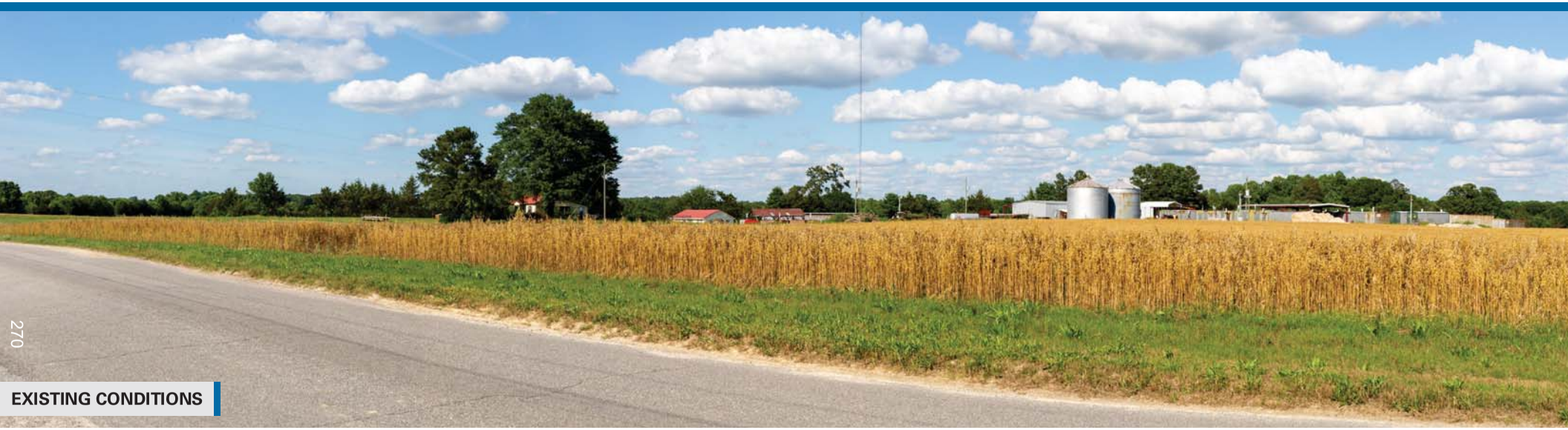
NEBULA TO RAINES
Transmission Line Project

Viewpoint 7

Date: 05/21/2024 **Time:** 2:38 pm **Viewing Direction:** Northeast

7 Viewpoint Location — Route 1

Dominion Energy®



EXISTING CONDITIONS

PROPOSED CONDITIONS

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

NEBULA TO RAINES
Transmission Line Project

Viewpoint 7

Date: 05/21/2024 **Time:** 3:18 pm **Viewing Direction:** Northeast

7 Viewpoint Location — Route 3

Dominion Energy®

EXISTING CONDITIONS

PROPOSED CONDITIONS

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

NEBULA TO RAINES
Transmission Line Project

Viewpoint 8

Date: 05/21/2024 **Time:** 3:39 pm **Viewing Direction:** North

8 Viewpoint Location — Route 3

Dominion Energy®

272

EXISTING CONDITIONS

PROPOSED CONDITIONS

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

NEBULA TO RAINES
Transmission Line Project

Viewpoint 9

Date: 05/20/2024 **Time:** 2:23 pm **Viewing Direction:** Northwest

9 Viewpoint Location — Route 5

Dominion Energy®

EXISTING CONDITIONS

PROPOSED CONDITIONS

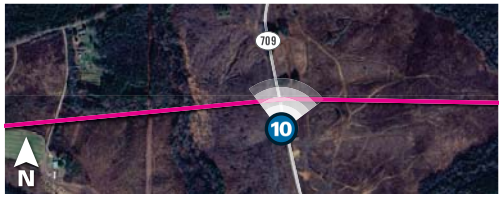
Photo simulations are for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.

NEBULA TO RAINES
Transmission Line Project

Viewpoint 10

Date: 05/21/2024 **Time:** 4:07 pm **Viewing Direction:** North

10 Viewpoint Location — Route 1



Dominion Energy®

EXISTING CONDITIONS

PROPOSED CONDITIONS

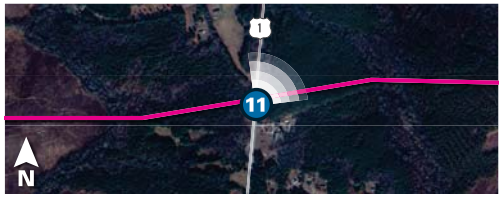
Photo simulations are for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.

NEBULA TO RAINES
Transmission Line Project

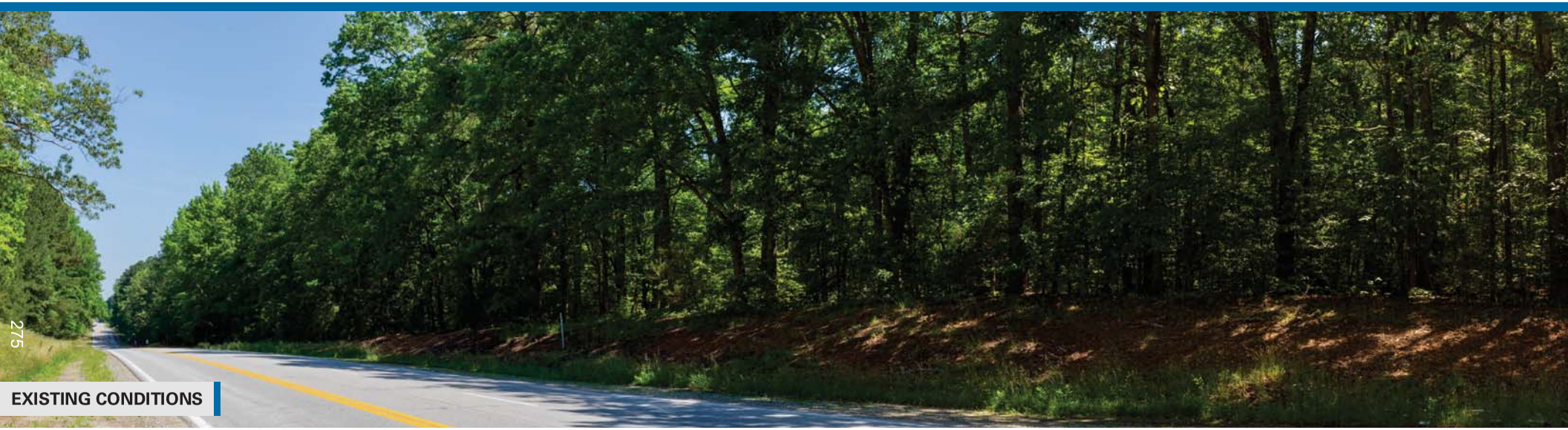
Viewpoint 11

Date: 05/22/2024 **Time:** 10:21 am **Viewing Direction:** Northeast

11 Viewpoint Location — Route 1



Dominion Energy®



EXISTING CONDITIONS

PROPOSED CONDITIONS

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

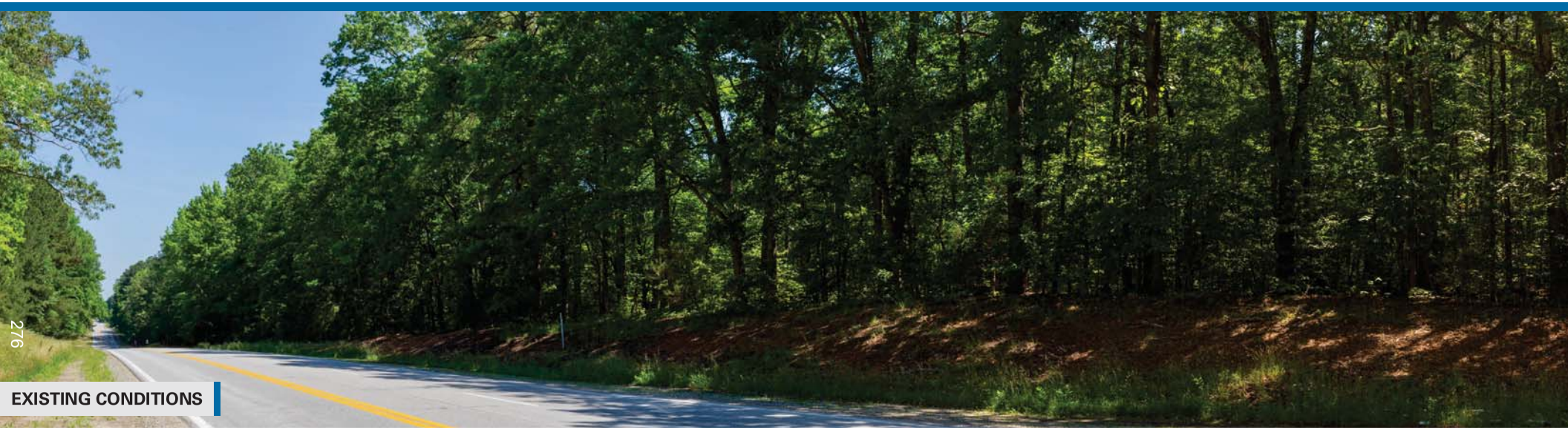
NEBULA TO RAINES
Transmission Line Project

Viewpoint 11

Date: 05/22/2024 **Time:** 10:21 am **Viewing Direction:** Northeast

11 Viewpoint Location — Route 3

Dominion Energy®



EXISTING CONDITIONS

PROPOSED CONDITIONS

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

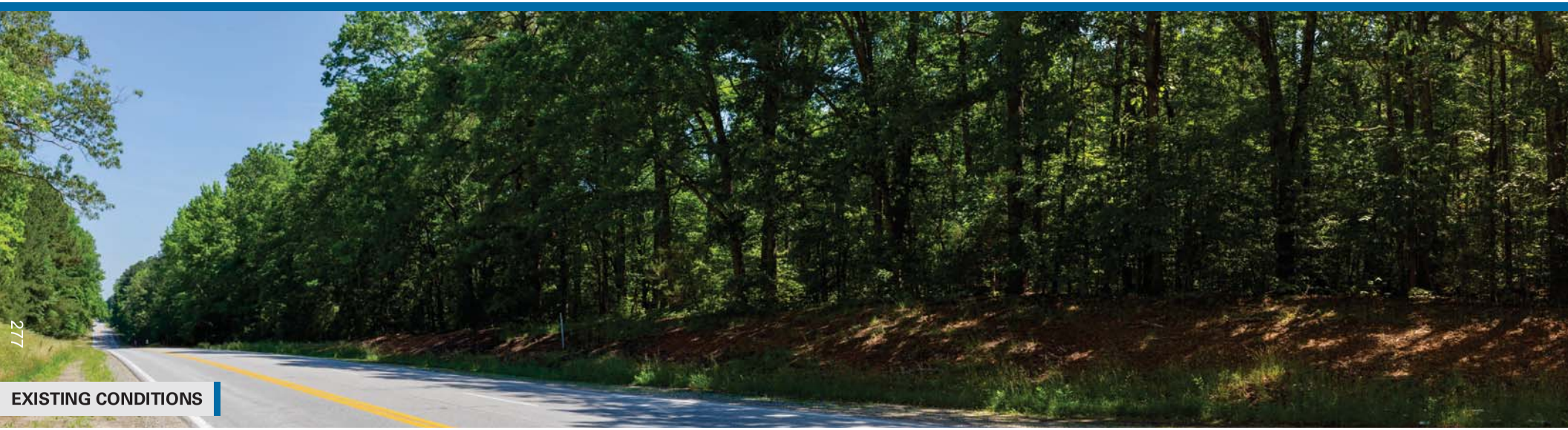
NEBULA TO RAINES
Transmission Line Project

Viewpoint 11

Date: 05/22/2024 **Time:** 10:21 am **Viewing Direction:** Northeast

11 Viewpoint Location — Route 3

Dominion Energy®



277

EXISTING CONDITIONS

PROPOSED CONDITIONS OVERLAY

Only the sections of the project highlighted in yellow are visible from this viewpoint.

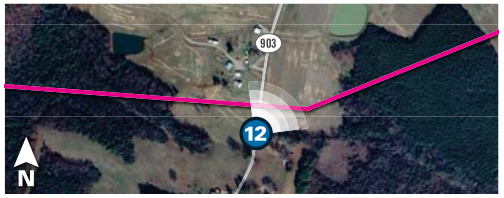
Photo simulations are for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.

NEBULA TO RAINES
Transmission Line Project

Viewpoint 12

Date: 05/21/2024 **Time:** 9:48 am **Viewing Direction:** Northeast

12 Viewpoint Location — Route 1



Dominion Energy®

EXISTING CONDITIONS

PROPOSED CONDITIONS

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

NEBULA TO RAINES
Transmission Line Project

Viewpoint 13

Date: 05/20/2024 **Time:** 2:58 pm **Viewing Direction:** North

13 Viewpoint Location — Route 5

Dominion Energy®

EXISTING CONDITIONS

PROPOSED CONDITIONS

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

NEBULA TO RAINES
Transmission Line Project

Viewpoint 14

Date: 05/21/2024 **Time:** 4:26 pm **Viewing Direction:** East

14 Viewpoint Location — Route 3

Dominion Energy®

280

EXISTING CONDITIONS

PROPOSED CONDITIONS

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

NEBULA TO RAINES
Transmission Line Project

Viewpoint 14

Date: 05/21/2024 **Time:** 4:26 pm **Viewing Direction:** East

14 Viewpoint Location — Route 3

Dominion Energy®

EXISTING CONDITIONS

PROPOSED CONDITIONS | OVERLAY

Only the sections of the project highlighted in yellow are visible from this viewpoint.

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

NEBULA TO RAINES
Transmission Line Project

Viewpoint 16

Date: 05/22/2024 **Time:** 11:53 am **Viewing Direction:** Southwest

16 Viewpoint Location — Route 5

Dominion Energy®

EXISTING CONDITIONS

PROPOSED CONDITIONS

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

NEBULA TO RAINES
Transmission Line Project

Viewpoint 17

Date: 05/22/2024 **Time:** 7:16 am **Viewing Direction:** South

17 Viewpoint Location — Route 5

Dominion Energy®

EXISTING CONDITIONS

PROPOSED CONDITIONS

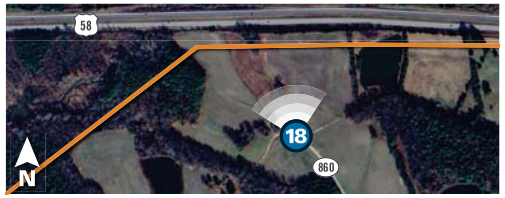
Photo simulations are for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.

NEBULA TO RAINES
Transmission Line Project

Viewpoint 18

Date: 05/22/2024 **Time:** 12:40 pm **Viewing Direction:** North

18 Viewpoint Location — Route 3



Dominion Energy®

EXISTING CONDITIONS

PROPOSED CONDITIONS

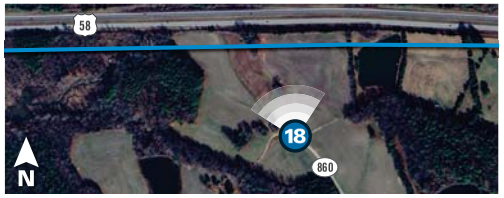
Photo simulations are for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.

NEBULA TO RAINES
Transmission Line Project

Viewpoint 18

Date: 05/22/2024 **Time:** 12:40 pm **Viewing Direction:** North

18 Viewpoint Location — Route 5



Dominion Energy®

EXISTING CONDITIONS

PROPOSED CONDITIONS

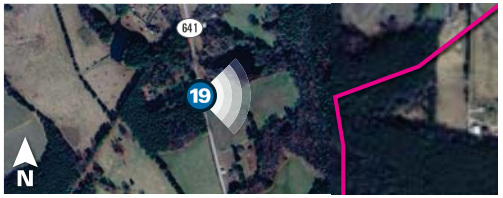
Photo simulations are for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.

NEBULA TO RAINES
Transmission Line Project

Viewpoint 19

Date: 05/21/2024 **Time:** 11:31 am **Viewing Direction:** East

19 Viewpoint Location — Route 1



Dominion Energy®

EXISTING CONDITIONS

PROPOSED CONDITIONS

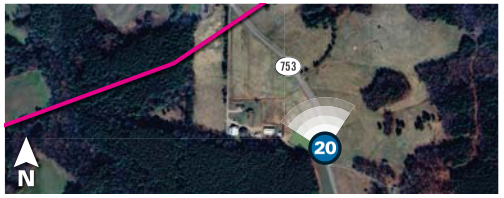
Photo simulations are for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.

