



Sub Regional RTEP Committee Western Region ATSI

September 28, 2018

Need Number: ATSI-2018-001
 Process Stage: Need Meeting
 Date: 9/28/2018

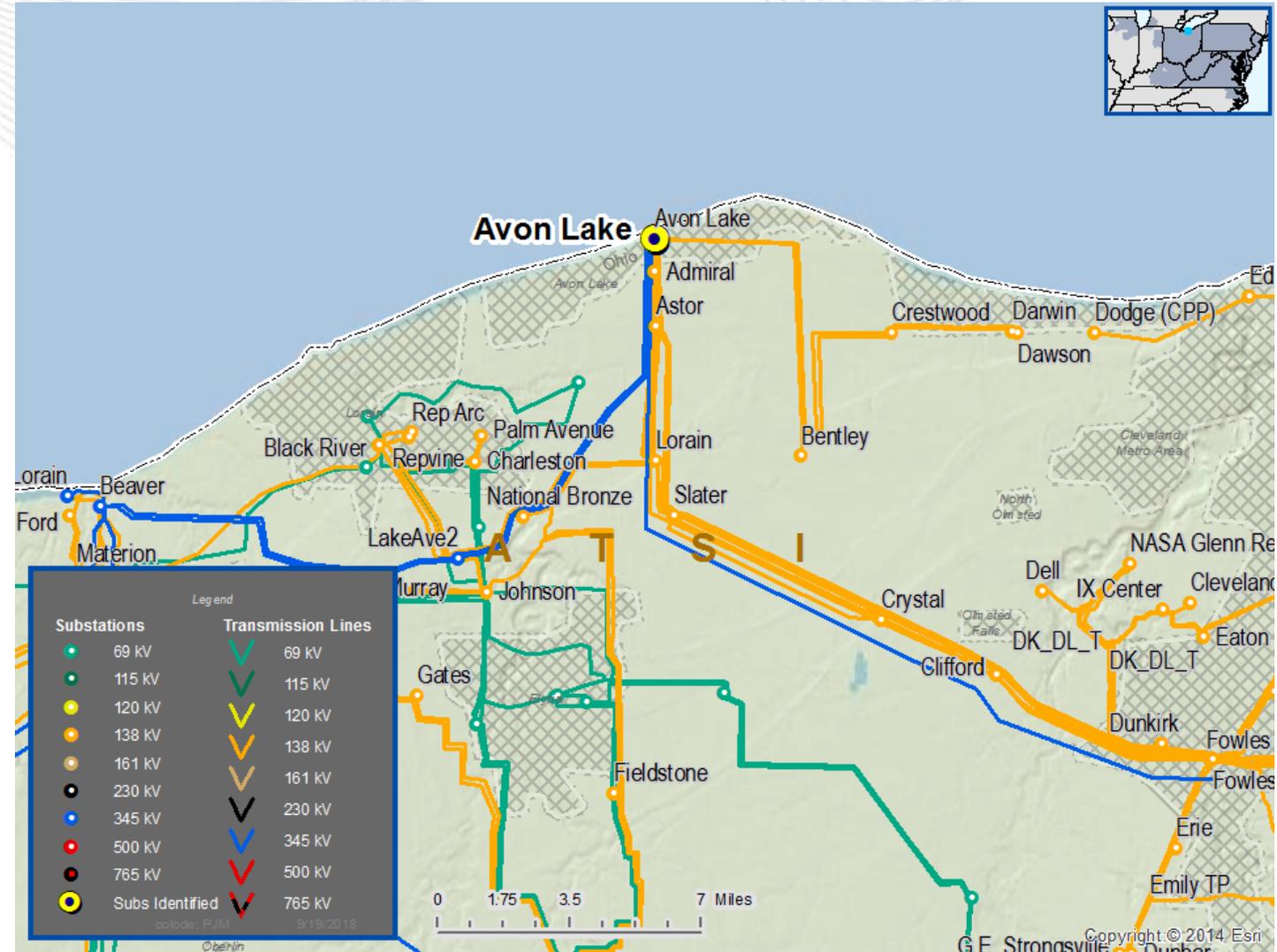
Project Driver(s):
Equipment Material Condition, Performance and Risk

Specific Assumption Reference(s)
 Substation Condition Rebuild / Replacement

- Power Transformers and Load Tap Changers (LTC)

Problem Statement
 Avon 345 / 138 kV 448 MVA #91 Transformer

- Transformer is gassing at an increasing rate
- Oil condition is degraded
- Leaks – Not cost effective to repair
- Severe loading history
- Cooler condition is degraded



Need Number: ATSI-2018-002
 Process Stage: Need Meeting
 Date: 9/28/2018

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

Specific Assumption Reference(s)

Substation Condition Rebuild / Replacement

- Power Transformers and Load Tap Changers (LTC)
- Circuit Breaker and Other Fault Interrupting Devices

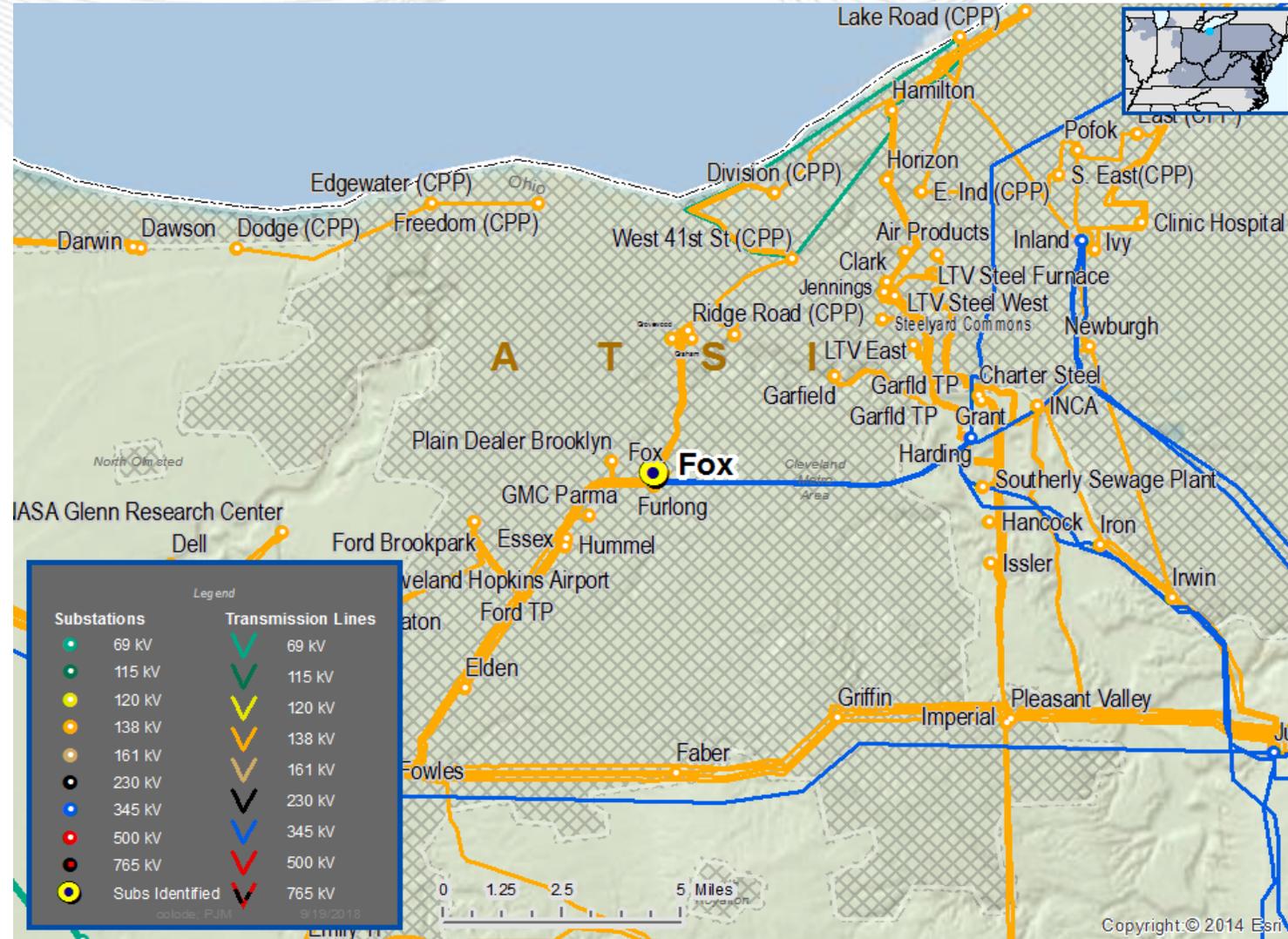
Problem Statement

Fox 345 / 138 kV 224 MVA #5 Transformer

- Oil Pump/cooler maintenance
- Aging/deteriorating bushings
- Increased failure risk

Fox 138 kV Circuit Breaker Q5

- Mechanism issues
- Aging/deteriorating bushings
- Spare part availability/vendor support limitations
- Negative impact on equipment health (transformer)



Need Number: ATSI-2018-003
 Process Stage: Need Meeting
 Date: 9/28/2018

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

Specific Assumption Reference(s)
 Substation Condition Rebuild / Replacement

- Power Transformers and Load Tap Changers (LTC)
- Circuit Breaker and Other Fault Interrupting Devices

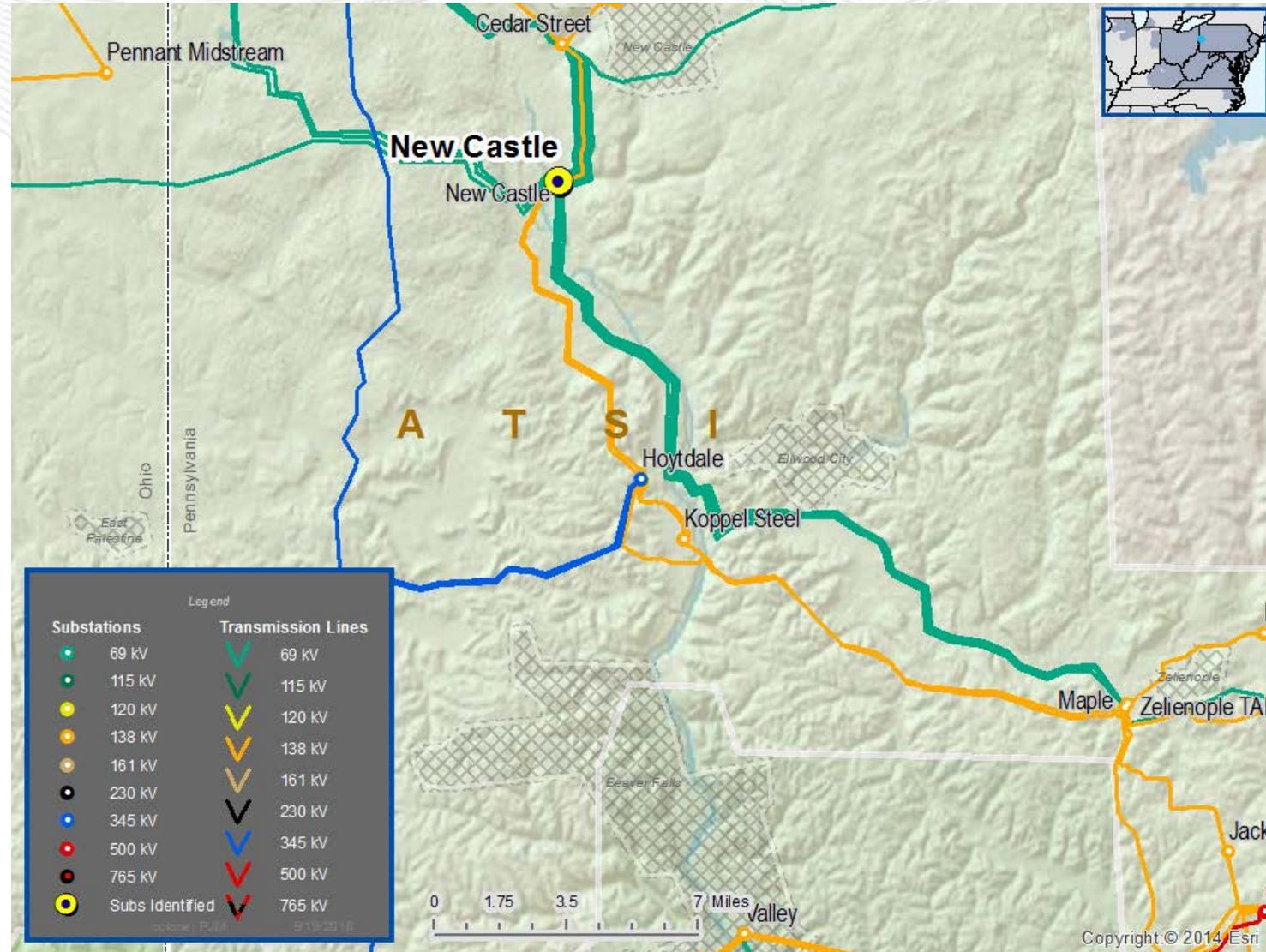
Problem Statement

New Castle 138 / 69 kV 75 MVA #7 Transformer

- Oil Leaks/moisture ingress
- Aging/deteriorating bushings
- Increased failure risk

