

Facilities Study Report

For

Physical Interconnection of

PJM Generation Interconnection Request

Project ID AH1-723

“Cunningham 500kV”

Introduction

This Facilities Study has been prepared in accordance with the PJM Open Access Transmission Tariff, as well as the Application and Studies Agreement between the Project Developer and PJM Interconnection, LLC (PJM or Transmission Provider (TP)). The Transmission Owner (TO) is Virginia Electric and Power Company d/b/a Dominion Energy Virginia (Dominion).

This Facility Study was performed to satisfy the Phase 2 Facility Study requirement of the PJM Tariff. The Facility Study is intended to provide scope, cost and schedule estimates for the project as currently defined and approved for Phase 2 study. In the event project changes are made during DP2 that impact this report, updates will be provided as part of the Phase 3 report. Following execution of the project's final agreement, this report will not be updated to account for other changes made as part of the agreements modification clause and instead the scope change process will be followed.

A. Transmission Owner Facilities Study Summary

1. PROJECT DESCRIPTION

The Project Developer (PD) has proposed a Storage Generating Facility located in, Fluvanna County, Virginia with a designated PJM Project ID of AH1-723. The installed facilities under AH1-712 will have a total Maximum Facility Output (MFO) of 776 MW with 611 MW of this output being recognized by PJM as Capacity. PJM Project ID of AH1-723 increases the total MFO to 776 MW with 712 MW of this output being recognized by PJM as Capacity.

2. POINT OF INTERCONNECTION (POI)

AH1-723 will interconnect with the Dominion transmission system via the existing Cunningham Substation.

The proposed generation interconnection is shown on the single line diagram in Attachment #1.

3. POINT OF CHANGE IN OWNERSHIP

The Point of Change in Ownership between the two stations will be the 500kV disconnect switch 4-hole pad located outside the Cunningham Substation fence.

4. SCOPE OF PROJECT DEVELOPER INTERCONNECTION FACILITIES

Project Developer will design, build, own, operate and maintain the Project Developer Interconnection Facilities on Project Developer's side of the Point of Change in Ownership (PCO). This includes, but is not limited to:

- Circuit breakers and associated equipment located between the high side of the MPT(s) or GSU(s) and the Point of Change in Ownership
- Generator lead line from the Generating Facility to the Point of Change in Ownership
- Relay and protective equipment, telecommunications equipment, and Supervisory Control and Data Acquisition (SCADA) to comply with the TO's Applicable Technical Requirements and Standards

B. Transmission Owner Facilities Study Results

The following is a description of the planned Transmission Owner facilities for the physical interconnection of the proposed AH1-723 project to Dominion transmission system. These facilities shall be designed according to all Dominion Applicable Technical Requirements and Standards in effect March 20th, 2026. Dominion Energy Virginia – Electric Transmission Facility Interconnection Requirements, Procedure Version 25.0, dated October 1, 2025, shall apply. Once built, Dominion will own, operate, and maintain these Facilities.

1. TRANSMISSION OWNER INTERCONNECTION FACILITIES:

The Transmission Owner Interconnection Facilities include the portion of the interconnection switching station which is associated solely with the single feed to the generating facilities collector station. The equipment associated with the Transmission Owner Interconnection Facilities includes disconnect switch, conductors and connectors.

The proposed Transmission Owner Interconnection Facility scope is detailed in Attachment #3 and Attachment #4.

2. STAND ALONE NETWORK UPGRADES

No Stand Alone Network Upgrades have been Identified in this Facility Study Report.

3. NETWORK UPGRADES

Substation Expansion at Cunningham 500kV:

Cunningham Substation will be expanded to accommodate the new generation interconnection.

The proposed substation expansion scope is shown in Attachment #3.

4. OTHER SCOPE OF WORK

Other scope includes the metering accuracy CCVT's, metering accuracy CT's, and associated metering equipment.

5. MILESTONE SCHEDULE FOR COMPLETION OF [TO] WORK

Facilities outlined in this report are estimated to take 96 months to construct, from the time the Generation Interconnection Agreement is fully executed. This schedule may be impacted by the timeline for procurement and installation of long lead items, the ability to obtain outages to construct and test the proposed facilities.

