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February 23, 2022

BY ELECTRONIC FILING

Mr. Bernard Logan, Clerk
c/o Document Control Center
State Corporation Commission
1300 East Main Street
Tyler Building – 1st Floor
Richmond, Virginia 23219

Application of Virginia Electric and Power Company for approval and certification of electric transmission facilities: Nimbus 230 kV Line Loop and Nimbus Substation and 230 kV Farmwell-Nimbus Transmission Line
Case No. PUR-2022-00027

Dear Mr. Logan:

Please find enclosed for electronic filing in the above-captioned proceeding the application for approval of electric facilities on behalf of Virginia Electric and Power Company (the "Company"). This filing contains the Application, Appendix, Direct Testimony, DEQ Supplement, and Environmental Routing Study, including attachments.

As indicated in Section II.A.12.b of the Appendix, an electronic copy of the map of the Virginia Department of Transportation "General Highway Map" for Loudoun County, as well as the digital geographic information system ("GIS") map required by § 56-46.1 of the Code of Virginia, which is Attachment II.A.2 to the Appendix, were provided via an e-room to the Commission's Division of Energy Regulation on February 22, 2022.

Please do not hesitate to call if you have any questions in regard to the enclosed.

Very truly yours,

Vishwa B. Link

Enclosures

cc: William H. Chambliss, Esq.
Mr. David Essah (without enclosures)

Mr. Neil Joshipura (without enclosures)
Mr. Michael A. Cizenski (without enclosures)
David J. DePippo, Esq.
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Dominion Energy®

Application, Appendix, DEQ Supplement, Direct Testimony and Exhibits of Virginia Electric and Power Company

Before the State Corporation Commission of Virginia

Nimbus 230 kV Line Loop and Nimbus Substation and 230 kV Farmwell-Nimbus Transmission Line

Application No. 314

Case No. PUR-2022-00027

Filed: February 23, 2022

Volume 1 of 3

COMMONWEALTH OF VIRGINIA
BEFORE THE
STATE CORPORATION COMMISSION

APPLICATION OF

VIRGINIA ELECTRIC AND POWER COMPANY

FOR APPROVAL AND CERTIFICATION
OF ELECTRIC TRANSMISSION FACILITIES

Nimbus 230 kV Line Loop and Nimbus Substation
and
230 kV Farmwell-Nimbus Transmission Line

Application No. 314

Case No. PUR-2022-00027

Filed: February 23, 2022

COMMONWEALTH OF VIRGINIA

STATE CORPORATION COMMISSION

APPLICATION OF	)	
	)	
VIRGINIA ELECTRIC AND POWER COMPANY	)	Case No. PUR-2022-00027
	)	
For approval and certification of electric transmission facilities: Nimbus 230 kV Line Loop and Nimbus Substation and 230 kV Farmwell-Nimbus Transmission Line	)	

APPLICATION OF VIRGINIA ELECTRIC AND POWER COMPANY FOR APPROVAL AND CERTIFICATION OF ELECTRIC TRANSMISSION FACILITIES: NIMBUS 230 kV LINE LOOP AND SUBSTATION AND 230 kV FARMWELL-NIMBUS TRANSMISSION LINE

Pursuant to § 56-46.1 of the Code of Virginia ("Va. Code") and the Utility Facilities Act, Va. Code § 56-265.1 *et seq.*, Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company"), by counsel, files with the State Corporation Commission of Virginia (the "Commission") this application for approval and certification of electric transmission facilities (the "Application"). In support of its Application, Dominion Energy Virginia respectfully states as follows:

1. Dominion Energy Virginia is a public service corporation organized under the laws of the Commonwealth of Virginia furnishing electric service to the public within its Virginia service territory. The Company also furnishes electric service to the public in portions of North Carolina. Dominion Energy Virginia's electric system—consisting of facilities for the generation, transmission, and distribution of electric energy—is interconnected with the electric systems of neighboring utilities and is a part of the interconnected network of electric systems serving the continental United States. By reason of its operation in two states and its interconnections with other utilities, the Company is engaged in interstate commerce.

2. In order to perform its legal duty to furnish adequate and reliable electric service,

Dominion Energy Virginia must, from time to time, replace existing transmission facilities or construct new transmission facilities in its system. The electric facilities proposed in this Application are necessary so that Dominion Energy Virginia can continue to provide reliable electric service to its customers, consistent with applicable reliability standards.

3. In this Application, in order to provide service requested by a retail electric service customer (the "Customer"), to maintain reliable service for the overall growth in the area, and to comply with mandatory North American Electric Reliability Corporation ("NERC") Reliability Standards, Dominion Energy Virginia proposes the following in Loudoun County, Virginia:

(i) Construct a new overhead 230 kV double circuit line by cutting existing Beaumeade-Buttermilk Line #2152 at Structure #2152/19A ("Nimbus Line Loop"), resulting in (i) 230 kV Beaumeade-Nimbus Line #2152, and (ii) 230 kV Buttermilk-Nimbus Line #2255. The proposed Nimbus Line Loop will extend approximately 0.61 mile on new 100-foot-wide right-of-way to a proposed new 230-34.5 kV Nimbus Substation ("Nimbus Substation") constructed with five 230 kV, 4000A circuit breakers in a ring bus arrangement, three 230 kV line terminals, two 230-34.5 kV, 84 MVA transformers, eight 34.5 kV distribution circuits, and other associated equipment (collectively, the "Nimbus Line Loop and Substation");

(ii) Construct a new approximately 0.26-mile 230 kV overhead single circuit line, Farmwell-Nimbus Line #2260, on new 80-foot-wide right-of-way, originating at the Company's existing Farmwell Substation and terminating at the proposed new Nimbus Substation (the "Farmwell-Nimbus Line"); and

(iii) Install one 230 kV, 4000A circuit breaker, one 230 kV, 4000A disconnect switch and line terminal equipment at the Company's existing Farmwell Substation for one 230 kV transmission line. Additionally, the project will require relay resets, drawing updates, and field support, as necessary, at the Company's existing Buttermilk and Beaumeade Substations.

Collectively, the Nimbus Line Loop and Substation, the Farmwell-Nimbus Line, and related substation work comprise the "Project."

4. The Project is necessary to assure that Dominion Energy Virginia can maintain

and improve reliable electric service to customers in the load area, in compliance with mandatory NERC Reliability Standards.

5. The Nimbus Line Loop and Substation are necessary to serve the Customer, as well as other area existing and planned customers in the load area surrounding Waxpool Road in Loudoun County ("Waxpool Road Load Area"), and to maintain and improve reliable electric service. The Customer is adding a fourth building to its existing data center campus, located in Loudoun County's Data Center Alley ("DCA") at a parcel on the southwestern corner of the Waxpool Road and Loudoun County Parkway intersection. The Customer currently has three buildings on this campus (Buildings A, B, and C) with a fourth building (Building D) yet to be built. Buildings A, B, and C are currently served from Cumulus Substation, which is located directly adjacent to the data center campus and to the proposed Nimbus Substation. The Company plans to serve the Customer's Building D (90 MVA) from the proposed Nimbus Substation. Other area customers, both existing and planned in the future, also will be served from both the proposed Nimbus Substation and the existing Cumulus Substation. This plan is based on the proximity of the Customer's campuses to these substations, as well as existing and future projected load in the Project area.

6. As part of the Nimbus Line Loop and Substation, the Company proposes to construct a new overhead 230 kV overhead double circuit line by cutting existing Beaumeade-Buttermilk Line #2152 at Structure #2152/19A, resulting in (i) 230 kV Beaumeade-Nimbus Line #2152, and (ii) 230 kV Buttermilk-Nimbus Line #2255. The proposed Nimbus Line Loop will extend approximately 0.61 mile on new 100-foot-wide right-of-way to a proposed new 230-34.5 kV Nimbus Substation.

7. The Farmwell-Nimbus Line is necessary to maintain reliable electric service in

compliance with mandatory NERC Reliability Standards. Specifically, a load loss of more than 300 MW was identified under certain conditions, which is in violation of NERC Reliability Standards, requiring applicable system reinforcements. To address this potential violation, the Company proposed a new 230 kV single circuit line between the existing Farmwell Substation and the proposed Nimbus Substation (which had already been proposed by the Company to PJM Interconnection, LLC ("PJM") as part of the Nimbus Line Loop and Substation) to PJM, which approved the proposal as an acceptable solution to this violation. The proposed Farmwell-Nimbus Line will extend approximately 0.26 mile on new 80-foot-wide right-of-way, originating at Farmwell Substation and terminating at the proposed Nimbus Substation.

8. The Company identified an approximately 0.61-mile proposed route for the Nimbus Line Loop, and an approximately 0.26-mile proposed route for the Farmwell-Nimbus Line (the "Proposed Routes"). The Company is proposing these two routes for notice and Commission consideration. Discussion of the Proposed Routes, as well as other overhead routes that the Company studied but ultimately rejected, is provided in Section II of the Appendix and in the Environmental Routing Study included with the Application.

9. The proposed Nimbus Substation will be constructed with five 230 kV, 4000A circuit breakers in a ring bus arrangement, three 230 kV line terminals, two 230-34.5 kV, 84 MVA transformers, eight 34.5 kV distribution circuits, and other associated equipment. In total, it will be designed to accommodate future growth in the area with two additional 230-34.5 kV transformers and up to twenty 34.5 kV distribution circuits. Additionally, a new control enclosure will be installed to accommodate the protective relay and communications cabinets. The total area required to build the Substation is approximately 8.0 acres. A more detailed description of the proposed Project, including the Nimbus Line Loop and Substation and the

Farmwell-Nimbus Line, is provided in Sections I and II of the Appendix attached to this Application.

10. The desired in-service target date for the proposed Project is December 27, 2024. The Company estimates it will take approximately 24 months for detailed engineering, scheduled outages, materials procurement, permitting, real estate, and construction after a final order from the State Corporation Commission (the "Commission"). Accordingly, to support this estimated construction timeline and construction plan, the Company respectfully requests a final order by December 27, 2022. Should the Commission issue a final order by December 27, 2022, the Company estimates that construction should begin around March 2023, and be completed by December 27, 2024. This schedule is contingent upon obtaining the necessary permits. Dates may need to be adjusted based on permitting delays or design modifications to comply with additional agency requirements identified during the permitting application process, as well as the ability to schedule outages, and unpredictable delays due to the COVID-19 pandemic, labor shortages, or materials/supply issues.

11. The estimated conceptual cost of the proposed Project is approximately $37.5 million, which includes a total of approximately $9.3 million for transmission-related work, and a total of approximately $28.2 million for substation-related work (2021 dollars).

12. The Proposed Route for the Nimbus Line Loop is the shortest and most direct possible route of all routes reviewed in the Environmental Routing Study. This route crosses the fewest number of landowners at two. Moreover, the parcels crossed by the route are all associated with data center developments. Additionally, minimal tree removal associated with landscape buffers on data center properties would be required with this route. For these reasons, the Company selected the Proposed Route as the preferred route option for the Nimbus Line Loop.

13. The proposed route for the Farmwell-Nimbus Line would be located entirely on data center properties. The route represents the most direct possible route to connect the two substations. For these reasons, the Company selected the Proposed Route as the preferred route option for the Farmwell-Nimbus Line.

14. Based on consultations with the Virginia Department of Environmental Quality ("DEQ"), the Company has developed a supplement ("DEQ Supplement") containing information designed to facilitate review and analysis of the proposed facilities by the DEQ and other relevant agencies. The DEQ Supplement is attached to this Application.

15. Based on the Company's experience, the advice of consultants, and a review of published studies by experts in the field, the Company believes that there is no causal link to harmful health or safety effects from electric and magnetic fields generated by the Company's existing or proposed facilities. Section IV of the Appendix provides further details on Dominion Energy Virginia's consideration of the health aspects of electric and magnetic fields.

16. Section V of the Appendix provides a proposed route description for public notice purposes and a list of federal, state, and local agencies and officials that the Company has or will notify about the Application.

17. In addition to the information provided in the Appendix, the DEQ Supplement, and the Environmental Routing Study, this Application is supported by the pre-filed direct testimony of Company Witnesses Steve Schweiger, Robert C. Moorhead III, Sherrill Crenshaw, Santosh Bhattarai, Charles Weil, and Jon M. Berkin.

WHEREFORE, Dominion Energy Virginia respectfully requests that the Commission:

(a) direct that notice of this Application be given as required by § 56-46.1 of the Code of Virginia;

(b) approve pursuant to § 56-46.1 of the Code of Virginia the construction of the Project; and,

(c) grant a certificate of public convenience and necessity for the Project under the Utility Facilities Act, § 56-265.1 *et seq.* of the Code of Virginia.

VIRGINIA ELECTRIC AND POWER COMPANY

By: *[s] Vishwa B. Link*
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Counsel for Applicant Virginia Electric and Power Company

February 23, 2022

COMMONWEALTH OF VIRGINIA
BEFORE THE
STATE CORPORATION COMMISSION

APPLICATION OF

VIRGINIA ELECTRIC AND POWER COMPANY

FOR APPROVAL AND CERTIFICATION
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Nimbus 230 kV Line Loop and Nimbus Substation
and
230 kV Farmwell-Nimbus Transmission Line

Application No. 314

Appendix

Containing Information in Response to
"Guidelines for Transmission Line Applications Filed Under Title 56 of the Code of Virginia"

Case No. PUR-2022-00027

Filed: February 23, 2022

TABLE OF CONTENTS

EXECUTIVE SUMMARY

In order to provide service requested by a retail electric service customer (the "Customer"), to maintain reliable service for the overall growth in the area, and to comply with mandatory North American Electric Reliability Corporation ("NERC") Reliability Standards, Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company") proposes the following in Loudoun County Virginia:

- Construct a new overhead 230 kV double circuit line by cutting existing Beaumeade-Buttermilk Line #2152 at Structure #2152/19A ("Nimbus Line Loop"), resulting in (i) 230 kV Beaumeade-Nimbus Line #2152, and (ii) 230 kV Buttermilk-Nimbus Line #2255. The proposed Nimbus Line Loop will extend approximately 0.61 mile on new 100-foot-wide right-of-way to a proposed new 230-34.5 kV Nimbus Substation ("Nimbus Substation") constructed with five 230 kV, 4000A circuit breakers in a ring bus arrangement, three 230 kV line terminals, two 230-34.5 kV, 84 MVA transformers, eight 34.5 kV distribution circuits, and other associated equipment (collectively, the "Nimbus Line Loop and Substation");

- Construct a new approximately 0.26-mile 230 kV overhead single circuit line, Farmwell-Nimbus Line #2260, on new 80-foot-wide right-of-way, originating at the Company's existing Farmwell Substation and terminating at the proposed new Nimbus Substation (the "Farmwell-Nimbus Line");

- Install one 230 kV, 4000A circuit breaker, one 230 kV, 4000A disconnect switch and line terminal equipment at the Company's existing Farmwell Substation for one 230 kV transmission line. Additionally, the project will require relay resets, drawing updates, and field support, as necessary, at the Company's existing Buttermilk and Beaumeade Substations.

Collectively, the Nimbus Line Loop and Substation, the Farmwell-Nimbus Line, and related substation work comprise the "Project." The Project is necessary to assure that Dominion Energy Virginia can maintain and improve reliable electric service to customers in the load area, in compliance with mandatory NERC Reliability Standards.

Specifically, the proposed Nimbus Line Loop and Substation are necessary to serve the Customer, as well as other area existing and planned customers in the load area surrounding Waxpool Road in Loudoun County ("Waxpool Road Load Area"), and to maintain and improve reliable electric service. The Customer is adding a fourth building to its existing data center campus, located in Loudoun County's Data Center Alley ("DCA") at a parcel on the southwestern corner of the Waxpool Road and Loudoun County Parkway intersection. The Customer currently has three buildings on this campus (Buildings A, B, and C) with a fourth building (Building D) yet to be built. Buildings A, B, and C are currently served from Cumulus Substation, which is located directly adjacent to the data center campus and to the proposed Nimbus Substation. The Company plans to serve the Customer's Building D (90 MVA) from the proposed Nimbus Substation. Other area customers, both existing and planned in the future, also will be served from both the proposed Nimbus Substation and the existing Cumulus Substation. This plan is based on the proximity of

the Customer's campuses to these substations, as well as existing and future projected load in the Project area.

As part of the Nimbus Line Loop and Substation, the Company proposes to construct a new overhead 230 kV overhead double circuit line by cutting existing Beaumeade-Buttermilk Line #2152 at Structure #2152/19A, resulting in (i) 230 kV Beaumeade-Nimbus Line #2152, and (ii) 230 kV Buttermilk-Nimbus Line #2255. The proposed Nimbus Line Loop will extend approximately 0.61 mile on new 100-foot-wide right-of-way to a proposed new 230-34.5 kV Nimbus Substation.

The proposed Nimbus Substation will be constructed with five 230 kV, 4000A circuit breakers in a ring bus arrangement, three 230 kV line terminals, two 230-34.5 kV, 84 MVA transformers, eight 34.5 kV distribution circuits, and other associated equipment. In total, it will be designed to accommodate future growth in the area with two additional 230-34.5 kV transformers and up to twenty 34.5 kV distribution circuits. Additionally, a new control enclosure will be installed to accommodate the protective relay and communications cabinets. The total area required to build the Nimbus Substation is approximately 8.0 acres.

The proposed Farmwell-Nimbus Line is necessary to maintain reliable electric service in compliance with mandatory NERC Reliability Standards. Specifically, a load loss of more than 300 MW was identified under certain conditions, which is in violation of NERC Reliability Standards, requiring applicable system reinforcements. To address this potential violation, the Company proposed a new 230 kV single circuit line between the existing Farmwell Substation and the proposed Nimbus Substation (which had already been proposed by the Company to PJM Interconnection, LLC ("PJM") as part of the Nimbus Line Loop and Substation) to PJM, which approved the proposal as an acceptable solution to this violation. The proposed Farmwell-Nimbus Line will extend approximately 0.26 mile on new 80-foot-wide right-of-way, originating at Farmwell Substation and terminating at the proposed Nimbus Substation.

The Company identified an approximately 0.61-mile proposed route for the Nimbus Line Loop, and an approximately 0.26-mile proposed route for the Farmwell-Nimbus Line (the "Proposed Routes"). The Company is proposing these two routes for notice and Commission consideration. Discussion of the Proposed Routes, as well as other overhead routes that the Company studied but ultimately rejected, is provided in Section II of this Appendix and in the Environmental Routing Study included with the Application.

The estimated conceptual cost of the proposed Project is approximately $37.5 million, which includes a total of approximately $9.3 million for transmission-related work, and a total of approximately $28.2 million for substation-related work (2021 dollars).

The desired in-service target date for the proposed Project is December 27, 2024. The Company estimates it will take approximately 24 months for detailed engineering, scheduled outages, materials procurement, permitting, real estate, and construction after a final order from the State Corporation Commission (the "Commission"). Accordingly, to support this estimated construction timeline and construction plan, the Company respectfully requests a final order by December 27, 2022. Should the Commission issue a final order by December 27, 2022, the Company estimates that construction should begin around March 2023, and be

completed by December 27, 2024. This schedule is contingent upon obtaining the necessary permits. Dates may need to be adjusted based on permitting delays or design modifications to comply with additional agency requirements identified during the permitting application process, as well as the ability to schedule outages, and unpredictable delays due to the COVID-19 pandemic, labor shortages, or materials/supply issues.

I. NECESSITY FOR THE PROPOSED PROJECT

A. State the primary justification for the proposed project (for example, the most critical contingency violation including the first year and season in which the violation occurs). In addition, identify each transmission planning standard(s) (of the Applicant, regional transmission organization ("RTO"), or North American Electric Reliability Corporation) projected to be violated absent construction of the facility.

Response: The Project is necessary in order to provide service requested by the Customer in Loudoun County, Virginia, to maintain reliable service for the overall growth in the Project area, and to comply with mandatory NERC Reliability Standards.

Dominion Energy Virginia's transmission system is responsible for providing transmission service: (i) for redelivery to the Company's retail customers; (ii) to Appalachian Power Company, Old Dominion Electric Cooperative, Northern Virginia Electric Cooperative, Central Virginia Electric Cooperative, and Virginia Municipal Electric Association for redelivery to their retail customers in Virginia; and, (iii) to North Carolina Electric Membership Corporation and North Carolina Eastern Municipal Power Agency for redelivery to their customers in North Carolina (collectively, the "Dominion Energy Zone" or the "DOM Zone").

Dominion Energy Virginia is part of the PJM regional transmission organization ("RTO"), which provides service to a large portion of the eastern United States. PJM is currently responsible for ensuring the reliability of, and coordinating the movement of, electricity through all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia, and the District of Columbia. This service area has a population of approximately 65 million and, on August 2, 2006, set a record high of 166,929 megawatts ("MW") for summer peak demand, of which Dominion Energy Virginia's load portion was approximately 19,256 MW. On July 20, 2020, the Company set a record high of 20,087 MW for summer peak demand. On February 20, 2015, the Company set a winter and all-time record demand of 21,651 MW. Based on the 2022 PJM Load Forecast, the Dominion Energy Zone is expected to grow with average growth rates of 2.2% summer and 2.6% winter over the next 10 years compared to the PJM average of 0.4% and 0.7% over the same period for the summer and winter, respectively.

Dominion Energy Virginia is also part of the Eastern Interconnection transmission grid, meaning its transmission system is interconnected, directly or indirectly, with all the other transmission systems in the United States and Canada between the Rocky Mountains and the Atlantic Coast, except for Quebec and most of Texas. All the transmission systems in the Eastern Interconnection are dependent on each other for moving bulk power through the transmission system and for reliability support. Dominion Energy Virginia's service to its customers is extremely reliant on a robust and reliable regional transmission system.

NERC has been designated by the Federal Energy Regulatory Commission ("FERC") as the electric reliability organization for the United States. Accordingly, NERC requires that the planning authority and transmission planner develop planning criteria to ensure compliance with NERC Reliability Standards. Mandatory NERC Reliability Standards require that a transmission owner ("TO") develop facility interconnection requirements that identify load and generation interconnection minimum requirements for a TO's transmission system, as well as the TO's reliability criteria.[1]

Federally mandated NERC Reliability Standards constitute minimum criteria with which all public utilities must comply as components of the interstate electric transmission system. Moreover, the Energy Policy Act of 2005 mandates that electric utilities follow these NERC Reliability Standards and imposes fines for noncompliance of approximately $1.3 million per day per violation.

PJM's Regional Transmission Expansion Plan ("RTEP") is the culmination of a FERC-approved annual transmission planning process that includes extensive analysis of the electric transmission system to determine any needed improvements.[2] PJM's annual RTEP is based on the effective criteria in place at the time of the analyses, including applicable standards and criteria of NERC, PJM, and local reliability planning criteria, among others.[3] Projects identified through the RTEP process are developed by the transmission owner ("TO") in coordination with PJM, and are presented at the Transmission Expansion Advisory Committee ("TEAC") meetings prior to inclusion in the RTEP, which is then presented for approval to the PJM Board of Managers (the "PJM Board").

Outcomes of the RTEP process include three types of transmission system upgrades or projects: (i) baseline upgrades are those that resolve a system reliability criteria violation, which can include planning criteria from NERC, ReliabilityFirst, SERC Reliability Corporation, PJM, and TOs; (ii) network upgrades are new or upgraded facilities required primarily to eliminate reliability criteria violations caused by proposed generation, merchant transmission, or long-term firm transmission service requests; and (iii) supplemental projects are projects initiated by the TO in order to interconnect new customer load, address degraded equipment performance, improve operational flexibility and efficiency, and increase infrastructure resilience. The Nimbus Line Loop and Substation is classified as a supplemental project initiated by the TO in order to interconnect new customer load. While supplemental projects are included in the RTEP, the PJM Board does not actually approve such projects. The Farmwell-Nimbus Line is classified as a baseline project initiated by the TO in order to resolve a NERC N-1-1 criteria violation identified by PJM. See Section I.J for a discussion of the PJM process as

[1] *See* FAC-001-3 (R1, R3) (effective April 1, 2021), which can be found at https://cdn-dominionenergy-prd-001.azureedge.net/-/media/pdfs/virginia/parallel-generation/facility-interconnection-requirements-signed.pdf?la=en&rev=38f51ffb04b1489f921b32a41d9887c8.

[2] PJM Manual 14B (effective December 15, 2021) focuses on the RTEP process and can be found at https://www.pjm.com/~/media/documents/manuals/m14b.ashx.

[3] *See* PJM Manual 14B, Attachment D: PJM Reliability Planning Criteria.

it relates to this Project.

The Northern Virginia data center market is spread across Loudoun, Fairfax, and Prince William Counties. Loudoun County's DCA, which, according to Loudoun County Economic Development, is home to "the world's largest concentration of data centers, with more than 18 million square feet currently in operation and millions more being planned or developed."[4] The DCA is loosely described as the area north of Dulles Airport, generally bounded by Dulles Greenway (Rt. 267) to the south, Sully Road (Rt. 28) to the east, Harry Byrd Highway (Rt. 7) to the north, and a western edge that roughly runs along Loudoun County Parkway and west along both sides of Waxpool Road. The boundaries are becoming blurred as multiple large data center buildings are coming online on both sides of Maries Road (east of Rt. 28), and multiple campus developments are also being constructed further south along Old Ox Road (Rt. 606) to Rt. 50, south of Dulles Airport, in both Dominion Energy Virginia's and NOVEC's service territories. The combination of competitive colocation/cloud environment, fiber connectivity, strategic geographic location, low risk of business disruptions, affordable and reliable power, and the business climate in Virginia has created the largest market for data center capacity in the United States.

Need for the Nimbus Line Loop and Substation

The proposed Nimbus Line Loop and Substation are necessary to serve the Customer, as well as other area existing and planned customers in the Waxpool Road Load Area, and to maintain and improve reliable electric service.

The Customer is adding a fourth building to its existing data center campus, located in Loudoun County's DCA at a parcel on the southwestern corner of the Waxpool Road and Loudoun County Parkway intersection. The Customer currently has three buildings on this campus (Buildings A, B, and C) with a fourth building (Building D) yet to be built. Specifically, the Customer is requesting 486 MVA of normal service (118 MVA at Building A, 118 MVA at Building B, 160 MVA at Building C, and 90 MVA at Building D) with an alternate feed for each building. Buildings A, B, and C are currently served from Cumulus Substation, which is located directly adjacent to the data center campus and to the proposed Nimbus Substation. The Company plans to serve the Customer's Building D from the proposed Nimbus Substation. Other area customers, both existing and planned in the future, also will be served from both the proposed Nimbus Substation and the existing Cumulus Substation. This plan is based on the proximity of the Customer's campuses to these substations, as well as existing and future projected load in the Project area. See Attachment I.A.1 for a map of the load area and the data center project locations.

The Customer's request for 90 MVA of power for normal service at Building D will overload the existing distribution substation equipment if it all were to be

[4] See https://biz.loudoun.gov/key-business-sectors/data-centers/.

connected to Cumulus Substation. Connecting the Customer's requested load to Cumulus Substation alone would result in (i) substation transformer thermal overloads, (ii) substation transformer contingency plan overloads, and (iii) violation of NERC transmission system reliability criteria. Further, without the proposed Nimbus Substation, the load of Buildings A, B, and C, along with the build-out of Building D, would theoretically be served from the existing Cumulus Substation, which is directly adjacent to the Customer's data center campus.

Other substations near the Customer's campus include Buttermilk Substation, Farmwell Substation, and Waxpool Substation. The addition of the load from Building D (90 MVA) at any one substation would result in (i) substation transformer thermal overloads, (ii) substation transformer contingency plan overloads, and (iii) violation of NERC transmission system reliability criteria. Splitting up the load amongst area substations not only presents distribution challenges but would also result in the same overloads and violations.

As described above, the Company plans to serve the Customer, as well as other area existing and planned customers, from the proposed Nimbus Substation and the existing Cumulus Substation. The proposed Nimbus Substation will provide capacity into the existing 34.5 kV distribution system served by Buttermilk Substation, Cumulus Substation, Farmwell Substation, and Waxpool Substation. This interconnection into the existing distribution grid will provide increased reliability to the Company's existing and future customers. Accordingly, the proposed Nimbus Line Loop and Substation are needed to meet the load requirements of the Customer's proposed new building along with future load growth in the Waxpool Road Load Area.

For the proposed Nimbus Line Loop, the Company proposes to construct a new overhead 230 kV overhead double circuit line by cutting existing Beaumeade-Buttermilk Line #2152 at Structure #2152/19A, resulting in (i) 230 kV Beaumeade-Nimbus Line #2152, and (ii) 230 kV Buttermilk-Nimbus Line #2255. The proposed Nimbus Line Loop will extend approximately 0.61 mile on new 100-foot-wide right-of-way to a proposed new 230-34.5 kV Nimbus Substation.

The proposed Nimbus Substation will be constructed with five 230 kV, 4000A circuit breakers in a ring bus arrangement, three 230 kV line terminals, two 230-34.5 kV, 84 MVA transformers, eight 34.5 kV distribution circuits, and other associated equipment. In total, it will be designed to accommodate future growth in the area with two additional 230-34.5 kV transformers and up to twenty 34.5 kV distribution circuits. Additionally, a new control enclosure will be installed to accommodate the protective relay and communications cabinets. The total area required to build the Nimbus Substation is approximately 8.0 acres.

Attachment I.A.2 provides the existing one-line diagram of the area transmission system. Attachment I.A.3 provides the proposed Nimbus Line Loop and Substation one-line diagram. See Attachment II.A.2 for a map depicting the proposed Project area.

Need for the Farmwell-Nimbus Line

The proposed Farmwell-Nimbus Line is necessary to maintain reliable electric service in compliance with mandatory NERC Reliability Standards.

As a part of the PJM 2020 RTEP Proposal Window, PJM identified a load drop of more than 300 MW under the N-1-1 condition in which the 230 kV lines from Waxpool to Roundtable and Buttermilk to Cumulus are taken out of service in the 2025 RTEP planning model. A load loss of more than 300 MW under these conditions is in violation of NERC Reliability Standards, requiring applicable system reinforcements. To address this potential violation, the Company proposed a new 230 kV single circuit line between the existing Farmwell Substation and the proposed Nimbus Substation (which had already been proposed by the Company to PJM as part of the Nimbus Line Loop and Substation) to PJM, which approved the proposal as an acceptable solution to this violation.

Specifically, the Company proposes to construct a new approximately 0.26-mile 230 kV overhead single circuit line, Farmwell-Nimbus Line #2260, on new 80-foot-wide right-of-way, originating at Farmwell Substation and terminating at the new Nimbus Substation.

See Attachment I.A.2 for the existing one-line diagram of the area transmission system. Attachment I.A.4 provides the proposed Farmwell-Nimbus Line one-line diagram. See Attachment II.A.2 for a map depicting the proposed Project area.

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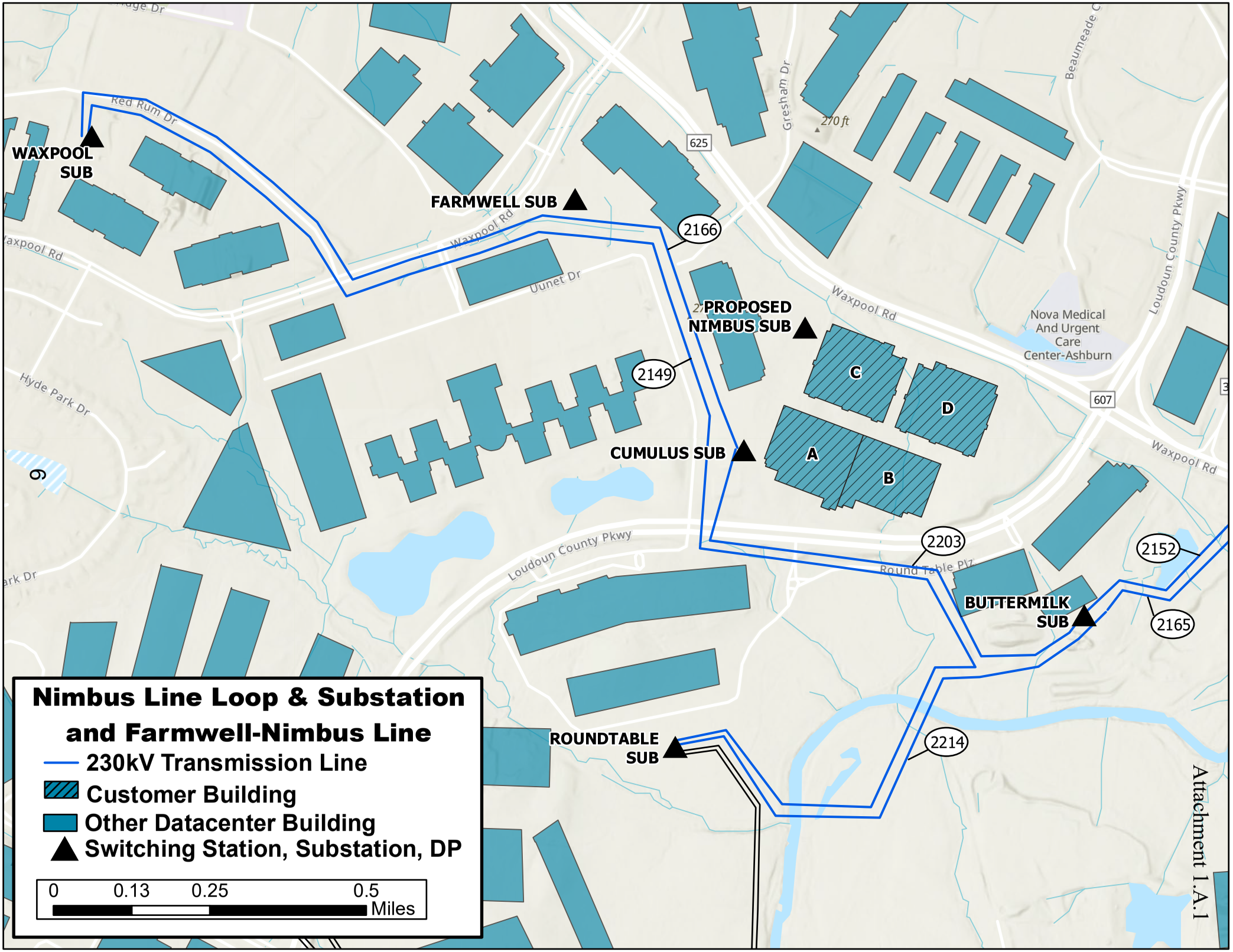
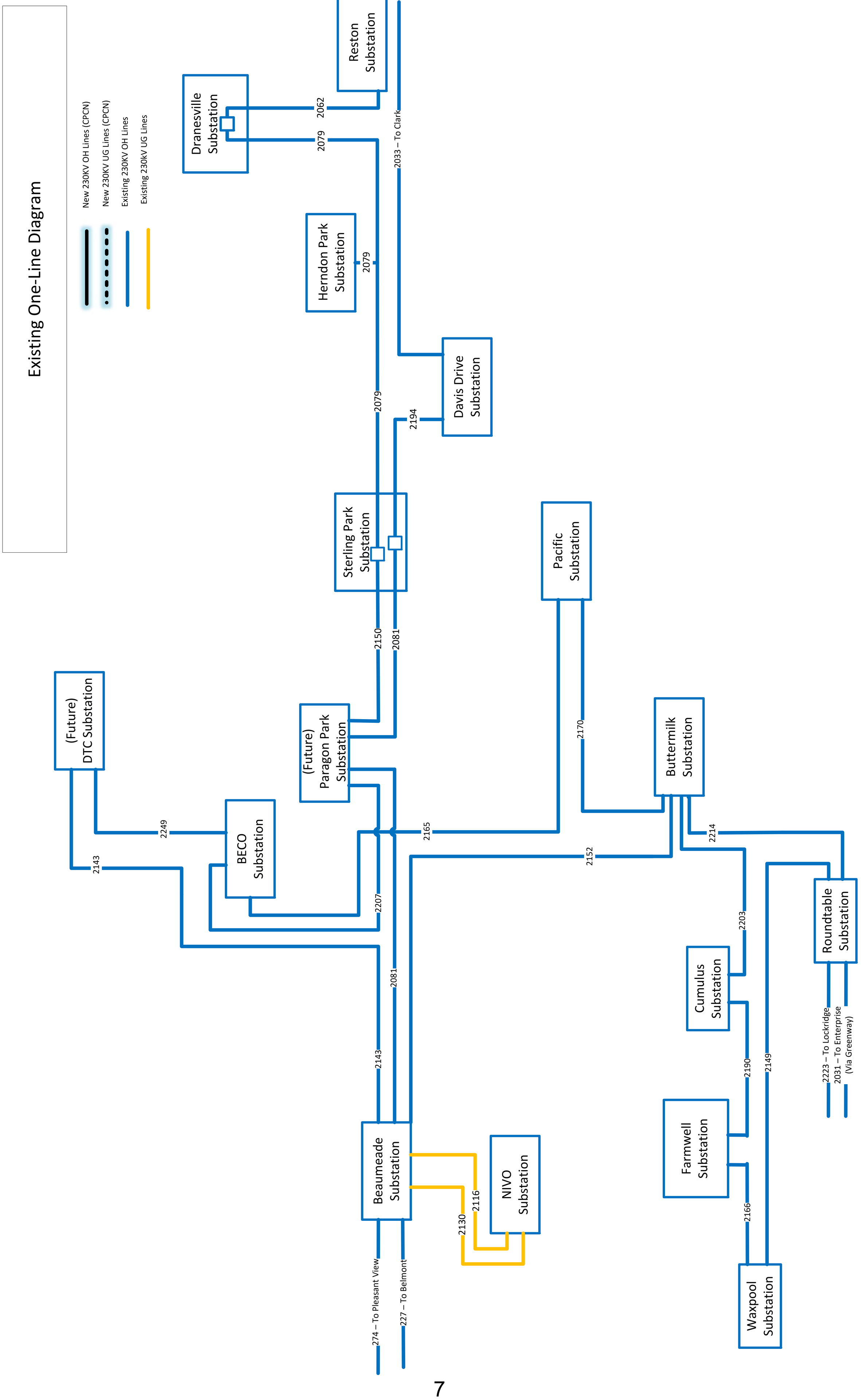
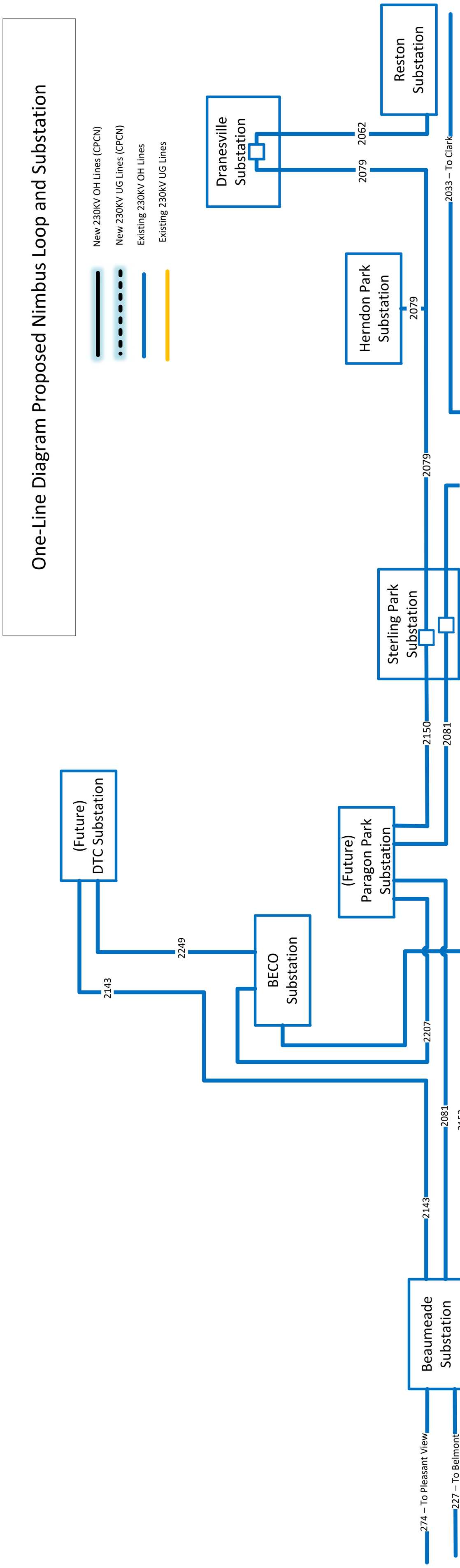
In summary, the proposed Project will provide service requested by the Customer in Loudoun County, Virginia, maintain reliable service for the overall growth in the Project area, and comply with mandatory NERC Reliability Standards.



