Dominion Supplemental Projects

Transmission Expansion Advisory Committee
April 6, 2021

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

Dominion Transmission Zone: Supplemental Customer Load Request

Need Number: DOM-2021-0003

Process Stage: Need Meeting 04/06/2021

Project Driver: Customer Service

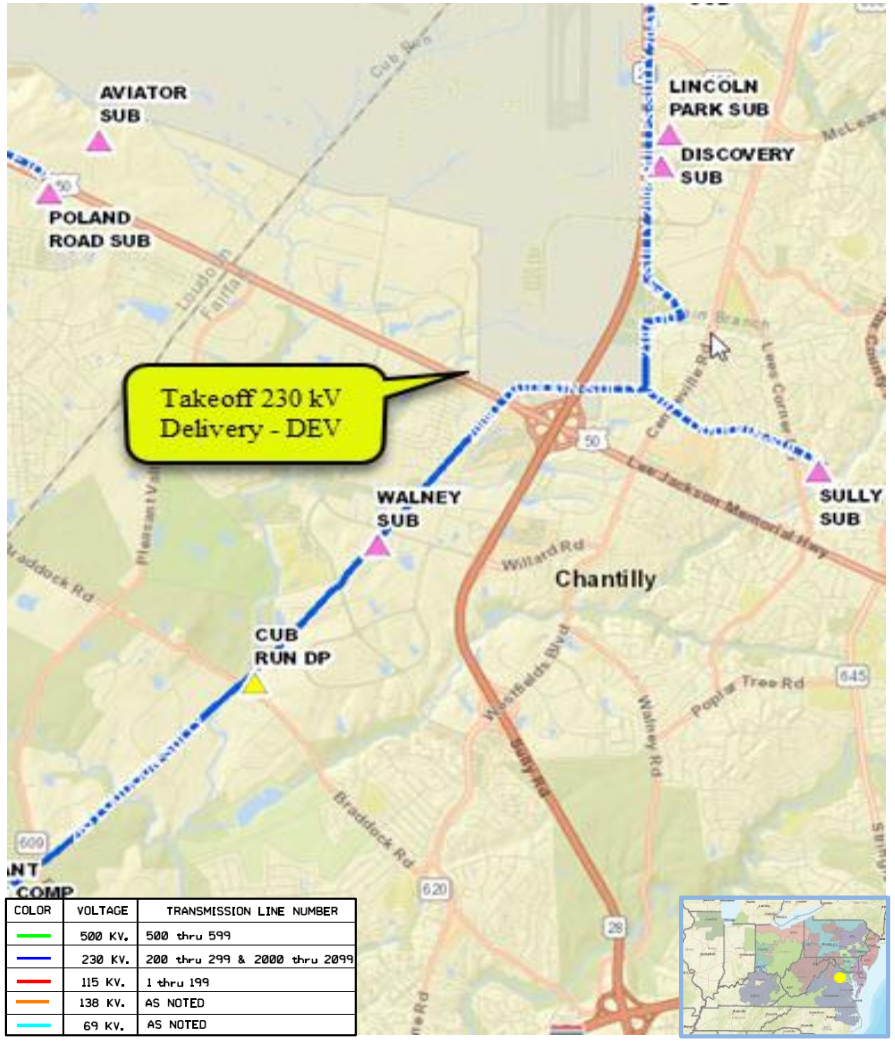
Specific Assumption References:

Customer load request will be evaluated per Dominion's Facility Interconnection Requirements Document and Dominion's Transmission Planning Criteria.

Problem Statement:

DEV Distribution has submitted a DP Request to add transformers at Takeoff Substation to support a new datacenter campus in Fairfax County with a total load in excess of 100 MW. The new station will also support existing load in the immediate area. Requested in-service date is 06/15/2024.

Initial In-Service Load	Projected 2026 Load
Summer: 86.0 MW	Summer: 143.2 MW



Dominion Transmission Zone: Supplemental Customer Load Request

Need Number: DOM-2021-0018

Process Stage: Need Meeting 04/06/2021

Project Driver: Customer Service

Specific Assumption References:

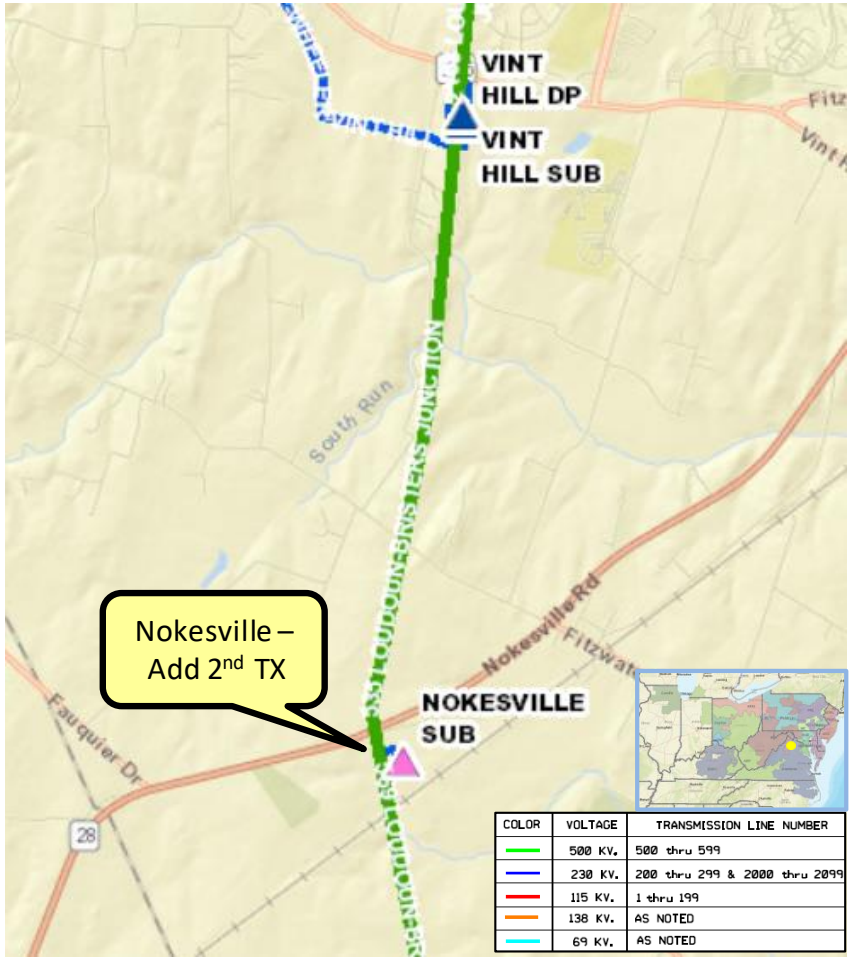
Customer load request will be evaluated per Dominion's Facility Interconnection Requirements Document and Dominion's Transmission Planning Criteria.

Problem Statement:

DEV Distribution has submitted a DP Request to add a 2nd distribution transformer at Nokesville Substation in Prince William County. The new transformer is being driven by data center load growth in the area.

Requested in-service date is 11/01/2022.

Initial In-Service Load	Projected 2026 Load
Summer: 27.2 MW	Summer: 63.3 MW



Dominion Transmission Zone: Supplemental Customer Load Request

Need Number: DOM-2021-0019

Process Stage: Need Meeting 04/06/2021

Project Driver: Customer Service

Specific Assumption References:

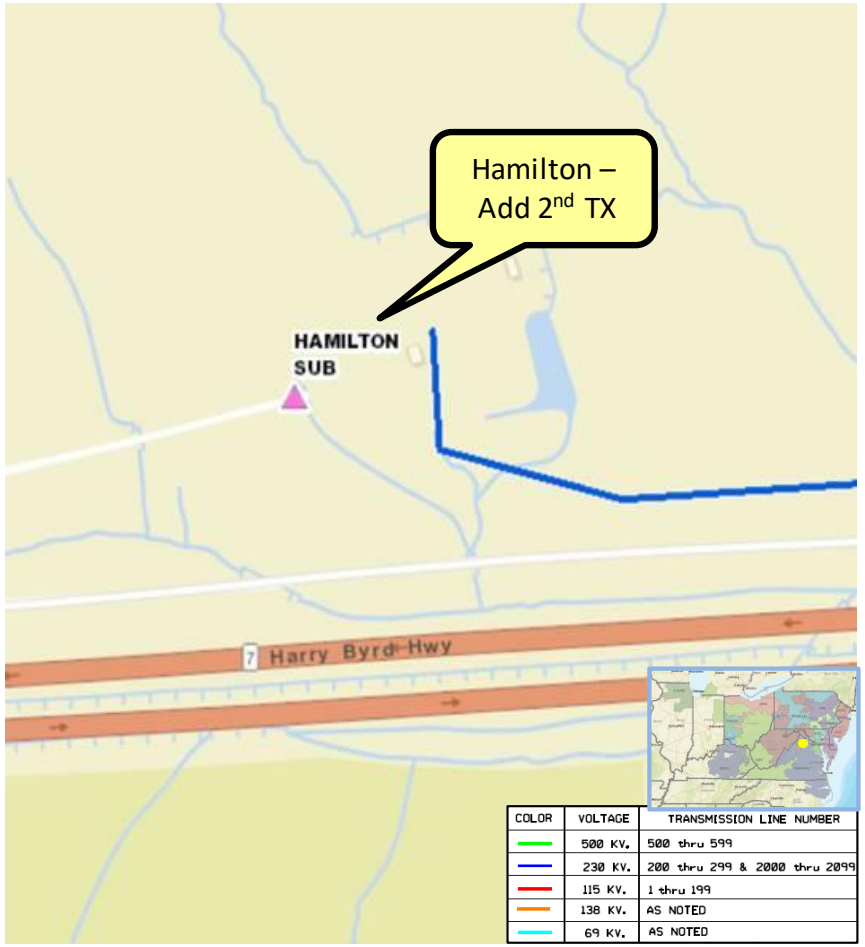
Customer load request will be evaluated per Dominion's Facility Interconnection Requirements Document and Dominion's Transmission Planning Criteria.