Description	Start month	Finish month
Detailed Design	1	8
Permitting/Procurement	2	86
Construction	76	96

6. ASSUMPTIONS IN DEVELOPING SCOPE/COST/SCHEDULE

Assumptions can be found in Attachments #3-5.

7. REVENUE METERING REQUIREMENTS

All revenue metering needed for this interconnection project must meet the metering requirements stated in Appendix 2, section 8 of the AH1-723 GIA, and in PJM Manuals M01 and M14D. The details of applicable revenue metering requirements are given in the Dominion Energy Virginia – Electric Transmission Facility Interconnection Requirements (FIR) Rev 25.0 posted on PJM website.

The revenue metering will be installed on the Dominion side of the Point of Change in Ownership will be installed, owned and maintained by Dominion.

8. LAND REQUIREMENTS FOR INTERCONNECTION SUBSTATION

Land requirements for the Interconnection Substation needed for this interconnection project must meet the requirements in Dominion's Facility Interconnection Requirements and NERC Compliance Procedure FAC-001 posted on PJM's website.

Dominion would be responsible for the following expectations in the area of Real Estate.

- The land required for Dominion's substation and project specific areas around must be deeded over title-in-fee.
- Any additional land needed for Storm Water Management, Landscaping, and Wetlands/Wetlands Mitigation.
- Dominion Real Estate and Counsel will provide standard real estate checklist word document. Process needs to start at least 6 months prior to closing date.
- Required subdivision plat and associated documentation to be reviewed prior to subdividing parcel with the county.
- Suitable Access Road from Substation to a Virginia/North Carolina State Maintained Roadway.
- Dominion will require access road, transmission line and utilities easement to the Substation.
- Any other Land/Permitting requirements required by the Substation.

The Project Developer is responsible for the following expectations in the area Real Estate.

- Land and/or Permitting associated with the Generation Facility and the Generation Line to the Point of Change in Ownership (PCO) structure.

9. APPLICABLE TECHNICAL REQUIREMENTS AND STANDARDS

These facilities shall be designed according to all Dominion Applicable Technical Requirements and Standards in effect March 20th, 2026. Dominion Energy Virginia – Electric Transmission Facility Interconnection Requirements, Procedure Version 25.0, dated October 1, 2025, shall apply.

10. ENVIRONMENTAL AND PERMITTING

Dominion would be responsible for the following expectations in the area of Environmental and Permitting.

- Assessment of environmental impacts related to the Interconnection Facility and/or Network Upgrades including:
 - Environmental Impact Study requirements
 - Environmental Permitting
- Dominion will require a stormwater easement for substation specific stormwater design BMP's to allow access to and use of the facilities.

A maintenance agreement should be in place in perpetuity 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 Substation