NEBULA TO RAINES
Transmission Line Project

Viewpoint 20

Date: 05/22/2024 **Time:** 7:53 am **Viewing Direction:** North

20 Viewpoint Location — Route 1



Dominion Energy®

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EXISTING CONDITIONS

PROPOSED CONDITIONS

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

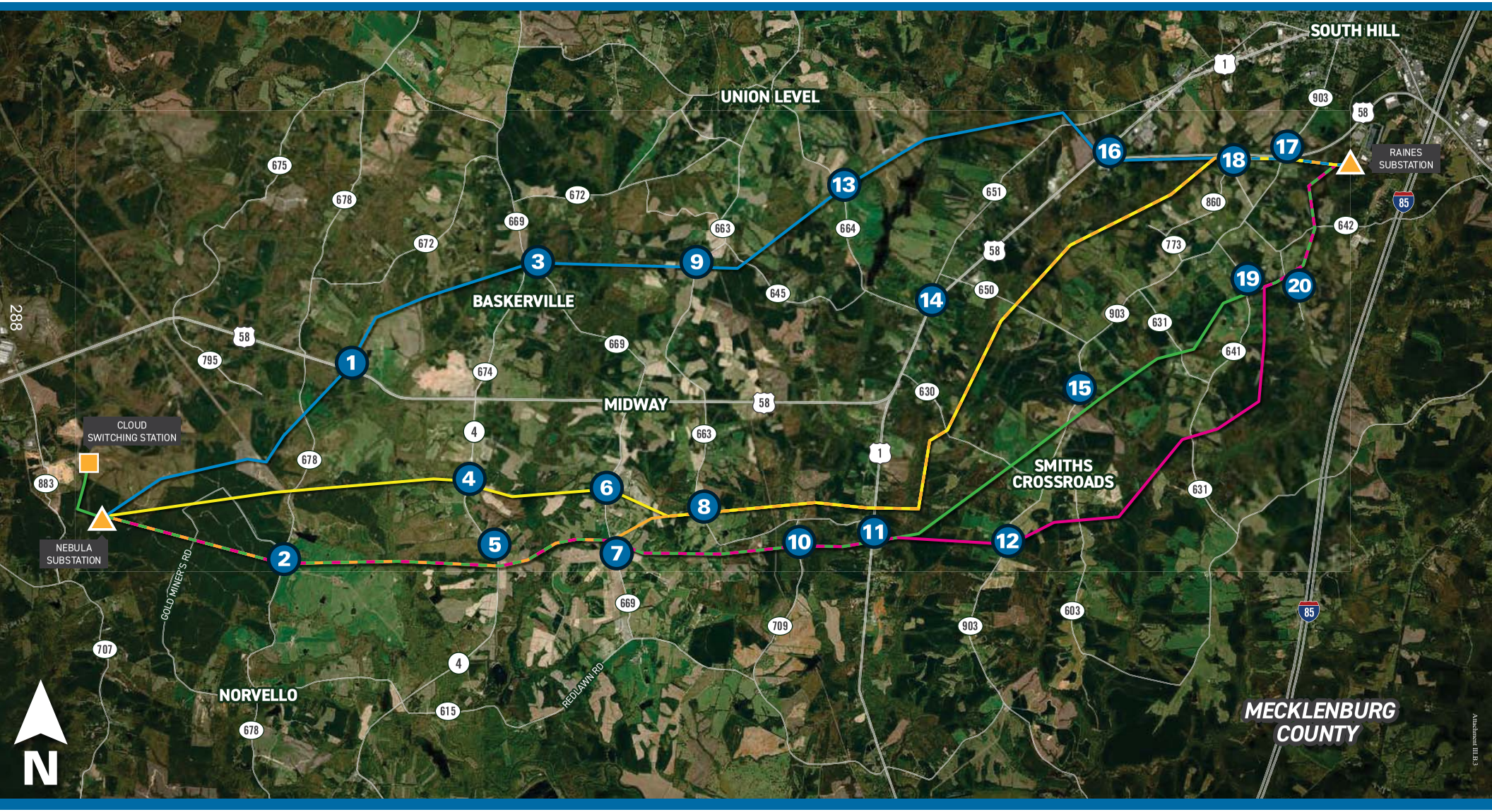
NEBULA TO RAINES
Transmission Line Project

Photo Location Map

1 Viewpoint Location ▲ Proposed Substation ■ Proposed Switching Station

Route 1 Route 2 Route 3 Route 4 Route 5

Dominion Energy®

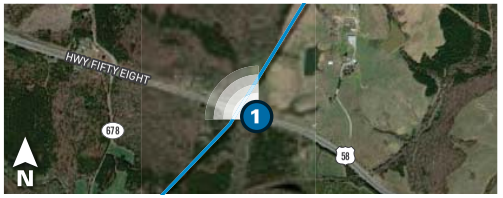


NEBULA TO RAINES
Transmission Line Project

Viewpoint 1

Date: 05/21/2024 **Time:** 11:31 am **Viewing Direction:** Northwest

1 Viewpoint Location — Route 5



Dominion Energy®

EXISTING CONDITIONS

PROPOSED CONDITIONS

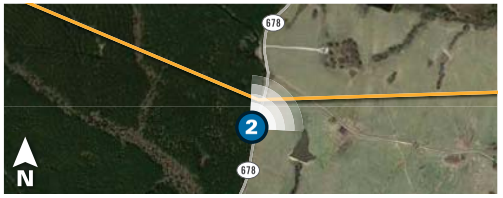
Photo simulations are for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.

NEBULA TO RAINES
Transmission Line Project

Viewpoint 2

Date: 05/21/2024 **Time:** 8:55 am **Viewing Direction:** Northeast

2 Viewpoint Location — Route 3



Dominion Energy®

EXISTING CONDITIONS

PROPOSED CONDITIONS

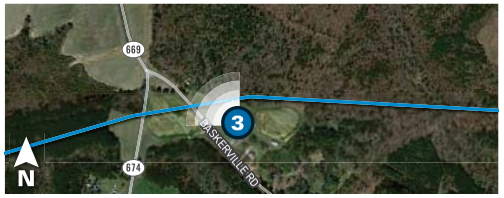
Photo simulations are for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.

NEBULA TO RAINES
Transmission Line Project

Viewpoint 3

Date: 05/21/2024 **Time:** 1:42 pm **Viewing Direction:** Northwest

3 Viewpoint Location — Route 5



Dominion Energy®

EXISTING CONDITIONS

PROPOSED CONDITIONS

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

NEBULA TO RAINES
Transmission Line Project

Viewpoint 4

Date: 05/21/2024 **Time:** 3:12 pm **Viewing Direction:** Southeast

4 Viewpoint Location — Route 4

Dominion Energy®

EXISTING CONDITIONS

PROPOSED CONDITIONS

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

NEBULA TO RAINES
Transmission Line Project

Viewpoint 5

Date: 05/22/2024 **Time:** 11:53 am **Viewing Direction:** Southeast

5 Viewpoint Location — Route 3

Dominion Energy®

EXISTING CONDITIONS

PROPOSED CONDITIONS

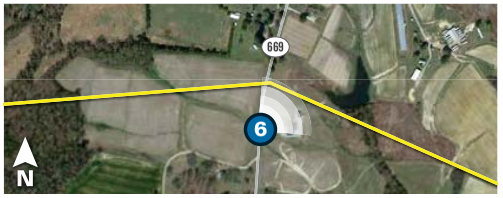
Photo simulations are for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.

NEBULA TO RAINES
Transmission Line Project

Viewpoint 6

Date: 05/22/2024 **Time:** 12:40 pm **Viewing Direction:** Northeast

6 Viewpoint Location — Route 4



Dominion Energy®

EXISTING CONDITIONS

PROPOSED CONDITIONS

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

NEBULA TO RAINES
Transmission Line Project

Viewpoint 7

Date: 05/22/2024 **Time:** 7:16 am **Viewing Direction:** Northeast

7 Viewpoint Location — Route 1

Dominion Energy®

EXISTING CONDITIONS

PROPOSED CONDITIONS

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

NEBULA TO RAINES
Transmission Line Project

Viewpoint 7

Date: 05/22/2024 **Time:** 7:16 am **Viewing Direction:** Northeast

7 Viewpoint Location — Route 3

Dominion Energy®

EXISTING CONDITIONS

PROPOSED CONDITIONS

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

NEBULA TO RAINES
Transmission Line Project

Viewpoint 8

Date: 05/21/2024 **Time:** 2:38 pm **Viewing Direction:** North

8 Viewpoint Location — Route 3

Dominion Energy®

EXISTING CONDITIONS

PROPOSED CONDITIONS

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

NEBULA TO RAINES
Transmission Line Project

Viewpoint 9

Date: 05/21/2024 **Time:** 9:48 am **Viewing Direction:** Northwest

9 Viewpoint Location — Route 5

Dominion Energy®

EXISTING CONDITIONS

PROPOSED CONDITIONS

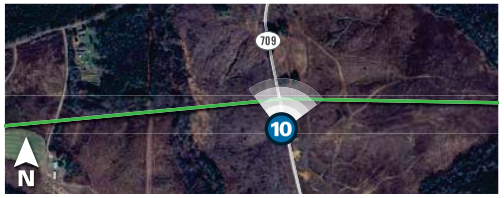
Photo simulations are for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.

NEBULA TO RAINES
Transmission Line Project

Viewpoint 10

Date: 05/21/2024 **Time:** 3:39 pm **Viewing Direction:** North

10 Viewpoint Location — Route 2



Dominion Energy®

299

EXISTING CONDITIONS

PROPOSED CONDITIONS

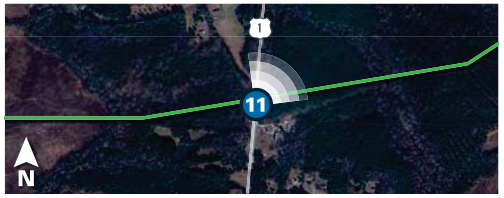
Photo simulations are for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.

NEBULA TO RAINES
Transmission Line Project

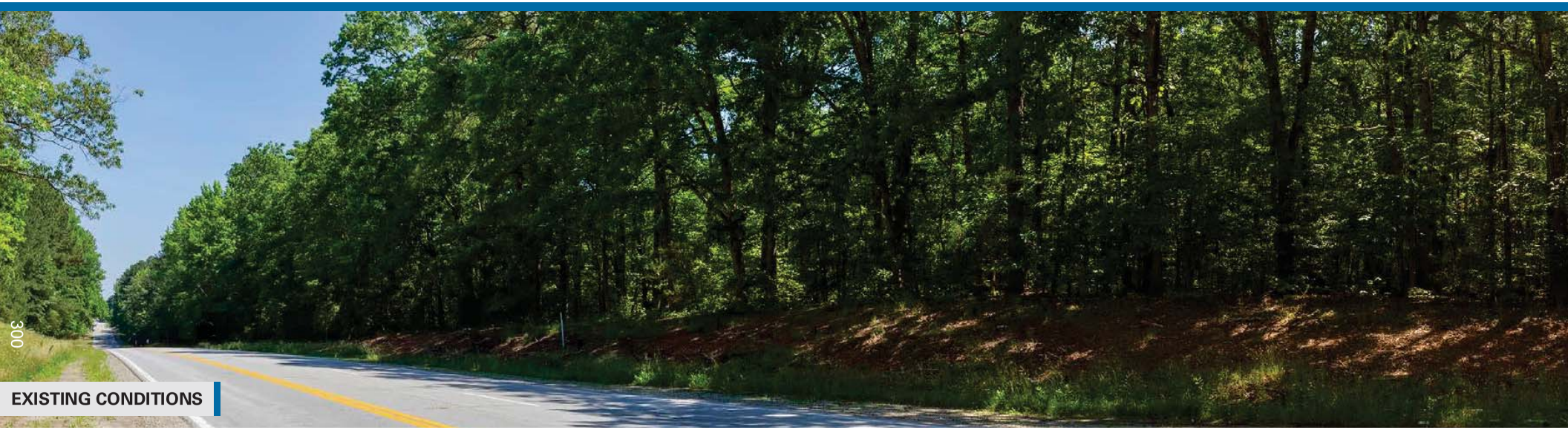
Viewpoint 11

Date: 05/20/2024 **Time:** 12:50 pm **Viewing Direction:** Northeast

11 Viewpoint Location — Route 2



Dominion Energy®



300

EXISTING CONDITIONS

PROPOSED CONDITIONS

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

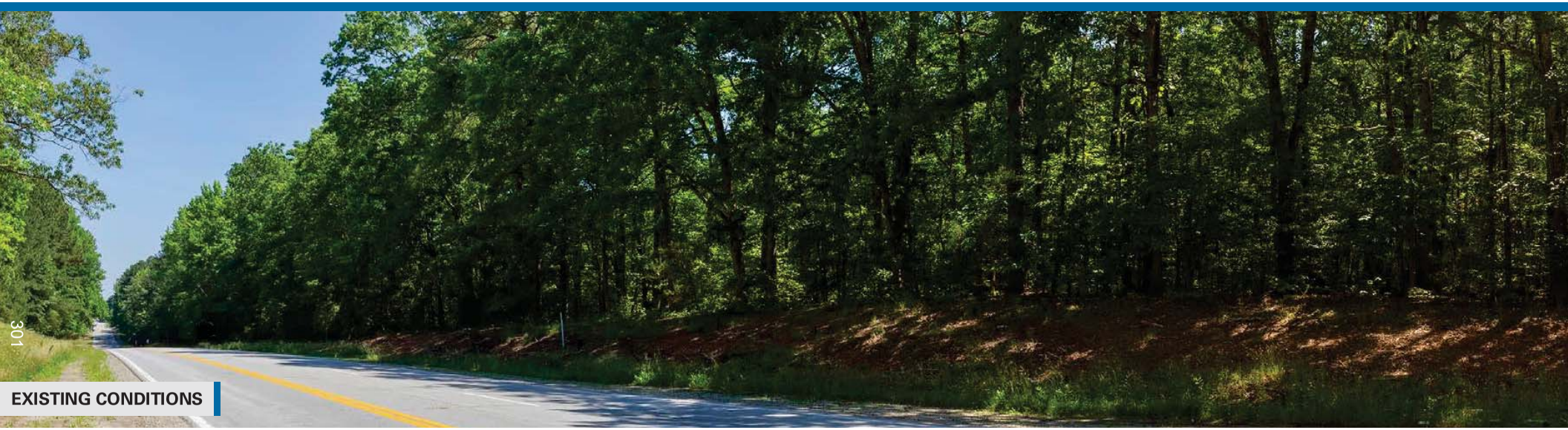
NEBULA TO RAINES
Transmission Line Project

Viewpoint 11

Date: 05/20/2024 **Time:** 12:50 pm **Viewing Direction:** Northeast

11 Viewpoint Location — Route 3

Dominion Energy®



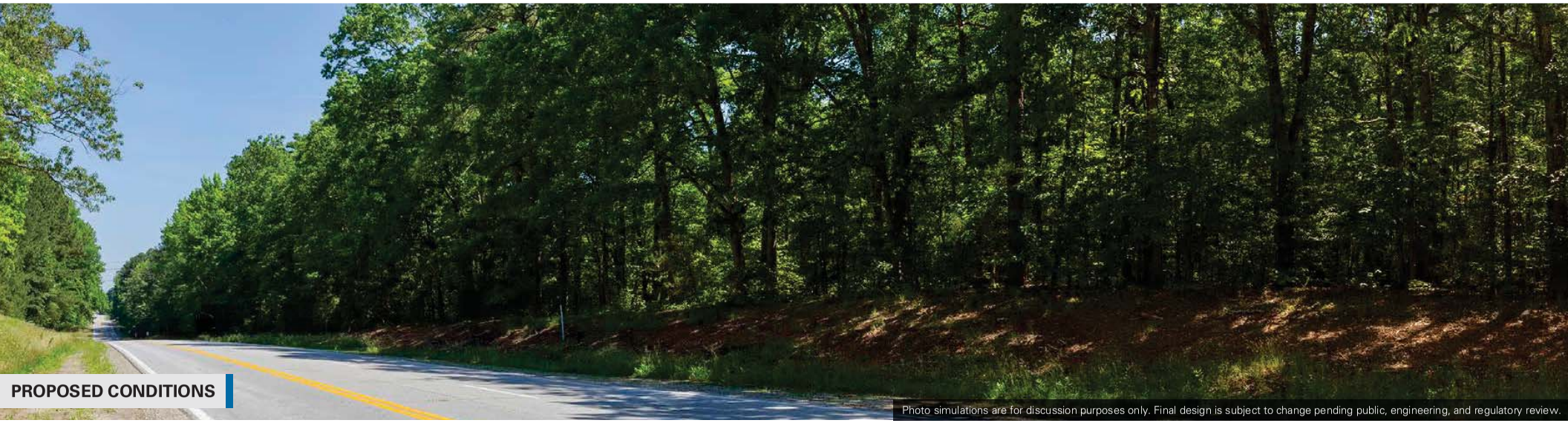


Photo simulations are for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.

