

SRRTEP Committee: Western EKPC Supplemental Projects

November 17, 2023

Needs

Stakeholders must submit any comments within 10 days of this meeting in order to provide time necessary to consider these comments prior to the next phase of the M-3 process

EKPC Transmission Zone M-3 Process Balltown Tap

Need Number: EKPC-2023-016

Process Stage: Need Meeting – November 17, 2023

Supplemental Project Driver:

Equipment Material Condition, Performance and Risk

Specific Assumption Reference:

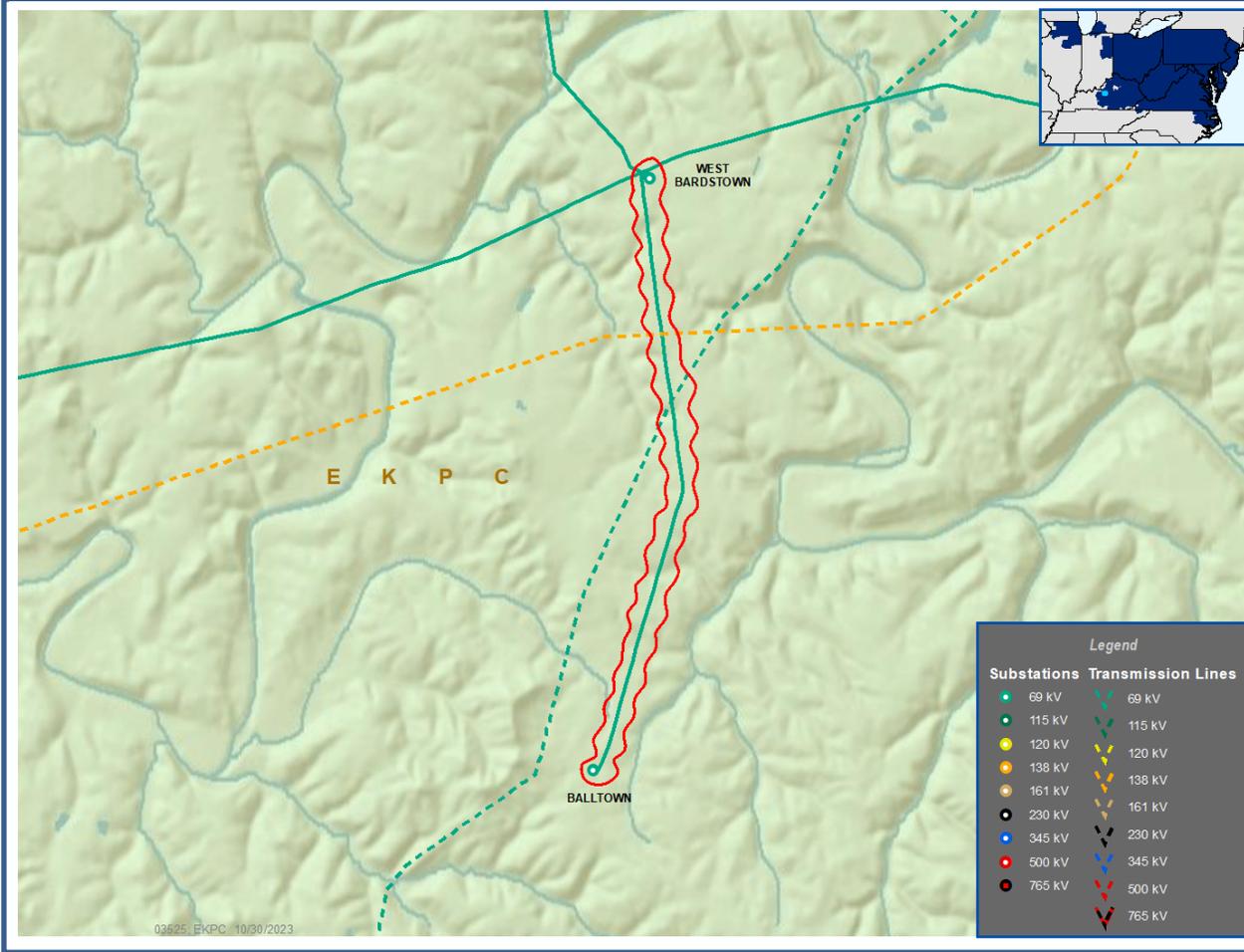
EKPC Assumptions Presentation Slide 13

Problem Statement:

The 3.5 mile, Balltown 69 KV radial distribution tap line is 1961 vintage wood pole construction with 4/0 conductor. This line section has reliability concerns related to aging wood poles as well as conductor steel core and static wire deterioration including, rusting, pitting and possible broken strands. There is currently no transmission or distribution back-feed capability.

The EKPC Reliability team has concluded, that this line is at or near end of life and should be addressed due to the condition.

Model: N/A



EKPC Transmission Zone M-3 Process Stephensburg-Bonnieville

Need Number: EKPC-2023-017

Process Stage: Need Meeting – November 17, 2023

Supplemental Project Driver:
Equipment Material Condition, Performance and Risk

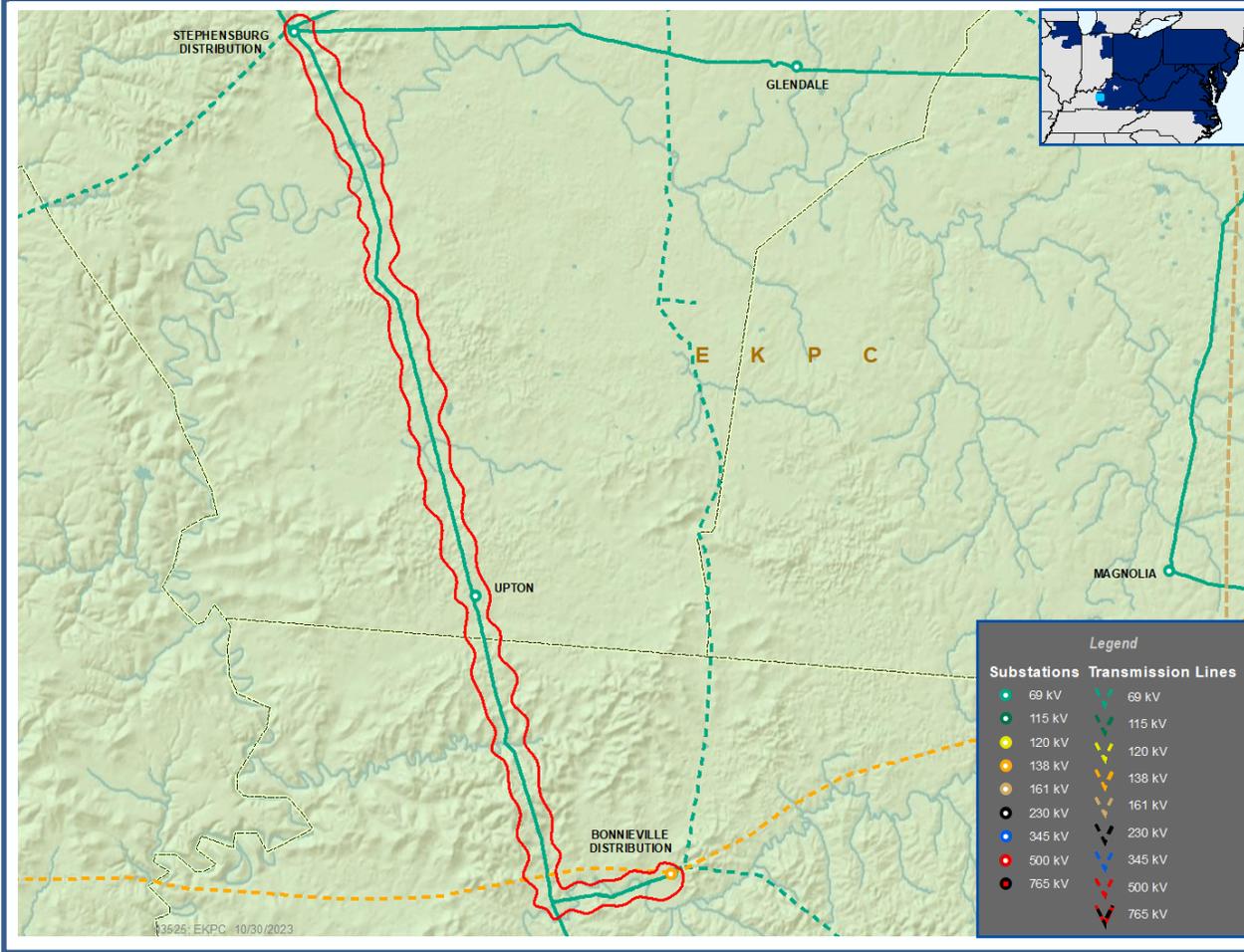
Specific Assumption Reference:
EKPC Assumptions Presentation Slide 13

Problem Statement:

The 16.42 mile, Stephensburg-Bonnieville 69 KV transmission line is 1955 vintage wood pole construction with 4/0 conductor. This line section has reliability concerns related to aging wood poles as well as conductor steel core and static wire deterioration including, rusting, pitting and possible broken strands.

The EKPC Reliability team has concluded, that this line is at or near end of life and should be addressed due to the condition.

Model: N/A



EKPC Transmission Zone M-3 Process Green County/Coburg Junction Area

Need Number: EKPC-2023-018

Process Stage: Need Meeting – November 17, 2023

Supplemental Project Driver:
Operational Flexibility and Efficiency

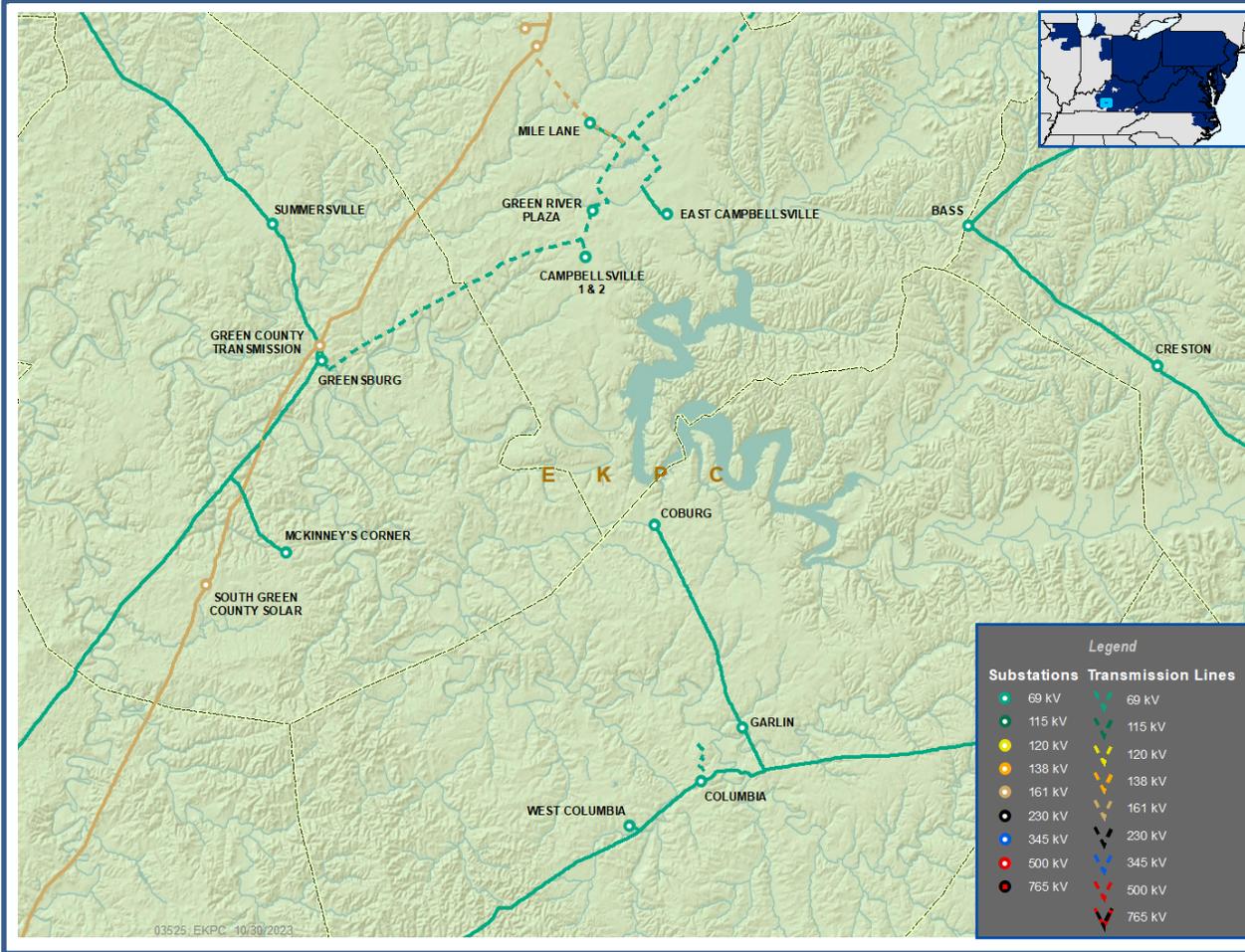
Specific Assumption Reference:
EKPC Assumptions Presentation Slide 14

