



Sub Regional RTEP Committee South

January 05, 2017

B2654.1 - .4 Cost Increase and Scope Modification

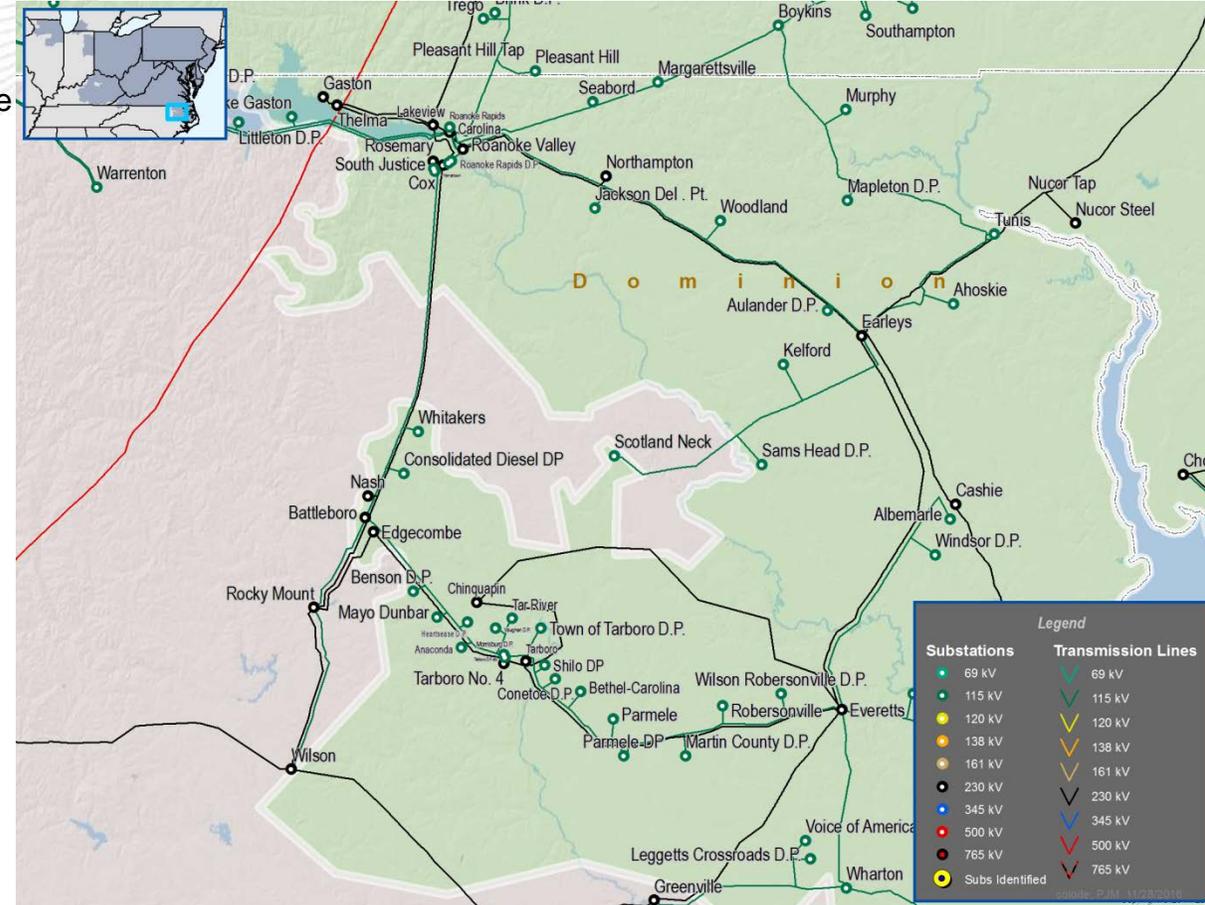
Problem: Dominion Radial Line Criteria Violation

- Line #126 is a 115kV 25 mile radial line from Earleys to Scotland Neck that feeds radial line on 2 pole wood H frames mostly built in 1969.
- The MW-miles for Line #126 is 775 MW-miles respectively, a violation of the DOM radial line criteria.
- This need is time sensitive due to the criteria violation in the immediate need timeframe.
- When this criteria violation was identified, the need date was already in the immediate need timeframe.

Proposed Immediate Need Solution:

Due to the immediate need, the timing required for an RTEP proposal window is infeasible. As a result, the local Transmission Owner will be the Designated Entity.

- Network Lines #126 by building a 15 mile 115kV line from Scotland Neck to S Justice Branch with a summer emergency rating of 262 MVA. **(b2654.1)**
- Install a 115kV three breaker ring at S Justice Branch **(b2654.2)** and a 115kV breaker at Scotland Neck **(b2654.3)**.
- Install a 2nd 224 MVA 230-115kV transformer at Hathaway **(b2654.4)** for contingency support (overload of Line #123 Rocky Mt - Battleboro 115 kV). The new line would be routed to allow HEMC to convert Dawsons Crossroads DP from 34.5kV to 115kV.