New Castle 69 kV Circuit Breaker B32

- Mechanism issues
- Aging/deteriorating bushings
- Spare part availability/vendor support limitations
- New breaker will offer improved transformer protection



Need Number: ATSI-2018-004

Process Stage: Need Meeting

Date: 9/28/2018

Project Driver(s):

Equipment Material Condition, Performance and Risk

Specific Assumption Reference(s)

Substation Condition Rebuild / Replacement

- Power Transformers and Load Tap Changers (LTC)

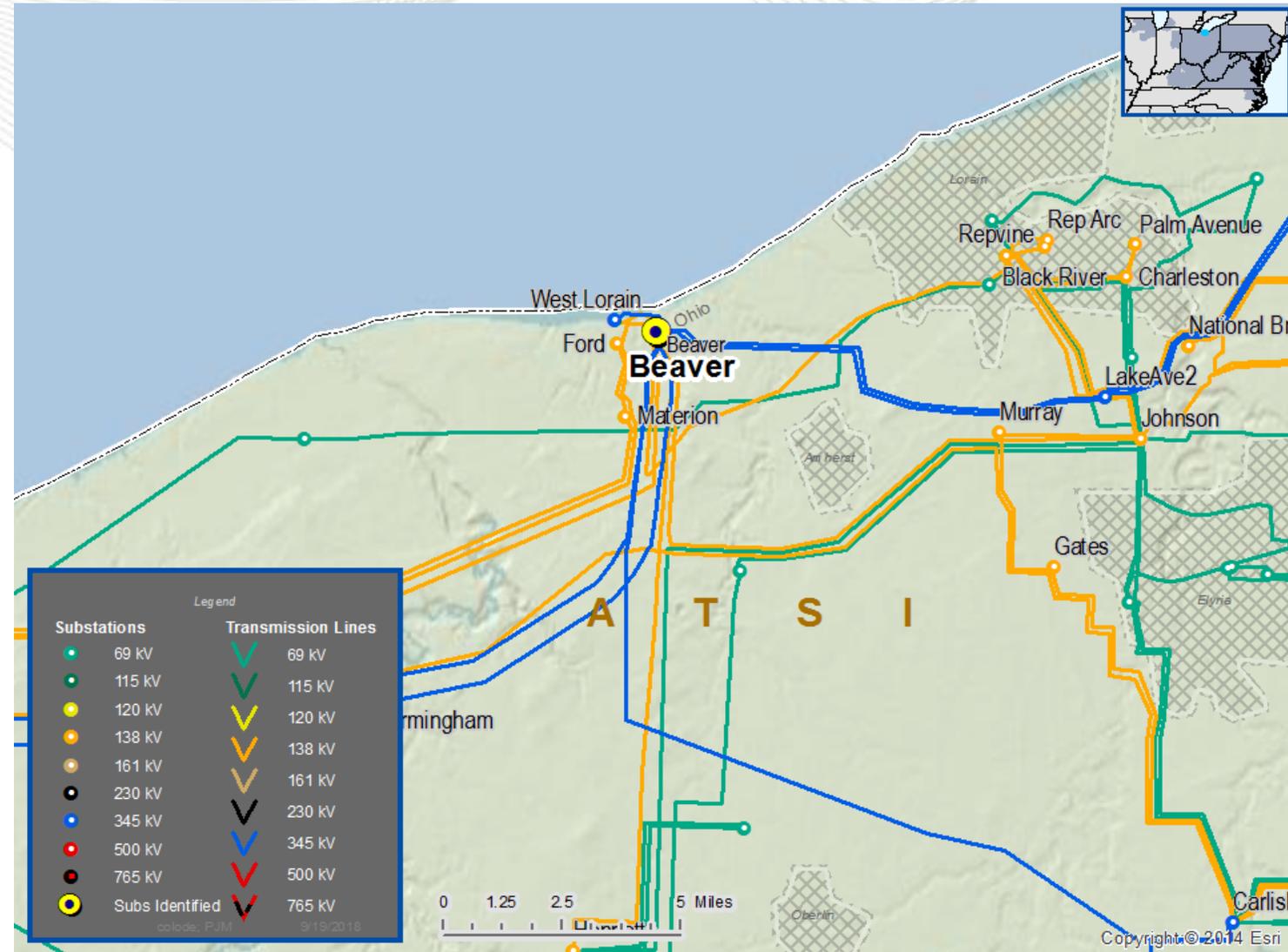
Problem Statement

Beaver 345 / 138 / 13.2 kV 392 MVA #1 Transformer

- Oil Pump issues and maintenance
- Increased failure probability
- Aging/deteriorating bushings

Beaver 345 / 138 / 13.2 kV 392 MVA #2 Transformer

- Oil Pump issues and maintenance
- Increased failure probability
- Aging/deteriorating bushings



Need Number: ATSI-2018-005

Process Stage: Need Meeting

Date: 9/28/2018

Project Driver(s):

Equipment Material Condition, Performance and Risk

Specific Assumption Reference(s)

Substation Condition Rebuild / Replacement

- Circuit Breaker and Other Fault Interrupting Devices
- Disconnect Switches
- Electromechanical and Solid-state Protective Relaying
- Potential Transformers (PTs), Coupling Capacitor Voltage Transformers (CCVTs)
- Line Arresters

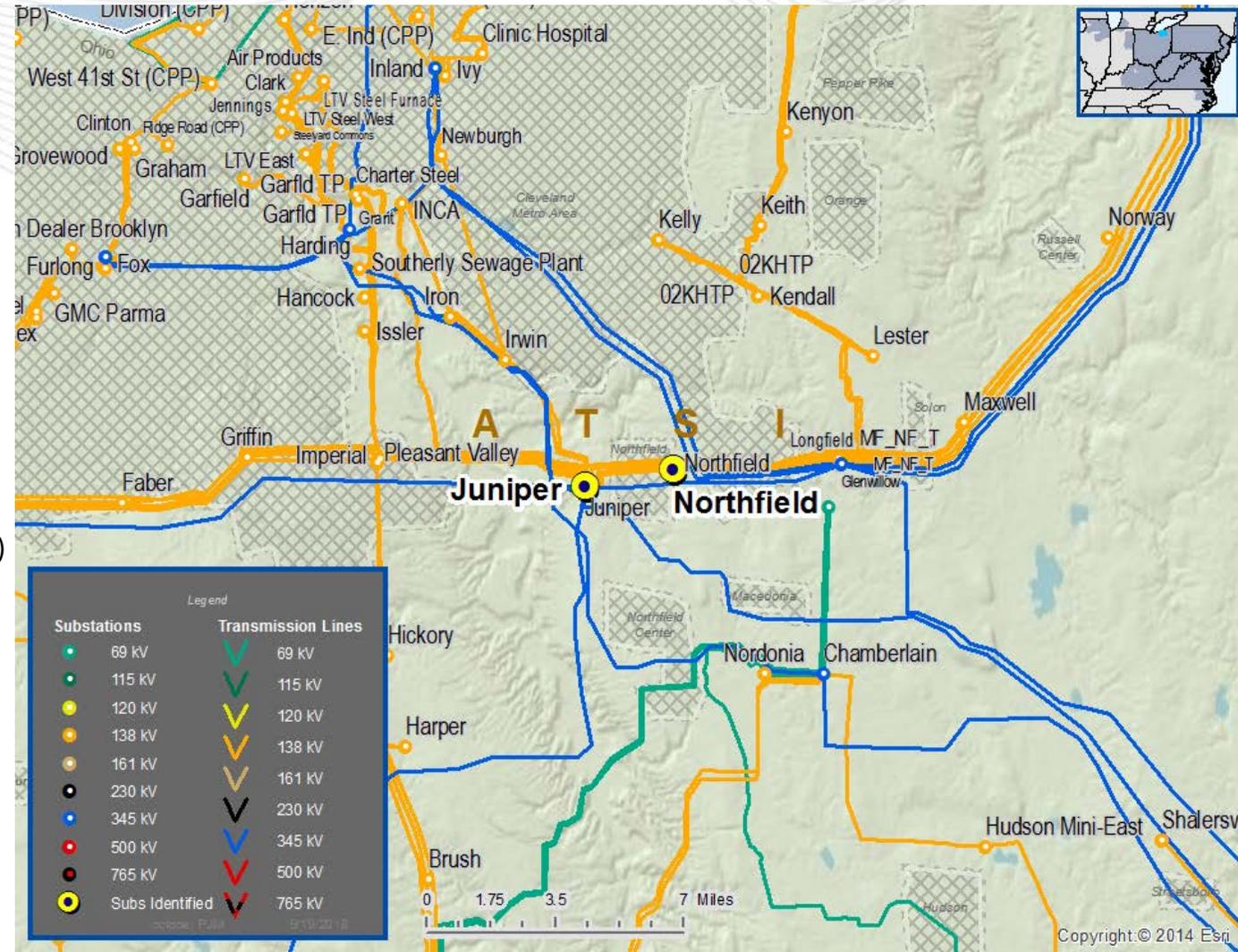
Problem Statement

Northfield 138 kV Bus 2 and Bus 4

- Deteriorated bushings and insulators, increased failure risks
- Reliability issues, EM relaying mis-operations

Juniper 138 kV Bus 1

- Deteriorated bushings and insulators, increased failure risks
- Reliability issues, EM relaying mis-operations



Need Number: ATSI-2018-006

Process Stage: Need Meeting

Date: 9/28/2018

Project Driver(s):

Operational Flexibility and Efficiency

Specific Assumption Reference(s)

Add / Expand Bus Configuration

- Substation buses that adversely impact system performance
- Reduce amount of exposed potential local load loss during contingency conditions.

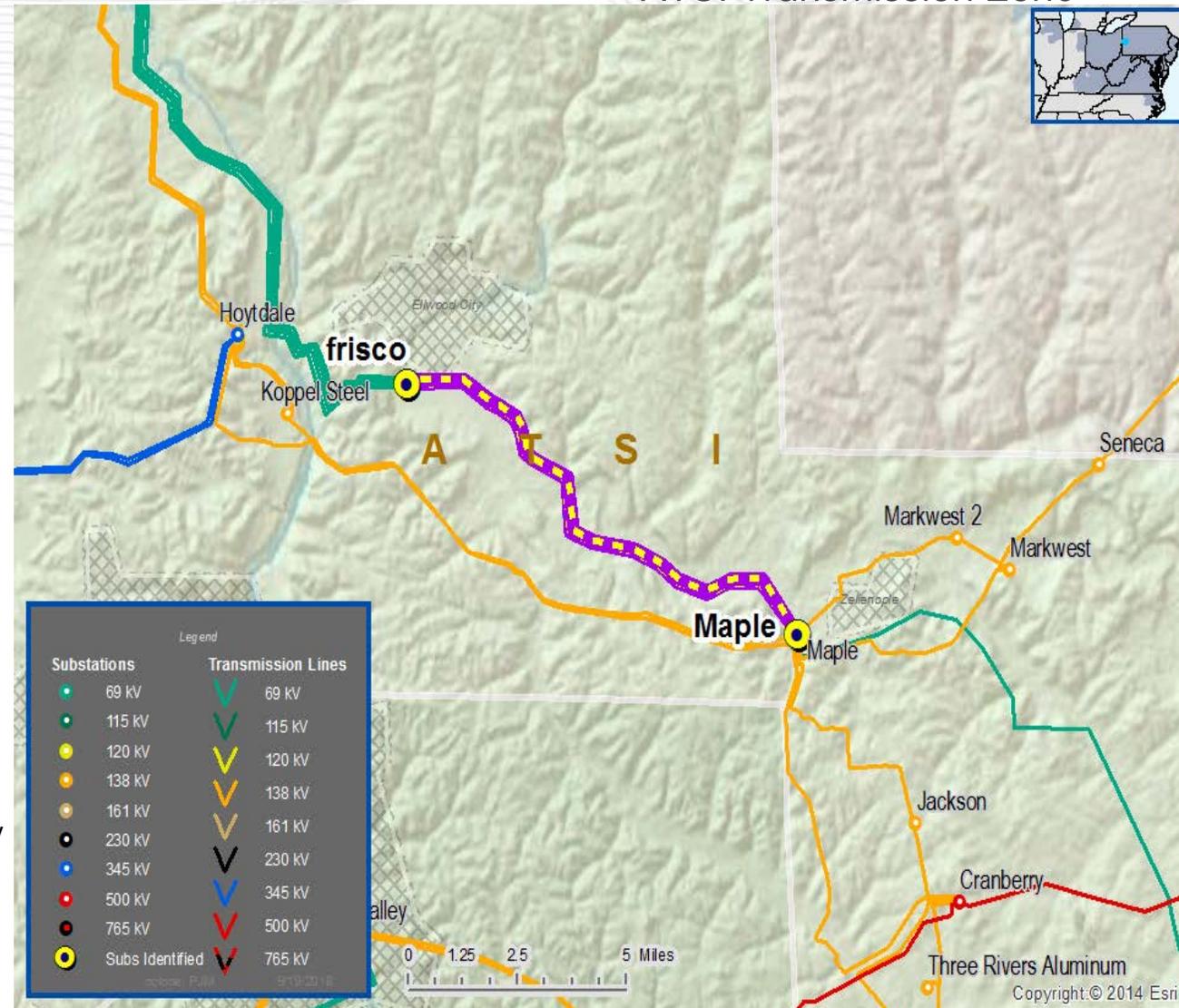
Reconductor / Rebuild Transmission Lines

- Mitigation of PJM issued PCLLRWs or post contingency switching limitations.

