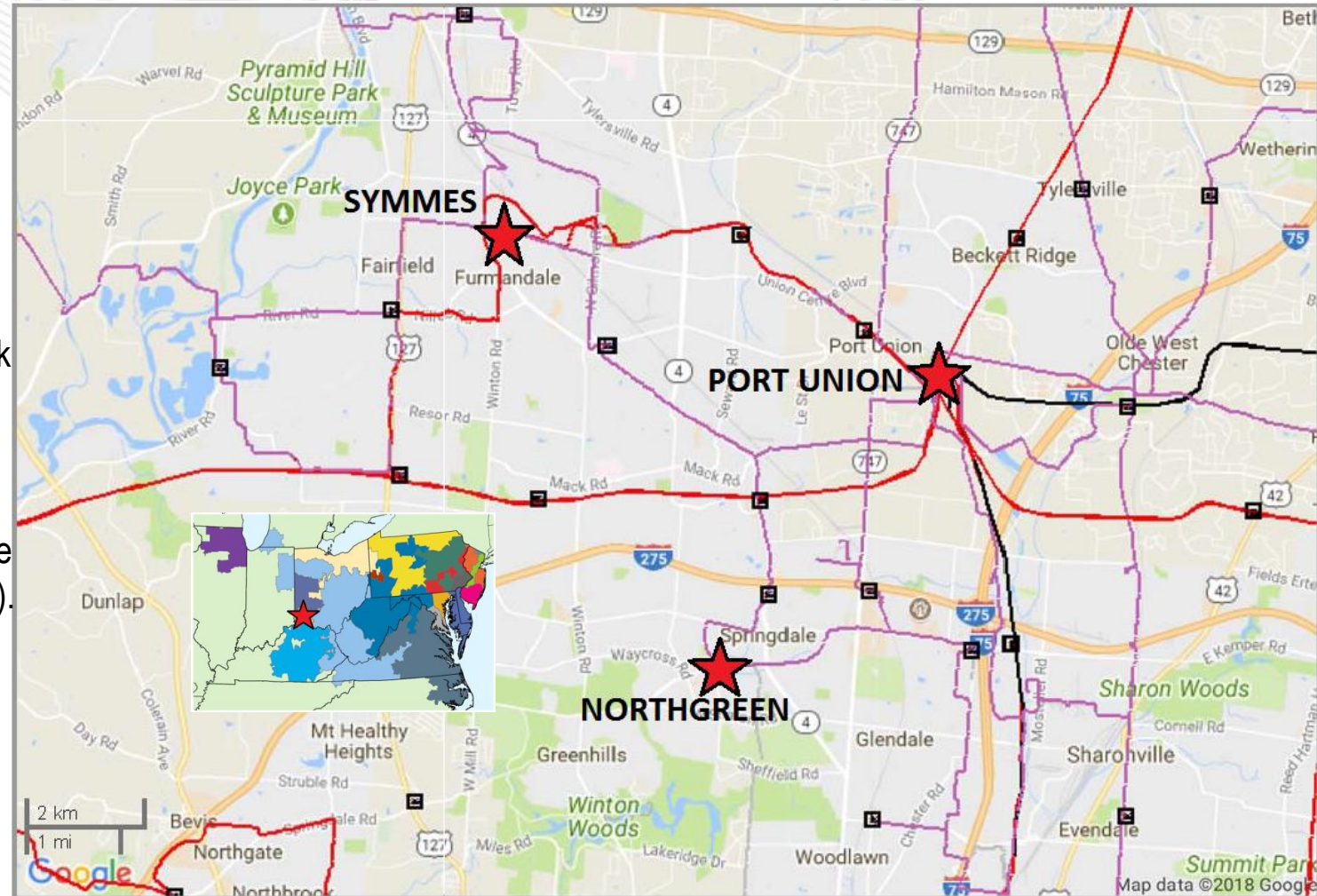
**Selected Solution:**

Rebuild 10.5 miles of 69kV feeder between Symmes and Northgreen substations including the tap to Port Union with 298 new structures, hardware, and conductor. Capacity of the line will increase from 97 MVA to 150MVA (conductor limited). **(\$1657)**

**Estimated Cost:** \$21.3 M

**Projected In-service:** 12/31/2018

**Project Status:** Engineering





## Previously Presented: 5/21/2018 SRRTPEP

### Problem Statement:

The 69 kV feeder between Princeton and Trenton substations is aged and in deteriorating condition (1950's era).

