



# Reliability Analysis Update

Transmission Expansion Advisory  
Committee  
August 9, 2018



# 2018 RTEP Analysis Update

April 27, 2018

- Preliminary 2023 results posted
  - Summer Baseline and N-1 (thermal and voltage)
  - Summer Generator Deliverability

July 2, 2018

- 2018 Proposal Window #1 Opened

Friday, August 31, 2018

- 2018 Proposal Window #1 Will Close



# Proposal Window Exclusion Definitions

- The following definitions explain the basis for excluding flowgates and/or projects from the competitive planning process and designating projects to the incumbent Transmission Owner.
- Flowgates/projects excluded from competition will include the underlined language on the corresponding slide.
  - Immediate Need Exclusion: Due to the immediate need of the violation (3 years or less), the timing required for an RTEP proposal window is infeasible. As a result, the local Transmission Owner will be the Designated Entity. - Operating Agreement, Schedule 6 § 1.5.8(m)
  - Below 200kV: Due to the lower voltage level of the identified violation(s), the driver(s) for this project are excluded from the competitive proposal window process. As a result, the local Transmission Owner will be the Designated Entity - Operating Agreement, Schedule 6 § 1.5.8(n)
  - FERC 715 (TO Criteria): Due to the violation need of this project resulting solely from FERC 715 TO Reliability Criteria, the driver(s) for this project are excluded from the competitive proposal window process. As a result, the local Transmission Owner will be the Designated Entity - Operating Agreement, Schedule 6 § 1.5.8(o)
  - Substation Equipment: Due to identification of the limiting element(s) as substation equipment, the driver(s) for this project are excluded from the competitive proposal window process. As a result, the local Transmission Owner will be the Designated Entity - Operating Agreement, Schedule 6 § 1.5.8(p)

# Baseline RTEP Projects



# PECO Transmission Zone: Baseline Project

## Generation Deliverability (Summer and Winter)

### Immediate Need

### Problem Statement:

- The Peach Bottom – Furnace Run 500 kV circuit is overloaded for single line outage loss of the Peach Bottom – Conastone 500 kV circuit in both the summer and winter cases. (FG# GD-S42 and GD-W65)

### Proposed Solution:

- Replace the following terminal equipment at Peach Bottom 500 kV substation:
  - (5) disconnect switches, (2) circuit breakers, (1) line trap, (2) relays. (1) CT, (6) meters and (6) sections of station conductor