B2654.1 - .4 Cost Increase and Scope Modification Continued

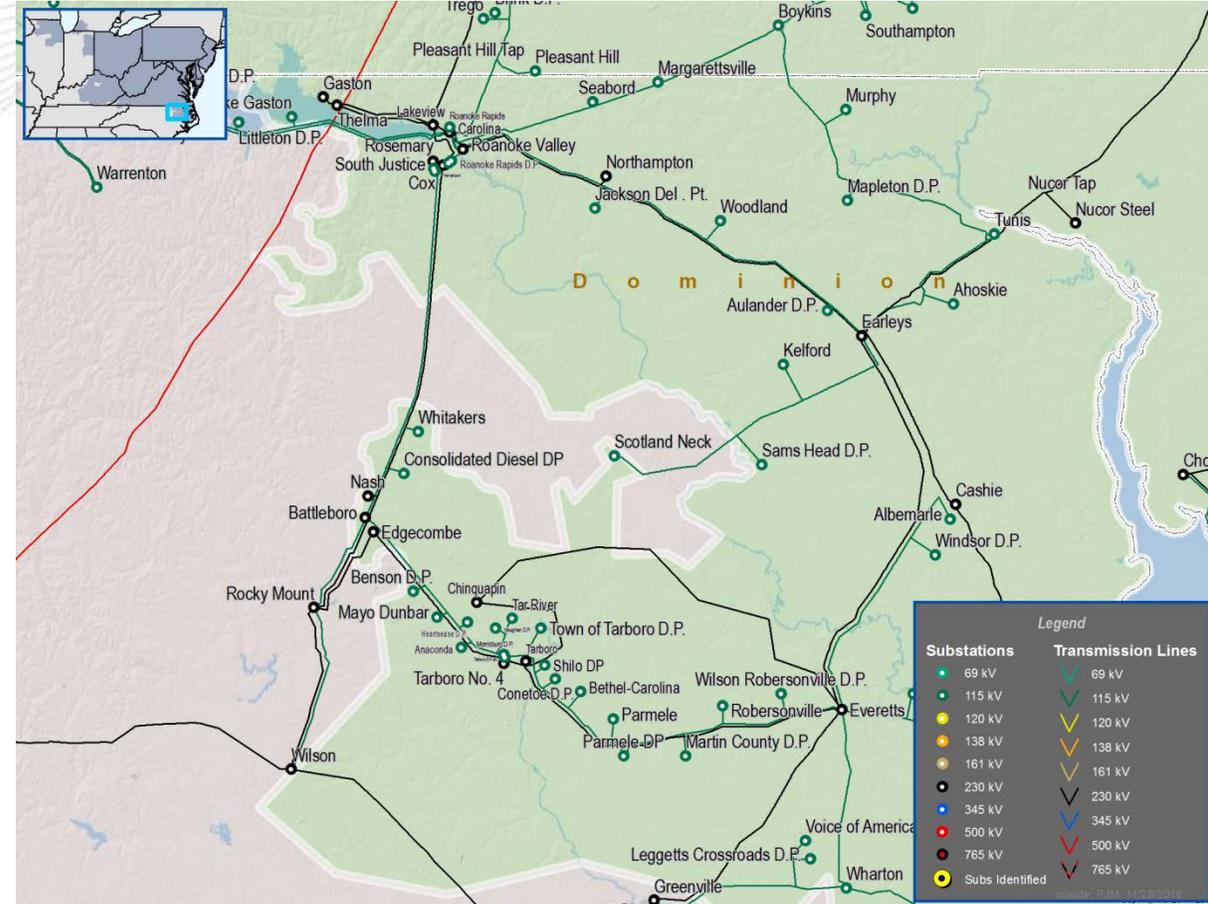
Reason for Cost Increase and Scope Modification:

- Final routing increased the line mileage from 15 to 16 miles from Scotland Neck to South Justice Branch.
- Summer emergency rating target changed to 346 MVA from 262 MVA.
- Install an additional 115kV breaker in the breaker ring at S Justice Branch for a total of four 115kV breakers in the ring for breaker failure reliability.
- The cost increase is due to refined detailed cost estimate updates and the increased line mileage for the final routing.

Previous Estimated Project Cost: \$ 33.0 M

Revised Estimated Project Cost: \$ 46.0 M

Projected IS Date: 06/01/2018



B2653.1 - .3 Cost Increase and Scope Modification

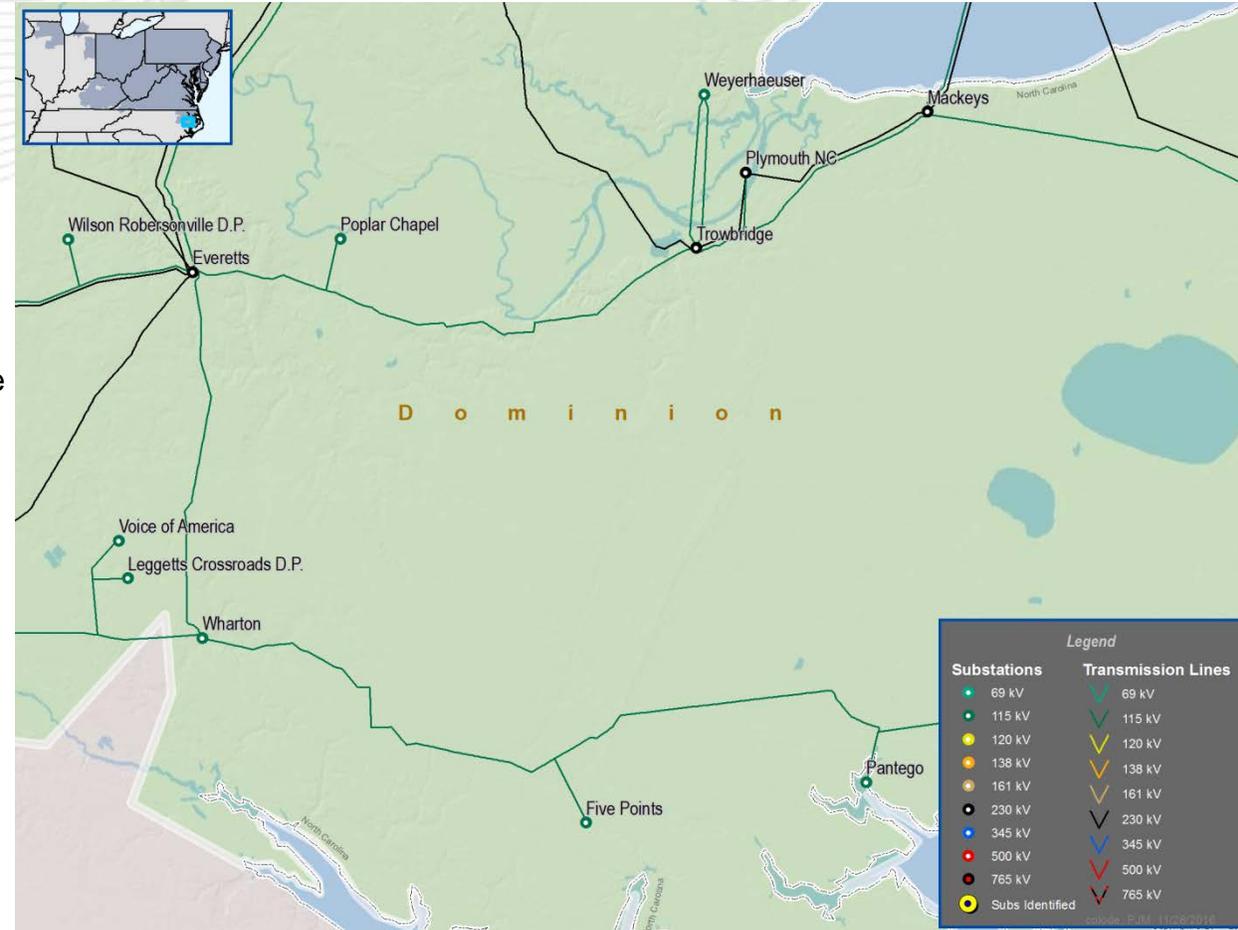
Problem: DOM Radial Line Criteria Violation

- Line #82 is a 115kV radial line from Everetts to Wharton (13.8) miles that feeds radial line #189 from Wharton to Pantego (30.2 miles)
- The MW-miles for Lines #82 and #189 are 2156 and 1419 MW-miles respectively, a violation of the DOM radial line criteria
- This need is time sensitive due to the criteria violation in the immediate need timeframe
- When this criteria violation was identified, the need date was already in the immediate need timeframe

Proposed Immediate Need Solution:

Due to the immediate need, the timing required for an RTEP proposal window is infeasible. As a result, the local Transmission Owner will be Designated Entity.