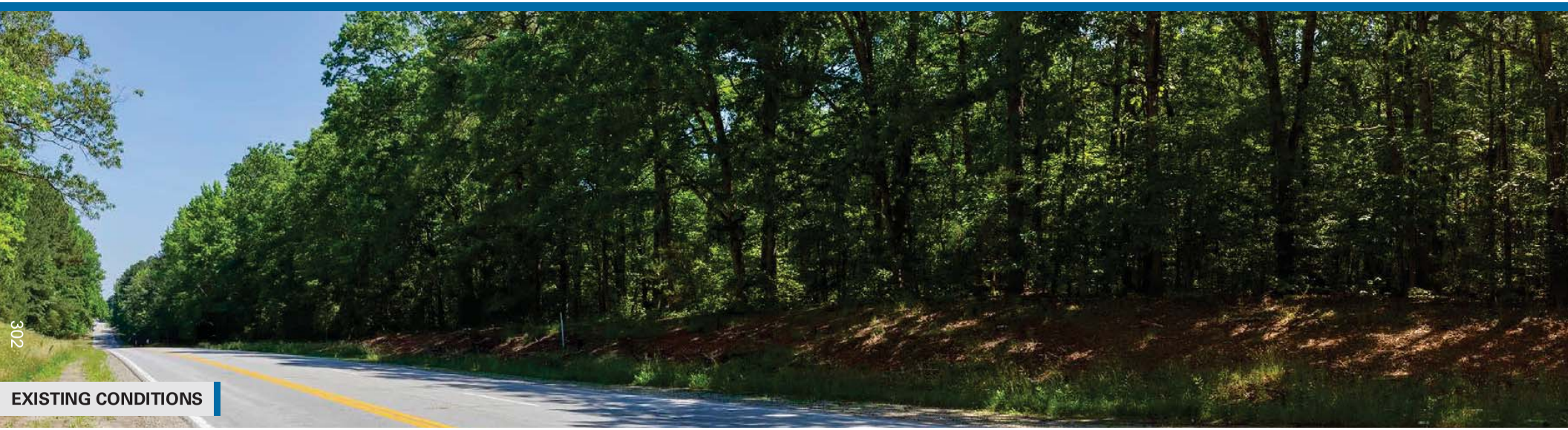
NEBULA TO RAINES
Transmission Line Project

Viewpoint 11

Date: 05/20/2024 **Time:** 12:50 pm **Viewing Direction:** Northeast

11 Viewpoint Location — Route 3

Dominion Energy®



EXISTING CONDITIONS

PROPOSED CONDITIONS | OVERLAY

Objects displayed in yellow will be fully or partially obscured by terrain and vegetation.

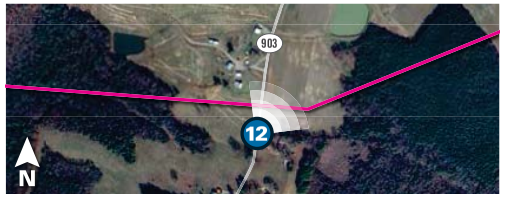
Photo simulations are for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.

NEBULA TO RAINES
Transmission Line Project

Viewpoint 12

Date: 05/21/2024 **Time:** 4:07 pm **Viewing Direction:** Northeast

12 Viewpoint Location — Route 1



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EXISTING CONDITIONS

PROPOSED CONDITIONS

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

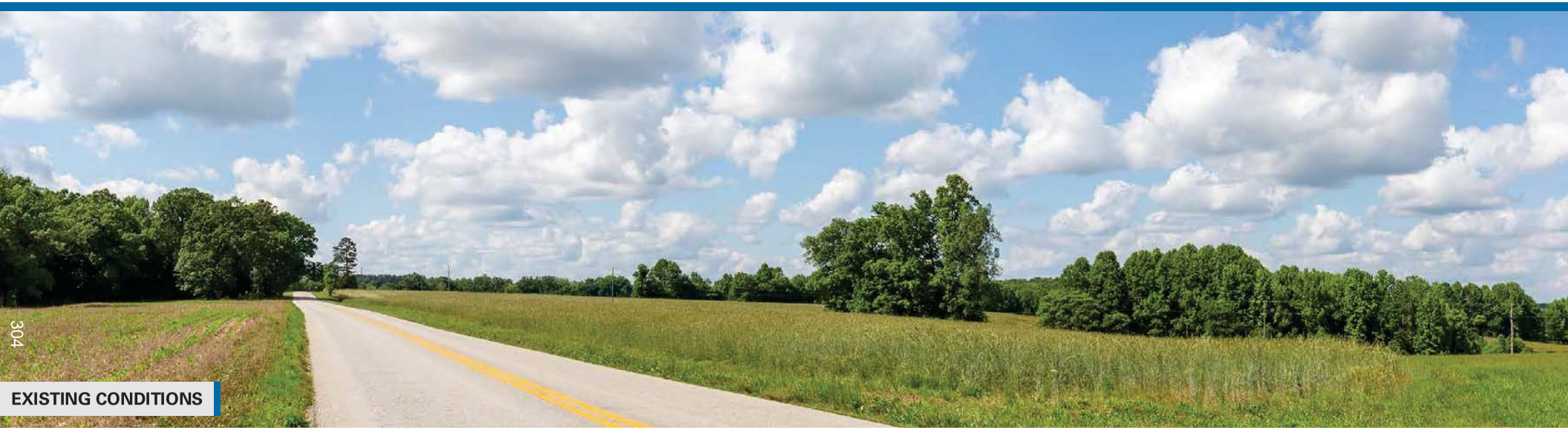
NEBULA TO RAINES
Transmission Line Project

Viewpoint 13

Date: 05/22/2024 **Time:** 10:21 am **Viewing Direction:** North

13 Viewpoint Location — Route 5

Dominion Energy®



EXISTING CONDITIONS

PROPOSED CONDITIONS

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

NEBULA TO RAINES
Transmission Line Project

Viewpoint 14

Date: 05/21/2024 **Time:** 4:26 pm **Viewing Direction:** East

14 Viewpoint Location — Route 3

Dominion Energy®

305

EXISTING CONDITIONS

PROPOSED CONDITIONS

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

NEBULA TO RAINES
Transmission Line Project

Viewpoint 14

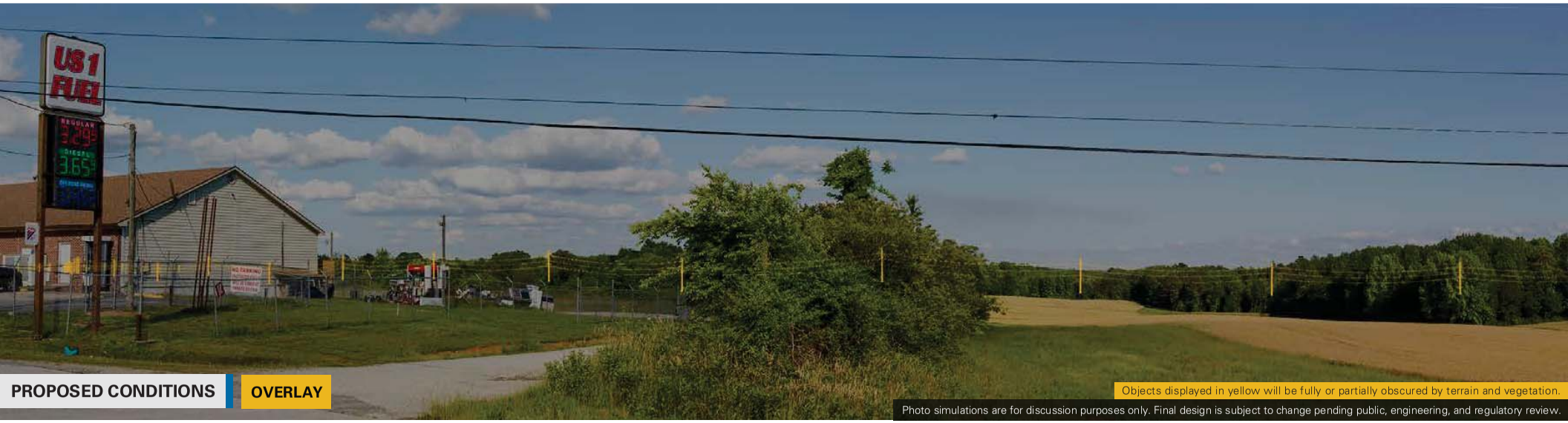
Date: 05/21/2024 **Time:** 4:26 pm **Viewing Direction:** East

14 Viewpoint Location — Route 3

Dominion Energy®

306

EXISTING CONDITIONS



PROPOSED CONDITIONS | OVERLAY

Objects displayed in yellow will be fully or partially obscured by terrain and vegetation.

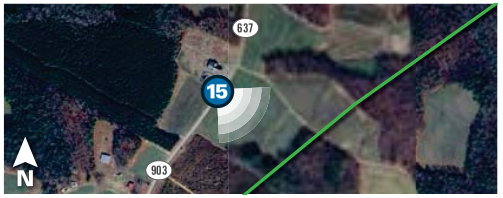
Photo simulations are for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.

NEBULA TO RAINES
Transmission Line Project

Viewpoint 15

Date: 05/20/2024 **Time:** 2:58 pm **Viewing Direction:** Southeast

15 Viewpoint Location — Route 2



Dominion Energy®

307

EXISTING CONDITIONS

PROPOSED CONDITIONS

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

NEBULA TO RAINES
Transmission Line Project

Viewpoint 16

Date: 05/22/2024 **Time:** 7:53 pm **Viewing Direction:** Southwest

16 Viewpoint Location — Route 5

Dominion Energy®

EXISTING CONDITIONS

PROPOSED CONDITIONS

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

NEBULA TO RAINES
Transmission Line Project

Viewpoint 17

Date: 05/20/2024 **Time:** 1:59 pm **Viewing Direction:** South

17 Viewpoint Location — Route 5

Dominion Energy®

EXISTING CONDITIONS

PROPOSED CONDITIONS

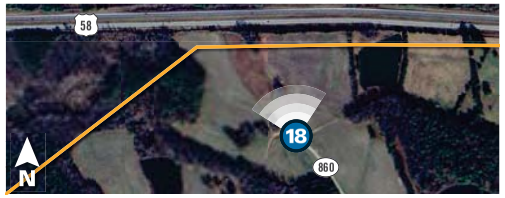
Photo simulations are for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.

NEBULA TO RAINES
Transmission Line Project

Viewpoint 18

Date: 05/21/2024 **Time:** 12:34 pm **Viewing Direction:** North

18 Viewpoint Location — Route 3



Dominion Energy®

310

EXISTING CONDITIONS

PROPOSED CONDITIONS

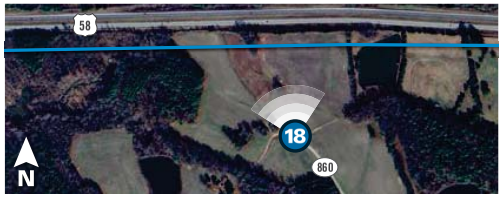
Photo simulations are for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.

NEBULA TO RAINES
Transmission Line Project

Viewpoint 18

Date: 05/21/2024 **Time:** 12:34 pm **Viewing Direction:** North

18 Viewpoint Location — Route 5



Dominion Energy®

311

EXISTING CONDITIONS

PROPOSED CONDITIONS

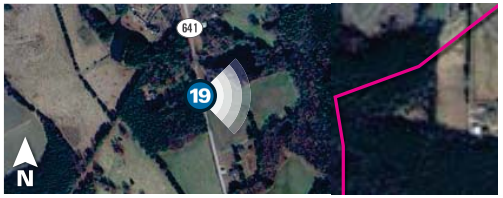
Photo simulations are for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.

NEBULA TO RAINES
Transmission Line Project

Viewpoint 19

Date: 05/20/2024 **Time:** 2:23 pm **Viewing Direction:** East

19 Viewpoint Location — Route 1



Dominion Energy®

EXISTING CONDITIONS

PROPOSED CONDITIONS

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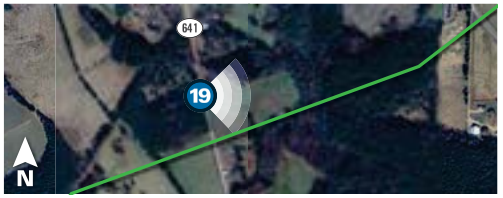
NEBULA TO RAINES
Transmission Line Project

Viewpoint 19

Date: 05/20/2024 **Time:** 2:23 pm **Viewing Direction:** East

19 Viewpoint Location — Route 2



Dominion Energy®

EXISTING CONDITIONS

PROPOSED CONDITIONS

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

NEBULA TO RAINES
Transmission Line Project

Viewpoint 20

Date: 05/21/2024 **Time:** 1:27 pm **Viewing Direction:** North

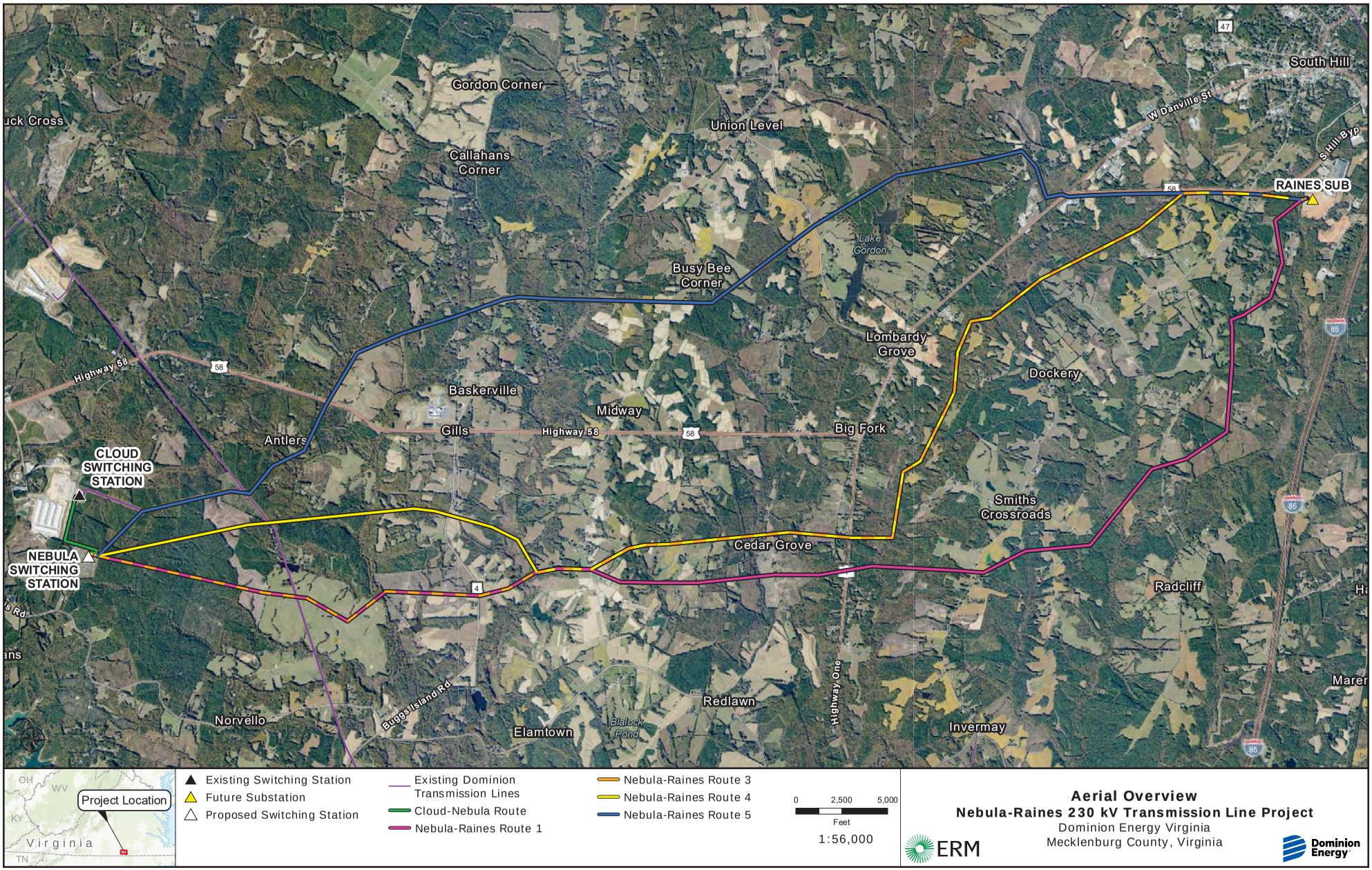
20 Viewpoint Location — Route 2

Dominion Energy®

EXISTING CONDITIONS

PROPOSED CONDITIONS

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


Gordon Corner
Union Level
Callahans Corner
South Hill
W Danville St
S Hill Byp
RAINES SUB
Lake Gordon
Busy Bee Corner
Lombardy Grove
Dockery
Highway 58
Baskerville
Midway
Gills
Antlers
Big Fork
CLOUD SWITCHING STATION
NEBULA SWITCHING STATION
Smiths Crossroads
Cedar Grove
Radcliff
Redlawn
Norvello
Buggs Island Rd
Elamtown
Blalock Pond
Highway One
Invermay
Project Location
OH
WV
KY
Virginia
TN
Existing Switching Station
Future Substation
Proposed Switching Station
Existing Dominion Transmission Lines
Cloud-Nebula Route
Nebula-Raines Route 1
Nebula-Raines Route 3
Nebula-Raines Route 4
Nebula-Raines Route 5
0
2,500
5,000
Feet
1:56,000
Aerial Overview
Nebula-Raines 230 kV Transmission Line Project
Dominion Energy Virginia
Mecklenburg County, Virginia
ERM
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: Nebula-Raines Line #2399

The Company did not identify any buildings that would have to be demolished or relocated to construct the Nebula-Raines Line.