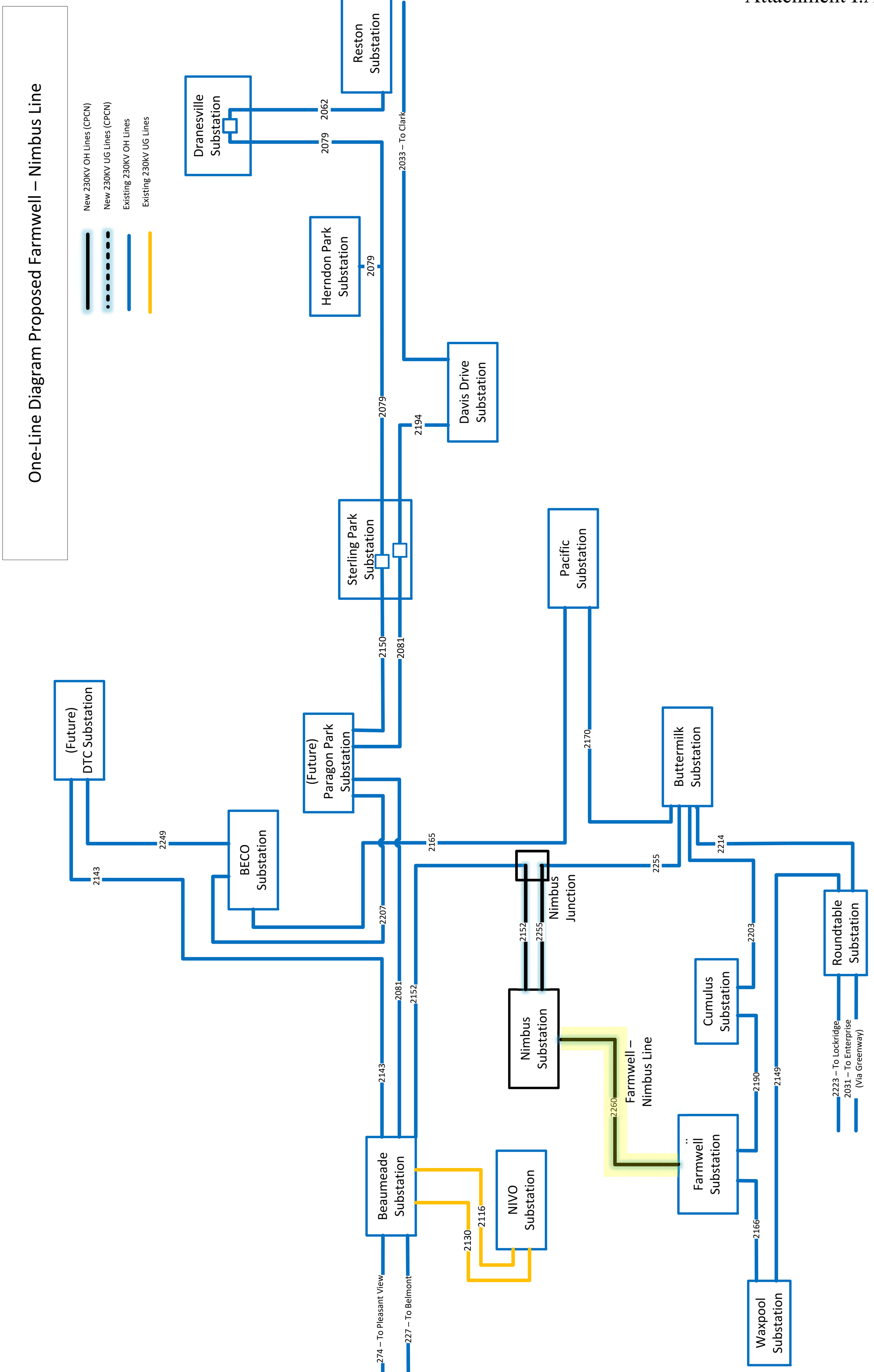
Attachment 1.A.1


Existing One-Line Diagram
New 230KV OH Lines (CPCN)
New 230KV UG Lines (CPCN)
Existing 230KV OH Lines
Existing 230kV UG Lines
Dranesville Substation
Reston Substation
2062
2079
2033 – To Clark
Herndon Park Substation
2079
Davis Drive Substation
2194
Sterling Park Substation
2150
2081
Pacific Substation
(Future) DTC Substation
2249
BECO Substation
(Future) Paragon Park Substation
2165
2170
Buttermilk Substation
2143
2207
2081
2152
2214
2203
Cumulus Substation
Roundtable Substation
2149
2190
2223 – To Lockridge
2031 – To Enterprise (Via Greenway)
Farmwell Substation
2166
Waxpool Substation
Beaumeade Substation
2116
2130
NIVO Substation
274 – To Pleasant View
227 – To Belmont

One-Line Diagram Proposed Nimbus Loop and Substation



One-Line Diagram Proposed Farmwell – Nimbus Line



I. NECESSITY FOR THE PROPOSED PROJECT

B. Detail the engineering justifications for the proposed project (for example, provide narrative to support whether the proposed project is necessary to upgrade or replace an existing facility, to significantly increase system reliability, to connect a new generating station to the Applicant's system, etc.). Describe any known future project(s), including but not limited to generation, transmission, delivery point or retail customer projects, that require the proposed project to be constructed. Verify that the planning studies used to justify the need for the proposed project considered all other generation and transmission facilities impacting the affected load area, including generation and transmission facilities that have not yet been placed into service. Provide a list of those facilities that are not yet in service.

Response: **(1) Engineering Justification for Project**

Detail the engineering justifications for the proposed project (for example, provide narrative to support whether the proposed project is necessary to upgrade or replace an existing facility, to significantly increase system reliability, to connect a new generating station to the Applicant's system, etc.).

See Section I.A of the Appendix.

(2) Known Future Projects

Describe any known future project(s), including but not limited to generation, transmission, delivery point or retail customer projects, that require the proposed project to be constructed.

The proposed Project is needed to serve future data center development in the Project area as described in Section I.A. Future data center load growth is expected to continue in the Waxpool Road Load Area, and the Company anticipates that the Project will accommodate future load growth in the area, to the extent necessary. See Attachment I.A.1 for existing and future facilities in the affected load area.

(3) Planning Studies

Verify that the planning studies used to justify the need for the proposed project considered all other generation and transmission facilities impacting the affected load area, including generation and transmission facilities that have not yet been placed into service.

For the Nimbus 230 kV Line Loop and Nimbus Substation, the Company's Distribution Planning group first used the Customer's load projection information for its Buildings A, B, C, and D and approximately 90 MW of additional load growth for the Waxpool Road Load Area to create a composite load projection. Starting with the scenario to feed the entire projected load from an existing substation (*i.e.*, Cumulus Substation), Distribution Planning determined that

overloads would occur on equipment and loading criteria would be violated. When the projected load was divided between existing Cumulus Substation and the proposed Nimbus Substation, the overloads and violations are avoided.

Distribution Planning then conferred with the Company's Transmission Planning group to analyze the effects of the projected growth and the addition of Nimbus Substation on the transmission system.

Dominion Energy Virginia's Electric Transmission Planning group performs planning studies to ensure delivery of bulk power to a continuously changing customer demand under a wide variety of operating conditions. Studies are performed in coordination with the Company's RTO (*i.e.*, PJM) and in accordance with NERC Reliability Standards. In completing these studies, the Company considered all other known generation and transmission facilities impacting the affected load area.

In order to maintain reliable service to customers of the Company and to comply with mandatory NERC Reliability Standards, specifically Facility Connection ("FAC") standard FAC-001,[5] the Company's Facility Interconnections Requirement ("FIR") document[6] addresses the interconnection requirements of generation, transmission, and electricity end-user facilities. The purpose of the NERC FAC standards is to avoid adverse impacts on reliability by requiring each TO to establish facility connection and performance requirements in accordance with FAC-001, and the TOs and end-users meet and adhere to the established facility connection and performance requirements in accordance with FAC-002.[7]

NERC Reliability Standards TPL-001 requirements R2, R5, and R6 require PJM, the Planning Coordinator ("PC"), and the TO to have criteria. PJM's planning criteria outlined in Attachment D of Manual 14B requires the Company, as a TO, to follow NERC and Regional Planning Standards and criteria as well as the TO Standards filed in Dominion Energy Virginia's FERC Form 715 filings. The Company's FERC Form 715 filing contains the Dominion Energy Virginia Transmission Planning Criteria in Exhibit A of the FIR document.

The four major criteria considered as part of this Project were:

1) Ring bus arrangement is required for load interconnections in excess of 100 MW (Company's FIR, Section 6.2);

2) The amount of direct-connected load at any substation is limited to 300 MW (Company's Transmission Planning Criteria Exhibit A, Section

[5] *See supra* n. 1.
[6] The Company's FIR document (effective Apr. 1, 2021) is available at: https://cdn-dominionenergy-prd-001.azureedge.net/-/media/pdfs/virginia/parallel-generation/facility-connection-requirements.pdf?la=en&rev=f280781e90cf47f69ea526c944c9c347&hash=82DD2567D0B033C47536134B8C4D5C5E.
[7] See FAC-002, which can be found at: https://www.nerc.com/pa/Stand/Reliability%20Standards/FAC-002-2.pdf.

C.2.8);

3) N-1-1 contingencies load loss is limited to 300 MW (PJM Manual 14B Section 2.3.8, Attachment D, Attachment D-1, Attachment F); and

4) The minimum load levels within a 10-year planning horizon for the direct interconnection to existing transmission lines is 30 MW for a 230 kV delivery (Company's FAC-001 Section 6, Load Criteria – End User).

The proposed Nimbus Line Loop is being constructed as a double circuit loop instead of a single circuit tap to comply with Section 6.2 of the Company's FIR, which requires a ring bus arrangement for load interconnections in excess of 100 MW.

The proposed Nimbus Line Loop and Substation are electrically more robust than the electric alternatives described in Section I.E of this Appendix, as this Project allows Nimbus Substation to be loaded to 300 MW and still meet all NERC Reliability Standards. See Section I.C of the Appendix for further discussion of the NERC criteria regarding 300 MW total substation loading.

The proposed Farmwell-Nimbus Line is being constructed as a single circuit line with the intent of being the least impactful solution from a construction, cost, and right-of-way perspective, with the purpose of remaining within compliance of NERC Reliability Standards and PJM Manual 14B Section 2.3.8, Attachment D, Attachment D-1, Attachment F.

(4) Facilities List

Provide a list of those facilities that are not yet in service.

See Attachment I.A.1 for existing and future facilities in the affected Waxpool Road Load Area.

I. NECESSITY FOR THE PROPOSED PROJECT

C. Describe the present system and detail how the proposed project will effectively satisfy present and projected future electrical load demand requirements. Provide pertinent load growth data (at least five years of historical summer and winter peak demands and ten years of projected summer and winter peak loads where applicable). Provide all assumptions inherent within the projected data and describe why the existing system cannot adequately serve the needs of the Applicant (if that is the case). Indicate the date by which the existing system is projected to be inadequate.

Response: The existing Waxpool Road Load Area is located in the Ashburn area of Loudoun County and is generally bounded by Ashburn Village Boulevard to the west, Loudoun County Parkway to the east, Farmwell/Waxpool Road to the north, and Dulles Greenway (Rt. 267) to the south. See Attachment I.A.1 for a map of the load area and the locations of the data center projects that comprise the need for the Project. See Attachment I.G.1 for the portion of the Company's transmission facilities in the area of the Project. The existing Cumulus, Farmwell, and Waxpool Substations are the primary sources of distribution power to the load area. The load at the Customer's four buildings is projected to be approximately 340 MVA of normal service in 10 years. Adding the load from the Customer's planned and existing data center buildings to existing Cumulus Substation would result in overload conditions and NERC transmission system reliability criteria violations.

Nimbus Line Loop and Substation

Attachment I.C.1 shows loading (MVA), as follows:

- Attachment I.C.1.a shows loading at Cumulus Substation with the Customer's Buildings A, B, and C, and without Nimbus Substation.
- Attachment I.C.1.b shows loading at Cumulus Substation with the Customer's Buildings A, B, C, and D, and without Nimbus Substation.
- Attachment I.C.1.c shows loading at Cumulus Substation with the Customer's Buildings A, B, C, and D until Nimbus Substation is energized and then Building D will move to Nimbus Substation.
- Attachment 1.C.1.d shows total loading at Cumulus, Farmwell and Waxpool Substations, with Building D fed by Cumulus Substation, and without Nimbus Substation.

Existing Cumulus Substation is designed to have ultimately five 84 MVA, 230-34.5 kV transformers. Each of these transformers has a normal overload ("NOL") rating of 90 MVA. Each of the five substation transformers has a number of feeder circuits connected to it that ultimately connect to customers through distribution facilities. These distribution circuits each have a thermal overload rating that is

based on the type of equipment and the configuration of the equipment in the field. To prevent overloads that could damage or fail equipment, the maximum capacity limits of the distribution circuits and the substation transformers cannot be exceeded.

To ensure reliability to its customers, the Company maintains a substation transformer contingency plan. Because of the negative impact to customers due to the outage duration if a substation transformer were to fail, the Company creates a switching plan that allows customer load to be picked up on other equipment for loss of any substation transformer. There are various switching methods that can be used for these substation transformer contingency plans. If the contingency plan creates overloads in other equipment because of the switching, new substation capacity, such as constructing a new substation like the proposed Nimbus Substation, is necessary.

The Company's FIR document (Section C.2.8) requires that the total load in any distribution substation not exceed 300 MW to ensure system reliability and to remain in compliance with NERC mandated reliability criteria.

NERC criteria restricts total substation loading to no more than 300 MW. If the projected load inside a given substation will exceed 300 MW, the Company must create a project that eliminates the overload, such as constructing a new substation like the proposed Nimbus Substation.

Without Nimbus Substation, the NERC criteria for 300 MW total substation loading is exceeded starting in summer 2024 at Cumulus Substation. As shown in Attachment I.C.1.b, the total substation load is projected to be 201.4 MW (67% of criteria) in summer 2022, 291.9 MW (97% of criteria) in summer 2023, and 310 MW (103% of criteria) in summer 2024. For the purposes of this NERC criterion, the load values do not include the redundant, alternate feed contract values, but rather just the projected Customer loading in Cumulus Substation.

It is important to note that Attachments I.C.1.a-c include only the normal feed circuits to the Customer's three data center campuses. The Customer has requested that each of its data center buildings include one totally independent, redundant distribution feed. This is referred to as an alternate feed. At any customer's request, the Company will endeavor to design a distribution system that provides for a back-up source of power should their normal feed have an outage. The cost of this alternate feed arrangement is compared to the normal arrangement of service, and the difference in cost is collected through an excess facilities charge. The Customer's business plan counts on the requested alternate feed plan to meet the non-outage demands of its data center clients. Therefore, the Company plans to serve the Customer's four data center buildings with both normal feed circuits and alternate feed circuits.

Farmwell-Nimbus Line

NERC criteria restricts load loss during N-1-1 contingency scenarios to no more than 300 MW. In the 2020 PJM 2025 RTEP Summer model, the total substation loads of Cumulus, Farmwell, and Waxpool Substations were projected to be at approximately 120 MW, 76 MW, and 166 MW, respectively, totaling approximately 362 MW. In the 2025 Winter model, the total load at the same substations were projected to be approximately 132 MW, 92 MW, and 150 MW, respectively, totaling approximately 374 MW. Upon the occurrence of the N-1-1 scenario in which the Waxpool to Roundtable and Buttermilk to Cumulus 230 kV lines are taken out of service, these substations become islanded from Buttermilk Substation and Roundtable Substation, resulting in a load loss of over 300 MW.

Supplemental Projects, such as Nimbus Substation, are transmission system improvements identified by the TO to meet local needs not required for compliance with PJM criteria for reliability, operational performance or economic efficiency. Via PJM's Do-No-Harm process, in continuing to learn more about customer needs within Northern Virginia, a summer planning model is kept up to date on a monthly basis between the annual release of RTEP cases. Based on the projections in the PJM 2025 Do-No-Harm summer model, the total substation loads of Cumulus, Farmwell, and Waxpool Substations are projected to be at approximately 256 MW, 228 MW, and 224 MW, respectively, totaling an estimated 708 MW. The Company's internal load projections shown in Attachment I.C.1.d support PJM's Do-No-Harm case, as the load projections have continued to materialize.

By extending a new 230 kV line between Farmwell Substation and Nimbus Substation, the Cumulus, Farmwell, and Waxpool Substations above are no longer islanded due to maintaining a source via Nimbus Substation under the N-1-1 scenario in violation.

Based on all the stated projected loadings and criteria violations above, the Company identified a need to construct Farmwell-Nimbus Line by summer 2025 to avoid these violations and remain in compliance with NERC Standards and the deadline set forth via the 2020 PJM RTEP Proposal Window process.

Table I.C.1.a																	
Waxpool Road Load Area			(Load and Ratings in MVA)														
Cumulus Substation (Loads contain Customer Buildings A, B & C loads only, No Nimbus Substation)																	
			Load (MVA) 2017 Summer Actual	Load (MVA) 2018 Summer Actual	Load (MVA) 2019 Summer Actual	Load (MVA) 2020 Summer Actual	Load (MVA) 2021 Summer Actual	Load (MVA) 2022 Summer Projection	Load (MVA) 2023 Summer Projection	Load (MVA) 2024 Summer Projection	Load (MVA) 2025 Summer Projection	Load (MVA) 2026 Summer Projection	Load (MVA) 2027 Summer Projection	Load (MVA) 2028 Summer Projection	Load (MVA) 2029 Summer Projection	Load (MVA) 2030 Summer Projection	Load (MVA) 2030 Summer Projection
Substation Total			0	0	0	13.2	86.5	188	248.1	263.3	268.9	268.9	268.9	268.9	268.9	268.9	268.9
Substation Total Calculation for 300MW NERC Limit			0	0	0	12.5	82.2	178.6	235.7	250.1	255.5	255.5	255.5	255.5	255.5	255.5	255.5
Transformer	Nameplate	NOL															
TX #1	84	90	0	0	0	0	0	56	56.7	56.7	56.7	56.7	56.7	56.7	56.7	56.7	56.7
TX #2	84	90	0	0	0	13.2	84	50	53.2	53.2	53.2	53.2	53.2	53.2	53.2	53.2	53.2
TX #3	84	90	0	0	0	0	0	0	63.4	63.4	63.4	63.4	63.4	63.4	63.4	63.4	63.4
TX #4	84	90	0	0	0	0	2.5	82	74.8	56.4	56.4	56.4	56.4	56.4	56.4	56.4	56.4
TX #5	84	90	0	0	0	0	0	0	0	33.6	39.2	39.2	39.2	39.2	39.2	39.2	39.2

Table I.C.1.b																
Waxpool Road Load Area			(Load and Ratings in MVA)													
Cumulus Substation (Loads contain Customer's Buildings A, B, C & D fed from Cumulus Sub, No Nimbus Sub)																
			Load (MVA) 2018 Summer Actual	Load (MVA) 2019 Summer Actual	Load (MVA) 2020 Summer Actual	Load (MVA) 2021 Summer Actual	Load (MVA) 2022 Summer Projection	Load (MVA) 2023 Summer Projection	Load (MVA) 2024 Summer Projection	Load (MVA) 2025 Summer Projection	Load (MVA) 2026 Summer Projection	Load (MVA) 2027 Summer Projection	Load (MVA) 2028 Summer Projection	Load (MVA) 2029 Summer Projection	Load (MVA) 2030 Summer Projection	Load (MVA) 2030 Summer Projection
Substation Total			0	0	13.2	86.5	212	307.3	326.3	331.9	331.9	331.9	331.9	331.9	331.9	331.9
Substation Total Calculation for 300MW NERC Limit			0	0	12.5	82.2	201.4	291.9	310	315.3	315.3	315.3	315.3	315.3	315.3	315.3
Transformer	Nameplate	NOL														
TX #1	84	90	0	0	0	0	56	68.7	72.5	72.5	72.5	72.5	72.5	72.5	72.5	72.5
TX #2	84	90	0	0	13.2	84	56	68.9	68.9	68.9	68.9	68.9	68.9	68.9	68.9	68.9
TX #3	84	90	0	0	0	0	40	63.4	63.4	63.4	63.4	63.4	63.4	63.4	63.4	63.4
TX #4	84	90	0	0	0	2.5	34	53.2	56.4	56.4	56.4	56.4	56.4	56.4	56.4	56.4
TX #5	84	90	0	0	0	0	26	53.1	65.1	70.7	70.7	70.7	70.7	70.7	70.7	70.7

0.671333 0.973 1.0333333

Table I.C.1.c																
Waxpool Road Load Area			(Load and Ratings in MVA)													
Cumulus Sub (Loads contain Customer's Buildings A, B, and C from Cumulus Sub until Nimbus is Energized, Customer's Building D fed from Nimbus Sub)																
			Load (MVA) 2018 Summer Actual	Load (MVA) 2019 Summer Actual	Load (MVA) 2020 Summer Actual	Load (MVA) 2021 Summer Actual	Load (MVA) 2022 Summer Projection	Load (MVA) 2023 Summer Projection	Load (MVA) 2024 Summer Projection	Load (MVA) 2025 Summer Projection	Load (MVA) 2026 Summer Projection	Load (MVA) 2027 Summer Projection	Load (MVA) 2028 Summer Projection	Load (MVA) 2029 Summer Projection	Load (MVA) 2030 Summer Projection	Load (MVA) 2030 Summer Projection
Substation Total			0	0	0	13.2	86.5	188	248.1	263.3	268.9	268.9	268.9	268.9	268.9	268.9
Substation Total Calculation for 300MW NERC Limit			0	0	0	12.5	82.2	178.6	235.7	250.1	255.5	255.5	255.5	255.5	255.5	255.5
Transformer	Nameplate	NOL														
TX #1	84	90	0	0	0	0	0	56	56.7	56.7	56.7	56.7	56.7	56.7	56.7	56.7
TX #2	84	90	0	0	0	13.2	84	50	53.2	53.2	53.2	53.2	53.2	53.2	53.2	53.2
TX #3	84	90	0	0	0	0	0	0	63.4	63.4	63.4	63.4	63.4	63.4	63.4	63.4
TX #4	84	90	0	0	0	0	2.5	82	74.8	56.4	56.4	56.4	56.4	56.4	56.4	56.4
TX #5	84	90	0	0	0	0	0	0	0	33.6	39.2	39.2	39.2	39.2	39.2	39.2
Nimbus Sub (Loads contain Customer's Building D plus other projected load growth in the area)																
			Load (MVA) 2018 Summer Actual	Load (MVA) 2019 Summer Actual	Load (MVA) 2020 Summer Actual	Load (MVA) 2021 Summer Actual	Load (MVA) 2022 Summer Projection	Load (MVA) 2023 Summer Projection	Load (MVA) 2024 Summer Projection	Load (MVA) 2025 Summer Projection	Load (MVA) 2026 Summer Projection	Load (MVA) 2027 Summer Projection	Load (MVA) 2028 Summer Projection	Load (MVA) 2029 Summer Projection	Load (MVA) 2030 Summer Projection	Load (MVA) 2030 Summer Projection
Substation Total			0	0	0	0	0	0	0	86.2	106.7	152.9	152.9	152.9	152.9	152.9
Substation Total Calculation for 300MW NERC Limit			0	0	0	0	0	0	0	81.9	101.4	145.3	145.3	145.3	145.3	145.3
Transformer	Nameplate	NOL														
TX #1	112	120	0	0	0	0	0	0	0	15.8	15.8	15.8	15.8	15.8	15.8	15.8
TX #2	84	90	0	0	0	0	0	0	0	15.8	28.3	28.3	28.3	28.3	28.3	28.3
TX #3	84	90	0	0	0	0	0	0	0	25.8	25.8	48.9	48.9	48.9	48.9	48.9
TX #4	112	120	0	0	0	0	0	0	0	28.8	36.8	59.9	59.9	59.9	59.9	59.9

Table I.C.1.d																
Waxpool Road Load Area			(Load and Ratings in MVA)													
Cumulus Sub (with Building D), Farmwell Sub, and Waxpool Sub - (No Nimbus Sub)																
			Load (MVA) 2018 Summer Actual	Load (MVA) 2019 Summer Actual	Load (MVA) 2020 Summer Actual	Load (MVA) 2021 Summer Actual	Load (MVA) 2022 Summer Projection	Load (MVA) 2023 Summer Projection	Load (MVA) 2024 Summer Projection	Load (MVA) 2025 Summer Projection	Load (MVA) 2026 Summer Projection	Load (MVA) 2027 Summer Projection	Load (MVA) 2028 Summer Projection	Load (MVA) 2029 Summer Projection	Load (MVA) 2030 Summer Projection	Load (MVA) 2030 Summer Projection
Load Area Total			0	0	132.6	222.1	464.7	637.9	740.5	800.3	822.4	825.1	825.1	825.1	825.1	825.1
Load Area Total Calculation for 300MW NERC Limit			0	0	126	211	441.5	606	703.5	760.3	781.3	783.8	783.8	783.8	783.8	783.8
Substation																
Cumulus Sub (with Building D)			0	0	13.2	86.5	212	307.3	326.3	331.9	331.9	331.9	331.9	331.9	331.9	331.9
Farmwell Sub			0	0	0	0	92.8	139.8	193.8	242	263.3	266	266	266	266	266
Waxpool Sub			0	0	119.4	135.6	159.9	190.8	220.4	226.4	227.2	227.2	227.2	227.2	227.2	227.2

I. NECESSITY FOR THE PROPOSED PROJECT

D. If power flow modeling indicates that the existing system is, or will at some future time be, inadequate under certain contingency situations, provide a list of all these contingencies and the associated violations. Describe the critical contingencies including the affected elements and the year and season when the violation(s) is first noted in the planning studies. Provide the applicable computer screenshots of single-line diagrams from power flow simulations depicting the circuits and substations experiencing thermal overloads and voltage violations during the critical contingencies described above.

Response: Not applicable. See Section I.C for the substation transformer contingency planning rationale from a distribution system perspective.

I. NECESSITY FOR THE PROPOSED PROJECT

E. Describe the feasible project alternatives, if any, considered for meeting the identified need including any associated studies conducted by the Applicant or analysis provided to the RTO. Explain why each alternative was rejected.

Response: The Company considered electrical alternatives to the proposed Project, including the use of distribution facilities as well as existing and planned substations to serve the need for the Project, as discussed below.

Nimbus Line Loop and Substation

The Company considered the following distribution alternatives to the Nimbus Line Loop and Substation. There were no transmission alternatives due to the 300 MW NERC criteria violation.

Distribution Alternatives:

Distribution Alternative (1): *Feed the Waxpool Road Load Area growth from Cumulus Substation*

Under this distribution alternative scenario, Nimbus Substation would not be constructed and the projected load growth, including the Customer's four data center buildings, would be sourced from existing Cumulus Substation. Cumulus Substation is directly adjacent to the Customer's four building data center campus.

Distribution Alternative (1) was rejected for two key reasons. First, if the Customer's load from Building D (90 MVA) is added to Cumulus Substation, the total projected Cumulus Substation load would exceed 300 MW, in violation of NERC Reliability Standards. Second, transformer contingencies are not possible to maintain due to no available capacity in the substation to effectively transfer all load for the loss of any one transformer.

Distribution Alternative (2): *Feed the Waxpool Road Load Area growth from Buttermilk Substation*

Under this distribution alternative scenario, Nimbus Substation would not be constructed and the projected load growth, including the Customer's four data center buildings, would be split between existing Cumulus Substation and existing Buttermilk Substation. Due to its proximity to Cumulus Substation, Buildings A, B, and C would still be fed from there, and Building D would be fed from Buttermilk Substation. Buttermilk Substation is approximately 0.3 straight-line mile from Building D.

Distribution Alternative (2) was rejected because of three key reasons. First, the available capacity at Buttermilk Substation is needed for planned and expected load growth in the vicinity of the substation. Second, the addition of the load from Building D (90 MVA) to Buttermilk Substation would result in overloading two of

the four planned transformers. Third, transformer contingencies are not possible to maintain due to no available capacity in the substation to effectively transfer all load for the loss of any one transformer.

Distribution Alternative (3): *Feed the Waxpool Road Load Area growth from Farmwell Substation*

Under this distribution alternative scenario, Nimbus Substation would not be constructed and the projected load growth, including the Customer's four data center buildings, would be split between existing Cumulus Substation and existing Farmwell Substation. Due to its proximity to Cumulus Substation, Buildings A, B, and C would still be fed from there, and Building D would be fed from Farmwell Substation. Farmwell Substation is approximately 0.5 straight-line mile from Building D.

Distribution Alternative (3) was rejected for four key reasons. First, if the load from Building D (90 MVA) was added to Farmwell Substation, the total projected Farmwell Substation load would exceed 300 MW, in violation of NERC Reliability Standards. Second, two of the four planned Farmwell Substation transformers would each overload. Third, transformer contingencies are not possible to maintain due to no available capacity in the substation to effectively transfer all load for the loss of any one transformer. Fourth, the small amount of available capacity (*i.e.*, the capacity that is available beyond the currently projected existing and future loads) at Farmwell Substation is needed to serve future growth from customers in the vicinity of the Farmwell Substation.

Distribution Alternative (4): *Feed the Waxpool Road Load Area growth from Waxpool Substation*

Under this distribution alternative scenario, Nimbus Substation would not be constructed and the projected load growth, including the Customer's four data center buildings, would be split between existing Cumulus Substation and existing Waxpool Substation. Due to its proximity to Cumulus Substation, Buildings A, B, and C would still be fed from there, and Building D would be fed from Waxpool Substation. Waxpool Substation is approximately 1.0 straight-line mile from Building D.

Distribution Alternative (4) was rejected for five key reasons. First, if the load from Building D (90 MVA) was added to Waxpool Substation, the total projected Waxpool Substation load would exceed 300 MW, in violation of NERC Reliability Standards. Second, three of the four Waxpool Substation transformers would each overload. Third, transformer contingencies are not possible to maintain due to no available capacity in the substation to effectively transfer all load for the loss of any one transformer. Fourth, the small amount of available capacity (*i.e.*, the capacity that is available beyond the currently projected existing and future loads) at Waxpool Substation is needed to serve future growth from customers close to Waxpool Substation. Fifth, it is not practical to construct distribution circuits from

Waxpool Substation to Building D. Building D will require four normal feeder circuits, and the existing distribution corridors to get from Waxpool Substation to Building D are already filled with existing circuits feeding existing customers in the area.

Distribution Alternative (5): *Feed the Waxpool Road Load Area growth from a combination of the Cumulus, Buttermilk, Farmwell, and Waxpool Substations*

Under this distribution alternative scenario, Nimbus Substation would not be constructed and the projected load growth, including the Customer's four data center buildings, would be split among the existing Cumulus, Buttermilk, Farmwell, and Waxpool Substations.

Distribution Alternative (5) was rejected for two key reasons. First, this alternative would present distribution challenges in terms of routing five new circuits to each of the substations, as existing distribution corridors are already filled with existing circuits feeding existing customers in the area. Second, this alternative would not solve the need to serve additional growth in this area.

Farmwell-Nimbus Line

The Company considered the following transmission alternatives to the Farmwell-Nimbus Line. There were no distribution alternatives to the proposed Farmwell-Nimbus Line due to the NERC N-1-1 300 MW load drop violation being identified on the 230 kV transmission system, as described in Sections I.A, I.B and I.C.

Transmission Alternatives:

Transmission Alternative (1): *230 kV Farmwell-Shellhorn Line*

Under this transmission alternative scenario, a new 230 kV line would be extended from Shellhorn Substation to a structure near Farmwell Substation and cut into existing Line #2149 (Roundtable to Waxpool) creating a new line (Shellhorn to Waxpool) on new right-of-way. This alternative would require the expansion of right-of-way in two areas, the first being approximately 0.3 mile in length and the second being approximately 0.4 mile in length, in addition to approximately 0.75 mile of new right of way.

Transmission Alternative (1) was submitted as a proposal and rejected by PJM in the 2020 RTEP Proposal Window. While reviewing each proposal and selecting their final project recommendation, PJM considers the following criteria: initial performance review (evaluation of whether or not the project proposal solved the required reliability criteria violation drivers posted as part of the open solicitation process), initial planning level cost review (review of the estimated project cost submitted by the project sponsor and any relevant cost commitment mechanisms submitted), initial feasibility review (review of the overall proposed implementation plan to determine if the project, as proposed, can feasibly be

constructed), and additional benefits review (review of the information provided by the proposing entity to determine if the project, as proposed, provides additional benefits such as the elimination of other needs on the system).

Under the criteria mentioned above, PJM rejected this transmission alternative after determining that the proposed Farmwell-Nimbus Line was the most efficient and cost-effective solution that was proposed to mitigate the N-1-1 300 MW violation on the Buttermilk to Cumulus 230 kV flowgate in the 2025 RTEP planning model.

Transmission Alternative (2): *230 kV Roundtable-Enterprise Line Loop*

Under this transmission alternative scenario, a new double circuit 230 kV line would be cut in and looped between Enterprise-Roundtable Line #2031 and Roundtable-Waxpool Line #2149. This alternative would require acquisition of new right-of-way, approximately 0.9 mile in length, as well as coordination with supplemental projects previously approved by PJM.

Transmission Alternative (2) was submitted as a proposal and rejected by PJM in the 2020 RTEP Proposal Window under the same criteria as Transmission Alternative (1).

Analysis of Demand-Side Resources:

Pursuant to the Commission's November 26, 2013, Order entered in Case No. PUE-2012-00029, and its November 1, 2018, Final Order entered in Case No. PUR-2018-00075 ("2018 Final Order"), the Company is required to provide analysis of demand-side resources ("DSM") incorporated into the Company's planning studies. DSM is the broad term that includes both energy efficiency ("EE") and demand response ("DR"). In this case, the Company has identified a need for the proposed Project based on the need to provide service to data center customers and to comply with mandatory NERC Reliability Standards, while maintaining the overall long-term reliability of the transmission system.[8] Notwithstanding, when performing an analysis based on PJM's 50/50 load forecast, there is no adjustment in load for DR programs that are bid into the PJM reliability pricing model ("RPM") auction because PJM only dispatches DR when the system is under stress (i.e., a system emergency). Accordingly, while existing DSM is considered to the extent the load forecast accounts for it, DR that has been bid into PJM's RPM market is not a factor in this particular application because of the identified need for the Project. Based on these considerations, the evaluation of the Project demonstrated that despite accounting for DSM consistent with PJM's methods, the Project is necessary.

[8] While the PJM load forecast does not directly incorporate DR, its load forecast incorporates variables derived from Itron that reflect EE by modeling the stock of end-use equipment and its usages. Further, because PJM's load forecast considers the historical non-coincident peak ("NCP") for each load serving entity ("LSE") within PJM, it reflects the actual load reductions achieved by DSM programs to the extent an LSE has used DSM to reduce its NCPs.

Incremental DSM also will not absolve the need for the Project. As reflected in Attachment I.C.1.b, the projected load at Cumulus Substation without the Nimbus Line Loop and Substation and with all four of the Customer's data center buildings fully built out exceeds 300 MW starting in summer 2024. Further, as discussed in Section I.C, the total combined substation loads of Cumulus, Farmwell and Waxpool Substations are projected to exceed 300 MW in the 2020 PJM 2025 RTEP summer and winter models without the Farmwell-Nimbus Line. Upon the occurrence of the N-1-1 scenario in which the Waxpool to Roundtable and Buttermilk to Cumulus 230 kV lines are taken out of service, these substations become islanded from Buttermilk Substation and Roundtable Substation, resulting in a load loss of over 300 MW, without the proposed line extension, in violation of NERC Reliability Standards. By way of comparison, statewide, the Company achieved demand savings of 120.4 MW from its DSM Programs in 2020.

I. NECESSITY FOR THE PROPOSED PROJECT

F. Describe any lines or facilities that will be removed, replaced, or taken out of service upon completion of the proposed project, including the number of circuits and normal and emergency ratings of the facilities.

Response: Not applicable.

I. NECESSITY FOR THE PROPOSED PROJECT

G. Provide a system map, in color and of suitable scale, showing the location and voltage of the Applicant's transmission lines, substations, generating facilities, etc., that would affect or be affected by the new transmission line and are relevant to the necessity for the proposed line. Clearly label on this map all points referenced in the necessity statement.

Response: See Attachment I.G.1.

NIMBUS LINE LOOP & SUBSTATION and FARMWELL-NIMBUS LINE

230kV Transmission Line

Switching Station, Substation, DP

0 0.25 0.5 1 Miles

BEAUMEADE SUB

NIVO SUB

BECO SUB

FUTURE PARAGON PARK SUB

WAXPOOL SUB

FARMWELL SUB

PROPOSED NIMBUS SUB

CUMULUS SUB

BUTTERMILK SUB

ROUNDTABLE SUB

SHELLHORN ROAD SUB

PACIFIC SUB

STERLING PARK SUB

DAVIS DRIVE SUB

227 274 2116 2130 2150 2152 2143 2165 2081 2166 2149 2203 2214 2170 2194 2079 2033

I. NECESSITY FOR THE PROPOSED PROJECT

H. Provide the desired in-service date of the proposed project and the estimated construction time.

Response: The desired in-service target date for the proposed Project is December 27, 2024.

The Company estimates it will take approximately 24 months for detailed engineering, scheduled outages, materials procurement, permitting, real estate, and construction after a final order from the Commission. Accordingly, to support this estimated construction timeline and construction plan, the Company respectfully requests a final order by December 27, 2022. Should the Commission issue a final order by December 27, 2022, the Company estimates that construction should begin around March 2023, and be completed by December 27, 2024. This schedule is contingent upon obtaining the necessary permits. Dates may need to be adjusted based on permitting delays or design modifications to comply with additional agency requirements identified during the permitting application process, as well as the ability to schedule outages, and unpredictable delays due to the COVID-19 pandemic, labor shortages, or materials/supply issues.

I. NECESSITY FOR THE PROPOSED PROJECT

I. Provide the estimated total cost of the project as well as total transmission-related costs and total substation-related costs. Provide the total estimated cost for each feasible alternative considered. Identify and describe the cost classification (e.g. "conceptual cost," "detailed cost," etc.) for each cost provided.

Response: The estimated conceptual cost of the proposed Project is approximately $37.5 million, which includes a total of approximately $9.3 million for transmission-related work, and a total of approximately $28.2 million for substation-related work (2021 dollars).

Additional breakdown of the Project conceptual costs is provided below.

Nimbus Line Loop and Substation

Transmission-related costs: approximately $6.3 million

Substation-related costs: approximately $26.5 million

Total – approximately $32.8 million

Farmwell-Nimbus Line

Transmission-related costs: approximately $3.0 million

Substation-related costs: approximately $1.7 million

Total – approximately $4.7 million

I. NECESSITY FOR THE PROPOSED PROJECT

J. If the proposed project has been approved by the RTO, provide the line number, regional transmission expansion plan number, cost responsibility assignments, and cost allocation methodology. State whether the proposed project is considered to be a baseline or supplemental project.

Response: The Nimbus Substation is classified as a supplemental project (Supplemental Project DOM-2018-0011) initiated by the TO in order to interconnect new customer load. The Nimbus Line Loop and Substation were submitted to PJM on September 13, 2018, and the solution slide was submitted to PJM on May 16, 2019. See Attachments I.J.1 and I.J.2, respectively. The proposed Nimbus Line Loop and Substation have been assigned Supplemental Project No. s2100 and were accepted into the 2019 Local Plan. See Attachment I.J.3.