Problem Statement

Frisco-Maple # 1 and #2 69 kV line Terminal Equipment

- Mitigate PJM issued PCLLRWs / Pre-contingency switching orders, eight times, for thermal concerns on the 69 kV system under contingency conditions.
 - Loss of the New Castle-Hoytdale #1 and New Castle-Hoytdale #2 138 kV lines.
 - Results in potential thermal loading greater than 100% on the Frisco-Maple #1 69 kV line or potential thermal loading on the Frisco-Maple #2 69 kV line depending on system conditions.



Need Number: ATSI-2018-007
 Process Stage: Need Meeting
 Date: 9/28/2018

Project Driver(s):
Operational Flexibility and Efficiency

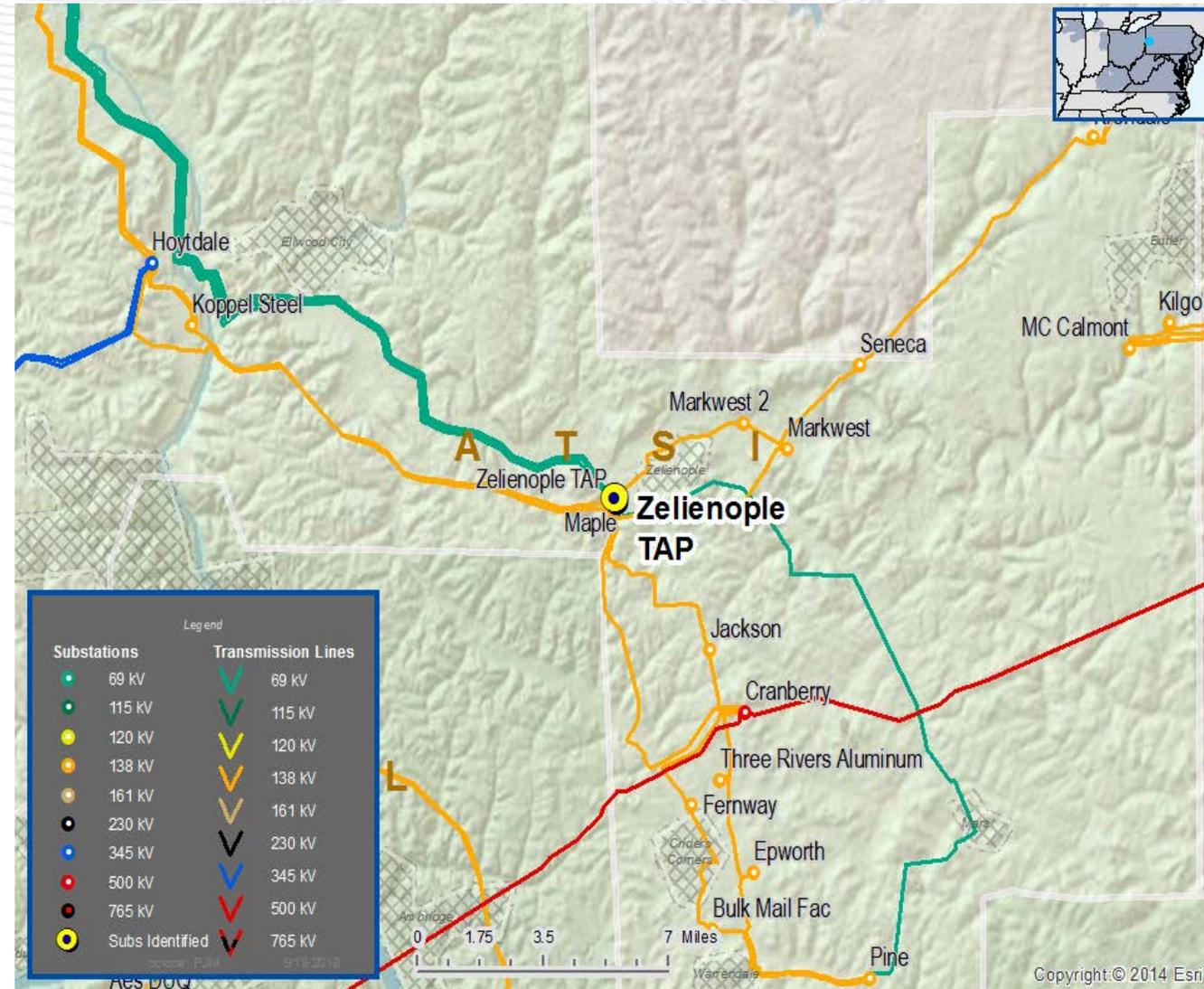
Specific Assumption Reference(s)
 Add / Expand Bus Configuration

- Substation buses that adversely impact system performance
- Reduce amount of exposed potential local load loss during contingency conditions.

Problem Statement

Zelienople 69 kV Area Load At Risk

- Outage of the Zelienople circuit results in loss of 16.6 MW and 3,762 customers
- Radial line exposure is 1.2 miles
- Line has experienced 2 sustained outages in the past 5 years



Need Number: ATSI-2018-008

Process Stage: Need Meeting

Date: 9/28/2018

Project Driver(s):

*Equipment Material Condition, Performance and Risk
Operational Flexibility and Efficiency*

Specific Assumption Reference(s)

Add / Expand Bus Configuration

- Substation buses that adversely impact system performance
- Reduce amount of exposed potential local load loss during contingency conditions.

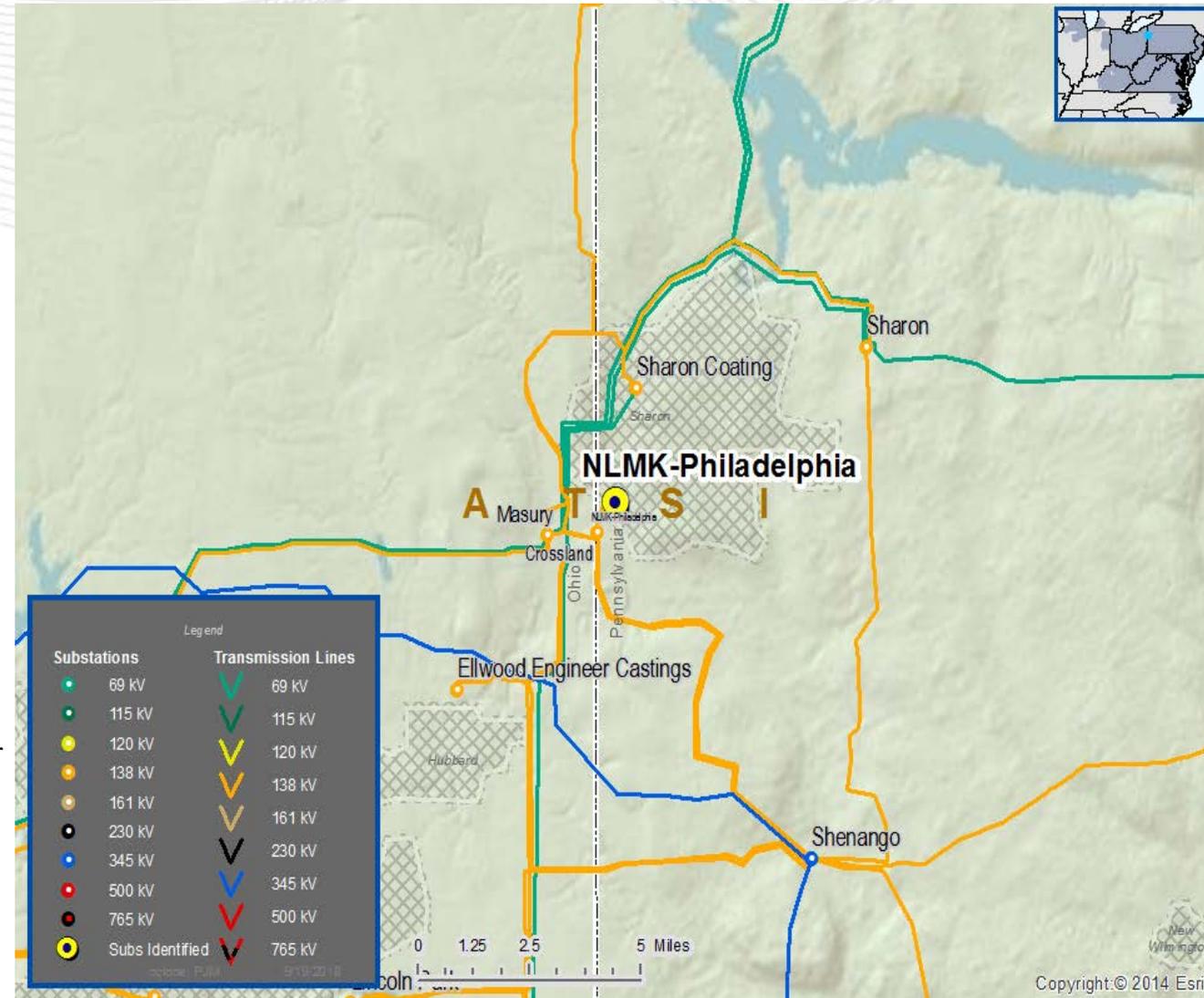
Substation Condition Rebuild / Replacement

- Power Transformers and Load Tap Changers (LTC)
- Circuit Breaker and Other Fault Interrupting Devices

Line Condition Rebuild / Replacement

Assessment of existing transmission lines for equipment characteristics that are at, or beyond their existing service life, or contain components that are obsolete.

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Need Number: ATSI-2018-008 (Continued)

Process Stage: Need Meeting

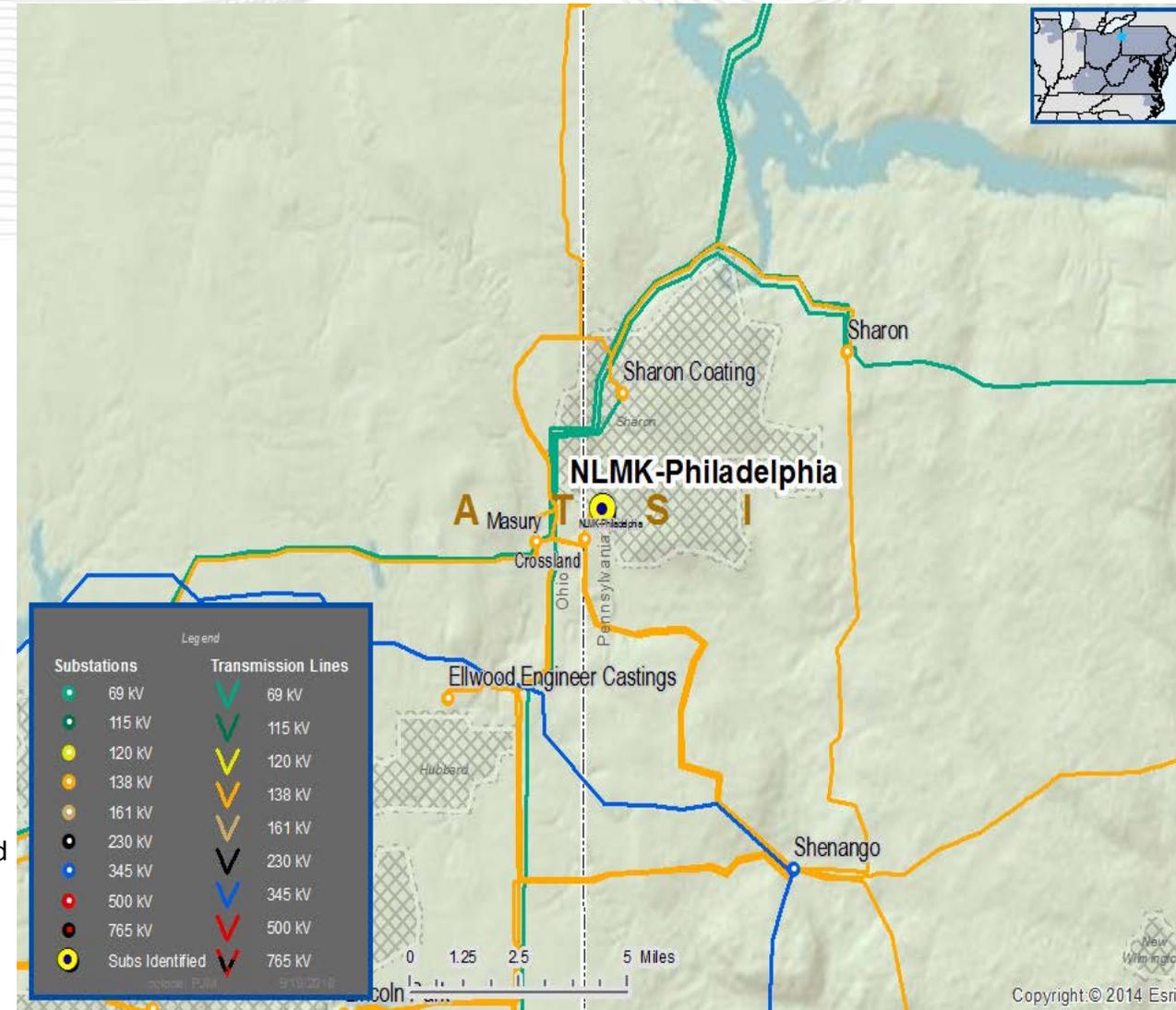
Date: 9/28/2018

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Problem Statement

NLMK 69 kV Load At Risk

- Reduce the amount of local load loss under contingency conditions.
 - Loss of Crossland-NLMK 138 kV line
 - Results in loss of approximately 58 MWs of load.
- Or
 - Masury 69 kV bus fault
 - Results in potential local voltage collapse of the Masury 69 kV area
- Equipment Material Condition, Performance and Risk
 - NLMK 69 kV system cable trenches are deteriorated and in need of replacement
 - 69 kV breakers in need of replacement (bus-tie breaker has already failed)
 - NLMK 138/69 kV transformer # 6 and # 12 are aged (> 50 years) and not standard design.
 - Transformer #6 has elevated gas levels.
 - Existing 69 kV transmission line conductor around NLMK is corroded and deteriorated with multiple splice locations.
 - Need to upgrade to current standards