Cloud-Nebula Line #2402

The Company did not identify any buildings that would have to be demolished or relocated to construct the Cloud-Nebula Line.

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: Portions of the Project's Proposed and Alternative Routes parallel existing physical facilities, as identified in the table below.

Existing Facility Feature (Mi)	Nebula-Raines				Cloud-Nebula Proposed Route
	Proposed Route	Alternative Route 1	Alternative Route 3	Alternative Route 4	
Existing Dominion Energy Virginia right-of-way	0.9	0.0	0.0	0.0	0.0
Roadway (total)	1.9	0.3	0.8	0.8	0.0
US 58	1.9	0.0	0.8	0.8	0.0
Unnamed Gravel Road	0.0	0.3	0.0	0.0	0.0

The Nebula-Raines Proposed Route (Route 5) parallels the Company's existing overhead Lines #1041 and #38 for approximately 0.9 mile. The existing Line #1041 and #38 right-of-way corridor has been in continuous use since 2022 and is regularly maintained to keep vegetation at the emergent and scrub-shrub level for the safe operation of the existing facilities.

Additionally, the Nebula-Raines Proposed Route and Nebula-Raines Alternative Routes 3 and 4 parallel US 58, a four-lane divided highway. The highway is paved with grassy shoulders, median and ditches. Nebula-Raines Alternative Route 1 parallels an existing gravel driveway. The shoulders and ditches are grassy and mowed by the landowner.

The Cloud-Nebula Proposed Route does not parallel any existing transmission lines, pipelines, roads or other existing physical facilities.

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 Mecklenburg County Long Range Plan (adopted in 2012 and amended in 2017),[39] the Town of South Hill Comprehensive Plan (adopted in 2017),[40] and the Town of Boydton Comprehensive Plan (adopted in 2009)[41] were reviewed to evaluate the potential effect that the Projects' Proposed and Alternatives Routes could have on future development.

Mecklenburg County

The Mecklenburg Long Range Plan (the "Long Range Plan" or "Plan") does not address electric transmission lines other than in discussion with emergence of solar energy facilities and collocation with existing transmission lines. It should be noted that the County's vision includes providing cost-effective utility infrastructure to help drive future development and has advanced investment in telecommunications and utility infrastructure to attract a number of high-profile technology companies. There is an emphasis in the Plan to market the County for information technology and data center business opportunities, including creating a Technology Advisory Council to connect businesses and schools. The arrival or expansion of industries potentially herald the start of an information technology and data center cluster in Mecklenburg County. Additionally, one of the goals established in the Strategic Economic Development Plan within the Long Range Plan is to implement a high-speed rail line from Raleigh, North Carolina to Richmond, Virginia. Demand is expected to continue to grow with new data centers and the Southeast High-Speed Rail.

Planned development within Mecklenburg County includes transportation improvements such as bridge rehabilitation, bypass construction, and general road improvement projects. There are no planned unit or clustered development provisions included in the Plan; however, Mecklenburg County is working to revise zoning codes to allow for additional development.

Within Mecklenburg County, the Project's Proposed and Alternative Routes are collocated with existing transmission lines to the maximum extent possible to minimize new corridor creation and avoid impacts to the area. The Proposed and Alternative Routes are not expected to interfere with future planning in Mecklenburg County and are expected to aid in the economic and planned

[39] *See* https://va-mecklenburgcounty.civicplus.com/DocumentCenter/View/284/Mecklenburg-County-Comprehensive-Plan?bidId=.

[40] *See* https://www.southhillva.org/town-of-sh/forms-applications-other-downloads/downloads/plans-documents.

[41] *See* https://boydton.org/wp-content/uploads/2015/07/Boydton-VA-Comprehensive-Plan.pdf.

development goals of the County by increasing connectivity to potential data centers and meeting growing electricity demands.

Town of South Hill

The South Hill Comprehensive Plan notes that residential housing is the dominant land use in the Town, with a 76-acre area designated as an Urban Development Area to be used as residential or commercial development. None of the Project's Proposed or Alternatives Routes cross through the current or potential annexation boundaries. The South Hill Comprehensive Plan emphasizes the desire for growth and development that enhances the community character and environmental quality. Future land use within the Town boundaries is expected to display an increase in residential, commercial, and industrial areas, with industrial parks on the southern, southwestern, and northeastern areas of the Town.

Town of Boydton

The Boydton Comprehensive Plan provides a guide for the future of the Town development, while enhancing citizens' well-being and environmental resources. The development of a coordinated, well-planned system of public services and utilities is also emphasized in the Boydton Comprehensive Plan. None of the Project's Proposed or Alternatives Routes cross through the current or potential annexation boundaries.

Virginia Department of Transportation

Review of VDOT Projects and Studies was completed to determine the impact of the Proposed and Alternative Routes on future road projects. One six-year improvement plan project has been approved within 1.0 mile of the Project routes. The project is located northeast of the future Raines Substation at the intersection of US 58 and Country Lane and would not be crossed or affected by any of the routes. See Section 4.1.9 of the Environmental Routing Study.

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 Mecklenburg 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: (1) None

(2) There are no listed or determined eligible sites crossed by or adjacent to the proposed rights-of-way. However, site 058-0141, Sanders Farm, (unevaluated, locally significant) is intersected by the Nebula-Raines Proposed Route.

(3) None

(4) The known archaeological sites in the rights-of-way for the Project's Proposed and Alternative Routes are summarized in the table below. None of the eight sites have been formally evaluated for NRHP-eligibility. Four are associated with temporary camps, two are multi-component sites, one is a lithic scatter, and one is defined as remains of a transportation foundation. No known archaeological sites were identified within the right-of-way for the Cloud-Nebula Proposed Route. This is potentially due to the fact that minimal previous surveys overlap this route.

Site Number	Description	NRHP Status	Route Alternative
44MC0367	Lithic scatter (Pre-Contact); Church site (Antebellum Period, Civil War, Reconstruction and Growth)	Unevaluated	Nebula-Raines Proposed Route Nebula-Raines Route Alternative 3 Nebula-Raines Route Alternative 4
44MC0416	Temporary camp (Archaic, Woodland)	Unevaluated	Nebula-Raines Route Alternative 1 Nebula-Raines Route Alternative 3
44MC0444	Temporary camp (Archaic)	Unevaluated	Nebula-Raines Route Alternative 4
44MC0457	Transportation foundation remains (Historic)	Unevaluated	Nebula-Raines Proposed Route
44MC0460	Temporary camp (Middle Archaic)	Unevaluated	Nebula-Raines Route Alternative 4
44MC0474	Lithic scatter (Pre-Contact); Domestic artifact scatter (Antebellum Period, Civil War, Reconstruction and Growth)	Unevaluated	Nebula-Raines Proposed Route Nebula-Raines Route Alternative 3 Nebula-Raines Route Alternative 4
44MC0475	Lithic scatter (Pre-Contact)	Unevaluated	Nebula-Raines Proposed Route Nebula-Raines Route Alternative 3 Nebula-Raines Route Alternative 4
44MC0585	Temporary camp (Prehistoric/Unknown); Tobacco barn (20th Century)	Unevaluated	Nebula-Raines Proposed Route Nebula-Raines Route Alternative 3 Nebula-Raines Route Alternative 4

(5) None

(6) None

(7) None

(8) None

(9) None

(10) None

(11) No lands owned by a municipality or school district will be crossed by the Project's Proposed or Alternative Routes. Some government-owned lands are in close proximity to the routes. From MP 9.6 to 9.7, the right-of-way for the Nebula-Raines Proposed Route is located approximately 70 feet south of lands owned by Mecklenburg County and houses a communications antenna on it. Additionally, from MP 10.6 to 11.0, the right-of-way of the Nebula-Raines Proposed Route is located approximately 90 feet southeast of lands owned by Mecklenburg County and used as the County landfill. From MP 0.5 to 0.8, the right-of-way for Nebula-Raines Alternative Route 1 is located approximately 80 feet west of lands owned by Mecklenburg County and the Town of South Hill for the South Hill Wastewater Treatment Facility.

No other municipal or school district lands are crossed by the Project's Proposed or Alternative Routes.

(12) The Beaches to Bluegrass Trail, Christianna Loop Birding Wildlife Trail, East Coast Greenway, Tobacco Heritage Trail, and U.S. Bike Route 1 are all crossed by the Nebula-Raines Proposed and Alternative Routes. The Cloud-Nebula Proposed Route does not cross any trails.

The Beaches to Bluegrass Trail is a statewide shared-use path and multi-use trail being developed to connect communities between the Virginia Beach oceanfront and Cumberland Gap. The Nebula-Raines Proposed Route crosses the trail three times at MP 0.6, 8.5 and 11.6. Nebula-Raines Alternative Route 1 crosses the trail at MP 0.8 and 6.0. Nebula-Raines Alternative Routes 3 and 4 cross the trail at MP 0.6, adjacent to Goodes Ferry Road.

The Nebula-Raines Proposed Route crosses the Christianna Loop Birding Wildlife Trail at MP 2.5 and 11.3. Nebula-Raines Alternative Route 1 crosses the wildlife trail at MP 7.3 and 11.2. Nebula-Raines Alternative Routes 3 crosses the trail at MP 6.8 and 10.7. Nebula-Raines Alternative Route 4 crosses the wildlife trail at MP 6.8 and 11.2.

The East Coast Greenway intends to create a safe walking and biking route through the country's most populated corridor by connecting over 3,000 miles on the east

coast. The Nebula-Raines Proposed Route crosses the Greenway at MP 0.6, 3.1, 6.8, and 7.3. Nebula-Raines Alternative Route 1 crosses the Greenway at MP 0.8 and 10.0. Nebula-Raines Alternative Routes 3 and 4 each cross the Greenway twice at MP 0.6 and 9.5.

The Tobacco Heritage Trail is a planned network of multi-use trails using former railroad right-of-way managed by Roanoke River Rails-to-Trails, Inc. The trail is crossed by the Nebula-Raines Proposed Route at MP 0.6, 8.5 and 11.6. Nebula-Raines Alternative Route 1 crosses the trail at MP 0.8 and 12.2. Nebula-Raines Alternative Route 3 crosses the trail at MP 0.6 and 11.7. Nebula-Raines Alternative Route 4 crosses the trail at MP 0.6 and 12.0.

U.S. Bike Route 1 follows Wooden Bridge Road and Buggs Island Road through the Project area. The Nebula-Raines Proposed Route crosses U.S. Bike Route 1 at MP 9.0. Alternative Routes 1, 3 and 4 cross the bike path at MP 11.2, 10.7 and 11.2, respectively.

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[42] to identify airports/heliports within 10.0 nautical miles of the proposed Project. Based on this review, the following FAA-restricted airports/heliports are located within 10.0 nautical miles of the Project:

Airport Name	Approximate Distance and Direction from Proposed Dominion Energy Virginia Facility (nautical miles)	Use
Loves Helipad Heliport	o 2.7 miles northeast of the Raines Substation (eastern terminus of all Nebula-Raines routes)	Private Use
Community Memorial Hospital Heliport	o 2.9 miles northeast of the Raines Substation (eastern terminus of all Nebula-Raines routes)	Private Use
Mecklenburg-Brunswick Regional Airport	o 3.8 miles east of the Raines Substation (eastern terminus of all Nebula-Raines routes)	Public Use
Twin Towers Airport	o 5.5 miles northwest of the Nebula-Raines Proposed Route	Private Use
Martindale Executive Airpark Airport	o 6.6 miles southeast of Nebula-Raines Alternative Route 1	Private Use
Merifield Airport	o 8.0 miles southwest of the Cloud-Nebula Proposed Route o 8.1 miles southwest of the Nebula Station (western terminus of all routes)	Private Use
Nocarva Airport	o 8.5 miles southeast of Nebula-Raines Alternative Route 1	Private Use
Lake County Regional Airport	o 10.0 miles southwest of the Cloud-Nebula Proposed Route	Public Use
Chase City Municipal Airport	o 10.0 miles northwest of the Cloud Switching Station (northern terminus of the Cloud-Nebula Proposed Route)	Public Use

[42] *See* https://oeaaa.faa.gov/oeaaa/external/portal.jsp and https://adip.faa.gov/agis/public/#/public.

Of the public use airports listed above, it was determined only the Mecklenburg-Brunswick Regional Airport was in close enough proximity to potentially impact navigable airspace. The regulations that govern objects that may affect navigable airspace are codified in the Code of Federal Regulations, Title 14, Part 77. In these regulations it states that restrictions to structure heights only apply to public use airports and do not apply to privately owned airports. The Company conducted an airport analysis 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 the Mecklenburg-Brunswick Regional Airport. Standard Geographic Information Systems 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 associated with the Mecklenburg-Brunswick Regional Airport and thus there would be no impacts to navigable airspace from the proposed Project.

Based on FAA Form 7460-1, Notice of Proposed Construction or Alteration, notice must be filed for penetrating a 100 to 1 slope within a distance of 20,000 feet from a public airport or any airport with at least one FAA-approved instrument approach procedure. The Mecklenburg-Brunswick Regional Airport is located over 22,000 feet east of the eastern most extent of the Project. Given the distance between the Project and the airport, no notice is anticipated to be required for the Project.

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: Nebula-Raines Line

State Route 903 (Goodes Ferry Road) in Mecklenburg County is designated as a Virginia Byway. This designation identifies roads "having relatively high aesthetic or cultural value, leading to or within areas of historical, natural or recreational significance."[43] The designation does not carry land use or visual impact controls, but instead recognizes roads "controlled by zoning or otherwise, so as to reasonably protect the aesthetic or cultural value of the highway."[44]

The Nebula-Raines Proposed Route (Route 5) would cross Goodes Ferry Road approximately 0.6 mile west of the Raines Substation at MP 0.6. The route crosses Goodes Ferry Road at a perpendicular angle reducing overall visual impacts. Additionally, the north side of the crossing is located adjacent to the four lane US 58 highway. Goodes Ferry Road utilizes an elevated bridge to cross over US 58. The east and west sides of the byway are open grasslands where a structure on either side of the crossing may be visible from the road, depending on final engineering design. Given the perpendicular crossing of the road, views of the transmission line would only be visible for a short distance as drivers are driving the road. See Attachment II.A.6 for a map with mileposts.

Nebula-Raines Alternative Route 1 would cross Goodes Ferry Road approximately 0.8 mile south of Smith Cross Road at MP 6.0. The route crosses Goodes Ferry Road at a perpendicular angle reducing overall visual impacts. The east and west sides of the byway are open grasslands/agricultural (row crop) lands where a structure on either side of the crossing may be visible from the road, depending on final engineering design. Given the perpendicular crossing of the road, views of the transmission line would only be visible for a short distance as drivers are driving the road.

Nebula-Raines Alternative Routes 3 and 4 follow the same alignment as the Proposed Route at the crossing of Goodes Ferry Road. Impacts would be the same as described for the Proposed Route above. Perpendicular road crossings, which are preferred by VDOT and Mecklenburg County, will be utilized at other road crossings.

[43] VDOT 2019. Virginia's Scenic Byways. Accessed: June 2021. Retrieved from: http://www.virginiadot.org/programs/prog-byways.asp.

[44] Va. Code § 33.2-406.

Cloud-Nebula Line

The Cloud-Nebula Proposed Route does not cross any roads, including scenic byways.

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

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

Response: As described in detail in Sections III.B and V.D of the Appendix, the Company solicited feedback from Mecklenburg County regarding the proposed Project. Below is a list of coordination that has occurred with municipal, state, and federal agencies:

- Coordination with the U.S. Army Corps of Engineers ("Corps"), DEQ, VDOT, and the Virginia Marine Resources Commission ("VMRC") will take place as appropriate to obtain necessary approvals for the Project.
- A letter dated November 6, 2024, was submitted to Mecklenburg County to describe the Project and request comments. See Section V.D.
- A Stage I Pre-Application Analysis has been prepared and was submitted to VDHR on January 22, 2025. See Attachment 2.I.1 to the DEQ Supplement.

On May 14, 2024, the Company solicited comments via letter from several state and federally recognized Native American tribes, including:

Name	Tribe
Chief Brian Harris	Catawba Indian Nation (a/k/a Catawba Indian Tribe of South Carolina)
Caitlin Rogers	Catawba Indian Nation (a/k/a Catawba Indian Tribe of South Carolina)
Dr. Wenonah G. Haire	Catawba Indian Nation (a/k/a Catawba Indian Tribe of South Carolina)
Chief Walt "Red Hawk" Brown	Cheroenhaka (Nottoway) Indian Tribe
Mary Frances Wilkerson	Cheroenhaka (Nottoway) Indian Tribe
Chief Stephen Adkins	Chickahominy Indian Tribe
Assistant Chief Reginald Stewart	Chickahominy Indian Tribe
Chief Gerald A. Stewart	Chickahominy Indian Tribe Eastern Division
Jessica Phillips	Chickahominy Indian Tribe Eastern Division

Dana Adkins	Director – Natural Resources Chickahominy Tribe
Deborah Dotson	Delaware Nation, Oklahoma
Katelyn Lucas	Delaware Nation, Oklahoma
Chief Mark Custalow	Mattaponi Tribe
Chief Diane Shields	Monacan Indian Nation
Chief Keith Anderson	Nansemond Indian Nation
Chief Lynette Allston	Nottoway Indian Tribe of Virginia
SUB: Ms. Beth Roach	Nottoway Indian Tribe of Virginia
Chief Robert Gray	Pamunkey Indian Tribe
Ms. Kendall Stevens	Pamunkey Indian Tribal Resource Office
Chief Charles (Bootsie) Bullock	Patawomeck Indian Tribe of Virginia
Chief G. Anne Richardson	Rappahannock Tribe
Assistant Chief	Rappahannock Tribe
Chief W. Frank Adams	Upper Mattaponi Indian Tribe
Ms. Leigh Mitchell	Upper Mattaponi Indian Tribe
Ms. Kathy Harris	Haliwa-Saponi Indian Tribe
Chief Ogletree Richardson	Haliwa-Saponi Indian Tribe
Chief Jonathan Caudill, Jr.	Mehrrin Indian Tribe
Ms. Vickie Jeffries	Occaneechi Band of the Saponi Nation
Mr. W.A. “Tony” Hayes	Occaneechi Band of the Saponi Nation

A template of the letter is included as Attachment III.J.1.