Problem Statement:

DEV Distribution has submitted a DP Request to add a 2nd distribution transformer at Hamilton Substation in Loudoun County. The new transformer is being driven by contingency loading for loss of the existing transformer.

Requested in-service date is 12/01/2022.

Initial In-Service Load	Projected 2026 Load
Summer: 58.7 MW	Summer: 66.4 MW



Dominion Transmission Zone: Supplemental Customer Load Request

Need Number: DOM-2021-0020

Process Stage: Need Meeting 04/06/2021

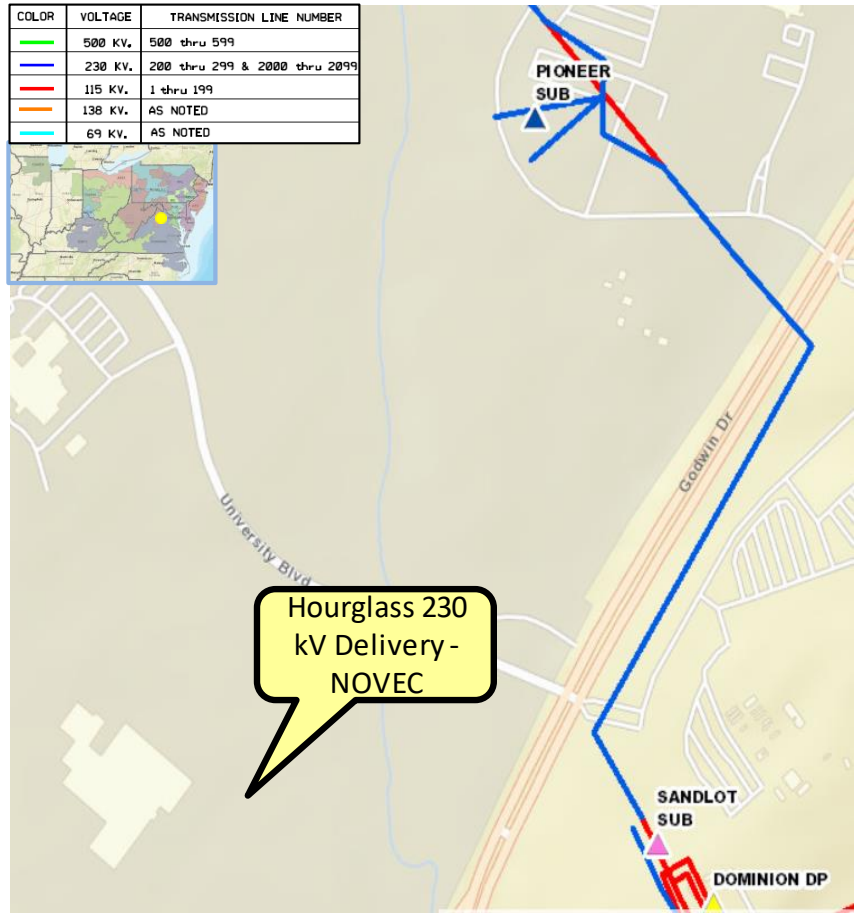
Project Driver: Customer Service

Specific Assumption References:
Customer load request will be evaluated per Dominion's Facility Interconnection Requirements Document and Dominion's Transmission Planning Criteria.

Problem Statement:
NOVEC has submitted a DP Request for a new substation (Hourglass) to serve a data center complex in Prince William County with a total load in excess of 100 MW.

Requested in-service date is 06/15/2023.

Initial In-Service Load	Projected 2026 Load
Summer: 10.0 MW	Summer: 114.7 MW



Dominion Transmission Zone: Supplemental Customer Load Request

Need Number: DOM-2021-0032

Process Stage: Need Meeting 04/06/2021

Project Driver: Customer Service

Specific Assumption References:

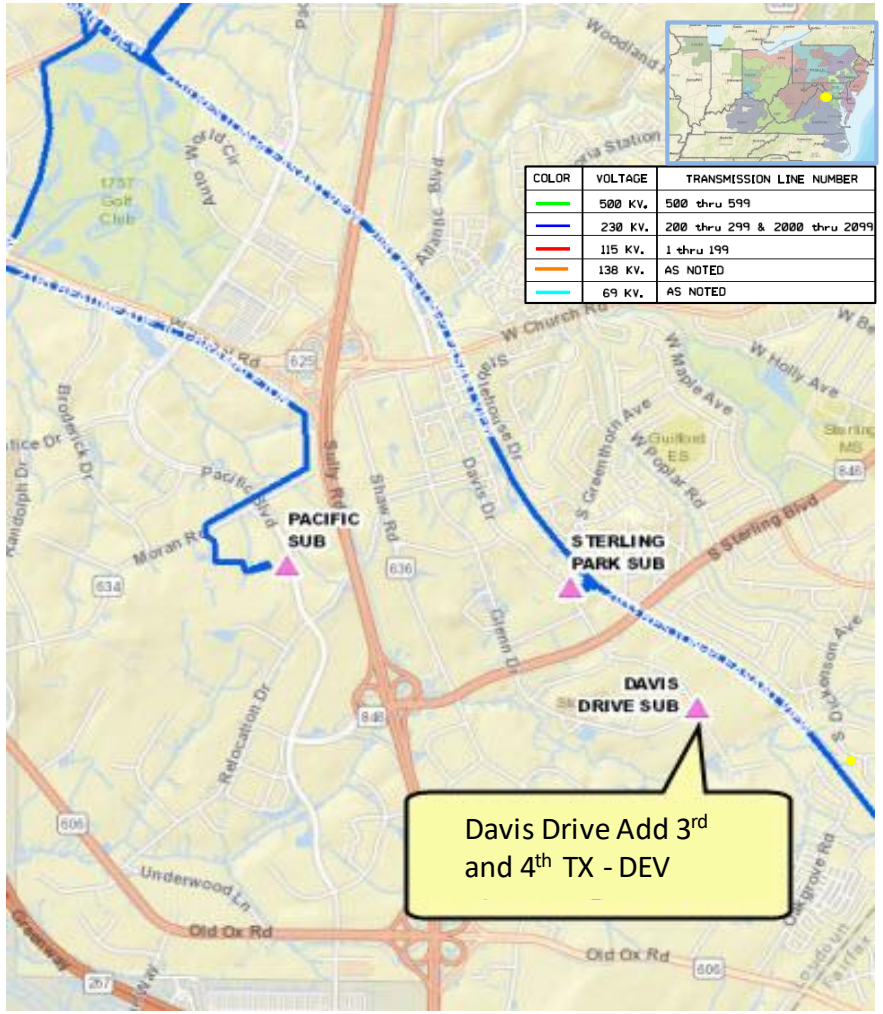
Customer load request will be evaluated per Dominion's Facility Interconnection Requirements Document and Dominion's Transmission Planning Criteria.

Problem Statement:

DEV Distribution has submitted a DP Request to add the 3rd and 4th distribution transformers at Davis Drive Substation in Loudoun County. The new transformers are being driven by continued data center load growth in the area.

Requested in-service date is 10/01/2022.

Initial In-Service Load	Projected 2026 Load
Summer: 175.0 MW	Summer: 224.0 MW



Dominion Transmission Zone: Supplemental Customer Load Request

Need Number: DOM-2021-0035

Process Stage: Need Meeting 04/06/2021

Project Driver: Customer Service

Specific Assumption References:

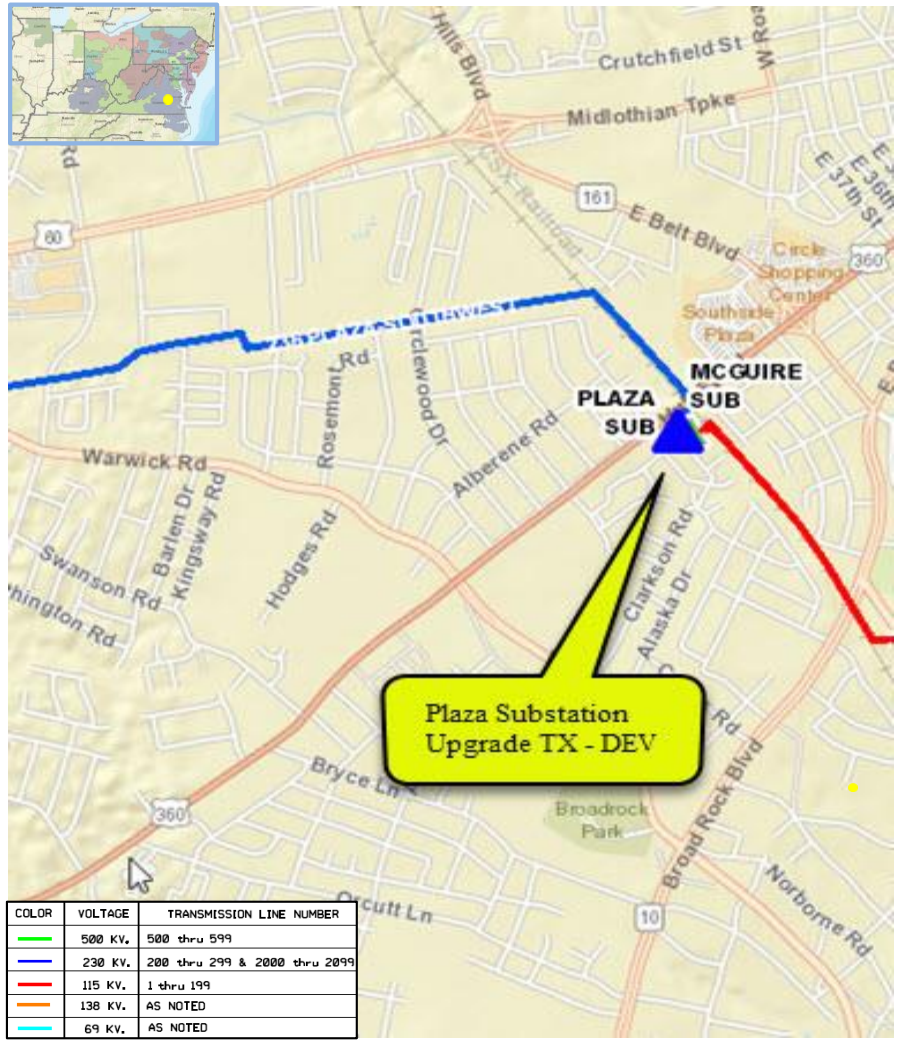
Customer load request will be evaluated per Dominion's Facility Interconnection Requirements Document and Dominion's Transmission Planning Criteria.

Problem Statement:

DEV Distribution has submitted a DP Request to upgrade the distribution transformer at Plaza Substation in the City of Richmond. The transformer upgrade is being driven by a poor Transformer Health Assessment (THA) score.

Requested in-service date is 12/31/2021.

Initial In-Service Load	Projected 2026 Load
Winter: 40.4 MW	Winter: 45.8 MW



Dominion Transmission Zone: Supplemental Equipment Material Condition, Performance and Risk

Need Number: DOM-2021-0025

Process Stage: Need Meeting 04/06/2021

Project Driver: Equipment Material Condition, Performance and Risk

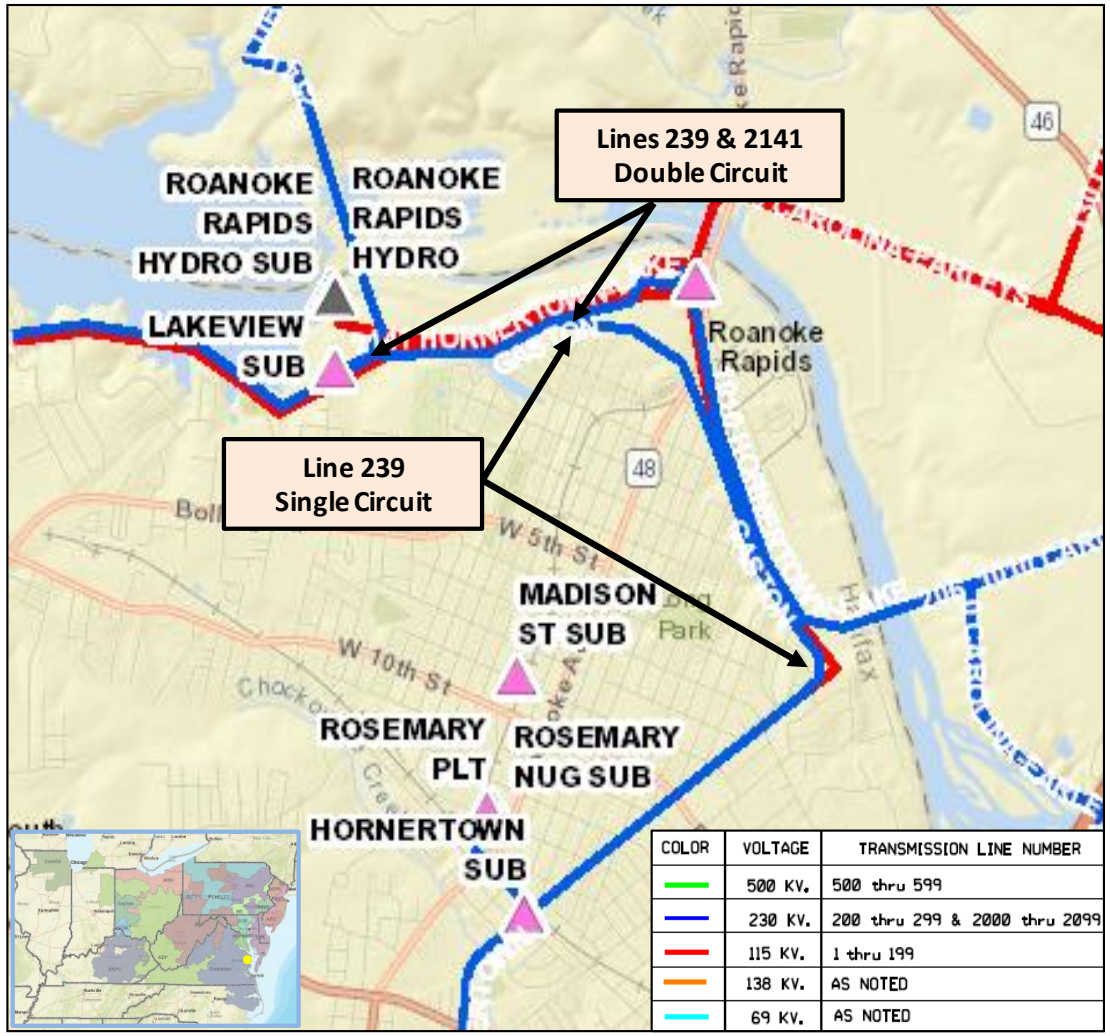
Specific Assumption References:

See details on Equipment Material Condition, Performance and Risk in Dominion's Planning Assumptions presented in December 2020.

Problem Statement:

Dominion Energy has identified a need to replace approximately 2.7 miles of 230kV Line #239 (Lakeview to Hornertown) which includes the double circuit segment with Line #2141 (Carolina to Lakeview) based on the Company's End of Life criteria.

- Double-circuit is on steel towers and single-circuit is on 2-pole wood H-frame structures all dating back to 1967. Conductor is ACSR.
- A field-condition assessment indicated woodpecker damage to several poles and broken insulators in numerous locations.
- Industry guidelines indicate equipment life for steel structures is 40-60 years, conductor and connectors are 40-60 years, and porcelain insulators are 50 years.
- Remaining segment of Line #239 is being rebuilt under project b3114.



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

Dominion Transmission Zone: Supplemental Customer Load Request

Need Number: DOM-2021-0009

Process Stage: Solutions Meeting 04/06/2021

Previously Presented: Need Meeting 02/09/2021

Project Driver: Customer Service

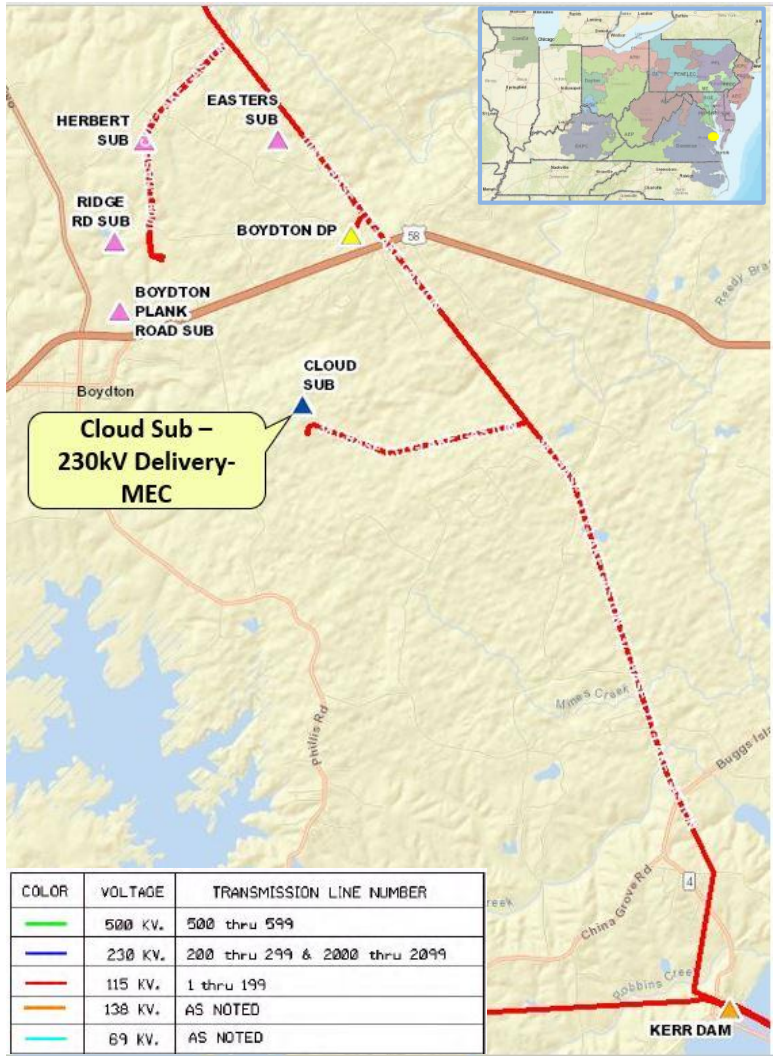
Specific Assumption References:

Customer load request will be evaluated per Dominion's Facility Interconnection Requirements Document and Dominion's Transmission Planning Criteria.