### Alternatives Considered:

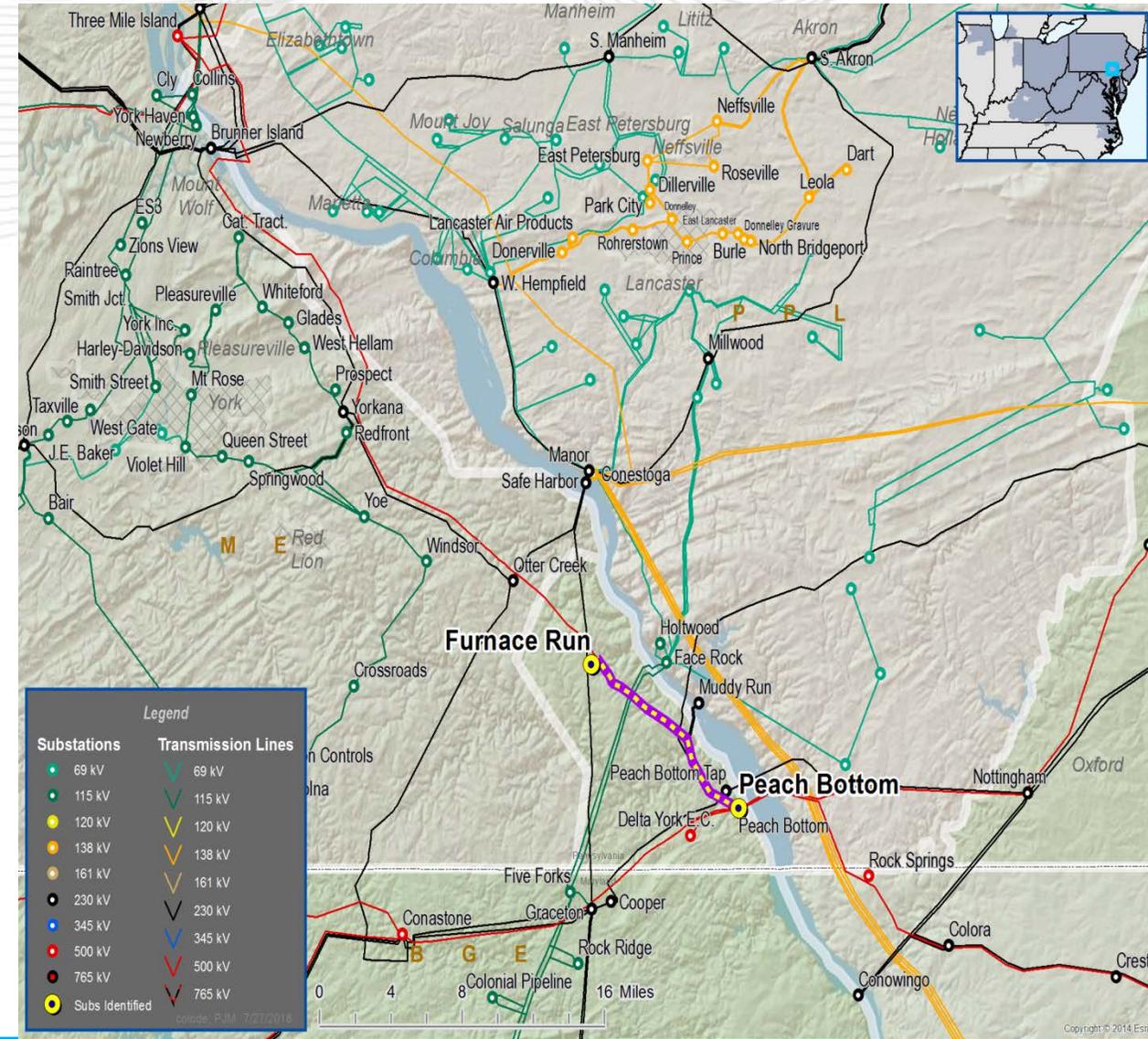
- None

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

**Required IS Date: 6/1/2021**

**Projected IS date: 6/1/2021**

**Status: Conceptual**



## Generation Deliverability (Summer)

### Immediate Need

#### Problem Statement:

- The Pleasant View – Ashburn 230 kV is overloaded (104.28%) for the single contingency loss of the 230kV Line #227. (FG# GD-S142)
- This project is considered Immediate Need as it is also identified in the 2021 RTEP study.

#### Recommended Solution:

Re-conductor the entire Line #274 (Pleasant View – Ashburn – Beaumeade) using a higher capacity conductor staying consistent with the latest northern Virginia projects with a minimum rating of 1200 MVA. Also upgrade terminal equipment.