On November 13, 2024, the Company sent an additional letter to Sappony. A template of that letter is included as Attachment III.J.2.

Name	**Tribe**
Mr. Dante Desiderio	Sappony
Dorothy Yates	Sappony

See also Sections III.B, III.K, and V.D of this Appendix, and the DEQ Supplement.

Dominion Energy Virginia
Dominion Energy North Carolina
Electric Transmission
5000 Dominion Boulevard
Glen Allen, VA 23060
DominionEnergy.com

May 14, 2024

Cloud-Raines 230 kV Electric Transmission Line Project

Dear ____,

Dominion Energy is dedicated to maintaining safe, reliable, and affordable electric service in the communities we serve. You are receiving this project announcement letter as part of our efforts to proactively communicate early with Tribal Nations who may have an interest in this area. With your unique perspective, you can help us better plan projects in their earliest stages. Please note, this letter is not a notification of formal government-to-government consultation from any state or federal agency. Dominion Energy has been and continues to be committed to creating and maintaining strong, open, supportive, and mutually beneficial relationships with Tribal Nations.

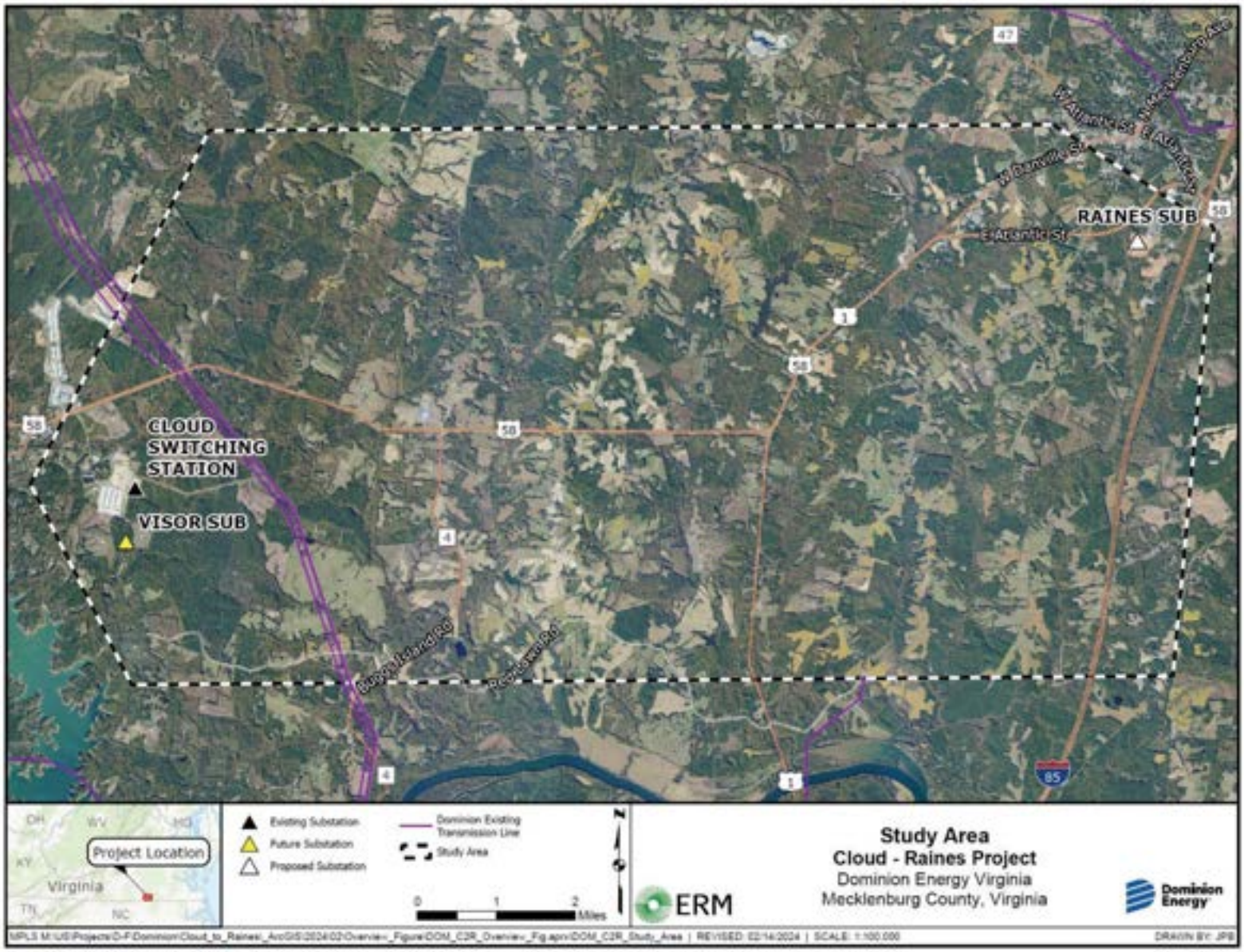
We are planning to build a new single-circuit 230 kilovolt (kV) electric transmission line in Mecklenburg County, Virginia, on approximately 14 miles of new right of way connecting the Cloud Substation, located east of Boydton, and the Raines Substation near South Hill.

This project requires review by the Virginia State Corporation Commission (SCC). We are still in the conceptual phase of the project and more details will be provided as activities progress. Enclosed is a project map for your reference. Providing your input now allows us to consider any concerns you may have as we work to meet the project's needs. Please feel free to notify other relevant organizations that may have an interest in the project area. For reference, other recipients of this letter include county and state historic, cultural, and scenic organizations.

If you have questions or would like to set up a meeting to discuss the project, contact me by calling 804-944-5313 or sending an email to Janae.p.johnson@dominionenergy.com. You may also contact Tribal Relations Manager Ken Custalow by sending an email to Ken.Custalow@dominionenergy.com or calling 804-837-2067.

Sincerely,

Janae Johnson
Communications Consultant
The Electric Transmission Project Team


CLOUD
SWITCHING
STATION
VISOR SUB
RAINES SUB
E Atlantic St
Project Location
Virginia
Existing Substation
Future Substation
Proposed Substation
Dominion Existing Transmission Line
Study Area
0 1 2 Miles
ERM
Study Area
Cloud - Raines Project
Dominion Energy Virginia
Mecklenburg County, Virginia
Dominion Energy

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

November 13, 2024

Nebula-Raines 230 kV Electric Transmission Line Project

Dear _____,

Dominion Energy is dedicated to maintaining safe, reliable, and affordable electric service in the communities we serve. You are receiving this project announcement letter as part of our efforts to proactively communicate early with Tribal Nations who may have an interest in this area. With your unique perspective, you can help us better plan projects in their earliest stages. Please note, this letter is not a notification of formal government-to-government consultation from any state or federal agency. Dominion Energy has been and continues to be committed to creating and maintaining strong, open, supportive, and mutually beneficial relationships with Tribal Nations.

We are planning to build a new single-circuit 230 kilovolt (kV) electric transmission line in Mecklenburg County, Virginia, on approximately 14 miles of new right of way connecting the Nebula Substation, located east of Boydton, and the Raines Substation near South Hill.

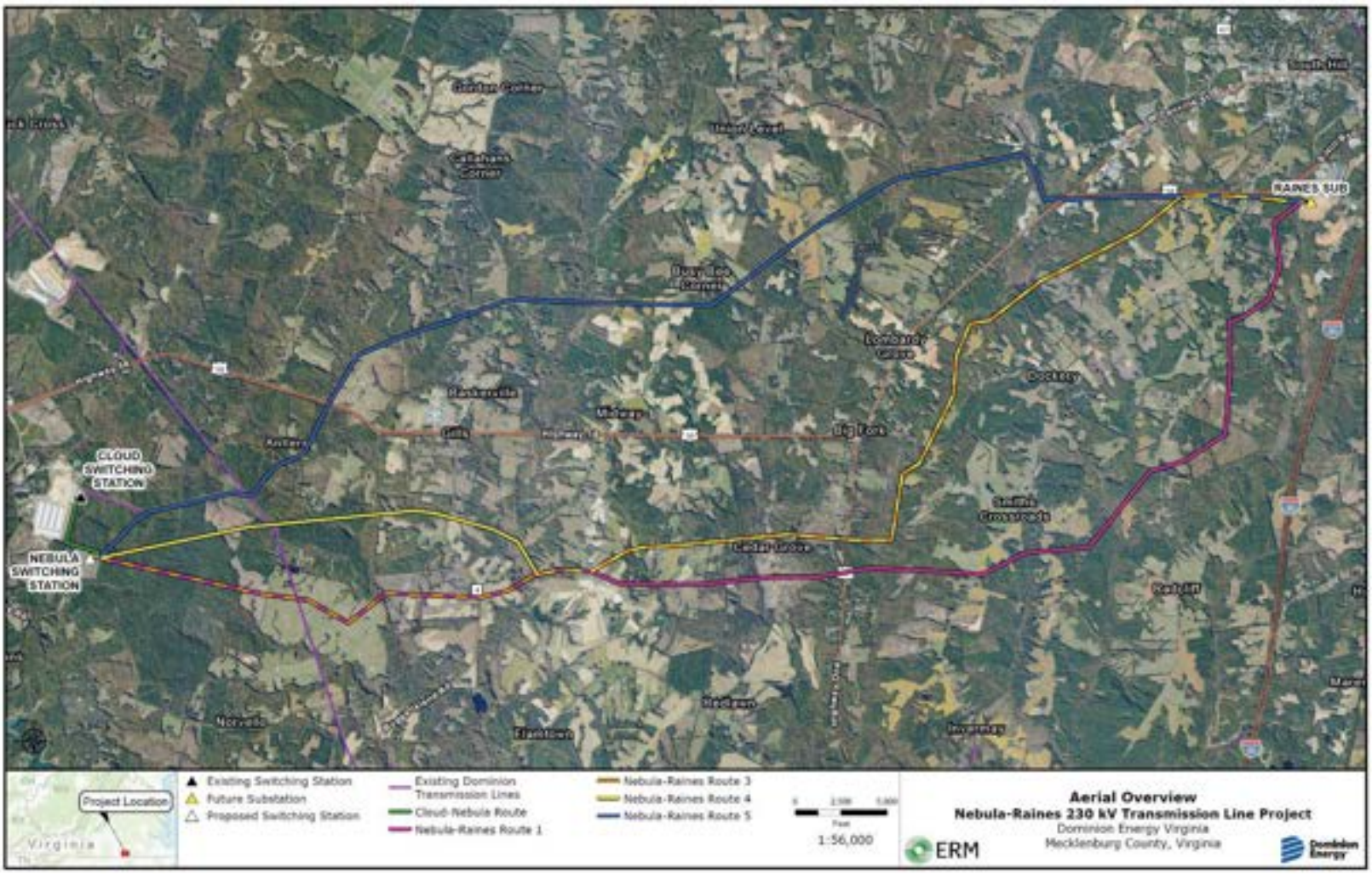
This project requires review by the Virginia State Corporation Commission (SCC). We are still in the conceptual phase of the project and more details will be provided as activities progress. Enclosed is a project map for your reference. Providing your input now allows us to consider any concerns you may have as we work to meet the project's needs. Please feel free to notify other relevant organizations that may have an interest in the project area. For reference, other recipients of this letter include county and state historic, cultural, and scenic organizations.

If you have questions or would like to set up a meeting to discuss the project, contact me by calling 804-944-5313 or sending an email to Janae.p.johnson@dominionenergy.com. You may also contact Tribal Relations Manager Ken Custalow by sending an email to Ken.Custalow@dominionenergy.com or calling 804-837-2067.

Sincerely,

Janae Johnson
Communications Consultant
The Electric Transmission Project Team

Dominion Energy Virginia
Electric Transmission
P.O. Box 26666, Richmond, VA 23261
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 May 14, 2024, the Company began to solicit comments via letter from the nongovernmental organizations and private citizen groups identified below. A template of the letter is provided as Attachment III.K.1.

Name	Organization
Ms. Elizabeth S. Kostelny	Preservation Virginia
Mr. Thomas Gilmore	American Battlefield Trust
Mr. Jim Campi	American Battlefield Trust
Mr. Max Hokit	American Battlefield Trust
Mr. Steven Williams	Colonial National Historical Park
Ms. Eleanor Breen, PhD, RPA	Council of Virginia Archaeologists
Ms. Leighton Powell	Scenic Virginia
Ms. Elaine Chang	National Trust for Historic Preservation
Ms. Julie Bolthouse	Piedmont Environmental Council
Mr. John McCarthy	Piedmont Environmental Council
Dr. Cassandra Newby- Alexander, Dean	Norfolk State University
Mr. Roger Kirchen, Archaeologist	Virginia Department of Historic Resources
Ms. Adrienne Birge-Wilson	Virginia Department of Historic Resources
Mr. Dave Dutton	Dutton + Associates, LLC

Additionally, ERM, on behalf of the Company, contacted Preservation Virginia (Mr. Logan Parham), Mecklenburg County Historical Society, South Central Virginia Genealogical Society, Virginia Genealogical Society, Virginia Museum of History and Culture, Mecklenburg County Planning Commission (Mr. Charles P. Reamy), and Tobacco Heritage Trail for comments and awareness of the Project.

Dominion Energy Virginia
Dominion Energy North Carolina
Electric Transmission
5000 Dominion Boulevard
Glen Allen, VA 23060
DominionEnergy.com

May 14, 2024

Cloud-Raines 230 kV Electric Transmission Line Project

Dear _____,

Dominion Energy is dedicated to maintaining safe, reliable, and affordable electric service in the communities we serve. As a valued stakeholder with a unique perspective, you can help us meet these objectives as we plan necessary electric infrastructure projects. We are reaching out to you as we have an upcoming project in Mecklenburg County, and you may have an interest in this area.

We are planning to build a new single-circuit 230 kilovolt (kV) electric transmission line on approximately 14 miles of new right of way connecting the Cloud Substation, located east of Boydton and the Raines Substation, near South Hill.

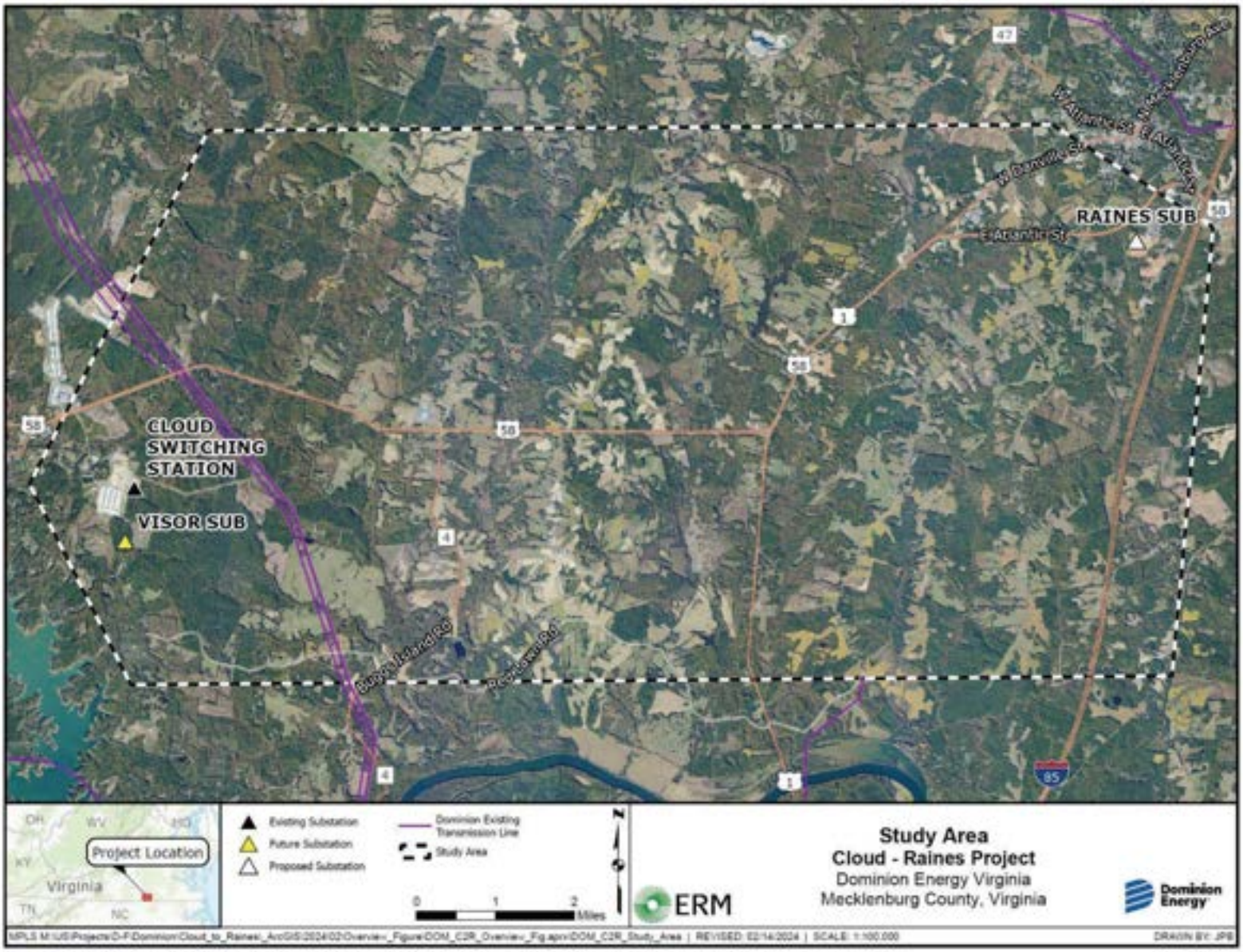
Enclosed is a project overview map for your reference. This project requires review by the Virginia State Corporation Commission (SCC). We are still in the conceptual phase of the project and do not yet have specific routes to share. Providing your input now allows us to consider any concerns you may have as we work to meet the project's needs. Please feel free to notify other relevant organizations that may have an interest in the project area. For reference, other recipients of this letter include county and state historic, cultural, and scenic organizations, as well as Tribal Nations.