Problem Statement:

System operation issues exist for, pre-existing outages of either the Green County 161/69 kV transformer or the LG&E/KU Taylor County 161/69 kV transformer (or 69 kV line sections between Taylor County and Green County), followed by another outage of one of these facilities in the area. This outage combination can result in low voltage limit violations in the area, as well as potential thermal loading violations for the Summer Shade-Green County 69 kV line. The system is often configured in a radial configuration, to segment load when an outage is occurring in the area to prevent voltage collapse and/or the thermal loading issue for a subsequent outage. Numerous PCLLRWs have been issued related to this area for potential operational violations in the area for a subsequent contingency.

Alternative will be developed to relieve the system operation concerns for this area.

Model: N/A



EKPC Transmission Zone M-3 Process Elizabethtown-Central Hardin-Stephensburg

Need Number: EKPC-2023-019

Process Stage: Need Meeting – November 17, 2023

Supplemental Project Driver:

Equipment Material Condition, Performance and Risk

Specific Assumption Reference:

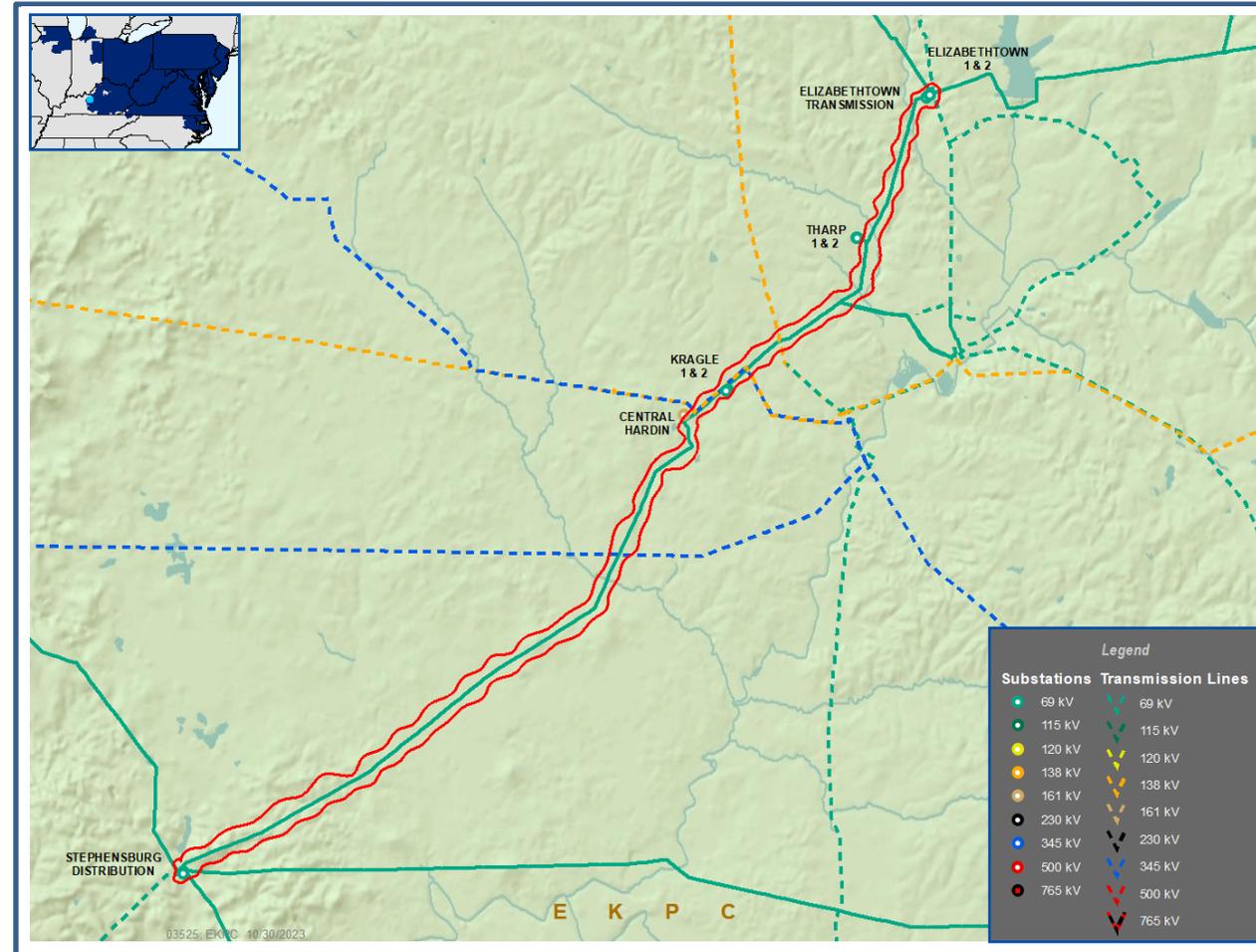
EKPC Assumptions Presentation Slide 13

Problem Statement:

The EKPC reliability team has been working to identify transmission lines sections, with single wood pole structures and 556.5 ACSR wire or larger that are known to have structural design issues. Most of the structures on these lines are believed to be over 100% capacity if the structure was new, based on EKPC current design standards. Many of the lines have been re-conducted with larger wire and very little structure design was performed at the time of the re-conductor.

The 11.7 mile, Elizabethtown-Central Hardin-Stephensburg 69 KV line sections has been identified from the above to be addressed. Alternatives will be developed to address these structural loading concerns.

Model: N/A



EKPC Transmission Zone M-3 Process Elizabethtown-Patriot Parkway-Vine Grove

Need Number: EKPC-2023-020

Process Stage: Need Meeting – November 17, 2023

Supplemental Project Driver:

Equipment Material Condition, Performance and Risk

Specific Assumption Reference:

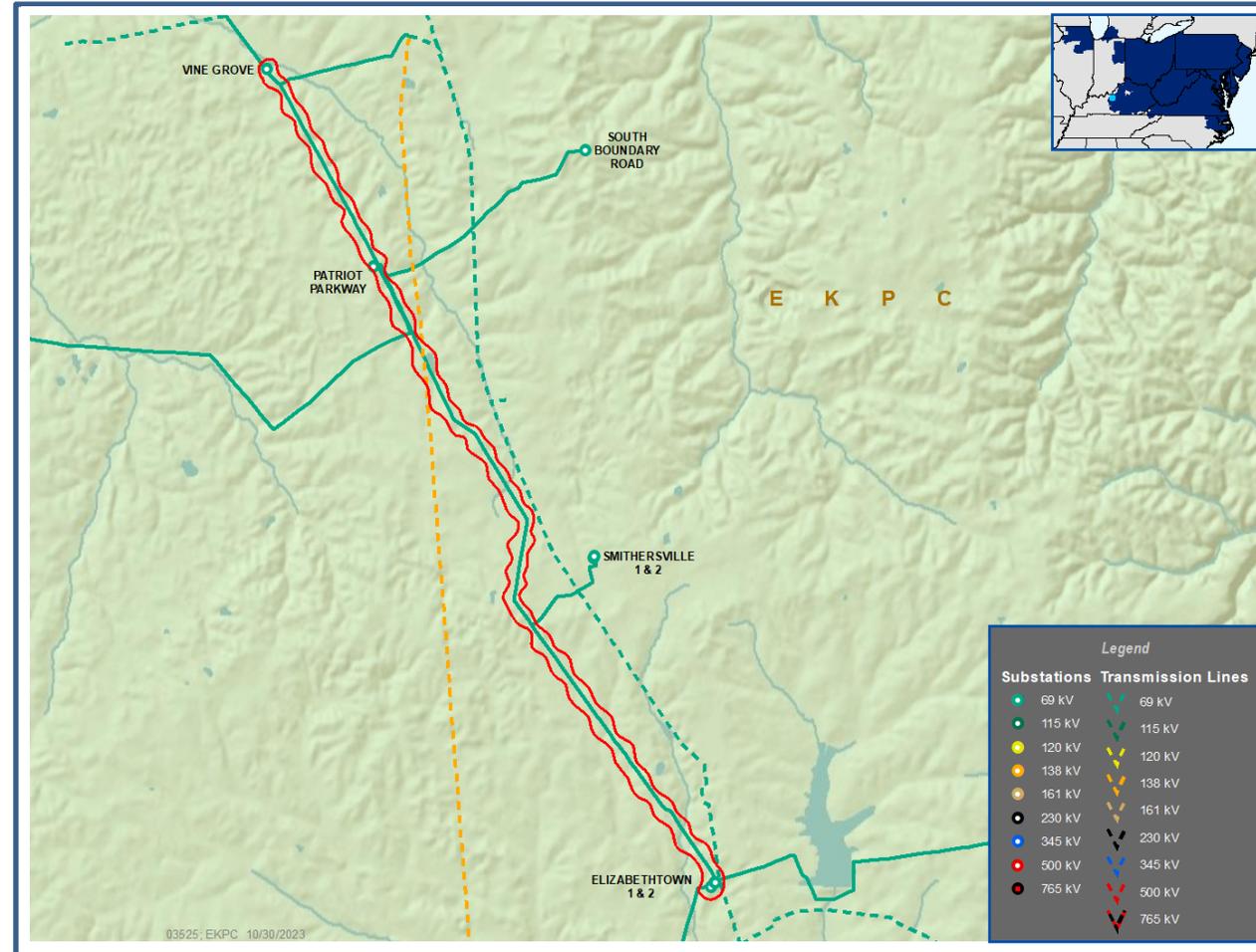
EKPC Assumptions Presentation Slide 13

Problem Statement:

The EKPC reliability team has been working to identify transmission lines sections, with single wood pole structures and 556.5 ACSR wire or larger that are known to have structural design issues. Most of the structures on these lines are believed to be over 100% capacity if the structure was new, based on EKPC current design standards. Many of the lines have been re-conducted with larger wire and very little structure design was performed at the time of the re-conductor.

The 7.45 mile, Elizabethtown-Patriot Parkway-Vine Grove 69 KV line sections has been identified from the above to be addressed. Alternatives will be developed to address these structural loading concerns.