#### Alternative:

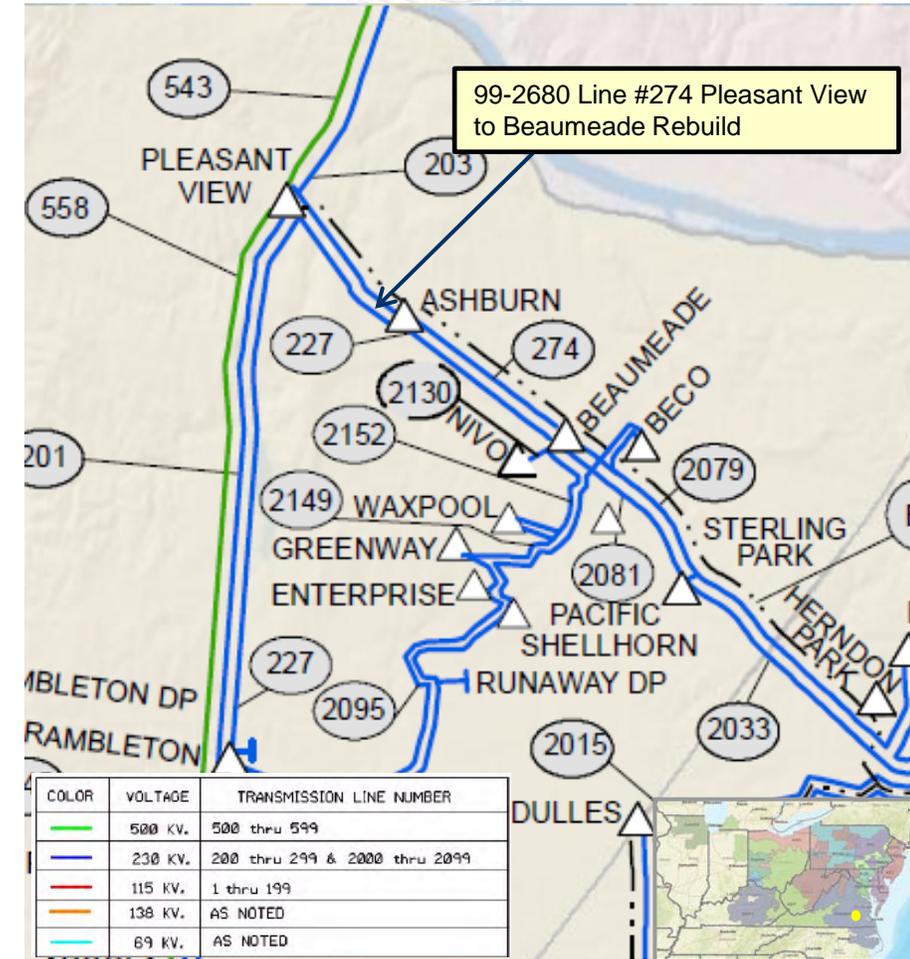
Re-conductor the entire Line #274 (Pleasant View – Ashburn – Beaumeade) using a conductor with a minimum rating of 1047 MVA.

**Estimated Project Cost:** \$10.0 M

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

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

**Project Status:** Conceptual





# Dominion Transmission Zone: Baseline Ladysmith 500/230 kV Transformer No. 2

## Generation Deliverability (Summer) and Baseline Stability Issue

### Problem Statement: Immediate Need

- PJM and Dominion have identified a stability issue in the Ladysmith, Four Rivers area of Dominion under an N-1 contingency using Dominion's previously updated FERC 715 stability criteria. This is an existing condition.
- PJM has identified a generation deliverability violation on the Ladysmith 500/230 kV Transformer #1 for Summer 2023. (FG# GD-S158)

### Recommended Solution:

- Add a 2<sup>nd</sup> 500/230 kV 840 MVA transformer at Dominion's Ladysmith Substation. Adding the second transformer will resolve the generation deliverability as well as the instability issue in the Ladysmith, Four Rivers area of Dominion.
- With the addition of the 2<sup>nd</sup> 500/230 kV transformer at Ladysmith, the loading on 230 kV Line #2089 increases (~98%). It is proposed to re-conductor Line #2089 between Ladysmith and Ladysmith CT Substations to increase the line rating from 1047 MVA to 1225 MVA.