We will host in-person community meetings prior to submitting to the SCC in mid-summer 2024. Please visit the project webpage at DominionEnergy.com/Cloudraines for meeting updates and more project information.

If you have questions or would like to set up a meeting to discuss the project, contact me by calling 804-944-5313 or sending an email to Janae.p.johnson@dominionenergy.com.

Sincerely,

Janae Johnson
Communications Consultant
The Electric Transmission Project Team


RAINES SUB
CLOUD SWITCHING STATION
VISOR SUB
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W Atlantic St
W Danville St
Bugg Island Rd
Project Location
Virginia
Existing Substation
Future Substation
Proposed Substation
Dominion Existing Transmission Line
Study Area
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ERM
Study Area
Cloud - Raines Project
Dominion Energy Virginia
Mecklenburg County, Virginia
Dominion Energy

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.

Potential Permits

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
Aerial Water Crossing	Subaqueous Habitat Management Permit	Virginia Marine Resources Commission
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

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 associated with high voltage power lines is best estimated by field levels 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 (2028) annual average and maximum (peak) loading conditions. The EMF values provided in this section were calculated based on the Company's proposed line characteristics of a typical span in both average and peak loading conditions.

Proposed Project – Projected average loading in 2028

EMF levels were calculated for the proposed Project at the ***projected average*** load condition (95 amps for Line #2399, 112 amps for Line #2402) and at an operating voltage of 241.5 kV when supported on the proposed Project structures – see Attachment II.A.5.a.

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.

Proposed Project – Projected Average Loading (2028)				
Attachment	Left Edge Looking Towards Nebula/Cloud		Right Edge Looking Towards Nebula/Cloud	
	Electric Field (kV/m)	Magnetic Field (mG)	Electric Field (kV/m)	Magnetic Field (mG)
II.A.5.a	0.691	6.998	0.146	4.023

Proposed Project – Projected peak loading in 2028

EMF levels were calculated for the proposed Project at the ***projected peak*** load condition (158 amps for Line #2399, 186 amps for Line #2402) and at an operating voltage of 241.5 kV when supported on the proposed Project structures – see Attachment II.A.5.a.

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.

Proposed Project – Projected Peak Loading (2028)				
Attachment	**Left Edge Looking Towards Nebula/Cloud**		**Right Edge Looking Towards Nebula/Cloud**	
	Electric Field (kV/m)	Magnetic Field (mG)	Electric Field (kV/m)	Magnetic Field (mG)
II.A.5.a	0.691	11.622	0.146	6.681

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 few decades are the foundation of the Company's opinion that no adverse health effects are anticipated to result from the operation of the proposed Project. Each of these panels has evaluated the scientific research related to health and extremely low frequency ("ELF") EMF, also referred to as power-frequency (50/60 Hertz ("Hz")) 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 on biological responses of high, short-term EMF exposure not typically found in people's day-to-day lives, while others evaluate the effects of common, low 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 100 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 scientific agencies to identify, review, and summarize the results of this large and diverse research.

The reviews of ELF EMF-related biological and health research have been conducted by numerous scientific and health agencies, including, for example, 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 Health, Environmental and Emerging Risks ("SCHEER") (formerly 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, 2022; ICES, 2019; SCHEER, 2023). 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 and 2023 reports by SCENIHR and SCHEER, respectively, and annual reviews published by SSM (i.e., for the years 2015 through 2022). 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.

WHO has recommended that countries adopt recognized international standards published by ICNIRP and ICES. Typical levels of EMF from Dominion Energy Virginia's high voltage 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.

Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR). Opinion on Potential Health Effects of Exposure to Electromagnetic Fields (EMF). Brussels, Belgium: European Commission, 2015.

Scientific Committee on Health, Environmental and Emerging Risks (SCHEER). Preliminary Opinion on Potential Health Effects of Exposure to Electromagnetic Fields (EMF): Update with regard to frequencies between 1Hz and 100 kHz. Brussels, Belgium: European Commission, 2023.

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.

Swedish Radiation Safety Authority (SSM). Research 2016:15. Recent Research on EMF and Health Risk - Eleventh report from SSM's Scientific Council on Electromagnetic Fields, 2016. Including Thirteen years of electromagnetic field 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.

Swedish Radiation Safety Authority (SSM). Research 2018:09. Recent Research on EMF and Health Risk - Twelfth report from SSM's Scientific Council on Electromagnetic Fields, 2017. Stockholm, Sweden: Swedish Radiation Safety Authority (SSM), 2018.

Swedish Radiation Safety Authority (SSM). Research 2019:08. Recent Research on EMF and Health Risk – Thirteenth Report from SSM's Scientific Council on Electromagnetic Fields, 2018. Stockholm, Sweden: Swedish Radiation Safety Authority (SSM), 2019.

Swedish Radiation Safety Authority (SSM). Research 2020:04. Recent Research on EMF and Health Risk – Fourteenth Report from SSM's Scientific Council on Electromagnetic Fields, 2019. Stockholm, Sweden: Swedish Radiation Safety Authority (SSM), 2020.

Swedish Radiation Safety Authority (SSM). Research 2021:08. Recent Research on EMF and Health Risk – Fifteenth report from SSM's Scientific Council on Electromagnetic Fields, 2020. Stockholm, Sweden: Swedish Radiation Safety Authority (SSM), 2021.

Swedish Radiation Safety Authority (SSM). Research 2022:16. Recent Research on EMF and Health Risk – Sixteenth report from SSM's Scientific Council on Electromagnetic Fields, 2021. Stockholm, Sweden: Swedish Radiation Safety Authority (SSM), 2022.

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

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."[45]

The continuing scientific research on ELF 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:

- WHO, which published one of the most comprehensive and detailed reviews of the relevant scientific peer-reviewed literature in 2007;
- SCHEER (formerly SCENIHR), a committee of the European Commission, which published its assessments in 2009, 2015 and 2023;
- The SSM, which has published annual reviews of the relevant peer-reviewed scientific literature since 2003, with its most recent review published in 2022; 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

[45] *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). In their 2023 Preliminary Opinion providing an update on the potential health effects of exposure to electromagnetic fields in the 1 Hz to 100 kilohertz ("kHz") range, SCHEER concluded that "overall, there is weak evidence concerning the association of ELF-MF [magnetic field] exposure with childhood leukaemia" (SCHEER 2023, p. 2).

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 March 2024, provide additional evidence and contribute to clarification of previous findings. Overall, new research studies have not provided evidence to alter the previous conclusions of scientific and health organizations, including WHO and SCENIHR.

Epidemiologic studies of EMF and childhood leukemia published during the above referenced period 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 tumors, 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 and after) and reported no overall associations between exposure categories and childhood leukemia for the later periods (1980 and after), 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 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 Quebec. 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 exposure to high calculated magnetic fields (≥ 0.4 microtesla ["μT"]) (i.e., ≥ 4 milligauss ["mG"]). 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.

- Amoon et al. (2022) conducted a pooled analysis of four studies of residential exposure to magnetic fields and childhood leukemia published following a 2010 pooled analysis by Kheifets et al. (2010). The study by Amoon et al. (2022) compared the exposures of 24,994 children with leukemia to the exposures of 30,769 controls without leukemia in California, Denmark, Italy, and the United Kingdom. Exposure was assessed by measured or calculated magnetic fields at their residences. The exposure of these two groups to magnetic fields were found not to significantly differ. A decrease in the combined effect estimates in epidemiologic studies was observed over time, and the authors concluded that their findings, based on the most recent studies, were "not in line" with previous pooled analyses that reported an increased risk of childhood leukemia.

- Brabant et al. (2022) performed a literature review and meta-analysis of studies of childhood leukemia and magnetic-field exposure. The overall analysis included 21 epidemiologic studies published from 1979 to 2020. The authors reported a statistically significant association, which they noted was "mainly explained by the studies conducted before 2000." The authors reported a statistically significant association between childhood leukemia and measured or calculated magnetic-field exposures > 0.4 μT (4 mG); no statistically significant overall associations were reported between childhood leukemia and lower magnetic-field exposure (< 0.4 μT [4 mG]), residential distance from power lines, or wire coding configuration. An association between childhood

leukemia and electric blanket use was also reported. The overall results were likely influenced by the inclusion of a large number of earlier studies; 10 of the 21 studies in the main analysis were published prior to 2000. Studies published prior to 2000 included fewer studies deemed to be of higher study quality, as determined by the authors, compared to studies published after 2000.

- Nguyen et al. (2022) investigated whether potential pesticide exposure from living in close proximity to commercial plant nurseries confounds the association between magnetic-field exposure and childhood leukemia development reported within the California study population previously analyzed in Crespi et al. (2016) and Kheifets et al. (2017). The authors in Nguyen et al. (2022) noted that while the association between childhood leukemia and magnetic-field exposure was "slightly attenuated" after adjusting for nursery proximity or when restricting to subjects living > 300 meters from nurseries, their results "do not support plant nurseries as an explanation for observed childhood leukemia risks." The authors further noted that close residential proximity to nurseries may be an independent risk factor for childhood leukemia.

- Guo et al. (2023) reported conducting a systematic review and meta-analysis of studies published from 2015 to 2022 that evaluated associations between magnetic-field exposure and childhood leukemia development. Three meta-analyses were conducted to evaluate the relationship using different exposure metrics. In the first meta-analysis, magnetic-field levels ranging from 0.4 μT (4 mG) to 0.2 μT (2 mG) were associated with a statistically significant reduced risk of childhood leukemia development (i.e., a protective association). In the second meta-analysis, exposure was based on wiring configuration codes, and the reported pooled relative risk estimates demonstrated a statistically significant increased association with childhood leukemia. In the third meta-analysis, exposure was categorized into groupings of magnetic-field strength; no statistically significant associations with childhood leukemia were reported for any of the groupings, including for magnetic-field levels ≥ 0.4 μT (4 mG). There are significant limitations of this study that prevent meaningful interpretations of the results. Most of the analyses of magnetic fields did not state whether measurements and calculations were included, and the authors provided no description of the methods used for their analyses, no data tables to support their findings, and no references to the number and type of studies included. In fact, much of the article's introduction discusses ionized radiation. The authors also do not report relevant metrics for evaluating meta-analyses such as study heterogeneity.

- Malagoli et al. (2023) examined associations between exposure to magnetic fields from high voltage power lines (≥ 132 kV) and childhood leukemia development in a case-control study of children in Italy. The study included 182 cases diagnosed with childhood leukemia between 1998 and 2019 and 726 controls matched based on age, sex, and Italian province. The authors assessed magnetic-field exposure by calculating the distance from each participant's

residence to the nearest high voltage power line and classifying that distance into one of three exposed categories (participants living < 100 meters, 100 to < 200 meters, or 200 to < 400 meters from the power lines) or as unexposed (participants living ≥ 400 meters from the power lines). The authors reported a non-statistically significant association between childhood leukemia and a residence distance of <100 meters; no statistically significant associations were reported for any distance, including when stratifying by age (< 5 or ≥ 5 years) or when restricting to acute lymphoblastic leukemia (ALL).

- Nguyen et al. (2023) extended their previous investigation (Nguyen et al., 2022) into whether pesticide exposure was an independent risk factor or confounder for childhood leukemia in the presence of magnetic-field exposure from high voltage power lines by examining the potential impact of specific pesticide exposure factors (*e.g.*, intended use, chemical class, active ingredient). The authors found no statistically significant associations between distance to high voltage power lines or magnetic-field exposure and childhood leukemia, including when adjusting for pesticide exposures. Several of the examined pesticides were determined by the authors to be potential independent risk factors for childhood leukemia.

- Zagar et al. (2023) examined the relationship between magnetic fields and childhood cancers, including childhood leukemia, in Slovenia. Cancer cases, including 194 cases of leukemia, were identified from the Slovenian Cancer Registry; cases were then classified into one of five calculated magnetic-field exposure levels (ranging from < 0.1 μT [< 1 mG] to ≥ 0.4 μT [≥ 4 mG]) based on residential distance to high voltage (*e.g.*, 110-kV, 220-kV, and 400-kV) power lines. The authors reported that less than 1% of Slovenian children and adolescents lived in an area near high voltage power lines. No differences in the development of childhood cancers, including leukemia, brain tumors, or all cancers combined, were reported across the five exposure categories.

- Crespi et al. (2024) assessed the association between residential proximity to electricity transformers in multi-story residential buildings and childhood leukemia development in the International Transformer Exposure study. Participants were required to live in an apartment building that contained a built-in transformer; exposure was estimated using the participants' apartment location relative to the transformer and categorized as high exposure (located above or adjacent to the transformer), intermediate exposure (located on the same floor as apartments in the high exposure category), or unexposed (all other apartments). In the pooled analyses of five countries' data, a total of 74 cases and 20,443 controls were included; 18 of the 74 cases were identified in the intermediate or high exposure categories. No significant associations were reported between proximity to residential transformers and childhood leukemia. Sensitivity analyses performed using the data from one of the five countries (Finland) where a cohort study design was used, also reported no significant associations. The authors concluded that the evidence for an elevated risk of childhood leukemia from proximity to residential transformers was "weak."

- Duarte-Rodríguez et al. (2024) conducted a population-based case-control study to examine the geographical distribution of childhood ALL cases in Mexico City, Mexico. Cases and controls were geolocated using the most recent residential address, and a spatial scan statistic was used to detect spatial clusters of cancer cases. The authors identified eight spatial clusters of cases, representing nearly 40% of all cases included in the study (n=1,054 cases). The authors noted that six of the eight spatial clusters were located in proximity to high voltage power lines and high voltage electric installations (distances not specified), and that the remaining two clusters were located near former petrochemical industrial facility sites. Since the study did not directly assess magnetic-field exposure and made no conclusions about magnetic-field exposure and cancer development, this study adds little value to the existing literature regarding a potential association between exposure to ELF EMF and childhood leukemia development.

- Malavolti et al. (2024) examined the association between magnetic-field exposure from transformer stations and childhood leukemia in the same Italian study population as Malagoli et al. (2023). Magnetic-field exposure was estimated based on residential distance to the nearest transformer station, and participants were then categorized as exposed or unexposed using two different distance cut-points: residing within a radius of 15 or 25 meters from the transformer station (exposed); residing ≥ 15 meters or ≥ 25 meters from the transformer station (unexposed). No significant associations were reported for all leukemias, or ALL specifically, when either distance cut-point was used, and in fact no association at all (an odds ratio = 1.0) was observed when the more stringent cut-point of 15 meters was used. In sub-analyses that stratified by participant age (< 5 years vs. ≥ 5 years), no significant associations were reported for either age category.

Epidemiologic studies of EMF and neurodegenerative diseases published during the above referenced period 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 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[46] 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

[46] 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).

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 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.

- Grebeneva et al. (2021) evaluated disease rates among electric power company workers in the Republic of Kazakhstan. The authors included three groups of "exposed" workers who "were in contact with equipment generating [industrial frequency EMF]" (a total of 161 workers), as well as 114 controls "who were not associated with exposure to electromagnetic fields." Disease rates were assessed "based on analyzing the sick leaves of employees" from 2010 to 2014 and expressed as "incidence rate per 100 employees." The authors reported a higher "incidence rate" of "diseases of the nervous system" in two of the exposed categories compared to the non-exposed group. No meaningful conclusions from the study could be drawn, however, because no specific diagnoses within "diseases of the nervous system" were identified in the paper and no clear description was provided on how the authors defined and calculated "incidence rate" for the evaluated conditions. In addition, no measured or calculated magnetic-field levels were presented by the authors.