Problem Statement:

ODEC has submitted a request with an updated load projection on behalf of Mecklenburg Electric Coop (MEC) for a delivery point (Cloud Sub - Coleman Creek DP) at Boydton, VA, to support a datacenter campus of total load in excess of 100 MW. The customer requests service by June 1, 2024.

Initial In-Service Load	Projected 2026 Load
Summer: 91.0 MW	Summer: 156.0 MW



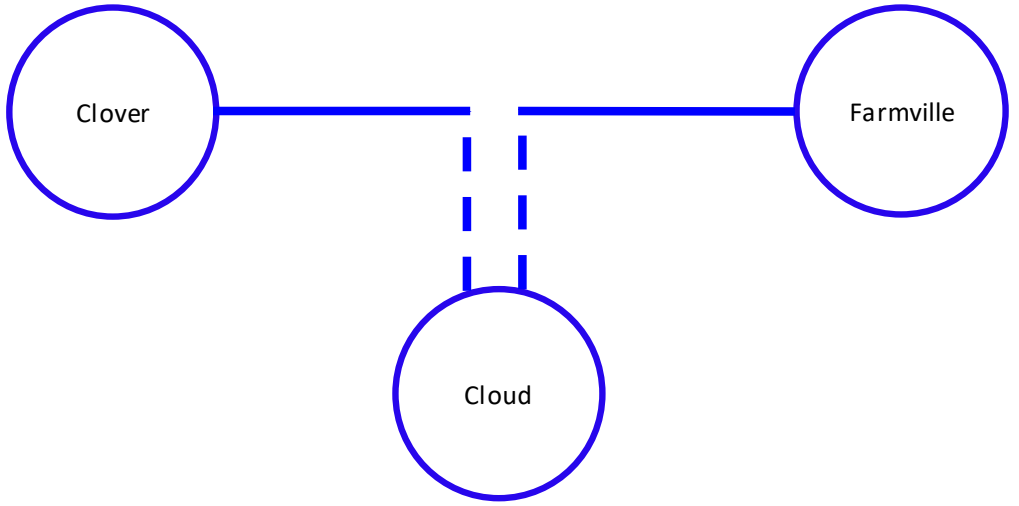
Dominion Transmission Zone: Supplemental Cloud 230kV Delivery - MEC

Need Number: DOM-2021-0009

Process Stage: Solutions Meeting 04/06/2021

Proposed Solution:

- Split 230kV Line #235 (Clover - Farmville) near Chase City substation and extend two single circuit 230kV lines for approx. 15 miles to the proposed Cloud Substation.
- Terminate the two 230kV lines into 4 breaker ring bus to create a Cloud - Clover line and a Cloud - Farmville line.
- Add two 224 MVA 115/230kV transformers with breakers on both sides.
- Expand 115kV bus to 4 breaker ring bus.
- 4 additional 230kV breakers will be paid for by Customer (cost not included here).



Estimated Project Cost: $45.0 M (Total)

Transmission Line	$30M
Substation	$15M

Alternatives Considered:

No feasible alternatives

Projected In-service Date: 06/01/2024

Project Status: Engineering

Dominion Transmission Zone: Supplemental Customer Load Request

Need Number: DOM-2021-0010

Process Stage: Solutions Meeting 04/06/2021

Previously Presented: Need Meeting 02/09/2021

Project Driver: Customer Service

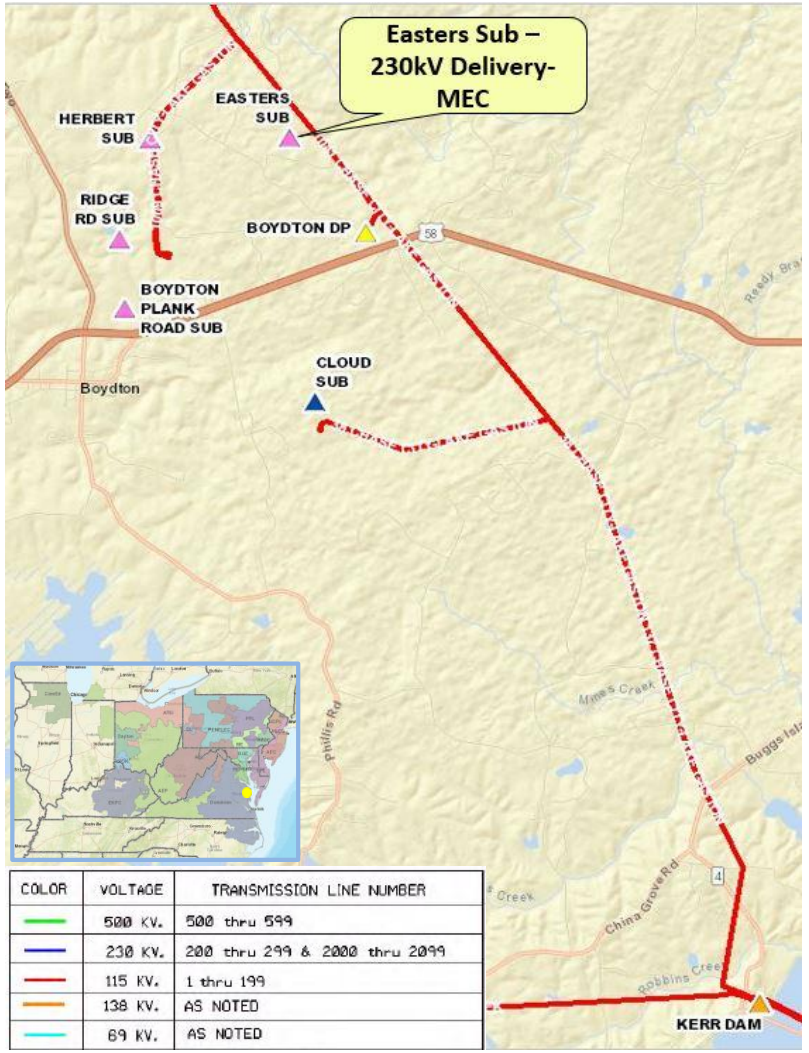
Specific Assumption References:

Customer load request will be evaluated per Dominion's Facility Interconnection Requirements Document and Dominion's Transmission Planning Criteria.

Problem Statement:

ODEC has submitted a request on behalf of Mecklenburg Electric Coop (MEC) for a new delivery point (Easters Sub – Timber DP) at Boydton, VA, to support a new datacenter campus with a total load in excess of 100 MW. The customer requests service by November 1, 2021.

Initial In-Service Load	Projected 2026 Load
Winter: 12.0 MW	Summer: 123.0 MW



Dominion Transmission Zone: Supplemental Easters 230kV Delivery - MEC

Need Number: DOM-2021-0010

Process Stage: Solutions Meeting 04/06/2021

Proposed Solution:

The project will need to be built in 2 stages due to the timeframe associated with obtaining a CPCN and extend 230kV into the area. The 115kV Station will help meet the initial load target date.

Stage 1: Interconnect the new substation by cutting and extending 115kV Line #137 (Kerr Dam – Ridge Road) to the proposed Easters 115kV Substation. The conductor, substation and line equipment used to interconnect Easters 115 kV with the transmission system will be same as 230kV substation. The projected in-service date for Stage 1 is November 1, 2021.

Stage 2: Cut and extend 230kV Line #2226 (Clover – Cloud 230kV) to the proposed Easters 230kV Substation. Add one 84 MVAR 230kV cap bank for voltage support. Once conversion from 115kV to 230kV substation is complete, remove Easters 115kV tap and reconnect Line #137 Kerr Dam – Ridge Road. 8 additional 230kV breakers will be paid for by Customer (cost not included here). The projected in-service date for Stage 2 is June 1, 2024.

