

PJM Facilities Study Report
For
Network Upgrade N9136
Transition Cycle #1

June 2025

Introduction

This Facilities Study has been prepared in accordance with the PJM Open Access Transmission Tariff and PJM Manuals. The Transmission Owner (TO) is Virginia Electric and Power Company (VEPCO or Dominion).

A. Project Description

The System Impact Study for PJM Interconnection Transition Cycle #1 has identified the need for PJM Network Upgrade N9136. The scope of this Network Upgrade includes the following:

- Upgrade 1.32 Miles of 115kV transmission line 65 from Garner DP to AG1-135 Tap

B. Transmission Owner Facilities Study Results

1. Detailed Scope of work for Network Upgrade N9136:

The following is a detailed description of Transmission Owner Upgrades for Network Upgrade N9136. These facilities shall be designed according to the Transmission Owner's Applicable Technical Requirements and Standards. Once built the Transmission Owner will own, operate, and maintain these facilities.

See Preliminary Scoping Summaries located in the Appendices, Attachment #1, #2 and #3.

2. MILESTONE SCHEDULE FOR COMPLETION OF DOMINION WORK

Facilities outlined in this report are estimated to take 42 months to construct, from the time of full execution of the Generation Interconnection Agreement and completion of a construction kickoff call. This schedule is may be impacted by the timeline for procurement and installation of long lead items and the ability to obtain outages to construct and test the proposed facilities.

Description	Start month	Finish month
Engineering	1	30
Permitting/Procurement	3	38
Construction	36	42

Due to outage congestion, Network Upgrades and/or internal Dominion projects have been identified as having possible outage conflicts with this network upgrade that may affect the

estimated milestones listed above. Additional outage sequencing may be required that includes, but not limited to the following projects:

3. ASSUMPTIONS IN DEVELOPING SCOPE/COST/SCHEDULE

- ~~Coordinate with other projects on the 65 line~~
- The preliminary construction schedule is dependent on outage availability.
- See Attachment 1 and 2– Preliminary Scoping Summary – Substation for additional assumptions
- See Attachment 3 – Preliminary Scoping Summary – Transmission line for additional assumptions

4. LAND REQUIREMENTS

Dominion will be responsible for the following expectations in the area of Real Estate:

- Any additional land needed for Storm Water Management, Landscaping, and Wetlands/Wetlands Mitigation.
- Any other Land/Permitting requirements required by the Network Upgrade

5. ENVIRONMENTAL AND PERMITTING

The Dominion will be responsible for the following expectations in the area of Environmental and Permitting:

- Assessment of environmental impacts related to the Network Upgrade including:
 - Environmental Impact Study requirements
 - Environmental Permitting
- A stormwater easement and/or specific stormwater design BMP's to allow access to and use of the facilities, including a maintenance agreement for said stormwater facilities.
- Conditional Use Permit for Substation
- Any additional land needed for Storm Water Management, Landscaping, and Wetlands/Wetlands Mitigation
- Any other Permitting requirements required by the Network Upgrade

C. APPENDICES

- Attachment #1: Preliminary Scoping Summary – Substation Robley (AG1-135)
- Attachment #2: Preliminary Scoping Summary – Substation Garmer D.P.
- Attachment #3: Preliminary Scoping Summary – Transmission



Project Number: N9136 – AG1-135 Station

Project Description: Replace Line Lead for Line 65
SUBSTATION SCOPE OF WORK

Date: 06/20/2025

Revision Number: 0

Project Summary

Network upgrade N9136 provides for the upgrade of line 65 at AG1-135 Station in Richmond County, Virginia.

Purchase and install substation material – Network Upgrade:

1. Conductors, connectors, and grounding materials as per engineering standards



Project Number: N9136 – Garner DP Station

Project Description: Replace Line Lead for Line 65
SUBSTATION SCOPE OF WORK

Date: 06/20/2025

Revision Number: 0

Project Summary

Network upgrade N9136 provides for the uprate of Line 65 at Garner DP Substation in Richmond County, Virginia.