- Network Lines #82 and #189 by building a 20 mile 115kV line from Pantego to Trowbridge with a summer emergency rating of 262 MVA. **(b2653.1)**
- Install a 115kV four breaker ring at Pantego **(b2653.2)** and a 115kV breaker at Trowbridge **(b2653.3)**



B2653.1 - .3 Cost Increase and Scope Modification Continued

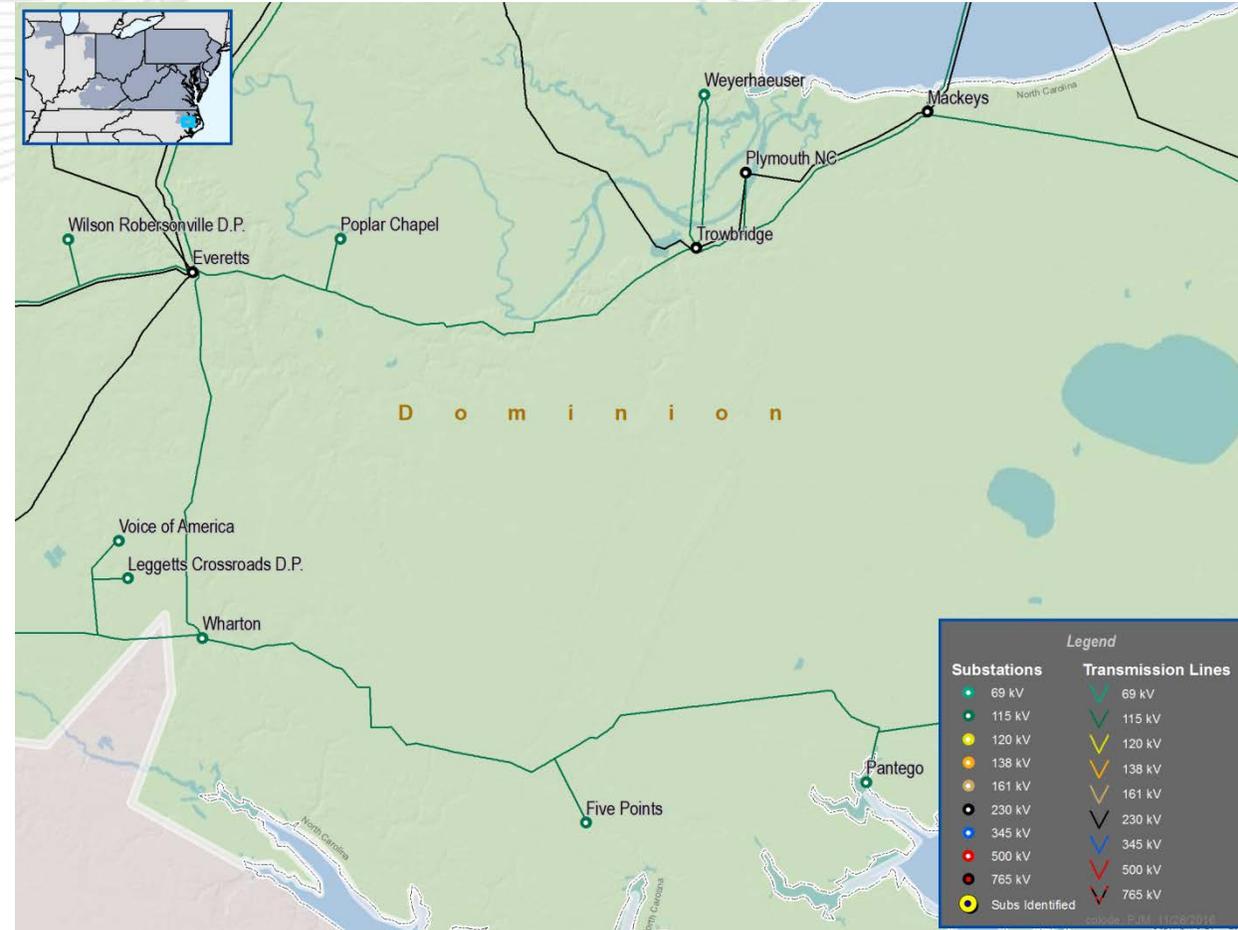
Reason for Cost Increase and Scope Modification:

- Final routing increased the line mileage from 20 to 22 miles from Pantego to Trowbridge
- Summer emergency rating target changed to 346 MVA from 262 MVA
- The cost increase is due to refined detailed cost estimate updates and the increased line mileage for the final routing.

Previous Estimated Project Cost: \$ 35.0 M

Revised Estimated Project Cost: \$ 44.6 M

Projected IS Date: 06/01/2018



Existing B1794 Cost Increase

Problem: N-1 Thermal Violation

- Overload of Rocky Mt – Battleboro 115kV for the loss of Battleboro – Carolina 115kV

Scope:

- Build a new switching station west of Edgecombe NUG to be called Hathaway Switching Station with a 230-115kV transformer, 5-230kV breakers in a breaker and a half scheme, 4-115kV breakers in a ring. Re-configure Battleboro – Benson 115kV, Nash-Hornertown 230kV, and Edgecombe NUG – Rocky Mt 230kV to terminate into Hathaway (b1794).