Estimated Project Cost: $20.0 M (Total)

Transmission Line	$5M
115kV Substation	$10M
230kV Substation	$5M

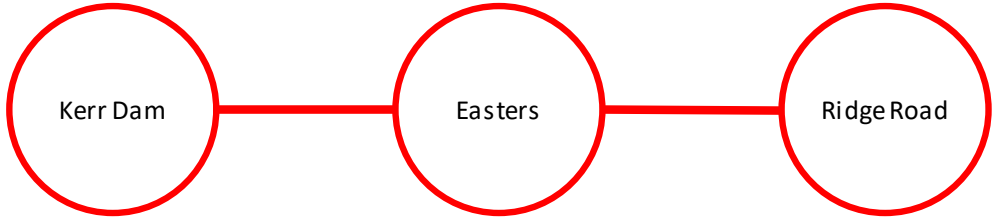
Alternatives Considered:

No feasible alternatives

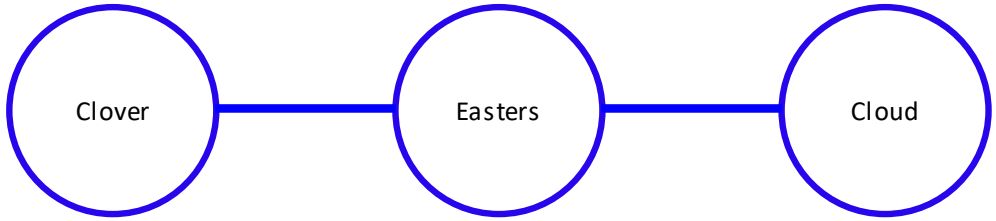
Projected In-service Date: 06/01/2024 (Stage 2)

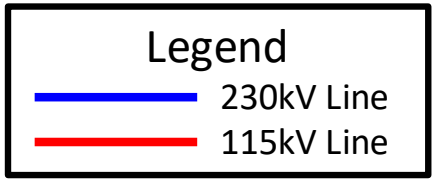
Project Status: Engineering

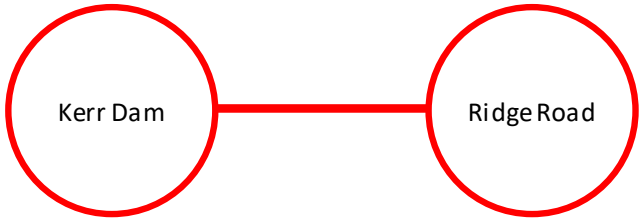
Stage 1: Easters 115kV Sub



Stage 2: Easters 230kV Sub







Dominion Transmission Zone: Supplemental Customer Load Request

Need Number: DOM-2021-0016

Process Stage: Solutions Meeting 04/06/2021

Previously Presented: Need Meeting 03/09/2021

Project Driver: Customer Service

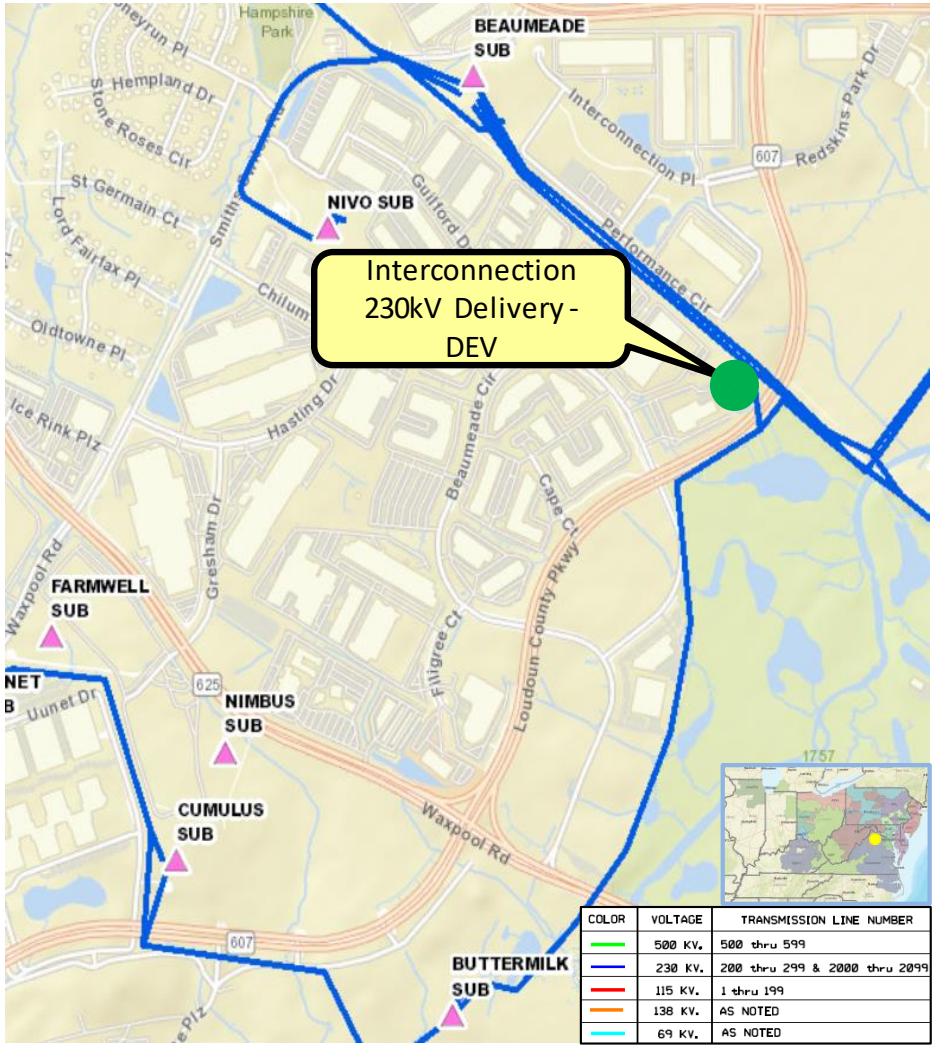
Specific Assumption References:

Customer load request will be evaluated per Dominion's Facility Interconnection Requirements Document and Dominion's Transmission Planning Criteria.

Problem Statement:

DEV Distribution has submitted a DP Request for a new substation (Interconnection) to accommodate a new datacenter campus in Loudoun County with a total load in excess of 100MW. Requested in-service date is 12/15/2024.

Initial In-Service Load	Projected 2026 Load
Summer: 180.3 MW	Summer: 208.3 MW



Dominion Transmission Zone: Supplemental Interconnection 230kV Delivery - DEV

Need Number: DOM-2021-0016

Process Stage: Solutions Meeting 04/06/2021

Proposed Solution:

Interconnect the new substation by cutting and extending 230kV Line #2152 (Buttermilk - Beaumeade) to the proposed Interconnection Substation. Terminate both ends into a four-breaker ring arrangement to create an Interconnection - Beaumeade line and an Interconnection - Buttermilk line.

Estimated Project Cost: $16.0 M

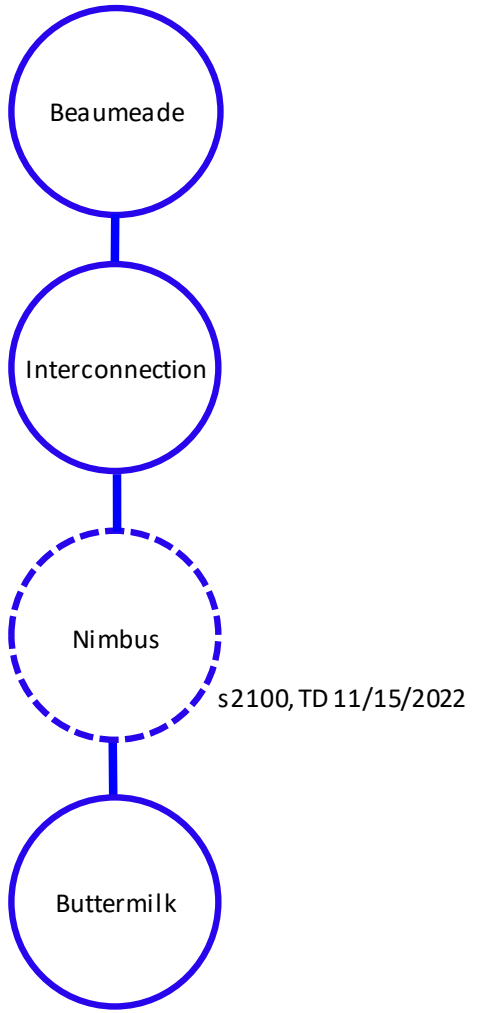
Alternatives Considered:

No feasible alternatives

Projected In-service Date: 12/15/2024

Project Status: Engineering

Model: 2025 RTEP



s2100, TD 11/15/2022

Dominion Transmission Zone: Supplemental Equipment Material Condition, Performance and Risk