Model: N/A



EKPC Transmission Zone M-3 Process Penn-Renaker

Need Number: EKPC-2023-021

Process Stage: Need Meeting – November 17, 2023

Supplemental Project Driver:

Equipment Material Condition, Performance and Risk

Specific Assumption Reference:

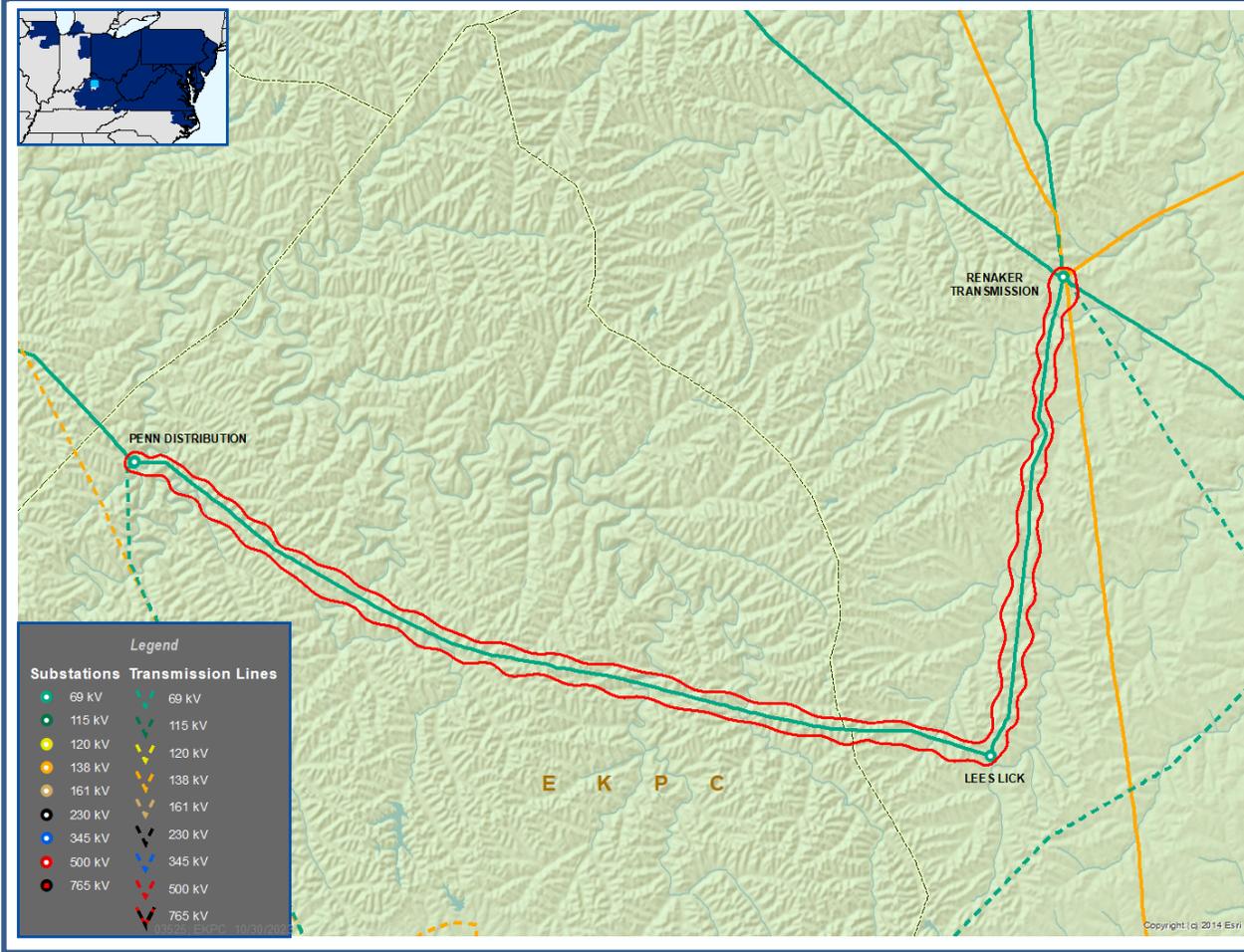
EKPC Assumptions Presentation Slide 13

Problem Statement:

The 20.79 mile, Penn-Renaker 69 KV transmission line is 1955 vintage wood pole construction with 2/0 conductor. This line section has reliability concerns related to aging wood poles as well as conductor steel core and static wire deterioration including, rusting, pitting and possible broken strands.

The EKPC Reliability team has concluded, that this line is at or near end of life and should be addressed due to the condition.

Model: N/A



EKPC Transmission Zone M-3 Process Windsor-Somerset

Need Number: EKPC-2023-022

Process Stage: Need Meeting – November 17, 2023

Supplemental Project Driver:
Equipment Material Condition, Performance and Risk

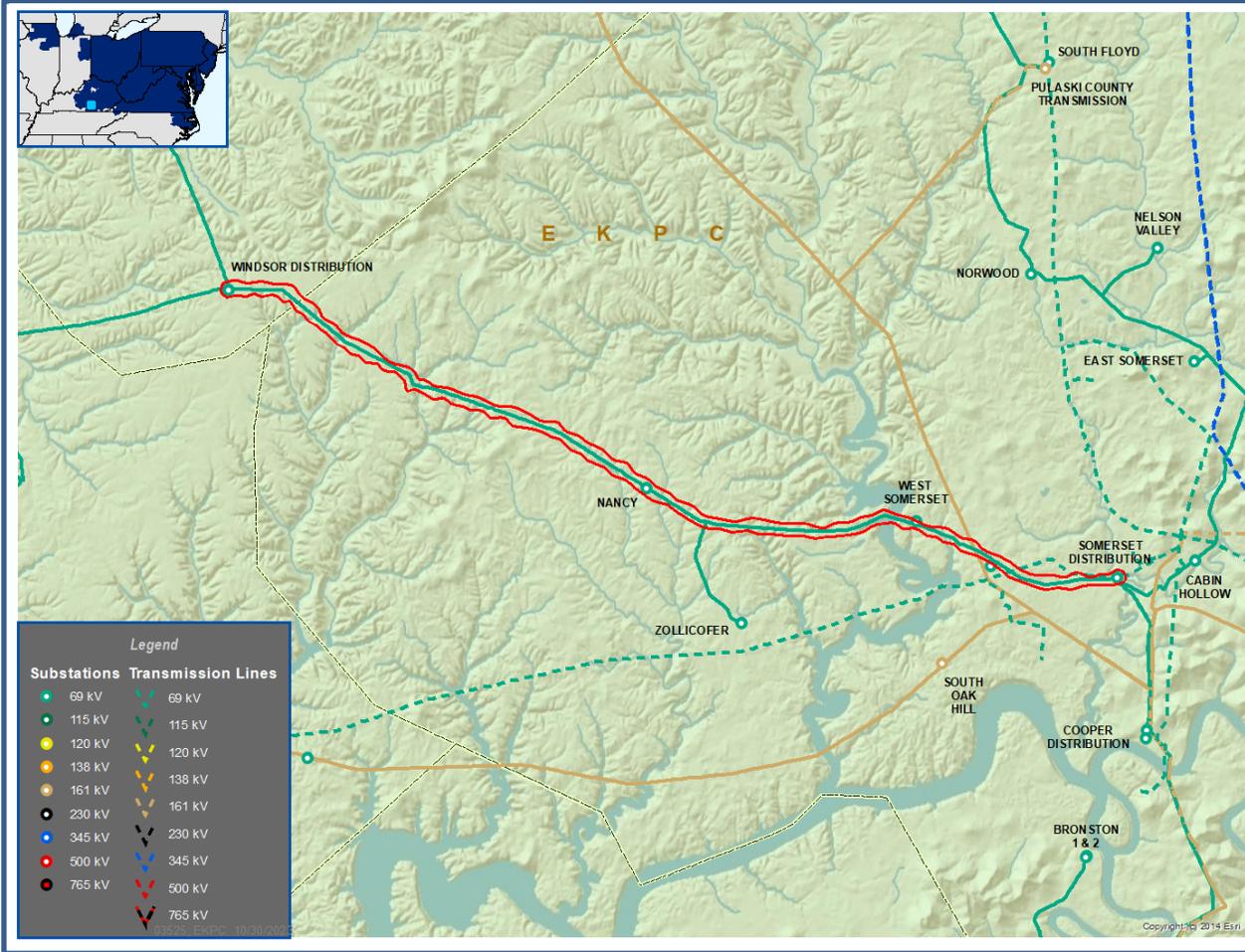
Specific Assumption Reference:
EKPC Assumptions Presentation Slide 13

Problem Statement:

The EKPC reliability team has been working to identify transmission lines sections, with single wood pole structures and 556.5 ACSR wire or larger that are known to have structural design issues. Most of the structures on these lines are believed to be over 100% capacity if the structure was new, based on EKPC current design standards. Many of the lines have been re-conducted with larger wire and very little structure design was performed at the time of the re-conductor.

The 18.97 mile, Windsor-Somerset 69 KV line sections has been identified from the above to be addressed. Alternatives will be developed to address these structural loading concerns.

Model: N/A



Solutions

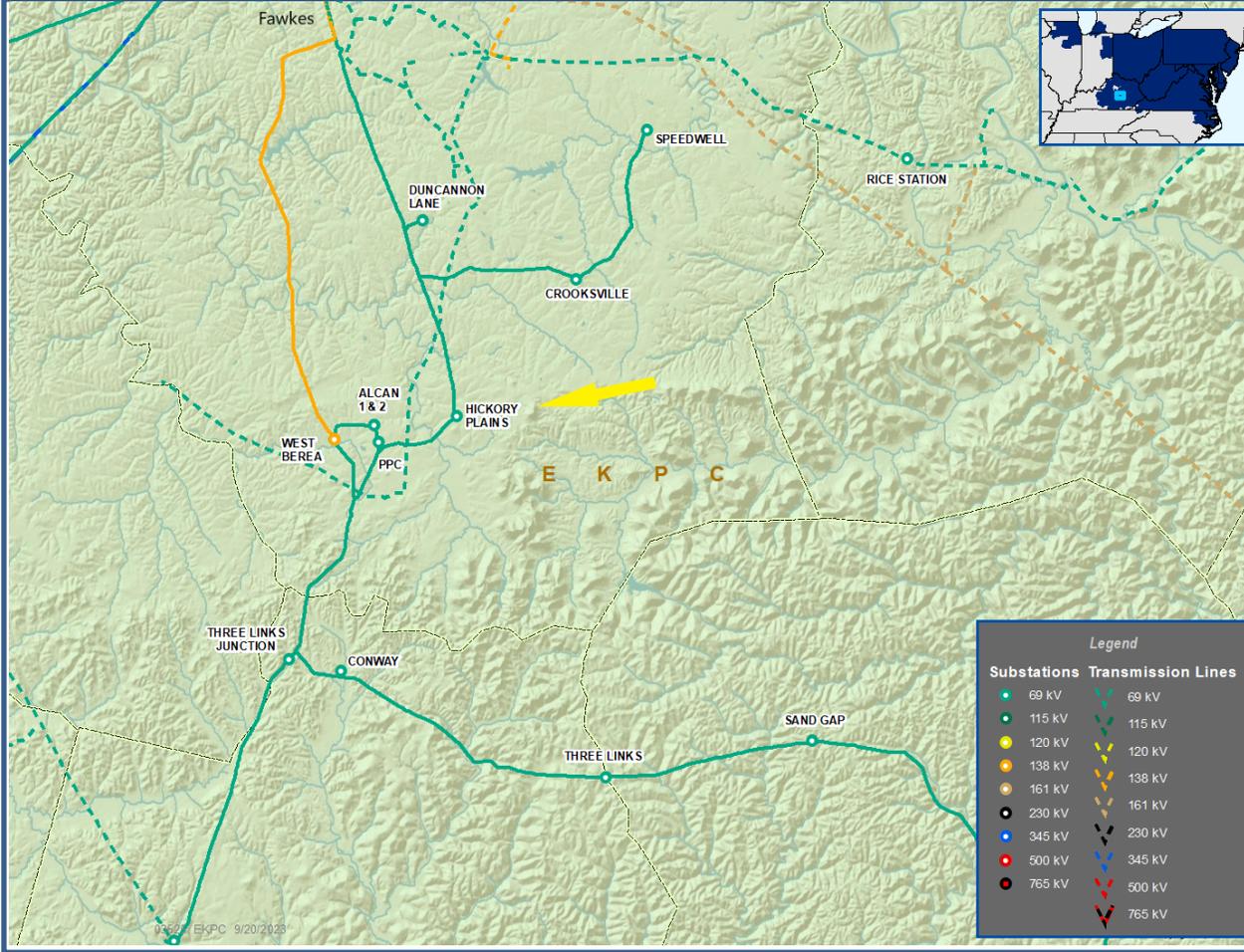
Stakeholders must submit any comments within 10 days of this meeting in order to provide time necessary to consider these comments prior to the next phase of the M-3 process