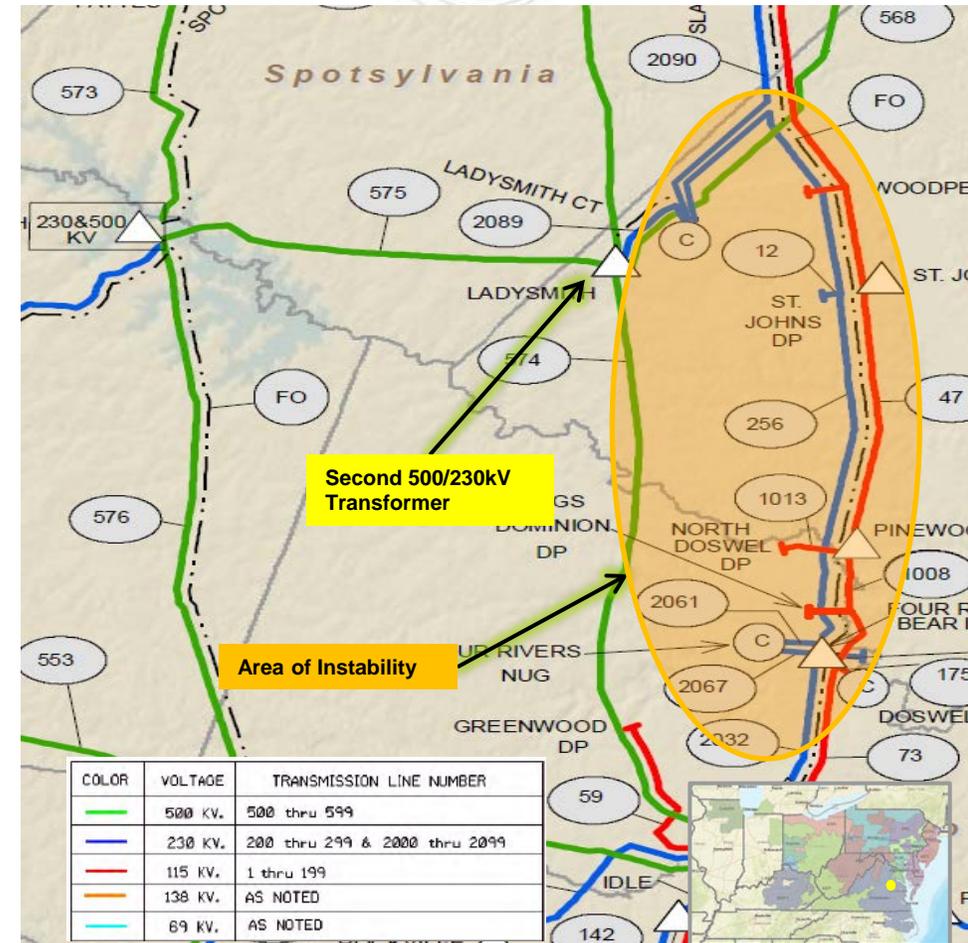
### Alternatives:

Install a second 230 kV Line between Ladysmith and Ladysmith CT Substation on the existing vacant arms instead of re-conductoring the existing Line #2089. This would require the installation of an additional 230 kV breaker at both Ladysmith and Ladysmith CT Substations. The estimated cost of this option is \$4.0 M.

### Estimated Project Cost:

500/230 kV transformer bank, bus work, breaker, substation construction	<b>\$ 20.0 M</b>
Re-Conductor Line #2089	<b>\$ 2.4 M</b>
<b>Total:</b>	<b>\$ 22.4 M</b>

**Required IS Date:** Immediate  
**Projected IS Date:** 06/01/2021  
**Project Status:** Conceptual



# Supplemental Projects



## Supplemental Project

### Problem Statement:

### Equipment Material/Condition/Performance/Risk:

At Jacksons Ferry station, 765 kV circuit breakers "A", "A1", "A2", "B1" & "B2" are PK Air blast breakers, which currently require hearing protection be used for personnel within the substation. Air blast breakers are being replaced across the AEP system due to reliability concerns, intensive maintenance, and their tendency to catastrophically fail. During failures, sharp pieces of porcelain from their bushings are typically expelled, which can be a potential safety hazard to field personnel. In addition, the ability to get spare parts for these breakers is becoming increasingly difficult. CB "A" has experienced 8 operations, "A1" has experienced 11 operations, "A2" has experienced 17 operations, "B1" has experienced 17 operations and "B2" has experienced 30 operations

### Potential Solution:

Replace existing 3000 A 50 kA 765 kV PK CB's "A", "A1", "A2", "B1" & "B2" with new 4000 A 63 kA CB. Estimated Cost: \$25.4M