**Driver:** Equipment Material Condition, Performance and Risk

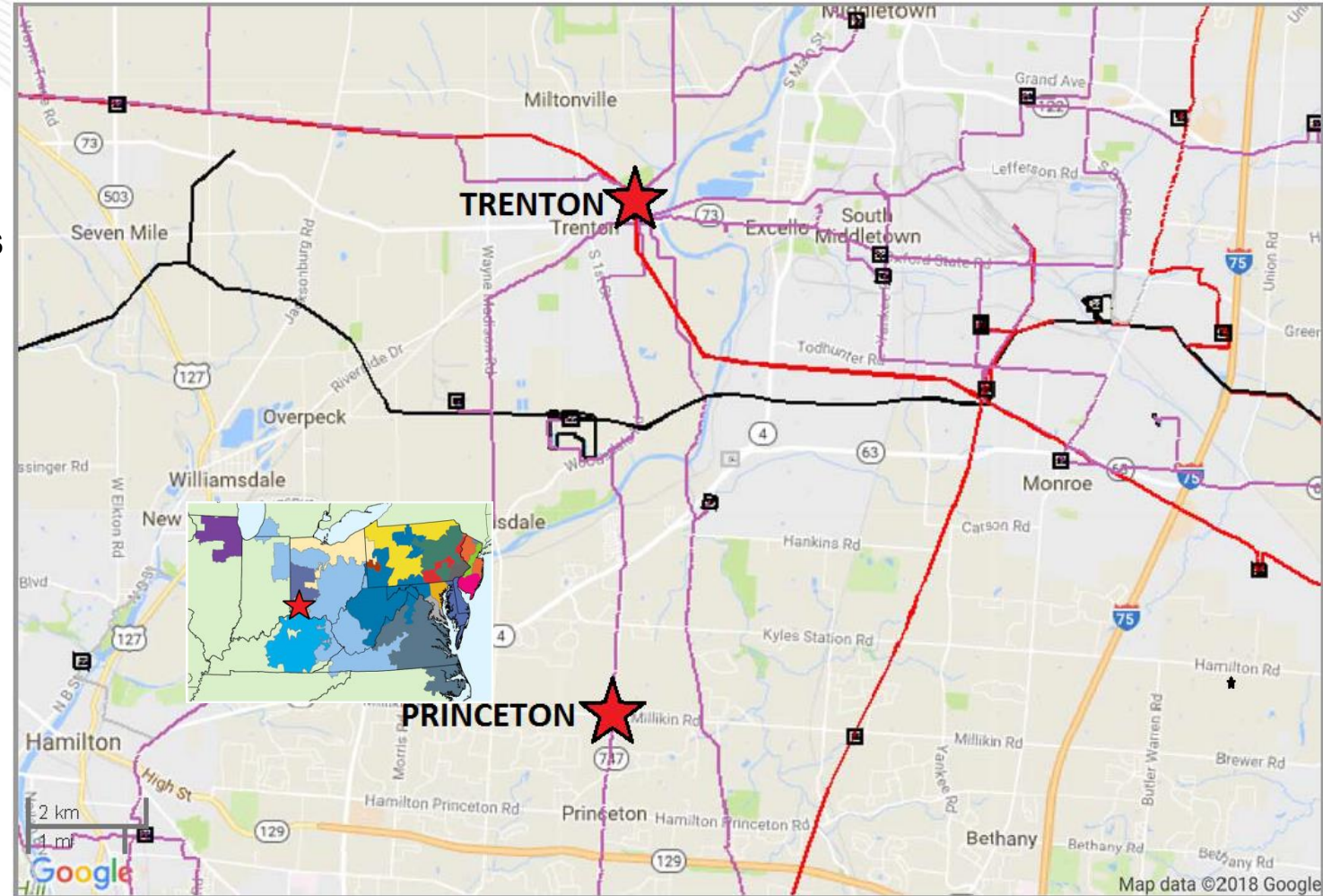
### Selected Solution:

Rebuild 6.1 miles of feeder between Princeton and Trenton substations with 137 new structures, hardware, and conductor. Replace two 69 kV switches. Capacity of the line will increase from 97 MVA to 107 MVA (bus limited). (**\$1658**)

**Estimated Cost:** \$7.8 M

**Projected In-service:** 12/31/2018

**Project Status:** Engineering





**Previously Presented: 5/21/2018 SR RTEP**

**Problem Statement:**

The 69 kV feeder between Oakley and Fairfax substations is aged and in deteriorating condition (1970's era).