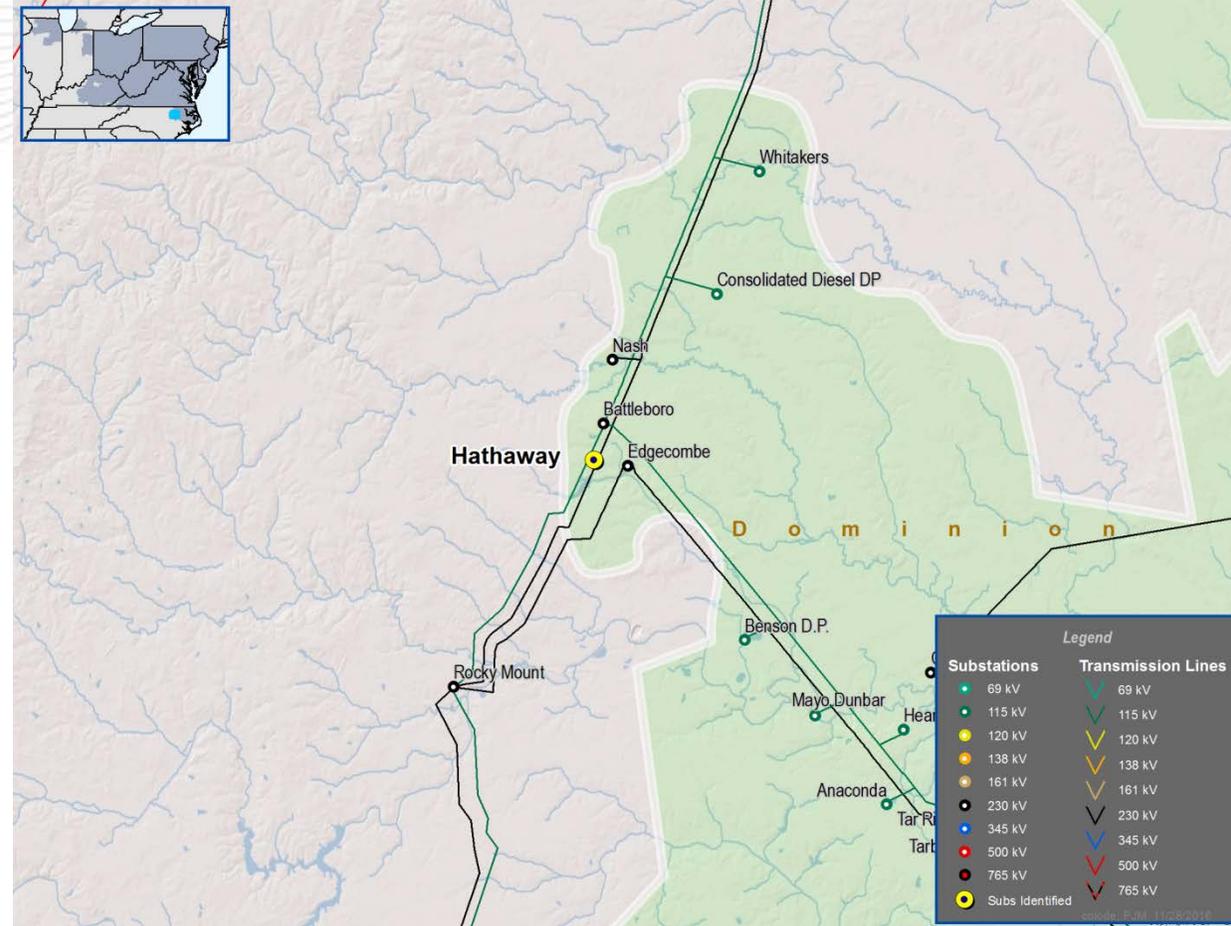
Reason for Cost Increase:

- The cost increase is due to additional substation expense, cost of land, expense for storm drainage and escalation of material and labor costs.

Previous Estimated Project Cost: \$ 19.0M

Revised Estimated Project Cost: \$ 25.4M

Projected IS Date: 06/01/2017



Problem: DOM “End of Life Criteria”

- Line #171 Chase City to Boydton Plank Rd was constructed on wood H-frames with 3/8 inch steel static. The line is approximately 61 years old.
- Removal of this line would violate Dominion’s 700 MW-mile radial line criteria
- This is an immediate need project based on “End of Life” criteria.
- When this criteria violation was identified, the need date was already in the immediate need timeframe.

Alternatives Considered

Given the immediate need timing of the violation, alternatives that would require new lines to be built were not considered.

Proposed Immediate Need Solution

Due to the immediate need, the timing required for an RTEP proposal window is infeasible. As a result, the local Transmission Owner will be the Designated Entity.

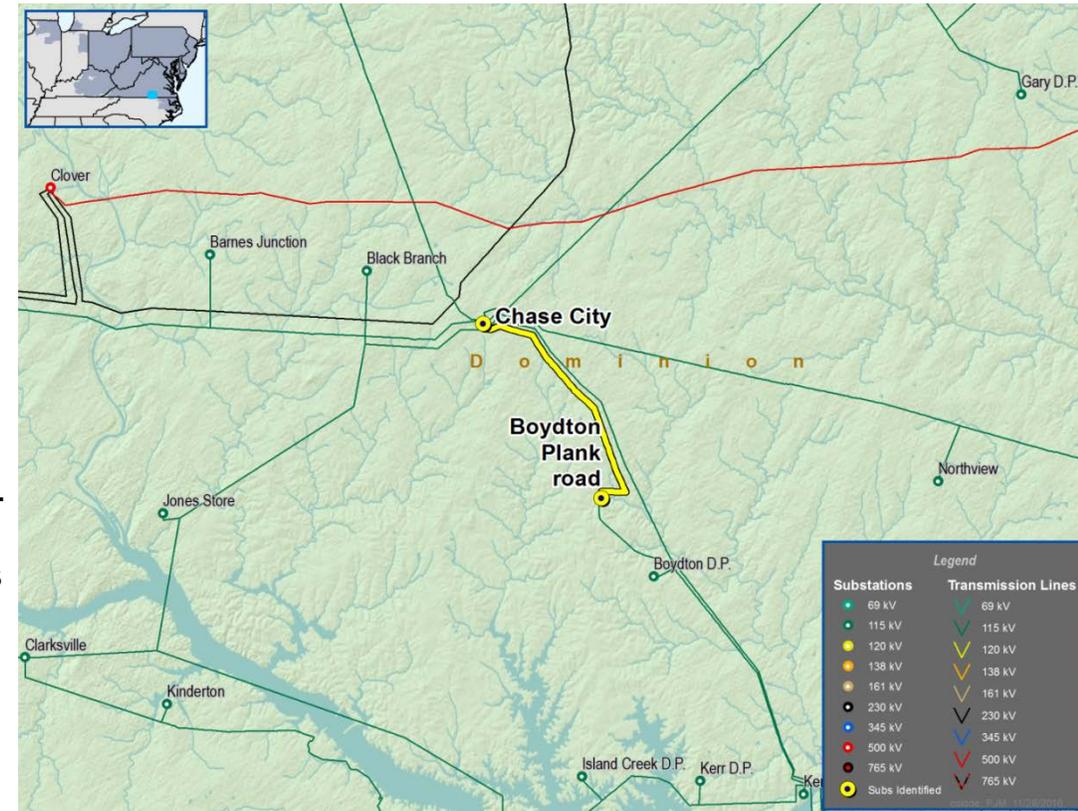
- Double circuit structures will be installed as part of project b2746¹. This project removes Line #171 end-of-life facilities and installs new conductor on the other arms, 9.4 miles, from Chase City to the Boydton Plank Road tap. The conductor used will be at current standards with a summer emergency rating of 393 MVA at 115kV. **(b2802)**