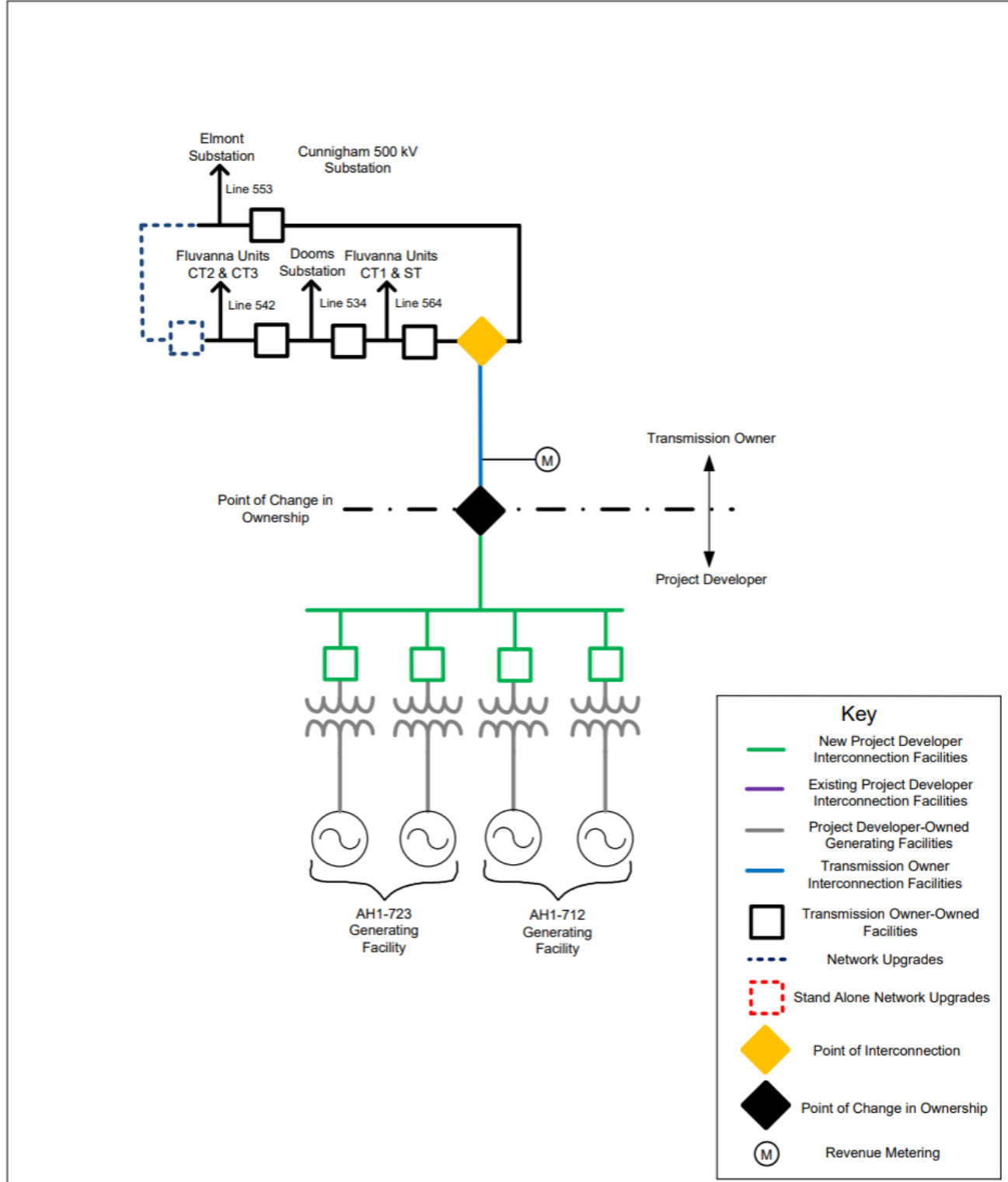
The Project Developer is responsible for the following expectations in the area Environmental and Permitting.

- Environmental and/or Permitting associated with the Generation Facility and the Generation Line to the Point in Change in Ownership (PCO) structure.

C. APPENDICES

- Attachment #1: Single line Diagram for the Physical Interconnection
- Attachment #2: Substation General Arrangement
- Attachment #3: Network Upgrade & Transmission Owner Interconnection Facility Scope - Substation
- Attachment #4: Transmission Owner Interconnection Facility Scope - Transmission

Attachment #1: Single line Diagram for the Physical Interconnection



[illegible]

Attachment #3: Network Upgrade & Transmission Owner Interconnection Facility Scope - Substation

Project Summary

Project number AH1-712 & AH1-723 provides for the initial construction of a new 500kV interconnect line into the existing Cunningham Substation in Fluvanna County, Virginia.

The objective of this project is to add one new line position and one new 500kV breaker installed at Cunningham Substation to support the new solar farm built by Project Developer.

The Generating Facilities will be located outside of Cunningham Substation. The Point of Change in Ownership between the two stations will be the 500kV disconnect switch 4-hole pad located outside the Cunningham Substation fence. The Project Developer will bring its conductor to the demarcation point.

Transmission line engineering is to provide a new number for the new line between Cunningham Substation and the 500kV solar farm interconnect.

Security and fence type – match existing fence.

Assumption:

Currently, the scope and estimate assume dominion standard spread footer foundation. Once the soil information is available and it is prudent to change the design to “helical pile foundations” the Dominion team should be informed to adjust the project estimate at the earliest possible opportunity.