**Driver:** Equipment Material Condition, Performance and Risk

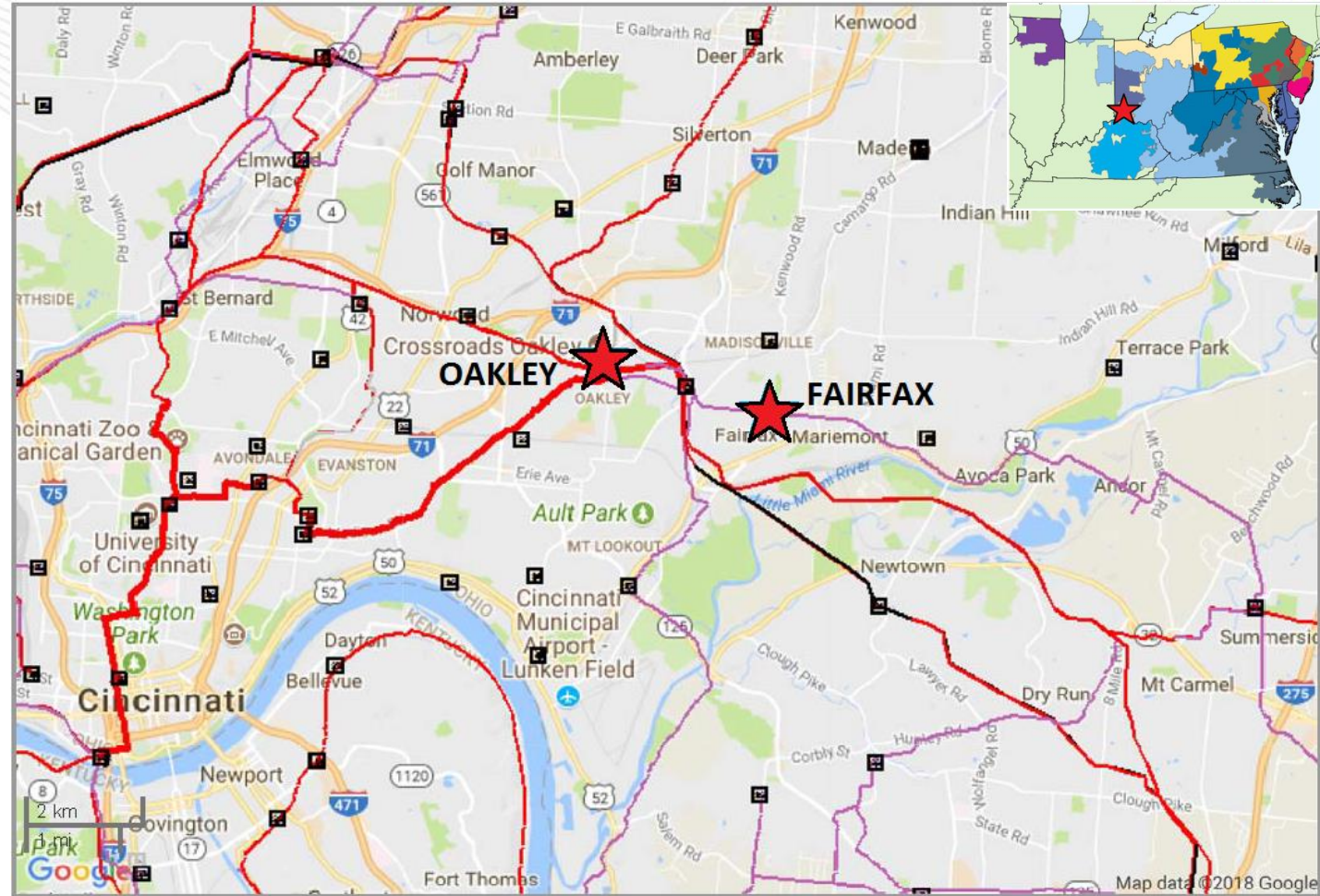
**Selected Solution:**

Rebuild 2.3 miles of feeder between Oakley and Fairfax substations with 65 new structures, hardware, and conductor. Replace one switch. Access issues due to hills, creek and railroad. Capacity of the line will increase from 97 MVA to 150 MVA (conductor limited). **(\$1659)**

**Estimated Cost:** \$4.0 M

**Projected In-service:** 12-31-2018

**Project Status:** Engineering







**Previously Presented: 7/27/2018 SR RTEP**

**Problem Statement:**

400 MVA TB 23 shows high levels of dissolved combustible gasses. There is no breaker between the high side of TB 23 and the 345kV bus. If TB 23 faults or its low side breaker fails the 345kV circuit between Zimmer, Silver Grove and Red Bank substations is lost. The low side circuit breaker connecting TB 23 to the 138kV bus is oil filled, obsolete and spare parts are no longer available.