Purchase and install substation material – Network Upgrade:

1. Conductors, connectors, and grounding materials as per engineering standards

115 kV LINE #1078
Garner D.P – Robley Sub
PROJECT N9136

PRELIMINARY SCOPING SUMMARY

This project serves to rebuild 115 kV line 1078 from Garner D.P to Robley Sub (also referred to as AG1-135 Tap) for approximately 1.32 miles, which is located in Richmond County, VA. See **Figure 1** for the project location. The proposed work requires 3.20 acres of additional right of way but will primarily occur within the existing right of way. The project will install a total of ten (10) new structures. A Certificate of Public Convenience and Necessity (CPCN) filing will be required due to the structure placements.

The existing line consists mainly of single circuit direct embed weathering steel H-frame structures built in 2013. The proposed structures to be installed are single circuit direct embed “DOM” steel suspension H-frame structures. The existing single (1) 477 ACSR (24/7) “Flicker” conductor will be replaced with single (1) 768.2 ACSS/TW/HS (20/7) “Maumee” conductor. The existing one (1) 3#6 Alumoweld shield wire and one (1) DNO-11410 OPGW will be replaced with dual (2) DNO-11410 Optical Ground Wire (OPGW).

Project AG1-135 has scope overlap with project N9136. This scope assumes that project AG1-135 will occur prior to project N9136. Project AG1-135 will renumber line 65 to new line 1078 between Robley Sub and Moon Corner Sub.

Projects N7698 and N9145 have work impacting Robley Sub (AG1-135 Tap) and Garner D.P that could impact this project. It is assumed that project N9136 would move forward independently of projects N9145 and N7698.

Design Considerations:

EXISTING FACILITIES TO BE REMOVED:

1. Remove ten (10) existing 115 kV single circuit weathering steel H-frame suspension structures as follows:
 - a. Structures 1078/500-508
2. Remove approximately 1.32 miles of single (1) 477 ACSR (24/7) conductor from existing structure 1078/499A to existing structure 1078/509.

3. Remove approximately 1.32 miles of one (1) 3#6 Alumoweld shield wire from existing structure 1078/499A to existing structure 1078/509.
4. Remove approximately 1.32 miles of one (1) DNO-11410 OPGW from existing structure 1078/499A to existing structure 1078/509.

EXISTING FACILITIES TO BE MODIFIED:

1. Replace three (3) conductor strain assemblies with three (3) conductor strain assemblies [Reference Drawing 31.540], three (3) conductor jumper assemblies with three (3) conductor jumper loops [Reference Drawing 39.225], three (3) training insulators with three (3) training insulators [Reference Drawing 31.640], and one (1) shield wire strain assembly and one (1) OPGW strain assembly with two (2) OPGW strain assemblies [Reference Drawing 96.060] on the following one (1) structure:
 - a. Structure 1078/509
2. Replace three (3) conductor strain assemblies with three (3) conductor crossing strain assemblies [Reference Drawing 31.340] and one (1) shield wire strain assembly and one (1) OPGW strain assembly with two (2) OPGW strain assemblies [Reference Drawing 96.061] on the following one (1) structure:
 - a. Structure 1078/499A
3. Replace three (3) conductor jumper loop assemblies with three (3) conductor jumper loop assemblies [Reference Drawing 39.225] on the existing one (1) self-supporting switch structure:
 - a. Structure 1078/500A

PERMANENT FACILITIES TO BE INSTALLED:

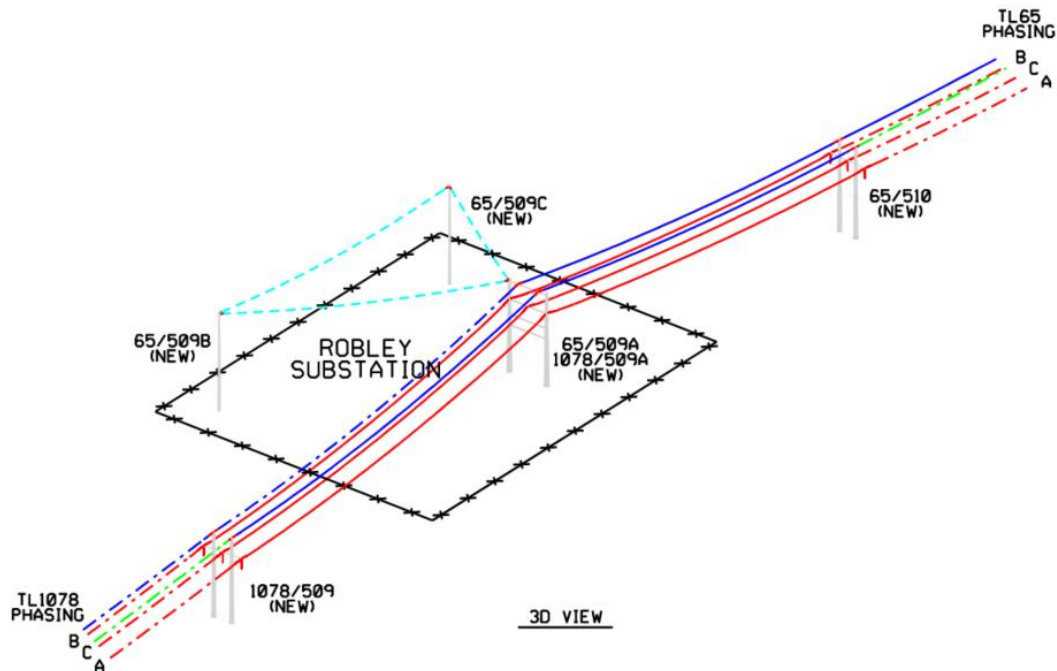
1. Install ten (10) 115 kV single circuit direct embed “DOM” suspension H-frame structures [Reference Drawing 11.655] on foundations as follows:
 - a. Structures 1078/500-508
 - b. See **Figure 2** for a visual of the proposed structure design.
2. Install approximately 1.32 miles of 3-phase single (1) 768.2 ACSS/TW/HS (20/7) “Maumee” conductor from existing structure 1078/499A to existing structure 1078/509.
3. Install approximately 1.32 miles of dual (2) DNO-11410 OPGW from existing structure 1078/499A to existing structure 1078/509.
 - a. This includes the installation of two (2) total splices as follows:
 - i. Two (2) fiber splices on existing structure 1078/499A

- Project N9136 will utilize the existing two (2) splices on structure 1078/509 per project AG1-135.

CONCEPTUAL SCOPE NOTES:

1. No PLS-CADD modeling was done for this project. Instead, a design span was used to determine the difference in sags between the existing and proposed conductors at max sag conditions. The resulting change in max sags is approximately 4.43 feet. This change in sags is substantial enough to assume that the line must be rebuilt. Structures were replaced like for like and estimated using typical transmission right of way characteristics.
 - a. Design Span Length = 850 feet
 - b. Existing Design Tension = 7,500 lbs NESC Heavy
 - c. Proposed Design Tension = 7,500 lbs NESC Heavy
2. This project scope assumes that it is independent from other network upgrades included in Transition Cycle 1 – Phase 3. The following projects may impact the project scope if this assumption is incorrect.
 - a. N7556 – Rebuild 115 kV Line 65 from Chilton Sub (AD2-074 Tap) to AG1-146 Tap
 - b. N7698 – Rebuild 115 kV Line 65 from Chilton Sub (AD2-074 Tap) to Robley Sub (AG1-135 Tap)
 - c. N8305 – Rebuild 115 kV Line 65 from Ocran Sub to Whitestone Sub
 - d. N9145 – Rebuild 115 kV Line 1078 from Garner DP to Moon Corner Sub
 - e. N9212 – Rebuild 115 kV Line 65 from Lancaster Sub to Ocran Sub
 - f. N9218 – Rebuild 115 kV Line 65 from AG1-146 Tap to Lancaster Sub
3. Structures are designed based off the following NESC code parameters: NESC Heavy, 90 mph wind, $\frac{3}{4}$ " Ice & 30 mph wind regardless of project location.
4. It is assumed for detailed engineering that a LiDAR survey will be required.
5. Any potential height restrictions were not accounted for in this design.
6. An existing right of way width of 100' is assumed based on the MapViewer provided by Dominion. Approximately 3.20 acres (20 ft for 1.32 miles) will be required of additional right of way.
7. A wetland delineation has not been completed as part of this conceptual package.
8. Wire reel lengths were not accounted for this line design. The assumed pull pad locations to avoid tension splices will be determined during detailed design.