The proposed Farmwell-Nimbus Line is classified as a baseline project initiated by the TO in order to resolve a NERC N-1-1 criteria violation identified by PJM in the 2020 RTEP Proposal Window. The Farmwell-Nimbus Line proposal was submitted to PJM on September 1, 2020 and was presented by PJM to stakeholders at the October 6, 2020 TEAC meeting. See Attachment I.J.4. The proposed Farmwell-Nimbus Line has been assigned Baseline Project No. b3303 and was accepted by PJM to be included in the 2026 RTEP model. See Attachment I.J.5.

The Project is presently 100% cost allocated to the DOM Zone.

Dominion Supplemental Projects Needs

Transmission Expansion Advisory Committee

September 13, 2018

Dominion Transmission Zone: Supplemental Customer Load Request

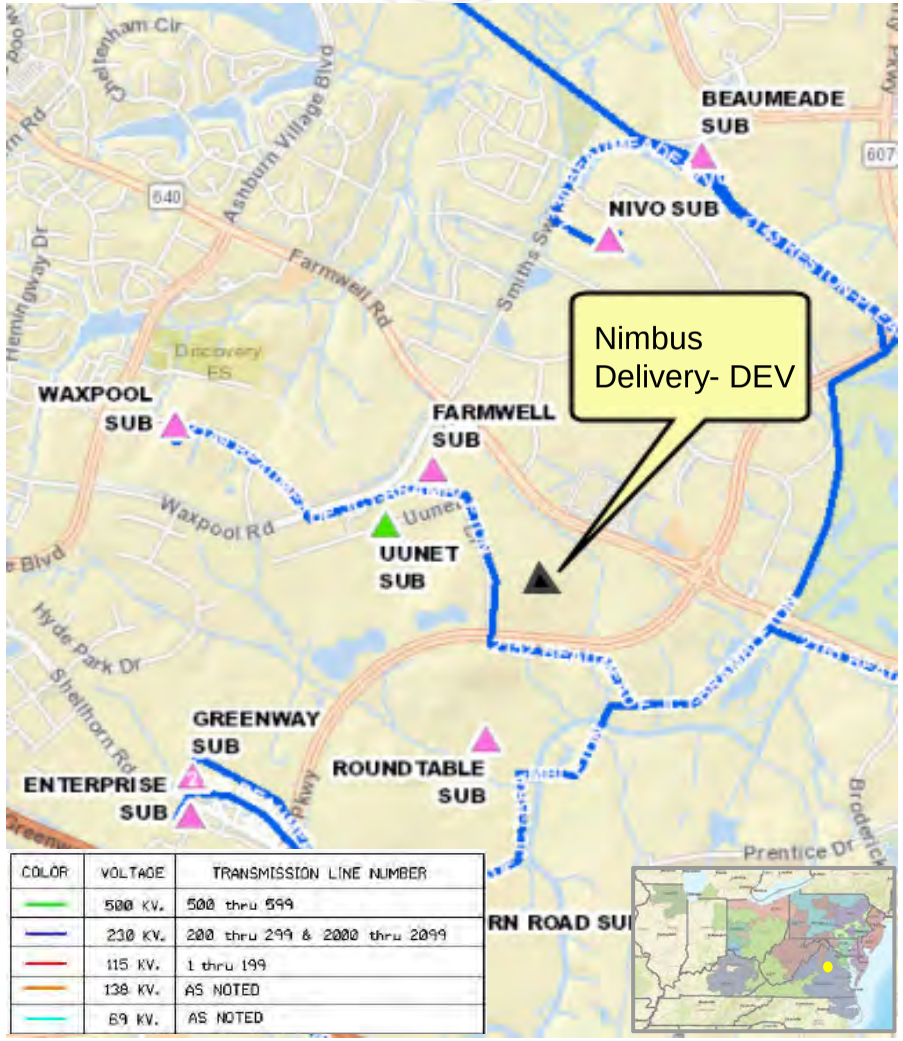
Need Number: DOM-2018-0011

Meeting Date: 09/13/2018
Process Stage: NEED
Supplemental Project Driver: Customer Service

Problem Statement:
DEV Distribution has submitted a DP Request for a new substation (Nimbus) to accommodate a new datacenter campus in Loudoun County with a total load in excess of 100 MW. Requested in-service date is 11/15/2022.

Projected 2023 Load
Summer: 60.0 MW
Winter: 80.0 MW

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



Dominion Supplemental Projects

Transmission Expansion Advisory Committee

May 16, 2019

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-2018-0011

Meeting Date: 05/16/2019

Process Stage: SOLUTIONS
Need Presented: 09/13/2018
Supplemental Project Driver: Customer Service

Problem Statement:
DEV Distribution has submitted a DP Request for a new substation (Nimbus) to accommodate a new datacenter campus in Loudoun County with a total load in excess of 100 MW. Requested in-service date is 11/15/2022.

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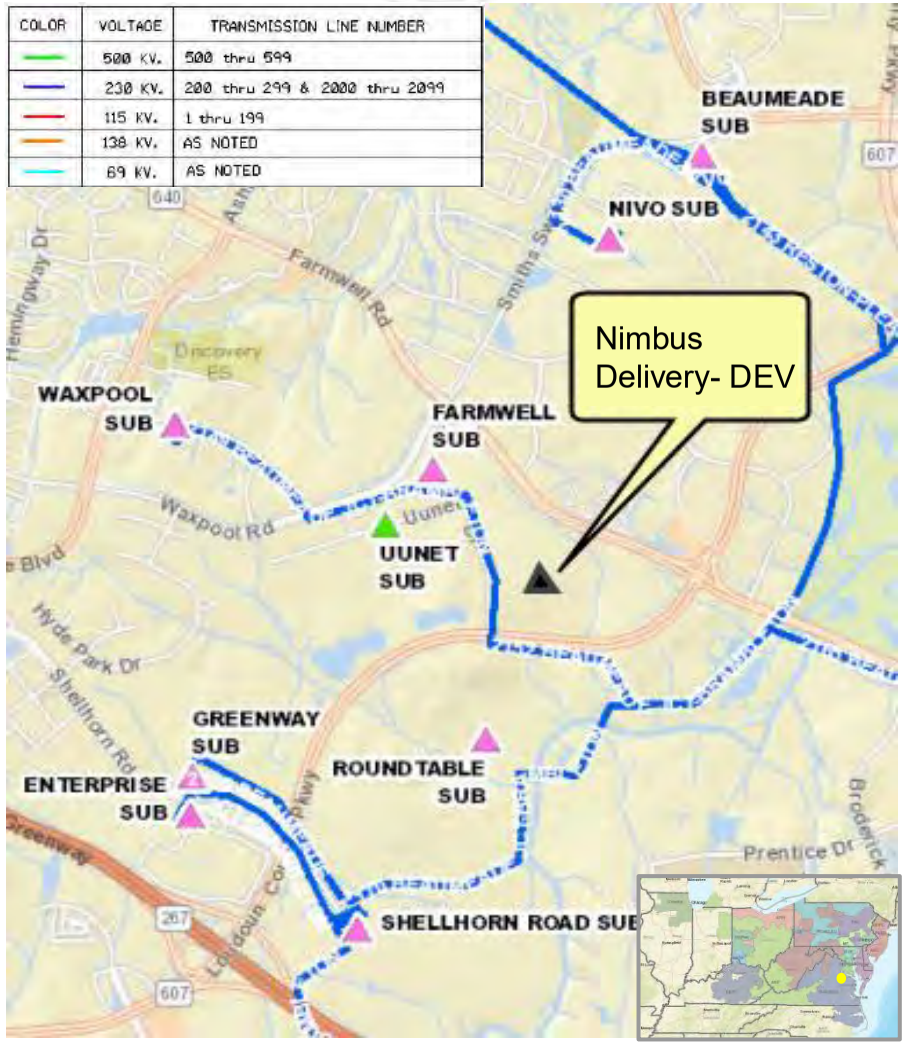
Initial In-Service Load	Projected 2024 Load
Summer: 60.0 MW	Summer: 100.0 MW

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



Submission of Supplemental Projects for Inclusion in the Local Plan

Dominion Transmission Zone M-3 Process
Nimbus 230 kV Delivery - DEV

Need Number: DOM-2018-0011

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan – 12/17/2019

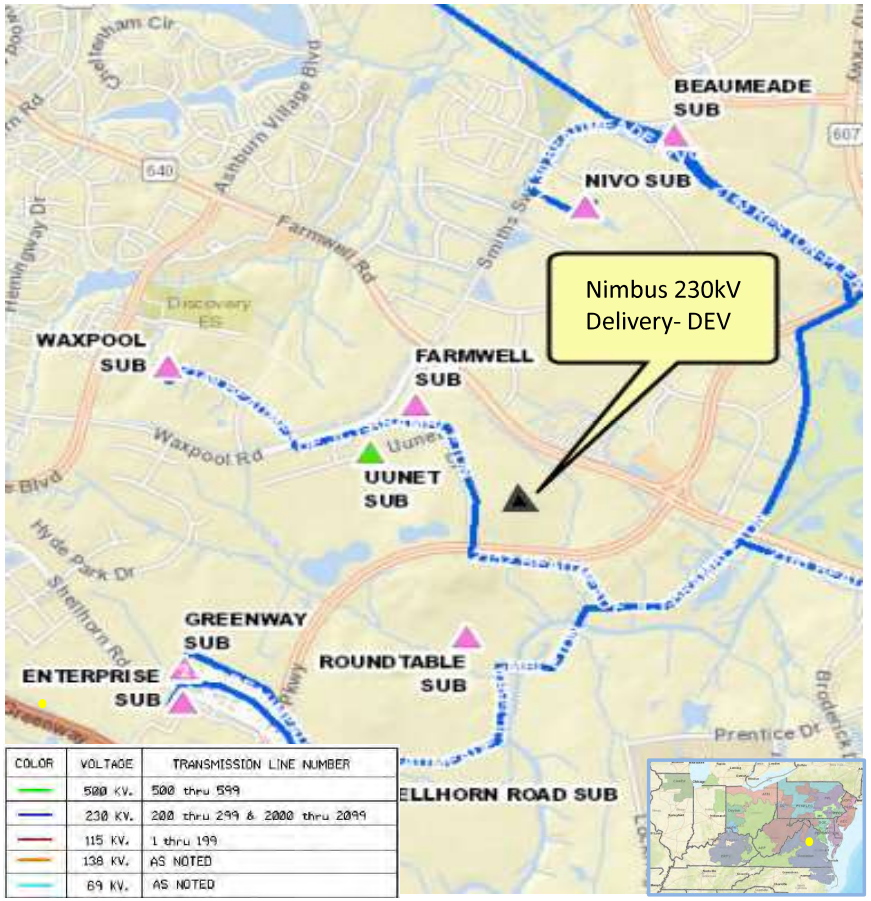
Previously Presented:
Need – 9/13/2018
Solution – 05/16/2019

Project Driver:
Customer Service

Specific Assumption Reference:
Customer load request will be evaluated per Dominion's Facility Interconnections Requirements Document & Dominion's Transmission Planning Criteria.

Problem Statement:
DEV Distribution has submitted a DP Request for a new substation (Nimbus) to accommodate a new datacenter campus in Loudoun County with a total load in excess of 100 MW. Requested in-service date is 11/15/2022.

Projected 2023 load
Summer: 60 MW
Winter: 80 MW



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Dominion Transmission Zone M-3 Process
Nimbus 230 kV Delivery - DEV

Need Number: DOM-2018-0011

Process Stage: Submission of Supplemental Project for Inclusion in the Local Plan – 12/17/2019

Selected Solution:

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

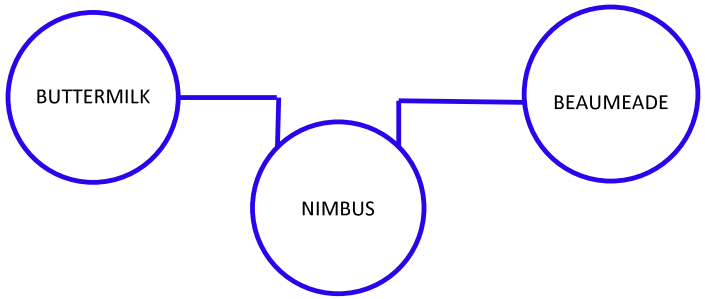
Estimated Cost: $20.0 M

Projected In-Service: 11/15/2022

Supplemental Project ID: s2100

Project Status: Conceptual

Model: 2023 RTEP



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Reliability Analysis Update

Aaron Berner, Manager

Transmission Expansion Advisory Committee
October 6, 2020

2020 RTEP Window 1 Update

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2020 RTEP Proposal Window 1 - Statistics

Timeline

- Window 1 Opened: July 1, 2020
- Window 1 Closed: August 31, 2020

47 proposals received from 8 entities

- 8 proposal includes cost containment provisions
- 12 proposals include greenfield construction

2020 RTEP Proposal Window 1 - Proposals

Proposal ID#	Project Type	Project Description	Total Construction Cost M$	Zone	kV Level	Analysis	Flowgate	Cluster
704	Greenfield	Waxpool Loop - Nimbus to Farmwell line extension	5.703	Dominion	230kV	Load Drop	N2-SLD8,N2-WLD4	2
376	Greenfield	Waxpool Loop - Loop Line #2031 Option	17.698	Dominion	230kV	Load Drop	N2-SLD8,N2-WLD4	2
883	Greenfield	Waxpool Loop - Shellhorn Option	41.203	Dominion	230kV	Load Drop	N2-SLD8,N2-WLD4	2

43

- July 1, 2020 – Proposal Window No.1 opened
- August 31, 2020 – Proposal Window No.1 closed

44 PJM evaluating proposals and violations

- Proposals presented for violations without competing proposals in this slide deck based on completion of reviews
- PJM performing analysis for other violations with multiple proposals
  - Performance, constructability, cost commitment reviews

Reliability Analysis Update

Aaron Berner, Manager

Transmission Expansion Advisory Committee
January 6, 2021

Second Review

Baseline Reliability Projects

Dominion Transmission Zone: Baseline Waxpool Area

Process Stage: Recommended Solution

Criteria: >300MW Load Loss

Assumption Reference: 2025 RTEP assumption

Model Used for Analysis: 2025 RTEP cases

Proposal Window Exclusion: None

Problem Statement:

N2-SLD8, N2-WLD4

More than 300MW of load is dropped due to the loss of 230kV Line #2149 and 230kV Line #9167 under N-1-1.

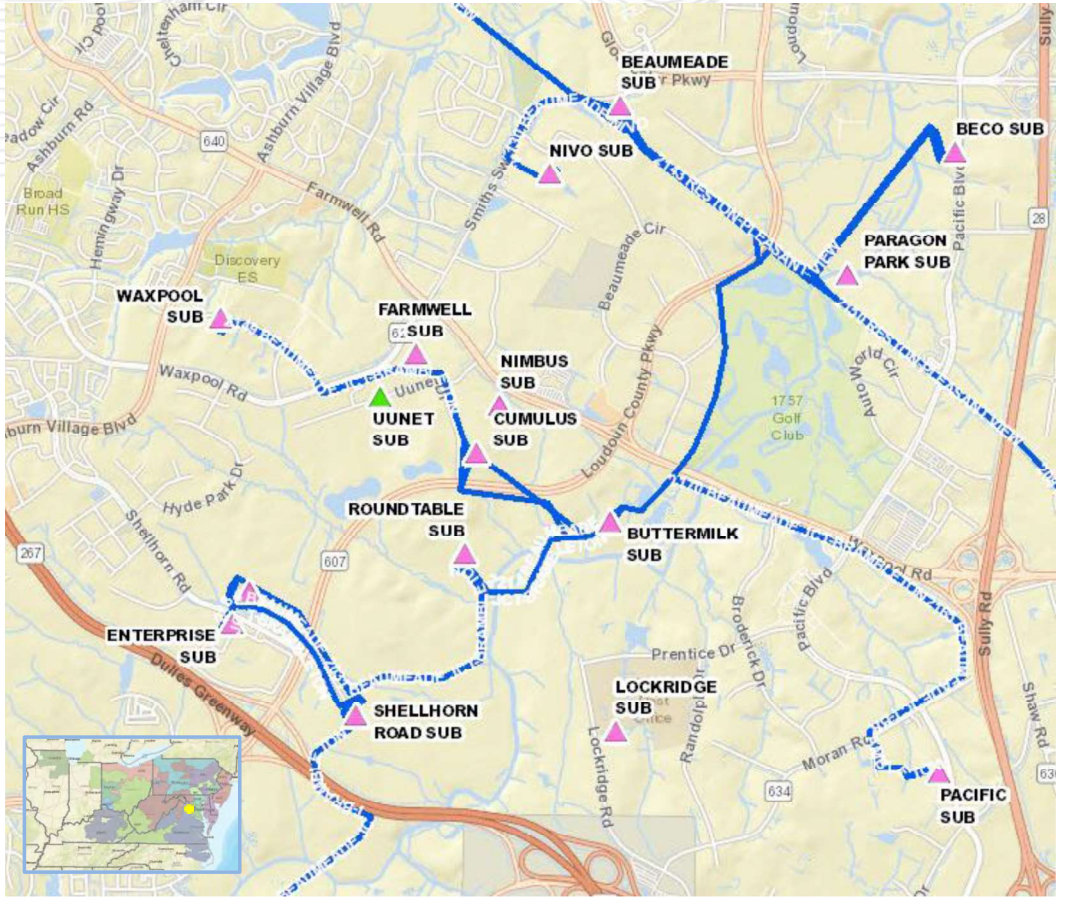
47

Existing Facility Rating:

Branch	SN/SE/SLD/WN/WE/WLD (MVA)
6NIMBUS - 6BEAMEAD 230kV	876/956/1163/1068/1123/1334

Continued on next slide…

COLOR	VOLTAGE	TRANSMISSION LINE NUMBER
	500 KV.	500 thru 599
	230 KV.	200 thru 299 & 2000 thru 2099
	115 KV.	1 thru 199
	138 KV.	AS NOTED
	69 KV.	AS NOTED



Dominion Transmission Zone: Baseline Waxpool Area

Recommended Solution:

Proposal #2020_W1-704: Extend a new 230kV single circuit line (#9250) approximately 0.4 miles of new ROW between Farmwell Substation and Nimbus Substation **(B3303.1)**

Remove Beaumeade 230kV Line #2152 line switch **(B3303.2)**

Proposed Facility Rating:

Branch	SN/SE/SLD/WN/WE/WLD (MVA)
6NIMBUS - 6FARMWELL 230kV (NEW)	1574/1574/1801/1650/1650/1897
6NIMBUS - 6BEAMEAD 230kV	1047/1047/1204/1160/1160/1334

48

Estimated Cost: $5.703 M

Required IS Date: 6/1/2025

Projected IS Date: 6/1/2025

SN / SE / SLD/ WN / WE / WLD: Summer Normal / Summer Emergency / Summer Load Dump / Winter Normal / Winter Emergency / Winter Load Dump

I. NECESSITY FOR THE PROPOSED PROJECT

K. If the need for the proposed project is due in part to reliability issues and the proposed project is a rebuild of an existing transmission line(s), provide five years of outage history for the line(s), including for each outage the cause, duration and number of customers affected. Include a summary of the average annual number and duration of outages. Provide the average annual number and duration of outages on all Applicant circuits of the same voltage, as well as the total number of such circuits. In addition to outage history, provide five years of maintenance history on the line(s) to be rebuilt including a description of the work performed as well as the cost to complete the maintenance. Describe any system work already undertaken to address this outage history.

Response: Not applicable.

I. NECESSITY FOR THE PROPOSED PROJECT

L. If the need for the proposed project is due in part to deterioration of structures and associated equipment, provide representative photographs and inspection records detailing their condition.

Response: Not applicable.

I. NECESSITY FOR THE PROPOSED PROJECT

M. In addition to the other information required by these guidelines, applications for approval to construct facilities and transmission lines interconnecting a Non-Utility Generator ("NUG") and a utility shall include the following information:

1. The full name of the NUG as it appears in its contract with the utility and the dates of initial contract and any amendments;

2. A description of the arrangements for financing the facilities, including information on the allocation of costs between the utility and the NUG;

3. a. For Qualifying Facilities ("QFs") certificated by Federal Energy Regulatory Commission ("FERC") order, provide the QF or docket number, the dates of all certification or recertification orders, and the citation to FERC Reports, if available;

b. For self-certificated QFs, provide a copy of the notice filed with FERC;

4. Provide the project number and project name used by FERC in licensing hydroelectric projects; also provide the dates of all orders and citations to FERC Reports, if available; and

5. If the name provided in 1 above differs from the name provided in 3 above, give a full explanation.

Response: Not applicable.

I. NECESSITY FOR THE PROPOSED PROJECT

N. Describe the proposed and existing generating sources, distribution circuits or load centers planned to be served by all new substations, switching stations and other ground facilities associated with the proposed project.

Response: The proposed Nimbus Substation will serve the Waxpool Road Load Area described in Sections I.A and I.C. See also Attachment I.A.1. The Project may also be used to support future load centers in the area.

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way ("ROW")

1. Provide the length of the proposed corridor and viable alternatives.

Response: The length of the Nimbus Line Loop along the Proposed Route is approximately 0.61 mile.

The length of the Farmwell-Nimbus Line along the Proposed Route is approximately 0.26 mile.

See Section II.A.9 of this Appendix, as well as the Environmental Routing Study referenced therein, for an explanation of the Company's route selection process and alternative routes considered but rejected by the Company.

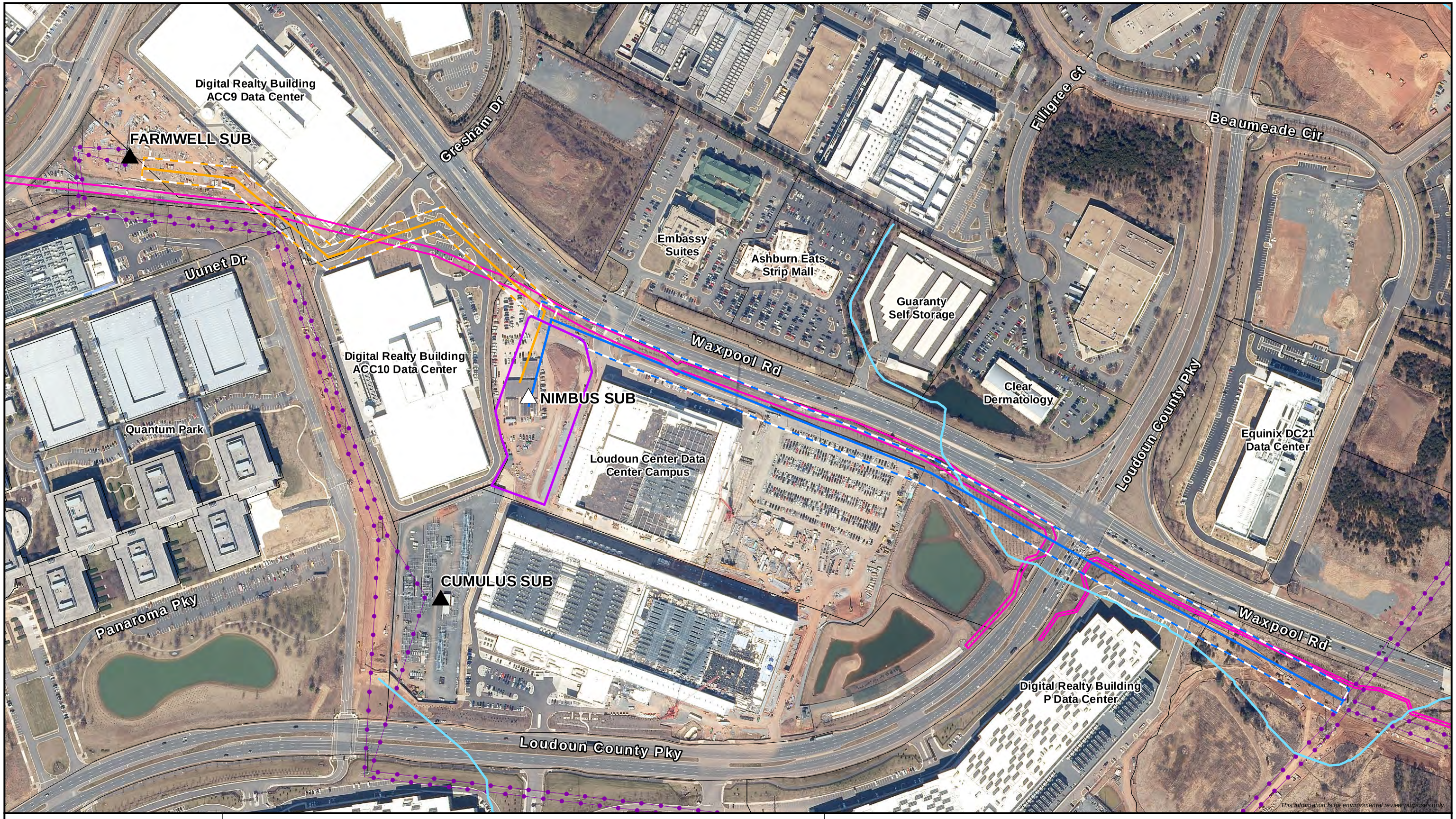
II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way ("ROW")

2. Provide color maps of suitable scale (including both general location mapping and more detailed GIS-based constraints mapping) showing the route of the proposed line and its relation to: the facilities of other public utilities that could influence the route selection, highways, streets, parks and recreational areas, scenic and historic areas, open space and conservation easements, schools, convalescent centers, churches, hospitals, burial grounds/cemeteries, airports and other notable structures close to the proposed project. Indicate the existing linear utility facilities that the line is proposed to parallel, such as electric transmission lines, natural gas transmission lines, pipelines, highways, and railroads. Indicate any existing transmission ROW sections that are to be quitclaimed or otherwise relinquished. Additionally, identify the manner in which the Applicant will make available to interested persons, including state and local governmental entities, the digital GIS shape file for the route of the proposed line.

Response: See Attachment II.A.2. No portion of the right-of-way is proposed to be quitclaimed or relinquished.

Dominion Energy Virginia will make the digital Geographic Information Systems ("GIS") shape file available to interested persons upon request to the Company's legal counsel as listed in the Project Application.



0 250 500
Feet

N

- Existing Substation
- Proposed Substation
- Nimbus 230 kV Line Loop Proposed Route
- Nimbus 230 kV Line Loop Proposed ROW
- 230 kV Farmwell-Nimbus Proposed Route
- 230 kV Farmwell-Nimbus Proposed ROW
- Proposed Nimbus Substation Boundary
- Dominion Existing Overhead Transmission Line
- Waterbody (desktop delineated)
- Dominion Existing Distribution Easement
- Parcel Boundary

Attachment II.A.2

Nimbus 230 kV Line Loop and Nimbus Substation and 230 kV Farmwell-Nimbus Transmission Line

Dominion Energy Virginia

Loudoun County, Virginia

Dominion Energy

ERM

MPLS M:\Clients\D-F\DOM\Nivo_Nimbus_ArcGIS\2021\12_SCC_Appendix_Figures\DOM_Nimbus_Attachment_II_A_2.mxd | REVISED: 02/15/2022 | SCALE: 1:4,000 when printed at 11x17

DRAWN BY: JPB

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way ("ROW")

3. Provide a separate color map of a suitable scale showing all the Applicant's transmission line ROWs, either existing or proposed, in the vicinity of the proposed project.

Response: See Attachment I.G.1.

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way ("ROW")

4. To the extent the proposed route is not entirely within existing ROW, explain why existing ROW cannot adequately service the needs of the Applicant.

Response: Nimbus Line Loop

There is no existing Company-owned right-of-way that serves the Customer's site.

Farmwell-Nimbus Line

There is no existing Company-owned right-of-way located between Farmwell Substation and the proposed Nimbus Substation.

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way ("ROW")

5. Provide drawings of the ROW cross section showing typical transmission line structure placements referenced to the edge of the ROW. These drawings should include:

a. ROW width for each cross section drawing;

b. Lateral distance between the conductors and edge of ROW;

c. Existing utility facilities on the ROW; and

d. For lines being rebuilt in existing ROW, provide all of the above (i) as it currently exists, and (ii) as it will exist at the conclusion of the proposed project.

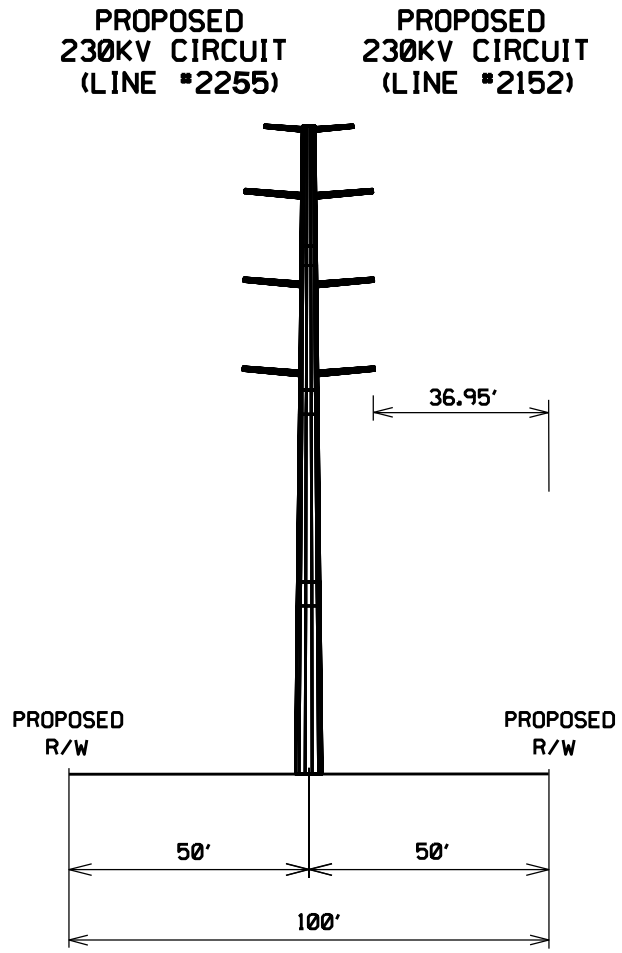
Response: See Attachment II.A.5.a for the Nimbus Line Loop.

See Attachment II.A.5.b for the Farmwell-Nimbus Line.

For additional information on the structures, see Section II.B.3.

LINE 2152 LOOP TO NIMBUS

PRELIMINARY



PROPOSED CONFIGURATION
TYPICAL CORRIDOR LOOKING TO NIMBUS

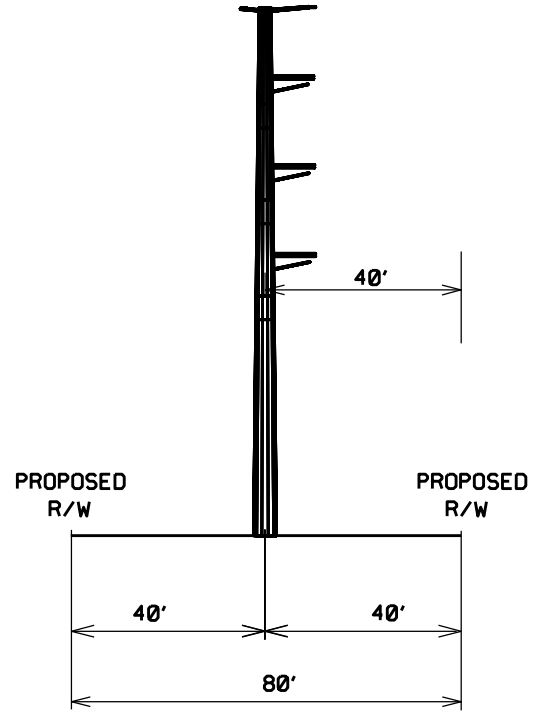
NOTE: Information contained on drawing is to be considered preliminary in nature and subject to change based on final design.

$DGNSPEC$

FARMWELL - NIMBUS 230kV LINE

PRELIMINARY

PROPOSED
230KV CIRCUIT
(LINE #2260)



PROPOSED CONFIGURATION
TYPICAL CORRIDOR LOOKING TO NIMBUS

NOTE: Information contained on drawing is to be considered preliminary in nature and subject to change based on final design.

$DGNSPEC$

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way ("ROW")

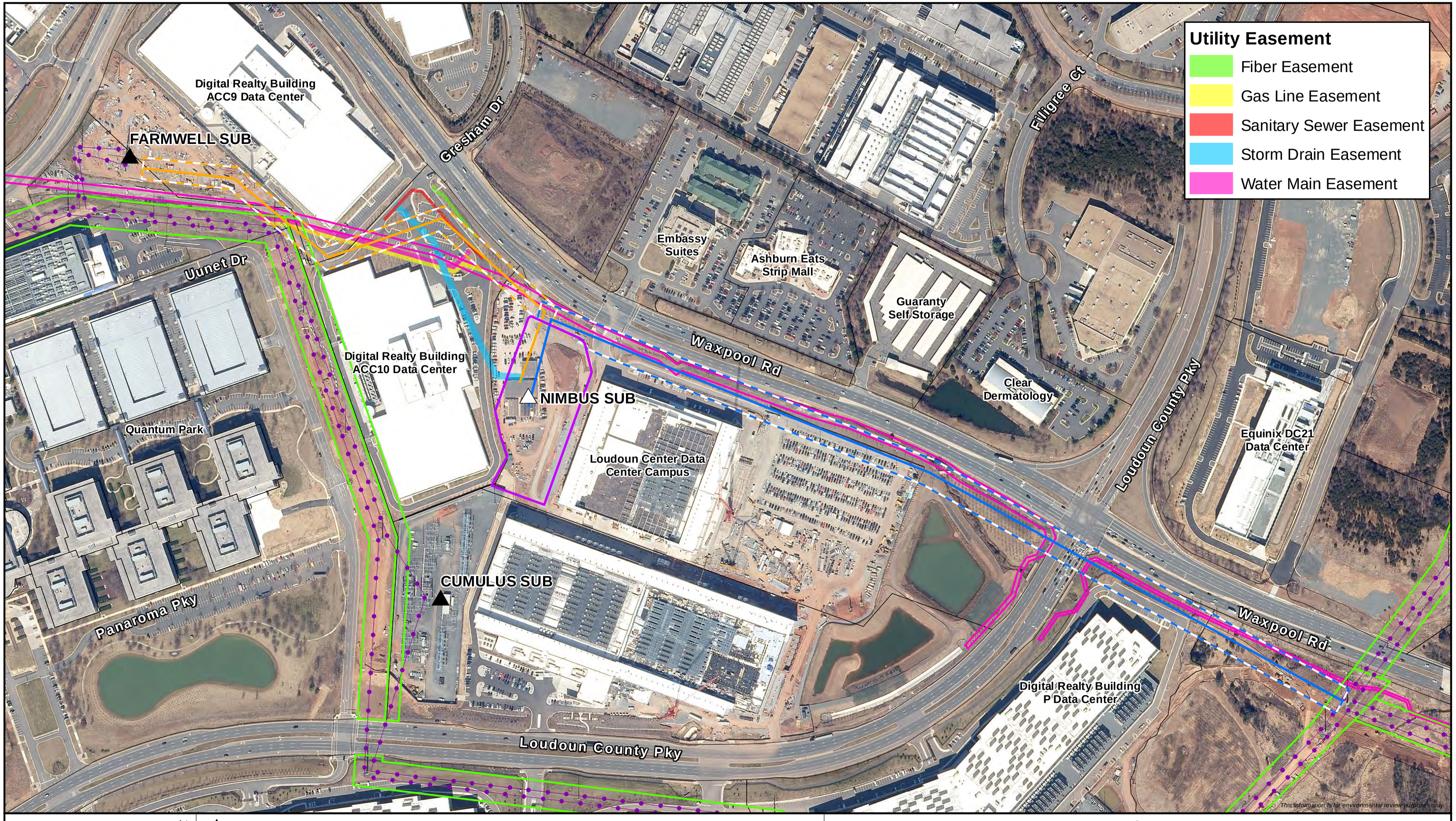
6. Detail what portions of the ROW are subject to existing easements and over what portions new easements will be needed.

Response: As discussed in Section II.A.4, there is no existing Company-owned transmission right-of-way that that can be used for the Project. Therefore, the entire right-of-way for the Project will require easements for new-build transmission lines. However, portions of the routes will overlap existing easements, as discussed below.

The Proposed Route of the Nimbus Line Loop, where it parallels Waxpool Road, will overlap existing Dominion Energy Virginia overhead and underground electric distribution line easements for a length of 0.54 mile. Additionally, the Nimbus Line Loop right-of-way crosses existing and proposed fiber optics easements. These fiber easements begin approximately 200 feet west of the cut in at Line #2152 (Structure #2152/19A) and extend west to the Nimbus Substation property.

The Farmwell-Nimbus Line crosses multiple utility easements where the route extends through the parking area between data center buildings. These include water main, storm drain, sanitary sewer, gas line and fiber easements. In addition, the right-of-way for the Farmwell-Nimbus Line overlaps a portion of sanitary sewer easement that is located adjacent to Waxpool Road.

See Attachment II.A.6.a for a map illustrating easements crossed by the Project. See Attachment II.A.6.b for a letter on behalf of a landowner whose property is crossed by the proposed Project indicating plans to provide an easement, subject to the parties' negotiations regarding compensation.



0 250 500
Feet

N

- Existing Substation
- Proposed Substation
- Nimbus 230 kV Line Loop Proposed Route
- Nimbus 230 kV Line Loop Proposed ROW
- 230 kV Farmwell-Nimbus Proposed Route
- 230 kV Farmwell-Nimbus Proposed ROW
- Proposed Nimbus Substation Boundary
- Dominion Existing Overhead Transmission Line
- Dominion Existing Transmission Line Right-of-Way
- Dominion Existing Distribution Easement
- Parcel Boundary

Dominion Energy

Attachment II.A.6.a
Nimbus 230 kV Line Loop and Nimbus Substation and 230 kV Farmwell-Nimbus Transmission Line
Dominion Energy Virginia
Loudoun County, Virginia

ERM

MPLS M:\Clients\D-F\DOM\Nivo_Nimbus_ArcGIS\2021\12_SCC_Appendix_Figures\DOM_Nimbus_Attachment_II_A_6b.mxd | REVISED: 02/15/2022 | SCALE: 1:4,000 when printed at 11x17

DRAWN BY: JPB

1212 New York Avenue, NW Suite 1000
Washington, DC 20005
P 202.607.2300 | **F** 202.803.5702

Virginia State Corporation Commission
Division of Public Utility Regulation
P.O. Box 1197 Richmond, Virginia 23218

RE: Nimbus 230kV Transmission Line

Dear Mr. McBride:

Over the past few months, Dominion Energy has been working with CloudHQ regarding the acquisition of an easement for a right-of-way for the above referenced Nimbus 230kV transmission line project. Consistent with those discussions, CloudHQ is willing to discuss the terms of Dominion's acquisition of the necessary right-of-way easement for the transmission line project.

Kind regards,

Brian O'Hara

Brian O'Hara
Vice President, Design & Infrastructure

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way ("ROW")

7. Detail the proposed ROW clearing methods to be used and the ROW restoration and maintenance practices planned for the proposed project.

Response: The right-of-way for the double circuit 230 kV Nimbus Line Loop will be 100 feet wide; the right-of-way for the proposed single circuit 230 kV Farmwell-Nimbus Line will be 80 feet wide. Vegetation in the corridors that exceeds 10 feet tall would need to be removed. Based on existing conditions, minimal tree clearing would be required as the Project is positioned within a highly developed area that is often maintained periodically. Recently planted vegetation buffers located along Waxpool Road would need to be reviewed and potentially redesigned to include vegetation that does not exceed the safety requirements for the overhead transmission line circuits and complies with the Company's approved species list.

Any tree along the right-of-way that is tall enough to endanger the conductors if it were to break at the stump or uproot and fall directly toward the conductors and exhibits signs or symptoms of disease or structural defect that make it an elevated risk for falling will be designated as a "danger tree" and may be removed. The proposed Project is expected to have minimal, if any, impact on forest resources, as the proposed Project is primarily located on properties that have been previously cleared and maintained for existing facility operation and industrial and commercial developments.