**Driver:** Equipment Condition, Performance and Risk

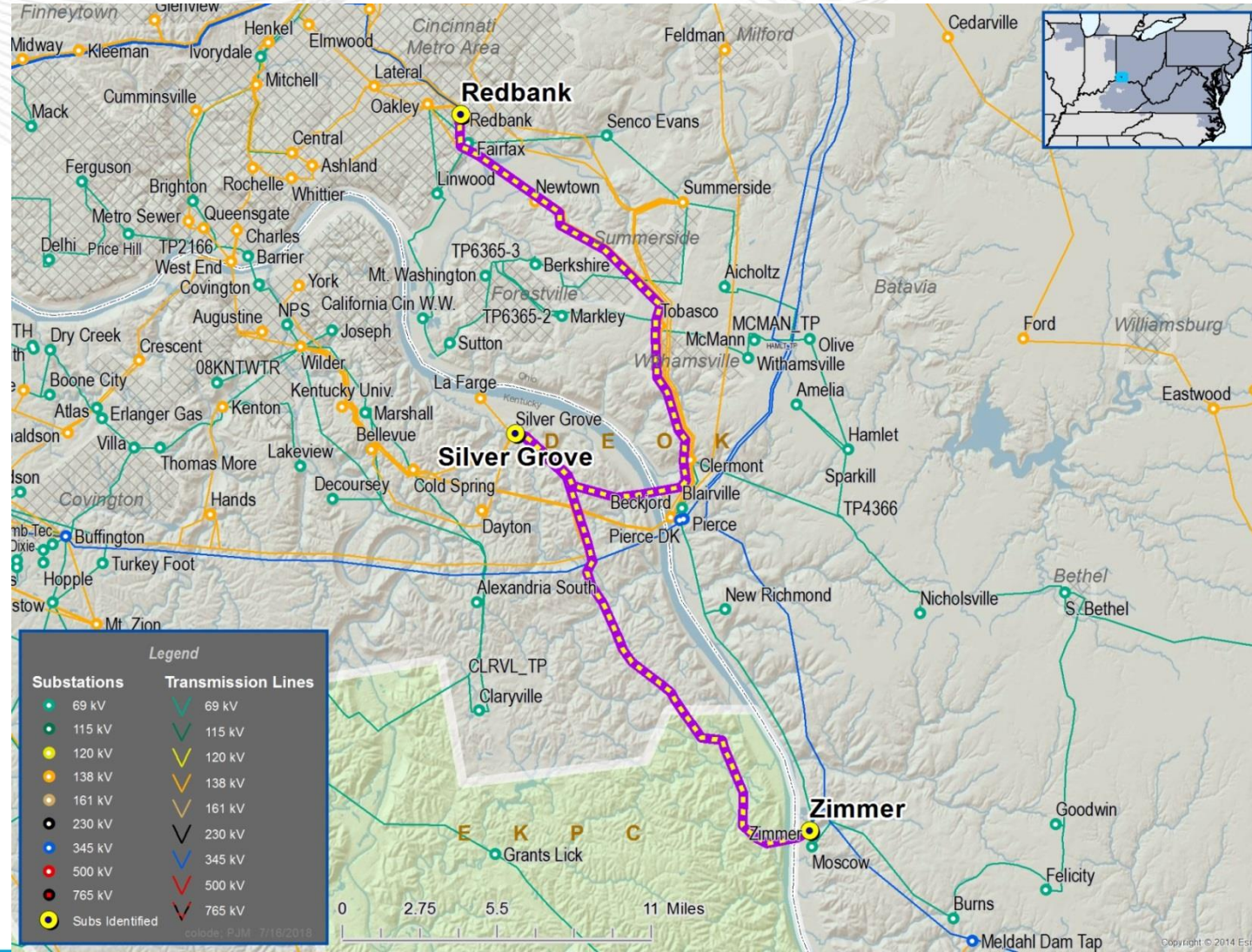
**Selected Solution:**

Replace the Silver Grove 345/138kV transformer 23 with a transformer of the same capacity, install a circuit breaker on the high side keeping the 345kV circuit in service for the fault or failure, replace the low side circuit breaker. (**\$1683**)

**Estimated Cost:** \$7.8 M

**Projected In-service:** 12-31-2019

**Project Status:** Engineering





DL

**Previously Presented: 8/31/2018 SRRTEP**

**Problem Statement:**

On April 25, a landslide near Wilmerding substation caused multiple transmission structures on the radial Wilmerding-WABCO (Z-98) 138 kV transmission line to shift and caused the conductors to fault. The land which the current Wilmerding-WABCO transmission line remains unstable and, as such, the Wilmerding-WABCO radial line cannot be returned to service without redesign and modifications to the impacted transmission structures. As a result, a new solution is needed to address the changing customer need and site vulnerability.

**Drivers:**

Equipment Material Condition, Performance and Risk; Infrastructure Resilience; Customer Service