Estimated Project Cost: \$3.5 M

Projected IS Date: 06/30/2019

Required IS Date: 06/30/2019

¹ See Appendix.



Problem: DOM Limitation on Direct-Connect Load Violation

- Line #47 (Four Rivers – Fredericksburg) is a 34 mile long 115kV line and serves five delivery points (4 REC and 1 Dominion).
- The Dominion Planning Criteria states that the number of DP's on a transmission line should be limited to four and the Dominion Facility Connection Requirement states that transmission tap lines greater than a mile should be protected by a breaker to improve the reliability of the line.
- This is an immediate need project based on "Limitation on Direct-Connect Load" criteria.
- When this criteria violation was identified, the need date was already in the immediate need timeframe

Alternatives Considered

Given the immediate need timing of the violation, alternatives that would require new lines to be built were not considered.

Proposed Immediate Need Solution

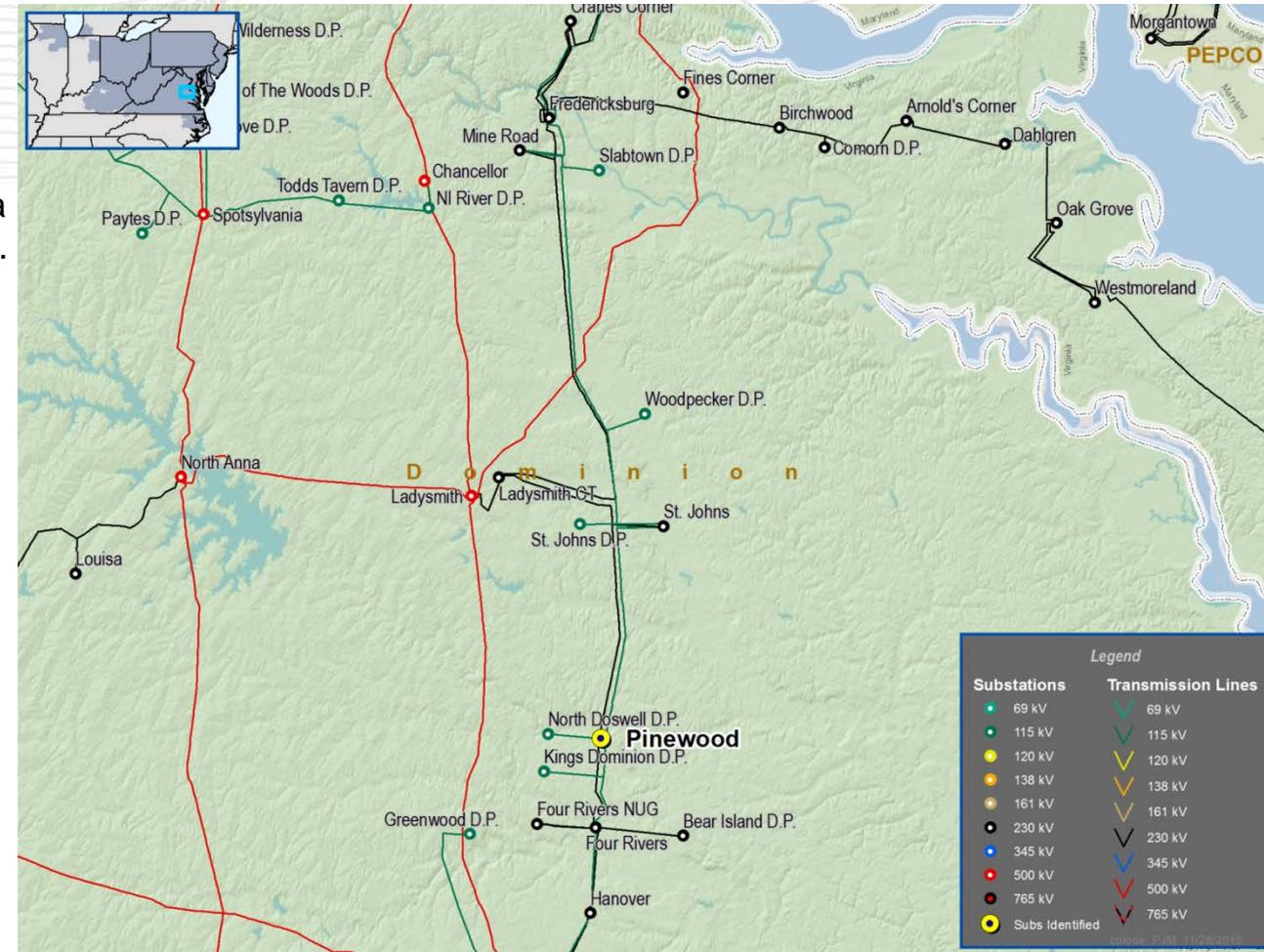
Due to the immediate need, the timing required for an RTEP proposal window is infeasible. As a result, the local Transmission Owner will be the Designated Entity.

- Build a new switching station (Pinewood 115kV Switching Station) at the tap serving North Doswell DP with an 115kV four breaker ring bus (b2815)

Estimated Project Cost: \$ 12.8 M

Projected IS Date: 06/01/2017

Required IS Date: 06/01/2017





Supplemental Upgrades

Existing S0610¹ Cost Increase

Problem:

- Transferring 6 MW from Halifax DP to new Darlington DP for reliability and anticipated industrial park development (no new load initially). Projected load 15 MW by 2024.

Solution:

- Install 2 switches on Line 81 and provide 115kV tap for new 115kV DP.