Need Number: ATSI-2018-009

Process Stage: Need Meeting

Date: 9/28/2018

Project Driver(s):
Operational Flexibility and Efficiency

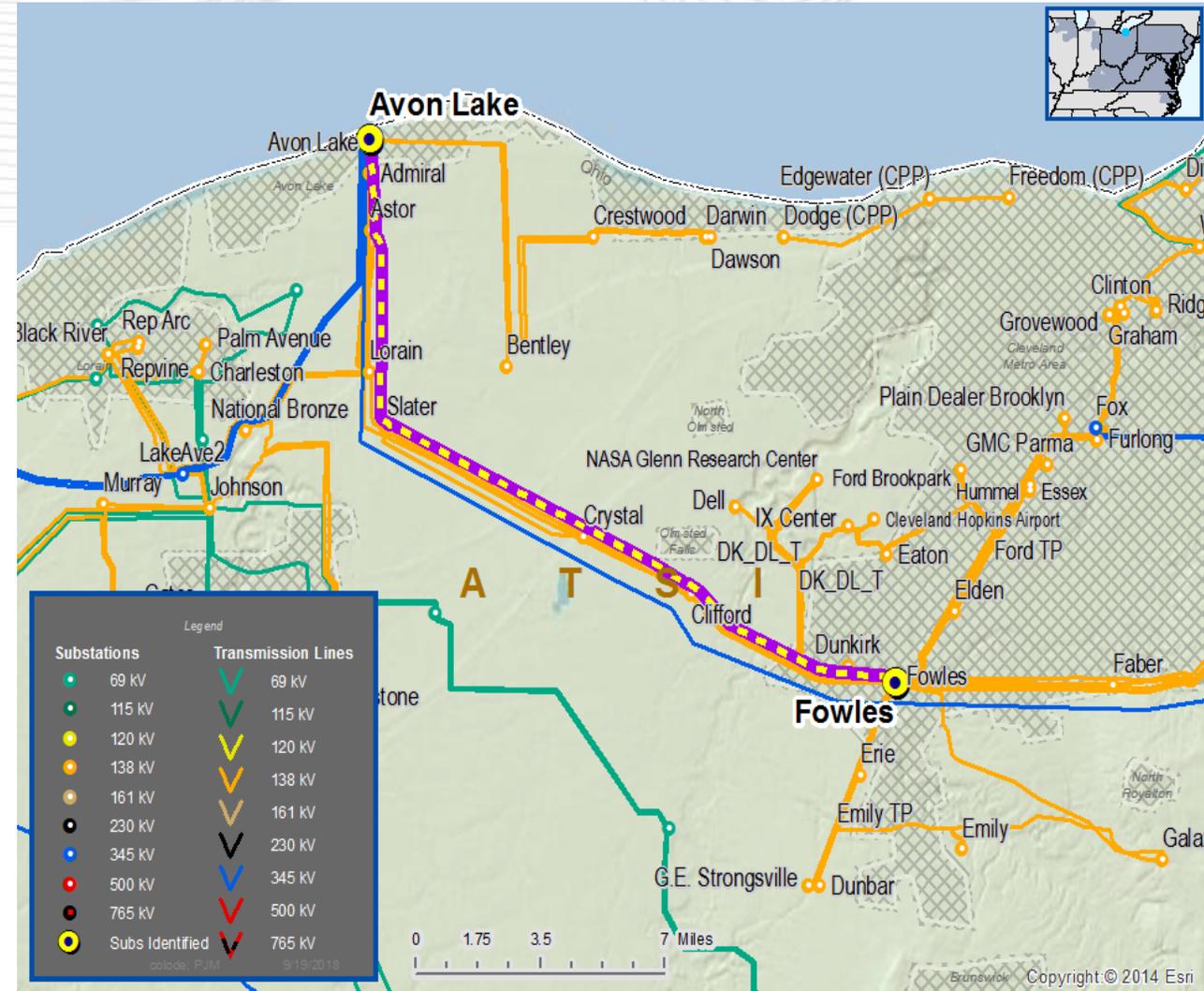
Specific Assumption Reference(s)
Add / Expand Bus Configuration

- Reduce amount of exposed potential local load loss during contingency conditions.

Build New Transmission Line

- Improve system reliability under contingency conditions.
- Reduce the amount of potential local load loss during contingency conditions.

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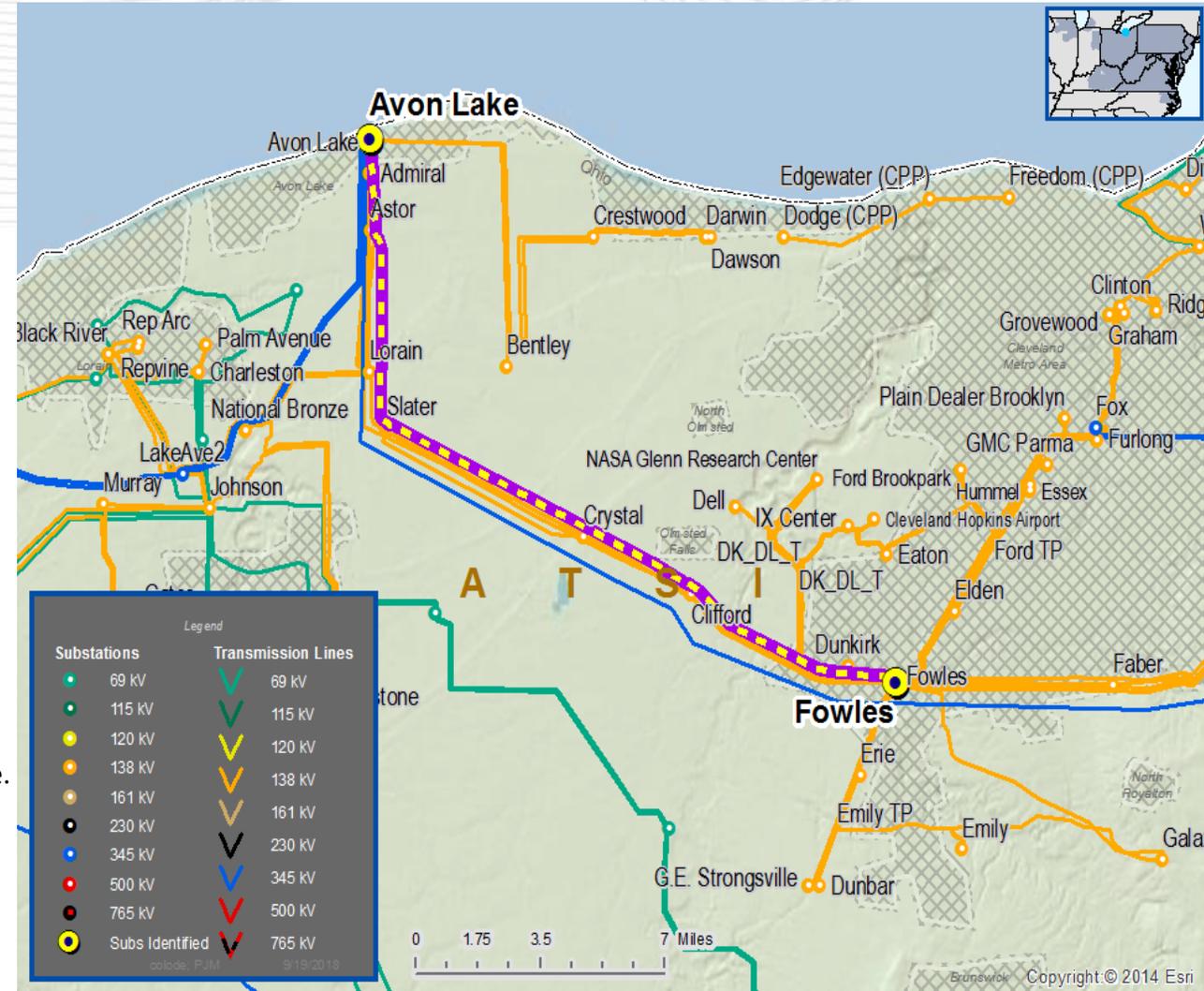
Need Number: ATSI-2018-009 (Continued)
 Process Stage: Need Meeting
 Date: 9/28/2018

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Problem Statement

Avon-Fowles 138 kV Q1 and Q3 Line Load at Risk

- Reduce the amount of local load loss at risk and mitigate non-planning criteria voltage concerns on the > 100 kV system under contingency conditions.
 - Loss of Avon-Fowles Q1 138kV line and path-end outage of the Avon-Fowles Q3 138 line.
 - Results in the potential loss of approximately 60 MWs and 14,000 customers.
 - Results in the potential low voltage (0.91 p.u.) at Dawson 138kV Substation
- Or
- Common tower outage Avon-Fowles Q1 138kV line and the Avon-Fowles Q3 138 line.
- Results in the consequential load loss of approximately 237 MWs and 68,200 customers.



Need Number: ATSI-2018-010

Process Stage: Need Meeting

Date: 9/28/2018

Project Driver(s):

Equipment Material Condition, Performance and Risk

Specific Assumption Reference(s)

Line Condition Rebuild / Replacement

Assessment of existing transmission lines for equipment characteristics that are at, or beyond their existing service life, or contain components that are obsolete.

- Aged or deteriorated wood pole transmission line structures.
- Negatively impact customer outage frequency and/or durations.
- Demonstrate an increasing trend in maintenance findings and/or costs

Network Radial Transmission Line

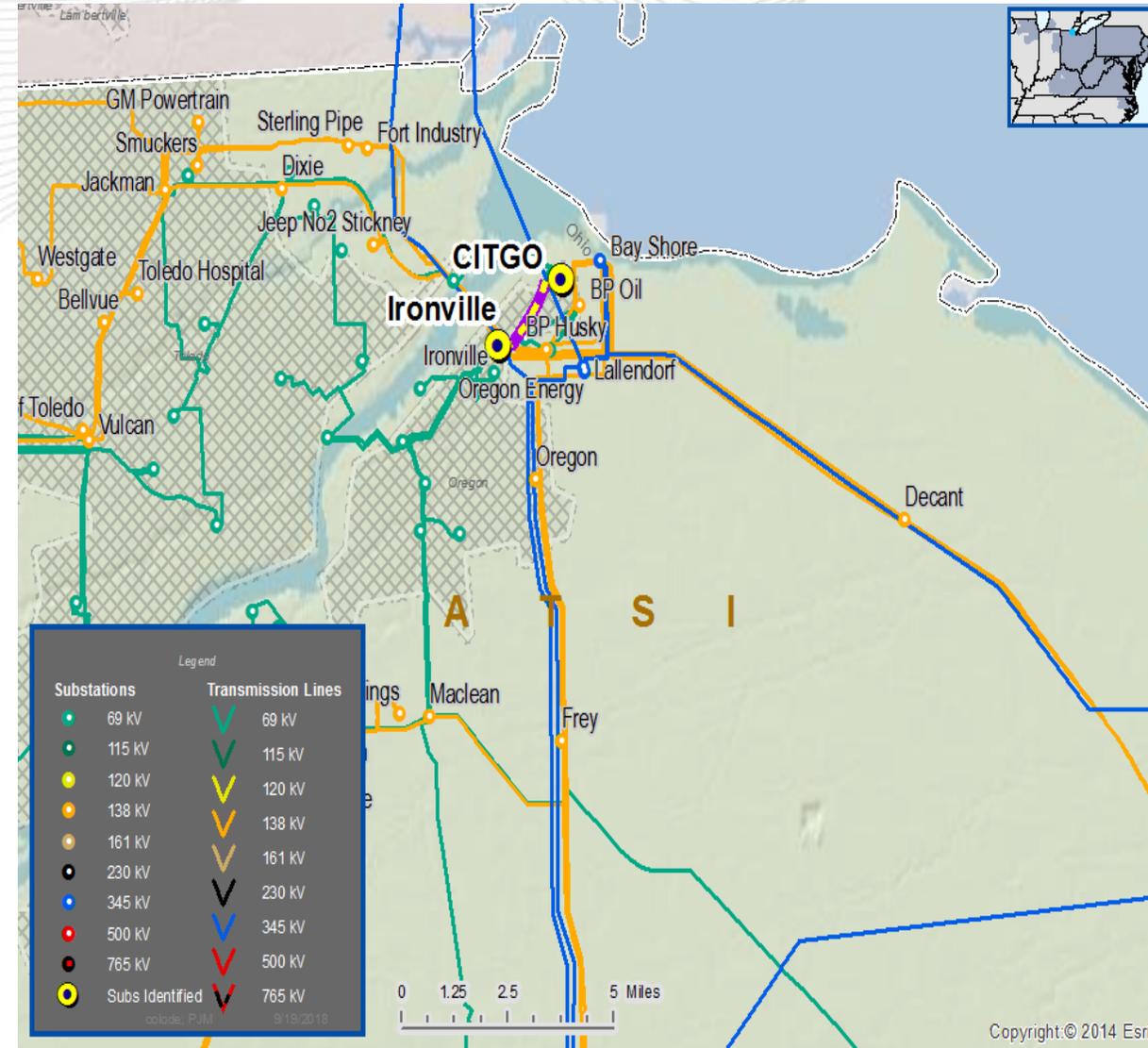
- Radial lines that serve multiple delivery points.