9. It is assumed that Robley Sub (AG1-135) will be constructed prior to project N9136. Project AG1-135 will renumber line 65 to new line 1078 between Robley Sub and Moon Corner Sub. See the figures below for more information one Robley Sub (AG1-135 Tap).
- a. Robley Sub (AG1-135 Tap)



10. The proposed structures will be designed based on 115kV spacing while utilizing 230kV engineered structure as reference.

CONCEPTUAL ESTIMATE NOTES:

1. Engineered steel pole costs were determined based off typical wind and weight spans, line angles, and average structure heights in the typical right of way associated with the structure type.
2. Steel pole foundation costs were based off the projects' location and structure type in the regional soil profile map. The regional soil profile map used for this project is Coastal Plains East.
3. The conceptual estimate assumes that a laydown yard is required for this project.
4. Prior to detailed engineering, a full land rights review would be required. A desktop review

was completed to estimate the project cost.

5. Access estimate cost inputs include the following assumptions:
 - a. Work pad totals based on provided SOW and assumptions from kmz file. Assume 15 mats for tangents and 30 mats for angles at each work pad for reconductor work and 50 mats per pull pad.
 - b. DDE structures assumed based off of wire reel lengths - based off of pull pad locations.
 - c. Pull pad locations based on location of major road/water crossings and line mileage.
 - d. Assuming that existing stone in Substations will be used for access per SOW and that access is existing or will be built by others before the start of construction. Assumes that the substations will be constructed with access roads built to and from Substations and work from inside the substations for Backbone installation.
 - e. Assumes no delays due to permitting or real estate issues after work begins. Assume no schedule compressions from SOC/PJM.
 - f. Assumes all clearing and forestry costs have been captured by others. No access costs for forestry activities included in this pricing.
 - g. Stream crossing based on estimates from aerial imagery.
 - h. Assumes that all existing roads may be dressed with stone that can remain at the end of the project. Assumes existing two track roads in many locations will be impermeable. No costs for stone road removal are included.
6. Due to the time allotted to create an estimate, stakeholders were not consulted for their respective costs. Stakeholder costs were derived as follows:
 - a. Telecommunications costs were based on a cost per mile based off comparable projects in the TC#1 Phase 3 Cycle. Project N8305, which is rebuilding Line 65 from Ocran Sub to Whitestone Sub, was used to develop the Telecommunications cost per mile due to similar project scope and location.
 - b. Forestry costs were based on a cost per mile based off comparable projects in the TC#1 Phase 3 Cycle. Project N9222, which is rebuilding Line 89 from White Marsh Substation to Hayes, was used to develop the Forestry cost per mile due to similar project scope and location.