Reason for Cost Increase:

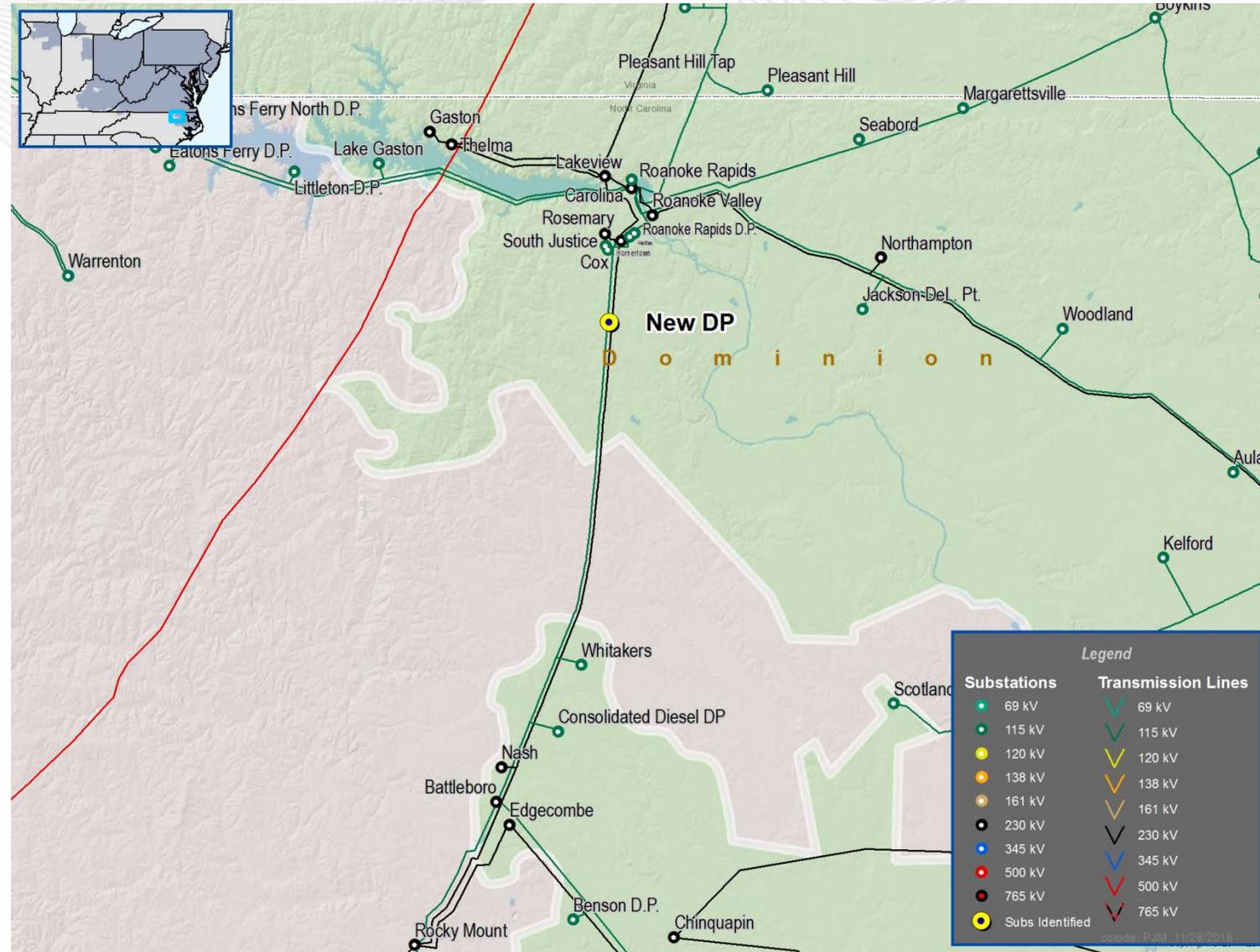
- Modification to the scope of work and timing of the Delivery Point
- Detailed estimated versus ballpark
- Retirement of Halifax DP switches

Previous Estimated Project Cost: \$ 0.6 M

Revised Estimated Project Cost: \$ 2.0 M

Projected IS Date: 01/01/2017

¹ See Appendix.



Problem:

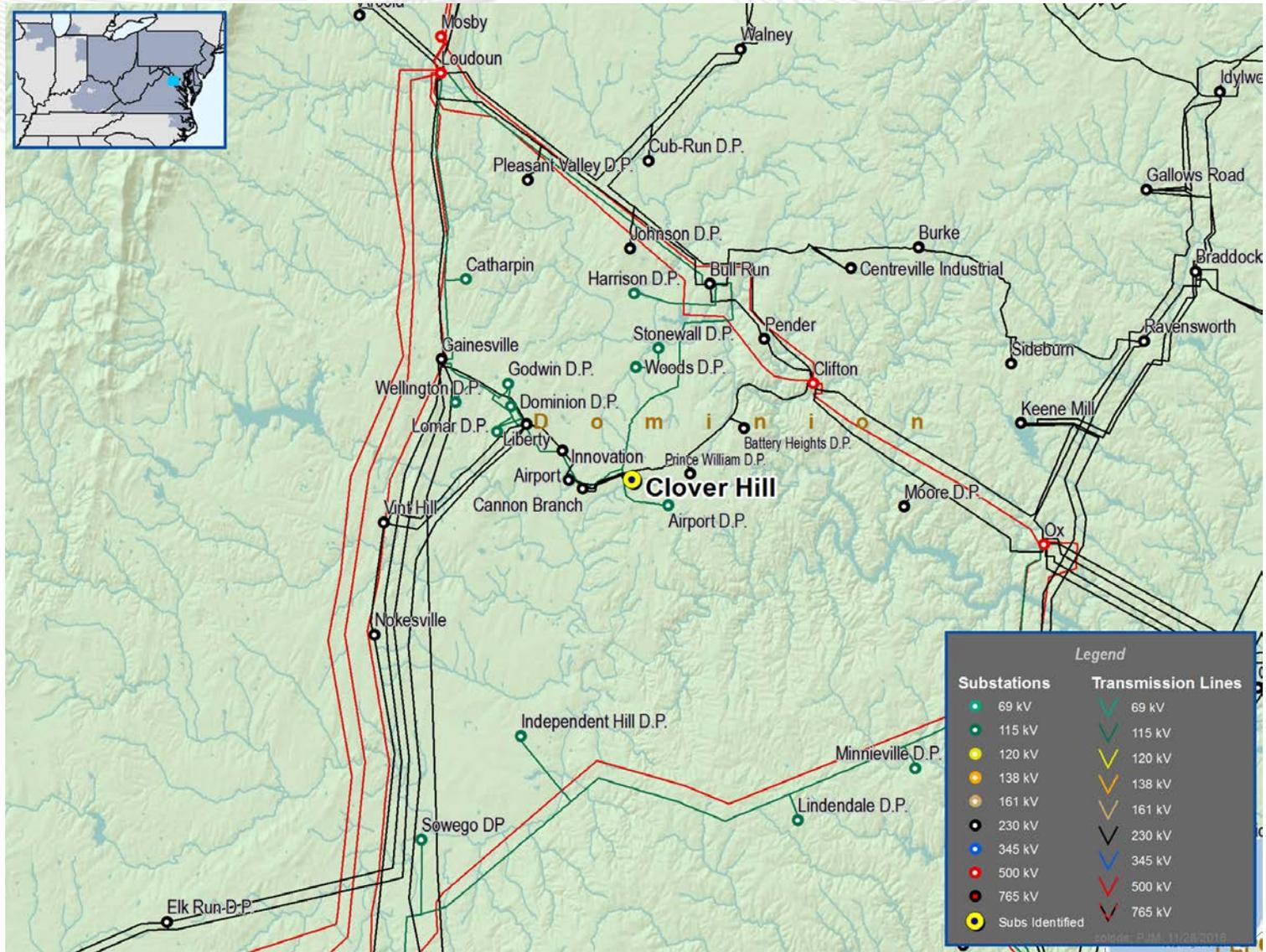
- Dominion Distribution is installing a 2nd 84 MVA 230-34.5kV transformer at Clover Hill to serve growing data center load.