Problem Statement

Ironville-Citgo 69 kV Condition Assessment (Approximately 4 miles)

Line Condition Rebuild / Replacement

- Identified obsolete and deteriorated equipment.
 - 60-68 year old construction; poor inspection results, 89 % rejection rate.
 - Approximately 2 repair records over the past 5 years.
- Multiple transmission delivery points (3) impacted; back-up source to (4) transmission delivery points.



Need Number: ATSI-2018-011
 Process Stage: Need Meeting
 Date: 9/28/2018

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

Specific Assumption Reference(s)
 Line Condition Rebuild / Replacement

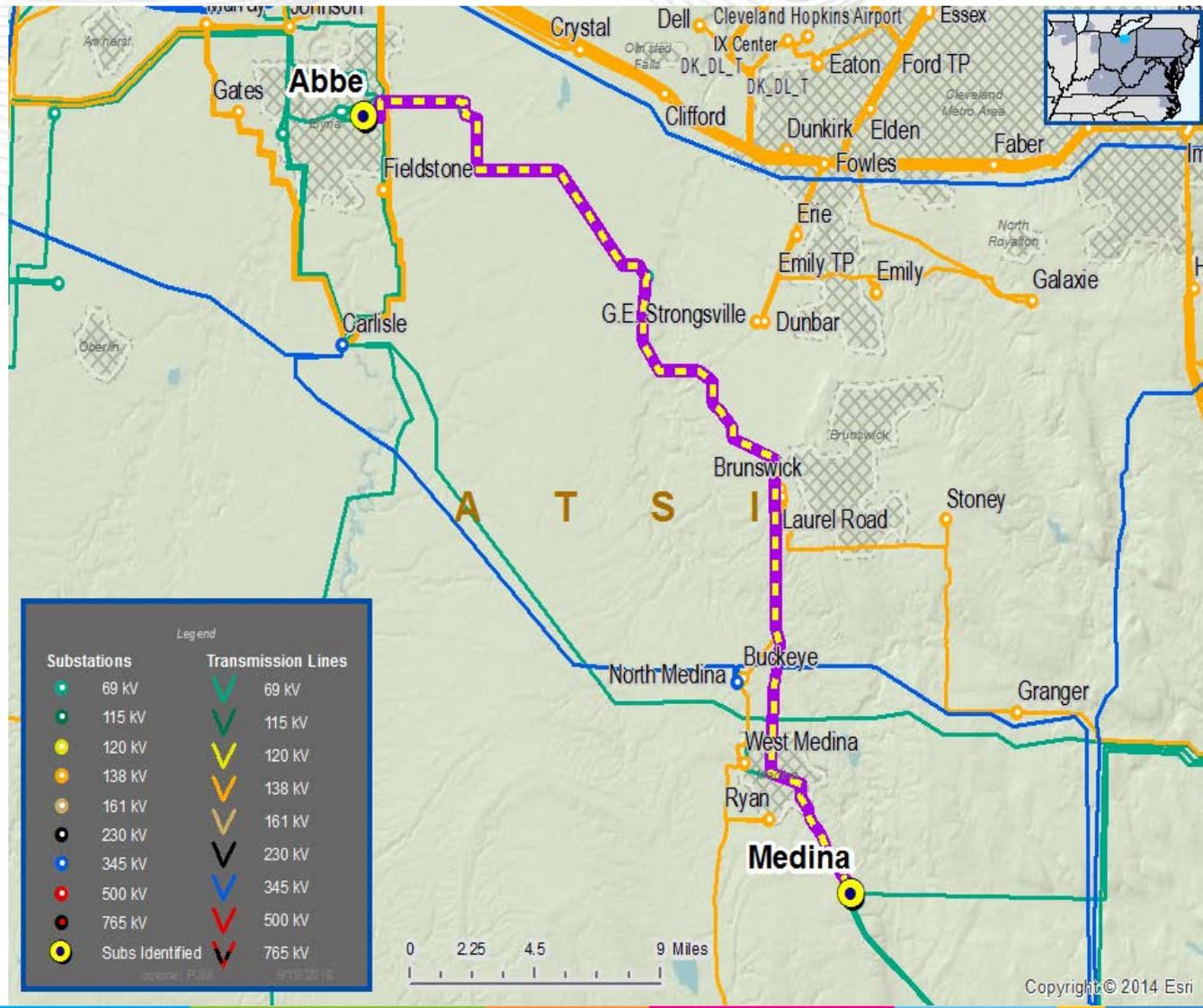
Assessment of existing transmission lines for equipment characteristics that are at, or beyond their existing service life, or contain components that are obsolete.

- Aged or deteriorated wood pole transmission line structures.
- Negatively impact customer outage frequency and/or durations.
- Demonstrate an increasing trend in maintenance findings and/or costs

Problem Statement

Abbe-Medina 69 kV Condition Assessment (Approx. 30 miles)

- Identified obsolete and deteriorated equipment.
 - 62 year old construction; poor inspection results.
 - Negative outage history over past 5 years.
 - Approximately 17 repair records over the past 5 years; increasing trend .
- Multiple transmission delivery points (8) impacted.
- Need to upgrade to current standards



Need Number: ATSI-2018-012
 Process Stage: Need Meeting
 Date: 9/28/2018

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

Specific Assumption Reference(s)
 Line Condition Rebuild / Replacement

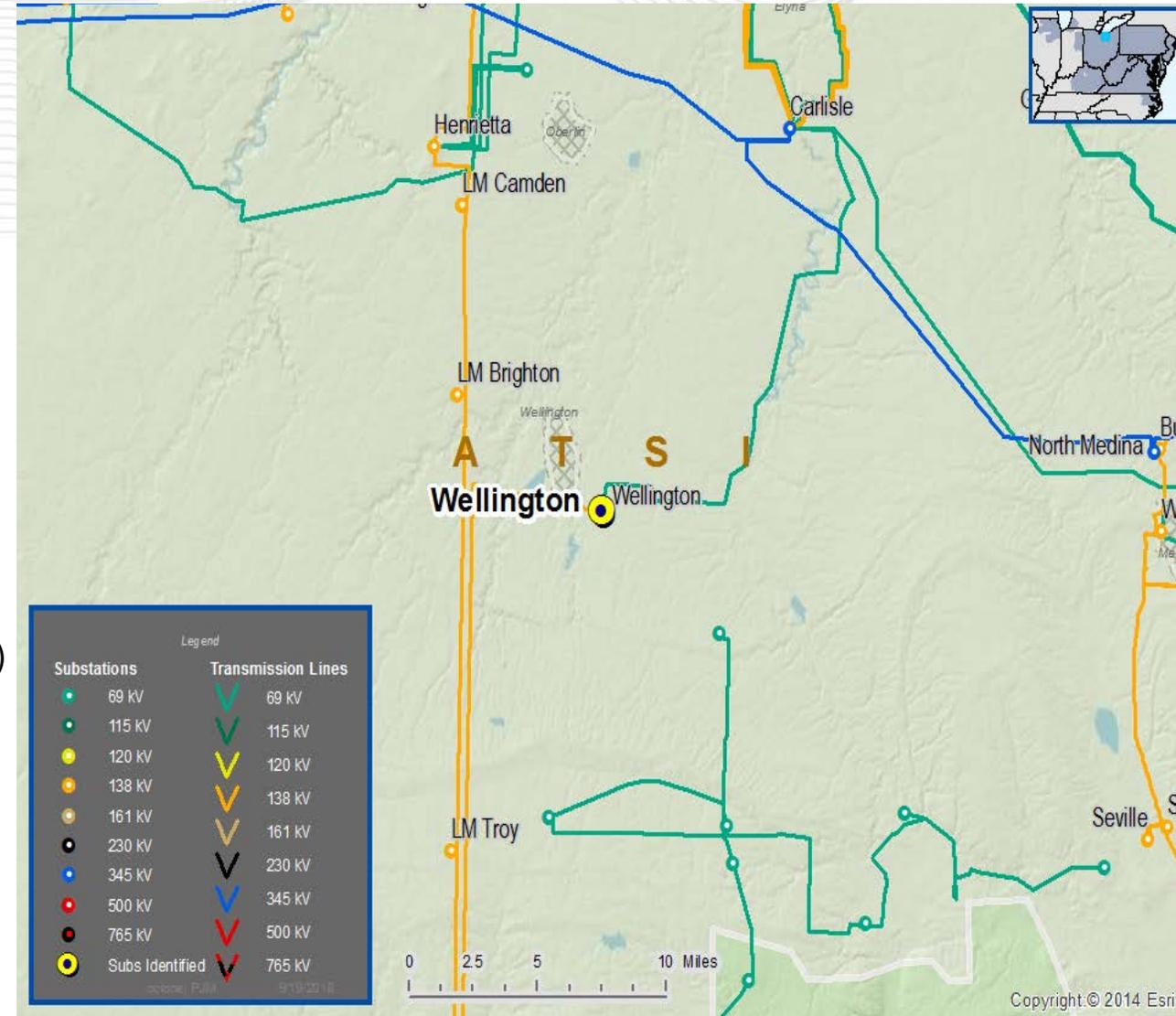
Assessment of existing transmission lines for equipment characteristics that are at, or beyond their existing service life, or contain components that are obsolete.

- Aged or deteriorated wood pole transmission line structures.
- Negatively impact customer outage frequency and/or durations.
- Demonstrate an increasing trend in maintenance findings and/or costs

Problem Statement

Wellington-Hanville-Steuben 69 kV Condition Assessment (Approx. 33 miles)

- Identified obsolete and deteriorated equipment.
 - 50 to 56 year old construction; poor inspection results.
 - Negative outage history over past 5 years;
 - Previous radial line (now networked) with 5 distribution delivery points.
 - Approximately 13 repair records over the past 5 years; increasing trend.
- Multiple transmission delivery points (5) impacted.
- Need to upgrade to current standards



Need Number: ATSI-2018-013

Process Stage: Need Meeting

Date: 9/28/2018

Project Driver(s):

Equipment Material Condition, Performance and Risk

Specific Assumption Reference(s)