Erosion and sediment controls will be maintained and temporary stabilization for all soil disturbing activities will be utilized until the right-of-way has been restored and stabilized. Upon completion of the Project, the Company will restore the right-of-way utilizing site rehabilitation procedures outlined in the Company's *Standards & Specifications for Erosion & Sediment Control and Stormwater Management for Construction and Maintenance of Linear Electric Transmission Facilities* that was approved by the Virginia Department of Environmental Quality ("DEQ"). Time of year and weather conditions may affect when permanent stabilization takes place.

This right-of-way will continue to be maintained on a regular cycle to prevent interruptions to electric service and provide ready access to the right-of-way in order to patrol and make emergency repairs. Periodic maintenance to control woody growth will consist of hand cutting, machine mowing and herbicide application.

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way ("ROW")

8. Indicate the permitted uses of the proposed ROW by the easement landowner and the Applicant.

Response: Any non-transmission use will be permitted that:

- Is in accordance with the terms of the easement agreement for the right-of-way;
- Is consistent with the safe maintenance and operation of the transmission lines;
- Will not restrict future line design flexibility; and
- Will not permanently interfere with future construction.

Subject to the terms of the easement, examples of typical permitted uses include but are not limited to:

- Agriculture
- Hiking Trails
- Fences
- Perpendicular Road Crossings
- Perpendicular Utility Crossings
- Residential Driveways
- Wildlife / Pollinator Habitat

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way ("ROW")

9. Describe the Applicant's route selection procedures. Detail the feasible alternative routes considered. For each such route, provide the estimated cost and identify and describe the cost classification (e.g. "conceptual cost," "detailed cost," etc.). Describe the Applicant's efforts in considering these feasible alternatives. Detail why the proposed route was selected and other feasible alternatives were rejected. In the event that the proposed route crosses, or one of the feasible routes was rejected in part due to the need to cross, land managed by federal, state, or local agencies or conservation easements or open space easements qualifying under §§ 10.1-1009 – 1016 or §§ 10.1-1700 – 1705 of the Code (or a comparable prior or subsequent provision of the Code), describe the Applicant's efforts to secure the necessary ROW.

Response: The Company's route selection for a new transmission line typically begins with identification of the project "origin" and "termination" points provided by the Company's Transmission Planning group. This is followed by the development of a study area for the project. The study area represents a circumscribed geographic area from which potential routes that may be suitable for a transmission line can be identified.

For the Project, the Company retained the services of Environmental Resources Management ("ERM") to help collect information within the study area, identify potential routes, perform a routing analysis comparing the route alternatives, and document the routing efforts in an Environmental Routing Study. After investigating various electrical solutions, the Company determined that two electrical line segments are required for the Project:

- Nimbus Line Loop: a double circuit 230 kV overhead route that would cut the Company's existing Beaumeade-Buttermilk Line #2152 at Structure #2152/19A along Waxpool Road, east of Loudoun County Parkway, and extend to the proposed Nimbus Substation.

- Farmwell-Nimbus Line: a single circuit 230 kV overhead route that would extend from the existing Farmwell Substation to the proposed Nimbus Substation.

A study area was developed that encompassed the areas surrounding these two proposed line segments.

As discussed in the Environmental Routing Study, ERM originally identified five potential route alternatives for the Nimbus Line Loop. Of these five routes, the Proposed Route represents the only feasible, least impacting route option.

Nimbus Line Loop Alternative Route 2 was dismissed due to the impacts the route would have on five commercial properties along the north side of Waxpool Road. Nimbus Line Loop Alternative Route 3 was dismissed because it would require a non-perpendicular crossing of Waxpool Road and the removal of a portion of a recently planted landscape buffer at the intersection of Waxpool Road and Loudoun County Parkway. Nimbus Line Loop Alternative Route 4 was dismissed due to lack of space to collocate the route with the Company's existing Lines #2203/#2149 without significantly overlapping with Loudoun County Parkway and the inability to cross over the Cumulus Substation. Nimbus Line Loop Alternative Route 5 was dismissed for the same reasons as Alternative Route 4: insufficient space to collocate with the Company's existing Lines #2203/#2149 without significantly overlapping Loudoun County Parkway and the inability to cross over the Cumulus Substation. Additionally, this route would require multiple crossings of the Company's existing transmission lines south of Loudoun County Parkway.

Because the Proposed Route of the Farmwell-Nimbus Line represents the shortest and most direct route option to connect the existing Farmwell Substation and the proposed Nimbus Substation, the Company did not consider any alternative routes for the Farmwell-Nimbus Line.

The route development process for the Project is described in more detail in the Environmental Routing Study. The Proposed Routes are discussed below. Refer to Section 2.5 of the Environmental Routing Study for additional information on the rejected routes.

Nimbus Line Loop Proposed Route

This route would construct an overhead double circuit 230 kV transmission line originating at the cut in on Line #2152 at existing Structure #2152/19A adjacent to the south side of Waxpool Road, east of Loudoun County Parkway, and extend to the proposed Nimbus Substation termination point. See Section I.I for the estimated conceptual cost for the Proposed Route for the Nimbus Line Loop.

The total length of the Proposed Route of the Nimbus Line Loop between Structure #2152/19A and the proposed Nimbus Substation is approximately 0.61 mile. Beginning at Structure #2152/19A, the route continues west along the south side of Waxpool Road, crossing over Loudoun County Parkway, for a distance of 3,225 linear feet. At this point, the route turns south for a distance of 20 feet where it terminates at the proposed Nimbus Substation.

The Proposed Route of the Nimbus Line Loop is the shortest and most direct possible route of all routes reviewed in the Environmental Routing Study. This route crosses the fewest number of landowners at two. Moreover, the parcels crossed by the route are all associated with data center developments. Additionally, minimal tree removal associated with landscape buffers on data center properties would be required with this route.

Farmwell-Nimbus Line Proposed Route

This route would construct an overhead single circuit 230 kV transmission line originating from the Company's existing Farmwell Substation to the proposed Nimbus Substation termination point. See Section I.I for the estimated conceptual cost of the Proposed Route for the Farmwell-Nimbus Line**.**

The total length of the Proposed Route of the Farmwell-Nimbus Line is approximately 0.26 mile. The route exits the eastern side of the Farmwell Substation then turns to the southeast and extends parallel to an existing data center building for approximately 450 feet. The route then turns to the northeast across an existing parking area for approximately 430 feet. Upon exiting the parking area, the route next turns southeast and parallels Waxpool Road for approximately 510 feet. The route then turns south and enters into the proposed Nimbus Substation.

The Proposed Route for the Farmwell-Nimbus Line would be located entirely on data center properties. The route represents the most direct possible route to connect the two substations.

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way ("ROW")

10. Describe the Applicant's construction plans for the project, including how the Applicant will minimize service disruption to the affected load area. Include requested and approved line outage schedules for affected lines as appropriate.

Response: The Company plans to construct the Project in a manner that minimizes outage time. Note that it is the Company's intention to construct both the Nimbus Line Loop and Substation and the Farmwell-Nimbus Line at the same time; however, either could be constructed first in a sequential manner and still achieve the in-service date for the Project, while also minimizing outage time.

The Company will request the outages discussed below from PJM prior to the date of such outages. It is customary for PJM not to grant approval of outages until shortly before the outages are expected to occur and, therefore, it may be subject to change.

Nimbus Line Loop and Substation

Assuming construction commences around March 2023, the cut-in of Line #2152 should begin around September 2024. The cut-in process will require a PJM outage eDart ticket on the Beaumeade-Buttermilk Line #2152. The line cut in should only require a 60-day outage. Assuming a final order from the Commission by December 27, 2022, as requested in Section I.H. of this Appendix, the Company estimates that construction of the Nimbus Line Loop and Substation will commence around March 2023, and be completed by December 27, 2024.

The Company will request this outage from PJM prior to the date of such outage. It is customary for PJM not to grant approval of outages until shortly before the outages are expected to occur and, therefore, it may be subject to change.

Farmwell-Nimbus Line

Assuming construction commences around November 2023, the installation of Line #2260 should begin around September 2024. The installation process will not require a PJM outage eDart ticket because an outage will not be required. Assuming a final order from the Commission by December 27, 2022, as requested in Section I.H. of this Appendix, the Company estimates that construction of the Farmwell-Nimbus Line will commence around September 2024, and be completed by December 27, 2024.

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way ("ROW")

11. Indicate how the construction of this transmission line follows the provisions discussed in Attachment 1 of these Guidelines.

Response: The Company utilized Guideline #1 (rights-of-ways should be selected with the purpose of minimizing conflict between the rights-of-way and present and prospective uses of the land) by siting the transmission lines to the exterior of the property boundaries and by working with the landowners to route the lines in a way that limits the impacts to the present and future development of the land. In the case of the Nimbus Line Loop, the Company coordinated with the owners of the existing and planned data center developments on the south side of Waxpool Road to ensure that the route for the transmission line would not impact these developments. Similarly, for the Farmwell-Nimbus Line, the Company coordinated with the affected property owners to place the line in a location that would not impact operation and future development of the site.

In accordance with Guideline #2, the Proposed Routes do not impact any national historic places listed in the National Register of Historic Places ("NRHP") and natural landmarks listed in the National Register of Natural Landmarks maintained by the Secretary of the Interior and parks, scenic, wildlife and recreational lands, officially designated by duly constituted public authorities. See Section III.G for a description of the cultural resources identified in the Stage I Pre-Application Analysis prepared by Dutton + Associates, LLC ("D+A") on behalf of the Company, which is included as Appendix F of the Environmental Routing Study.

The Proposed Routes are not located in an area of high scenic value in conformance with Guideline #3. As discussed in Section III.E, the area in the vicinity of the Proposed Routes, which is north of Washington Dulles International Airport, is expected to continue to be a key location for industrial uses, airport-related businesses, and data center development.

The Company follows recommended construction methods on a site-specific basis for typical construction projects (Guidelines #8, #10, #11, #12, #15, #16, #18 and #22).

The Company also utilizes recommended guidelines in the clearing of right-of-way, constructing facilities and maintaining rights-of-way after construction. Moreover, secondary uses of right-of-way that are consistent with the safe maintenance and operation of facilities are permitted.

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way ("ROW")

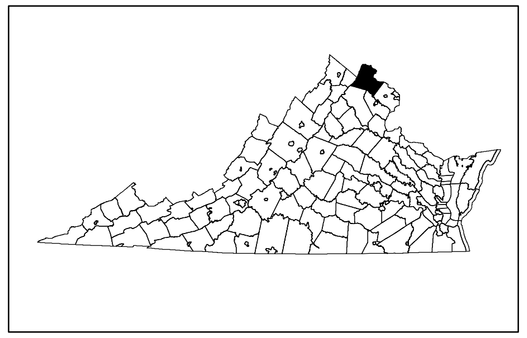
12. a. Detail counties and localities through which the line will pass. If any portion of the line will be located outside of the Applicant's certificated service area: (1) identify each electric utility affected; (2) state whether any affected electric utility objects to such construction; and (3) identify the length of line(s) proposed to be located in the service area of an electric utility other than the Applicant; and

b. Provide three (3) color copies of the Virginia Department of Transportation "General Highway Map" for each county and city through which the line will pass. On the maps show the proposed line and all previously approved and certificated facilities of the Applicant. Also, where the line will be located outside of the Applicant's certificated service area, show the boundaries between the Applicant and each affected electric utility. On each map where the proposed line would be outside of the Applicant's certificated service area, the map must include a signature of an appropriate representative of the affected electric utility indicating that the affected utility is not opposed to the proposed construction within its service area.

Response: a. The proposed Project traverses Loudoun County for a total of approximately 0.87 mile, which includes approximately 0.61 mile for the Nimbus Line Loop and approximately 0.26 mile for the Farmwell-Nimbus Line. The Project is located entirely within Dominion Energy Virginia's service territory.

b. An electronic copy of the map of the Virginia Department of Transportation ("VDOT") "General Highway Map" for Loudoun County has been marked as required and submitted with the Application. A reduced copy of the map is provided as Attachment II.A.12.b.

Loudoun County Road Map



This digital map depicts the Virginia Electric and Power Company ("Company") transmission facilities in this county as approved by the Virginia State Corporation Commission ("SCC"), and any proposed transmission facilities in this county, as of February 9, 2022. Other Company facilities previously authorized by the SCC may be depicted on prior SCC approved county maps.

VIRGINIA ELECTRIC AND POWER COMPANY PLANS TO BUILD TRANSMISSION LINES AND SUBSTATIONS AS SHOWN IN BLACK DASHES ON THIS MAP.

Legend

- Proposed Project
- 500kV Under Consideration by SCC
- 230kV Under Consideration by SCC
- Number of Lines of Structures/Number of Circuits
- Proposed Substation
- Existing Substation
- 115 kV
- 230 kV
- 500 kV

Provider Service Territory

- NOVEC
- VEPCO

West Virginia

Maryland

Clarke County

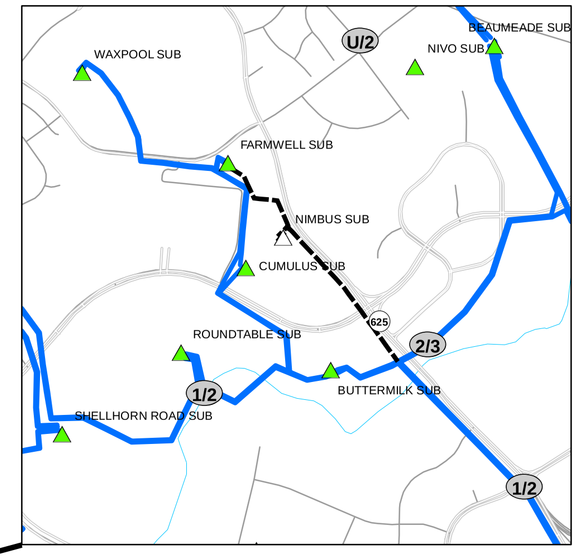
Fauquier County

Prince William County

Fairfax County

Maryland

HAMILTON SUB
BREEZY KNOLL SUB
DRY MILL SOUTH SUB
GOOSE CREEK SUB
PLEASANT VIEW SUB
BELMONT SUB
STONEWATER SUB
ASHBURN SUB
MIDDLEBURG SUB
NEW ROAD SUB
BRAMBLETON SUB
ENTERPRISE SUB
WAXPOOL SUB
FARMWELL SUB
NIVO SUB
CUMULUS SUB
BEAUMEADE SUB
DTC SUB
BECO SUB
SHELLHORN ROAD SUB
LOCKRIDGE SUB
PACIFIC SUB
STERLING PARK SUB
DAVIS DRIVE SUB
CABIN RUN SUB
EVERGREEN MILLS SUB
YARDLEY RIDGE SUB
LOUDOUN SUB
MOSBY SUB
POLING ROAD SUB
AVIATOR SUB
WASHINGTON-DULLES INTL AIRPORT



Miles
2 1 0 2 4 6

*VDOT and other road data obtained from Navteq and County data, current as of June 2016.

Loudoun

72

Attachment II.A.12.b

II. DESCRIPTION OF THE PROPOSED PROJECT

B. Line Design and Operational Features

1. Detail the number of circuits and their design voltage, initial operational voltage, any anticipated voltage upgrade, and transfer capabilities.

Response: The proposed double circuit Nimbus Line Loop will be designed and operated at 230 kV with no anticipated voltage upgrade and have a transfer capability of 1573 MVA.

The proposed single circuit Farmwell-Nimbus Line will be designed and operated at 230 kV with no anticipated voltage upgrade and have a transfer capability of 1573 MVA.

II. DESCRIPTION OF THE PROPOSED PROJECT

B. Line Design and Operational Features

2. Detail the number, size(s), type(s), coating and typical configurations of conductors. Provide the rationale for the type(s) of conductor(s) to be used.

Response: The proposed double circuit 230 kV Nimbus Line Loop will include 3-phase twin-bundled 768.2 ACSS/TW/HS conductors arranged as shown in Attachments II.B.3.i-ii. The twin-bundled 768.2 ACSS/TW/HS conductors are a Company standard for new 230 kV construction.

The proposed single circuit 230 kV Farmwell-Nimbus Line will include 3-phase twin-bundled 768.2 ACSS/TW/HS conductors arranged as shown in Attachment II.B.3.iii. The twin-bundled 768.2 ACSS/TW/HS conductors are a Company standard for new 230 kV construction.

II. DESCRIPTION OF THE PROPOSED PROJECT

B. Line Design and Operational Features

3. With regard to the proposed supporting structures over each portion of the ROW for the preferred route, provide diagrams (including foundation reveal) and descriptions of all the structure types, to include:

a. mapping that identifies each portion of the preferred route;

b. the rationale for the selection of the structure type;

c. the number of each type of structure and the length of each portion of the ROW;

d. the structure material and rationale for the selection of such material;

e. the foundation material;

f. the average width at cross arms;

g. the average width at the base;

h. the maximum, minimum and average structure heights;

i. the average span length; and

j. the minimum conductor-to-ground clearances under maximum operating conditions.

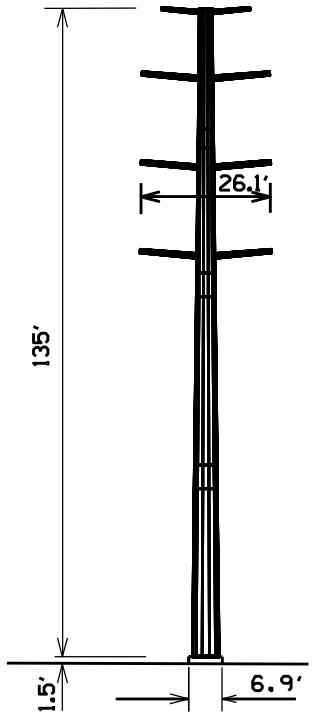
Response: See Attachments II.B.3.i-ii for the Nimbus Line Loop.

See Attachment II.B.3.iii for the Farmwell-Nimbus Line.

See Attachment II.B.3.iv for mapping of structure locations per subpart (a).

DOUBLE CIRCUIT DOUBLE DEADEND STEEL POLE

PRELIMINARY



PROPOSED STRUCTURES

a. MAPPING THAT IDENTIFIES EACH PORTION OF THE PREFERRED ROUTE: SEE ATTACHMENT II.B.3.iv

b. RATIONALE FOR THE SELECTION OF THE STRUCTURE TYPE: THE SINGLE SHAFT STEEL POLE ALLOWS THE INSTALLATION OF THE DOUBLE CIRCUIT LINE IN A 100' R/W AND REDUCES THE FOOTPRINT OF THE STRUCTURE

c. NUMBER OF EACH TYPE OF STRUCTURE AND LENGTH OF EACH PORTION OF THE R/W: 4 AND 0.66 MILES (LINE 2255) & 0.67 MILES (LINE 2152)

d. STRUCTURE MATERIAL AND RATIONALE FOR THE SELECTION OF SUCH MATERIAL: GALVANIZED STEEL TO MATCH EXISTING STRUCTURES

e. FOUNDATION MATERIAL: CONCRETE

f. AVERAGE WIDTH AT CROSSARM: 26.1'

G. AVERAGE WIDTH AT BASE: 6.9' - DIAMETER (RANGE 6'-7.5')

h. MAX, MIN, AND AVERAGE STRUCTURE HEIGHTS: 140 FEET, 125', AND 134' (DOES NOT INCLUDE FOUNDATION REVEAL)

i. AVERAGE SPAN LENGTH: 703 FEET (RANGE 273 - 889 FEET)

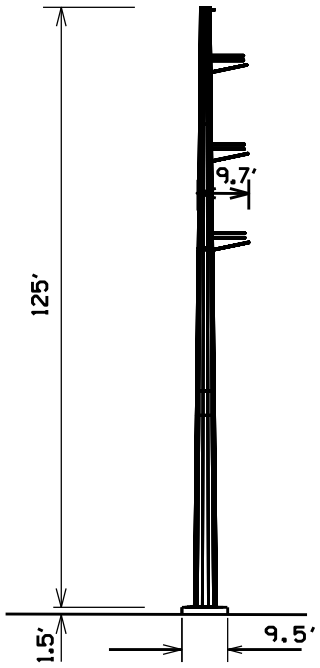
j. MINIMUM CONDUCTOR-GROUND CLEARANCE UNDER MAXIMUM OPERATING CONDITIONS: 22.5'

NOTE: Information contained on drawing is to be considered preliminary in nature and subject to change based on final design.

$DGNSPEC$

SINGLE CIRCUIT DOUBLE DEADEND STEEL POLE

PRELIMINARY



PROPOSED STRUCTURES

a. MAPPING THAT IDENTIFIES EACH PORTION OF THE PREFERRED ROUTE:
SEE ATTACHMENT II.B.3.iv

b. RATIONALE FOR THE SELECTION OF THE STRUCTURE TYPE: ALLOWS THE EXISTING LINE TO BE CUT TO LOOP TO NIMBUS AND MINIMIZES FOOTPRINT OF STRUCTURE

c. NUMBER OF EACH TYPE OF STRUCTURE AND LENGTH OF EACH PORTION OF THE R/W:
3 AND 0.66 MILES (LINE 2255) & 0.67 MILES (LINE 2152)

d. STRUCTURE MATERIAL AND RATIONALE FOR THE SELECTION OF SUCH MATERIAL:
GALVANIZED STEEL TO MATCH EXISTING STRUCTURES

e. FOUNDATION MATERIAL: CONCRETE

f. AVERAGE WIDTH AT CROSSARM: 9.7'

G. AVERAGE WIDTH AT BASE: 9.5' DIAMETER

h. MAX, MIN, AND AVERAGE STRUCTURE HEIGHTS: 125 FEET, 125', AND 125'
(DOES NOT INCLUDE FOUNDATION REVEAL)

i. AVERAGE SPAN LENGTH: 703FEET (RANGE 273 - 889 FEET)

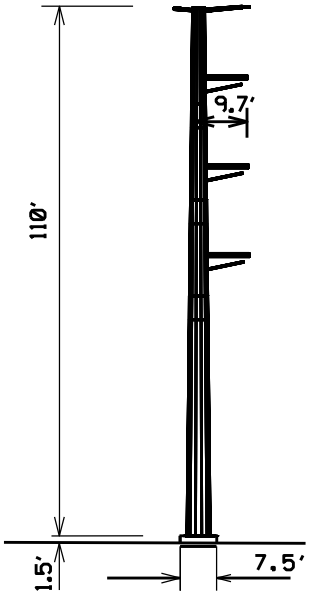
j. MINIMUM CONDUCTOR-GROUND CLEARANCE UNDER MAXIMUM OPERATING CONDITIONS: 22.5'

NOTE: Information contained on drawing is to be considered preliminary in nature and subject to change based on final design.

$DGNSPEC$

SINGLE CIRCUIT DOUBLE DEADEND STEEL POLE

PRELIMINARY



PROPOSED STRUCTURES

a. MAPPING THAT IDENTIFIES EACH PORTION OF THE PREFERRED ROUTE:
SEE ATTACHMENT II.B.3.iv

b. RATIONALE FOR THE SELECTION OF THE STRUCTURE TYPE: ALLOWS THE INSTALLATION OF THE LINE IN THE 80' R/W AND MINIMIZES FOOTPRINT OF STRUCTURE

c. NUMBER OF EACH TYPE OF STRUCTURE AND LENGTH OF EACH PORTION OF THE R/W:
3 AND 0.4 MILES

d. STRUCTURE MATERIAL AND RATIONALE FOR THE SELECTION OF SUCH MATERIAL:
GALVANIZED STEEL TO MATCH EXISTING STRUCTURES

e. FOUNDATION MATERIAL: CONCRETE

f. AVERAGE WIDTH AT CROSSARM: 9.7'

G. AVERAGE WIDTH AT BASE: 7.5' DIAMETER

h. MAX, MIN, AND AVERAGE STRUCTURE HEIGHTS: 110 FEET, 110', AND 110'
(DOES NOT INCLUDE FOUNDATION REVEAL)

i. AVERAGE SPAN LENGTH: 399 FEET (RANGE 273 - 503 FEET)

j. MINIMUM CONDUCTOR-GROUND CLEARANCE UNDER MAXIMUM OPERATING CONDITIONS: 22.5'

NOTE: Information contained on drawing is to be considered preliminary in nature and subject to change based on final design.

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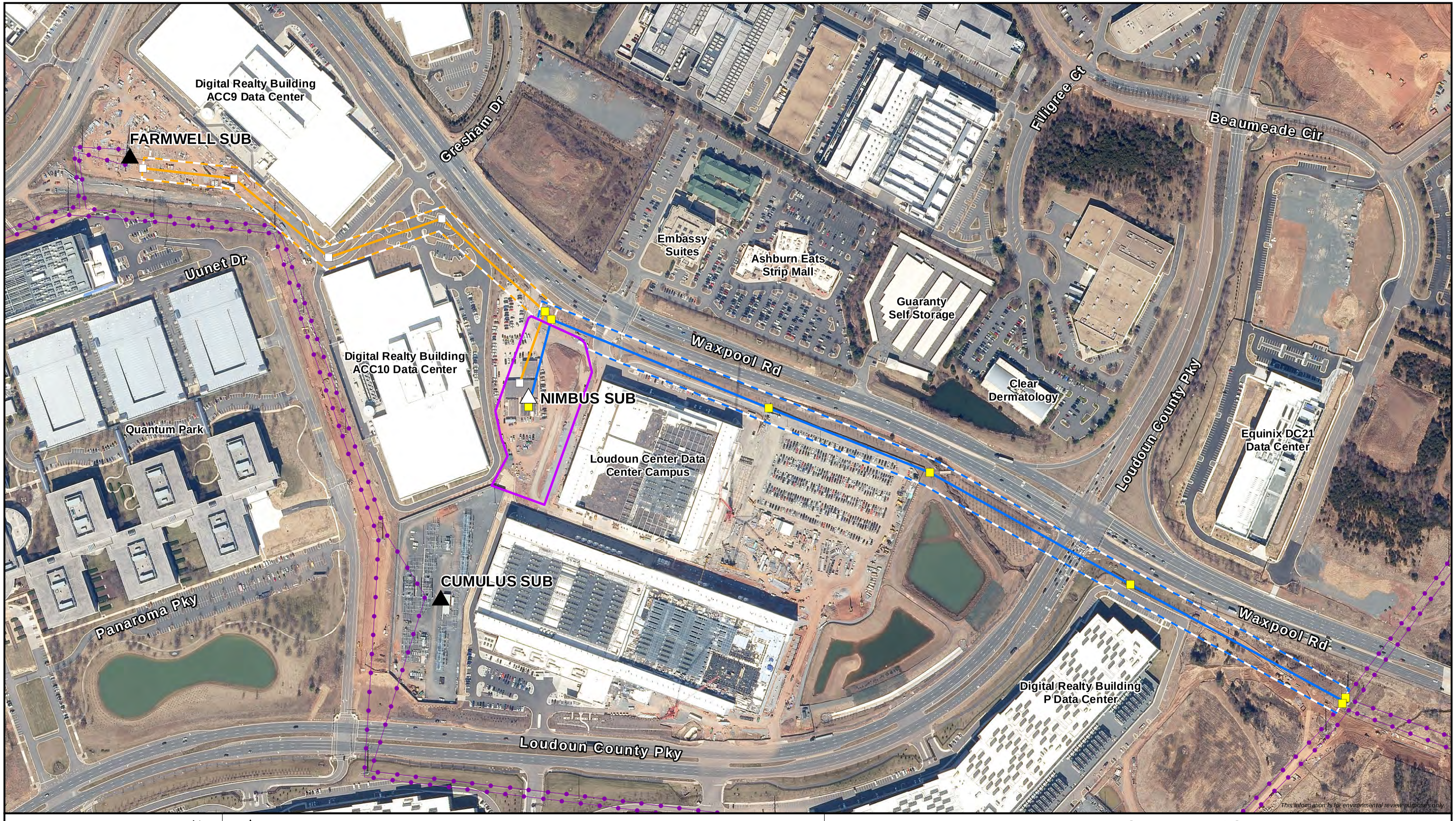

0 250 500
Feet

N

- Existing Substation
- Proposed Substation
- Nimbus 230 kV Line Loop Proposed Structure Location
- Nimbus 230 kV Line Loop Proposed Route
- Nimbus 230 kV Line Loop Proposed ROW
- 230 kV Farmwell-Nimbus Proposed Structure Location
- 230 kV Farmwell-Nimbus Proposed Route
- 230 kV Farmwell-Nimbus Proposed ROW
- Proposed Nimbus Substation Boundary
- Dominion Existing Overhead Transmission Line

Attachment II.B.3.iv

Nimbus 230 kV Line Loop and Nimbus Substation and 230 kV Farmwell-Nimbus Transmission Line

Dominion Energy Virginia

Loudoun County, Virginia

Dominion Energy

ERM

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Attachment II.B.3.iv

II. DESCRIPTION OF THE PROPOSED PROJECT

B. Line Design and Operational Features

4. With regard to the proposed supporting structures for all feasible alternate routes, provide the maximum, minimum and average structure heights with respect to the whole route.

Response: Not applicable.

II. DESCRIPTION OF THE PROPOSED PROJECT

B. Line Design and Operational Features

5. For lines being rebuilt, provide mapping showing existing and proposed structure heights for each individual structure within the ROW, as proposed in the application.

Response: Not applicable.

II. DESCRIPTION OF THE PROPOSED PROJECT

B. Line Design and Operational Features

6. Provide photographs for [a] typical existing facilities to be removed, ;b]comparable photographs or representations for proposed structures, and [c] visual simulations showing the appearance of all planned transmission structures at identified historic locations within one mile of the proposed centerline and in key locations identified by the Applicant.

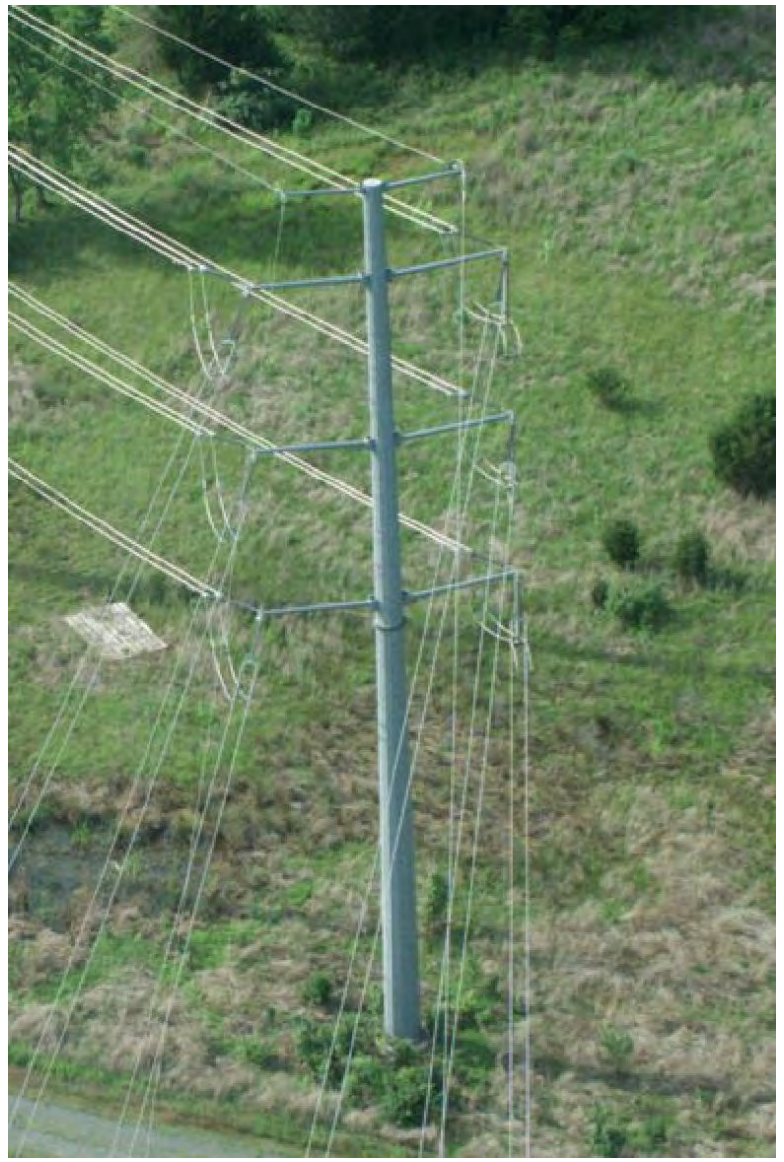
Response: [a] Not applicable. There are no existing structures proposed for removal pursuant to the Project.

[b] See Attachment II.B.6.b for representative photographs of the proposed structures.

[c] Visual simulations showing the appearance of the proposed transmission structures at identified historic locations within 1.0 mile of the proposed centerlines of the Proposed Routes are provided. See Attachment II.B.6.c.1 for a viewshed map of the simulation locations, and the existing and simulated proposed views of Broad Run Ford and Ox Road (viewpoint 1). See Attachment II.B.6.c.2 for a viewshed map of the simulation locations, and the existing and simulated proposed views of Broad Run Ford and Ox Road (viewpoint 2). These simulations were created using GIS modeling to depict whether the proposed structures will be visible from the identified historic properties. The historic properties evaluated are described below. See also the Stage I Pre-Application Analysis Report contained in Appendix F of the Environmental Routing Study.

Historic Property	Viewpoint	Comments
Broad Run Ford and Ox Road (VDHR ID# 053-6416)	1	The Project will have no more than a minimal impact on Broad Run Ford and Ox Road.
Broad Run Ford and Ox Road (VDHR ID# 053-6416)	2	The Project will have no more than a minimal impact on Broad Run Ford and Ox Road.

See Attachment III.B.4 for visual simulations of key locations evaluated.



Double Circuit Steel Pole

Single Circuit Steel Pole

Single Circuit Monopole and Double Circuit Monopole Configuration

This information is for environmental review purposes only.

Attachment II.B.6.b
Nimbus 230 kV Line Loop and Nimbus Substation and 230 kV Farmwell-Nimbus Transmission Line
Dominion Energy Virginia
Loudoun County, Virginia

MPLS M:\Clients\D-F\DOM\Nivo_Nimbus_ArcGIS\2021\12_SCC_Appendix_Figures\DOM_Nimbus_Attachment_II_B_6b.mxd | REVISED: 01/21/2022 | SCALE: 1:4,000 when printed at 11x17 DRAWN BY: JPB

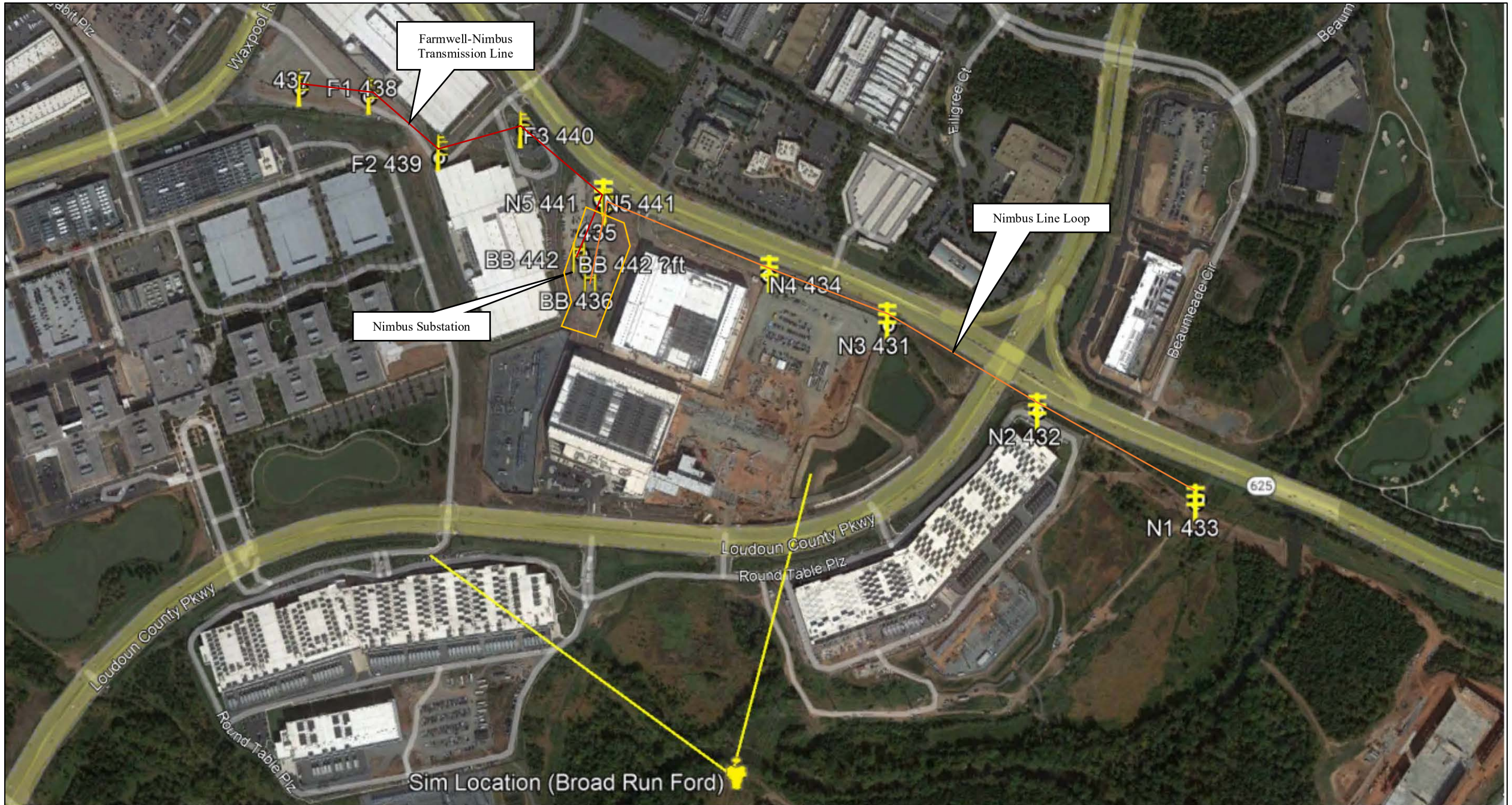


Photo simulations prepared by:
GTTE LLC
email:
info@gttellc.com
703 447 1350

Location: Broad Run Ford and Ox Road

Project:
Nimbus 230kV Line Loop and Substation

Farmwell-Nimbus Transmission Line

Structure	Distance (ft)	Height (ft)
438	3913	110.0
438	3710	110.0
439	3292	110.0
440	3268	110.0
441	2836	110.0
442	2610	70.0

Structure	Distance (ft)	Height (ft)
431	2297	140.0
432	2306	140.0
433	2632	125.0
434	2411	130.0
435	2802	120.0
436	2518	70.0

Figure 5-9: Photo Simulation 1 - Location and structures modeled from Broad Run Ford portion of the previously recorded Broad Run Ford and Ox Road. Source: GTTE

Figure 5-10: Photo Simulation 1 - Existing view from Broad Run Ford. Source: GTTE

Figure 5-11: Photo Simulation 1 - Proposed view from Broad Run Ford (structures not visible shown in yellow). Source: GTTE

Photo simulations prepared by:
GTTE LLC
email:
info@gttellc.com
703 447 1350

Location: Broad Run Ford 2

Project:
Nimbus 230kV Line Loop and Substation

Farmwell-Nimbus Transmission Line

Structure	Distance (ft)	Height (ft)
438	3913	110.0
438	3710	110.0
439	3292	110.0
440	3268	110.0
441	2836	110.0
442	2610	70.0

Structure	Distance (ft)	Height (ft)
431	2297	140.0
432	2306	140.0
433	2632	125.0
434	2411	130.0
435	2802	120.0
436	2518	70.0

Figure 5-12: Photo Simulation 2 - Location and structures modeled. Source: GTTE

Figure 5-13: Photo Simulation 2 - Existing view from Broad Run Ford. Source: GTTE

Figure 5-14: Photo Simulation 2 - Proposed view from Broad Run Ford (structures not visible shown in yellow). Source: GTTE

II. DESCRIPTION OF THE PROPOSED PROJECT

C. Describe and furnish plan drawings of all new substations, switching stations, and other ground facilities associated with the proposed project. Include size, acreage, and bus configurations. Describe substation expansion capability and plans. Provide one-line diagrams for each.