Proposed Solution:

- Install a 230kV circuit switcher, high side switches and necessary bus work for the new transformer and additional high side switches for future transformers from same bus. (**\$1237**)

Estimated Project Cost: \$1.3 M

Projected IS Date: 11/15/2017



Problem:

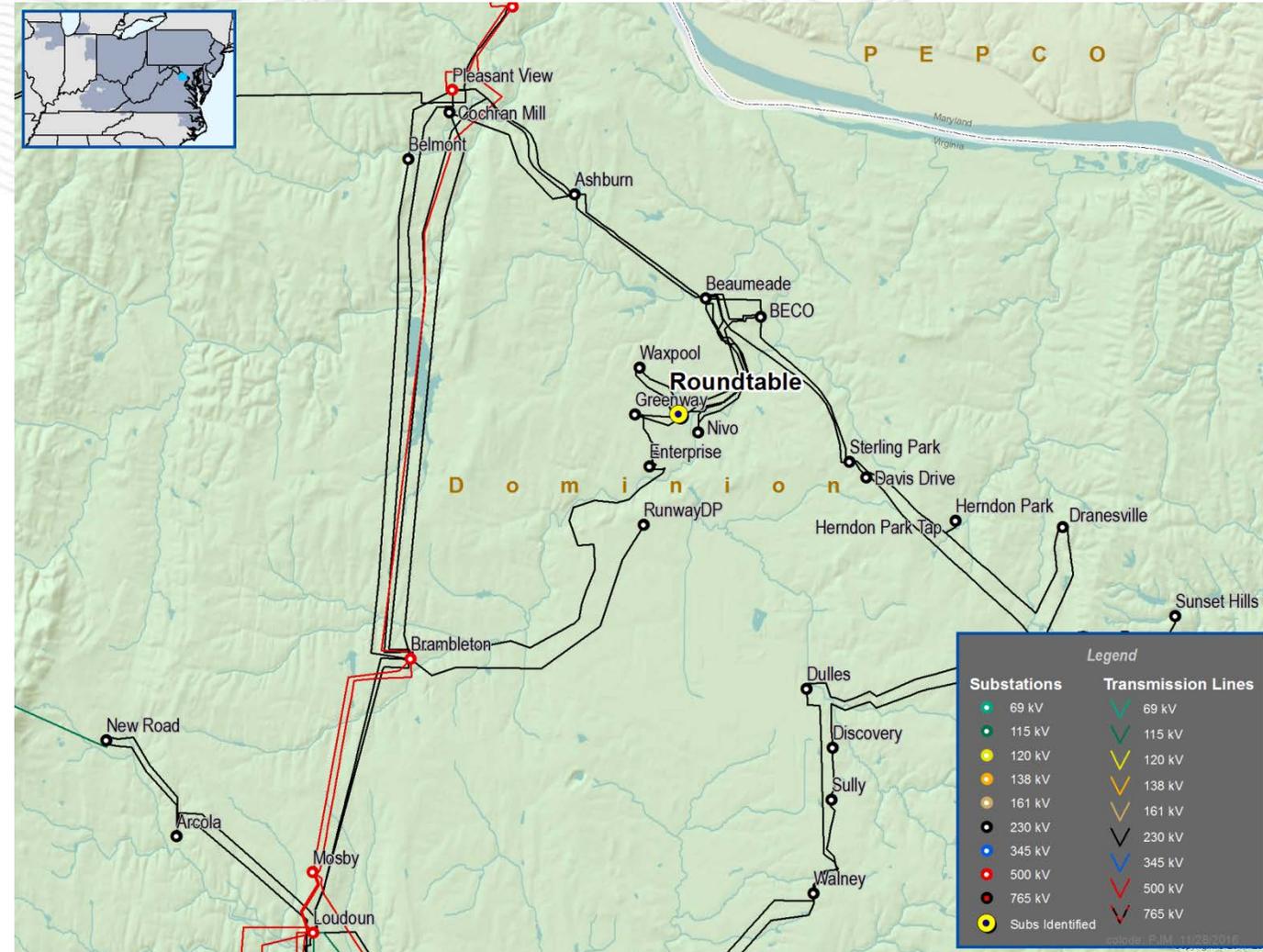
- Dominion Distribution has submitted a DP Request for a new substation to accommodate a new datacenter campus in Ashburn.
- Initial installation will include two 84 MVA 230-34.5 kV transformers with an ultimate capacity of four 84 MVA units.