Purchase and install substation material – Network Upgrade:

1. One (1), 500kV, 5000A, 63kAIC, SF-6 circuit breaker
2. Three (3), 500kV, relay accuracy CCVT
3. Four (3), 500kV, 5000A, 3-phase double-end break switch
4. Six (6), 396kV, 318kV MCOV surge arrester
5. One (1), 20' x 12' control enclosure expansion
6. Approximately 813' linear ft 20 ft tall fence, around the perimeter station expansion along with the security cameras and integrators as per existing fence standards.
7. Station stone as required
8. Station lighting as required
9. Steel structures as required including switch stands, bus supports, arrester, and CT supports
10. Foundations as required
11. Conductors, connectors, conduits, control cables, cable trough, and grounding materials as per engineering standards

Remove substation material – Network Upgrade:

1. Three (3), 396kV, 318kV MCOV surge arrester
2. Three (3), 500kV, relay accuracy CCVT

Purchase and install relay material – Network Upgrade:

1. One (1), 1340 - 24" dual SEL-411L CD/Fiber line panel
2. One (1), 1510 - 24" dual SEL-351-7 transmission breaker with reclosing panel
3. One (1), 4510 - SEL-2411 breaker annunciator

4. One (1), 1515 – 500KV breaker panel (use with 1510)
5. One (1), 4536 – 500KV breaker condition monitor
6. One (1), 4526_D - breaker with BCM fiber make-up box

The Transmission Owner Interconnection Facilities include the portion of the interconnecting switching station which is associated solely with the single feed to the generating facilities collector station. The equipment associated with the attachment facilities include the disconnect switch, conductors and connectors.

Other Scope includes metering accuracy CCVT's and metering accuracy CT's.

Purchase and install substation material – Transmission Owner Interconnection Facilities Upgrade:

1. One (1), 500kV, 5000A, 3-phase double end break switch (by Transmission)
2. Conductor, connectors, conduits, control cables, foundations, steel structures and grounding material as per engineering standards

Purchase and install relay material – Transmission Owner Interconnection Facilities Upgrade:

1. One (1), 1340 - 24" dual SEL-411L CD/Fiber line panel
2. One (1), 1323 - 24" SEL-487E/735 PMU and PQ monitoring panel

Purchase and install metering material – Other:

1. Three (3), 500kV, metering accuracy CCVT
2. Three (3), 500kV, 1000:5 metering accuracy CT
3. One (1), 1425 - 24" dual SEL-735 transmission and generator interconnect metering panel
4. One (1), 4524 - revenue metering CT make-up box
5. One (1), 4506 - 3-phase CCVT potential make-up box with metering (P4)

Preliminary Scoping Summary

This project serves to construct a new 500kV developer generation tie-in line from existing Cunningham Substation to a point of change in ownership (PCO) structure, which is located in Fluvanna County, VA. The new 500kV circuit will hereby be referred to as line 5XXX. The point of change in ownership (PCO) structure will be proposed structure 5XXX/2, which is to be installed outside Cunningham Substation on Dominion owned property. The PCO structure is the demarcation point between Dominion Energy and the developer. The demarcation point on the PCO structure will be the compression terminal pads on the back side of proposed structure 5XXX/2. See **Figure 1** for the Cunningham Substation project location.

This scope only includes the installations for the “Transmission Ownership Interconnection Facilities” (TOIF) for the gen-tie line. A "Network Upgrade" (NW) scope has not been provided due to no work to be completed for overhead transmission.

The proposed structure to be installed is one (1) 500kV single circuit engineered steel double deadend large angle 3-pole structure. The new conductor and shield wire to be used will be triple bundled (3) 1351 ACSS/TW (Type 13) “Martin” conductor and two (2) DNO-10100 OPGW .

Length of Route	0.06 miles
Location of the subject line (County/State)	Fluvanna County, VA
Total Number of Permanent Structures	1
CPCN/SCC Required?	No
New ROW Required?	Yes

New ROW Required:

ROW Length	ROW Width
0.02 Miles	150 ft.

This project will utilize current Dominion 500kV standards. The conceptual estimate includes cost for the following:

Transmission Owner Build - Existing Facilities to be Removed

Structures

Structure Type	Dwg Number	Str. Qty.
Steel Static Pole	9.008	1

Wire: Mileage listed is per circuit.

Length (Miles)	Circuit	# if Bundled-Wire Type "Name"	Start-End
0.05	1	7#7 Alumoweld Shield Wire	Existing Static Pole – Existing BB 534/571 (564/1)

Transmission Owner Build - Permanent Facilities to be Installed

Structures: See attached spreadsheet for heights and loading information. All structures will be galvanized steel.