Figure 1 – Project Location

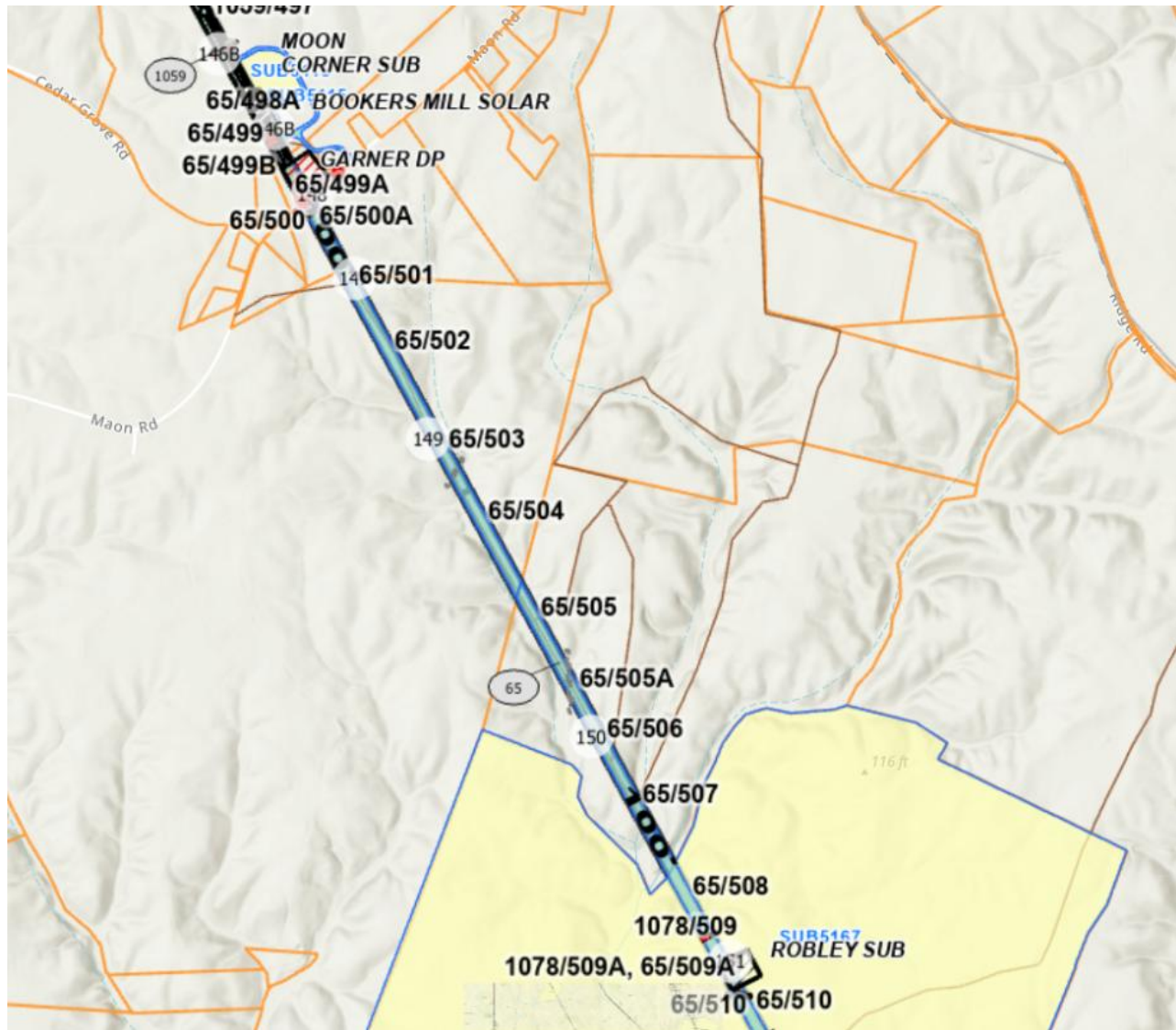
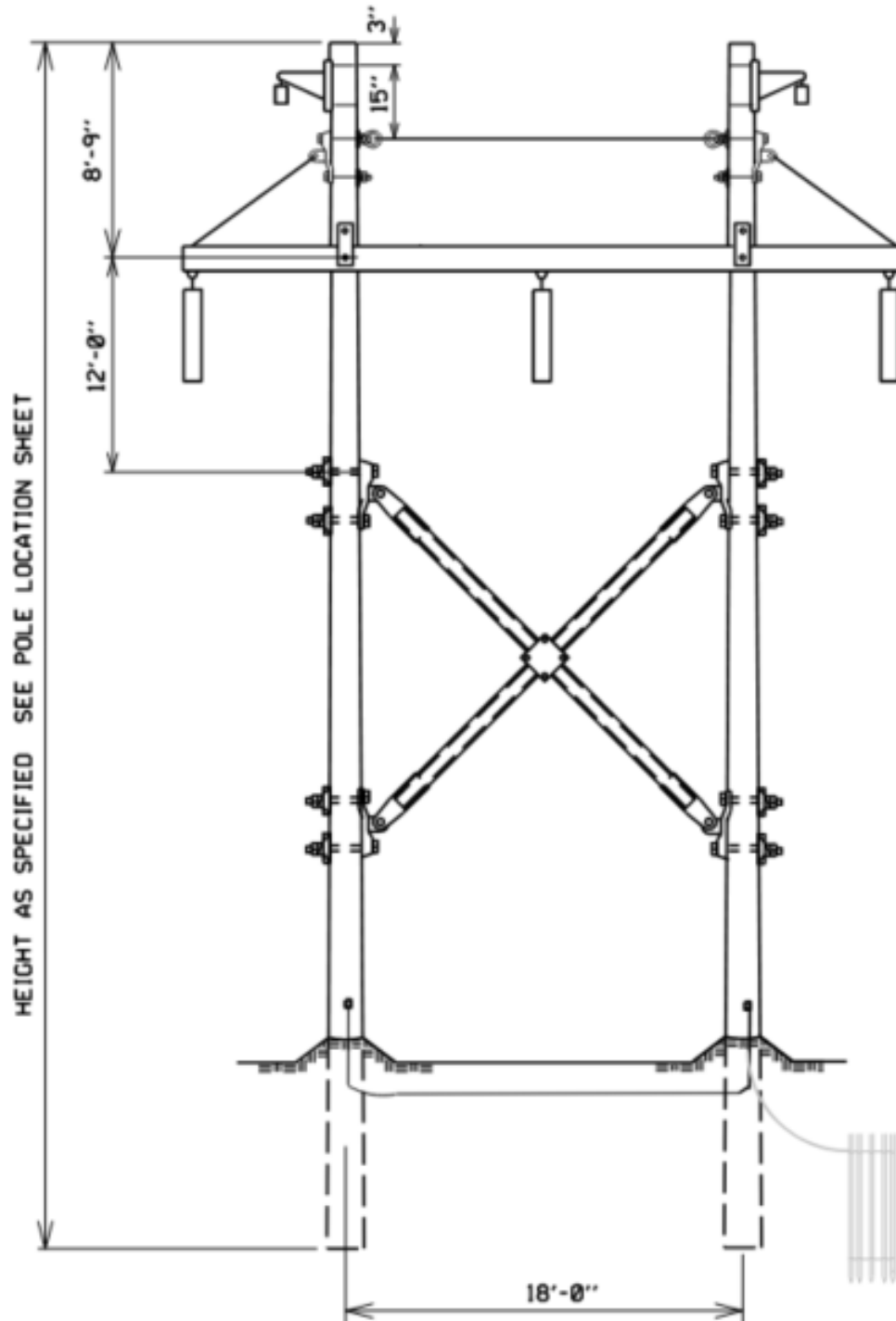


Figure 2 – Proposed Suspension H-Frame Structure Configuration



Required Material Summary

Item	Qty
115kV Single Circuit Direct Embed "DOM" Suspension H-Frame Structure [11.655]	10
12,000-Ft DNO-11410 OPGW Reels	2
12,000-Ft 768.2 ACSS/TW/HS (20/7) "Maumee" conductor	3