EKPC Transmission Zone M-3 Process Hickory Plains

Need Number: EKPC-2023-010
Process Stage: Solutions Meeting – November 17, 2023
Previously Presented:
 Need Meeting – October 20, 2023
Supplemental Project Driver:
 Customer Service
Specific Assumption Reference:
 EKPC Assumptions Presentation Slide 15

Problem Statement:
 The Hickory Plains distribution substation currently serves the highest numbers of customers of any distribution substation on EKPC system. Base on load forecast and steady growth in the area, the Hickory Plains 25 MVA distribution transformer is forecasted to overload in 2025/26 winter. Additionally due to the load growth, the distribution system forecasts feeder overloads and voltage constraints. Alternatives will be developed to address the transformer loading and distribution system issues.

Model: N/A



EKPC Transmission Zone M-3 Process Big Hill

Need Number: EKPC-2023-010

Process Stage: Solutions Meeting – November 17, 2023

Proposed Solution:

Build a new 69-13.2 kV, 12/16/20 MVA distribution substation (Big Hill), install an 9 MVAR capacitor bank and 8.6 mile 69 KV tap line using 266.8 conductor. Tap point will be 1.2 mile from Three Link towards Sand gap, tapping the Three Link-Sand Gap 69 KV line section.

Transmission Cost: \$0.0M

Distribution Cost: \$12.0M

Ancillary Benefits:

- Reduces loading on the Fawkes-West Berea 69 KV transmission line.

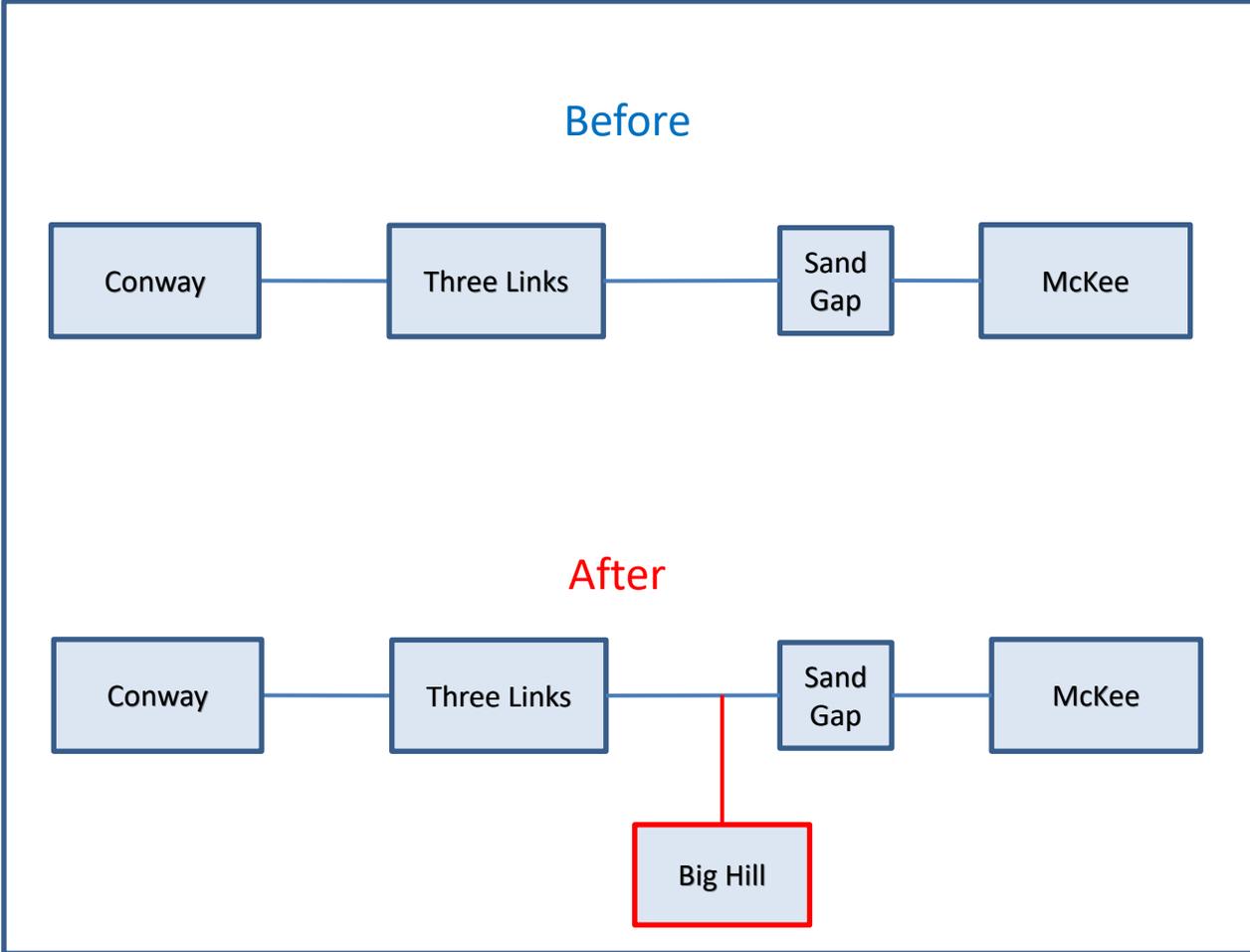
Alternatives Considered:

- No feasible alternatives

Projected In-Service: 6/1/2025

Project Status: Engineering

Model: N/A



EKPC Transmission Zone M-3 Process North Springfield-Loretto

Need Number: EKPC-2023-011

Process Stage: Solutions Meeting – November 17, 2023

Previously Presented:

Need Meeting – October 20, 2023

Supplemental Project Driver:

Equipment Material Condition, Performance and Risk

Specific Assumption Reference:

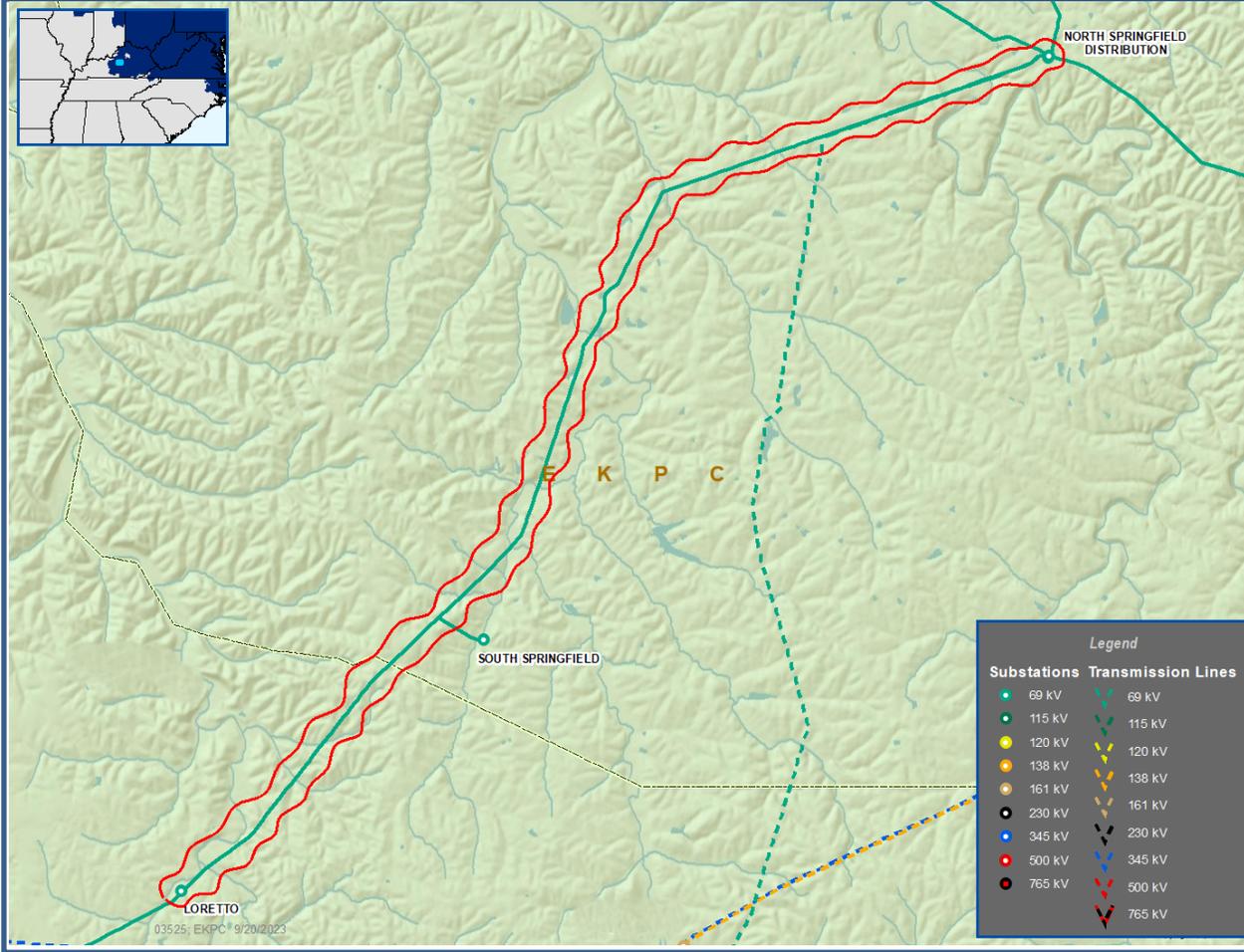
EKPC Assumptions Presentation Slide 13

Problem Statement:

The 14.11 mile, North Springfield-Loretto 69 KV line section is 1952 vintage wood pole construction with 4/0 conductor. This line section is expected to have condition issues such as, conductor steel core and static wire deterioration including rusting, pitting and possible broken strands. These condition issues have been exhibited by other 4/0 conductors with similar age and environmental conditions. There are currently 17 open work orders associated with structure issues such as degraded poles and insulator issues.

The EKPC Reliability team has concluded, that this line is at or near end of life and should be addressed due to the condition.

Model: N/A



EKPC Transmission Zone M-3 Process North Springfield-Loretto

Need Number: EKPC-2023-011

Process Stage: Solutions Meeting – November 17, 2023

Proposed Solution:

Rebuild the 14.11 mile, North Springfield-Loretto 69 KV line using 556.5 conductor and steel pole construction.