Structure Type	Dwg Number	Str. Qty.
500kV SC ENGR Steel DDE (Large Angle) 3-Pole Structure	15.242	1

Wire:

1. Mileage listed is per circuit.
2. Conductors include dampers and spacers. Fiber includes dampers and splices.
 - Estimate includes approximately four (4) fiber splices.

Length (Miles)	Circuit	# If Bundled-Wire Type "Name"	Start-End
0.06	1	Triple (3) bundled 1351 ACSS/TW (Type 13) "Martin" Conductor	Existing BB Str. 5XXX/1 (553/560) – Proposed Str. 5XXX/2
0.06	2	DNO-10100 OPGW	Existing BB Str. 5XXX/1 (553/560) – Proposed Str. 5XXX/2

Transmission Owner Build - Existing Facilities to be Transferred or Modified

1. Install three (3) new conductor crossing deadend assemblies [Reference Drawing 35.252], two (2) new OPGW deadend assemblies [Reference Drawing 96.061], and two (2) new OPGW safety catch assemblies [Reference Drawing 96.100] on existing backbone structure 5XXX/1 (553/560).

Scope Notes/Assumptions

1. Due to allocated amount of time, no PLS-CADD modeling was done for this project, which results in higher level scopes. Projects in the Transition Cycle 2 – Phase 2 will need to go through full conceptual engineering design prior reaching detailed engineering.
2. This project does require acquisition of a laydown yard.
3. The generalized structure height for this project is 120/95/120 ft for proposed structure 5XXX/2. This was determined for the high-level estimate projects for Dominion Generation Interconnection Projects.
4. All deadend engineered steel structures outside the substation (Structures 5XXX/2) will be designed for full construction deadend loading for construction conditions.
5. Project area code required loading include: NESC Heavy, 95 mph wind, $\frac{3}{4}$ " Ice & 30 mph wind.

6. For detailed engineering, a LiDAR survey is required, including underground survey and ROW file.
7. Crossing insulators will be used whenever crossing over substation fences.
8. The PCO structure 5XXX/2 is located outside the proposed substation Cunningham Substation and will be installed on Dominion owned property. This structure will be the demarcation point between the developer and Dominion Energy.
9. An additional 0.02 miles of 150 ft width right of way will need to be acquired for this project to accommodate the 500 kV Dominion ROW preferences.
10. There is an existing underground water line that runs through Cunningham Substation. In detailed engineering, it will need to be determined if this water line will need to be relocated.
11. A wetland delineation has not been completed as part of this conceptual package.
12. A substation general arrangement was provided by the conceptual substation engineering team. See **Figure 2** for the Cunningham Substation general arrangement used for this project.
13. The assumed reel lengths for this project are 12,000 feet.
14. Cross slopes are not accounted for in this conceptual design. Structures designed assuming a 1.5' foundation reveal at the center of the structure.
15. The developer collector station will be located approximately 1.82 miles to the west of Cunningham Substation.
16. This project scope assumes that it is independent from other projects in the Transition Cycle.
17. Projects AH1-712 and AH1-723 each include the same project scope since they are dependent on each other. Should one of the two (2) projects withdraw from the Transition Cycle, the scope would transfer to the other remaining scope in the Transition Cycle.

Estimate Notes/Assumptions

1. This scope and estimate for project AH1-723 refer to the "Transmission Ownership Interconnection Facilities" (TOIF). This includes the engineering, project management, and construction costs for the transmission assets between existing Cunningham Substation and proposed structure 5XXX/2. A "Network Upgrade" (NW) scope and estimate has not been provided due to no work to be completed for overhead transmission.
 - a. One (1) estimate has been provided for this project.
 - i. Transmission Ownership Interconnection Facilities (TOIF)
2. Engineered steel pole costs were determined based off typical wind and weight spans, line angles, and average structure heights for each voltage. These inputs were used to derive an estimated steel pole weight, which was used to develop the structure costs. This was determined for the high-level estimate projects for Dominion Generation Interconnection Projects.
3. Engineered 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 Piedmont.
4. Survey costs were determined based on substation proposed location, fiber installation, and impacts on existing line.
5. The estimate associated with this scope includes a \$50,000 cost to account for the AC mitigation study for cathodic protection for the UG water line inside Cunningham Substation.

Figure 1 – Project Location