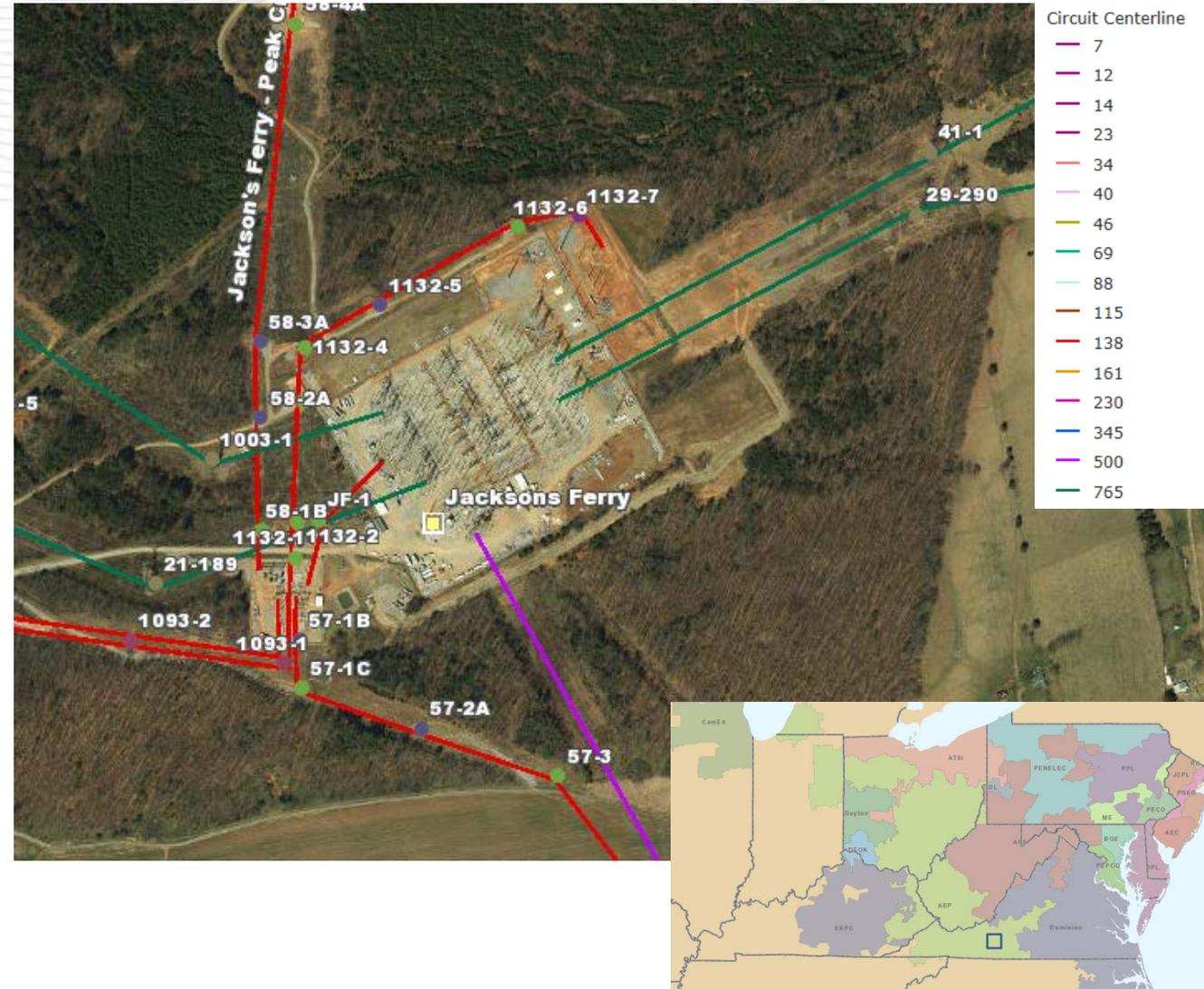
Total Estimated Transmission Cost: \$25.4M

### Alternatives:

No viable cost-effective transmission alternative was identified.

Projected In-service: 11/2019

Project Status: Engineering





# Dominion Transmission Zone: Supplemental Haymarket 230kV Delivery

## Existing s0918 Scope Modification and Cost Increase

Date Project Last Presented: 03/09/2015 Southern Sub-Regional

### Original Problem Statement:

- In 2014, Dominion Distribution submitted a DP Request for a new substation (Haymarket) to accommodate a new datacenter campus and general growth in the Haymarket Load Area in Prince William County. Initial energization is summer 2018 with load of approximately 80 MVA, growing to over 100 MVA by 2019.

### Original Solution:

- Loop (in-and-out) an overhead, double-circuit, 230kV transmission line extension approximately 6 miles (along new right-of-way) from a point in the corridor north of Gainesville to the proposed Haymarket Substation site. Install four 230kV breakers in a ring arrangement to accommodate the connection of DVP's 84 MVA, 230-34.5kV transformers (two initial, three ultimate).