Line Condition Rebuild / Replacement

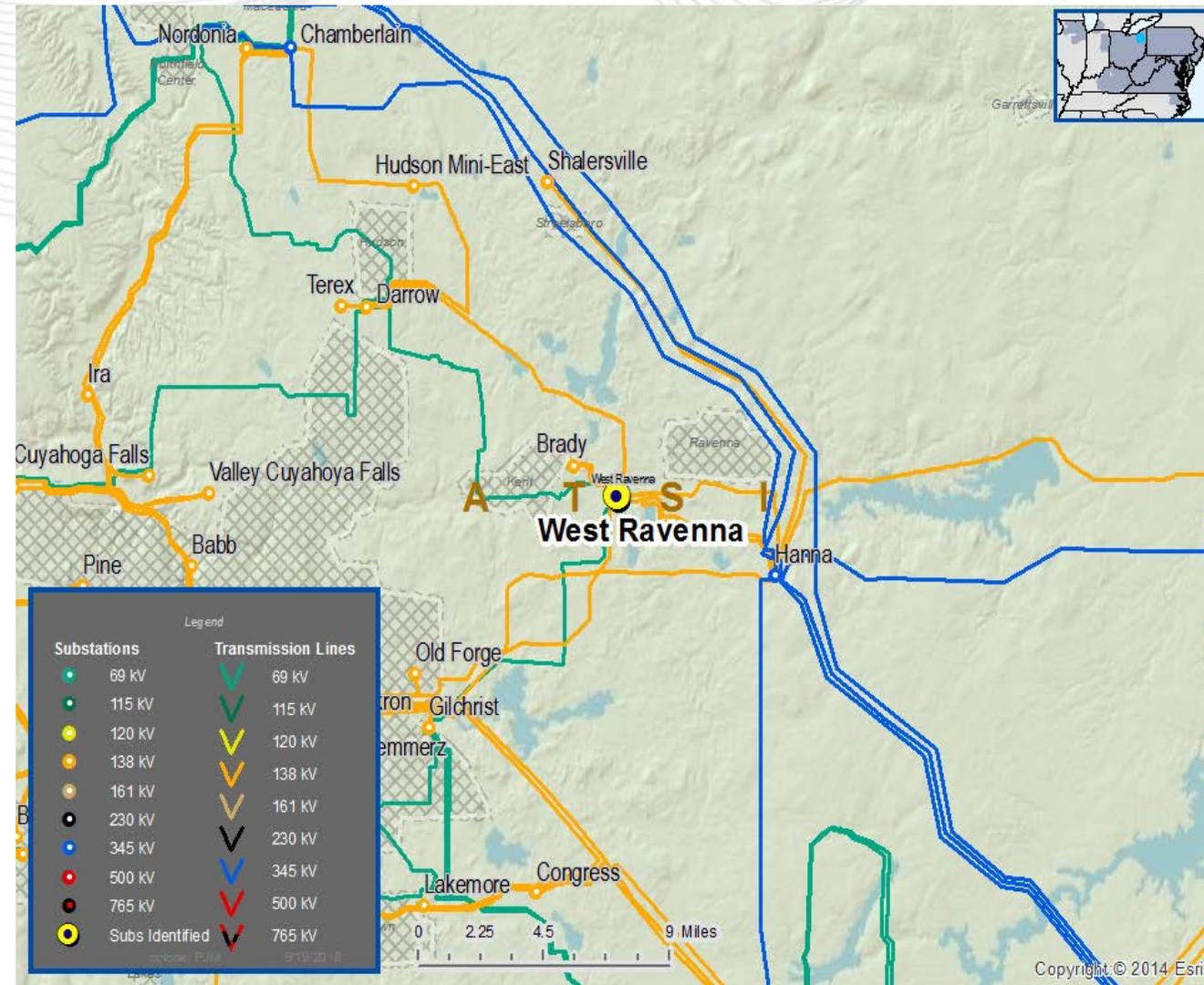
Assessment of existing transmission lines for equipment characteristics that are at, or beyond their existing service life, or contain components that are obsolete.

- Aged or deteriorated wood pole transmission line structures.
- Negatively impact customer outage frequency and/or durations.
- Demonstrate an increasing trend in maintenance findings and/or costs

Problem Statement

Ravenna-West Ravenna #2 69 kV Condition Assessment (Approx. 4 miles)

- Identified obsolete and deteriorated equipment.
 - 50 year old construction; poor inspection results, 94 % rejection rate.
 - Negative outage history over past 5 years;
 - Approximately 21 repair records over the past 5 years; increasing trend.
- Need to upgrade to current standards



Need Number: ATSI-2018-014

Process Stage: Need Meeting

Date: 9/28/2018

Project Driver(s):

Equipment Material Condition, Performance and Risk

Specific Assumption Reference(s)

Line Condition Rebuild / Replacement

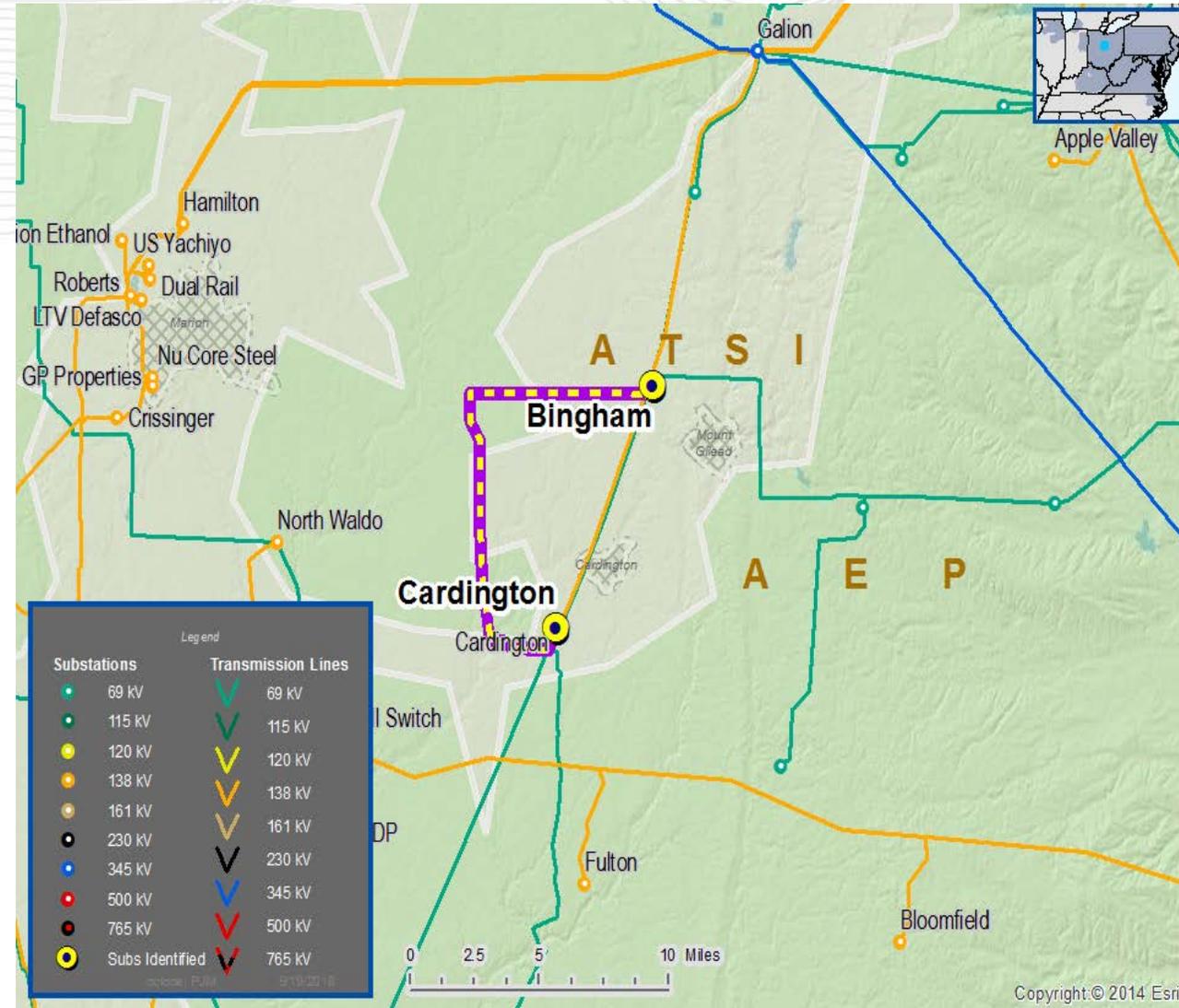
Assessment of existing transmission lines for equipment characteristics that are at, or beyond their existing service life, or contain components that are obsolete.

- Aged or deteriorated wood pole transmission line structures.
- Negatively impact customer outage frequency and/or durations.
- Demonstrate an increasing trend in maintenance findings and/or costs

Problem Statement

Bingham-Cardington (Schaff) 69 kV Condition Assessment (Approx. 15 miles)

- Identified obsolete and deteriorated equipment.
 - 45-62 year old construction; poor inspection results, 92 % rejection rate.
 - Negative outage history over past 5 years;
 - Approximately 10 repair records over the past 5 years; increasing trend.
- Need to upgrade to current standards



Need Number: ATSI-2018-015
 Process Stage: Need Meeting
 Date: 9/28/2018

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

Specific Assumption Reference(s)
 Line Condition Rebuild / Replacement

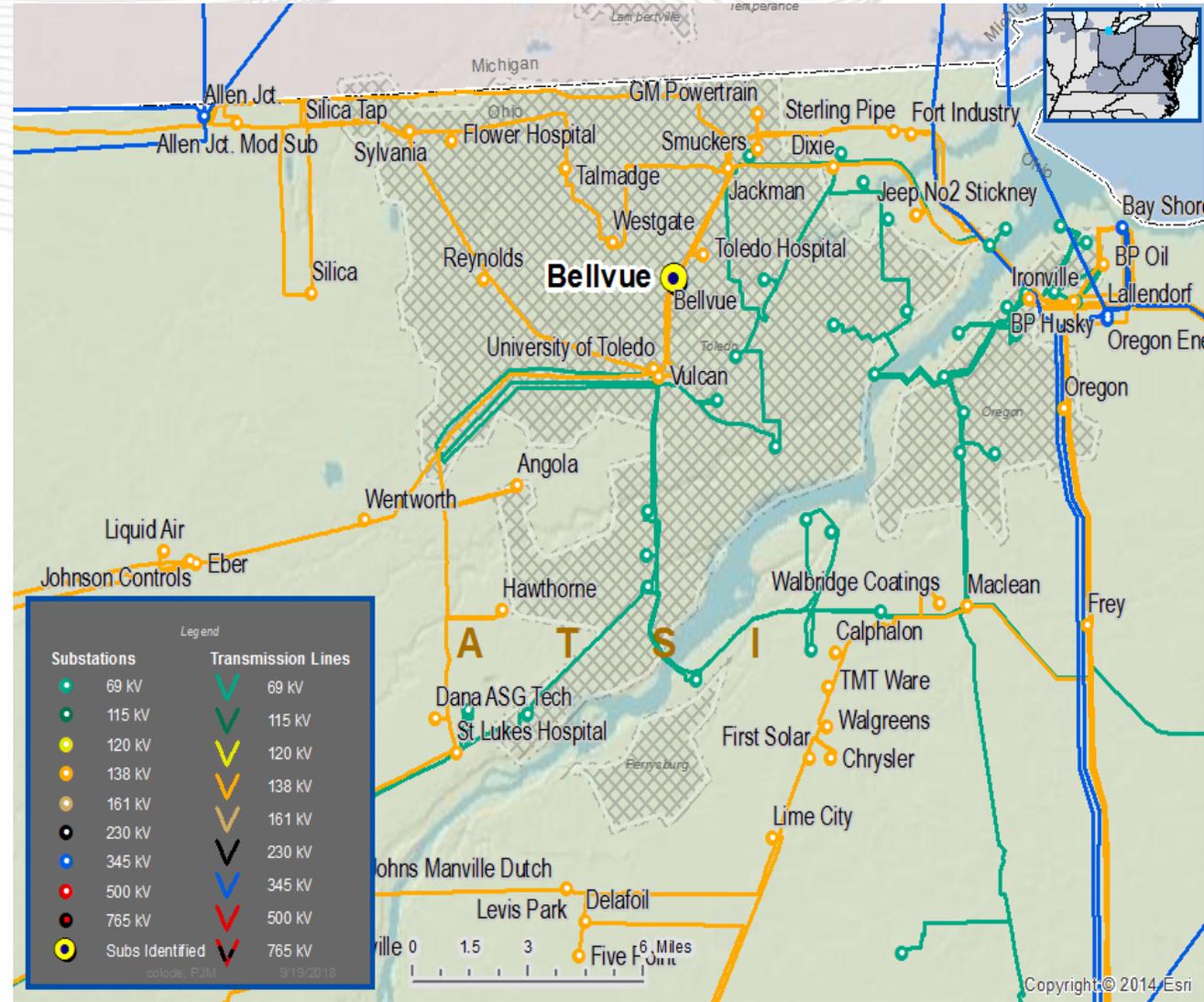
Assessment of existing transmission lines for equipment characteristics that are at, or beyond their existing service life, or contain components that are obsolete.