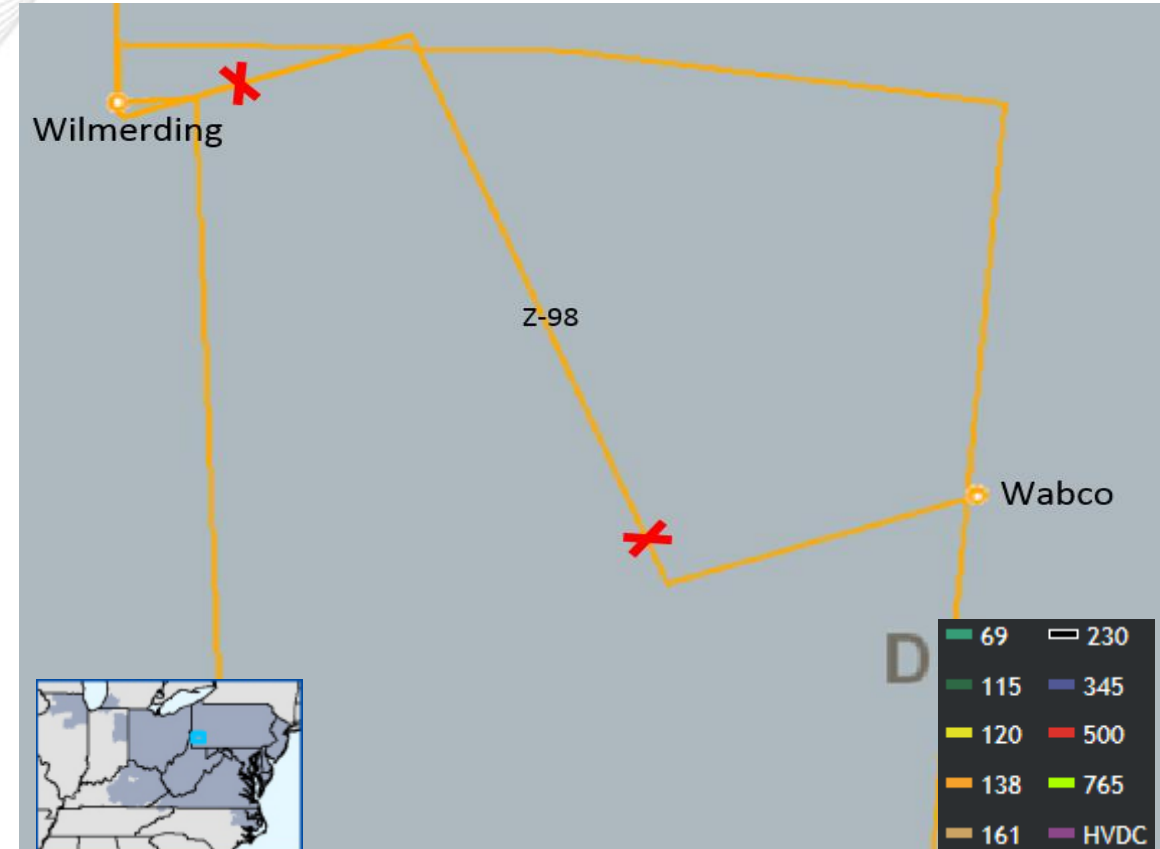
**Selected Solution:**

Remove the 2000 A Wilmerding-WABCO (Z-98) 138 kV line breaker at the Wilmerding substation, the 1600 A Wilmerding-Dravosburg (Z-76) 138 kV line breaker at the Wilmerding substation, and ~0.5 miles of the radial from service to retire the Wilmerding-WABCO (Z-98) 138 kV line. **(S1737)**

**Estimated Project Cost:** \$300 K

**Projected IS Date (Expected IS Date):** 3/31/2019

**Status:** Construction







# DL Transmission Zone: Supplemental Potter – NOVA Chemical 138 kV line

Previously Presented: 8/31/2018 SRRTEP

### Problem Statement:

Currently NOVA Chemical is being served by the Valley-Hopewell 69 kV transmission line tap to the Kobuta substation, which provides one of two electrical connections to NOVA Chemical. The Valley-Hopewell 69 kV tap is at the end of its useful life. The other service to the customer is from the Potter-AES 138 kV transmission line. The customer has requested to retain two redundant electrical sources to maintain reliability because of their critical business processes.

### Drivers:

Customer Service, Equipment Material Condition

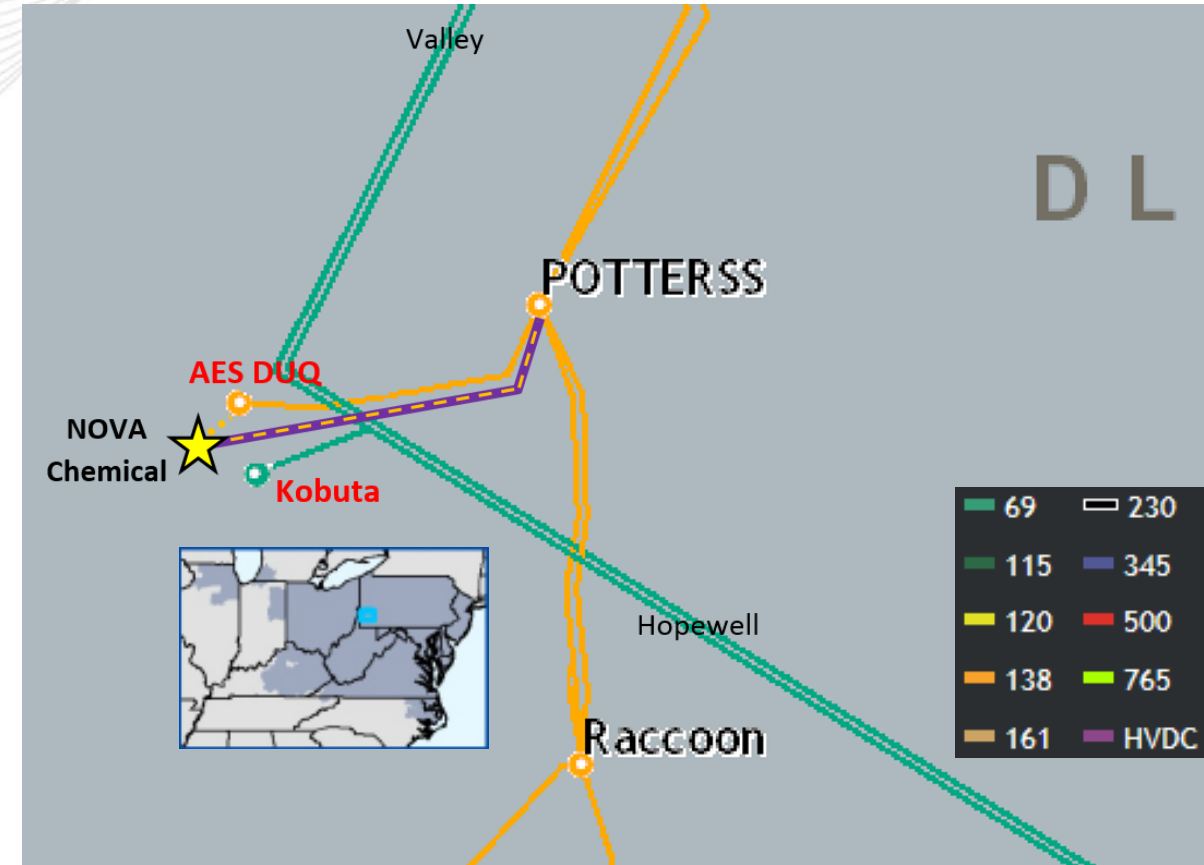
### Selected Solution:

Eliminate the existing Kobuta substation and the 69 kV tap and replace it with a new 138 kV transmission line from the Potter substation to the newly constructed NOVA Chemical substation, which is being built by the customer. **(S1738.1)** Install a #6-#7 3000 A 63kA 138 kV bus tie breaker and associated protection and control equipment at Potter substation. Install the new Potter-NOVA Chemical (Z-180) 138 kV line using 853.7 ACAR 24/13. **(S1738.2)** Install two 138 kV disconnect switches, protection, communications, and metering equipment at the newly constructed NOVA Chemical substation. **(S1738.3)** Eliminate the 69 kV Kobuta tap and associated customer substation from the Valley-Hopewell 69 kV line. Remove all associated equipment from the AES substation to establish Potter-NOVA Chemical (Z-80). **(S1738.4)**

**Estimated Project Cost:** \$4 M

**Projected IS Date (Expected IS Date):** 7/31/2019

**Status:** Engineering



# DL Transmission Zone: Supplemental Panther Hollow Cut in

**Previously Presented: 3/27/2018 SRRTEP**

**Problem Statement (Scope):**

The Oakland 138-23kV substation has exceeded its capacity to reliably serve the increased and projected distribution load growth in the area. The Oakland substation has a peak distribution load of 204MVA.

**Drivers:** Customer Service, Operational Flexibility and Efficiency

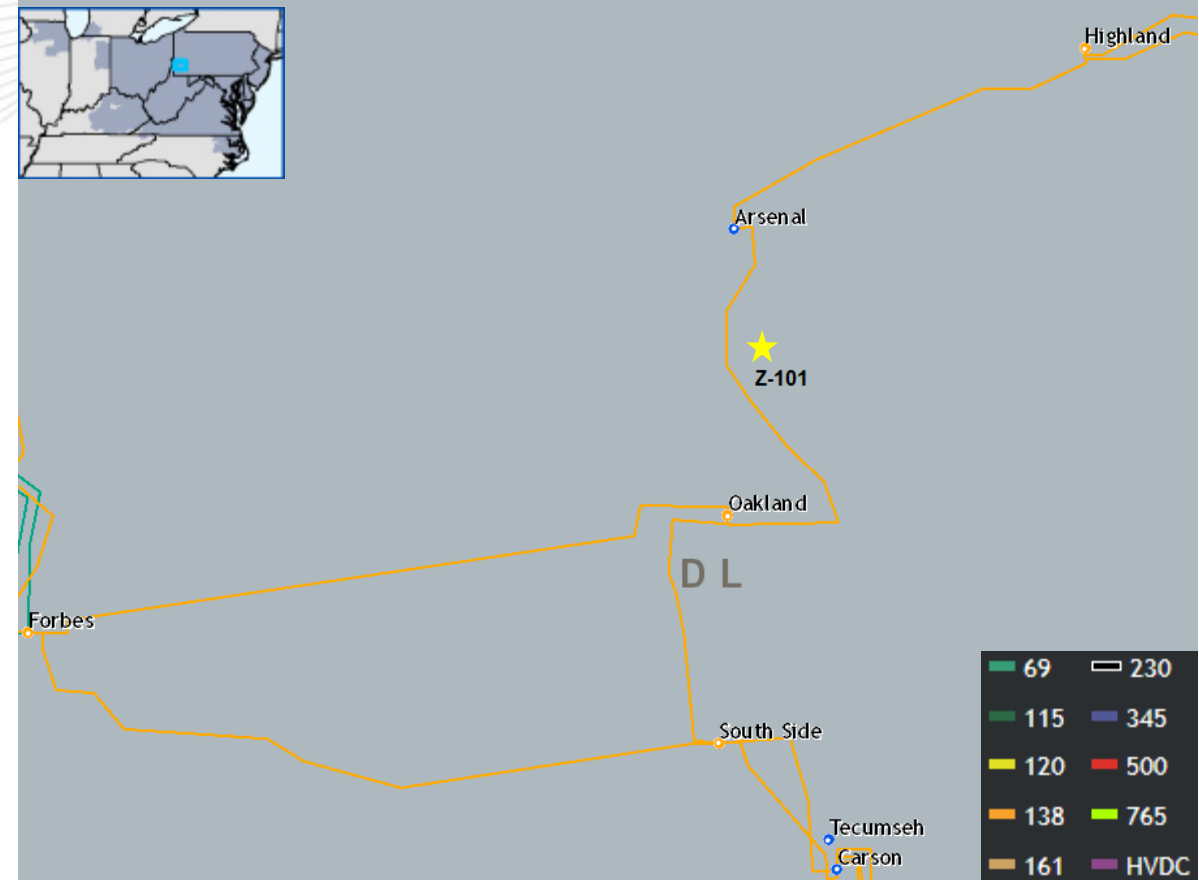
**Selected Solution:**

Establish a new 138-23kV substation (Panther Hollow) utilizing the existing Arsenal-Oakland (Z-101) 138kV circuit as a looped transmission source. **(\$1588)**

**Estimated Transmission Cost:** \$16.8M

**Projected In-Service Date (Expected IS Date):** 5/31/2020

**Status:** Conceptual





# DL Transmission Zone: Supplemental Wilmerding Breaker Replacement

*Previously presented on 2/14/2018 SRRTEP*

## Problem Statement

The Wilmerding #86 and #88 138kV breakers were installed in 1968. The #88 breaker feeds a transmission customer and has the potential to remove this customer from service if not replaced. The lifespan of these breakers have been optimized and each are now at the end of their useful lives based on material condition and performance.