### Revised Solution:

- Loop (in-and-out) an overhead, double-circuit, 230kV transmission line extension approximately 3 miles (along new right-of-way) from a point in the corridor north of Gainesville to Heathcote Switching Station. Install four breakers in a ring arrangement and two 50-100 MVAR variable reactors at Heathcote. Loop (in-and-out) an **underground\***, double-circuit, 230kV transmission line extension approximately 3 miles (along new right-of-way) from Heathcote Switching Station to Haymarket Substation. Install four 230kV breakers in a ring arrangement to accommodate the connection of DVP's 84 MVA, 230-34.5kV transformers (two initial, three ultimate).

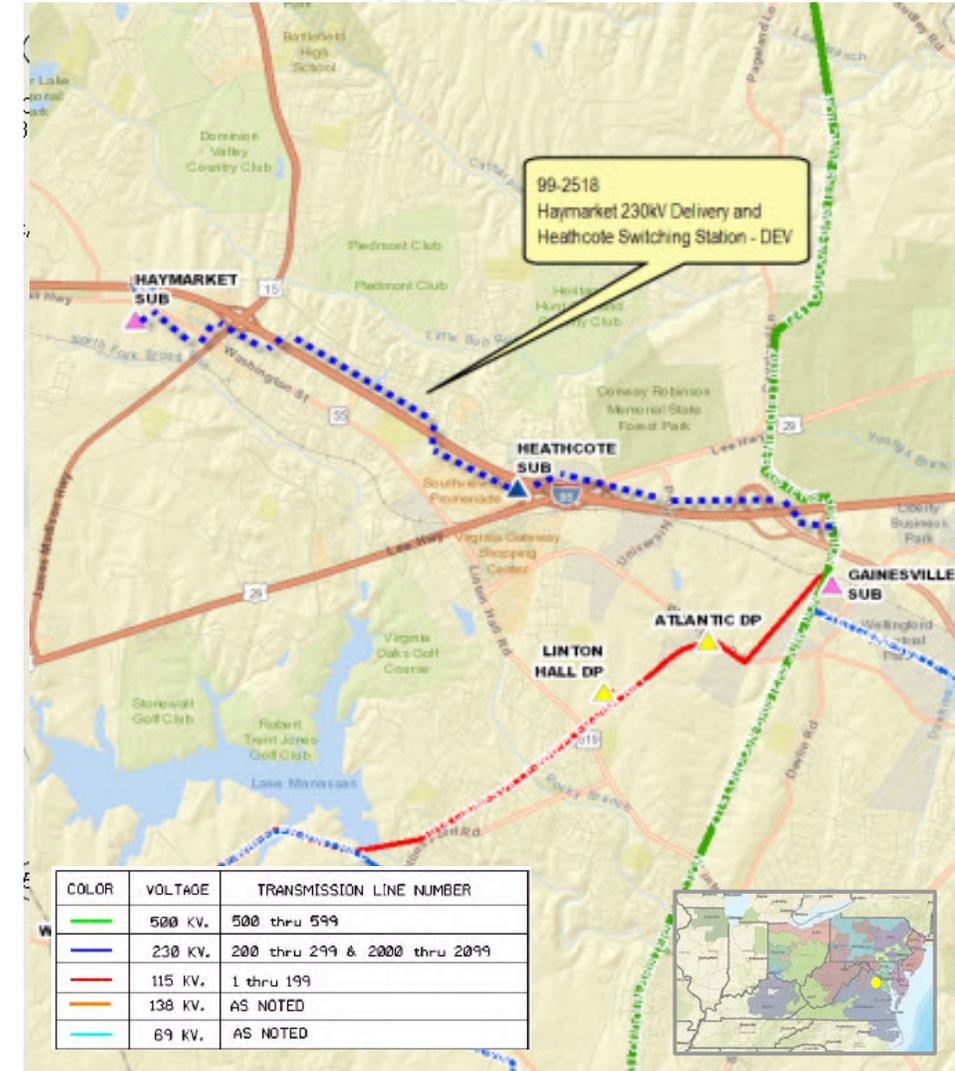
\* The Virginia State Corporation Commission has approved the project under a newly enacted underground transmission pilot program as part of the Grid Transformation and Security Act of 2018. The legislation was signed into law on March 9, 2018 and went into effect July 1, 2018.