- Aged or deteriorated wood pole transmission line structures.
- Negatively impact customer outage frequency and/or durations.
- Demonstrate an increasing trend in maintenance findings and/or costs

Problem Statement

Bellevue-Carriage 69 kV Condition Assessment (Approximately 13 miles)

- Identified obsolete and deteriorated equipment.
 - 48 year old construction; poor inspection results, 62 % rejection rate.
 - Negative outage history over past 5 years;
 - Approximately 9 repair records over the past 5 years; increasing trend.
 - Sections of older 3/0 CU conductor.
- Multiple transmission delivery points (7) impacted.
- Need to upgrade to current standards



Need Number: ATSI-2018-016
 Process Stage: Need Meeting
 Date: 9/28/2018

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

Specific Assumption Reference(s)
 Line Condition Rebuild / Replacement

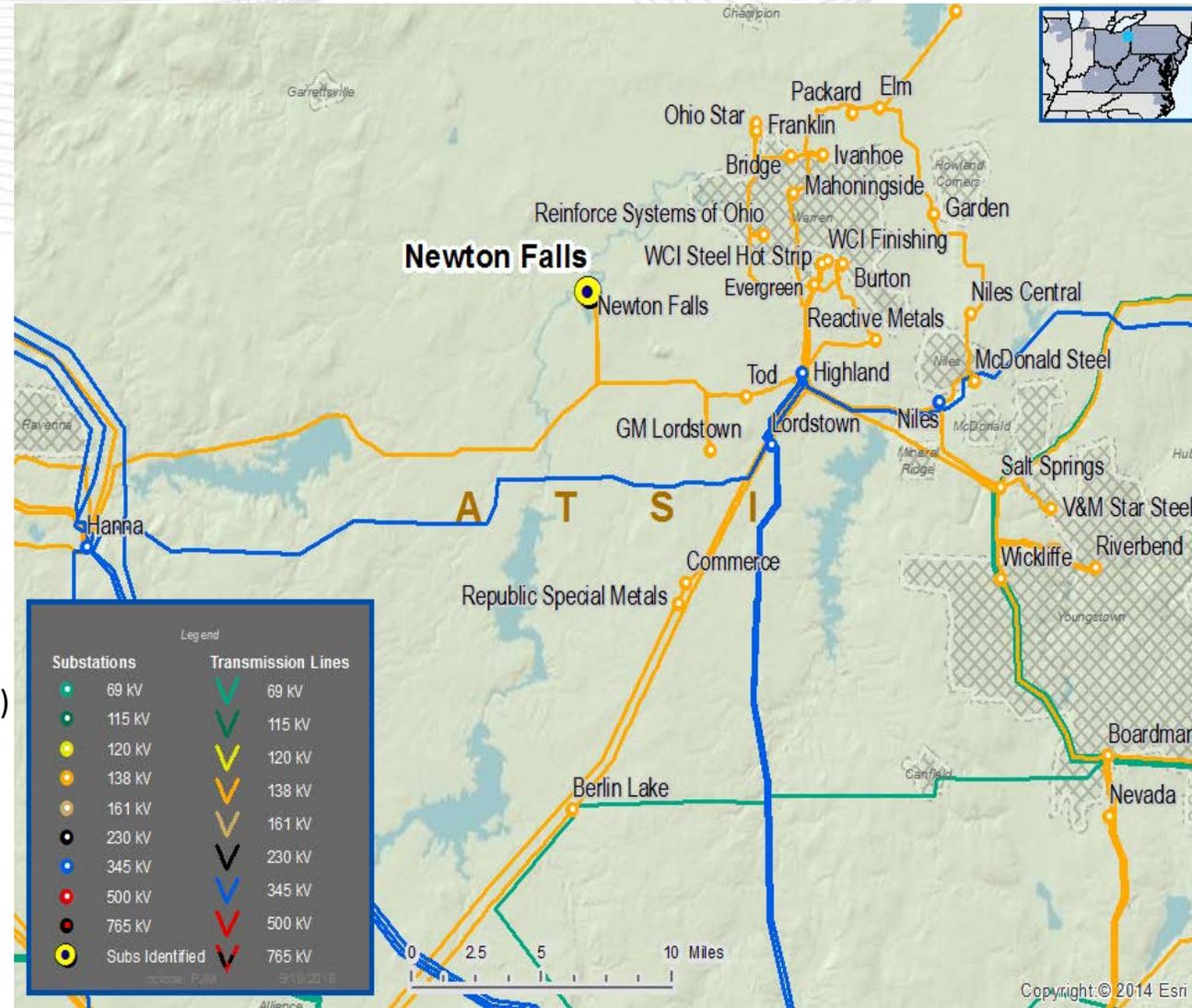
Assessment of existing transmission lines for equipment characteristics that are at, or beyond their existing service life, or contain components that are obsolete.

- Aged or deteriorated wood pole transmission line structures.
- Negatively impact customer outage frequency and/or durations.
- Demonstrate an increasing trend in maintenance findings and/or costs

Problem Statement

Hanna-Newton Falls 138 kV Condition Assessment (Approximately 20 miles)

- Identified obsolete and deteriorated equipment.
 - 62 year old construction; poor inspection results, 87 % rejection rate.
 - Negative outage history over past 5 years;
 - Approximately 45 repair records over the past 5 years; increasing trend.
- Need to upgrade to current standards



Need Number: ATSI-2018-017

Process Stage: Need Meeting

Date: 9/28/2018

Project Driver(s):

*Equipment Material Condition, Performance and Risk
Operational Flexibility and Efficiency*

Specific Assumption Reference(s)

Line Condition Rebuild / Replacement

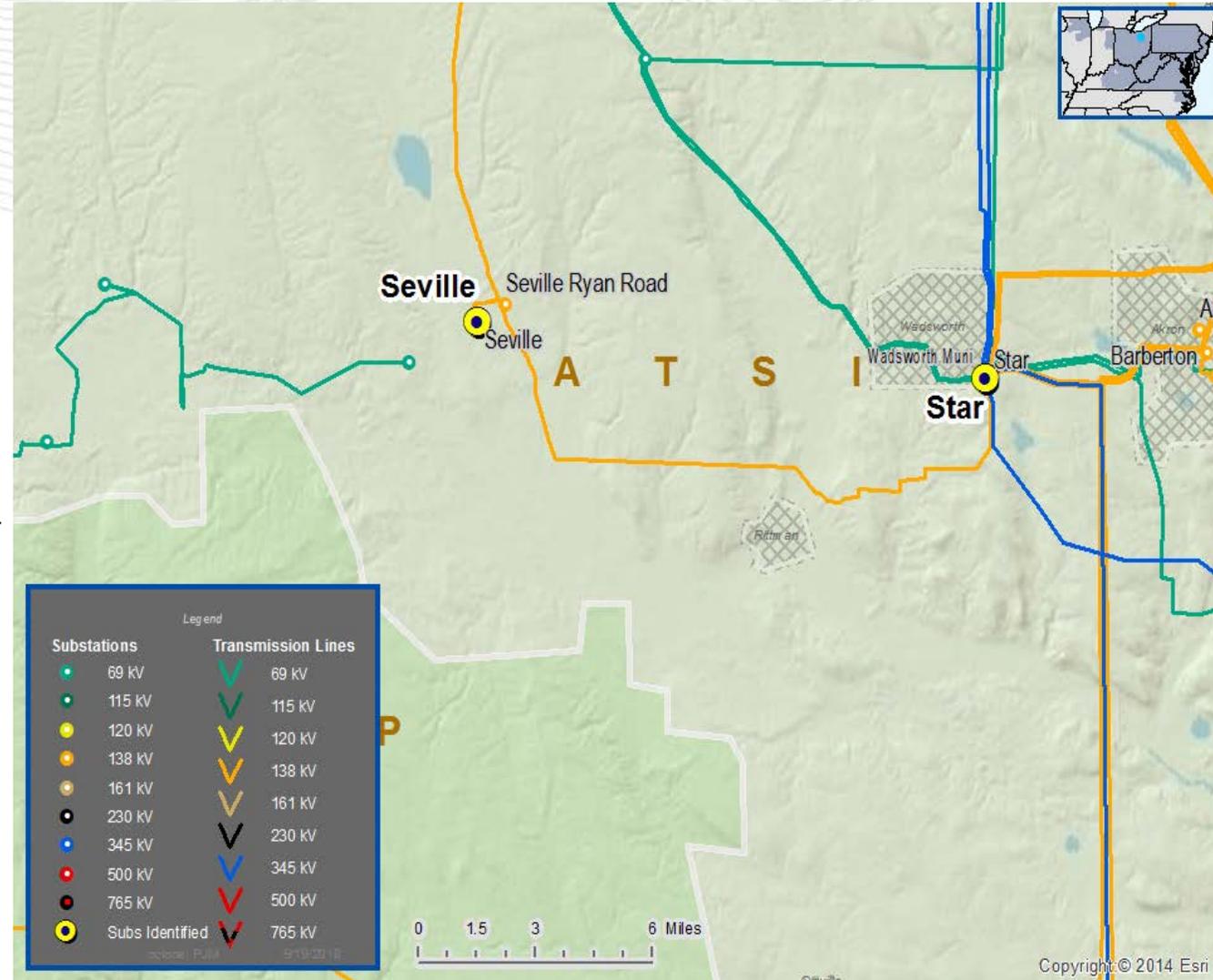
Assessment of existing transmission lines for equipment characteristics that are at, or beyond their existing service life, or contain components that are obsolete.

- Aged or deteriorated wood pole transmission line structures.
- Negatively impact customer outage frequency and/or durations.
- Demonstrate an increasing trend in maintenance findings and/or costs

Network Radial Transmission Line

- Radial lines that serve multiple delivery points.

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Need Number: ATSI-2018-017 (Continued)

Process Stage: Need Meeting

Date: 9/28/2018

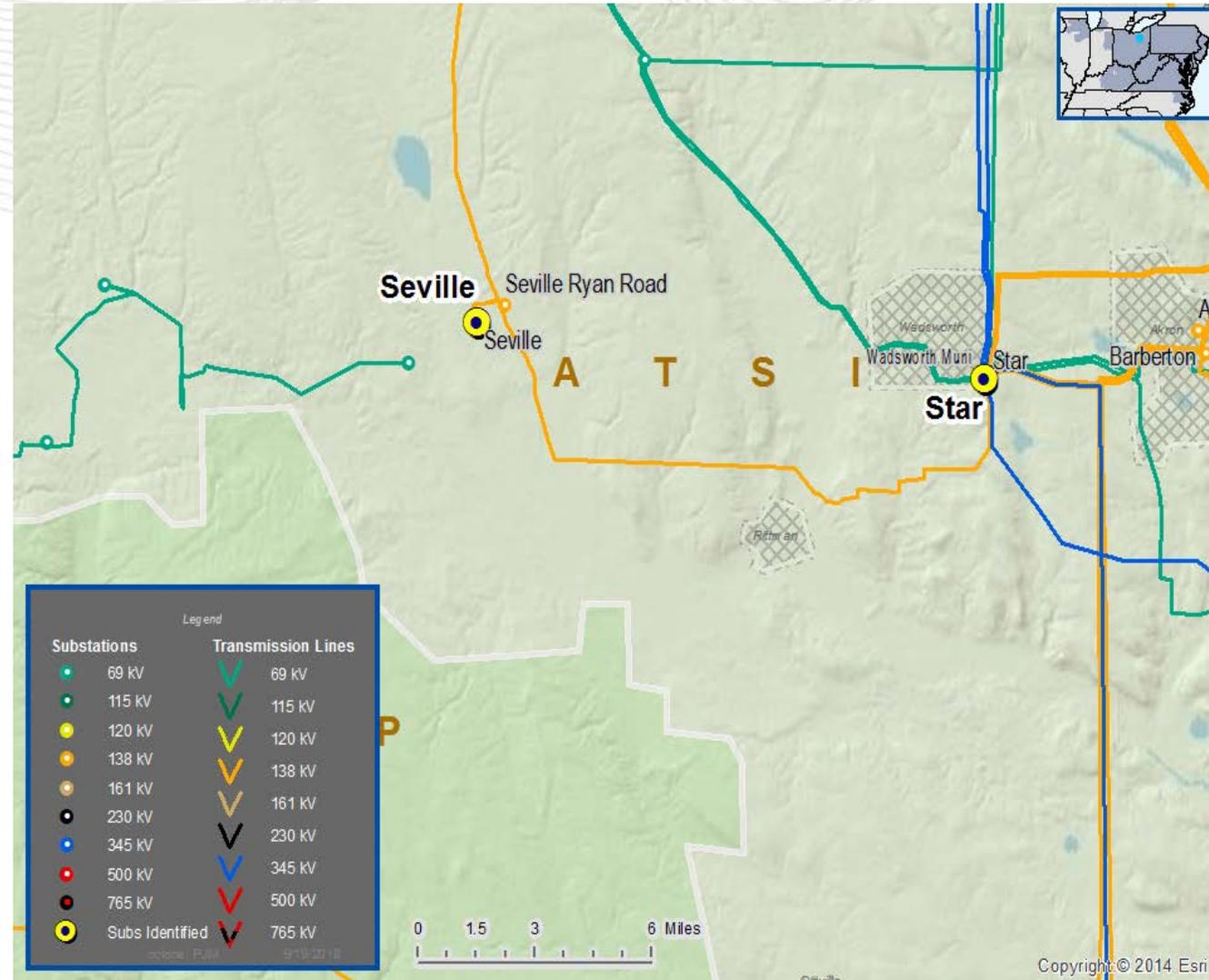
Project Driver(s):
*Equipment Material Condition, Performance and Risk
 Operational Flexibility and Efficiency*

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Problem Statement

Star-Seville (Rittman) 69 kV Condition Assessment (Approximately 18 miles)

- Identified obsolete and deteriorated equipment.
 - 56 year old construction; poor inspection results, 82 % rejection rate.
 - Negative outage history over past 5 years;
 - Approximately 30 repair records over the past 5 years; increasing trend.
- Multiple transmission delivery points (3) impacted.
- Radial 69 kV transmission line with approximately 30 MWs and approximately 7,700 customer at risk.