Response: The proposed Project requires the construction of the new 230-34.5 kV Nimbus Substation in Loudoun County, Virginia. Additionally, new line terminal equipment will be added at the Company's existing Farmwell Substation and relay settings will be updated at the Company's existing Beaumeade and Buttermilk Substations.

The proposed Nimbus Substation will be constructed with five 230 kV, 4000A circuit breakers in a ring bus arrangement, three 230 kV line terminals, two 230-34.5 kV, 84 MVA transformers, eight 34.5 kV distribution circuits, and other associated equipment. In total, it will be designed to accommodate future growth in the area with two additional 230-34.5 kV transformers and up to twenty 34.5 kV distribution circuits. Additionally, a new control enclosure will be installed to accommodate the protective relay and communications cabinets. The total area required to build the Nimbus Substation is approximately 8.0 acres. The one-line diagram and general arrangement for the proposed Nimbus Substation are provided as Attachments II.C.1 and II.C.2, respectively.

At Farmwell Substation, the Project will require installation of one 230 kV, 4000A circuit breaker, one 230 kV, 4000A disconnect switch and line terminal equipment for one 230 kV transmission line.

At Beaumeade Substation, the Project will require relay resets, drawing updates, and field support as necessary to change the Line #2152 destination from Buttermilk Substation to Nimbus Substation.

At Buttermilk Substation, the Project will require relay resets, drawing updates, and field support as necessary to change Line #2152 to Line #2255 and the destination from Beaumeade Substation to Nimbus Substation.

ATTACHMENT II.C.1

LEGEND

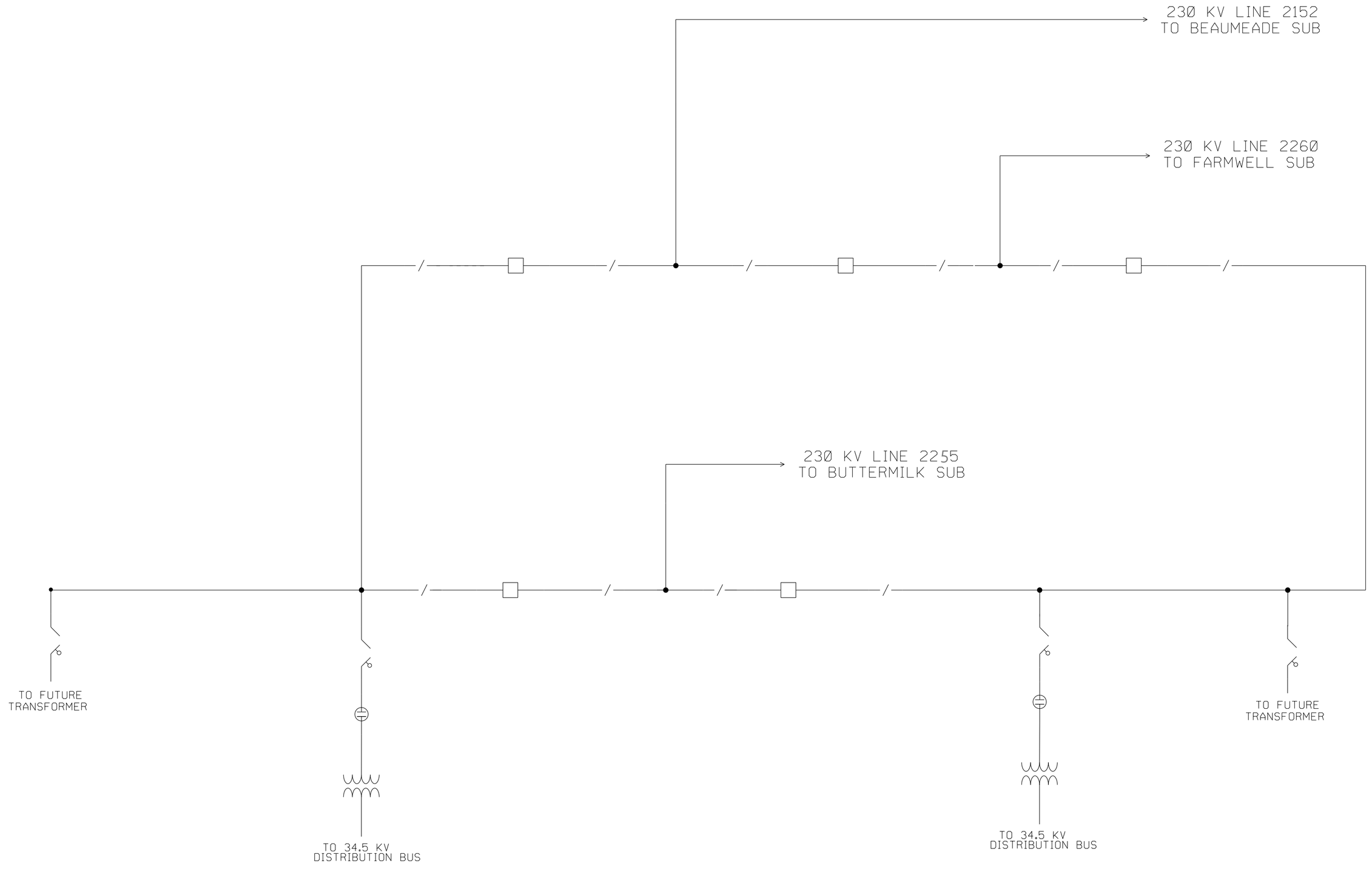
CIRCUIT BREAKER

POWER TREANSFOREMR

DISCONNECT SWITCH

DISCONNECT SWITCH WITH MOTOR OPERATOR

CIRCUIT SWITCHER



PRELIMINARY
NOT FOR CONSTRUCTION

Attachment II.C.1

By	Approval
Date	
Project No.	
BM No.	
Description	

Revisions

Dominion Energy

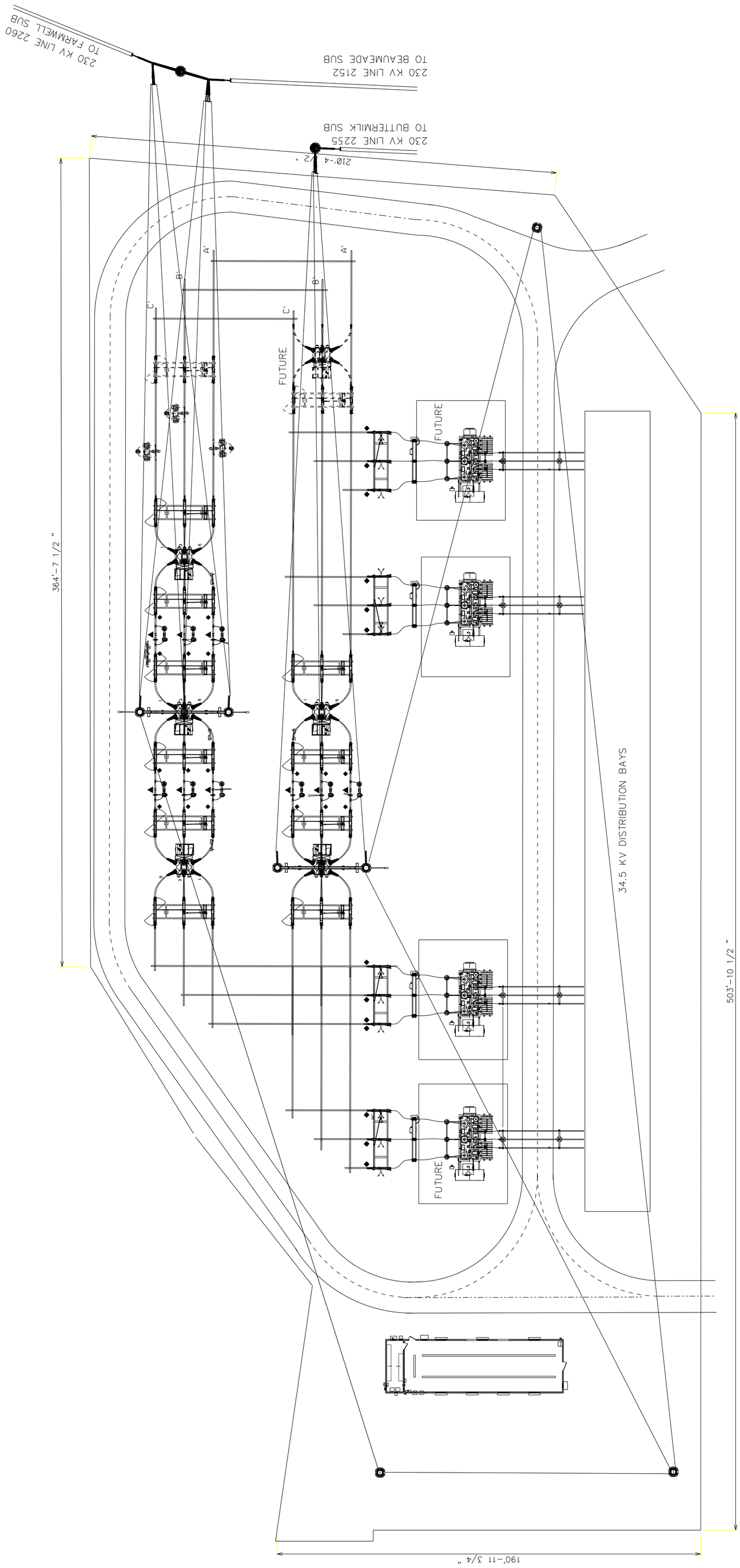
ONE LINE DIAGRAM

Drawn By: SB	Date 02-15-22	Substation	NIMBUS
Approval	Date	Drawing No.	XXXX000Z

91

$USERNAME$

Attachment II.C.2



PRELIMINARY
NOT FOR CONSTRUCTION

ATTACHMENT II.C.2

Dominion Energy

GENERAL ARRANGEMENT–ULTIMATE
NIMBUS SUBSTATION
LOUDOUN COUNTY, VIRGINIA

	Name	Date
Designed by:	SB	
Approvals		
Approvals		

Project No. | Scale | B/M No. | Sheet No. OF | Revisions | Drawing No. GEN ARR

Cad File Name: $$$$$$$$$$$SYTIME
PLOTTED: $$$$$$$$$$$SYTIME
$USERNAME$

Typical Drawing Information
Library Location | Cell Name
B/M Assembly | Pipe Stand Foundation Cells (Pier) | Pipe Stand Foundation Cells (Spread) | Foundation Cells for Other Typical Structures (Pier) | Steel Detail & Assembly (Spread)

Revisions: No. | Date | By | Description | Checked/Appr. | Project Number | B/M

$USERNAME$

III. IMPACT OF LINE ON SCENIC, ENVIRONMENTAL AND HISTORIC FEATURES

A. Describe the character of the area that will be traversed by this line, including land use, wetlands, etc. Provide the number of dwellings within 500 feet, 250 feet and 100 feet of the centerline, and within the ROW for each route considered. Provide the estimated amount of farmland and forestland within the ROW that the proposed project would impact.

Response: **Nimbus Line Loop Proposed Route**

The Proposed Route of the Nimbus Line Loop traverses approximately 0.61 mile through Loudoun County in an area that is characterized by extensive data center development as well as some light commercial areas. Loudoun County has zoned the entire area of the Proposed Route as Planned Development – Office Park ("PDOP"). Major thoroughfares, including Waxpool Road and Loudoun County Parkway, traverse the area.

Based on a review of the Loudoun County GIS parcel, zoning data and aerial photo analysis, there are no dwellings located within 500 feet, 250 feet, or 100 feet of the centerline or within the right-of-way of the Nimbus Line Loop Proposed Route.

According to Natural Resources Conservation Service Data ("NRCS"), there is no agricultural land within or near the right-of-way of the Proposed Route, and no farmland of statewide importance is crossed. There are no forested areas located within the proposed right-of-way.

Based on an analysis of the U.S. Geological Survey ("USGS") 7.5-minute current (2011-2019) and historic (1952-1994) topographic mapping, USGS National Hydrography Dataset ("NHD"), Loudoun County Hydrology (water feature lines) and Hydrology (water feature polygons) Datasets (Loudoun County Streams), and Loudoun County Wetlands (wetland feature polygons) Dataset (Loudoun County Wetlands), the Proposed Route of the Nimbus Line Loop crosses one intermittent waterbody. Approximately 0.16 acre of emergent wetlands, 0.13 acre of riverine wetlands, and 0.04 acre of freshwater pond occur within the right-of-way of the Proposed Route. No forested wetlands occur within the right-of-way. Based on a review of the natural heritage resources found in the Virginia Department of Conservation and Recreation's ("DCR") Biotics Data System, there are no natural heritage resources found within 100 feet of the Proposed Route of the Nimbus Line Loop.

Farmwell-Nimbus Line Proposed Route

The Proposed Route of the Farmwell-Nimbus Line traverses approximately 0.26 mile through Loudoun County in an area that is characterized by extensive data center development as well as some light commercial areas. Loudoun County has

zoned the entire area of the Proposed Route as PDOP. Major thoroughfares including Waxpool Road traverse the area.

Based on a review of the Loudoun County GIS parcel, zoning data and aerial photo analysis, there are no dwellings located within 500 feet, 250 feet, or 100 feet of the centerline or within the right-of-way of the Proposed Route.

According to NRCS, there is no agricultural land within or near the right-of-way of the Proposed Route, and no farmland of statewide importance is crossed. There are no forested areas located within the proposed right-of-way.

Based on an analysis of the USGS 7.5-minute current (2011-2019) and historic (1952-1994) topographic mapping, USGS NHD, Loudoun County Hydrology (water feature lines) and Hydrology (water feature polygons) Datasets (Loudoun County Streams), and Loudoun County Wetlands (wetland feature polygons) Dataset (Loudoun County Wetlands), the Proposed Route of the Farmwell-Nimbus Line does not cross perennial or intermittent waterbodies. Additionally, no wetlands are found within the right-of-way of the Proposed Route. Based on a review of the natural heritage resources found in the DCR's Biotics Data System, there are no natural heritage resources found within 100 feet of the Proposed Route of the Farmwell-Nimbus Line.

III. IMPACT OF LINE ON SCENIC, ENVIRONMENTAL AND HISTORIC FEATURES

B. Describe any public meetings the Applicant has had with neighborhood associations and/or officials of local, state or federal governments that would have an interest or responsibility with respect to the affected area or areas.

Response: In December 2021, the Company launched a project website dedicated to the proposed Project: www.dominionenergy.com/nimbus. The website includes a description and benefits of the proposed Project, an explanation of need, route map, photo simulations, a recording of the virtual open house meeting, and information on the Commission review process.

In January 2022, the Company sent project announcement postcards to approximately 625 property owners and residents within 1,000 feet of the Project. Each postcard included information about the Project and an overview map. The postcard also advised that due to COVID-19, the Company would not host a traditional in-person open house event, but would host a virtual community meeting. In addition, the communication indicated that detailed materials would be posted to the dedicated Project website and how to contact the Project team to provide any feedback or questions. A copy of the postcard and overview map is included as Attachment III.B.1. The Company also created a Spanish language postcard for residents who use English as a second language and live in the Project area. The message in the Spanish version is identical to the English version and a link to the postcard was placed on the Project website. A copy of the Spanish version of the postcard including an overview map also is included in Attachment III.B.1.

Newspaper print advertisements regarding the Project and virtual open house were placed in Loudoun Now and Loudoun Times and Loudoun Local Living (Washington Post). The advertisements ran on January 27, 2022, in Loudoun Now and Loudoun Local Living. The advertisement ran on January 28, 2022, in Loudoun Times. A copy of the advertisement placed in the Loudoun papers is included as Attachment III.B.2.

From January 28, 2022, to February 15, 2022, the Company used paid digital and social media campaigns to drive awareness of Dominion Energy Virginia's Project and the upcoming virtual community meeting. The Company also included a Spanish language social media campaign. The pre- and post-event campaigns ran within Google AdWords, Google Display, Google Video, Facebook and Twitter. All phases urged local residents to visit www.dominionenergy.com/nimbus to learn more about the meeting and to participate virtually. A copy of those digital advertisements are included as Attachment III.B.3.

The Project's pre-event campaigns ran on Facebook, Twitter, Google and Next Door from January 28 through February 3, 2022. Campaign results included 852,980 Impressions Delivered, 3.10% Click Thru Rate, 24,546 Link Clicks and

51,017 ad engagements, including reactions, likes, comments, shares and saves. The Project's pre-event Spanish campaign ran on Facebook from January 31 through February 3, 2022. Campaign results included 32,223 Impressions Delivered, 0.69% Click Thru Rate, 141 Link Clicks and 3,257 ad engagements, including reactions, likes, comments, shares and saves.

The Project's post-event campaigns ran on Facebook, Twitter, Google and Next Door from February 9, through February 15, 2022. Campaign results included 519,607 Impressions Delivered, 4.11% Click Thru Rate, 21,380 Link Clicks and 32,794 ad engagements, including reactions, likes, comments, shares and saves.

A virtual open house was held on February 3, 2022, at 5:00 p.m. At the virtual open house, the Company made available details about construction, project timing, and the Commission approval process. Traditional open house materials have been posted on the website for the proposed Project, including simulations of the proposed Project from key locations. The key location simulations are included as Attachment III.B.4.

The Company researched the demographics of the surrounding communities using the U.S. Environmental Protection Agency ("EPA") mapping tool ("EJSCREEN") to determine that six Census Block Groups ("CBGs") are within a mile of the Project, one of which would be crossed by the Project. A review of minority, income, language, age, and education census data identified populations within the study area that meet the EPA's defined threshold for Environmental Justice protections ("EJ Communities").

Four CBGs within one mile of the Project have populations of color that exceed the state average of 38 percent and one of these CBGs is crossed by the Project.

No low-income populations are crossed by the Project. However, one CBG within a mile of the Project has a low-income population percentage greater than or equal to 30 percent. Additionally, this CBG contains populations of color and linguistically isolated households that exceed the state averages. Project information mailers were translated from English to Spanish and made available on the Project website.

When compared to the reference population *(i.e.*, the state), none of the CBGs in the one-mile screening area contains under age 5 populations or populations with less than a high school education that exceed 20 percentage points. One CBG contains an elderly population (a senior living community) that exceeds 20 percentage points; however, it is not crossed by the Project.

Impacts associated with construction are considered temporary. Various regulations, permit stipulations, industry standards, and best management practices would guide Project construction to minimize impacts.

During operation, the long-term presence of new structures along overhead routes are not expected to result in disproportionately high or adverse impacts on EJ populations because they cross primarily developed areas, including commercial/industrial land, rather than visually sensitive areas.

Indirect impacts on property value caused by direct visual impacts of high-voltage transmission lines (*i.e.*, lines carrying more than 69 kV) depend on proximity, visibility, size and type of transmission structures, easement landscaping, and surrounding topography. Based on a review of peer-reviewed and industry research published in peer-reviewed journals and trade journals, residential property values and sales prices are primarily affected by factors unrelated to the presence of a transmission line. Other factors, such as location, type and condition of improvements to the property, neighborhood, and local real estate market conditions, are shown through research to have greater influence on the value of residential property than the presence of a transmission line. Because the Project crosses developed areas and commercial/industrial land, the Project is unlikely to result in property devaluation.

As discussed in more detail in Section IV.B, scientific evidence does not show that common sources of electric and magnetic fields ("EMF") in the environment, including transmission lines and other parts of the electric system, are a cause of any adverse health effects. As such, the impacts of constructing and operating either of the proposed routes on the natural and human environments are not anticipated to be significant.

Based on the analysis of the Project, the Company does not anticipate disproportionately high or adverse impacts to the EJ Communities located within the study area. See Sections 3.1.10 and 4.1.7 of the Environmental Routing Study for the results of the Company's EJ analysis.

In addition to its evaluation of impacts, the Company has and will continue to engage the EJ Communities in a manner that allows them to meaningfully participate in the Project development and approval process so that the Company can take their views and input into consideration. See Attachment III.B.5 for a copy of the Company's Environmental Justice Policy.

Dominion Energy image. Not project specific.

Electric Transmission
P.O. Box 26666
Richmond, VA 23261

Dominion Energy®

Actions Speak Louder

YOU'RE INVITED TO A VIRTUAL COMMUNITY MEETING

DETAILS ENCLOSED

<<NAME>>
<<ADDRESS>>

IMPORTANT

Local Power Line Project Information

Use your iPhone camera or the QR reader app on other smartphones to visit the project page on our website.

Nimbus 230 kV Electric Transmission Line Project

AT DOMINION ENERGY, we are committed to continually reviewing and analyzing our energy infrastructure to provide safe, reliable electricity to our neighbors.

You are receiving this postcard because we would like to invite you to our virtual community meeting for the Nimbus 230 kV Electric Transmission Line Project.

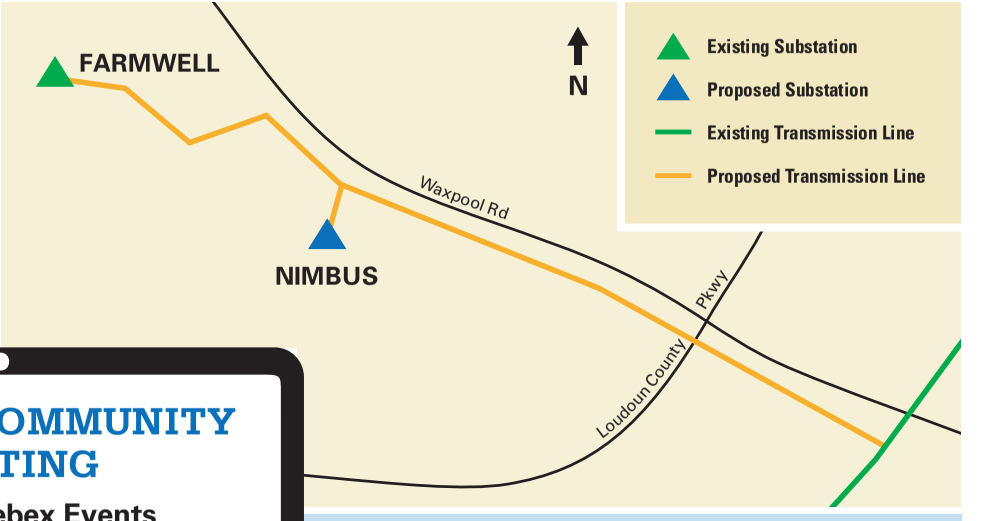
As part of this project, we are preparing to build the new Nimbus Substation near Waxpool Road in Loudoun County, Virginia. We are also planning to build a new electric transmission line connecting Nimbus Substation to the nearby Farmwell Substation.

Rapid growth in electrical demand in Loudoun County has resulted in the need to build new transmission infrastructure along with a new substation. This project will improve electric reliability for all customers in the region.

You can ask questions and interact with our team as they present important information about the project, including timelines, visual simulations and why this new infrastructure in needed.

You can access our virtual open house for free using a mobile device, computer or simply dial-in with your telephone. Please visit DominionEnergy.com/nimbus for details on how to access the meeting.

Please know that we are dedicated to working safely and courteously in your community and we will continue to keep you updated on our progress.



VIRTUAL COMMUNITY MEETING

Live Via Webex Events

Thursday, Feb. 3, 2022 • 5–6 p.m.

Join the meeting by visiting our website, DominionEnergy.com/nimbus.

A recording will be available on the project website after the meeting.

At Dominion Energy, we know many of our customers are facing challenges due to the COVID-19 pandemic. We're here to help. In accordance with the law recently passed in Virginia, we're offering flexible payment arrangements up to 24 months. To set up a payment plan, or view additional assistance options, please visit DominionEnergy.com or call 1-866-366-4357.

CONTACT US

Visit our website at DominionEnergy.com/nimbus for project updates. Or contact us by sending an email to powerline@dominionenergy.com or calling 888-291-0190.

This map is intended to serve as a representation of the project area and is not intended for detailed engineering purposes.

Dominion Energy image. Not project specific.

Electric Transmission
P.O. Box 26666
Richmond, VA 23261

Dominion Energy®

Actions Speak Louder

LO INVITAMOS A UNA REUNIÓN COMUNITARIA VIRTUAL

DETALLES ADJUNTOS

IMPORTANTE

Información sobre proyecto local de línea eléctrica

Use your iPhone camera or the QR reader app on other smartphones to visit the project page on our website.

Proyecto de Línea de Transmisión Eléctrica Nimbus 230 kV

EN DOMINION ENERGY, nos comprometemos a revisar y analizar continuamente nuestra infraestructura energética para brindar electricidad segura y fiable a nuestros vecinos.

Usted ha recibido esta postal porque deseamos invitarlo a nuestra reunión comunitaria sobre el Proyecto de Línea de Transmisión Eléctrica Nimbus 230 kV.

Como parte de este proyecto, estamos preparando la construcción de la subestación de Nimbus cerca de Waxpool Road en el condado de Loudoun. También tenemos previsto construir una nueva línea de transmisión eléctrica que conecte la subestación de Nimbus con la cercana subestación de Farmwell.

El rápido crecimiento de la demanda eléctrica en el condado de Loudoun ha creado la necesidad de construir una nueva infraestructura de transmisión junto con una nueva subestación. Este proyecto mejorará la fiabilidad eléctrica para todos los clientes de la región.

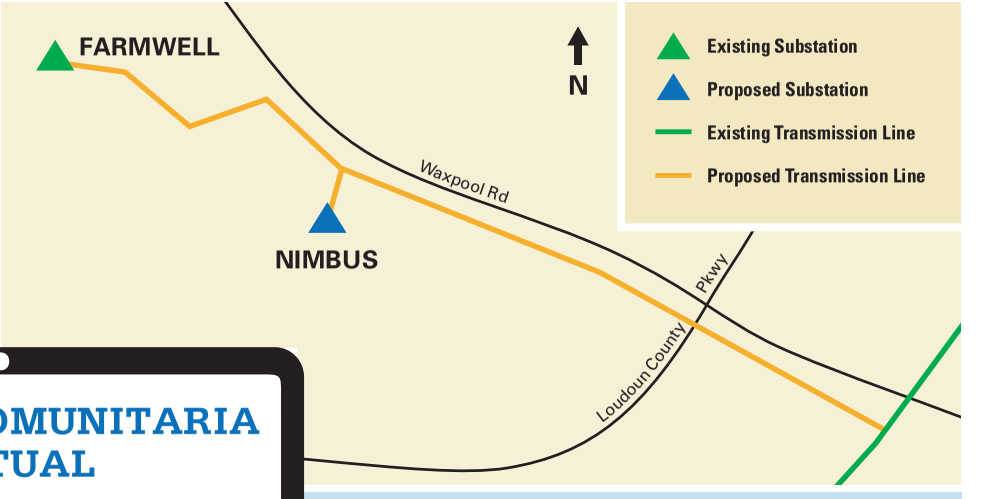
Usted podrá hacer preguntas e interactuar con nuestro equipo mientras le presentan información importante sobre el proyecto, incluidos los plazos, las simulaciones visuales y los motivos por los que se necesita esta infraestructura.

Puede acceder a nuestra jornada virtual de puertas abiertas de forma gratuita utilizando un dispositivo móvil, una computadora o simplemente marcando con su teléfono. Visite DominionEnergy.com/nimbus para obtener detalles sobre cómo acceder a la reunión.

Tenga presente que nos dedicamos a trabajar de forma segura y cortés en su comunidad y que seguiremos manteniéndole informado de nuestros avances.

COMUNÍQUESE CON NOSOTROS

Visite nuestro sitio web en DominionEnergy.com/nimbus para conocer las novedades del proyecto. O bien, envíenos un correo electrónico a powerline@dominionenergy.com o llámenos al 888-291-0190.



REUNIÓN COMUNITARIA VIRTUAL

En vivo a través de Webex Events

Jueves, 3 de febrero de 2022 • 5–6 p.m.

Acompáñenos en la reunión visitando nuestro sitio web, DominionEnergy.com/nimbus

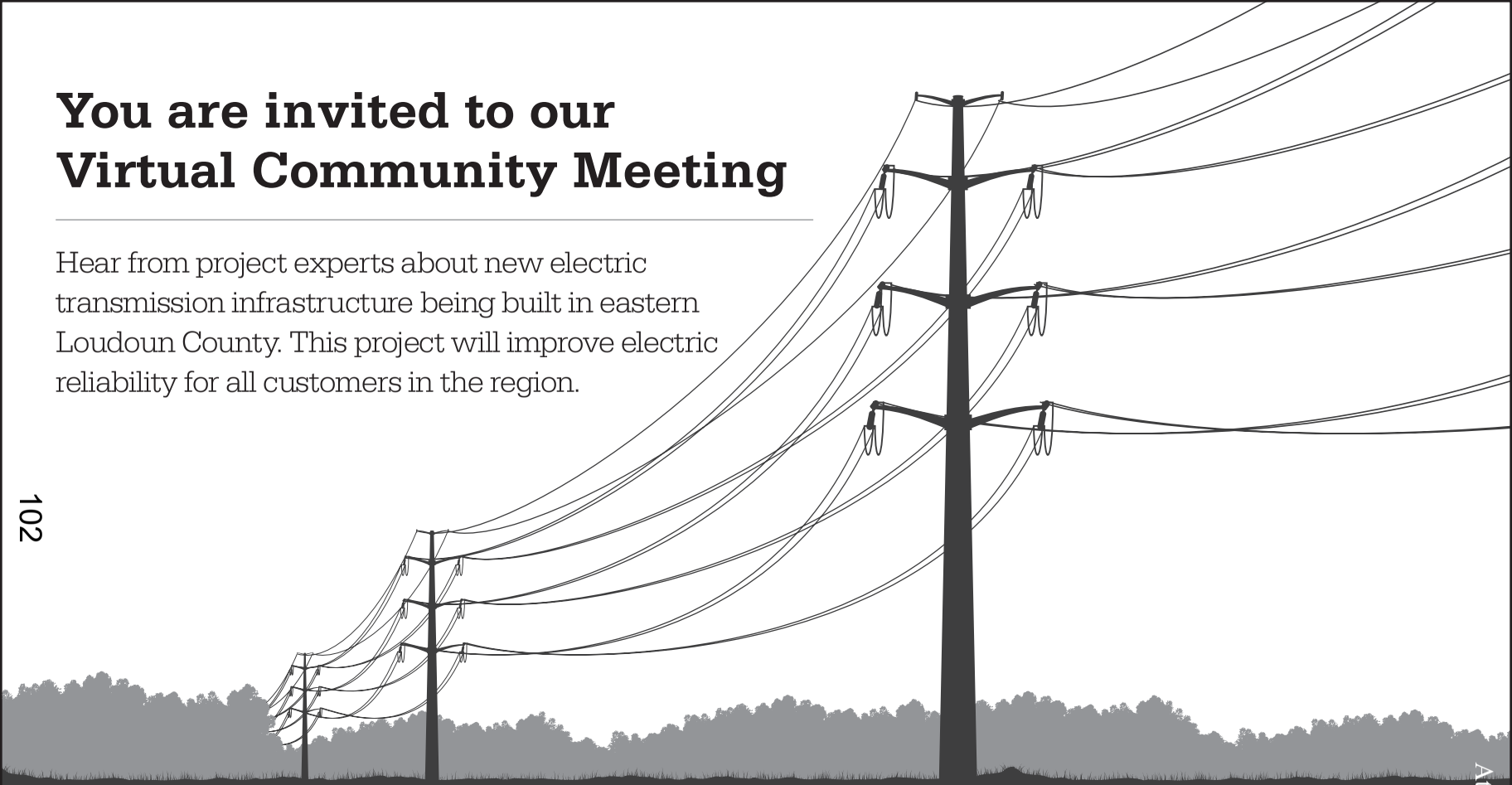
Habrá una grabación disponible en el sitio web del Proyecto después de la reunión.

En Dominion Energy, sabemos que muchos de nuestros clientes enfrentan dificultades debido a la pandemia de COVID-19. Estamos aquí para ayudarlos. De conformidad con la ley recientemente aprobada en Virginia, estamos ofreciendo acuerdos de pago flexibles por hasta 24 meses. Para establecer un plan de pagos, o conocer otras opciones de asistencia, visite DominionEnergy.com o llame al 1-866-366-4357.

This map is intended to serve as a representation of the project area and is not intended for detailed engineering purposes.

You are invited to our Virtual Community Meeting

Hear from project experts about new electric transmission infrastructure being built in eastern Loudoun County. This project will improve electric reliability for all customers in the region.



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Use your phone's camera or QR reader app to visit the project page directly.

Join us live online on Thursday, February 3 at 5 p.m.
You can find event details at DominionEnergy.com/nimbus

Dominion Energy®

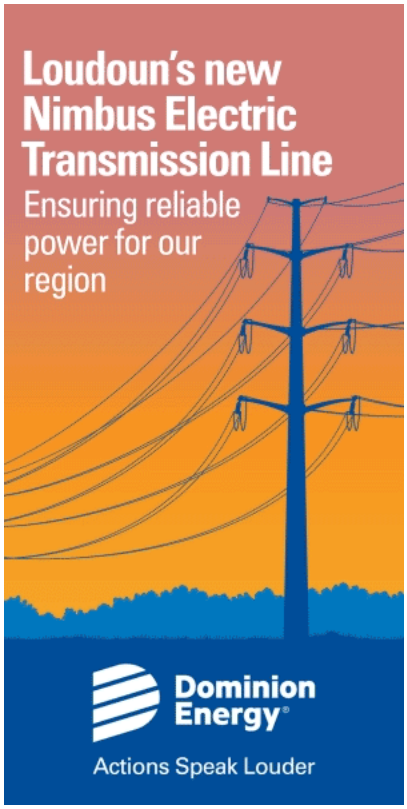
Actions Speak Louder

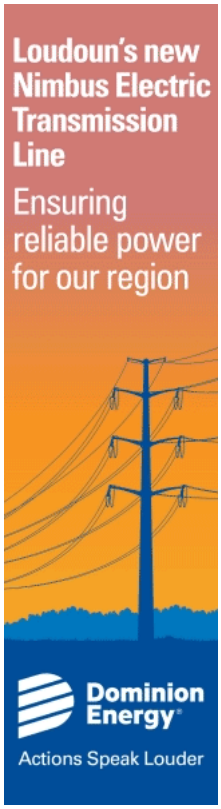
Attachment III.B.2

charles ryan associates

Dominion Energy
Electric Transmission

Nimbus Awareness Display

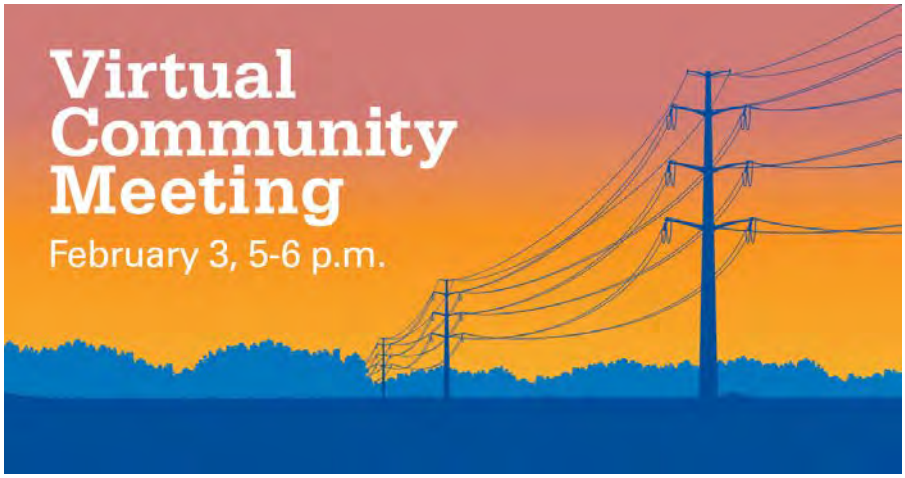




Dominion Energy Electric Transmission

Nimbus Nextdoor Imagery

Event Post Image:



Awareness Post Image:

Dominion Energy
Electric Transmission

Nimbus Pre Event
Social Videos

NIMBUS LOOP & SUBSTATION

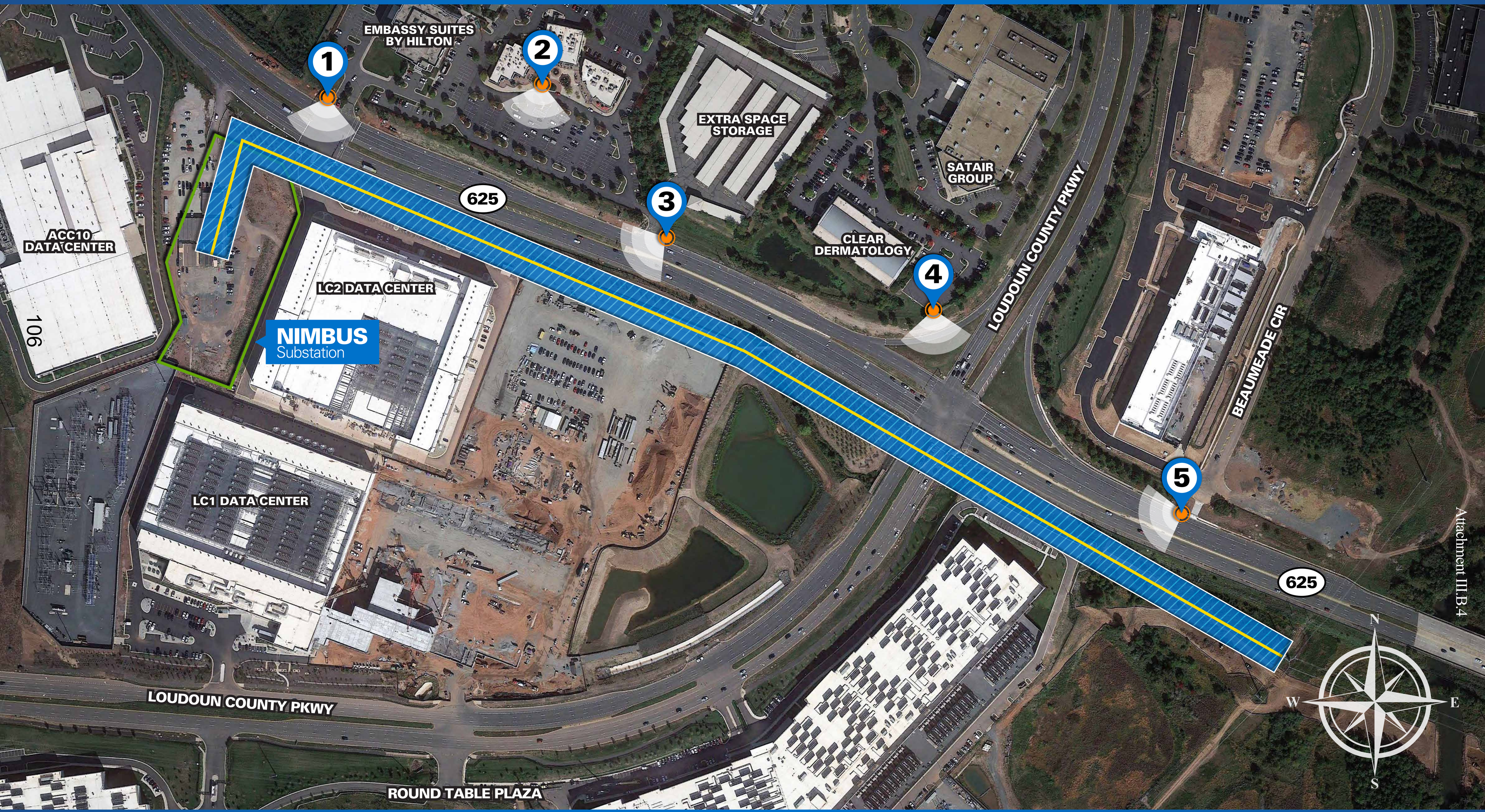
PROJECT RIGHT-OF-WAY

PROPOSED TRANSMISSION LINE

SUBSTATION

PHOTO LOCATION

Dominion Energy®



Attachment III.B.4

NIMBUS LOOP & SUBSTATION

SIMULATION 1

Looking South from 625 toward Proposed Nimbus Substation.

9/30/2021 • 11:33 am

Photo simulations are for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.