**Revised Estimated Project Cost:** \$174M (Original: \$45-57M)

**Revised Projected In-service Date:** 07/15/2021 (Original: 05/01/2018)

**Project Status:** Engineering

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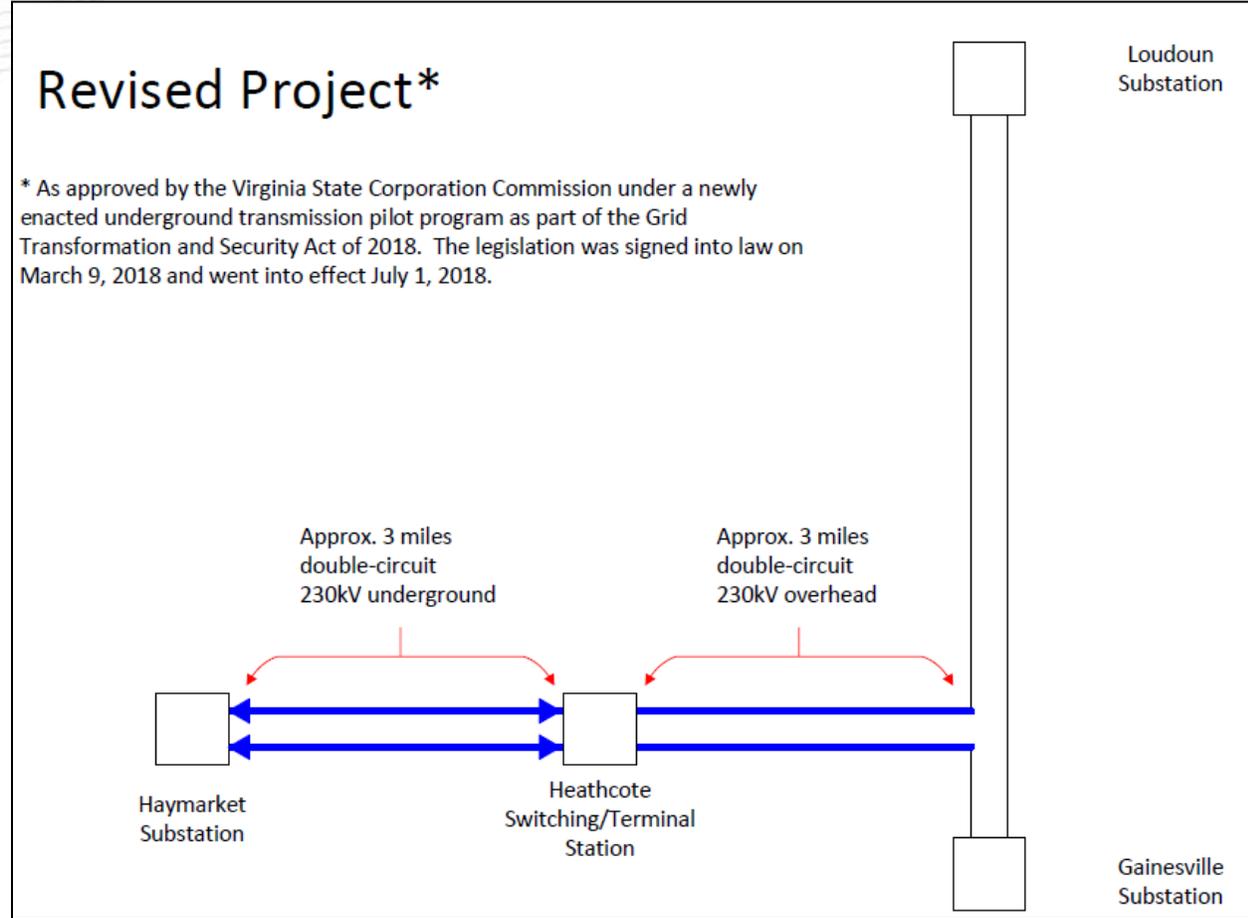
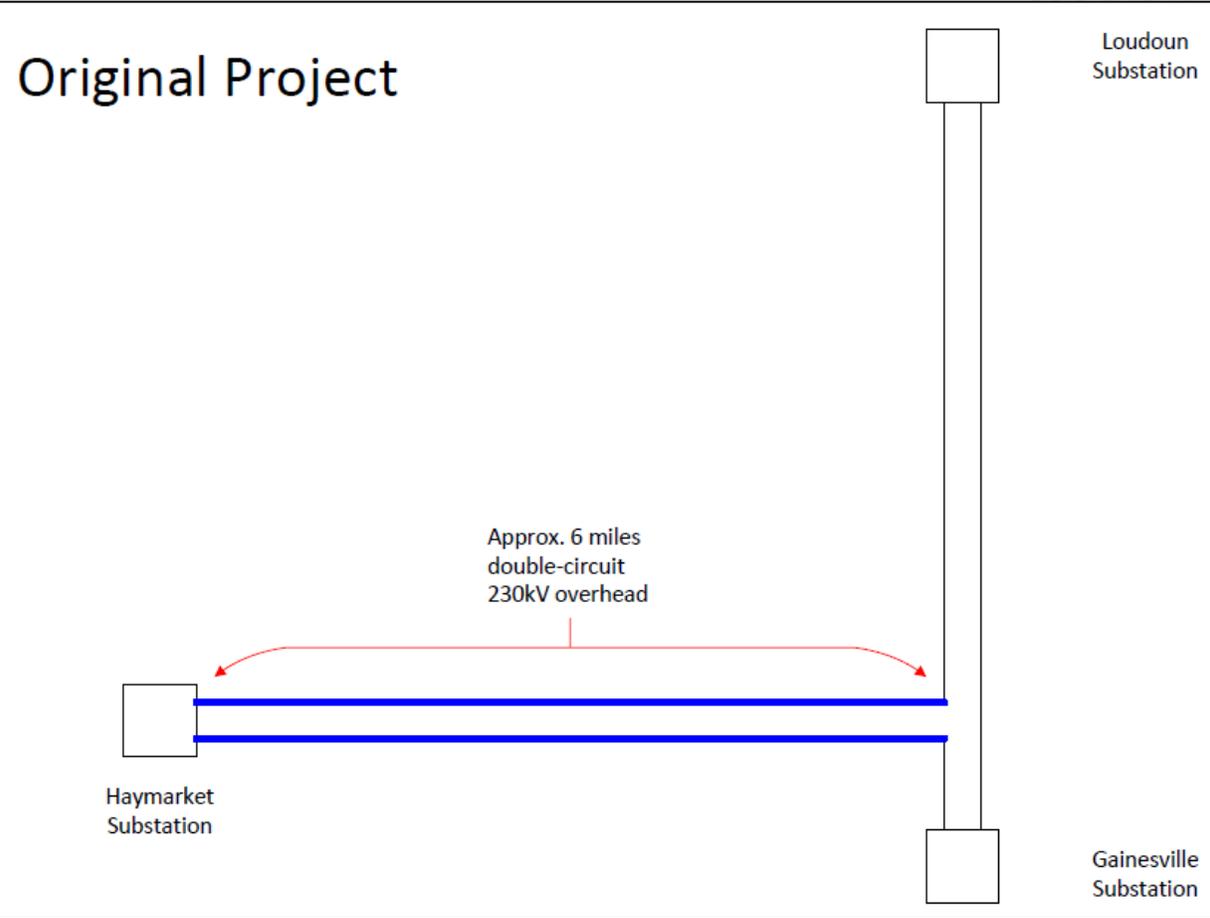




# Dominion Transmission Zone: Supplemental Haymarket 230kV Delivery

Existing s0918 Scope Modification and Cost Increase  
Date Project Last Presented: 03/09/2015 Southern Sub-Regional

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# 2018 RTEP Next Steps



- PJM will retire the RTEP@pjm.com email address as of September 1, 2018. Stakeholders with questions about planning updates or planning windows should use the [Planning Community](#).
- PJM is enhancing the way we communicate to follow industry standards and maintain its standing as an industry leader.
- The [Planning Community](#) is a vital avenue for PJM members and staff to collaborate on planning updates, including RTEP windows, and get their questions answered.

2018

- TEAC meetings are the following Thursdays in 2018
- 1/11, 2/8, 3/8, 4/5, 5/3, 6/7, 7/12, 8/9, **9/13, 10/11, 11/8, 12/13**

- V1 – 8/6/2018 – Original Slides Posted