Need Number: ATSI-2018-018

Process Stage: Need Meeting

Date: 9/28/2018

Project Driver(s):

Equipment Material Condition, Performance and Risk

Specific Assumption Reference(s)

Line Condition Rebuild / Replacement

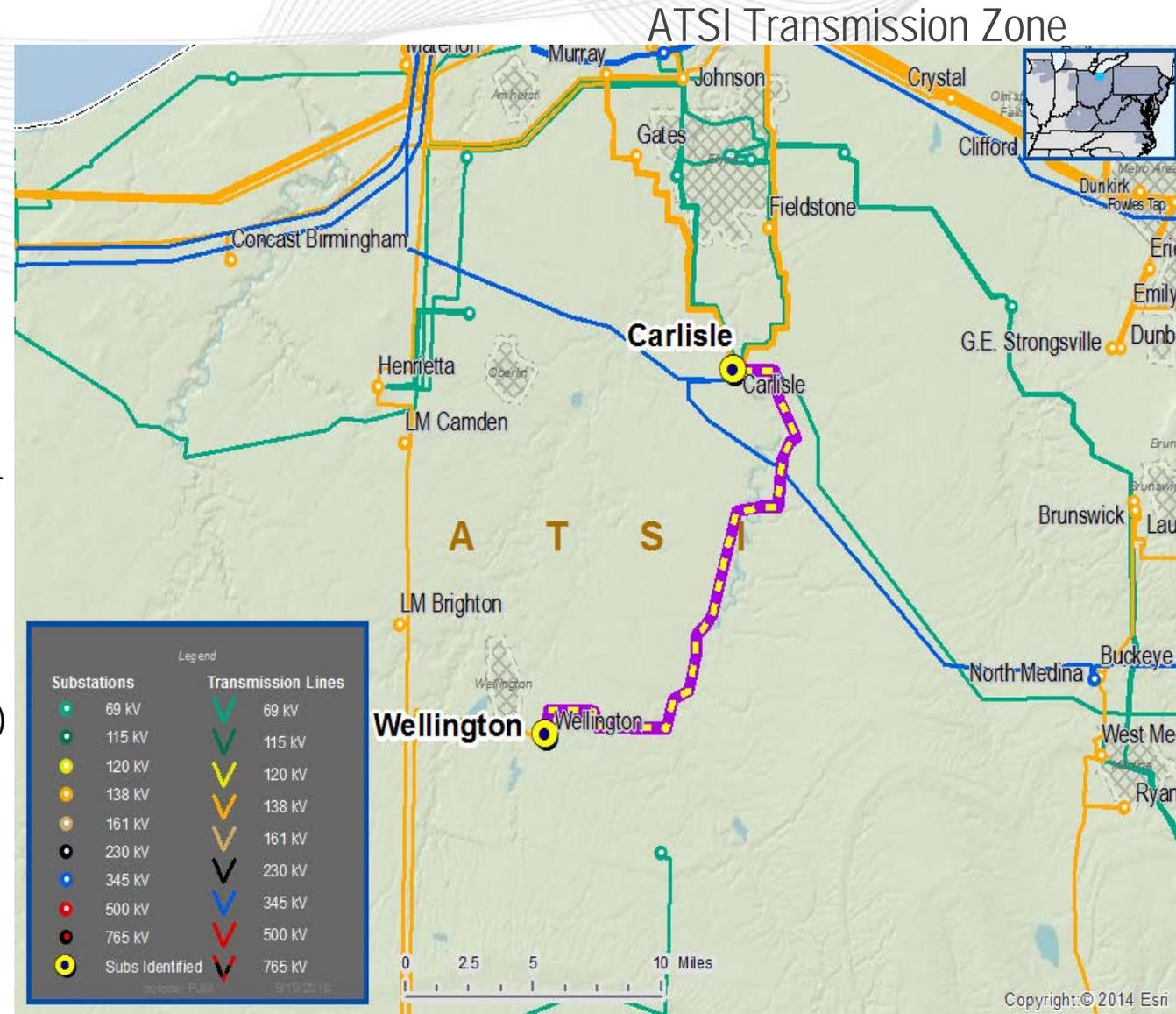
Assessment of existing transmission lines for equipment characteristics that are at, or beyond their existing service life, or contain components that are obsolete.

- Aged or deteriorated wood pole transmission line structures.
- Negatively impact customer outage frequency and/or durations.
- Demonstrate an increasing trend in maintenance findings and/or costs

Problem Statement

Carlisle-Wellington 69 kV Condition Assessment (Approximately 29 miles)

- Identified obsolete and deteriorated equipment.
 - 50-75 year old construction; poor inspection results, 75 % rejection rate.
 - Negative outage history over past 5 years;
 - Approximately 29 repair records over the past 5 years; increasing trend.
- Multiple transmission delivery points (9) impacted.



Need Number: ATSI-2018-019
 Process Stage: Need Meeting
 Date: 9/28/2018

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

Specific Assumption Reference(s)
 Line Condition Rebuild / Replacement

Assessment of existing transmission lines for equipment characteristics that are at, or beyond their existing service life, or contain components that are obsolete.

- Aged or deteriorated wood pole transmission line structures.
- Negatively impact customer outage frequency and/or durations.
- Demonstrate an increasing trend in maintenance findings and/or costs

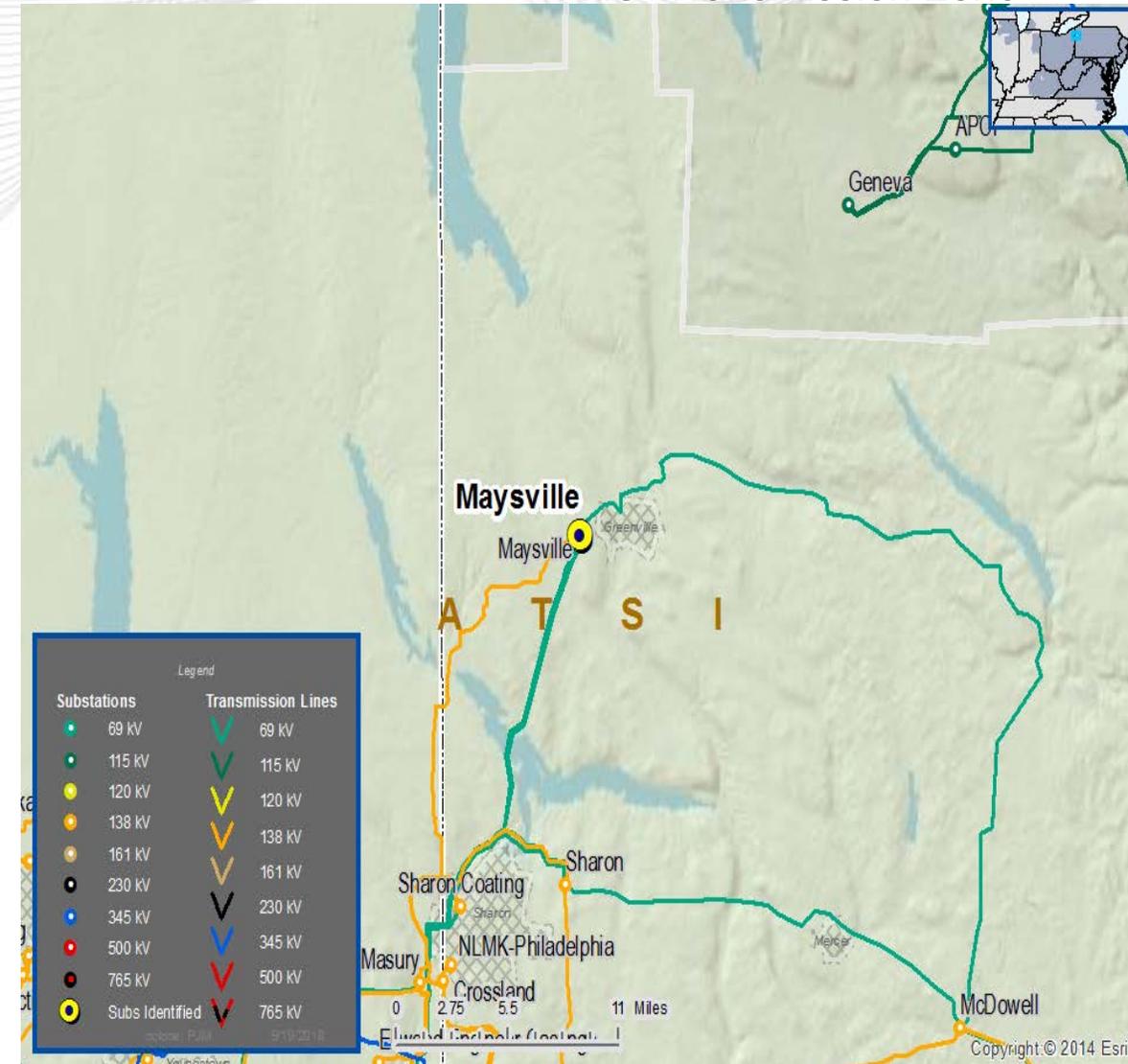
Network Radial Transmission Line

- Radial lines that serve multiple delivery points.

Problem Statement

Canal-Maysville (Greenville) 69 kV Condition Assessment (Approximately 1.5 miles)

- Identified obsolete and deteriorated equipment.
 - 61 year old construction; poor inspection results, 100 % rejection rate.
 - Approximately 4 repair records over the past 5 years.
- Radial 69 kV transmission line with 16 MWs and approximately 6,800 customer at risk.



Need Number: ATSI-2018-020
 Process Stage: Need Meeting
 Date: 9/28/2018

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

Specific Assumption Reference(s)
 Line Condition Rebuild / Replacement

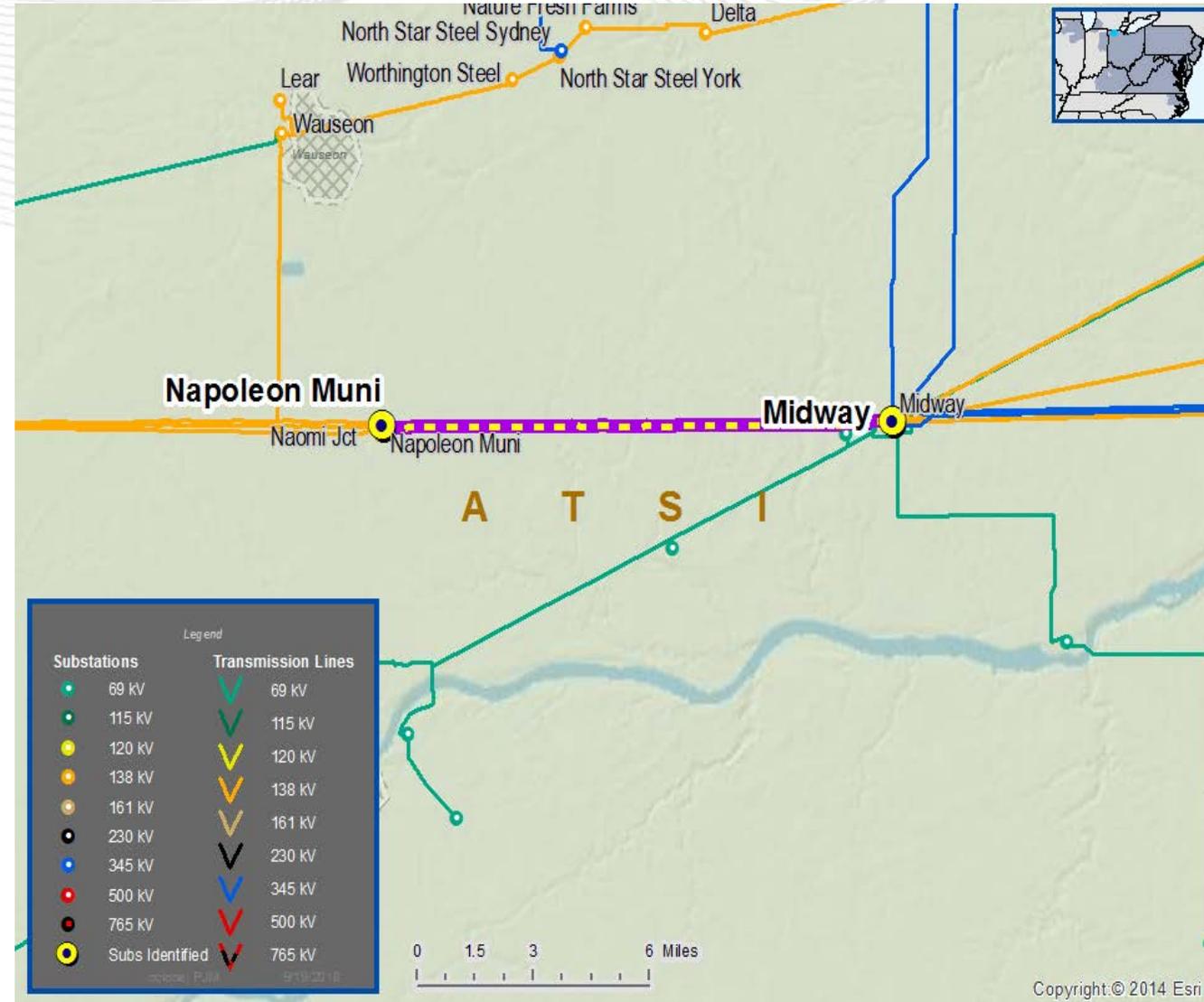
Assessment of existing transmission lines for equipment characteristics that are at, or beyond their existing service life, or contain components that are obsolete.

- Aged or deteriorated wood pole transmission line structures.
- Negatively impact customer outage frequency and/or durations.
- Demonstrate an increasing trend in maintenance findings and/or costs

Problem Statement

Midway-Napoleon 69 kV Condition Assessment (Approximately 11 miles)

- Identified obsolete and deteriorated equipment.
 - 42-52 year old construction; poor inspection results, 60 % rejection rate.
 - Approximately 8 repair records over the past 5 years; increasing trend.
 - 4/0 ACSR conductor





Revision History

9/19/2018 – V1 – Original version posted to pjm.com