**Drivers:** Equipment Material Condition, Performance and Risk

## Selected Solution:

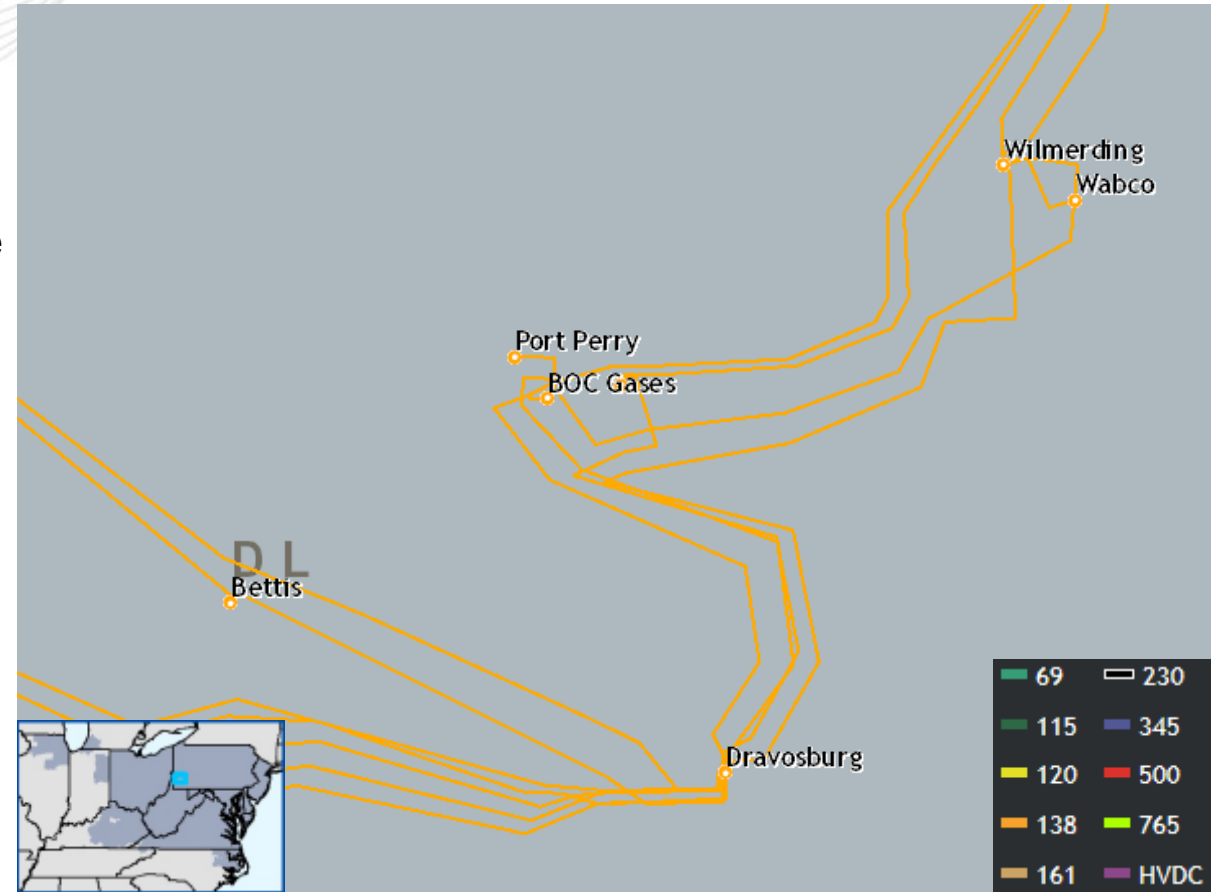
Replace Wilmerding SS - #86 138kV Breaker (Present rating: 37.1kA, Future rating: 50kA). (**\$1573.1**)

Replace Wilmerding SS - #88 138kV Breaker (Present rating: 37.9kA, Future rating: 50kA). (**\$1573.2**)

**Estimated Project Cost:** \$0.38M each

**Projected IS Date (Expected IS Date):** 9/30/2018

**Status:** Engineering



# Dayton





# Dayton Transmission Zone: Supplemental

## Rebuild 69 kV Line (6631) from Cisco Substation to Botkins Substation

Previously Presented: 8/31/2018 SR RTEP

### Problem Statement:

A reliability issue has been identified on the 69 kV line from Cisco Substation to Botkins Substation. The line was constructed in the 1950s with wood poles and crossarms. The line has several sleeves and many have failed in recent years, impacting customers in the area.