Need Number: DOM-2020-0028 UPDATE

Process Stage: Solution Meeting 04/06/2021

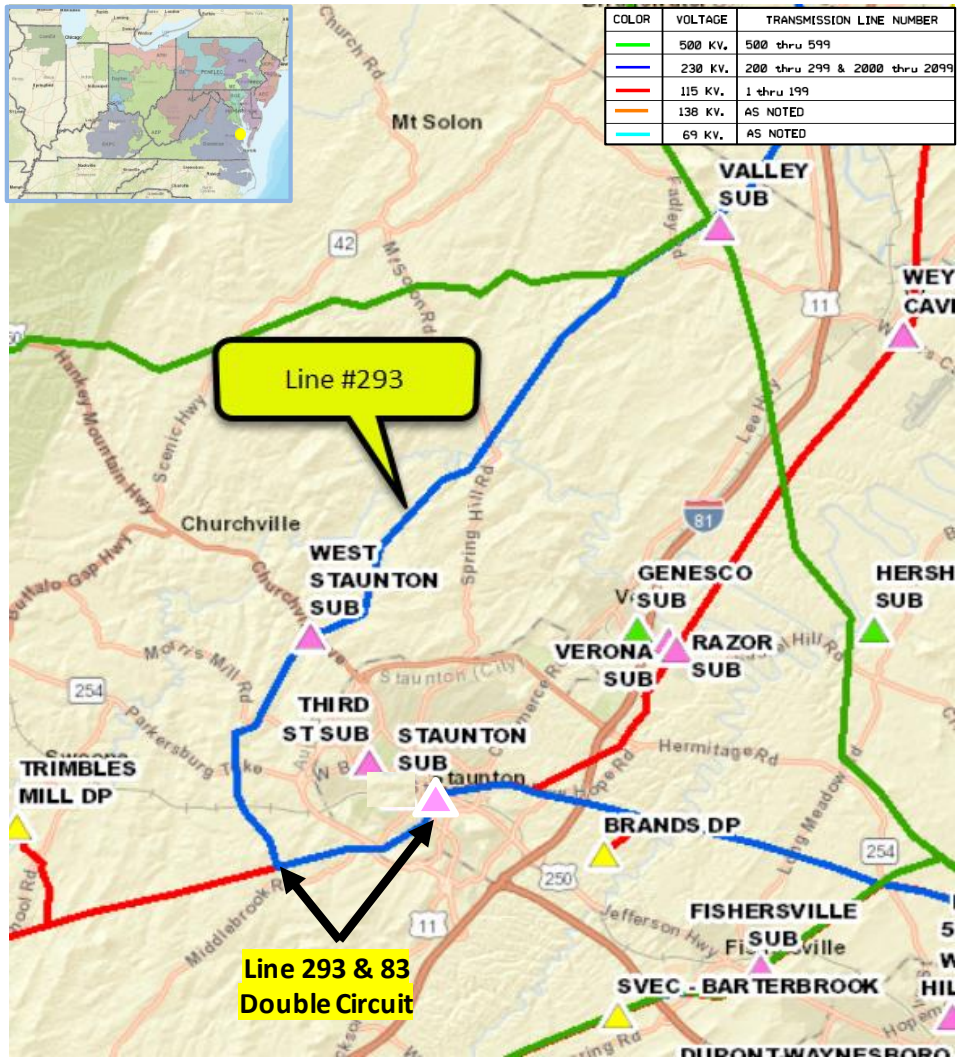
Previously Presented: Solution Meeting 11/04/2020

Project Driver: Equipment Material Condition, Performance and Risk

Specific Assumption References:
See details on Equipment Material Condition, Performance and Risk in Dominion's Planning Assumptions presented in December 2019 and updated in June 2020

Problem Statement:
Dominion Energy has identified a need to replace ~~47~~ 17.8 miles of existing single-circuit wood transmission towers ~~(Staunton – Valley)~~ of 230 kV Line #293 (Staunton and Valley), ~~-~~and 3.5 miles of double-circuit painted/weathering steel structures that are shared between Line #293 and 115 kV Line #83 (Craigsville-Staunton).

- The 293 line was constructed largely on wood H-frame structures in timeframe between 1971 and 1981. Approximately 17.8 miles of ~~21.27~~ 21.3 miles of this line was constructed on wood H-frame structures and these structures are at the end of their useful life.
- The remaining 3.5 miles of double-circuit structures were constructed in 1981 and consist mainly of weathering steel lattice structures that are at the end of their useful life.
- Industry guidelines indicate equipment life for wood structures is 35-55 years.
- The Line #293 provides service to West Staunton Substation (Dominion Distribution) with approximately 46.6 MW tapped load.



Dominion Transmission Zone: Supplemental
230kV Line #293 & 115 kV Partial Line #83 – EOL Rebuild

Need Number: DOM-2020-0028 UPDATE

Process Stage: Solutions Meeting ~~11/04/2020~~ 04/04/2021

Proposed Solution:
Replace ~~A~~approximately 17.8 miles of existing single-circuit ~~involving~~ wood H-frame structures on Line #293 and 3.5 miles of double-circuit painted/weathering steel structures shared between Line #293 and Line #83 ~~weathering steel Corten lattice towers will be replaced~~ with single and double-circuit steel monopoles, as appropriate. ~~and n~~New conductor with a normal summer rating of 1047 MVA will be used for the entire Line #293. The 3.5-mile segment of Line#83 that is being replaced will use new conductor with a normal summer rating of 261 MVA.

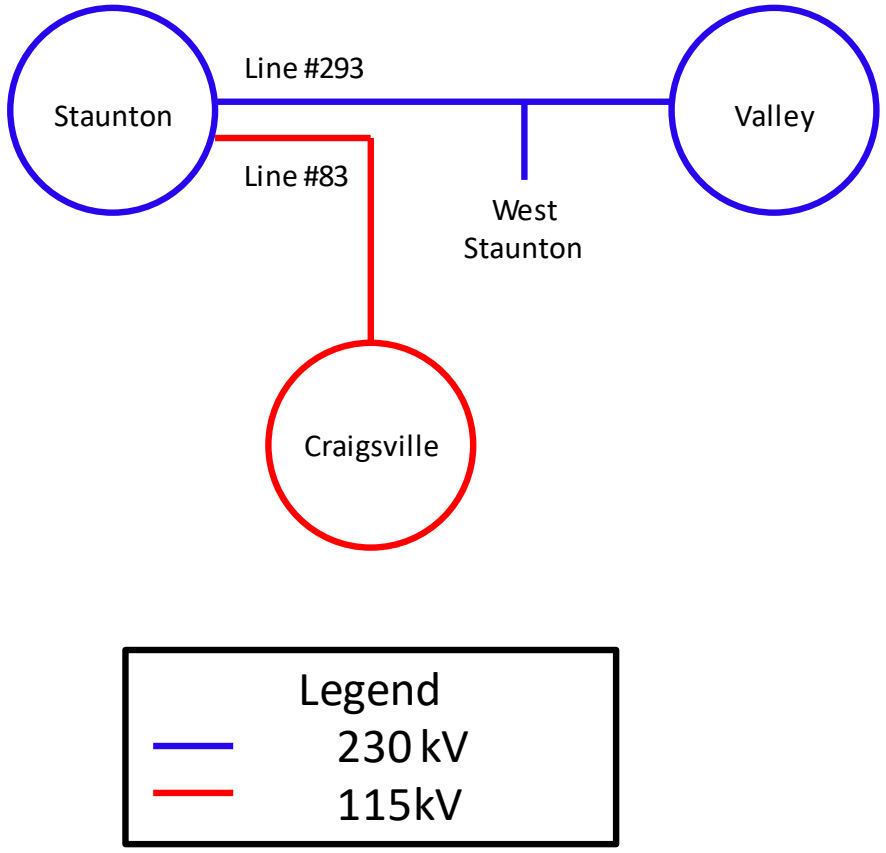
Estimated Project Cost: $~~35.6~~ 44.8 M

Alternatives Considered:
No feasible alternatives

Projected In-service Date: 12/15/2025

Project Status: ~~Conceptual~~ Engineering

Model: 2025 RTEP



Dominion Transmission Zone: Supplemental Equipment Material Condition, Performance and Risk