Dominion Energy®

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EXISTING Conditions

PROPOSED Conditions

NIMBUS LOOP & SUBSTATION

SIMULATION 2

Looking South from restaurant courtyard on north side of 625.

9/30/2021 • 11:22 am

Photo simulations are for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.

Dominion Energy®

108

EXISTING Conditions

PROPOSED Conditions

NIMBUS LOOP & SUBSTATION

SIMULATION 3

Looking Southwest from 625 at the entrance to Extra Space Storage.

9/30/2021 • 11:13 am

Photo simulations are for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.

Dominion Energy®

EXISTING Conditions

PROPOSED Conditions

NIMBUS LOOP & SUBSTATION

SIMULATION 4

Looking South from parking lot of Clear Dermatology

9/30/2021 • 10:12 am

Photo simulations are for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.

Dominion Energy®

110

EXISTING Conditions

PROPOSED Conditions

NIMBUS LOOP & SUBSTATION

SIMULATION 5

Looking West down 625 from east of Loudoun County Pkwy.

9/30/2021 • 9:54 am

Photo simulations are for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.

Dominion Energy®

111

EXISTING Conditions

PROPOSED Conditions

NIMBUS LOOP & SUBSTATION

PROJECT RIGHT-OF-WAY

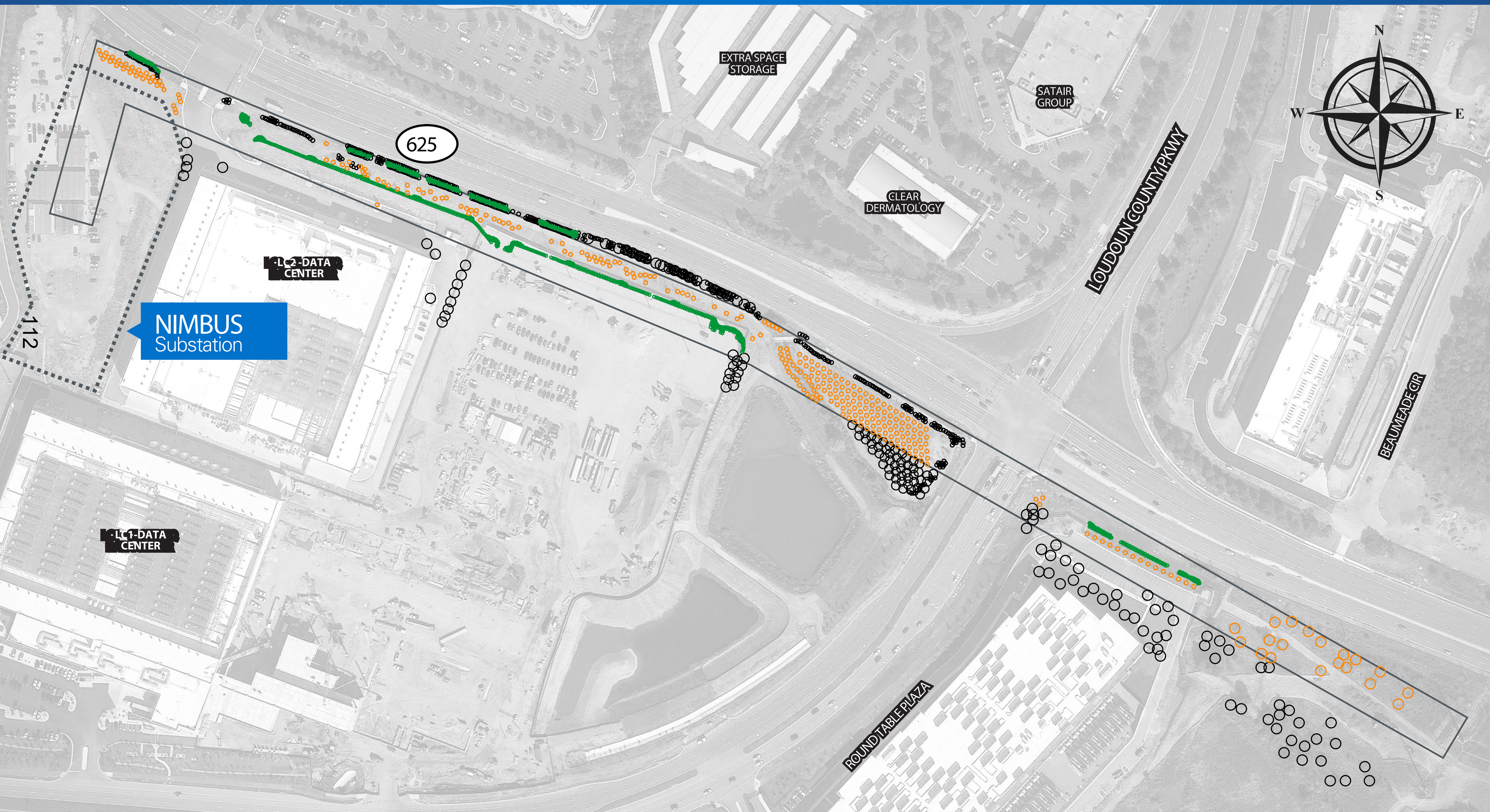
SUBSTATION

EXISTING VEGETATION TO REMAIN

EXISTING VEGETATION TO BE REMOVED

VEGETATION TO BE ADDED

Dominion Energy®



NIMBUS - FARMWELL
Rebuild Project

PROJECT RIGHT-OF-WAY

PROPOSED TRANSMISSION LINE

SUBSTATION

PHOTO LOCATION

Dominion Energy®

NIMBUS - FARMWELL
Rebuild Project

SIMULATION 1
Looking South from 625 and Gresham Dr.

9/30/2021 • 1:06 pm

Photo simulations are for discussion purposes only.
Final design is subject to change pending public,
engineering, and regulatory review.

Dominion Energy®

114

EXISTING Conditions

PROPOSED Conditions

NIMBUS - FARMWELL
Rebuild Project

PROJECT RIGHT-OF-WAY

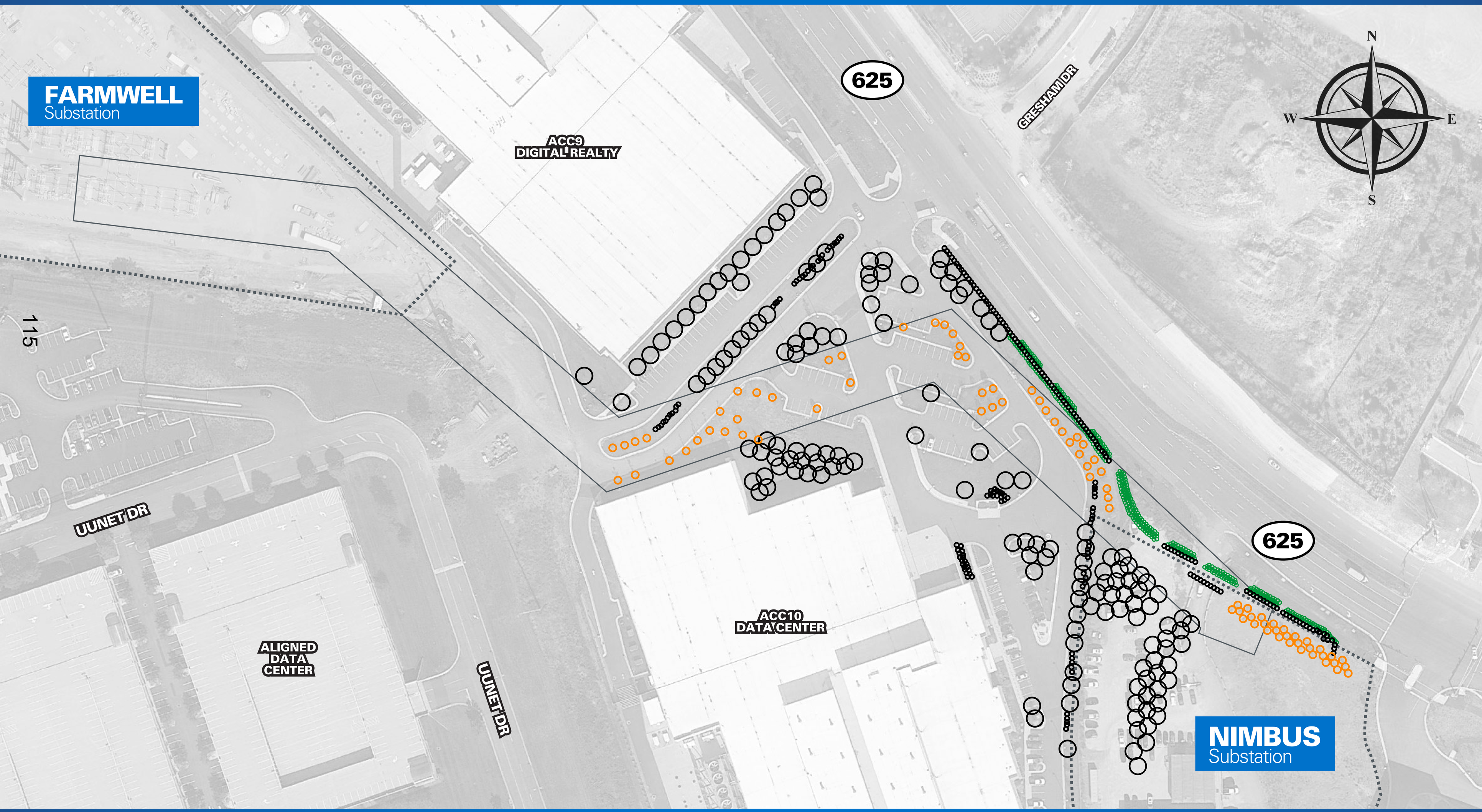
SUBSTATION

EXISTING VEGETATION TO REMAIN

EXISTING VEGETATION TO BE REMOVED

VEGETATION TO BE ADDED

Dominion Energy®



Environmental Justice: Ongoing Commitment to Our Communities

At Dominion Energy, we are committed to providing reliable, affordable, clean energy in accordance with our values of safety, ethics, excellence, embrace change and team work. This includes listening to and learning all we can from the communities we are privileged to serve.

Our values also recognize that environmental justice considerations must be part of our everyday decisions, community outreach and evaluations as we move forward with projects to modernize the generation and delivery of energy.

To that end, communities should have a meaningful voice in our planning and development process, regardless of race, color, national origin, or income. Our neighbors should have early and continuing opportunities to work with us. We pledge to undertake collaborative efforts to work to resolve issues. We will advance purposeful inclusion to ensure a diversity of views in our public engagement processes.

Dominion Energy will be guided in meeting environmental justice expectations of fair treatment and sincere involvement by being inclusive, understanding, dedicated to finding solutions, and effectively communicating with our customers and our neighbors. We pledge to be a positive catalyst in our communities.

November 2018

III. IMPACT OF LINE ON SCENIC, ENVIRONMENTAL AND HISTORIC FEATURES

C. Detail the nature, location, and ownership of each building that would have to be demolished or relocated if the project is built as proposed.

Response: No buildings would have to be demolished or relocated to construct the proposed Project.

III. IMPACT OF LINE ON SCENIC, ENVIRONMENTAL AND HISTORIC FEATURES

D. Identify existing physical facilities that the line will parallel, if any, such as existing transmission lines, railroad tracks, highways, pipelines, etc. Describe the current use and physical appearance and characteristics of the existing ROW that would be paralleled, as well as the length of time the transmission ROW has been in use.

Response: The Proposed Route of the Nimbus Line Loop would parallel Waxpool Road for nearly its entire length. Additionally, the route would overlap and parallel an existing Dominion Energy Virginia overhead/underground electric distribution line right-of-way for approximately 0.54 mile. This right-of-way currently is maintained to be cleared of large trees for its entire length, however, there are several new trees/shrubs planted associated with landscaping buffers within the right-of-way.

The Proposed Route of the Farmwell-Nimbus Line would parallel Waxpool Road for approximately 0.1 mile. Where the route parallels Waxpool Road, it would also parallel a sanitary sewer easement for approximately 225 feet. This right-of-way currently is comprised primarily of paved parking lots, access drives, and is maintained to be cleared of large trees for its entire length; however, there are several new trees/shrubs planted associated with landscaping buffers within the right-of-way.

III. IMPACT OF LINE ON SCENIC, ENVIRONMENTAL AND HISTORIC FEATURES

E. Indicate whether the Applicant has investigated land use plans in the areas of the proposed route and indicate how the building of the proposed line would affect any proposed land use.

Response: The Loudoun County 2019 General Plan ("General Plan")[9] and the Loudoun County 2019 Countywide Transportation Plan ("2019 CTP")[10] were reviewed to evaluate the potential effect the Proposed Routes of the Project could have on future development. The General Plan and 2019 CTP do not address electric transmission lines within their land use policies and strategies explicitly; however, the General Plan recognizes that the area in proximity to the Proposed Routes north of Washington Dulles International Airport is expected to continue to be a key location for industrial uses, airport-related businesses, and data center development. Future demand for data centers will need to be accommodated in places that have access to utilities, including electricity. The General Plan acknowledges that electrical demand in the County has grown dramatically in recent years with the development of data centers in eastern Loudoun County. Demand is expected to continue to grow with new data center construction, and other land development near the Proposed Routes.

[9] *See* https://www.loudoun.gov/DocumentCenter/View/152287/CTP---Combined-with-small-maps-bookmarked.
[10] *See* https://www.loudoun.gov/DocumentCenter/View/152285/General-Plan---Combined-with-small-maps-bookmarked.

III. IMPACT OF LINE ON SCENIC, ENVIRONMENTAL AND HISTORIC FEATURES

F. Government Bodies

1. Indicate if the Applicant determined from the governing bodies of each county, city and town in which the proposed facilities will be located whether those bodies have designated the important farmlands within their jurisdictions, as required by § 3.2-205 B of the Code.

2. If so, and if any portion of the proposed facilities will be located on any such important farmland:

a. Include maps and other evidence showing the nature and extent of the impact on such farmlands;

b. Describe what alternatives exist to locating the proposed facilities on the affected farmlands, and why those alternatives are not suitable; and

c. Describe the Applicant's proposals to minimize the impact of the facilities on the affected farmland.

Response: (1) Coordination with Loudoun County has concluded that no land is designated as important farmlands within the study area.

(2) Not applicable.

III. IMPACT OF LINE ON SCENIC, ENVIRONMENTAL AND HISTORIC FEATURES

G. Identify the following that lie within or adjacent to the proposed ROW:

1. **Any district, site, building, structure, or other object included in the National Register of Historic Places maintained by the U.S. Secretary of the Interior;**

2. **Any historic architectural, archeological, and cultural resources, such as historic landmarks, battlefields, sites, buildings, structures, districts or objects listed or determined eligible by the Virginia Department of Historic Resources ("DHR");**

3. **Any historic district designated by the governing body of any city or county;**

4. **Any state archaeological site or zone designated by the Director of the DHR, or its predecessor, and any site designated by a local archaeological commission, or similar body;**

5. **Any underwater historic assets designated by the DHR, or predecessor agency or board;**

6. **Any National Natural Landmark designated by the U.S. Secretary of the Interior;**

7. **Any area or feature included in the Virginia Registry of Natural Areas maintained by the Virginia Department of Conservation and Recreation ("DCR");**

8. **Any area accepted by the Director of the DCR for the Virginia Natural Area Preserves System;**

9. **Any conservation easement or open space easement qualifying under §§ 10.1-1009 – 1016, or §§ 10.1-1700 – 1705, of the Code (or a comparable prior or subsequent provision of the Code);**

10. **Any state scenic river;**

11. **Any lands owned by a municipality or school district; and**

12. **Any federal, state or local battlefield, park, forest, game or wildlife preserve, recreational area, or similar facility. Features, sites, and the like listed in 1 through 11 above need not be identified again.**

Response: Nimbus Line Loop and Substation and Farmwell-Nimbus Line

1. None

2. Broad Run Ford and Ox Road (VDHR ID# 053-6416), which has been determined as eligible for listing in the NRHP, is located within 0.5 mile of both the Nimbus Line Loop and Substation and the Farmwell-Nimbus Line. However, the setting of this resource in the vicinity of the transmission line routes has been compromised severely by existing utilities and large-scale development.

3. None

4. None

5. None

6. None

7. None

8. None

9. None

10. None

11. None

12. None

III. IMPACT OF LINE ON SCENIC, ENVIRONMENTAL AND HISTORIC FEATURES

H. List any registered aeronautical facilities (airports, helipads) where the proposed route would place a structure or conductor within the federally-defined airspace of the facilities. Advise of contacts, and results of contacts, made with appropriate officials regarding the effect on the facilities' operations.

Response: The Federal Aviation Administration ("FAA") is responsible for overseeing air transportation in the United States. The FAA manages air traffic in the United States and evaluates physical objects that may affect the safety of aeronautical operations through an obstruction evaluation. The prime objective of the FAA in conducting an obstruction evaluation is to ensure the safety of air navigation and the efficient utilization of navigable airspace by aircraft.

The Company has reviewed the FAA's website[11] to identify airports within 10 miles of the proposed Project. Based on this review, the following FAA-restricted airports are located within ten miles of the Project:

- Dulles International Airport, approximately 2.9 miles north of the Project
- Leesburg Executive Airport, approximately 6.6 miles northwest of the Project

Of these two airports, it was determined only Dulles International Airport was in close enough proximity to potentially impact navigable airspace. The Company conducted a detailed airport study to determine if any of the FAA defined Civil Airport Imaginary Surface would be penetrated by structures associated with the Project. The Company hired ERM to conduct the review. ERM reviewed the height limitations associated with FAA-defined imaginary surfaces for all runways associated with the Dulles International Airport. Standard GIS tools, including ESRI's ArcMap 3D and Spatial Extension software were used to create and geo-reference the imaginary surfaces in space, and in relation to the locations and proposed heights of the transmission structures. Ground surface data for the study area was derived by using a USGS 10 Meter Digital Elevation Model. Based on the results of this review it was determined there would be no potential for penetration into any of the proposed imaginary surfaces and thus there would be no impacts to navigable airspace from the proposed Project.

[11] *See* https://oeaaa.faa.gov/oeaaa/external/portal.jsp.

III. IMPACT OF LINE ON SCENIC, ENVIRONMENTAL AND HISTORIC FEATURES

I. Advise of any scenic byways that are in close proximity to or that will be crossed by the proposed transmission line and describe what steps will be taken to mitigate any visual impacts on such byways. Describe typical mitigation techniques for other highways' crossings.

Response: No scenic byways are in close proximity to the Project.

III. IMPACT OF LINE ON SCENIC, ENVIRONMENTAL AND HISTORIC FEATURES

J. Identify coordination with appropriate municipal, state, and federal agencies.

Response: Below is a list of coordination that has occurred to date with municipal, state, and federal agencies:

- On August 4, 2021, Dominion Energy Virginia representatives met with the Loudoun County Planning and Zoning to discuss the proposed Project.

- On September 27, 2021, Dominion Energy Virginia representatives met with the Loudoun County Planning and Zoning to discuss the proposed Project.

- On January 14, 2022, the Company requested comments from the following agencies regarding the proposed Project:
    - Virginia Department of Agriculture and Consumer Affairs, Endangered Plan and Insect Species Program
    - U.S. Fish and Wildlife Service – Ecological Services Virginia Field Office
    - Virginia Marine Resources Commission, Habitat Management Division
    - Virginia Department of Wildlife Resources
    - DCR, Environmental Review Coordinator, Natural Heritage Program
    - U.S. Army Corps of Engineers – Norfolk District
    - DCR, Planning and Recreation Resources Division ("PRR")
    - Virginia Outdoors Foundation ("VOF")
    - Virginia Department of Forestry – Forestland Conservation Division ("VDOF")

  The Company received responses from DCR PRR, VOF, and VDOF. See Attachments 2.K.1, 2.K.2, and 2.K.3 to the DEQ Supplement, respectively.

- The Company received a letter dated February 18, 2022, from the Virginia Department of Historic Resources ("VDHR") regarding the Project. See Attachment III.J.1.

- As part of the proposed Project, on January 20, 2022, the Company solicited comments via letter from several federally recognized Native American tribes, including:

  Cheroenhaka (Nottoway) Indian Tribe

Chickahominy Indian Tribe

Chickahominy Indian Tribe Eastern Division

Mattaponi Tribe

Monacan Indian Nation

Nansemond Indian Nation

Nottoway Indian Tribe

Pamunkey Indian Tribe

Patawomeck Indian Tribe of Virginia

Rappahannock Tribe

Upper Mattaponi Indian Tribe

A copy of the letter template is included as Attachment III.J.2.

COMMONWEALTH of VIRGINIA

Department of Historic Resources

Andrew Wheeler
Secretary of Natural and Historic Resources

2801 Kensington Avenue, Richmond, Virginia 23221

Julie V. Langan
Director

Tel: (804) 367-2323
Fax: (804) 367-2391
www.dhr.virginia.gov

February 18, 2022

Ken Custalow
Dominion Energy
Electric Transmission
P.O. Box 26666
Richmond, VA 23261

Re: Nimbus 230kV Line Transmission Line
Loudoun County, VA
DHR File No. 2022-3163

Dear Mr. Custalow:

We have received your request for comments on the above referenced project. The undertaking, as presented, involves the development of a less than 1-mile 230 kV electric transmission line in Loudoun County, VA. We have not been notified by any state or federal agency of their involvement in this project; however, we reserve the right to provide additional comments, if applicable, pursuant to the with Section 106 (54 U.S.C. 306108) of the National Historic Preservation Act (54 U.S.C. 300101 et seq.) and its implementing regulation, "Protection of Historic Properties" (36 CFR Part 800).

We understand that the proposed project meets the requirements to be files with the Virginia State Corporation Commission (SCC). We recommend Dominion follow the *Guidelines for Assessing Impacts of Proposed Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia*, developed by DHR and the SCC to assist project proponents in developing transmission line projects that minimize impacts to historic resources.

We recommend that the project proponent establish a study area for each route alternative under consideration and gather information on known resources. A qualified cultural resources consultant in the appropriate discipline should perform an assessment of impacts for each known resource present within the proposed study area.

Once the route alternatives have been finalized, DHR recommends that full architectural and archaeological surveys be conducted to determine the impacts of the projects on all historic resources listed in the Virginia

Landmarks Register (VLR) and National Register of Historic Places (NRHP), eligible for listing in the VLR/NRHP or potentially eligible for listing in the VLR/NRHP. This process involves the identification and recordation of all archaeological sites and architectural resources greater than 50 years of age, the evaluation of those resources for listing in the VLR/NRHP, determining the degree of impact of the project on these applicable resources, and developing a plan to avoid, minimize or mitigate negative impacts. Comments received from the public or other stakeholder groups regarding impacts to specific historic resources should be addressed as part of this survey and assessment process.

Thank you for seeking our comments to the project. If you have questions at this time, please do not hesitate to contact me via email at adrienne.birge-wilson@dhr.virginia.gov or via telephone at (804) 482-6092.

Sincerely,

Adrienne Birge-Wilson, Architectural Historian
Review and Compliance Division

COVID-19 Update: DHR is open for business and the majority of staff is teleworking. Please see our current Phase III Guidelines for staff and visitors.

Western Region Office
962 Kime Lane
Salem, VA 24153
Tel: (540) 387-5443
Fax: (540) 387-5446

Northern Region Office
5357 Main Street
PO Box 519
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Eastern Region Office
2801 Kensington Avenue
Richmond, VA 23221
Tel: (804) 367-2323
Fax: (804) 367-2391

Dominion Energy Virginia
Electric Transmission
P.O. Box 26666, Richmond, VA 23261-6666
DominionEnergy.com

Jan. 20, 2022

Nimbus 230 kV Electric Transmission Line Project

Dear _____:

At Dominion Energy, we are dedicated to finding the best solution for our long-term needs in the communities we serve. As a valued stakeholder with a vested interest in the community, we invite you to participate in the development of a less than 1-mile 230 kilovolt (kV) electric transmission line project in Loudoun County, Virginia.

We are preparing to build the new Nimbus Substation near Waxpool Road in Loudoun County. We are also planning to build a new electric transmission line connecting the Nimbus Substation to the nearby Farmwell Substation. This project is necessary due to rapid growth in electrical demand in the area.

Construction is scheduled to begin in April 2023 with an anticipated completion date of December 2024.

We are currently in the conceptual phase and are seeking input as we prepare to submit an application with the Virginia State Corporation Commission (SCC) in February 2022. Doing so allows us to hear any concerns you may have as we work to meet the needs of the project.
To see a project overview map and photo simulations, please visit our webpage at DominionEnergy.com/nimbus.

Please feel free to notify other relevant organizations that may have an interest in the project area. For reference, recipients of this letter include other county and statewide historic, cultural, and scenic organizations and Native American Tribes.

Due to the ongoing public health concerns resulting from the spread of the coronavirus, we do not plan to host formal community open house events at this time. In lieu of our traditional in-person meetings, we will hold a virtual community meeting Feb. 3, 2022 from 5-6 p.m. You can find meeting details, as well as project information, on our project webpage.

If you would like any additional information, have questions, or would like to set up a meeting to discuss the project, please do not hesitate to contact Ken Custalow, our Tribal Liaison. He can be reached by email at ken.custalow@dominionenergy.com. Thank you for your willingness to join us in our commitment to serving the community.

Sincerely,

Robert E. Richardson

Robert Richardson
Communications Consultant
The Electric Transmission Project Team
Robert.E.Richardson@DominionEnergy.com

III. IMPACT OF LINE ON SCENIC, ENVIRONMENTAL AND HISTORIC FEATURES

K. Identify coordination with any non-governmental organizations or private citizen groups.

Response: On January 20, 2022, the Company solicited comments via letter from the community leaders, environmental groups, business groups identified below. A copy of the letter template is included as Attachment III.K.1.

Name	Organization
Ms. Elizabeth S. Kostelny	Preservation Virginia
Mr. Jack Gary	Council of Virginia Archaeologists
Ms. Leighton Powell	Scenic Virginia
Ms. Sharee Williamson	National Trust for Historic Preservation
Mr. Dan Holmes	Piedmont Environmental Council
Dr. Newby- Alexander, Dean	Norfolk State University
Ms. Nancy Sorrells	Augusta County Historical Society
Mr. Thomas Gilmore	Civil War Trust
Mr. Steven Williams	Colonial National Historical Park
Mr. Alexander Macaulay	Macaulay & Jamerson
Mr. Keven Walker	Shenandoah Valley Battlefields Foundation
Mr. Jim Campi	Civil War Trust

Dominion Energy Virginia
Electric Transmission
P.O. Box 26666, Richmond, VA 23261-6666
DominionEnergy.com

Jan. 20, 2022

Nimbus 230 kV Electric Transmission Line Project

Dear _____:

At Dominion Energy, we are dedicated to finding the best solution for our long-term needs in the communities we serve. As a valued stakeholder with a vested interest in the community, we invite you to participate in the development of a less than 1-mile 230 kilovolt (kV) electric transmission line project in Loudoun County, Virginia.

We are preparing to build the new Nimbus Substation near Waxpool Road in Loudoun County, Virginia. We are also planning to build a new electric transmission line connecting the Nimbus Substation to the nearby Farmwell Substation. This project is necessary due to rapid growth in the area.

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To see a project overview map and photo simulations, please visit our webpage at DominionEnergy.com/nimbus.

Please feel free to notify other relevant organizations that may have an interest in the project area. For reference, recipients of this letter include other county and statewide historic, cultural, and scenic organizations and Native American Tribes.

Due to the ongoing public health concerns resulting from the spread of the coronavirus, we do not plan to host formal community open house events at this time. In lieu of our traditional in-person meetings, we will hold a virtual community meeting Feb. 3, 2022 from 5-6 p.m. You can find meeting details, as well as project information, on our project webpage.

If you would like any additional information, have questions, or would like to set up a meeting to discuss the project, please contact me by sending an email to Robert.E.Richardson@dominionenergy.com or calling 888-291-0190.

Thank you for your willingness to join in our commitment to serving the community.

Sincerely,

Robert E. Richardson

Rob Richardson
Communications Consultant
The Electric Transmission Project Team

III. IMPACT OF LINE ON SCENIC, ENVIRONMENTAL AND HISTORIC FEATURES

L. Identify any environmental permits or special permissions anticipated to be needed.

Response: The permits or special permissions that are likely to be required for the proposed Project are listed below.

Activity	Potential Permit	Agency/Organization
Impacts to wetlands and other waters of the U.S.	Nationwide Permit 57	U.S. Army Corps of Engineers
Impacts to wetlands and other waters of the U.S.	Virginia Water Protection Permit	Virginia Department of Environmental Quality
Discharge of stormwater from construction	Construction General Permit	Virginia Department of Environmental Quality
Work within VDOT rights-of-way	Land Use Permit	Virginia Department of Transportation
Airspace obstruction evaluation	FAA 7460-1	Dulles International Airport

IV. HEALTH ASPECTS OF ELECTROMAGNETIC FIELDS ("EMF")

A. Provide the calculated maximum electric and magnetic field levels that are expected to occur at the edge of the ROW. If the new transmission line is to be constructed on an existing electric transmission line ROW, provide the present levels as well as the maximum levels calculated at the edge of ROW after the new line is operational.

Response: Public exposure to magnetic fields is best estimated by field levels from power lines calculated at annual average loading. For any day of the year, the EMF levels associated with average conditions provide the best estimate of potential exposure. Maximum (peak) values are less relevant as they may occur for only a few minutes or hours each year.

This section describes the levels of EMF associated with the proposed transmission lines. EMF levels are provided for future (2026) annual average and maximum (peak) loading conditions.

Proposed project – Projected average loading in 2026

EMF levels were calculated for the proposed Project at the ***projected average*** load condition (378 amps for Line #2152, 15 amps for Line #2255, and 580 amps for Line #2260) and at an operating voltage of 241.5 kV when supported on the proposed Project structures – see Attachments II.A.5.a-b.

These field levels were calculated at mid-span where the conductors are closest to the ground and the conductors are at a projected average load operating temperature.

EMF levels at the edge of the rights-of-way for the proposed Project at the projected average loading:

	Left Edge		**Right Edge**	
	Electric Field (kV/m)	Magnetic Field (mG)	Electric Field (kV/m)	Magnetic Field (mG)
Attachment II.A.5.a	0.723	11.963	0.723	23.210
Attachment II.A.5.b	0.619	33.203	0.629	33.203

Proposed project – Projected Peak loading in 2026

EMF levels were calculated for the proposed Project at the ***projected peak*** load condition (473 amps for Line #2152, 24 amps for Line #2255, and 774 amps for Line #2260) and at an operating voltage of 241.5 kV when supported on the proposed Project structures – see Attachments II.A.5.a-b.

These field levels were calculated at mid-span where the conductors are closest to the ground and the conductors are at a projected peak load operating temperature.

EMF levels at the edge of the rights-of-way for the proposed Project at the projected peak loading:

	Left Edge		**Right Edge**	
	Electric Field (kV/m)	Magnetic Field (mG)	Electric Field (kV/m)	Magnetic Field (mG)
Attachment II.A.5.a	0.723	14.715	0.722	28.913
Attachment II.A.5.b	0.617	44.403	0.627	44.403

IV. HEALTH ASPECTS OF ELECTROMAGNETIC FIELDS ("EMF")

B. If the Applicant is of the opinion that no significant health effects will result from the construction and operation of the line, describe in detail the reasons for that opinion and provide references or citations to supporting documentation.

Response: The conclusions of multidisciplinary scientific review panels assembled by national and international scientific agencies during the past two decades are the foundation of the Company's opinion that no adverse health effects will result from the operation of the proposed Project. Each of these panels has evaluated the scientific research related to health and power-frequency EMF and provided conclusions that form the basis of guidance to governments and industries. The Company regularly monitors the recommendations of these expert panels to guide their approach to EMF.

Research on EMF and human health varies widely in approach. Some studies evaluate the effects of high, short-term EMF exposures not typically found in people's day-to-day lives on biological responses, while others evaluate the effects of common, lower EMF exposures found throughout communities. Studies also have evaluated the possibility of effects (*e.g.*, cancer, neurodegenerative diseases, and reproductive effects) of long-term exposure. Altogether, this research includes well over a hundred epidemiologic studies of people in their natural environment and many more laboratory studies of animals (*in vivo*) and isolated cells and tissues (*in vitro*). Standard scientific procedures, such as weight-of-evidence methods, were used by the expert panels assembled by agencies to identify, review, and summarize the results of this large and diverse research.

The reviews of EMF biological and health research have been conducted by numerous scientific and health agencies, including the European Health Risk Assessment Network on Electromagnetic Fields Exposure ("EFHRAN"), the International Commission on Non-Ionizing Radiation Protection ("ICNIRP"), the World Health Organization ("WHO"), the IEEE's International Committee on Electromagnetic Safety ("ICES"), the Scientific Committee on Emerging and Newly Identified Health Risks ("SCENIHR") of the European Commission, and the Swedish Radiation Safety Authority ("SSM") (formerly the Swedish Radiation Protection Authority ["SSI"]) (WHO, 2007; SCENIHR, 2009, 2015; EFHRAN, 2010, 2012; ICNIRP, 2010; SSM, 2015, 2016, 2018, 2019, 2020, 2021; ICES, 2019). The general scientific consensus of the agencies that have reviewed this research, relying on generally accepted scientific methods, is that the scientific evidence does not confirm that common sources of EMF in the environment, including transmission lines and other parts of the electric system, appliances, etc., are a cause of any adverse health effects.

The most recent reviews on this topic include the 2015 report by SCENIHR and annual reviews published by SSM (*e.g.*, for the years 2015 through 2021). These reports, similar to previous reviews, found that the scientific evidence does not

confirm the existence of any adverse health effects caused by environmental or community exposure to EMF.

The WHO has recommended that countries adopt recognized international standards published ICNIRP and ICES. Typical levels of EMF from Dominion's power lines outside its property and rights-of-way are far below the screening reference levels of EMF recommended for the general public and still lower than exposures equivalent to restrictions to limits on fields within the body (ICNIRP, 2010; ICES, 2019).

Thus, based on the conclusions of scientific reviews and the levels of EMF associated with the proposed Project, the Company has determined that no adverse health effects are anticipated to result from the operation of the proposed Project.

References

European Health Risk Assessment Network on Electromagnetic Fields Exposure (EFHRAN). Report on the Analysis of Risks Associated to Exposure to EMF: *In Vitro* and *In Vivo* (Animals) Studies. Milan, Italy: EFHRAN, 2010.

European Health Risk Assessment Network on Electromagnetic Fields Exposure (EFHRAN). Risk Analysis of Human Exposure to Electromagnetic Fields (Revised). Report D2 of the EFHRAN Project. Milan, Italy: EFHRAN, 2012.

International Commission on Non-ionizing Radiation Protection (ICNIRP). Guidelines for limiting exposure to time-varying electric and magnetic fields (1 Hz to 100 kHz). Health Phys 99: 818-36, 2010.

International Committee on Electromagnetic Safety (ICES). IEEE Standard for Safety Levels with Respect to Human Exposure to Electromagnetic Fields 0 to 300 GHz. IEEE Std C95.1-2019. New York, NY: IEEE, 2019.

Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR). Health Effects of Exposure to EMF. Brussels, Belgium: European Commission, 2009.

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Swedish Radiation Safety Authority (SSM). Research 2015:19. Recent Research on EMF and Health Risk - Tenth report from SSM's Scientific Council on Electromagnetic Fields. Stockholm, Sweden: Swedish Radiation Safety Authority (SSM), 2015.

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research monitored by SSM's Scientific Council on EMF and health: How has the evidence changed over time? Stockholm, Sweden: Swedish Radiation Safety Authority (SSM), 2016.

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IV. HEALTH ASPECTS OF ELECTROMAGNETIC FIELDS ("EMF")

C. Describe and cite any research studies on EMF the Applicant is aware of that meet the following criteria:

1. Became available for consideration since the completion of the Virginia Department of Health's most recent review of studies on EMF and its subsequent report to the Virginia General Assembly in compliance with 1985 Senate Joint Resolution No. 126;

2. Include findings regarding EMF that have not been reported previously and/or provide substantial additional insight into findings; and

3. Have been subjected to peer review.

Response: The Virginia Department of Health ("VDH") conducted its most recent review and issued its report on the scientific evidence on potential health effects of extremely low frequency ("ELF") EMF in 2000: "[T]he Virginia Department of Health is of the opinion that there is no conclusive and convincing evidence that exposure to extremely low frequency EMF emanated from nearby high voltage transmission lines is causally associated with an increased incidence of cancer or other detrimental health effects in humans."[12]

The continuing scientific research on EMF exposure and health has resulted in many peer-reviewed publications since 2000. The accumulating research results have been regularly and repeatedly reviewed and evaluated by national and international health, scientific, and government agencies, including most notably:

- The WHO, which published one of the most comprehensive and detailed reviews of the relevant scientific peer-reviewed literature in 2007;
- SCENIHR, a committee of the European Commission, which published its assessments in 2009 and 2015;
- The SSM, which has published annual reviews of the relevant peer-reviewed scientific literature since 2003, with its most recent review published in 2021; and,
- EFHRAN, which published its reviews in 2010 and 2012.

The above reviews provide detailed analyses and summaries of relevant recent peer-reviewed scientific publications. The conclusions of these reviews that the evidence overall does not confirm the existence of any adverse health effects due to exposure to EMF below scientifically established guideline values are consistent with the conclusions of the VDH report. With respect to the statistical association observed in some of the childhood leukemia epidemiologic studies, the most recent

[12] *See* http://www.vdh.virginia.gov/content/uploads/sites/12/2016/02/highfinal.pdf.

comprehensive review of the literature by SCENIHR, published in 2015, concluded that "no mechanisms have been identified and no support is existing [*sic*] from experimental studies that could explain these findings, which, together with shortcomings of the epidemiological studies prevent a causal interpretation" (SCENIHR, 2015, p. 16).

While research is continuing on multiple aspects of EMF exposure and health, many of the recent publications have focused on an epidemiologic assessment of the relationship between EMF exposure and childhood leukemia and EMF exposure and neurodegenerative diseases. Of these, the following recent publications, published following the inclusion date (June 2014) for the SCENIHR (2015) report through May 2021, provided additional evidence and contributed to clarification of previous findings. Overall, new research studies have not provided evidence to alter the previous conclusions of scientific and health organizations, including the WHO and SCENIHR.

Recent epidemiologic studies of EMF and childhood leukemia include:

- Bunch et al. (2015) assessed the potential association between residential proximity to high-voltage underground cables and development of childhood cancer in the United Kingdom largely using the same epidemiologic data as in a previously published study on overhead transmission lines (Bunch et al., 2014). No statistically significant associations or trends were reported with either distance to underground cables or calculated magnetic fields from underground cables for any type of childhood cancers.

- Pedersen et al. (2015) published a case-control study that investigated the potential association between residential proximity to power lines and childhood cancer in Denmark. The study included all cases of leukemia (n=1,536), central nervous system tumor, and malignant lymphoma (n=417) diagnosed before the age of 15 between 1968 and 2003 in Denmark, along with 9,129 healthy control children matched on sex and year of birth. Considering the entire study period, no statistically significant increases were reported for any of the childhood cancer types.

- Salvan et al. (2015) compared measured magnetic-field levels in the bedroom for 412 cases of childhood leukemia under the age of 10 and 587 healthy control children in Italy. Although the statistical power of the study was limited because of the small number of highly exposed subjects, no consistent statistical associations or trends were reported between measured magnetic-field levels and the occurrence of leukemia among children in the study.

- Bunch et al. (2016) and Swanson and Bunch (2018) published additional analyses using data from an earlier study (Bunch et al., 2014). Bunch et al. (2016) reported that the association with distance to power lines observed in earlier years was linked to calendar year of birth or year of cancer diagnosis, rather than the age of the power lines. Swanson and Bunch (2018) re-analyzed

data using finer exposure categories (e.g., cut-points of every 50-meter distance) and broader groupings of diagnosis date (e.g., 1960-1979, 1980-1999, and 2000-on) and reported no overall associations between exposure categories and childhood leukemia for the later periods (1980 and on), and consistent pattern for the periods prior to 1980.