Transmission Cost: \$12.97M
Distribution Cost: \$0.0M

Ancillary Benefits:

- Increases transmission line ratings

Alternatives Considered:

1. Build a new line from Marion County-S Springfield at 69kV. Rebuild Loretto-S Springfield & EKPC portion of N Springfield-Springfield KU using 556 ACSR, retire S Springfield-N Springfield
Transmission Cost: \$19.8M
Distribution Cost: \$0.0M

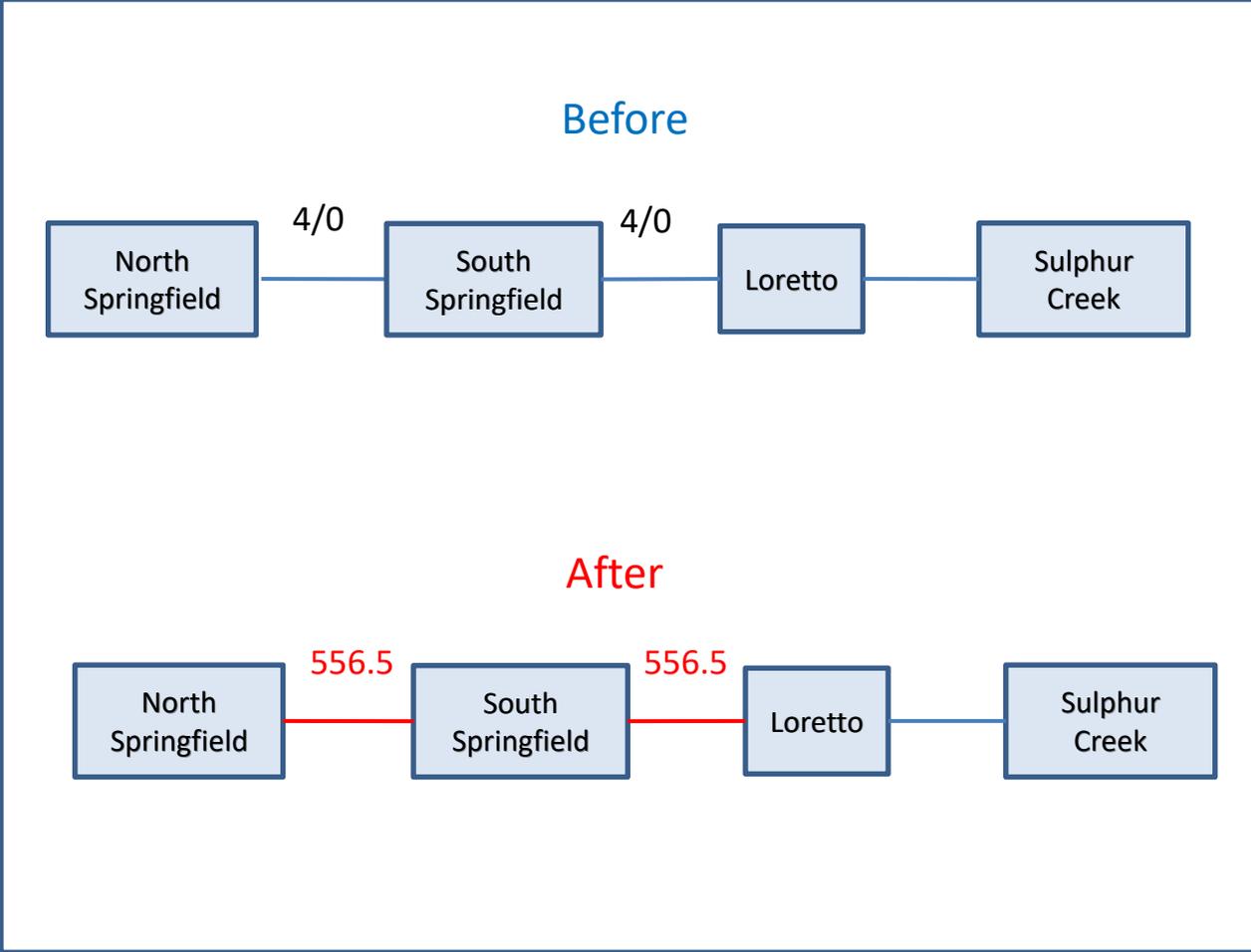
2. Build a new line from Marion County-S Springfield at 161kV. Rebuild Loretto-S Springfield & EKPC portion of N Springfield-Springfield KU using 556 ACSR, retire S Springfield-N Springfield
Transmission Cost: \$20.8M
Distribution Cost: \$0.0M

3. Build a new N.O. line from S Springfield-KU Springfield. Rebuild Loretto-S Springfield & EKPC portion of N Springfield-Springfield KU using 556 ACSR, retire S Springfield-N Springfield
Transmission Cost: \$12.2M
Distribution Cost: \$0.0M

Projected In-Service: 6/1/2025

Project Status: Engineering

Model: N/A



EKPC Transmission Zone M-3 Process Snow Tap-North Albany

Need Number: EKPC-2023-012

Process Stage: Solutions Meeting – November 17, 2023

Previously Presented:

Need Meeting – October 20, 2023

Supplemental Project Driver:

Equipment Material Condition, Performance and Risk

Specific Assumption Reference:

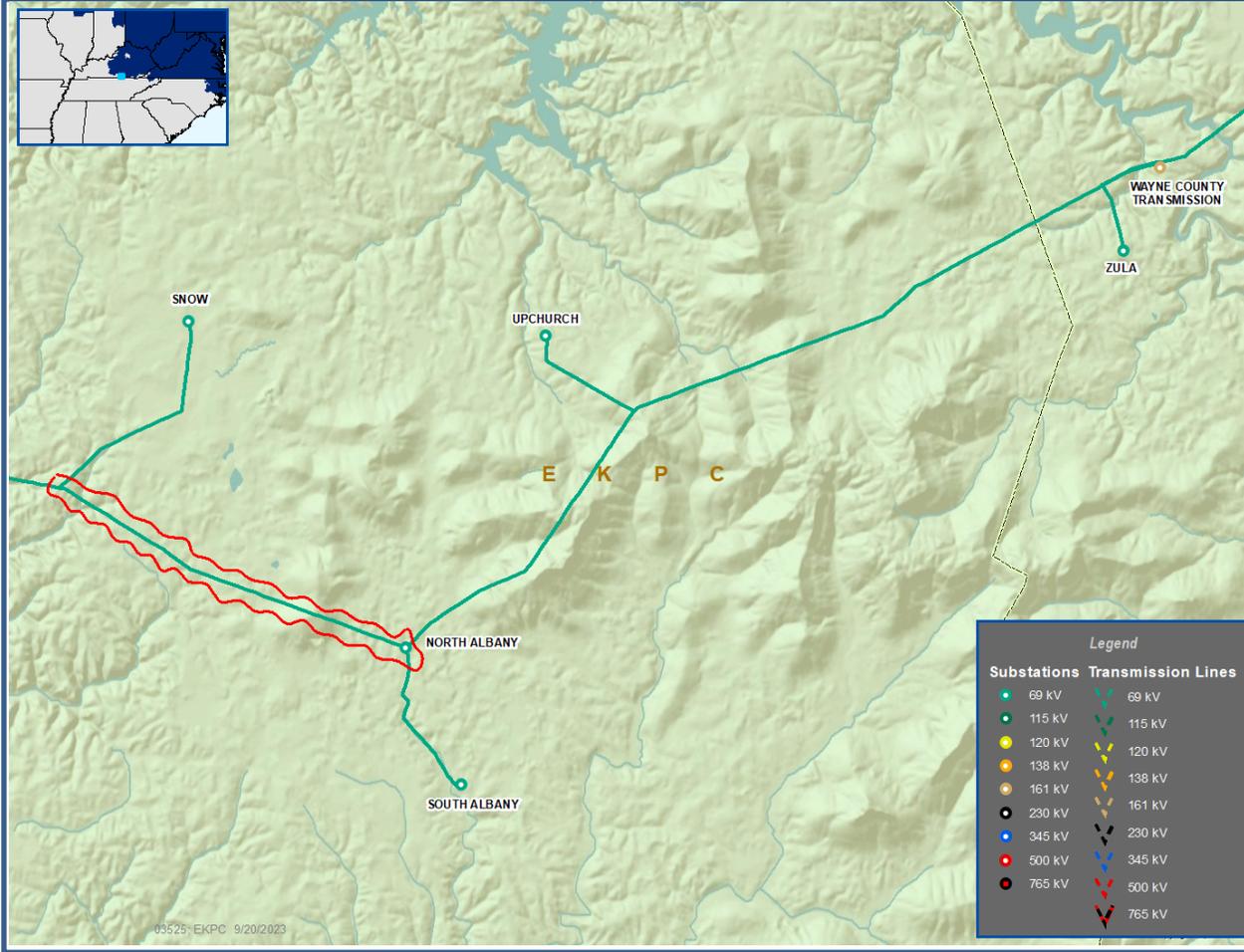
EKPC Assumptions Presentation Slide 13

Problem Statement:

The 4.4 mile, 69 kV Snow Tap-North Albany line section is 1954 vintage wood pole construction with 4/0 conductor. This line section is expected to have condition issues such as conductor steel core and static wire deterioration including rusting, pitting and possible broken strands. These condition issues have been exhibited by other 4/0 lines with similar age and environmental conditions. There are currently 12 open work orders associated with structure issues such as degraded poles.

The EKPC Reliability team has concluded, that this line is at or near end of life and should be addressed due to the condition.

Model: N/A



EKPC Transmission Zone M-3 Process Snow Tap-North Albany

Need Number: EKPC-2023-012

Process Stage: Solutions Meeting – November 17, 2023

Proposed Solution:

Rebuild the 4.4 mile, Snow Tap-North Albany 69 KV line using 556.5 conductor and steel pole construction.

Transmission Cost: \$4.6M

Distribution Cost: \$0.0M

Ancillary Benefits:

- Increases transmission line ratings

Alternatives Considered:

1. Build a new line from Snow Tap to the Albany-South Albany line and retire Snow Tap-Albany.

Transmission Cost: \$5.6M

Distribution Cost: \$0.0M

2. Build a new line from Snow-Upchurch and retire Snow Tap-Albany.

Transmission Cost: \$6.3M

Distribution Cost: \$0.0M

3. Build a new line from Snow-Albany and retire Snow Tap-Albany.

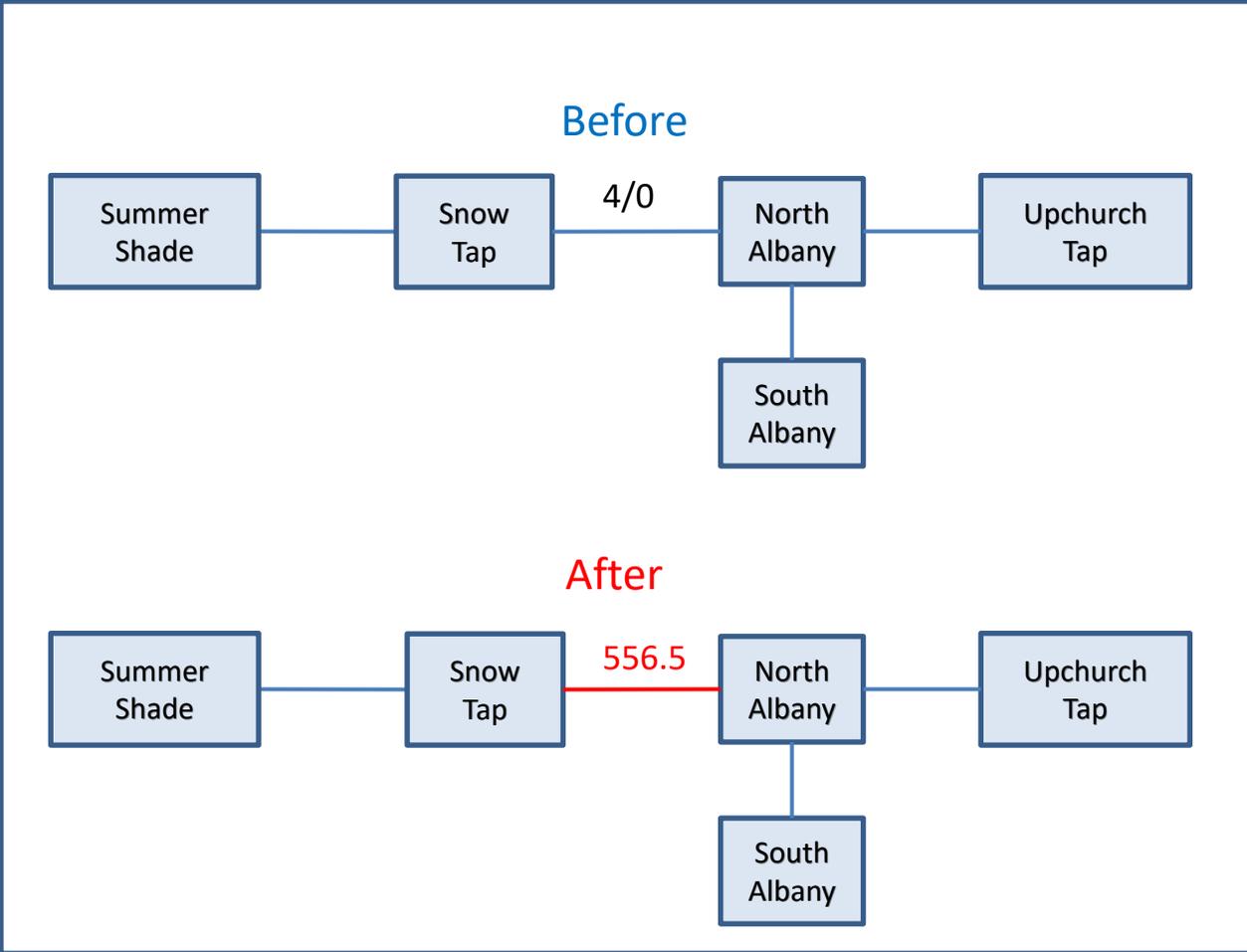
Transmission Cost: \$5.8M

Distribution Cost: \$0.0M

Projected In-Service: 7/1/2026

Project Status: Engineering

Model: N/A



EKPC Transmission Zone M-3 Process Shepherdsville & Brooks

Need Number: EKPC-2023-013

Process Stage: Need Meeting – October 20, 2023

Supplemental Project Driver:

Customer Service

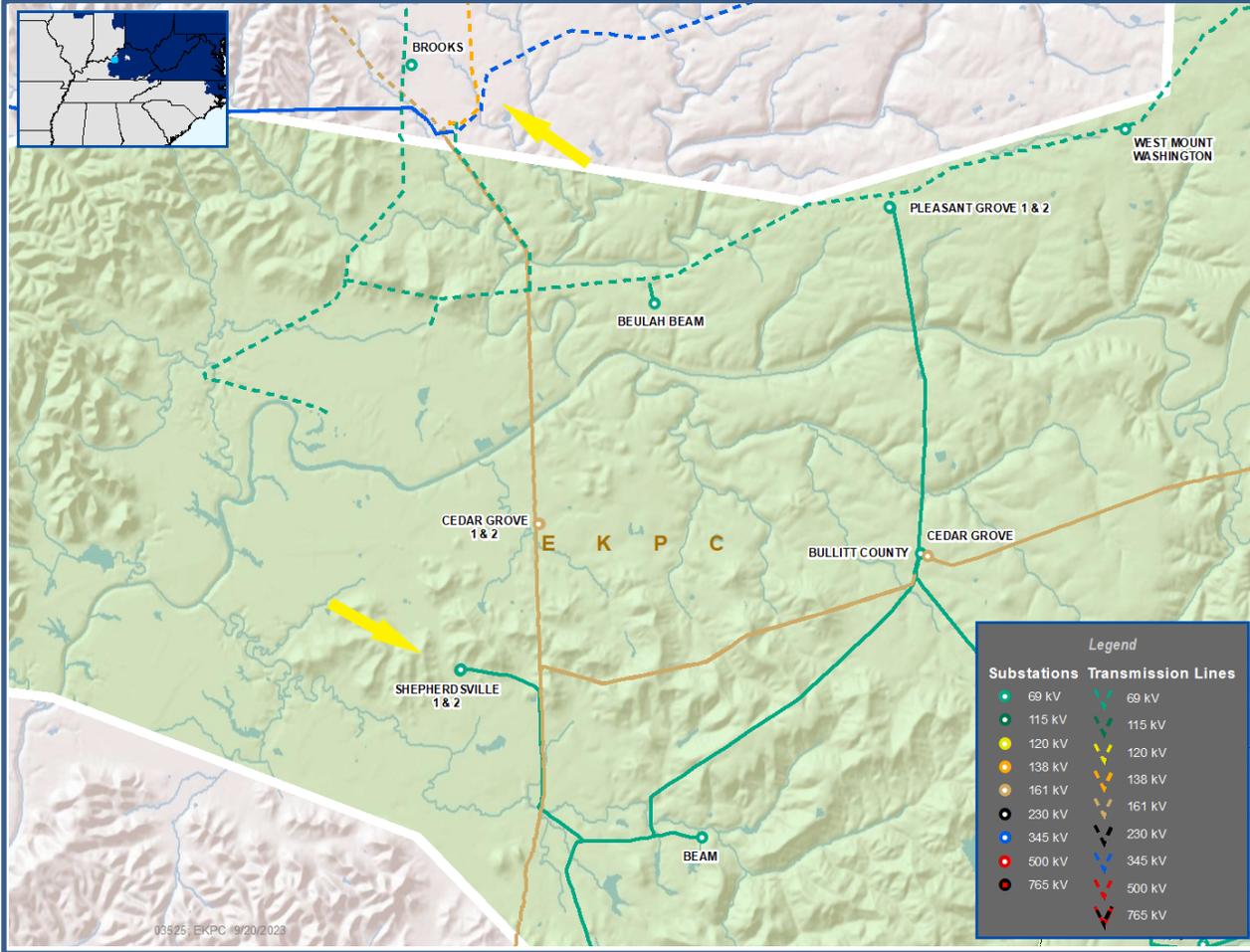
Specific Assumption Reference:

EKPC Assumptions Presentation Slide 15

Problem Statement:

Based on load forecast, the Brooks 69-12.5 kV, 15/20/25 MVA distribution transformer and the Shepherdsville #2 69-12.5 kV, 11.2/14 MVA distribution transformers are forecasted to overload during the upcoming summer peak periods. Additionally in 2022 summer, the Shepherdsville #2 transformer experienced actual loading greater than its summer rating. Alternatives will be developed to address these transformer loading issues.

Model: N/A



EKPC Transmission Zone M-3 Process West Shepherdsville

Need Number: EKPC-2023-013

Process Stage: Solutions Meeting – November 17, 2023

Proposed Solution:

Construct a new West Shepherdsville 69-13.2 kV, 12/16/20 MVA substation with an associated 4.0-mile 69 kV tap line from the existing Shepherdsville substation tap.

Transmission Cost: \$0.0M

Distribution Cost: \$9.8M

Ancillary Benefits:

- Eliminates a distribution feeder upgrade between Brooks and Shepherdville.
- Shifts load from the LG&E/KU transmission system (at Brooks) to the EKPC transmission system.

Alternatives Considered:

1. Upgrade the Brooks substation transformer using a 24/32/40 MVA unit and purchase a spare transformer. Upgrade the Shepherdville #2 substation transformer to a 12/16/20 MVA unit.

Transmission Cost: \$0.0M

Distribution Cost: \$5.4M

2. Construct a new West Shepherdsville 69-13.2 kV, 12/16/20 MVA substation with an associated 3.9-mile 69 kV tap line from the existing Shepherdville substation tap; construct 2.85 miles of 69 kV line parallel to the existing Shepherdville substation tap to loop into the Bullitt County-Nelson County 69 kV line.

Transmission Cost: \$3.3M

Distribution Cost: \$7.9M

3. Construct a new West Shepherdsville 161-13.2 kV, 12/16/20 MVA substation with an associated 4.4-mile 161 kV tap line from the EKPC portion of the Cedar Grove Industrial-Bullitt County 161 kV line.

Transmission Cost: \$7.5M

Distribution Cost: \$5.4M

4. Construct a new Brooks South 69-13.2 kV, 12/16/20 MVA substation near the Sabert industrial facility with an associated 1-mile 69 kV tap line from the LG&E/KU Blue Lick-Conestoga 69 kV line. Upgrade the Shepherdville #2 substation transformer to a 12/16/20 MVA unit.