Need Number: DOM-2021-0007

Process Stage: Solution Meeting 04/06/2021

Previously Presented: Need Meeting 03/09/2021

Project Driver: Equipment Material Condition, Performance and Risk

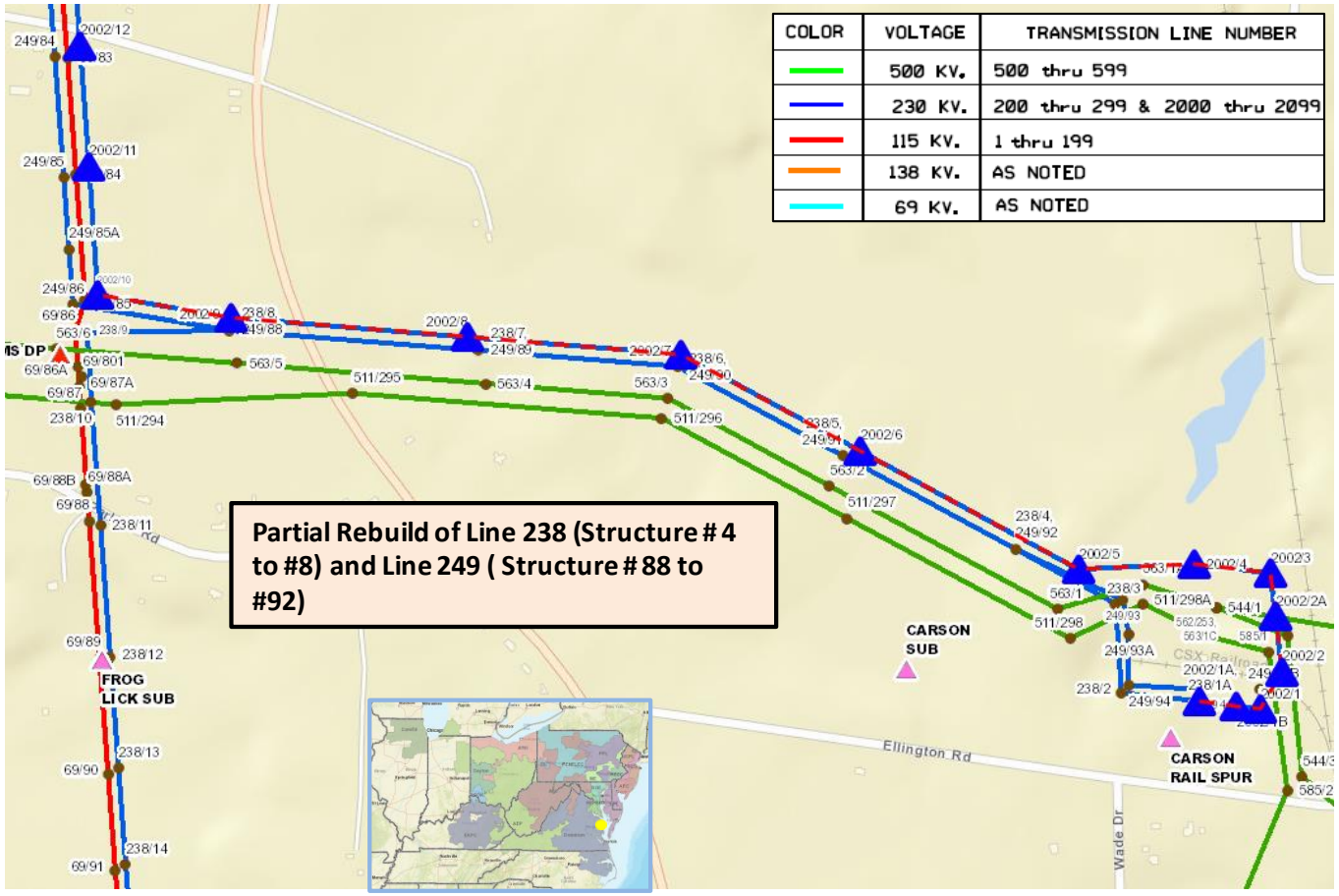
Specific Assumption References:

See details on Equipment Material Condition, Performance and Risk in Dominion's Planning Assumptions presented in December 2020.

Problem Statement:

Dominion Energy has identified a need to replace five (5) existing double-circuit COR-TEN® lattice towers that carry 230kV Line #238 (Structure #4 to # 8) and 230kV Line #249 (Structure #88 to #92) based on the Company's End of Life criteria.

- The five (5) transmission COR-TEN® towers were built in 1972 (49 years in service). Continued degradation of the steel components and connections on these towers has severely reduced their structural integrity. Field reports and condition assessment has identified the need to replace the towers.
- Industry guidelines indicate equipment life for wood structures is 35-55 years, conductor and connectors are 40-60 years, and porcelain insulators are 50 years. A 50-year cycle for COR-TEN® steel structures is often cited.
- Line 238 serves 20.5 MW of directly connected load. Line 249 serves 20 MW of directly connected load and 24.1 MW load at Locks Sub.



Dominion Transmission Zone: Supplemental Line #238 and Line #249 Partial Rebuild

Need Number: DOM-2021-0007

Process Stage: Solution Meeting 04/06/2021

Proposed Solution:

Replace five existing double-circuit towers with new galvanized steel towers of the same structural design on the existing foundations. Preliminary investigations have found that the existing foundation designs have sufficient structural capacity to support the new towers. Detailed field assessments may find that some foundation remediation is necessary, but extensive remediation is not anticipated.

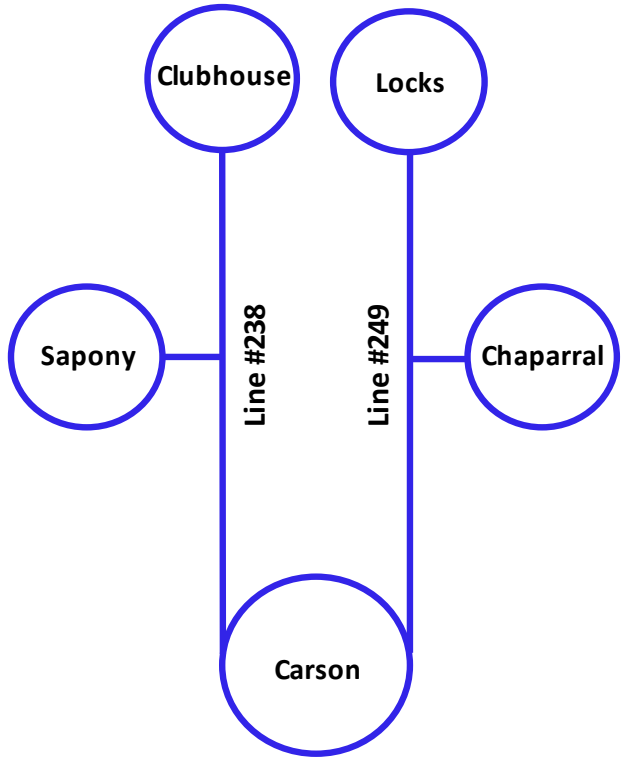
Estimate Project Cost: $3.5 M

Alternative Considered:

Retire the five structures on the Line 238 segment (between Carson and Sapony) and the Line 249 segment (between Carson and Chaparral).

This scenario will result in a voltage violation of NERC reliability criteria for the N-1 loss of Line 205 between Chesterfield and Locks; causing low bus voltage at Locks and Chaparral.

In addition, the customer at the Chaparral DP requires Line 249 to be networked in order to operate their arc furnaces. The removal of Line 249 from Carson to Chaparral DP will not allow Dominion Energy to meet the short circuit capacity, per terms of the contract with the customer.



Projected In-service Date: 12/31/2023

Project Status: Conceptual

Model: 2025 RTEP

Dominion Transmission Zone: Supplemental Equipment Material Condition, Performance and Risk

Need Number: DOM-2021-0008

Process Stage: Solution Meeting 04/06/2021

Previously Presented: Need Meeting 03/09/2021

Project Driver: Equipment Material Condition, Performance and Risk

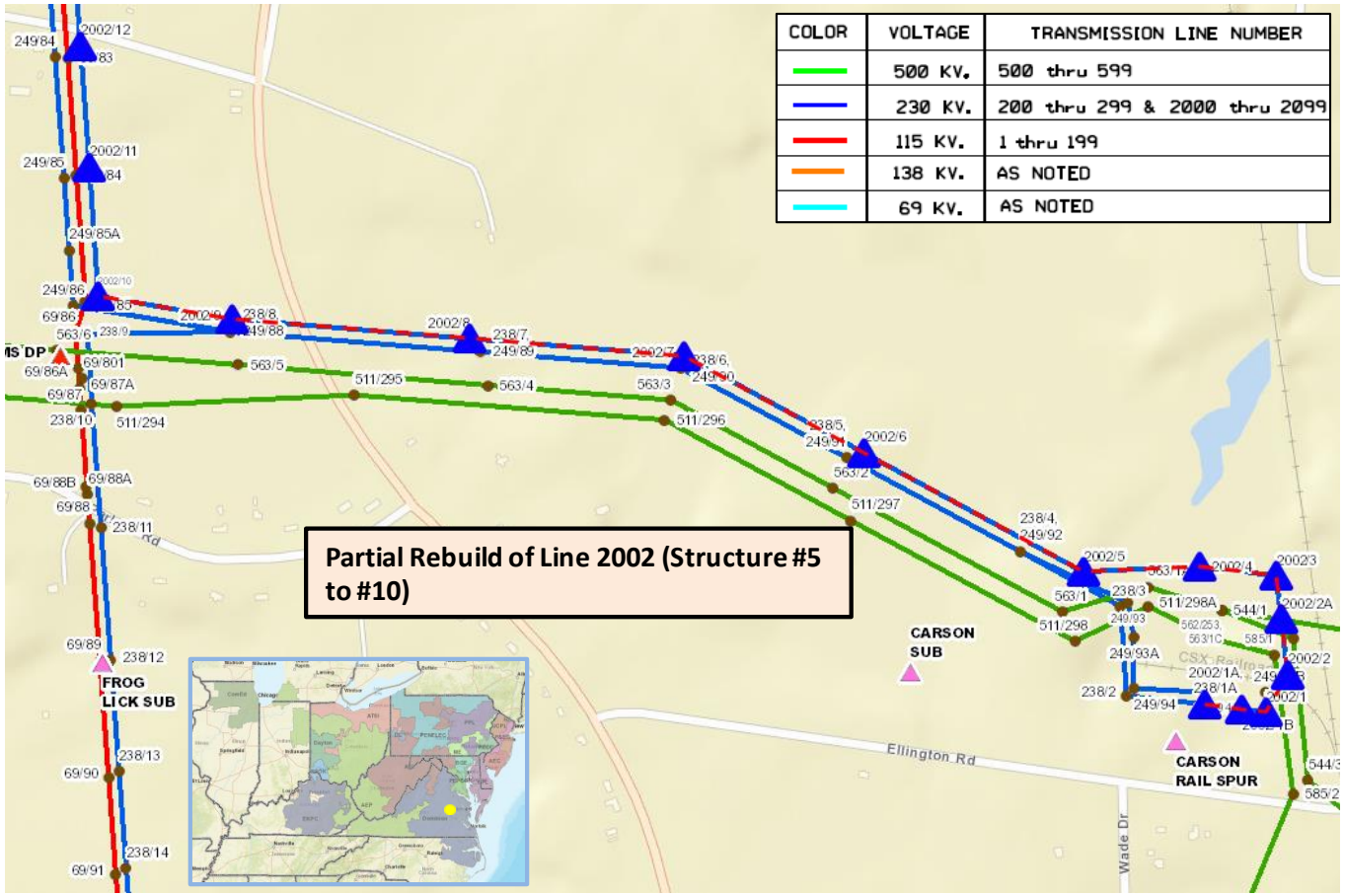
Specific Assumption References:

See details on Equipment Material Condition, Performance and Risk in Dominion's Planning Assumptions presented in December 2020.