### Selected Solution:

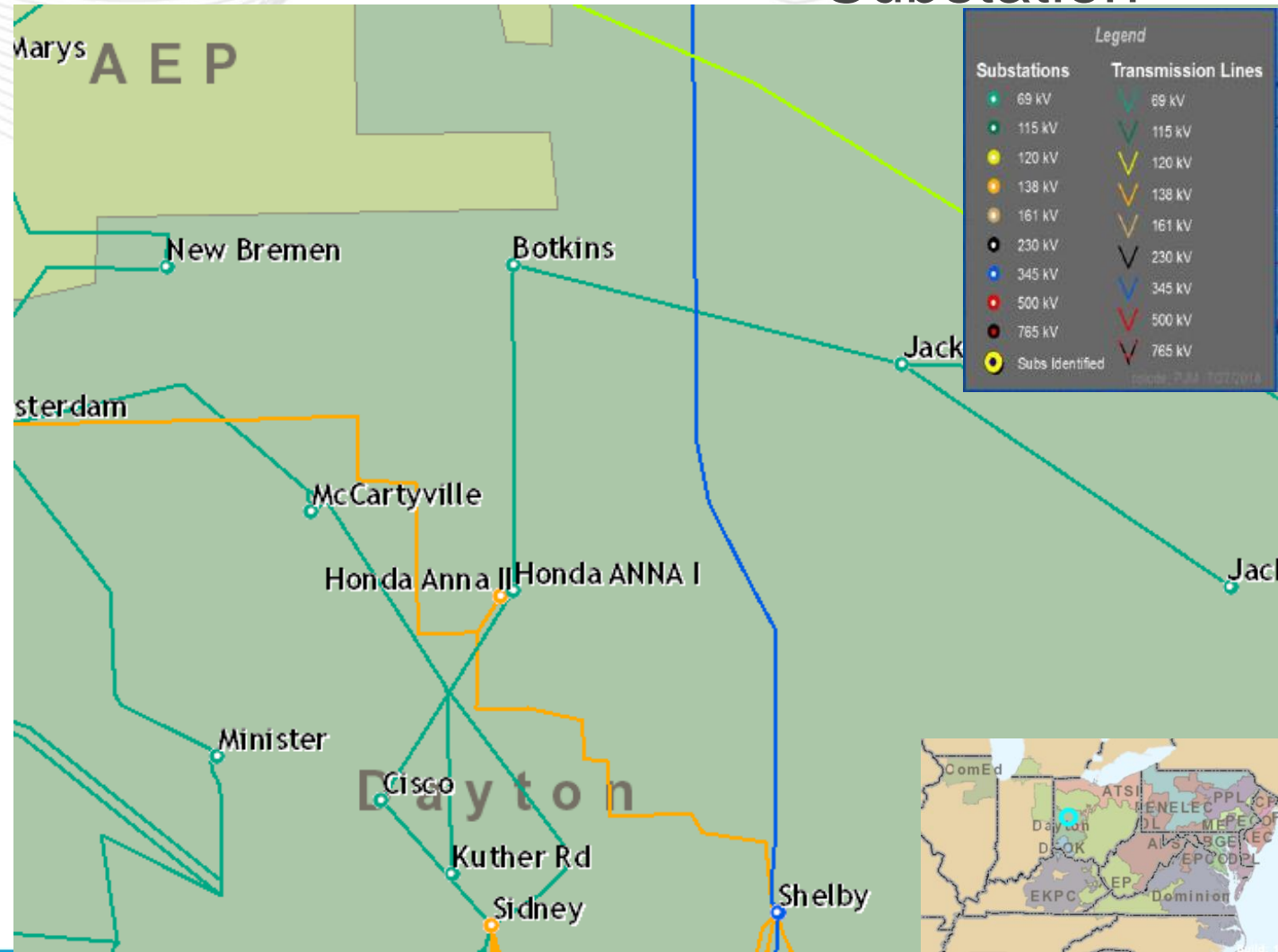
Rebuild the 69 kV line (6631) from Cisco Substation to Botkins Substation. (**\$1746**)

Old conductor: 477 ACSR (18x1); New conductor: 1351 AAC  
Cisco-Anna 69 kV Old Rating: SN/SE (80/98), Anna-Botkins 69 kV Old Rating SN/SE (80/98); Cisco-Anna 69 kV New Rating: SN/SE (151/187), Anna-Botkins 69 kV Old Rating SN/SE (151/165)

**Estimated Transmission Cost:** \$7.425 M

**Required In-Service:** 12/31/2019

**Status:** Engineering



# Dayton Transmission Zone: Supplemental Replace 13827 Switch

**Previously Presented: 8/31/2018 SRRTEP**

**Problem Statement:**

This project proposes to replace the existing switch on 13827 with an automatic 138 kV sectionalizing switch on the 13827 line (Amsterdam – Honda Anna 138 kV line). This sectionalizing switch is needed to serve a large industrial customer and is a critical path to maintain reliability in the area. This will give DP&L System Operations the ability to sectionalize the transmission system remotely.

**Selected Solution:**

Install a 138 kV automatic sectionalizing switch at Honda Anna 138 kV tap on the Amsterdam – Shelby 138 kV line with remote operation capability. **(\$1747)**

**Estimated Cost:** \$376 K

**Required In-Service:** 12/31/2019

**Status:** Engineering