- Filippini et al. (2021) conducted a meta-analysis to assess the dose-response relationship between residential exposure to magnetic fields and ALS. The

authors identified six ALS epidemiologic studies, published between 2009 and 2020, that assessed exposure to residential magnetic fields by either distance from overhead power lines or magnetic-field modeling. They reported a decrease in risk of ALS in the highest exposure categories for both distance-based and modeling-based exposure estimates. The authors also reported that their dose-response analyses "showed little association between distance from power lines and ALS"; the data were too sparse to conduct a dose-response analysis for modeled magnetic-field estimates. The authors noted that their study was limited by small sample size, "imprecise" exposure categories, the potential for residual confounding, and by "some publication bias."

- Jalilian et al. (2021) conducted a meta-analysis of occupational exposure to ELF magnetic fields and electric shocks and development of ALS. The authors included 27 studies from Europe, the United States, and New Zealand that were published between 1983 and 2019. A weak, statistically significant association was reported between magnetic-field exposure and ALS, and no association was observed between electric shocks and ALS. Indications of publication bias and "moderate to high" heterogeneity were identified for the studies of magnetic-field exposure and ALS, and the authors noted that "the results should be interpreted with caution."

- Goutman et al. (2022) examined occupational exposures, including "electromagnetic radiation" exposure, and associations with ALS in a case-control study of Michigan workers across various industries. The study included 381 cases diagnosed with ALS, all patients at the University of Michigan's Pranger ALS clinic, and 272 controls recruited from an online database for the University of Michigan. Participants were enrolled from 2010 to 2020 and completed a written survey of their work history and occupational exposures to nine exposure categories, including electromagnetic fields, particulate matter (PM), and pesticides. Exposure to electromagnetic fields was ascertained with a binary question asking whether they were "[e]xposed to power lines, transformation [*sic*] stations or other EM [electromagnetic radiation]?" The analysis was adjusted for age, sex, and military service. No association was observed between electromagnetic field exposure and ALS, while exposure to PM, pesticides, and metals, among others, were determined by the authors to be "associated with an increased ALS risk in this cohort."

- Sorahan and Nichols (2022) investigated magnetic-field exposure and mortality from MND in a large cohort of employees of the former Central Electricity Generating Board of England and Wales. The study included nearly 38,000 employees first hired between 1942 and 1982 and still employed in 1987. Estimates of exposure magnitude, frequency, and duration were calculated using data from the power stations and the employees' job histories, and were described in detail in a previous publication (Renew et al., 2003). Mortality from MND in the total cohort was observed to be similar to national rates. No statistically significant dose-response trends were observed with lifetime, recent, or distant magnetic-field exposure; statistically significant associations

were observed for some categories of recent exposure, but not for the highest exposure category.

- Duan et al. (2023) conducted a meta-summary of ALS and exposure to magnetic fields, which was 1 of 22 non-genetic risk factors evaluated across 67 studies for its association with ALS. Six of the 67 studies examined magnetic-field exposure and associations with ALS; of the six studies identified, the authors included four case-control studies and one cohort study in their meta-analysis. Pooling results from these studies resulted in significant increased odds of ALS among individuals with higher (but undefined) exposure to magnetic fields. However, this pooled odds ratio for magnetic-field exposure (1.22) was below the minimum odds ratio threshold of 1.3 set by the authors as the criterion for defining an exposure as an ALS risk factor. In addition, the authors identified "substantial" heterogeneity between studies evaluating magnetic-field exposure and ALS.

- In a subsequent publication of the same study as Goutman et al. (2022), Goutman et al. (2023) assessed the potential for the same nine exposure categories, including "electromagnetic radiation" exposure, to be risk factors for ALS progression, including survival and onset segment (bulbar, cervical, lumbar). Electromagnetic field exposure was not significantly associated with ALS survival or with bulbar onset compared to lumbar, but was significantly associated with cervical onset compared to lumbar. It is worth noting that an association with cervical onset compared to lumbar was observed in the majority (7/9) of the exposure categories. The authors make no concluding statements on electromagnetic field exposure and ALS and instead emphasize that occupational pesticide exposure and working in military operations were significantly associated with worse ALS survival.

- Saucier et al. (2023) carried out three systematic reviews of studies that evaluated relationships between urbanization, air pollution, and water pollution, and ALS development. The authors identified five studies that assessed whether electromagnetic fields (of varying frequencies) and high voltage infrastructure were significant urbanization risk factors for ALS, but make no conclusion about magnetic-field exposure and ALS development based on these studies, therefore adding little value to the existing literature.

- Vasta et al. (2023) examined the relationship between residential distance to power lines and ALS development in a cohort study of 1,098 participants in Italy. The authors reported no differences in the age of ALS onset or ALS progression rate between low-exposed and high-exposed participants based on residential distance to power lines at the time of the participants' diagnosis. Similarly, no differences were observed when exposure was based on residential distance to repeater antennas.

- Vitturi et al. (2023) conducted a systematic review and meta-analysis of case-control studies examining potential occupational risk factors related to multiple

sclerosis, including solvents, mercury, pesticides, and low-frequency magnetic fields. The authors included 24 studies in their review, but only one of the included studies investigated exposure to magnetic fields (Pedersen et al., 2017, discussed above), thereby adding little new information to the existing body of research.

References

Amoon AT, Oksuzyan S, Crespi CM, Arah OA, Cockburn M, Vergara X, Kheifets L. Residential mobility and childhood leukemia. Environ Res 164:459-466, 2018a.

Amoon AT, Crespi CM, Ahlbom A, Bhatnagar M, Bray I, Bunch KJ, Clavel J, Feychting M, Hemon D, Johansen C, Kreis C, Malagoli C, Marquant F, Pedersen C, Raaschou-Nielsen O, Röösli M, Spycher BD, Sudan M, Swanson J, Tittarelli A, Tuck DM, Tynes T, Vergara X, Vinceti M, Wunsch-Filho V, Kheifets L. Proximity to overhead power lines and childhood leukaemia: an international pooled analysis. Br J Cancer 119:364-373, 2018b.

Amoon AT, Arah OA, Kheifets L. The sensitivity of reported effects of EMF on childhood leukemia to uncontrolled confounding by residential mobility: a hybrid simulation study and an empirical analysis using CAPS data. Cancer Causes Control 30:901-908, 2019.

Amoon AT, Crespi CM, Nguyen A, Zhao X, Vergara X, Arah OA, and Kheifets L. The role of dwelling type when estimating the effect of magnetic fields on childhood leukemia in the California Power Line Study (CAPS). Cancer Causes Control 31:559-567, 2020.

Amoon AT, Swanson J, Magnani C, Johansen C, Kheifets L. Pooled analysis of recent studies of magnetic fields and childhood leukemia. Environ Res 204(Pt A):111993, 2022.

Auger N, Bilodeau-Bertrand M, Marcoux S, Kosatsky T. Residential exposure to electromagnetic fields during pregnancy and risk of child cancer: A longitudinal cohort study. Environ Res 176:108524, 2019.

Brabant C, Geerinck A, Beaudart C, Tirelli E, Geuzaine C, Bruyère O. Exposure to magnetic fields and childhood leukemia: a systematic review and meta-analysis of case-control and cohort studies. Rev Environ Health 38(2):229-253, 2022.

Bunch KJ, Keegan TJ, Swanson J, Vincent TJ, Murphy MF. Residential distance at birth from overhead high voltage powerlines: childhood cancer risk in Britain 1962-2008. Br J Cancer 110:1402-1408, 2014.

Bunch KJ, Swanson J, Vincent TJ, Murphy MF. Magnetic fields and childhood cancer: an epidemiological investigation of the effects of high voltage underground cables. J Radiol Prot 35:695-705, 2015.

Bunch KJ, Swanson J, Vincent TJ, Murphy MF. Epidemiological study of power lines and childhood cancer in the UK: further analyses. J Radiol Prot 36:437-455, 2016.

Checkoway H, Ilango S, Li W, Ray RM, Tanner CM, Hu SC, Wang X, Nielsen S, Gao DL, Thomas DB. Occupational exposures and parkinsonism among Shanghai women textile workers. Am J Ind Med 61:886-892, 2018.

Chen GX, Mannetje A, Douwes J, Berg LH, Pearce N, Kromhout H, Glass B, Brewer N, McLean DJ. Occupational exposure to electric shocks and extremely low-frequency magnetic fields and motor neurone disease. Am J Epidemiol 190(3):393-402, 2021.

Crespi CM, Vergara XP, Hooper C, Oksuzyan S, Wu S, Cockburn M, Kheifets L. Childhood leukaemia and distance from power lines in California: a population-based case-control study. Br J Cancer 115:122-128, 2016.

Crespi CM, Swanson J, Vergara XP, Kheifets L. Childhood leukemia risk in the California Power Line Study: Magnetic fields versus distance from power lines. Environ Res 171:530-535, 2019.

Crespi CM, Sudan M, Juutilainen J, Roivainen P, Hareuveny R, Huss A, Kandel S, Karim-Kos HE, Thuróczy G, Jakab Z, Spycher BD, Flueckiger B, Vermeulen R, Vergara X, Kheifets L. International study of childhood leukemia in residences near electrical transformer rooms. Environ Res 249:118459, 2024.

Duan QQ, Jiang Z, Su WM, Gu XJ, Wang H, Cheng YF, Cao B, Gao X, Wang Y, Chen YP. Risk factors of amyotrophic lateral sclerosis: a global meta-summary. Front Neurosci 17:1177431, 2023.

Duarte-Rodríguez DA, Flores-Lujano J, McNally RJQ, et al. Evidence of spatial clustering of childhood acute lymphoblastic leukemia cases in Greater Mexico City: report from the Mexican Inter-Institutional Group for the identification of the causes of childhood leukemia. Front Oncol 14:1304633, 2024.

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.

Filippini T, Tesauro M, Fiore M, Malagoli C, Consonni M, Violi F, Iacuzio L, Arcolin E, Oliveri Conti G, Cristaldi A, Zuccarello P, Zucchi E, Mazzini L, Pisano F, Gagliardi I, Patti F, Mandrioli J, Ferrante M, Vinceti M. Environmental and occupational risk factors of amyotrophic lateral sclerosis: A population-based case-control study. Int J Environ Res Public Health 17(8):2882, 2020.

Filippini T, Hatch EE, Vinceti M. Residential exposure to electromagnetic fields and risk of amyotrophic lateral sclerosis: a dose-response meta-analysis. Sci Rep 11(1):11939, 2021.

Fischer H, Kheifets L, Huss A, Peters TL, Vermeulen R, Ye W, Fang F, Wiebert P, Vergara XP, Feychting M. Occupational Exposure to Electric Shocks and Magnetic Fields and Amyotrophic Lateral Sclerosis in Sweden. Epidemiology 26:824-830, 2015.

Gervasi F, Murtas R, Decarli A, Giampiero Russo A. Residential distance from high voltage overhead power lines and risk of Alzheimer's dementia and Parkinson's disease: a population-based case-control study in a metropolitan area of Northern Italy. Int J Epidemiol 48(6):1949-1957, 2019.

Grebeneva OV, Rybalkina DH, Ibrayeva LK, Shadetova AZ, Drobchenko EA, Aleshina NY. Evaluating occupational morbidity among energy enterprise employees in industrial region of Kazakhstan. Russian Open Medical Journal 10(3):e0319, 2021.

Goutman SA, Boss J, Godwin C, Mukherjee B, Feldman EL, Batterman SA. Associations of self-reported occupational exposures and settings to ALS: a case-control study. Int Arch Occup Environ Health 95(7):1567-1586, 2022.

Goutman SA, Boss J, Godwin C, Mukherjee B, Feldman EL, Batterman SA. Occupational history associates with ALS survival and onset segment. Amyotroph Lateral Scler Frontotemporal Degener 24(3-4):219-229, 2023.

Gunnarsson LG and Bodin L. Amyotrophic lateral sclerosis and occupational exposures: A systematic literature review and meta-analyses. Int J Environ Res Public Health 15(11):2371, 2018.

Gunnarsson LG and Bodin L. Occupational exposures and neurodegenerative diseases: A systematic literature review and meta-analyses. Int J Environ Res Public Health 16(3):337, 2019.

Guo H, Kang L, Qin W, Li Y. Electromagnetic Radiation Exposure and Childhood Leukemia: Meta-Analysis and Systematic Review. Altern Ther Health Med 29(8):75-81, 2023.

Huang LY, Hu HY, Wang ZT, Ma YH, Dong Q, Tan L, Yu JT. Association of occupational factors and dementia or cognitive impairment: A systematic review and meta-analysis. J Alzheimers Dis 78(1):217-227, 2020.

Huss A, Peters S, Vermeulen R. Occupational exposure to extremely low-frequency magnetic fields and the risk of ALS: A systematic review and meta-analysis. Bioelectromagnetics 39:156-163, 2018.

Jalilian H, Teshnizi SH, Röösli M, Neghab M. Occupational exposure to extremely

low frequency magnetic fields and risk of Alzheimer disease: A systematic review and meta-analysis. Neurotoxicology 69:242-252, 2018.

Jalilian H, Najafi K, Khosravi Y, and Röösli M. Amyotrophic lateral sclerosis, occupational exposure to extremely low frequency magnetic fields and electric shocks: A systematic review and meta-analysis. Rev Environ Health 36(1):129-142, 2021.

Kheifets L, Crespi CM, Hooper C, Cockburn M, Amoon AT, Vergara XP. Residential magnetic fields exposure and childhood leukemia: a population-based case-control study in California. Cancer Causes Control 28:1117-1123, 2017.

Koeman T, Schouten LJ, van den Brandt PA, Slottje P, Huss A, Peters S, Kromhout H, Vermeulen R. Occupational exposures and risk of dementia-related mortality in the prospective Netherlands Cohort Study. Am J Ind Med 58:625-635, 2015.

Koeman T, Slottje P, Schouten LJ, Peters S, Huss A, Veldink JH, Kromhout H, van den Brandt PA, Vermeulen R. Occupational exposure and amyotrophic lateral sclerosis in a prospective cohort. Occup Environ Med 74: 578-585, 2017.

Kyriakopoulou A, Meimeti E, Moisoglou I, Psarrou A, Provatopoulou X, Dounias G. Parental Occupational Exposures and Risk of Childhood Acute Leukemia. Mater Sociomed 30: 209-214, 2018.

Malagoli C, Malavolti M, Wise LA, Balboni E, Fabbi S, Teggi S, Palazzi G, Cellini M, Poli M, Zanichelli P, Notari B, Cherubini A, Vinceti M, Filippini T. Residential exposure to magnetic fields from high voltage power lines and risk of childhood leukemia. Environ Res 232:116320, 2023.

Malavolti M, Malagoli C, Wise LA, Poli M, Notari B, Taddei I, Fabbi S, Teggi S, Balboni E, Pancaldi A, Palazzi G, Vinceti M, Filippini T. Residential exposure to magnetic fields from transformer stations and risk of childhood leukemia. Environ Res 245:118043, 2024.

Nguyen A, Crespi CM, Vergara X, Kheifets L. Commercial outdoor plant nurseries as a confounder for electromagnetic fields and childhood leukemia risk. Environ Res 212(Pt C):113446, 2022.

Nguyen A, Crespi CM, Vergara X, Kheifets L. Pesticides as a potential independent childhood leukemia risk factor and as a potential confounder for electromagnetic fields exposure. Environ Res 238(Pt 1):116899, 2023.

Núñez-Enríquez JC, Correa-Correa V, Flores-Lujano J, Pérez-Saldivar ML, Jiménez-Hernández E, Martín-Trejo JA, Espinoza-Hernández LE, Medina-Sanson A, Cárdenas-Cardos R, Flores-Villegas LV, Peñaloza-González JG, Torres-Nava JR, Espinosa-Elizondo RM, Amador-Sánchez R, Rivera-Luna R, Dosta-Herrera JJ, Mondragón-García JA, González-Ulibarri JE, Martínez-Silva SI, Espinoza-Anrubio G, Duarte-Rodríguez DA, García-Cortés LR, Gil-Hernández AE, Mejía-

Aranguré JM. Extremely low-frequency magnetic fields and the risk of childhood B-lineage acute lymphoblastic leukemia in a city with high incidence of leukemia and elevated exposure to ELF magnetic fields. Bioelectromagnetics 41(8):581-597, 2020.

Pedersen C, Johansen C, Schüz J, Olsen JH, Raaschou-Nielsen O. Residential exposure to extremely low-frequency magnetic fields and risk of childhood leukaemia, CNS tumour and lymphoma in Denmark. Br J Cancer 113:1370-1374, 2015.

Pedersen C, Poulsen AH, Rod NH, Frei P, Hansen J, Grell K, Raaschou-Nielsen O, Schüz J, Johansen C. Occupational exposure to extremely low-frequency magnetic fields and risk for central nervous system disease: an update of a Danish cohort study among utility workers. Int Arch Occup Environ Health 90:619-628, 2017.