Problem Statement:

Dominion Energy has identified a need to replace six existing COR-TEN® lattice tower structures from Carson to Poe 230kV Line #2002 from Structure #5 to #10 based on the Company's End of Life criteria.

- Line 2002 runs approximately 12.58 miles from Carson to Poe. The six (6) transmission COR-TEN® towers were built in 1977 (44 years in service). Continual deterioration of the steel components and connections on these towers has severely reduced their structural capacity and poses risk to the reliability of Line #2002. Field reports and condition assessment has identified the need to replace the towers.
- Industry guidelines indicate equipment life for wood structures is 35-55 years, conductor and connectors are 40-60 years, and porcelain insulators are 50 years. A 50-year cycle for COR-TEN® steel structures is often cited.
- Line 2002 serves 78 MW of loads at Poe Substation.



Dominion Transmission Zone: Supplemental Line #2002 Partial Rebuild

Need Number: DOM-2021-0008

Process Stage: Solution Meeting 04/06/2021

Proposed Solution:

Replace the six existing towers with new galvanized steel towers of the same structural design on the existing foundations. Preliminary investigations have found that the existing foundation designs have sufficient structural capacity to support the new towers. Detailed field assessments may find that some foundation remediation is necessary, but extensive remediation is not anticipated.

Estimate Project Cost: $4.25 M

Alternative Considered:

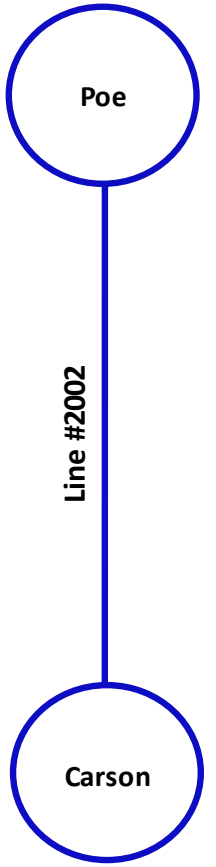
Retire Line #2002 from Carson to Poe.

This scenario will result in a violation of NERC reliability criteria for a P4-2 contingency involving a failed breaker (562T563) at Carson Substation. This contingency creates a thermal overload on 230kV Line #249 (Carson-Locks).

Projected In-service Date: 12/31/2023

Project Status: Conceptual

Model: 2025 RTEP



Dominion Transmission Zone: Supplemental Equipment Material Condition, Performance and Risk

Need Number: DOM-2021-0014

Process Stage: Solutions Meeting 04/06/2021

Previously Presented: Need Meeting 03/09/2021

Project Driver: Equipment Material Condition, Performance and Risk

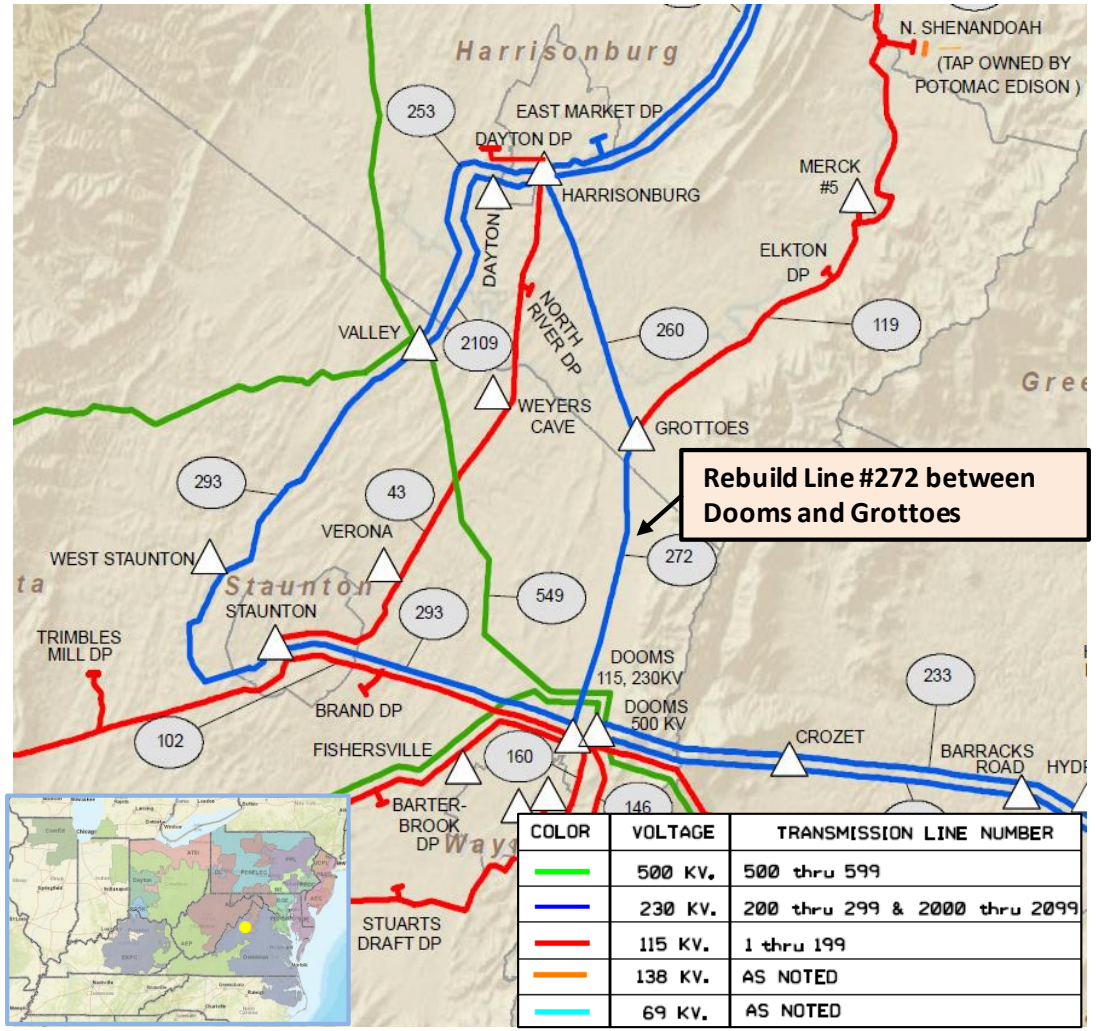
Specific Assumption References:

See details on Equipment Material Condition, Performance and Risk in Dominion's Planning Assumptions presented in December 2019.

Problem Statement:

Dominion Energy has identified a need to replace 79 existing transmission towers that carry 230 kV Line #272 (Dooms - Grottoes). The need for replacement is based on the Company's End of Life criteria.

- The 11.5 mile long line consists of CORTEN X-Series lattice-type towers that were constructed in 1967.
- These towers have inherent corrosion problems causing continuous deterioration to the steel members and have reached the end of their useful life. They are amongst the weakest and most problematic CORTEN lattice towers on our system and are a high priority for replacement.



Dominion Transmission Zone: Supplemental 230 kV Line #272 – EOL Rebuild

Need Number: DOM-2021-0014

Process Stage: Solutions Meeting 04/06/2021

Proposed Solution:

Approximately 11.5 miles containing weathering CORTEN lattice-type towers will be replaced with steel monopoles and new conductor with a normal summer rating of 1047 MVA to meet current 230 kV standards.

Estimated Project Cost: $30.8 M

Alternatives Considered:

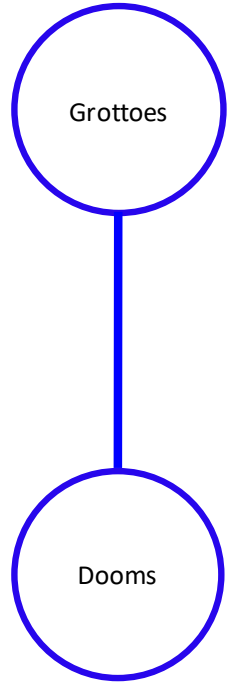
Retire Line #272 from Dooms to Grottoes.

Without Line #272 in service, thermal violations were identified on Line #43 (Harrisonburg – Verona) for the loss of Line #253 (Harrisonburg – Valley) and Line #2109 (Dayton – Valley) in the Winter 2025 RTEP model.

Projected In-service Date: 12/31/2026

Project Status: Conceptual

Model: 2025 RTEP



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

03/26/2021 – V1 – Original version posted to pjm.com.

04/05/2021 – V2 – Updated Project Status for DOM-2020-0028 to Engineering (slide 18). Updated Alternatives for DOM-2021-0014 (slide 24).

04/22/2021 – V3 – Updated the Projected In-service Date for DOM-2020-0028 to 12/15/2025.