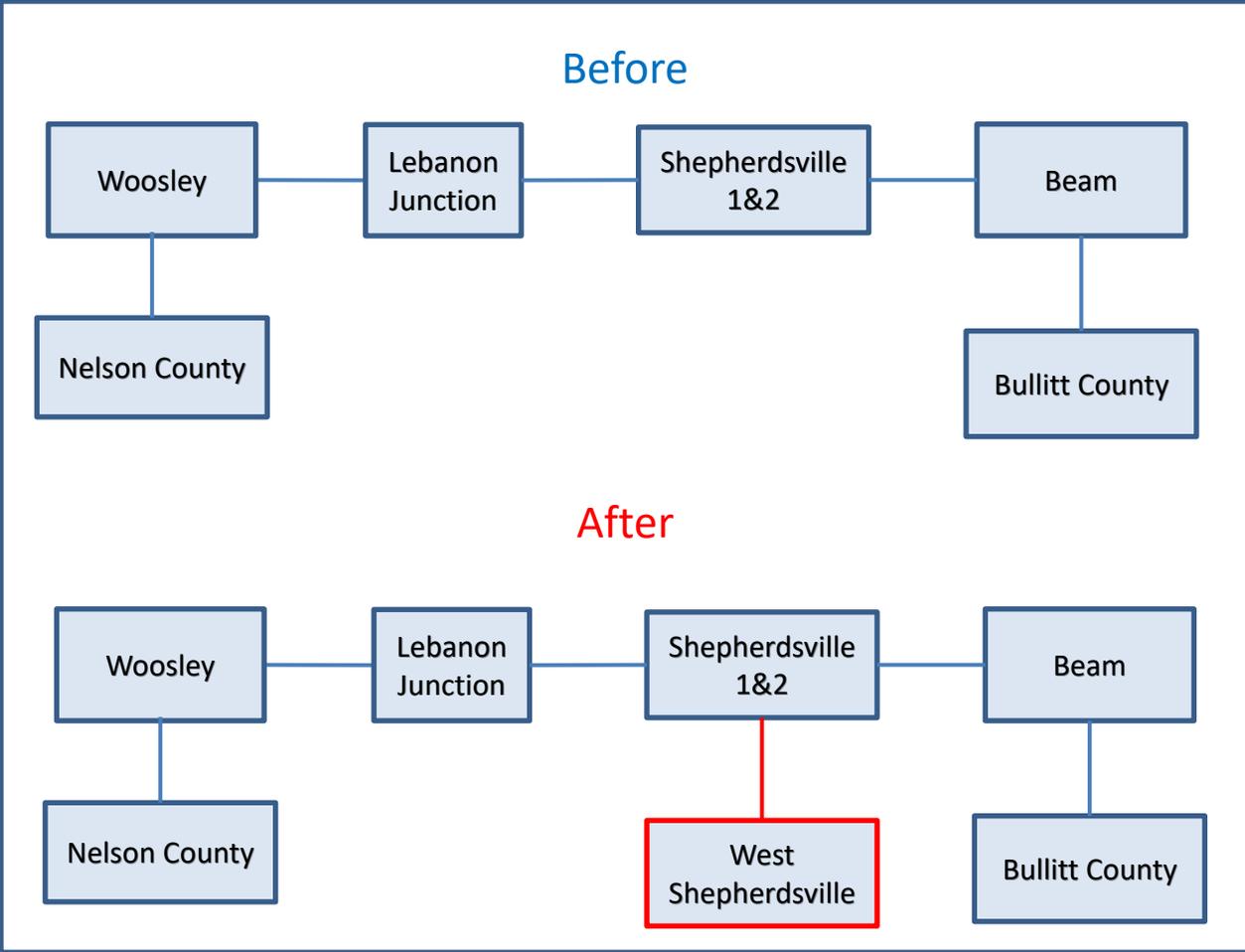
Transmission Cost: \$0.0M

Distribution Cost: \$7.4M

Projected In-Service: 6/1/2025

Project Status: Engineering

Model: N/A



EKPC Transmission Zone M-3 Process Lebanon

Need Number: EKPC-2023-014

Process Stage: Need Meeting – October 20, 2023

Supplemental Project Driver:
Customer Service

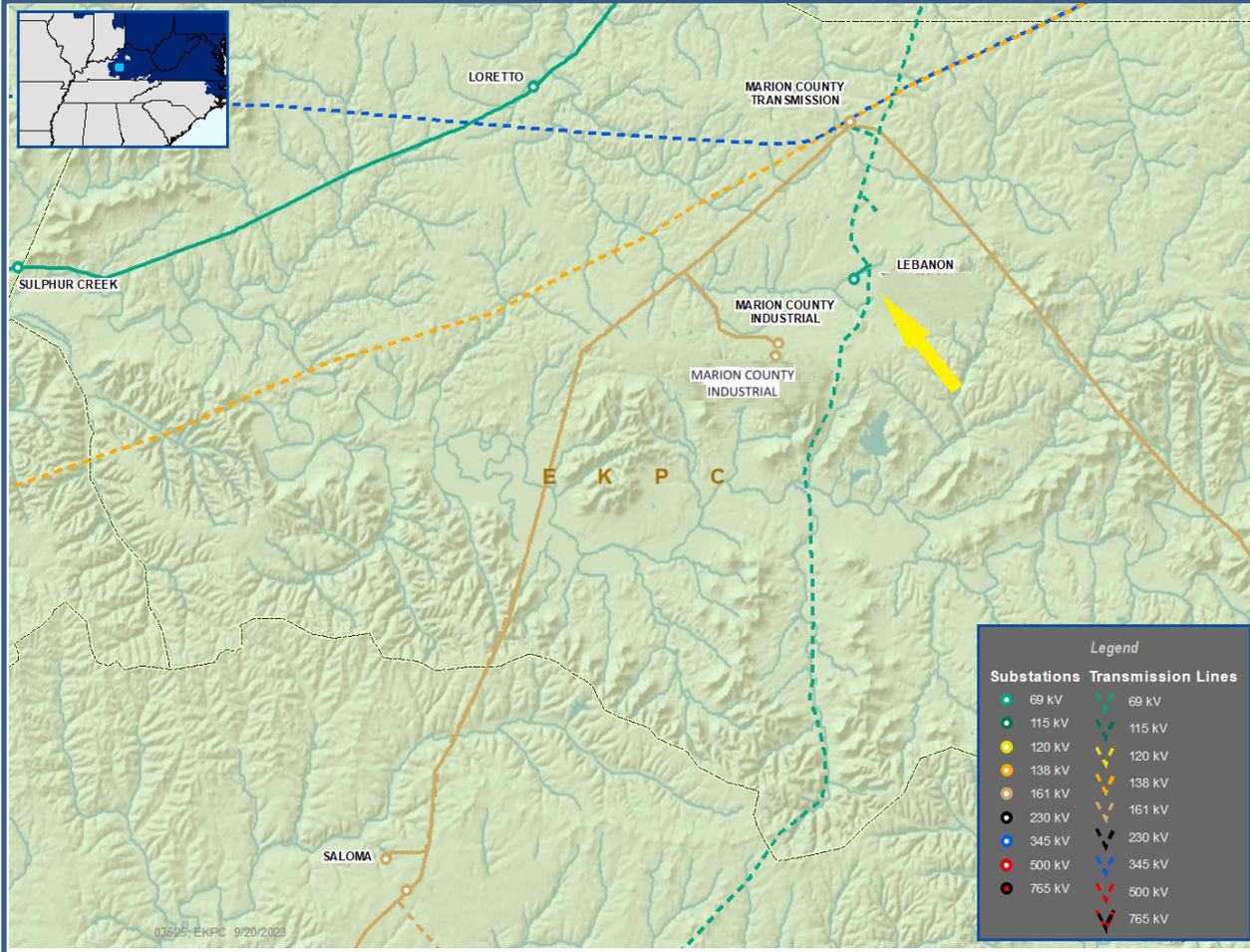
Specific Assumption Reference:
EKPC Assumptions Presentation Slide 15

Problem Statement:

The Lebanon distribution substation is located in Lebanon, KY and is served from the LG&E/KU 69 KV transmission system. Base on load forecast, the Lebanon 69-25 kV, 11.2/14 MVA distribution transformer is forecasted to overload in 2026/27 winter. Additionally, the distribution circuits in the area are experiencing high loading issues. Load transfers to a nearby substation has been utilized historically to reduce loading but have been exhausted due to the distribution circuit loading in the area.

Alternatives will be developed to address the transformer loading and distribution system issues in the area.

Model: N/A



EKPC Transmission Zone M-3 Process Metts Dr

Need Number: EKPC-2023-014

Process Stage: Solutions Meeting – November 17, 2023

Proposed Solution:

Construct a new Metts Drive 161-25 kV, 12/16/20 MVA distribution substation. New substation will be served by extending the Marion County Industrial Park 161 KV tap line by 0.9 miles. Construct a new 2.28 mile, parallel 161 kV line section extending from the existing Marion County Industrial tap point to the South Marion County Industrial distribution substation. Install normally open switch at the existing Marion County Industrial tap point.

Transmission Cost: \$2.95M

Distribution Cost: \$5.4M

Ancillary Benefits:

- Shifts load from the LG&E/KU transmission system to the EKPC transmission system.

Alternatives Considered:

1. Build a new 161 KV, 12/16/20 MVA distribution substation, parallel new 161 kV line section extending from the existing Marion County Industrial tap point (1.6 mi). New substation will tap the existing Marion County Industrial/ South Marion County Industrial 161 KV tap line 1.6 miles from the tap point. Keep the existing Lebanon substation as is.

Transmission Cost: \$2.7M

Distribution Cost: \$7.1M

2. Build a new 161 KV, 12/16/20 MVA distribution substation. New substation will tap the Marion County-Green County 161 KV line. Tap point will be ~0.85 mile from the Marion County Industrial/ South Marion County Industrial 161 KV tap point towards Green County. Keep the existing Lebanon substation as is.

Transmission Cost: \$0.0M

Distribution Cost: \$7.1M

3. Build a new KU 69 kV, 12/16/20 MVA distribution substation. New substation will tap the Taylor County - Lebanon KU 69 kV line. Tap point will be ~0.5 mile south from the KU Lebanon South substation. Retire Lebanon substation.

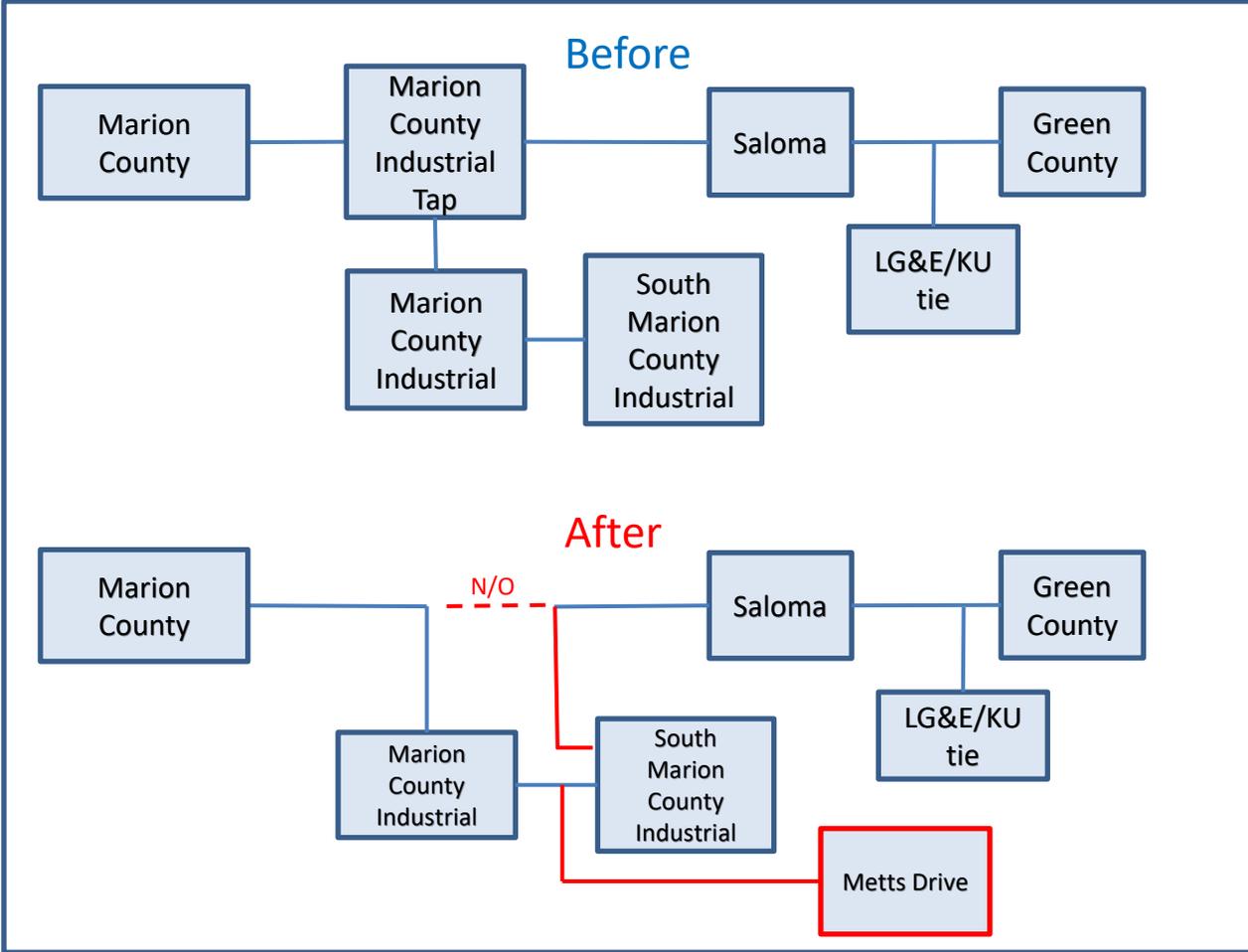
Transmission Cost: \$0.0M

Distribution Cost: \$6.4M

Projected In-Service: 6/1/2027

Project Status: Engineering

Model: N/A



EKPC Transmission Zone M-3 Process KU Fawkes-West Berea

Need Number: EKPC-2023-015

Process Stage: Need Meeting – October 20, 2023

Supplemental Project Driver:

Equipment Material Condition, Performance and Risk
Operational Flexibility and Efficiency & Infrastructure Resilience

Specific Assumption Reference:

EKPC Assumptions Presentation Slide 13, 14 & 16

Problem Statement:

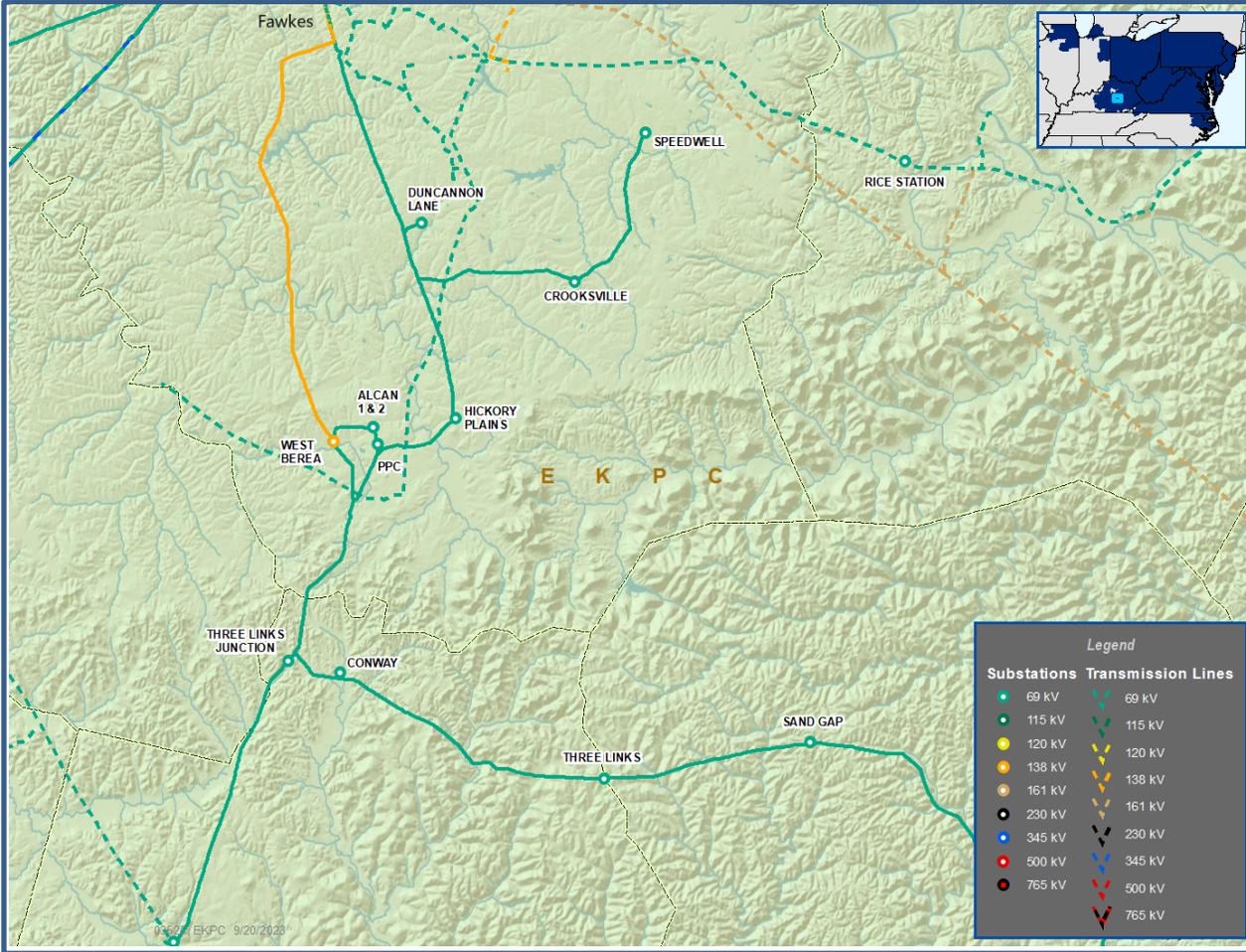
The 20.5 mile (not including tap lines), KU Fawkes-West Berea 69 KV transmission circuit currently serves nearly 6,000 customers including several industrial customers via 7 distribution substation.

This circuit currently has 16.3 miles of transmission and tap lines with reliability concerns, including wood pole deterioration, multiple identified structural loading issues as well as many recurring maintenance activities related to leaning structures/poles and cross arms failures. There are currently 66 open work orders associated with structure issues such as degraded poles.

The 9.1 mile, Speedwell 69 KV tap line creates system protection issues resulting in slow operations for faults near the Speedwell distribution substation. This does not adhere to EKPC’s setting criteria which leads to sequential tripping and remote coordination issues.

Alternatives are being evaluated to address all issues listed above.

Model: N/A



EKPC Transmission Zone M-3 Process

KU Fawkes-West Berea

Need Number: EKPC-2023-015

Process Stage: Solutions Meeting – November 17, 2023

Proposed Solution:

Rebuild the 16.3 mile, Duncannon Lane Tap-West Berea 69 KV line sections using 795 conductor and steel pole construction. Construct a new Madison County 69 KV switching station near the Duncannon Lane Tap point. This project will also include a new section of 69 kV double circuit line between the Crooksville Tap point and the Madison County switching station (approximately 1.3 miles) to serve Crooksville and Speedwell radially from the new Madison County switching station. Additionally, Duncannon Lane will be served radially from the new switching station.

Transmission Cost: \$15.5M
 Distribution Cost: \$3.0M

Ancillary Benefits:

- Supports local load growth

Alternatives Considered:

1. Perform structure replacements from Duncannon Lane Tap-West Berea 69 KV line sections. Build a new 69 KV switching station in the vicinity of Crooksville/Speedwell Tap. Expand the Union City 138 KV substation to step down to 69 KV, build a new 5 mile 69 KV line from Union City to Speedwell. Rebuild Crooksville Tap-Crooksville using 795 conductor.

Transmission Cost: \$28.5M
 Distribution Cost: \$0.0M

2. Perform structure replacements from Duncannon Lane Tap-West Berea 69 KV line sections. Build a new 69 KV switching station in the vicinity of Crooksville/Speedwell Tap. Replace all wood pole structures/framing w/ steel pole structures/framing along the Crooksville Tap-Crooksville line section while energized.

Transmission Cost: \$14.6M
 Distribution Cost: \$3.6M

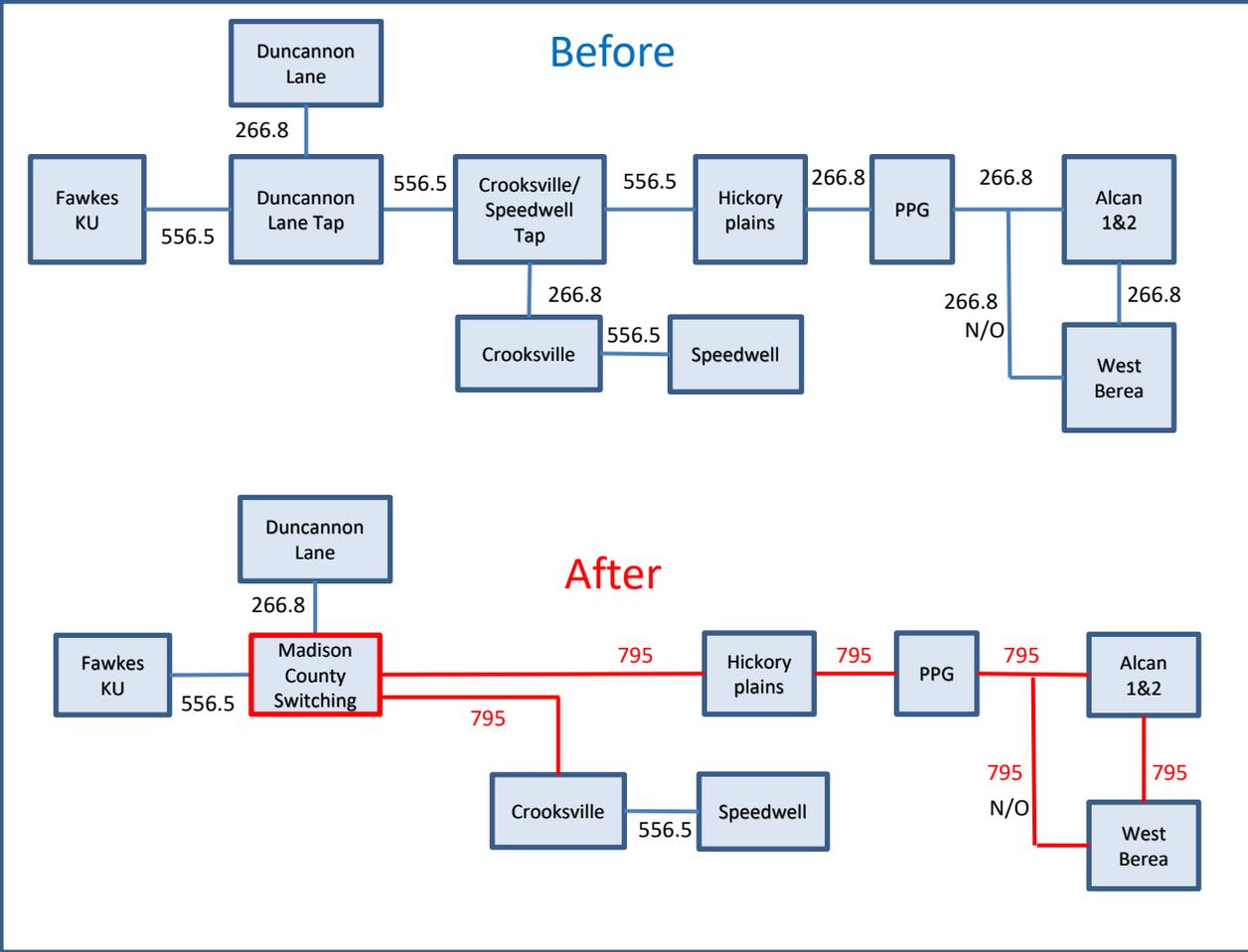
3. Perform structure replacements from Duncannon Lane Tap-West Berea 69 KV line sections. Build a new 69 KV switching station in the vicinity of Crooksville/Speedwell Tap. Construct a new 69 KV line parallel to the existing Crooksville Tap-Crooksville line and retire the existing line.

Transmission Cost: \$13.8M
 Distribution Cost: \$4.2M

Projected In-Service: 7/1/2026

Project Status: Engineering

Model: N/A



Appendix

High Level M-3 Meeting Schedule

Assumptions	Activity	Timing
	Posting of TO Assumptions Meeting information	20 days before Assumptions Meeting
	Stakeholder comments	10 days after Assumptions Meeting
Needs	Activity	Timing
	TOs and Stakeholders Post Needs Meeting slides	10 days before Needs Meeting
	Stakeholder comments	10 days after Needs Meeting
Solutions	Activity	Timing
	TOs and Stakeholders Post Solutions Meeting slides	10 days before Solutions Meeting
	Stakeholder comments	10 days after Solutions Meeting
Submission of Supplemental Projects & Local Plan	Activity	Timing
	Do No Harm (DNH) analysis for selected solution	Prior to posting selected solution
	Post selected solution(s)	Following completion of DNH analysis
	Stakeholder comments	10 days prior to Local Plan Submission for integration into RTEP
	Local Plan submitted to PJM for integration into RTEP	Following review and consideration of comments received after posting of selected solutions

Revision History

11/7/2023 – V1 – Original version posted to pjm.com