- Crespi et al. (2016) conducted a case-control epidemiologic study of childhood cancers and residential proximity to high-voltage power lines (60 kilovolts ["kV"] to 500 kV) in California. Childhood cancer cases, including 5,788 cases of leukemia and 3,308 cases of brain tumor, diagnosed under the age of 16 between 1986 and 2008, were identified from the California Cancer Registry. Controls, matched on age and sex, were selected from the California Birth Registry. Overall, no consistent statistically significant associations for leukemia or brain tumor and residential distance to power lines were reported.

- Kheifets et al. (2017) assessed the relationship between calculated magnetic-field levels from power lines and development of childhood leukemia within the same study population evaluated in Crespi et al. (2016). In the main analyses, which included 4,824 cases of leukemia and 4,782 controls matched on age and sex, the authors reported no consistent patterns, or statistically significant associations between calculated magnetic-field levels and childhood leukemia development. Similar results were reported in subgroup and sensitivity analyses. In two subsequent studies, Amoon et al. (2018a, 2019) examined the potential impact of residential mobility (i.e., moving residences between birth and diagnosis) on the associations reported in Crespi et al. (2016) and Kheifets et al. (2017). Amoon et al. (2018a) concluded that changing residences was not associated with either calculated magnetic-field levels or proximity to the power lines, while Amoon et al. (2019) concluded that while uncontrolled confounding by residential mobility had some impact on the association between EMF exposure and childhood leukemia, it was unlikely to be the primary driving force behind the previously reported associations in Crespi et al. (2016) and Kheifets et al. (2017).

- Amoon et al. (2018b) conducted a pooled analysis of 29,049 cases and 68,231 controls from 11 epidemiologic studies of childhood leukemia and residential distance from high-voltage power lines. The authors reported no statistically-significant association between childhood leukemia and proximity to transmission lines of any voltage. Among subgroup analyses, the reported associations were slightly stronger for leukemia cases diagnosed before 5 years of age and in study periods prior to 1980. Adjustment for various potential confounders (*e.g.*, socioeconomic status, dwelling type, residential mobility) had little effect on the estimated associations.

- Kyriakopoulou et al. (2018) assessed the association between childhood acute leukemia and parental occupational exposure to social contacts, chemicals, and electromagnetic fields. The study was conducted at a major pediatric hospital in Greece and included 108 cases and 108 controls matched for age, gender,

and ethnicity. Statistically non-significant associations were observed between paternal exposure to magnetic fields and childhood acute leukemia for any of the exposure periods examined (1 year before conception; during pregnancy; during breastfeeding; and from birth until diagnosis); maternal exposure was not assessed due to the limited sample size. No associations were observed between childhood acute leukemia and exposure to social contacts or chemicals.

- Auger et al. (2019) examined the relationship between exposure to EMF during pregnancy and risk of childhood cancer in a cohort of 784,000 children born in Quebéc. Exposure was defined using residential distance to the nearest high-voltage transmission line or transformer station. The authors reported statistically non-significant associations between proximity to transformer stations and any cancer, hematopoietic cancer, or solid tumors. No associations were reported with distance to transmission lines.
- Crespi et al. (2019) investigated the relationship between childhood leukemia and distance from high-voltage lines and calculated magnetic-field exposure, separately and combined, within the California study population previously analyzed in Crespi et al. (2016) and Kheifets et al. (2017). The authors reported that neither close proximity to high-voltage lines nor exposure to calculated magnetic fields alone were associated with childhood leukemia; an association was observed only for those participants who were both close to high-voltage lines (< 50 meters) and had high calculated magnetic fields (≥ 0.4 microtesla [i.e., ≥ 4 milligauss]). No associations were observed with low-voltage power lines (< 200 kV). In a subsequent study, Amoon et al. (2020) examined the potential impact of dwelling type on the associations reported in Crespi et al. (2019). Amoon et al. (2020) concluded that while the type of dwelling at which a child resides (e.g., single-family home, apartment, duplex, mobile home) was associated with socioeconomic status and race or ethnicity, it was not associated with childhood leukemia and did not appear to be a potential confounder in the relationship between childhood leukemia and magnetic-field exposure in this study population.
- Swanson et al. (2019) conducted a meta-analysis of 41 epidemiologic studies of childhood leukemia and magnetic-field exposure published between 1979 and 2017 to examine trends in childhood leukemia development over time. The authors reported that while the estimated risk of childhood leukemia initially increased during the earlier period, a statistically non-significant decline in estimated risk has been observed from the mid-1990s until the present (*i.e.*, 2019).
- Talibov et al. (2019) conducted a pooled analysis of 9,723 cases and 17,099 controls from 11 epidemiologic studies to examine the relationship between parental occupational exposure to magnetic fields and childhood leukemia. No statistically significant association was found between either paternal or maternal exposure and leukemia (overall or by subtype). No associations were observed in the meta-analyses.

- Núñez-Enríquez et al. (2020) assessed the relationship between residential magnetic-field exposure and B-lineage acute lymphoblastic leukemia ("B-ALL") in children under 16 years of age in Mexico. The study included 290 cases and 407 controls matched on age, gender, and health institution; magnetic-field exposure was assessed through the collection of 24-hour measurements in the participants' bedrooms. While the authors reported some statistically significant associations between elevated magnetic-field levels and development of B-ALL, the results were dependent on the chosen cut-points.

- Seomun et al. (2021) performed a meta-analysis based on 33 previously published epidemiologic studies investigating the potential relationship between magnetic-field exposure and childhood cancers, including leukemia and brain cancer. For childhood leukemia, the authors reported statistically significant associations with some, but not all, of the chosen cut-points for magnetic-field exposure. The associations between magnetic-field exposure and childhood brain cancer were statistically non-significant. The study provided limited new insight as most of the studies included in the current meta-analysis, were included in previously conducted meta- and pooled analyses.

Recent epidemiologic studies of EMF and neurodegenerative diseases include:

- Seelen et al. (2014) conducted a population-based case-control study in the Netherlands and included 1,139 cases diagnosed with amyotrophic lateral sclerosis ("ALS") between 2006 and 2013 and 2,864 frequency-matched controls. The shortest distance from the case and control residences to the nearest high-voltage power line (50 to 380 kilovolts [kV]) was determined by geocoding. No statistically significant associations between residential proximity to power lines with voltages of either 50 to 150 kV or 220 to 380 kV and ALS were reported.

- Sorahan and Mohammed (2014) analyzed mortality from neurodegenerative diseases in a cohort of approximately 73,000 electricity supply workers in the United Kingdom. Cumulative occupational exposure to magnetic-fields was calculated for each worker in the cohort based on their job titles and job locations. Death certificates were used to identify deaths from neurodegenerative diseases. No associations or trends for any of the included neurodegenerative diseases (Alzheimer's disease, Parkinson's disease, and ALS) were observed with various measures of calculated magnetic fields.

- Koeman et al. (2015, 2017) analyzed data from the Netherlands Cohort Study of approximately 120,000 men and women who were enrolled in the cohort in 1986 and followed up until 2003. Lifetime occupational history, obtained through questionnaires, and job-exposure matrices on ELF magnetic fields and other occupational exposures were used to assign exposure to study subjects. Based on 1,552 deaths from vascular dementia, the researchers reported a statistically not significant association of vascular dementia with estimated exposure to metals, chlorinated solvents, and ELF magnetic fields. However,

because no exposure-response relationship for cumulative exposure was observed and because magnetic fields and solvent exposures were highly correlated with exposure to metals, the authors attributed the association with ELF magnetic fields and solvents to confounding by exposure to metals (Koeman et al., 2015). Based on a total of 136 deaths from ALS among the cohort members, the authors reported a statistically significant, approximately two-fold association with ELF magnetic fields in the highest exposure category. This association, however, was no longer statistically significant when adjusted for exposure to insecticides (Koeman et al., 2017).

- Fischer et al. (2015) conducted a population-based case-control study that included 4,709 cases of ALS diagnosed between 1990 and 2010 in Sweden and 23,335 controls matched to cases on year of birth and sex. The study subjects' occupational exposures to ELF magnetic fields and electric shocks were classified based on their occupations, as recorded in the censuses and corresponding job-exposure matrices. Overall, neither magnetic fields nor electric shocks were related to ALS.

- Vergara et al. (2015) conducted a mortality case-control study of occupational exposure to electric shock and magnetic fields and ALS. They analyzed data on 5,886 deaths due to ALS and over 58,000 deaths from other causes in the United States between 1991 and 1999. Information on occupation was obtained from death certificates and job-exposure matrices were used to categorize exposure to electric shocks and magnetic fields. Occupations classified as "electric occupations" were moderately associated with ALS. The authors reported no consistent associations for ALS, however, with either electric shocks or magnetic fields, and they concluded that their findings did not support the hypothesis that exposure to either electric shocks or magnetic fields explained the observed association of ALS with "electric occupations."

- Pedersen et al. (2017) investigated the occurrence of central nervous system diseases among approximately 32,000 male Danish electric power company workers. Cases were identified through the national patient registry between 1982 and 2010. Exposure to ELF magnetic fields was determined for each worker based on their job titles and area of work. A statistically significant increase was reported for dementia in the high exposure category when compared to the general population, but no exposure-response pattern was identified, and no similar increase was reported in the internal comparisons among the workers. No other statistically significant increases among workers were reported for the incidence of Alzheimer's disease, Parkinson's disease, motor neuron disease, multiple sclerosis, or epilepsy, when compared to the general population, or when incidence among workers was analyzed across estimated exposure levels.

- Vinceti et al. (2017) examined the association between ALS and calculated magnetic-field levels from high-voltage power lines in Italy. The authors included 703 ALS cases and 2,737 controls; exposure was assessed based on

residential proximity to high-voltage power lines. No statistically significant associations were reported and no exposure-response trend was observed. Similar results were reported in subgroup analyses by age, calendar period of disease diagnosis, and study area.

- Checkoway et al. (2018) investigated the association between Parkinsonism[13] and occupational exposure to magnetic fields and several other agents (endotoxins, solvents, shift work) among 800 female textile workers in Shanghai. Exposure to magnetic fields was assessed based on the participants' work histories. The authors reported no statistically significant associations between Parkinsonism and occupational exposure to any of the agents under study, including magnetic fields.

- Gunnarsson and Bodin (2018) conducted a meta-analysis of occupational risk factors for ALS. The authors reported a statistically significant association between occupational exposures to EMF, estimated using a job-exposure matrix, and ALS among the 11 studies included. Statistically significant associations were also reported between ALS and jobs that involve working with electricity, heavy physical work, exposure to metals (including lead) and chemicals (including pesticides), and working as a nurse or physician. The authors reported some evidence for publication bias. In a subsequent publication, Gunnarsson and Bodin (2019) updated their previous meta-analysis to also include Parkinson's disease and Alzheimer's disease. A slight, statistically significant association was reported between occupational exposure to EMF and Alzheimer's disease; no association was observed for Parkinson's disease.

- Huss et al. (2018) conducted a meta-analysis of 20 epidemiologic studies of ALS and occupational exposure to magnetic fields. The authors reported a weak overall association; a slightly stronger association was observed in a subset analysis of six studies with full occupational histories available. The authors noted substantial heterogeneity among studies, evidence for publication bias, and a lack of a clear exposure-response relationship between exposure and ALS.

- Jalilian et al. (2018) conducted a meta-analysis of 20 epidemiologic studies of occupational exposure to magnetic fields and Alzheimer's disease. The authors reported a moderate, statistically significant overall association; however, they noted substantial heterogeneity among studies and evidence for publication bias.

- Röösli and Jalilian (2018) performed a meta-analysis using data from five epidemiologic studies examining residential exposure to magnetic fields and

[13] Parkinsonism is defined by Checkoway et al. (2018) as *"a syndrome whose cardinal clinical features are bradykinesia, rest tremor, muscle rigidity, and postural instability. Parkinson disease is the most common neurodegenerative form of [parkinsonism]"* (p. 887).

ALS. A statistically non-significant negative association was reported between ALS and the highest exposed group, where exposure was defined based on distance from power lines or calculated magnetic-field level.

- Gervasi et al. (2019) assessed the relationship between residential distance to overhead power lines in Italy and risk of Alzheimer's dementia and Parkinson's disease. The authors included 9,835 cases of Alzheimer's dementia and 6,810 cases of Parkinson's disease; controls were matched by sex, year of birth, and municipality of residence. A weak, statistically non-significant association was observed between residences within 50 meters of overhead power lines and both Alzheimer's dementia and Parkinson's disease, compared to distances of over 600 meters.

- Peters et al. (2019) examined the relationship between ALS and occupational exposure to both magnetic fields and electric shock in a pooled study of data from three European countries. The study included 1,323 ALS cases and 2,704 controls matched for sex, age, and geographic location; exposure was assessed based on occupational title and defined as low (background), medium, or high. Statistically significant associations were observed between ALS and ever having been exposed above background levels to either magnetic fields or electric shocks; however, no clear exposure-response trends were observed with exposure duration or cumulative exposure. The authors also noted significant heterogeneity in risk by study location.

- Filippini et al. (2020) investigated the associations between ALS and several environmental and occupational exposures, including electromagnetic fields, within a case-control study in Italy. The study included 95 cases and 135 controls matched on age, gender, and residential province; exposure to electromagnetic fields was assessed using the participants' responses to questions related to occupational use of electric and electronic equipment, occupational EMF exposure, and residential distance to overhead power lines. The authors reported a statistically significant association between ALS and residential proximity to overhead power lines and a statistically non-significant association between ALS and occupational exposure to EMF; occupational use of electric and electronic equipment was associated with a statistically non-significant decrease in ALS development.

- Huang et al. (2020) conducted a meta-analysis of 43 epidemiologic studies examining potential occupational risk factors for dementia or mild cognitive impairment. The authors included five cohort studies and seven case-control studies related to magnetic-field exposure. For both study types, the authors reported positive associations between dementia and work-related magnetic-field exposures. The paper, however, provided no information on the occupations held by the study participants, their magnetic-field exposure levels, or how magnetic-field levels were assessed; therefore, the results are difficult to interpret. The authors also reported a high level of heterogeneity among

studies. Thus, this analysis adds little, if any, to the overall weight of evidence on a potential association between dementia and magnetic fields.

- Jalilian et al. (2020) conducted a meta-analysis of ALS and occupational exposure to both magnetic fields and electric shocks within 27 studies from Europe, the United States, and New Zealand. A weak, statistically significant association was reported between magnetic-field exposure and ALS; however, the authors noted evidence of study heterogeneity and publication bias. No association was observed between ALS and electric shocks.

- Chen et al. (2021) conducted a case-control study to examine the association between occupational exposure to electric shocks, magnetic fields, and motor neuron disease ("MND") in New Zealand. The study included 319 cases with a MND diagnosis (including ALS) and 604 controls, matched on age and gender; exposure was assessed using the participants' occupational history questionnaire responses and previously developed job-exposure matrices for electric shocks and magnetic fields. The authors reported no associations between MND and exposure to magnetic fields; positive associations were reported between MND and working at a job with the potential for electric shock exposure.

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Vinceti M, Malagoli C, Fabbi S, Kheifets L, Violi F, Poli M, Caldara S, Sesti D, Violanti S, Zanichelli P, Notari B, Fava R, Arena A, Calzolari R, Filippini T, Iacuzio L, Arcolin E, Mandrioli J, Fini N, Odone A, Signorelli C, Patti F, Zappia M, Pietrini V, Oleari P, Teggi S, Ghermandi G, Dimartino A, Ledda C, Mauceri C, Sciacca S, Fiore M, Ferrante M. Magnetic fields exposure from high-voltage power lines and risk of amyotrophic lateral sclerosis in two Italian populations. Amyotroph Lateral Scler Frontotemporal Degener 18: 583-589, 2017.

World Health Organization (WHO). Environmental Health Criteria 238: Extremely Low Frequency (ELF) Fields. Geneva, Switzerland: World Health Organization, 2007.

V. NOTICE

A. Furnish a proposed route description to be used for public notice purposes. Provide a map of suitable scale showing the route of the proposed project. For all routes that the Applicant proposed to be noticed, provide minimum, maximum and average structure heights.

Response: A map showing the Nimbus Line Loop and Nimbus Substation and the Farmwell-Nimbus Line is provided as Attachment V.A. A written description of the Proposed Routes of the Nimbus Line Loop and Farmwell-Nimbus Line is as follows:

Nimbus Line Loop Proposed Route

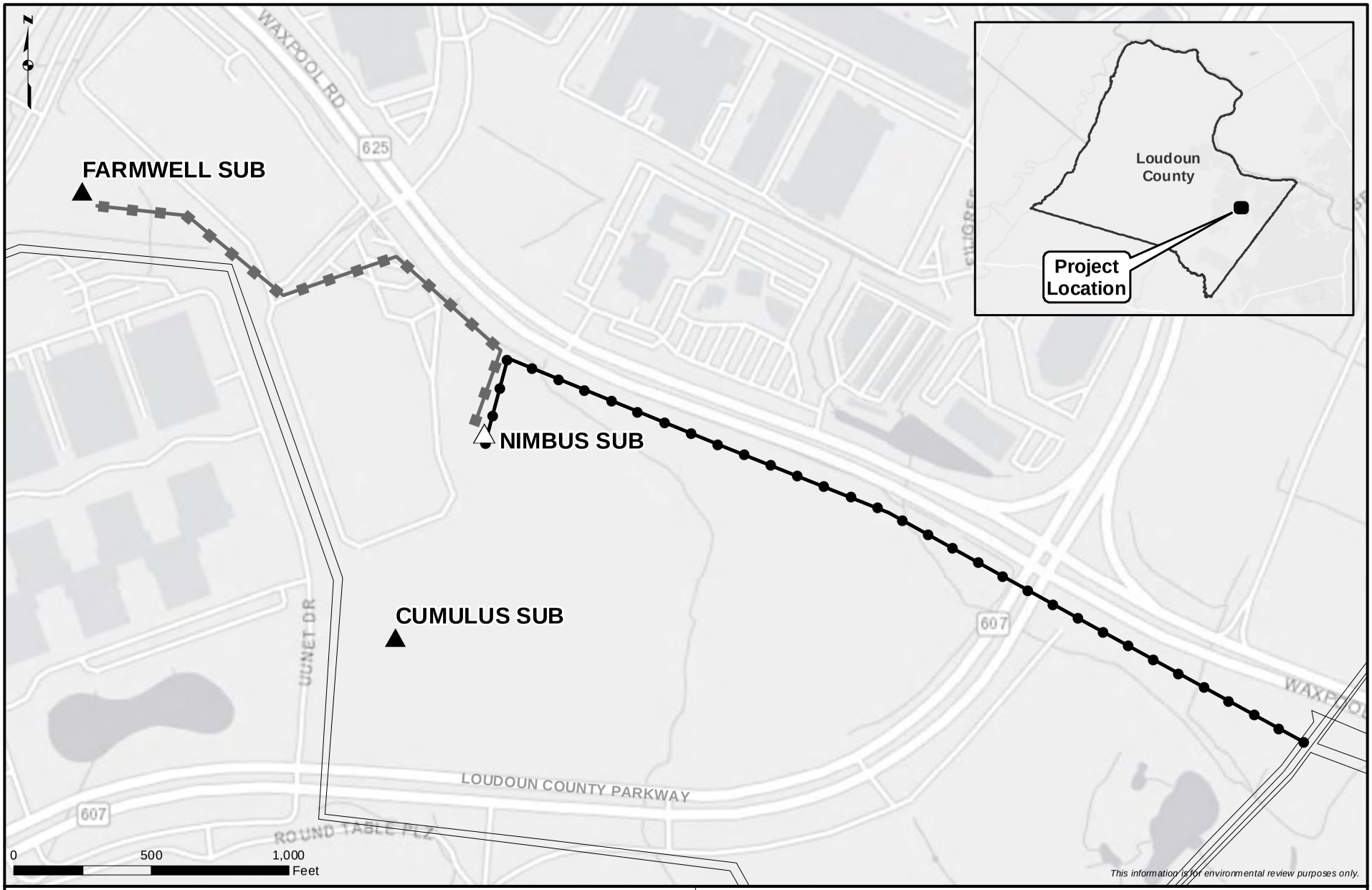
The length of the Proposed Route of the 230 kV double circuit Nimbus Line Loop is approximately 0.61 mile. Beginning at the cut in on Line #2152 at existing Structure #2152/19A adjacent to the south side of Waxpool Road, the route continues west along the south side of Waxpool Road, crossing over Loudoun County Parkway, for a distance of 3,225 feet. At this point, the route turns south for a distance of 20 feet and terminates at the proposed Nimbus Substation.

Four double circuit and three single circuit monopole structures will be installed along the Proposed Route of the Nimbus Line Loop. These proposed structures will have a minimum structure height of approximately 125 feet, a maximum structure height of approximately 140 feet, and an average proposed structure height of approximately 132 feet, based on preliminary conceptual design, not including foundation reveal and subject to change based on final engineering design.

Farmwell-Nimbus Line Proposed Route

The length of the Proposed Route of the 230 kV single circuit Farmwell-Nimbus Line is approximately 0.26 mile. The route begins by exiting the eastern side of the Farmwell Substation then turns to the southeast for approximately 450 feet. The route then turns to the northeast across a parking area for approximately 430 feet. The route next turns southeast and parallels Waxpool Road for approximately 510 feet. The route then turns south and terminates at the proposed Nimbus Substation.

Three single circuit monopole structures will be installed along the Proposed Route of the Farmwell-Nimbus Line. These proposed structures will have a minimum structure height of approximately 110 feet, a maximum structure height of approximately 110 feet, and an average proposed structure height of approximately 110 feet, based on preliminary conceptual design, not including foundation reveal and subject to change based on final engineering design.



▲ Existing Substation
△ Proposed Substation
Nimbus 230 kV Line Loop Proposed Route
230 kV Farmwell-Nimbus Proposed Route
Existing Dominion Transmission Lines

Attachment V.A
Notice Map
Nimbus 230 kV Line Loop and Nimbus Substation and 230 kV Farmwell-Nimbus Transmission Line
Loudoun County, Virginia

V. NOTICE

B. List Applicant offices where members of the public may inspect the application. If applicable, provide a link to website(s) where the application may be found.

Response: Due to COVID-19, the Application will be made available electronically for public inspection at: www.dominionenergy.com/nimbus.

V. NOTICE

C. List all federal, state, and local agencies and/or officials that may reasonably be expected to have an interest in the proposed construction and to whom the Applicant has furnished or will furnish a copy of the application.

Response:

Ms. Bettina Rayfield
Office of Environmental Impact Review
Department of Environmental Quality
P.O. Box 1105
Richmond, Virginia 23218

Ms. S. Rene Hypes
Virginia Department of Conservation and Recreation
Division of Natural Heritage
600 East Main Street, 24th Floor
Richmond, Virginia 23219

Ms. Robbie Rhur
Department of Conservation and Recreation, Planning Bureau
600 East Main Street, 17th Floor
Richmond, Virginia 23219

Mr. Roger Kirchen
Department of Historic Resources
Review and Compliance Division
2801 Kensington Avenue
Richmond, Virginia 23221

Ms. Amy M. Ewing
Virginia Department of Wildlife Resources
7870 Villa Park, Suite 400
Henrico, Virginia 23228

Mr. Keith Tignor
Virginia Department of Agriculture and Consumer Affairs
102 Governor Street
Richmond, Virginia 23219

Mr. Karl Didier, PhD
Forestland Conservation Division
Virginia Department of Forestry
900 Natural Resources Drive, Suite 800
Charlottesville, Virginia 22903

Mr. Mark Eversole
Virginia Marine Resources Commission
Habitat Management Division
Building 96, 380 Fenwick Road
Ft. Monroe, Virginia 23651

Mr. Troy Andersen
US Fish and Wildlife Service
Virginia Field Office, Ecological Services
6669 Short Lane
Gloucester, Virginia 23061

Regulator of the Day
US Army Corps of Engineers
Norfolk District
803 Front Street
Norfolk, Virginia 23510

Mr. Scott Denny
Virginia Department of Aviation
Airport Services Division
5702 Gulfstream Road
Richmond, Virginia 23250

Ms. Martha Little
Virginia Outdoors Foundation
600 East Main Street, Suite 402
Richmond, Virginia 23219

Mr. Randy Kiser
Staunton District Engineer
Virginia Department of Transportation
Staunton District Office
811 Commerce Road
Staunton, Virginia 24401

Mr. Don Komara
Harrisonburg Resident Engineer
Virginia Department of Transportation
Harrisonburg Residency
3536 North Valley Pike
Harrisonburg, Virginia 22802

Mr. Timothy Fitzgerald
Augusta County Administrator
P.O. Box 5910
Verona, Virginia 24482

Mr. Steven Rosenberg
Staunton City Manager
P.O. Box 58
Staunton, Virginia 24402

V. NOTICE

D. If the application is for a transmission line with a voltage of 138 kV or greater, provide a statement and any associated correspondence indicating that prior to the filing of the application with the SCC the Applicant has notified the chief administrative officer of every locality in which it plans to undertake construction of the proposed line of its intention to file such an application, and that the Applicant gave the locality a reasonable opportunity for consultation about the proposed line (similar to the requirements of § 15.2-2202 of the Code for electric transmission lines of 150 kV or more).

Response: In accordance with Va. Code §15.2-2202 E, letters dated January 19, 2022, were delivered to Mr. James David, Acting Director of the Loudoun County Department of Planning and Zoning, and Mr. Tim Hemstreet, Administrator of Loudoun County, where the Project is located. The letters stated the Company's intention to file this Application and invited the County to consult with the Company about the Project. These letters are included as Attachment V.D.1.[14]

[14] Note, due to an administrative oversight, new Buttermilk-Nimbus Line #2225 identified in the letters provided in Attachment V.D.1 should have indicated new Buttermilk-Nimbus Line #2255.

Dominion Energy Virginia
10900 Nuckols Road, Ste. 400
Glen Allen, VA 23060
DominionEnergy.com

January 19, 2022

James David, Acting Director
County of Loudoun
Department of Planning and Zoning
PO Box 7000
Leesburg, VA 20177-7000

RE: Dominion Energy Virginia's Proposed Nimbus 230 kV Line Loop & Nimbus Substation and 230 kV Farmwell-Nimbus Transmission Line, Loudoun County, Virginia
Notice Pursuant to Va. Code § 15.2-2202 E

Dear Mr. David,

Dominion Energy Virginia (the "Company") is proposing the Nimbus 230 kV Line Loop & Nimbus Substation and the 230 kV Farmwell-Nimbus Transmission Line (collectively, the "Project") within Loudoun County, Virginia. The Project is necessary to ensure that Dominion Energy Virginia can continue to meet customer needs and maintain reliable electric service for the overall growth in the area.

Specifically, the Company proposes as part of this Project to build a new approximately 0.6-mile overhead 230 kV double circuit transmission line loop ("Nimbus Line Loop") and 230-34.5 kV substation ("Nimbus Substation"), collectively called the Nimbus Line Loop & Substation. The proposed Nimbus Line Loop will be constructed in new right-of-way along a route that would tie into the Company's existing Beaumeade-Buttermilk Line #2152 at structure #2152/19A east of the intersection of Loudoun County Parkway and Waxpool Road, creating a loop that results in (i) Beaumeade-Nimbus Line #2152 and (ii) Buttermilk-Nimbus Line #2225.

The Company is also proposing as part of this Project to construct a new overhead 230 kV single circuit line ("Farmwell-Nimbus Line") that would originate at the Farmwell Substation and terminate at the new Nimbus Substation. The proposed Farmwell-Nimbus Line #2260 will be constructed in new right-of-way along a route that would extend northwest of the Nimbus Substation to the Farmwell Substation for approximately 0.26 mile.

The Company is in the process of preparing an application for a certificate of public convenience and necessity from the State Corporation Commission ("SCC"), which may be necessary for the Project. Pursuant to Va. Code § 15.2-2202, the Company is writing to notify Loudoun County of the proposed project in advance of the SCC filing. At this time, in advance of an SCC filing, the Company respectfully requests that you submit any comments or additional information that would have bearing on the proposed Project within 30 days of the date of this letter. If you would like to receive a GIS shapefile of the transmission line routes to assist in the project review or if there are any questions, please do not hesitate to contact me at (804) 239-6450 or charles.h.weil@dominionenergy.com.

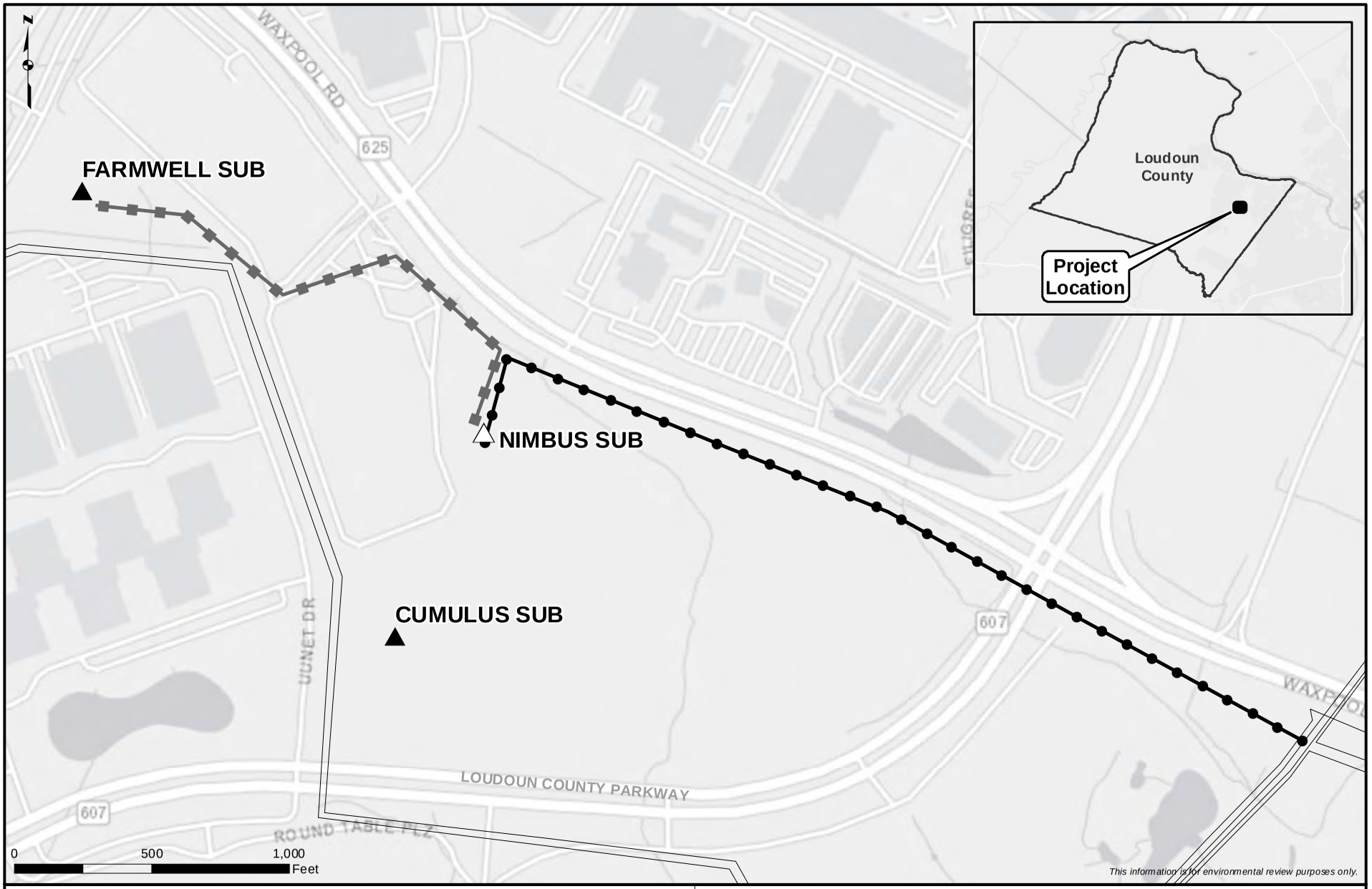
We appreciate your assistance with this project review and look forward to any additional information you may have to offer.

Sincerely,

Dominion Energy Virginia

Charles H. Weil, PE
Siting and Permitting

Attachment: Project Notice Map



▲ Existing Substation
△ Proposed Substation
Nimbus 230 kV Line Loop Proposed Route
230 kV Farmwell-Nimbus Proposed Route
Existing Dominion Transmission Lines

Overview Map

Nimbus 230 kV Line Loop and Nimbus Substation and 230 kV Farmwell-Nimbus Transmission Line

Loudoun County, Virginia

Dominion Energy Virginia
10900 Nuckols Road, Ste. 400
Glen Allen, VA 23060
DominionEnergy.com

January 19, 2022

Tim Hemstreet
Loudoun County Administrator
PO Box 7000
Leesburg, VA 20177

RE: Dominion Energy Virginia's Proposed Nimbus 230 kV Line Loop & Nimbus Substation and 230 kV Farmwell-Nimbus Transmission Line, Loudoun County, Virginia
Notice Pursuant to Va. Code § 15.2-2202 E

Dear Mr. Hemstreet,

Dominion Energy Virginia (the "Company") is proposing the Nimbus 230 kV Line Loop & Nimbus Substation and the 230 kV Farmwell-Nimbus Transmission Line (collectively, the "Project") within Loudoun County, Virginia. The Project is necessary to ensure that Dominion Energy Virginia can continue to meet customer needs and maintain reliable electric service for the overall growth in the area.

Specifically, the Company proposes as part of this Project to build a new approximately 0.6-mile overhead 230 kV double circuit transmission line loop ("Nimbus Line Loop") and 230-34.5 kV substation ("Nimbus Substation"), collectively called the Nimbus Line Loop & Substation. The proposed Nimbus Line Loop will be constructed in new right-of-way along a route that would tie into the Company's existing Beaumeade-Buttermilk Line #2152 at structure #2152/19A east of the intersection of Loudoun County Parkway and Waxpool Road, creating a loop that results in (i) Beaumeade-Nimbus Line #2152 and (ii) Buttermilk-Nimbus Line #2225.

The Company is also proposing as part of this Project to construct a new overhead 230 kV single circuit line ("Farmwell-Nimbus Line") that would originate at the Farmwell Substation and terminate at the new Nimbus Substation. The proposed Farmwell-Nimbus Line #2260 will be constructed in new right-of-way along a route that would extend northwest of the Nimbus Substation to the Farmwell Substation for approximately 0.26 mile.

The Company is in the process of preparing an application for a certificate of public convenience and necessity from the State Corporation Commission ("SCC"), which may be necessary for the Project. Pursuant to Va. Code § 15.2-2202, the Company is writing to notify Loudoun County of the proposed project in advance of the SCC filing. At this time, in advance of an SCC filing, the Company respectfully requests that you submit any comments or additional information that would have bearing on the proposed Project within 30 days of the date of this letter. If you would like to receive a GIS shapefile of the transmission line routes to assist in the project review or if there are any questions, please do not hesitate to contact me at (804) 239-6450 or charles.h.weil@dominionenergy.com.

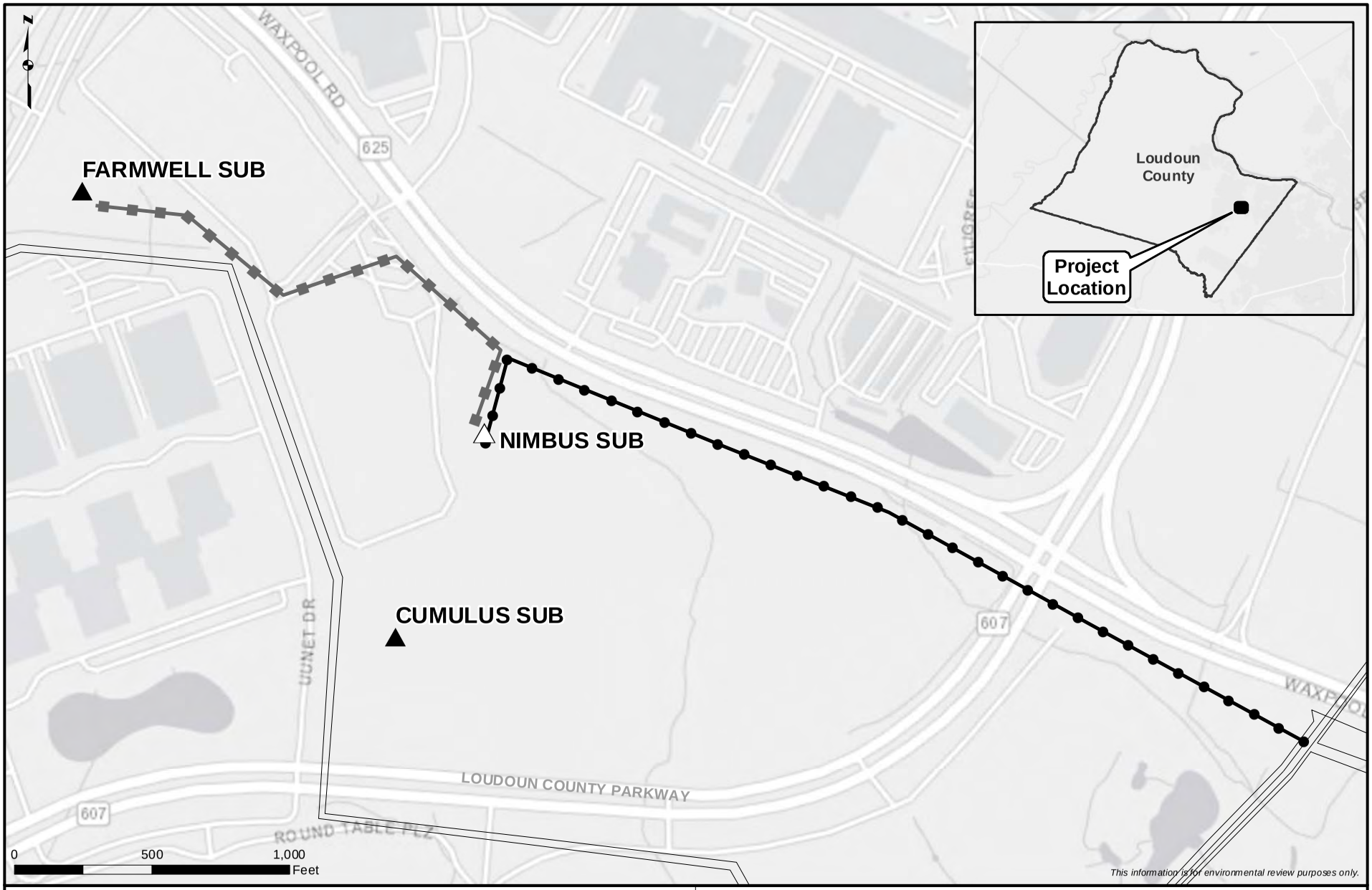
We appreciate your assistance with this project review and look forward to any additional information you may have to offer.

Sincerely,

Dominion Energy Virginia

Charles H. Weil, PE
Siting and Permitting

Attachment: Project Notice Map



▲ Existing Substation
△ Proposed Substation
Nimbus 230 kV Line Loop Proposed Route
230 kV Farmwell-Nimbus Proposed Route
Existing Dominion Transmission Lines

Overview Map

Nimbus 230 kV Line Loop and Nimbus Substation and 230 kV Farmwell-Nimbus Transmission Line

Loudoun County, Virginia

COMMONWEALTH OF VIRGINIA

STATE CORPORATION COMMISSION

APPLICATION OF	)	
	)	
VIRGINIA ELECTRIC AND POWER COMPANY	)	Case No. PUR-2022-00027
	)	
For approval and certification of electric transmission facilities: Nimbus 230 kV Line Loop and Nimbus Substation and 230 kV Farmwell-Nimbus Transmission Line	)	

IDENTIFICATION, SUMMARIES, AND TESTIMONY OF DIRECT WITNESSES OF VIRGINIA ELECTRIC AND POWER COMPANY

Steven Schweiger

Witness Direct Testimony Summary
Direct Testimony
Appendix A: Background and Qualifications

Robert C. Moorhead III

Witness Direct Testimony Summary
Direct Testimony
Appendix A: Background and Qualifications

Sherrill A. Crenshaw

Witness Direct Testimony Summary
Direct Testimony
Appendix A: Background and Qualifications

Santosh Bhattarai

Witness Direct Testimony Summary
Direct Testimony
Appendix A: Background and Qualifications

Charles H. Weil

Witness Direct Testimony Summary
Direct Testimony
Appendix A: Background and Qualifications

Jon M. Berkin, PhD

Witness Direct Testimony Summary
Direct Testimony
Appendix A: Background and Qualifications

WITNESS DIRECT TESTIMONY SUMMARY

Witness: Steven Schweiger

Title: Area Planning Engineer – Electric Transmission Planning

Summary:

Company Witness Steven Schweiger sponsors those sections of the Appendix describing the Company's electric transmission system and the need for, and benefits of, the proposed Project, as follows:

- Section I.G: This section provides a system map for the affected area.
- Section I.J: This section provides information about the project if approved by the RTO.
- Section I.K: This section, when applicable, provides outage history and maintenance history for existing transmission lines if the proposed project is a rebuild and is due in part to reliability issues.
- Section I.M: This section, when applicable, contains information for transmission lines interconnecting a non-utility generator.
- Section II.A.3: This section provides color maps of existing or proposed rights-of-way in the vicinity of the proposed project.
- Section II.A.10: This section provides details of the construction plans for the proposed project, including requested line outage schedules.