Proposed Solution:

- Interconnect the new substation by cutting and extending both Line #2149 (Enterprise-Waxpool) and Line #2137 (Brambleton-BECO) into and out of the proposed Roundtable Substation. Terminate the lines into a six-breaker 230kV ring bus. Install a 230kV circuit switcher, high side switches and necessary bus work for the new transformers and additional high side switches for future transformers from same bus. (**\$1238**)

Estimated Project Cost: \$7.5 M

Projected IS Date: 09/01/2018



Problem:

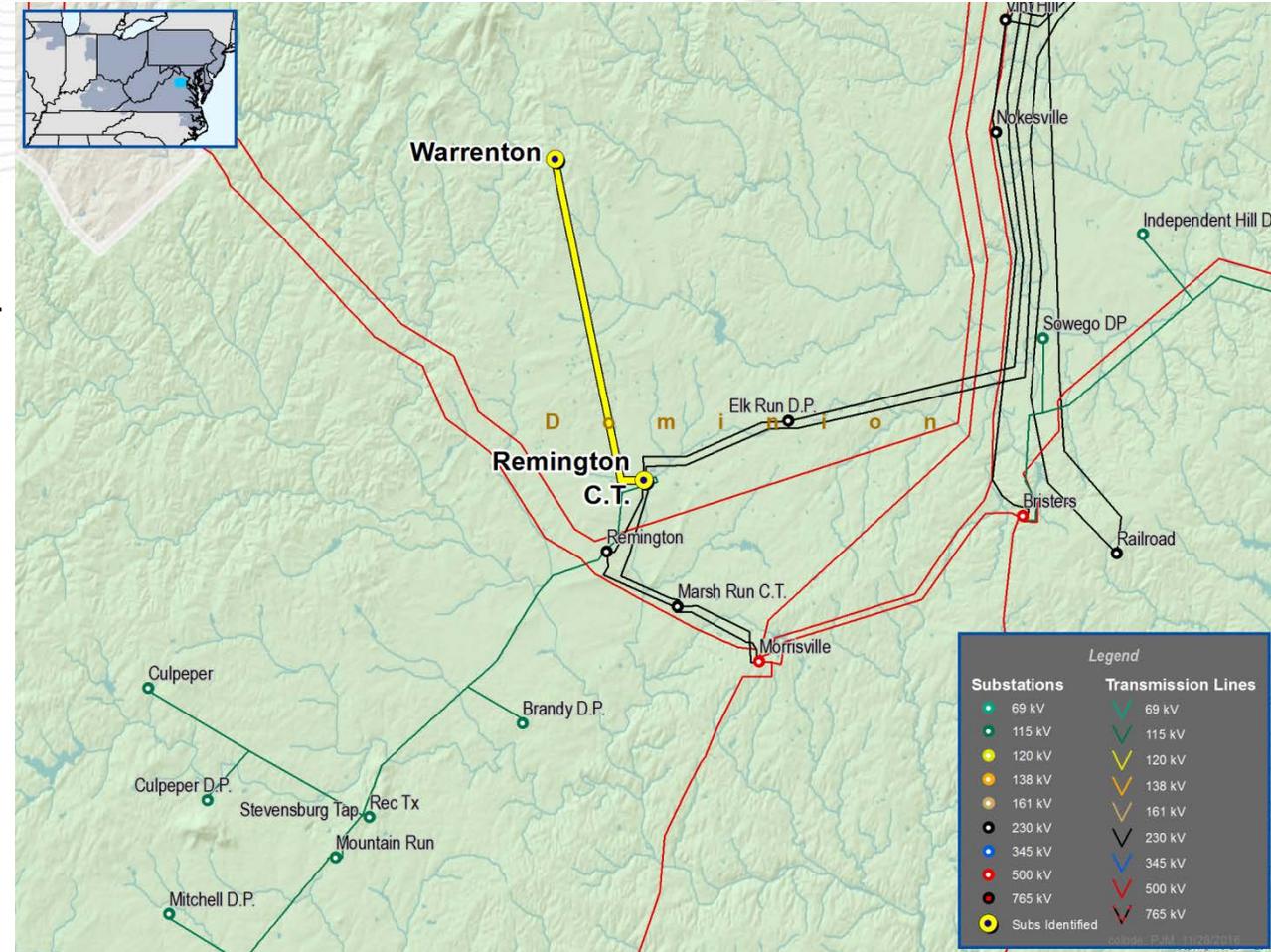
- Dominion Distribution has acquired land along Line #2086 (Remington CT-Warrenton) and submitted a DP Request for a future substation to accommodate projected load growth in southern Fauquier County.
- Line #2086 is being wrecked-and-rebuilt in 2018 from a single-circuit radial to a double-circuit networked configuration under PJM baseline upgrade project b2461.

Proposed Solution:

- Coordinate the Line #2086 design of double-circuit structure placements (including line switches and attachments) to accommodate the future Opal tap. This work will be done in 2018. (**\$1239**)

Estimated Project Cost: \$750 K

Projected IS Date: 05/31/2021



Questions?

Email: RTEP@pjm.com



Revision History

- 12/30/2016 – Original version posted to PJM.com. Includes the following updates since the 12/01/2016 SRRTEP meeting:
- Updated baseline IDs on slides 2 & 3 and provided contingency information for **b2654.4**
 - Updated slide 5 and removed the requirement for an additional breaker
 - Added Appendix section to provide additional information on slides 7 and 10
 - Included Required ISDs for slides 7 and 8
 - Revised language on slides 11-13 from “potential/possible” to “proposed/projected” for solution and ISD

Appendix

Slide 7 – Additional information regarding baseline upgrade **b2746**:

- Presented at 7/26/16 sub-regional RTEP South meeting
- Rebuild Line #137 Ridge Rd - Kerr Dam 115kV, 8.0 miles, for 346 MVA summer emergency rating (**b2746.1**)
- Rebuild Line #1009 Ridge Rd - Chase City, 9.5 miles, for 346 MVA summer emergency rating (**b2746.2**)
- Install a second 4.8 MVAR capacitor bank on the 13.8kV bus of each transformer at Ridge Rd (**b2746.3**)

Slide 10 – Additional information involving supplemental upgrade **s0610**:

- Original TEAC date: 08/21/13 Original TEAC cost: \$ 12.9 M
- Split Line 81, build 4mi of double circuit 115kV & a 115kV breaker station with a tap to serve Roanoke Industrial Park 115kV DP (REC)
- Latest TEAC date: 03/09/15 Latest TEAC cost: \$ 600 K
- REC cancelled their request for a 115kV DP at Roanoke Industrial Park
- Revised Solution: Install 2 switches on Line 81 and provide 115kV tap for new 115kV DP