Additionally, Company Witness Schweiger co-sponsors the following sections of the Appendix:

- Section I.A (co-sponsored with Company Witnesses Robert C. Moorhead, Sherrill A. Crenshaw, Santosh Bhattarai, Charles H. Weil, and Jon M. Berkin): This section details the primary justifications for the proposed project.
- Section I.B (co-sponsored with Company Witness Robert C. Moorhead): This section details the engineering justifications for the proposed project.
- Section I.C (co-sponsored with Company Witness Robert C. Moorhead): This section describes the present system and details how the proposed project will effectively satisfy present and projected future load demand requirements.
- Section I.D (co-sponsored with Company Witness Robert C. Moorhead): This section, when applicable, describes critical contingencies and associated violations due to the inadequacy of the existing system.
- Section I.E (co-sponsored with Company Witness Robert C. Moorhead): This section explains feasible project alternatives.
- Section I.H (co-sponsored with Company Witnesses Robert C. Moorhead and Charles H. Weil): This section provides the desired in-service date of the proposed project and the estimated construction time.
- Section I.I. (co-sponsored with Company Witnesses Sherrill A. Crenshaw and Santosh Bhattarai): This section provides the estimated total cost of the proposed project.
- Section I.L (co-sponsored with Company Witness Charles H. Weil): This section, when applicable, provides details on the deterioration of structures and associated equipment.
- Section I.N (co-sponsored with Company Witness Robert C. Moorhead): This section provides the proposed and existing generating sources, distribution circuits or load centers planned to be served by all new substations, switching stations, and other ground facilities associated with the proposed project.

A statement of Mr. Schweiger's background and qualifications is attached to his testimony as Appendix A.

DIRECT TESTIMONY
OF
STEVEN SCHWEIGER
ON BEHALF OF
VIRGINIA ELECTRIC AND POWER COMPANY
BEFORE THE
STATE CORPORATION COMMISSION OF VIRGINIA
CASE NO. PUR-2022-00027

Q. Please state your name, business address and position with Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company").

A. My name is Steven Schweiger and I am an Area Planning Engineer in the Electric Transmission Planning Department for the Company. My business address is 10900 Nuckols Road, Glen Allen, Virginia 23060. A statement of my qualifications and background is provided as Appendix A.

Q. Please describe your areas of responsibility with the Company.

A. I am responsible for planning the Company's electric transmission system for voltages of 69 kilovolt ("kV") through 500 kV.

Q. What is the purpose of your testimony in this proceeding?

A. In order to provide service requested by a retail electric service customer (the "Customer"), to maintain reliable service for the overall growth in the area, and to comply with mandatory North American Electric Reliability Corporation ("NERC") Reliability Standards, Dominion Energy Virginia proposes the following in Loudoun County, Virginia:

(i) Construct a new overhead 230 kV double circuit line by cutting existing Beaumeade-Buttermilk Line #2152 at Structure #2152/19A ("Nimbus Line Loop"), resulting in (i) 230 kV Beaumeade-Nimbus Line #2152, and (ii) 230 kV Buttermilk-Nimbus Line #2255. The proposed Nimbus Line Loop will extend approximately 0.61 mile on new 100-foot-wide right-of-way to a proposed new 230-34.5 kV Nimbus Substation ("Nimbus Substation")

constructed with five 230 kV, 4000A circuit breakers in a ring bus arrangement, three 230 kV line terminals, two 230-34.5 kV, 84 MVA transformers, eight 34.5 kV distribution circuits, and other associated equipment (collectively, the "Nimbus Line Loop and Substation");

(ii) Construct a new approximately 0.26-mile 230 kV overhead single circuit line, Farmwell-Nimbus Line #2260, on new 80-foot-wide right-of-way, originating at the Company's existing Farmwell Substation and terminating at the proposed new Nimbus Substation (the "Farmwell-Nimbus Line"); and

(iii) Install one 230 kV, 4000A circuit breaker, one 230 kV, 4000A disconnect switch and line terminal equipment at the Company's existing Farmwell Substation for one 230 kV transmission line. Additionally, the project will require relay resets, drawing updates, and field support, as necessary, at the Company's existing Buttermilk and Beaumeade Substations.

The Nimbus Line Loop, Nimbus Substation, and the Farmwell-Nimbus Line are collectively referred to as the "Project."

The purpose of my testimony is to describe the Company's electric transmission system and the need for, and benefits of, the proposed Project. I am sponsoring Sections I.G, I.J, I.K, I.M, II.A.3, and II.A.10 of the Appendix. Additionally, I co-sponsor the Executive Summary and Section I.A with Company Witnesses Robert C. Moorhead, Sherrill A. Crenshaw, Santosh Bhattarai, Charles H. Weil, and Jon M. Berkin; Sections I.B, I.C, I.D, I.E, and I.N with Company Witness Robert C. Moorhead; Section I.H with Company Witnesses Robert C. Moorhead and Charles H. Weil; Section I.I with Company Witnesses Sherrill A. Crenshaw and Santosh Bhattarai; and Section I.L with Company Witness Sherill Crenshaw.

Q. Does this conclude your pre-filed direct testimony?

A. Yes, it does.

APPENDIX A

BACKGROUND AND QUALIFICATIONS OF STEVEN SCHWEIGER

Steven Schweiger received a Bachelor of Science degree in Electrical Engineering from Hofstra University in Hempstead, NY. Before joining Dominion Energy Virginia in 2021, Mr. Schweiger worked with multiple electric utility companies in the Northeast, Midwest, and Southern regions from 2017 to 2021 as a Transmission Planning Consultant for Burns & McDonnell.

WITNESS DIRECT TESTIMONY SUMMARY

Witness: Robert C. Moorhead III

Title: Engineer III – Distribution Planning

Summary:

Company Witness Robert C. Moorhead co-sponsors those sections of the Appendix describing the Company's electric distribution system and the need for, and benefits of, the proposed Project, as follows:

- Section I.A (co-sponsored with Company Witnesses Steven Schweiger, Sherrill A. Crenshaw, Santosh Bhattarai, Charles H. Weil, and Jon M. Berkin): This section details the primary justifications for the proposed project.

- Section I.B (co-sponsored with Company Witness Steven Schweiger): This section details the engineering justifications for the proposed project.

- Section I.C (co-sponsored with Company Witness Steven Schweiger): This section describes the present system and details how the proposed project will effectively satisfy present and projected future load demand requirements.

- Section I.D (co-sponsored with Company Witness Steven Schweiger): This section, when applicable, describes critical contingencies and associated violations due to the inadequacy of the existing system.

- Section I.E (co-sponsored with Company Witness Steven Schweiger): This section explains feasible project alternatives, when applicable.

- Section I.H (co-sponsored with Company Witnesses Steven Schweiger and Charles H. Weil): This section provides the desired in-service date of the proposed project and the estimated construction time.

- Section I.N (co-sponsored with Company Witness Steven Schweiger): This section provides the proposed and existing generating sources, distribution circuits or load centers planned to be served by all new substations, switching stations, and other ground facilities associated with the proposed project.

A statement of Mr. Moorhead's background and qualifications is attached to his testimony as Appendix A.

DIRECT TESTIMONY
OF
ROBERT C. MOORHEAD III
ON BEHALF OF
VIRGINIA ELECTRIC AND POWER COMPANY
BEFORE THE
STATE CORPORATION COMMISSION OF VIRGINIA
CASE NO. PUR-2022-00027

Q. Please state your name, business address and position with Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company").

A. My name is Robert C. Moorhead III, and I am an Engineer III – Distribution Planning for the Company. My business address is 600 E. Canal Street, Richmond, Virginia 23219. A statement of my qualifications and background is provided as Appendix A.

Q. Please describe your areas of responsibility with the Company.

A. I am responsible for planning the Company's electric distribution system that serves data centers, primarily in the Company's Northern Virginia offices, for voltage under 69 kV.

Q. What is the purpose of your testimony in this proceeding?

A. In order to provide service requested by a retail electric service customer (the "Customer"), to maintain reliable service for the overall growth in the area, and to comply with mandatory North American Electric Reliability Corporation ("NERC") Reliability Standards, Dominion Energy Virginia proposes the following in Loudoun County, Virginia:

(i) Construct a new overhead 230 kV double circuit line by cutting existing Beaumeade-Buttermilk Line #2152 at Structure #2152/19A ("Nimbus Line Loop"), resulting in (i) 230 kV Beaumeade-Nimbus Line #2152, and (ii) 230 kV Buttermilk-Nimbus Line #2255. The proposed Nimbus Line Loop will extend approximately 0.61 mile on new 100-foot-wide right-of-way to a proposed new 230-34.5 kV Nimbus Substation ("Nimbus Substation") constructed with five 230 kV, 4000A circuit breakers in a ring bus arrangement, three 230 kV line terminals, two 230-34.5 kV, 84 MVA transformers, eight 34.5

kV distribution circuits, and other associated equipment (collectively, the "Nimbus Line Loop and Substation");

(ii) Construct a new approximately 0.26-mile 230 kV overhead single circuit line, Farmwell-Nimbus Line #2260, on new 80-foot-wide right-of-way, originating at the Company's existing Farmwell Substation and terminating at the proposed new Nimbus Substation (the "Farmwell-Nimbus Line"); and

(iii) Install one 230 kV, 4000A circuit breaker, one 230 kV, 4000A disconnect switch and line terminal equipment at the Company's existing Farmwell Substation for one 230 kV transmission line. Additionally, the project will require relay resets, drawing updates, and field support, as necessary, at the Company's existing Buttermilk and Beaumeade Substations.

The Nimbus Line Loop, Nimbus Substation, and the Farmwell-Nimbus Line are collectively referred to as the "Project."

The purpose of my testimony is to describe the Company's electric distribution system and the need for, and benefits of, the proposed Project. I co-sponsor the Executive Summary and Section I.A with Company Witnesses Steven Schweiger, Sherrill A. Crenshaw, Santosh Bhattarai, Charles H. Weil, and Jon M. Berkin. Additionally, I co-sponsor Sections I.B, I.C, I.D, I.E, and I.N of the Appendix with Company Witness Steven Schweiger; and Section I.H with Company Witnesses Steven Schweiger and Charles H. Weil.

Q. Does this conclude your pre-filed direct testimony?

A. Yes, it does.

APPENDIX A

BACKGROUND AND QUALIFICATIONS
OF
ROBERT C. MOORHEAD III

Robert C. Moorhead III is a 2014 graduate from the University of Virginia with a Bachelor of Science in Mechanical Engineering and a 2019 graduate from Virginia Polytechnic Institute and State University with a Master of Science in Systems Engineering. He is licensed as a Professional Engineer in the Commonwealth of Virginia. He has been employed by the Company since 2016. His experience with the Company includes distribution reliability and standards (4 years), substation engineering (1.5 years), and most recently distribution planning. Prior to working for the Company, Mr. Moorhead worked for an engineering consulting firm for 2 years.

WITNESS DIRECT TESTIMONY SUMMARY

Witness: Sherrill A. Crenshaw

Title: Consulting Engineer – Electric Transmission Line Engineering

Summary:

Company Witness Sherill A. Crenshaw sponsors those sections of the Appendix providing an overview of the design characteristics of the transmission facilities for the proposed Project, and discussing electric and magnetic field levels, as follows:

- Section I.F: This section, when applicable, describes any lines or facilities that will be removed, replaced, or taken out of service upon completion of the proposed project.
- Section II.A.5: This section provides drawings of the right-of-way cross section showing typical transmission lines structure placements.
- Sections II.B.1 to II.B.2: These sections provide the line design and operational features of the proposed project, as applicable.
- Section IV: This section provides analysis on the health aspects of electric and magnetic field levels.

Additionally, Company Witness Crenshaw co-sponsors the following sections of the Appendix:

- Section I.A (co-sponsored with Company Witnesses Steven Schweiger, Robert C. Moorhead, Santosh Bhattarai, Charles H. Weil, and Jon M. Berkin): This section details the primary justifications for the proposed project.
- Section I.I. (co-sponsored with Company Witnesses Steven Schweiger and Santosh Bhattarai): This section provides the estimated total cost of the proposed project.
- Section I.L (co-sponsored with Company Witness Steven Schweiger): This section, when applicable, provides details on the deterioration of structures and associated equipment.
- Sections II.B.3 to II.B.5 (co-sponsored with Company Witness Charles H. Weil): These sections, when applicable, provide supporting structure details along the proposed and alternative routes.
- Section II.B.6 (co-sponsored with Company Witnesses Charles H. Weil and Jon M. Berkin): This section provides photographs of existing facilities, representations of proposed facilities, and visual simulations.
- Section V.A (co-sponsored with Company Witnesses Charles H. Weil and Jon M. Berkin): This section provides the proposed route description and structure heights for notice purposes.

A statement of Ms. Crenshaw's background and qualifications is attached to his testimony as Appendix A.

DIRECT TESTIMONY
OF
SHERRILL A. CRENSHAW
ON BEHALF OF
VIRGINIA ELECTRIC AND POWER COMPANY
BEFORE THE
STATE CORPORATION COMMISSION OF VIRGINIA
CASE NO. PUR-2022-00027

Q. Please state your name, business address and position with Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company").

A. My name is Sherrill A. Crenshaw, and I am a Consulting Engineer in the Electric Transmission Line Engineering Department of the Company. My business address is 10900 Nuckols Road, Glen Allen, Virginia 23060. A statement of my qualifications and background is provided as Appendix A.

Q. Please describe your areas of responsibility with the Company.

A. I am responsible for the estimating, conceptual, and final design of high voltage transmission line projects from 69 kilovolt ("kV") to 500 kV.

Q. What is the purpose of your testimony in this proceeding?

A. In order to provide service requested by a retail electric service customer (the "Customer"), to maintain reliable service for the overall growth in the area, and to comply with mandatory North American Electric Reliability Corporation ("NERC") Reliability Standards, Dominion Energy Virginia proposes the following in Loudoun County, Virginia:

(i) Construct a new overhead 230 kV double circuit line by cutting existing Beaumeade-Buttermilk Line #2152 at Structure #2152/19A ("Nimbus Line Loop"), resulting in (i) 230 kV Beaumeade-Nimbus Line #2152, and (ii) 230 kV Buttermilk-Nimbus Line #2255. The proposed Nimbus Line Loop will extend approximately 0.61 mile on new 100-foot-wide right-of-way to a proposed new 230-34.5 kV Nimbus Substation ("Nimbus Substation")

constructed with five 230 kV, 4000A circuit breakers in a ring bus arrangement, three 230 kV line terminals, two 230-34.5 kV, 84 MVA transformers, eight 34.5 kV distribution circuits, and other associated equipment (collectively, the "Nimbus Line Loop and Substation");

(ii) Construct a new approximately 0.26-mile 230 kV overhead single circuit line, Farmwell-Nimbus Line #2260, on new 80-foot-wide right-of-way, originating at the Company's existing Farmwell Substation and terminating at the proposed new Nimbus Substation (the "Farmwell-Nimbus Line"); and

(iii) Install one 230 kV, 4000A circuit breaker, one 230 kV, 4000A disconnect switch and line terminal equipment at the Company's existing Farmwell Substation for one 230 kV transmission line. Additionally, the project will require relay resets, drawing updates, and field support, as necessary, at the Company's existing Buttermilk and Beaumeade Substations.

The Nimbus Line Loop, Nimbus Substation, and the Farmwell-Nimbus Line are collectively referred to as the "Project."

The purpose of my testimony is to describe the design characteristics of the transmission facilities for the proposed Project, and also to discuss electric and magnetic field ("EMF") levels. I am sponsoring Sections I.F, II.A.5, II.B.1, II.B.2, and IV of the Appendix. Additionally, I co-sponsor the Executive Summary and Section I.A with Company Witnesses Steven Schweiger, Robert C. Moorhead, Santosh Bhattarai, Charles H. Weil, and Jon M. Berkin; Section I.I with Company Witnesses Steven Schweiger and Santosh Bhattarai; Section I.L with Company Witness Steven Schweiger; Sections II.B.3 to II.B.5 with Company Witness Charles H. Weil; and Sections II.B.6 and V.A with Company Witnesses Charles H. Weil and Jon M. Berkin.

Q. Does this conclude your pre-filed direct testimony?

A. Yes, it does.

APPENDIX A

BACKGROUND AND QUALIFICATIONS
OF
SHERRILL A. CRENSHAW

Sherrill A. Crenshaw graduated from Virginia Polytechnic Institute and State University in 1985 with a Bachelor of Science in Civil Engineering. He joined the Company in 1986 and has held various engineering titles within the Electric Transmission Engineering department, where he currently works as a Consulting Engineer. Mr. Crenshaw is a licensed engineer in the Commonwealth of Virginia.

Mr. Crenshaw has previously testified before the Virginia State Corporation

WITNESS DIRECT TESTIMONY SUMMARY

Witness: Santosh Bhattarai

Title: Consulting Engineer – Substation Engineering

Summary:

Company Witness Santosh Bhattarai sponsors or co-sponsors the following sections of the Appendix describing the substation work to be performed for the proposed Project as follows:

- Section I.A (co-sponsored with Company Witnesses Steven Schweiger, Robert C. Moorhead, Sherrill A. Crenshaw, Charles H. Weil, and Jon M. Berkin): This section details the primary justifications for the proposed project.

- Section I.I (co-sponsored with Company Witnesses Steven Schweiger and Sherrill A. Crenshaw): This section provides the estimated total cost of the proposed project.

- Section II.C: This section describes and furnishes a one-line diagram and layout of the substation associated with the proposed project.

A statement of Mr. Bhattarai's background and qualifications is attached to his testimony as Appendix A.

DIRECT TESTIMONY
OF
SANTOSH BHATTARAI
ON BEHALF OF
VIRGINIA ELECTRIC AND POWER COMPANY
BEFORE THE
STATE CORPORATION COMMISSION OF VIRGINIA
CASE NO. PUR-2022-00027

Q. Please state your name, business address and position with Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company").

A. My name is Santosh Bhattarai, and I am a Consulting Engineer in the Substation Engineering section of the Electric Transmission group of the Company. My business address is 2400 Grayland Avenue, Richmond, Virginia 23220. A statement of my qualifications and background is provided as Appendix A.

Q. What are your responsibilities as a Consulting Engineer?

A. I am responsible for evaluation of the substation project requirements, feasibility studies, conceptual physical design, scope development, preliminary engineering and cost estimating for high voltage transmission and distribution substations.

Q. What is the purpose of your testimony in this proceeding?

A. In order to provide service requested by a retail electric service customer (the "Customer"), to maintain reliable service for the overall growth in the area, and to comply with mandatory North American Electric Reliability Corporation ("NERC") Reliability Standards, Dominion Energy Virginia proposes the following in Loudoun County, Virginia:

(i) Construct a new overhead 230 kV double circuit line by cutting existing Beaumeade-Buttermilk Line #2152 at Structure #2152/19A ("Nimbus Line Loop"), resulting in (i) 230 kV Beaumeade-Nimbus Line #2152, and (ii) 230 kV Buttermilk-Nimbus Line #2255. The proposed Nimbus Line Loop will

extend approximately 0.61 mile on new 100-foot-wide right-of-way to a proposed new 230-34.5 kV Nimbus Substation ("Nimbus Substation") constructed with five 230 kV, 4000A circuit breakers in a ring bus arrangement, three 230 kV line terminals, two 230-34.5 kV, 84 MVA transformers, eight 34.5 kV distribution circuits, and other associated equipment (collectively, the "Nimbus Line Loop and Substation");

(ii) Construct a new approximately 0.26-mile 230 kV overhead single circuit line, Farmwell-Nimbus Line #2260, on new 80-foot-wide right-of-way, originating at the Company's existing Farmwell Substation and terminating at the proposed new Nimbus Substation (the "Farmwell-Nimbus Line"); and

(iii) Install one 230 kV, 4000A circuit breaker, one 230 kV, 4000A disconnect switch and line terminal equipment at the Company's existing Farmwell Substation for one 230 kV transmission line. Additionally, the project will require relay resets, drawing updates, and field support, as necessary, at the Company's existing Buttermilk and Beaumeade Substations.

The Nimbus Line Loop, Nimbus Substation, and the Farmwell-Nimbus Line are collectively referred to as the "Project."

The purpose of my testimony is to describe the substation work to be performed as part of the Project. As it pertains to station work, I sponsor Section II.C of the Appendix. Additionally, I co-sponsor the Executive Summary and Section I.A with Company Witnesses Steven Schweiger, Robert C. Moorhead, Sherrill A. Crenshaw, Charles H. Weil, and Jon M. Berkin; and Section I.I of the Appendix with Company Witnesses Steven Schweiger and Sherrill A. Crenshaw.

Q. Does this conclude your pre-filed direct testimony?

A. Yes, it does.

APPENDIX A

BACKGROUND AND QUALIFICATIONS
OF
SANTOSH BHATTARAI

Santosh Bhattarai received a Master of Science degree in Electrical Engineering from South Dakota State University in 2006. Before working for the Company, Mr. Bhattarai worked at Electrical Consultants, Inc. from 2006 to 2009 in Billings, Montana as a Substation Design Engineer. Then, from 2010 to 2013, he worked at Electrical Consultants, Inc. in Madison, Wisconsin as a Substation Project Engineer. Mr. Bhattarai's responsibilities included the evaluation of the substation project requirements, development of project scope documents, estimates and schedules, preparation of specifications and bid documents, material procurement, development of detailed physical drawings, bill of materials, electrical schematics and wiring diagrams. Mr. Bhattarai joined the Dominion Energy Virginia Substation Engineering department in November 2013 as an Engineer III. He was promoted to Consulting Engineer in July 2019. He has been licensed as a Professional Engineer in the Commonwealth of Virginia since 2015. In recognition of his professional standing, the Institute of Electrical and Electronics Engineers ("IEEE") board elected him to the grade of Senior Member in 2017.

Mr. Bhattarai has previously testified before the Virginia State Corporation Commission.

WITNESS DIRECT TESTIMONY SUMMARY

Witness: Charles H. Weil

Title: Electric Transmission Local Permitting Consultant

Summary:

Company Witness Charles H. Weil will sponsor those sections of the Appendix providing an overview of the design of the route for the proposed Project, and related permitting, as follows:

- Section II.A.12: This section identifies the counties and localities through which the proposed project will pass and provides General Highway Maps for these localities.
- Sections V.B-D: These sections provide information related to public notice of the proposed project.

Additionally, Mr. Weil co-sponsors the following sections of the Appendix:

- Section I.A (co-sponsored with Company Witnesses Steven Schweiger, Robert C. Moorhead, Sherrill A. Crenshaw, Santosh Bhattarai, and Jon M. Berkin): This section details the primary justifications for the proposed project.
- Section I.H (co-sponsored with Company Witnesses Steven Schweiger and Robert C. Moorhead): This section provides the desired in-service date of the proposed project and the estimated construction time.
- Section II.A.1 (co-sponsored with Company Witness Jon M. Berkin): This section provides the length of the proposed corridor and viable alternatives to the proposed project.
- Section II.A.2 (co-sponsored with Company Witness Jon M. Berkin): This section provides a map showing the route of the proposed project in relation to notable points close to the proposed project.
- Section II.A.4 (co-sponsored with Company Witness Jon M. Berkin): This section explains why the existing right-of-way is not adequate to serve the need.
- Sections II.A.6 to II.A.8 (co-sponsored with Company Witness Jon M. Berkin): These sections provide detail regarding the right-of-way for the proposed project.
- Section II.A.9 (co-sponsored with Company Witness Jon M. Berkin): This section describes the proposed route selection procedures and details alternative routes considered.
- Section II.A.11 (co-sponsored with Company Witness Jon M. Berkin): This section details how the construction of the proposed project follows the provisions discussed in Attachment 1 of the Transmission Appendix Guidelines.
- Sections II.B.3 to II.B.5 (co-sponsored with Company Witness Sherrill A. Crenshaw): These sections, when applicable, provide supporting structure details along the proposed and alternative routes.
- Section II.B.6 (co-sponsored with Company Witnesses Sherrill A. Crenshaw and Jon M. Berkin): This section provides photographs of existing facilities, representations of proposed facilities, and visual simulations.
- Section III (co-sponsored with Company Witness Jon M. Berkin): This section details the impact of the proposed project on scenic, environmental, and historic features.
- Section V.A (co-sponsored with Company Witnesses Sherrill A. Crenshaw and Jon M. Berkin): This section provides the proposed route description and structure heights for notice purposes.

Finally, Mr. Weil co-sponsors the DEQ Supplement filed with the Application with Company Witness Jon M. Berkin. A statement of Mr. Weil's background and qualifications is attached to his testimony as Appendix A.

DIRECT TESTIMONY
OF
CHARLES H. WEIL
ON BEHALF OF
VIRGINIA ELECTRIC AND POWER COMPANY
BEFORE THE
STATE CORPORATION COMMISSION OF VIRGINIA
CASE NO. PUR-2022-00027

Q. Please state your name, business address and position with Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company").

A. My name is Charles H. Weil, and I serve as an Engineer II in the Siting and Permitting Group for the Company. My business address is 10900 Nuckols Road, Glen Allen, Virginia 23060. A statement of my qualifications and background is provided as Appendix A.

Q. Please describe your areas of responsibility with the Company.

A. I am responsible for identifying appropriate routes for transmission lines and obtaining necessary federal, state, and local approvals and environmental permits for those facilities. In this position, I work closely with government officials, permitting agencies, property owners, and other interested parties, as well as with other Company personnel, to develop facilities needed by the public so as to reasonably minimize environmental and other impacts on the public in a reliable, cost-effective manner.

Q. What is the purpose of your testimony in this proceeding?

A. In order to provide service requested by a retail electric service customer (the "Customer"), to maintain reliable service for the overall growth in the area, and to comply with mandatory North American Electric Reliability Corporation ("NERC")

Reliability Standards, Dominion Energy Virginia proposes the following in Loudoun County, Virginia:

(i) Construct a new overhead 230 kV double circuit line by cutting existing Beaumeade-Buttermilk Line #2152 at Structure #2152/19A ("Nimbus Line Loop"), resulting in (i) 230 kV Beaumeade-Nimbus Line #2152, and (ii) 230 kV Buttermilk-Nimbus Line #2255. The proposed Nimbus Line Loop will extend approximately 0.61 mile on new 100-foot-wide right-of-way to a proposed new 230-34.5 kV Nimbus Substation ("Nimbus Substation") constructed with five 230 kV, 4000A circuit breakers in a ring bus arrangement, three 230 kV line terminals, two 230-34.5 kV, 84 MVA transformers, eight 34.5 kV distribution circuits, and other associated equipment (collectively, the "Nimbus Line Loop and Substation");

(ii) Construct a new approximately 0.26-mile 230 kV overhead single circuit line, Farmwell-Nimbus Line #2260, on new 80-foot-wide right-of-way, originating at the Company's existing Farmwell Substation and terminating at the proposed new Nimbus Substation (the "Farmwell-Nimbus Line"); and

(iii) Install one 230 kV, 4000A circuit breaker, one 230 kV, 4000A disconnect switch and line terminal equipment at the Company's existing Farmwell Substation for one 230 kV transmission line. Additionally, the project will require relay resets, drawing updates, and field support, as necessary, at the Company's existing Buttermilk and Beaumeade Substations.

The Nimbus Line Loop, Nimbus Substation, and the Farmwell-Nimbus Line are collectively referred to as the "Project."

The purpose of my testimony is to provide an overview of the route and permitting for the proposed Project. I sponsor Sections II.A.12 and V.B to V.D of the Appendix. Additionally, I co-sponsor the Executive Summary and Section I.A with Company Witnesses Steven Schweiger, Robert C. Moorhead, Sherrill A. Crenshaw, Santosh Bhattarai, and Jon M. Berkin; Section I.H with Company Witnesses Steven Schweiger and Robert C. Moorhead; Sections II.A.1, II.A.2, II.A.4, II.A.6 to II.A.9, II.A.11, and III with Company Witness Charles H. Weil; Sections II.B.3 to II.B.5 with Company Witness Sherrill A. Crenshaw; and Sections II.B.6 and V.A with Company Witnesses

Sherrill A. Crenshaw and Jon M. Berkin. Finally, I co-sponsor the DEQ Supplement with Company Witness Jon M. Berkin.

Q. Has the Company complied with Va. Code § 15.2-2202 E?

A. Yes. In accordance with Va. Code §15.2-2202 E, a letters dated January 19, 2022, were delivered to Mr. James David, Acting Director of the Loudoun County Department of Planning and Zoning, and Mr. Tim Hemstreet, Administrator of Loudoun County, where the Project is located. The letters stated the Company's intention to file this Application and invited the County to consult with the Company about the Project. These letters are included as Attachment V.D.1 to the Appendix.[1]

Q. Does this conclude your pre-filed direct testimony?

A. Yes, it does.

[1] Note, due to an administrative oversight, new Buttermilk-Nimbus Line #2225 identified in the letters provided in Attachment V.D.1 to the Appendix should have indicated new Buttermilk-Nimbus Line #2255.

APPENDIX A

BACKGROUND AND QUALIFICATIONS
OF
CHARLES H. WEIL

Charles H. Weil graduated from Virginia Tech in 2012 with a Bachelor of Science in Civil and Environmental Engineering. He has a professional license in Civil Engineering. He was previously a transportation engineer with various consulting firms and the City of Suffolk, Virginia before joining Dominion Energy Virginia as an Engineer II in the Siting and Permitting Group in 2019.

Mr. Weil has previously submitted pre-filed testimony to the Virginia State Corporation Commission.

WITNESS DIRECT TESTIMONY SUMMARY

Witness: Jon M. Berkin, PhD

Title: Partner, Environmental Resource Management

Summary:

Company Witness Jon M. Berkin sponsors the Environmental Routing Study provided as part of the Company's Application.

Additionally, Dr. Berkin co-sponsors the following sections of the Appendix:

- Section I.A (co-sponsored with Company Witnesses Steve Schweiger, Robert C. Moorhead, Sherrill A. Crenshaw, Santosh Bhattarai, and Charles H. Weil): This section details the primary justifications for the proposed project.
- Section II.A.1 (co-sponsored with Company Witness Charles H. Weil): This section provides the length of the proposed corridor and viable alternatives to the proposed project.
- Section II.A.2 (co-sponsored with Company Witness Charles H. Weil): This section provides a map showing the route of the proposed project in relation to notable points close to the proposed project.
- Section II.A.4 (co-sponsored with Company Witness Charles H. Weil): This section explains why the existing right-of-way is not adequate to serve the need.
- Sections II.A.6 to II.A.8 (co-sponsored with Company Witness Charles H. Weil): These sections provide detail regarding the right-of-way for the proposed project.
- Section II.A.9 (co-sponsored with Company Witness Charles H. Weil): This section describes the proposed route selection procedures and details alternative routes considered.
- Section II.A.11 (co-sponsored with Company Witness Charles H. Weil): This section details how the construction of the proposed project follows the provisions discussed in Attachment 1 of the Transmission Appendix Guidelines.
- Section II.B.6 (co-sponsored with Company Witnesses Sherrill A. Crenshaw and Jon M. Berkin): This section provides photographs of existing facilities, representations of proposed facilities, and visual simulations.
- Section III (co-sponsored with Company Witness Charles H. Weil): This section details the impact of the proposed project on scenic, environmental, and historic features.
- Section V.A (co-sponsored with Company Witnesses Sherrill A. Crenshaw and Charles H. Weil): This section provides the proposed route description and structure heights for notice purposes.

Finally, Dr. Berkin co-sponsors the DEQ Supplement filed with this Application with Company Witness Greg R. Baka.

A statement of Dr. Berkin's background and qualifications is attached to his testimony as Appendix A.

DIRECT TESTIMONY
OF
JON M. BERKIN, PhD
ON BEHALF OF
VIRGINIA ELECTRIC AND POWER COMPANY
BEFORE THE
STATE CORPORATION COMMISSION OF VIRGINIA
CASE NO. PUR-2022-00027

Q. Please state your name, position and place of employment and business address.

A. My name is Jon M. Berkin. I am employed as a Partner with Environmental Resource Management ("ERM"). My business address is 222 South 9th Street, Suite 2900, Minneapolis, Minnesota 55402. A statement of my qualifications and background is provided as Appendix A.

Q. What professional experience does ERM have with the routing of linear energy transportation facilities?

A. ERM has extensive experience in the routing, feasibility assessments, and permitting of energy infrastructure projects. It has assisted its clients in the identification, evaluation and development of linear energy facilities for the past 30 years. During this time it has developed a consistent approach for linear facility routing and route selection based on the identification, mapping and comparative evaluation of routing constraints and opportunities within defined study areas. ERM uses data-intensive Geographic Information System spatial and dimensional analysis and the most current and refined data layers and aerial photography resources available for the identification, evaluation and selection of transmission line routes. In addition to Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company"), its clients include some of the largest energy companies in the United States, Canada and the world, including ExxonMobil, TC Energy, Shell, NextEra Energy, Phillips 66, Kinder Morgan, British

Petroleum, Enbridge Energy and others. ERM also routinely assists the staff of the Federal Energy Regulatory Commission, United States Army Corps of Engineers, and the U.S. Forest Service in the identification and/or evaluation of linear energy routes to support federal National Environmental Policy Act evaluations. ERM works on both small and large energy projects and has assisted in or conducted the routing and route evaluation of some of the largest electric transmission line and pipeline facilities in North America.

In Virginia, we served as routing consultant to Dominion Energy Virginia for its Cannon Branch-Cloverhill 230 kV transmission line project in the City of Manassas and Prince William County, approved by the Commission in Case No. PUE-2011-00011. We similarly served as the routing consultant for the Company's Dahlgren 230 kV double circuit transmission line project in King George County, approved by the Commission in Case No. PUE-2011-00113. ERM also served as the routing consultant for the Company's Surry-Skiffes Creek-Whealton 500 and 230 kV transmission lines in Case No. PUE-2012-00029; for the Company's Remington CT-Warrenton 230 kV Double Circuit transmission line, approved by the Commission in Case No. PUE-2014-00025; for the Haymarket 230 kV Line and Substation Project in Case No. PUE-2015-00107; for the Remington-Gordonsville Electric Transmission Project, approved by the Commission in Case No. PUE-2015-00117; for the Norris Bridge project approved by the Commission in Case No. PUE-2016-00021; for the Company's Idylwood-Tysons 230 kV single circuit underground transmission line, Tysons Substation rebuild and related transmission facilities, approved by the Commission in Case No. PUR-2017-00143, and most recently the Lockridge 230 kV Line Loop and Substation project approved by the Commission in

Case No. PUR-2019-00215. In addition, ERM currently serves as the routing consultant for the Company's Coastal Virginia Offshore Wind Commercial Project, in Case No. PUR-2021-00142, and the Company's DTC 230 kV Line Loop and DTC Substation, in Case No. PUR-2021-00280, and the Company's Aviator 230 kV Line Loop and Aviator Substation, Case No. PUR-2022-00012, which are currently pending before the Commission.

ERM's role as routing consultant for each of these transmission line projects included preparation of an Environmental Routing Study for the project and submission of testimony sponsoring it.

Q. What is the purpose of your testimony in this proceeding?

A. In order to provide service requested by a retail electric service customer (the "Customer"), to maintain reliable service for the overall growth in the area, and to comply with mandatory North American Electric Reliability Corporation ("NERC") Reliability Standards, Dominion Energy Virginia proposes the following in Loudoun County, Virginia:

(i) Construct a new overhead 230 kV double circuit line by cutting existing Beaumeade-Buttermilk Line #2152 at Structure #2152/19A ("Nimbus Line Loop"), resulting in (i) 230 kV Beaumeade-Nimbus Line #2152, and (ii) 230 kV Buttermilk-Nimbus Line #2255. The proposed Nimbus Line Loop will extend approximately 0.61 mile on new 100-foot-wide right-of-way to a proposed new 230-34.5 kV Nimbus Substation ("Nimbus Substation") constructed with five 230 kV, 4000A circuit breakers in a ring bus arrangement, three 230 kV line terminals, two 230-34.5 kV, 84 MVA transformers, eight 34.5 kV distribution circuits, and other associated equipment (collectively, the "Nimbus Line Loop and Substation");

(ii) Construct a new approximately 0.26-mile 230 kV overhead single circuit line, Farmwell-Nimbus Line #2260, on new 80-foot-wide right-of-way, originating at the Company's existing Farmwell Substation and terminating at the proposed new Nimbus Substation (the "Farmwell-Nimbus Line"); and

(iii) Install one 230 kV, 4000A circuit breaker, one 230 kV, 4000A disconnect switch and line terminal equipment at the Company's existing Farmwell Substation for one 230 kV transmission line. Additionally, the project will require relay resets, drawing updates, and field support, as necessary, at the Company's existing Buttermilk and Beaumeade Substations.

The Nimbus Line Loop, Nimbus Substation, and the Farmwell-Nimbus Line are collectively referred to as the "Project."

ERM was engaged on behalf of the Company to assist it in the identification and evaluation of route alternatives to resolve the identified electrical need that would meet the applicable criteria of Virginia law and the Company's operating needs.

The purpose of my testimony is to introduce and sponsor the Environmental Routing Study, which is included as part of the Application filed by the Company in this proceeding. Additionally, I co-sponsor the Executive Summary and Section I.A with Company Witnesses Steven Schweiger, Robert C. Moorhead, Sherrill A. Crenshaw, Santosh Bhattarai, and Charles H. Weil; Sections II.A.1, II.A.2, II.A.4, II.A.6 to II.A.9, II.A.11, and III with Company Witness Charles H. Weil; and Sections II.B.6 and V.A with Company Witnesses Sherrill A. Crenshaw and Charles H. Weil. Lastly, I co-sponsor the DEQ Supplement with Company Witness Charles H. Weil.

Q. Does this conclude your pre-filed direct testimony?

A. Yes, it does.

APPENDIX A

BACKGROUND AND QUALIFICATIONS OF JON M. BERKIN

Jon M. Berkin earned a Bachelor of Arts degree from Boston University and a Master of Arts and a Doctoral degree from Bryn Mawr College. He has approximately 29 years of experience working in the energy-related consulting field specializing in the siting and regulatory permitting of major linear energy facilities, including both interstate and intrastate electric transmission lines and gas and oil pipelines throughout the United States. During this time he was employed for 5 years with R. Christopher Goodwin and Associates, Inc. and 24 years with ERM, a privately-owned consulting company specializing in the siting, licensing and environmental construction compliance of large, multi-state energy transportation facilities.

Dr. Berkin's professional experience related to electric transmission line projects includes the direct management of field studies, impact assessments and agency consultations associated with the routing and licensing of multiple transmission line projects in the mid-Atlantic region, including the management and/or supervision of the routing and permitting. Work on these projects included studies to identify and delineate routing constraints and options; identification and evaluation of route alternatives; and the direction of field studies to inventory wetlands, stream crossings, cultural resources and sensitive habitats and land uses. Within the last several years he has managed or directed the identification and evaluation of over 150 miles of 230 and 500 kV transmission line route alternatives in the Commonwealth for Virginia Electric and Power Company.

Dr. Berkin has previously testified before the Virginia State Corporation Commission.