Peters S, Visser AE, D'Ovidio F, Beghi E, Chio A, Logroscino G, Hardiman O, Kromhout H, Huss A, Veldink J, Vermeulen R, van den Berg LH. Associations of Electric Shock and Extremely Low-Frequency Magnetic Field Exposure With the Risk of Amyotrophic Lateral Sclerosis. Am J Epidemiol 188:796-805, 2019.

Renew DC, Cook RF, Ball MC. A method for assessing occupational exposure to power-frequency magnetic fields for electricity generation and transmission workers. J Radiol Prot 23(3):279-303, 2003.

Röösli M and Jalilian H. A meta-analysis on residential exposure to magnetic fields and the risk of amyotrophic lateral sclerosis. Rev Environ Health 33:295-299, 2018.

Salvan A, Ranucci A, Lagorio S, Magnani C. Childhood leukemia and 50 Hz magnetic fields: findings from the Italian SETIL case-control study. Int J Environ Res Public Health 12:2184-2204, 2015.

Saucier D, Registe PPW, Bélanger M, O'Connell C. Urbanization, air pollution, and water pollution: Identification of potential environmental risk factors associated with amyotrophic lateral sclerosis using systematic reviews. Front Neurol 14:1108383, 2023.

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

Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR). Opinion on Potential Health Effects of Exposure to Electromagnetic Fields (EMF). Brussels, Belgium: European Commission, 2015.

Scientific Committee on Health, Environmental and Emerging Risks (SCHEER). Preliminary Opinion on Potential Health Effects of Exposure to Electromagnetic Fields (EMF): Update with regard to frequencies between 1Hz and 100 kHz.

Brussels, Belgium: European Commission, 2023.

Seelen M, Vermeulen RC, van Dillen LS, van der Kooi AJ, Huss A, de Visser M, van den Berg LH, Veldink JH. Residential exposure to extremely low frequency electromagnetic fields and the risk of ALS. Neurology 83:1767-1769, 2014.

Seomun G, Lee J, Park J. Exposure to extremely low-frequency magnetic fields and childhood cancer: A systematic review and meta-analysis. PLoS One 16:e0251628, 2021.

Sorahan T and Mohammed N. Neurodegenerative disease and magnetic field exposure in UK electricity supply workers. Occup Med (Lond) 64:454-460, 2014.

Sorahan T and Nichols L. Motor neuron disease risk and magnetic field exposures. Occup Med (Lond) 72(3):184-190, 2022.

Swanson J and Bunch KJ. Reanalysis of risks of childhood leukaemia with distance from overhead power lines in the UK. J Radiol Prot 38:N30-N35, 2018.

Swanson J, Kheifets L, and Vergara X. Changes over time in the reported risk for childhood leukaemia and magnetic fields. J Radiol Prot 39:470-488, 2019.

Swedish Radiation Safety Authority (SSM). Research 2019:08. Recent Research on EMF and Health Risk – Thirteenth Report from SSM's Scientific Council on Electromagnetic Fields, 2018. Stockholm, Sweden: Swedish Radiation Safety Authority (SSM), 2019.

Talibov M, Olsson A, Bailey H, Erdmann F, Metayer C, Magnani C, Petridou E, Auvinen A, Spector L, Clavel J, Roman E, Dockerty J, Nikkila A, Lohi O, Kang A, Psaltopoulou T, Miligi L, Vila J, Cardis E, Schüz J. Parental occupational exposure to low-frequency magnetic fields and risk of leukaemia in the offspring: findings from the Childhood Leukaemia International Consortium (CLIC). Occup Environ Med 76:746-753, 2019.

Vasta R, Callegaro S, Grassano M, Canosa A, Cabras S, Di Pede F, Matteoni E, De Mattei F, Casale F, Salamone P, Mazzini L, De Marchi F, Moglia C, Calvo A, Chiò A, Manera U. Exposure to electromagnetic fields does not modify neither the age of onset nor the disease progression in ALS patients. Amyotroph Lateral Scler Frontotemporal Degener 24(3-4):343-346, 2023.

Vergara X, Mezei G, Kheifets L. Case-control study of occupational exposure to electric shocks and magnetic fields and mortality from amyotrophic lateral sclerosis in the US, 1991-1999. J Expo Sci Environ Epidemiol 25:65-71, 2015.

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.

Vitturi BK, Montecucco A, Rahmani A, Dini G, Durando P. Occupational risk factors for multiple sclerosis: a systematic review with meta-analysis. Front Public Health 11:1285103, 2023.

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

Zagar T, Valic B, Kotnik T, Korat S, Tomsic S, Zadnik V, Gajsek P. Estimating exposure to extremely low frequency magnetic fields near high voltage power lines and assessment of possible increased cancer risk among Slovenian children and adolescents. Radiol Oncol 57(1):59-69, 2023.

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: Dominion Energy Virginia's Cloud-Nebula-Raines Transmission Project includes construction of the new overhead single circuit 230 kV Nebula-Raines Line #2399, the new overhead single circuit 230 kV Cloud-Nebula Line #2402, and the new Nebula Switching Station, all within Mecklenburg County, Virginia. Both Line #2399 and Line #2402 are proposed for construction on double circuit monopoles with an idle conductor to address future load growth.

A map is provided in Attachment V.A showing the overhead Proposed Route and three overhead Alternative Routes for the proposed Nebula-Raines Line #2399, and the overhead Proposed Route for the proposed Cloud-Nebula Line #2402. The map also shows the location of the proposed Nebula Switching Station.

A written description of the Proposed and Alternative Routes is as follows:

Nebula-Raines Line #2399

Proposed Route (Route 5)

The Nebula-Raines Proposed Route (Route 5) is approximately 14.4 miles in length. Beginning at the future Raines Substation, located near the intersection of Raines Street and Butts Street in South Hill, the Proposed Route heads west for about 2.5 miles, collocating with the south side of US 58 before crossing US 58 and US 1 and continuing west. At this point, the route turns north-northwest for about 0.6 mile crossing Plank Road. From here, the route angles southwest for about 3.6 miles, crossing Miles Creek, Union Level Road, and Gordon Lake Road. The route then turns west for about 2.0 miles, crossing Busy Bee Road. The route then heads southwest for about 3.6 miles, crossing Wooden Bridge Road, US 58, and Antler Road. The Proposed Route then turns west, crossing existing Lines #137 and #38 and sharing the existing right-of-way with existing Lines #1041 and #38 for about 0.9 mile before turning south for 0.6 mile and then turning west for 0.1 mile to terminate at the proposed Nebula Switching Station, located 1.7 miles east of the intersection of Washington Street and Rose Hill Road in Boydton.

The Nebula-Raines Proposed Route will be constructed on new 100-foot-wide right-of-way primarily supported by weathering steel double circuit monopoles with a minimum structure height of 110 feet, a maximum structure height of 175 feet, and an average structure height of 124 feet, based on preliminary conceptual design, not including foundation reveal, and subject to change based on final engineering design.

Nebula-Raines Alternative Route 1

Nebula-Raines Alternative Route 1 is approximately 15.4 miles in length. Beginning at the future Raines Substation located near the intersection of Raines Street and Butts Street in South Hill, Nebula-Raines Alternative Route 1 heads southwest for about 0.4 mile before turning south for 0.4 mile, crossing Rocky Branch Road, and angling southwest for 0.9 mile and crossing Turtle Road. From here, Nebula-Raines Alternative Route 1 turns and heads south for 1.1 miles and then turns southwest again for about 3.1 miles, crossing Trinity Church Road and Belfield Road. The route then turns and heads west for about 6.2 miles, crossing Goodes Ferry Road, US 1, Eureka Road, Baskerville Road, and Buggs Island Road. The route then angles southwest and then northwest for 1.0 mile before continuing west for about 2.3 miles and terminating at the proposed Nebula Switching Station, located 1.7 miles east of the intersection of Washington Street and Rose Hill Road in Boydton.

Nebula-Raines Alternative Route 1 will be constructed on new 100-foot-wide right-of-way primarily supported by weathering steel double circuit monopoles with a minimum structure height of 110 feet, a maximum structure height of 175 feet, and an average structure height of 124 feet, based on preliminary conceptual design, not including foundation reveal, and subject to change based on final engineering design.

Nebula-Raines Alternative Route 3

Nebula-Raines Alternative Route 3 is approximately 14.9 miles in length. Beginning at the future Raines Substation located near the intersection of Raines Street and Butts Street in South Hill, Nebula-Raines Alternative Route 3 heads west following the same alignment as the Proposed Route for about 1.3 miles. At this point, the route turns southwest for 2.6 miles, running approximately parallel to the south side of Dockery Creek. Just before Dockery Road, the route turns and heads south-southwest for about 2.4 miles, crossing Dockery Road and Smith Cross Road. From there, the route turns and heads west for 3.2 miles, crossing US 1, Ceder Grove Road, and Baskerville Road. At Baskerville Road, Nebula-Raines Alternative Route 3 converges with and shares the right-of-way with Alternative Route 1 for the remaining 5.4 miles, terminating at the proposed Nebula Switching Station, located 1.7 miles east of the intersection of Washington Street and Rose Hill Road in Boydton.

Nebula-Raines Alternative Route 3 will be constructed on new 100-foot-wide right-of-way primarily supported by weathering steel double circuit monopoles with a minimum structure height of 110 feet, a maximum structure height of 175 feet, and an average structure height of 124 feet, based on preliminary conceptual design, not including foundation reveal, and subject to change based on final engineering design.

Nebula-Raines Alternative Route 4

Nebula-Raines Alternative Route 4 is approximately 15.0 miles in length. Beginning at the future Raines Substation located near the intersection of Raines Street and Butts Street in South Hill, Nebula-Raines Alternative Route 4 follows the same alignment as Nebula-Raines Alternative Route 3 for the first 10.1 miles to a point 0.6 mile west of Baskerville Road. At this point, the route turns to the northwest for 0.4 mile, then turns to the west-northwest for 0.9 mile, crossing Cox Creek and Buggs Island Road. The route then turns to the west-southwest for 3.5 miles, crossing Antlers Road and the Company's existing Lines #137 and #38. The route then turns northwest for 0.1 mile (using the same right-of-way as Nebula-Raines Alternative Routes 1 and 3) and terminates at the proposed Nebula Switching Station, located 1.7 miles east of the intersection of Washington Street and Rose Hill Road in Boydton.

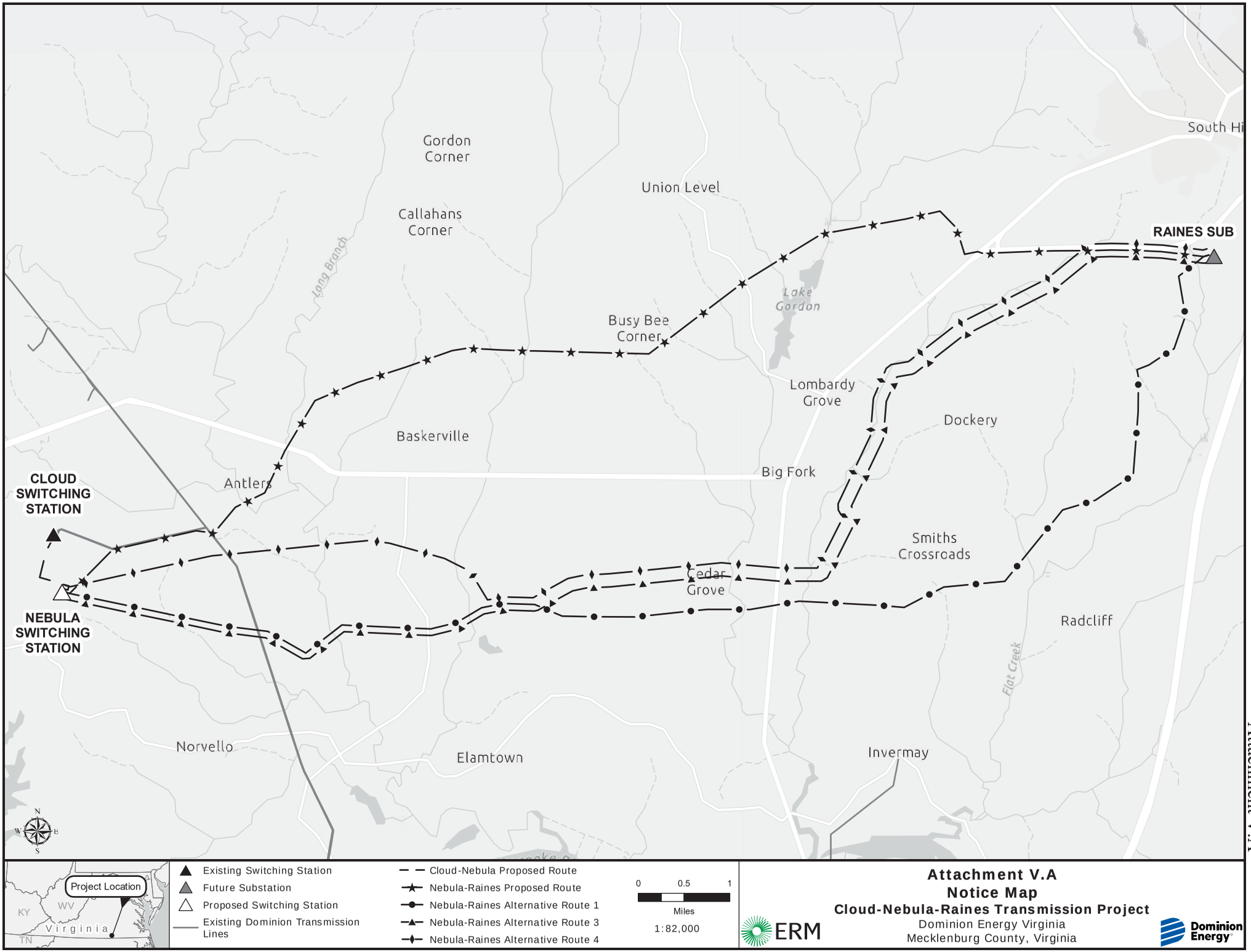
Nebula-Raines Alternative Route 4 will be constructed on new 100-foot-wide right-of-way primarily supported by weathering steel double circuit monopoles with a minimum structure height of 110 feet, a maximum structure height of 175 feet, and an average structure height of 124 feet, based on preliminary conceptual design, not including foundation reveal, and subject to change based on final engineering design.

Cloud-Nebula Line #2402

Cloud-Nebula Proposed Route

The Cloud-Nebula Proposed Route is approximately 0.9 mile in length. Beginning at the existing Cloud Switching Station located about 0.5 mile east of Herbert Drive, the Cloud-Nebula Proposed Route heads south for 0.5 mile adjacent to the western boundary of the existing Cloud Switching Station and an existing data center parcel. The route then turns to the east for 0.3 mile across managed timber land before turning south for 0.1 mile and terminating at the proposed Nebula Switching Station, located 1.7 miles east of the intersection of Washington Street and Rose Hill Road in Boydton.

The Cloud-Nebula Proposed Route will be constructed on new 100-foot-wide right-of-way primarily supported by weathering steel double circuit monopoles with a minimum structure height of 105 feet, a maximum structure height of 130 feet, and an average structure height of 122 feet, based on preliminary conceptual design, not including foundation reveal, and subject to change based on final engineering design.


Gordon Corner
Union Level
Callahans Corner
Long Branch
Busy Bee Corner
Lake Gordon
RAINES SUB
South Hi
Lombardy Grove
Dockery
Baskerville
Antlers
Big Fork
CLOUD SWITCHING STATION
NEBULA SWITCHING STATION
Smiths Crossroads
Cedar Grove
Radcliff
Flat Creek
Norvello
Elamtown
Invermay
N
W
E
S
Project Location
KY
WV
Virginia
TN
Existing Switching Station
Future Substation
Proposed Switching Station
Existing Dominion Transmission Lines
Cloud-Nebula Proposed Route
Nebula-Raines Proposed Route
Nebula-Raines Alternative Route 1
Nebula-Raines Alternative Route 3
Nebula-Raines Alternative Route 4
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1
Miles
1:82,000
ERM
Attachment V.A
Notice Map
Cloud-Nebula-Raines Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia
Dominion Energy

IV. 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: Shortly after filing, the Application will be made available electronically for public inspection at: www.dominionenergy.com/nebula-raines.

IV. 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
bettina.rayfield@deq.virginia.gov

Ms. Michelle Henicheck
Office of Wetlands and Streams
Department of Environmental Quality
1111 East Main Street, Suite 1400
Richmond, Virginia 23219

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

Environmental Reviewer
Department of Conservation and Recreation, Planning Bureau
600 East Main Street, 17th Floor
Richmond, Virginia 23219

Ms. Hannah Schul
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. Clint Folks
Virginia Department of Forestry
Forestland Conservation Division
900 Natural Resources Drive, Suite 800
Charlottesville, Virginia 22903

Scoping at VMRC
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

Ms. Regena Bronson
U.S. Army Corps of Engineers
Fredericksburg Field Office
WRDA Dominion VA Liaison
10300 Spotsylvania Parkway, Suite 230
Fredericksburg, Virginia 22408

Ms. Arlene Fields Warren
Virginia Department of Health
Office of Drinking Water
109 Governor Street, 6th Floor
Richmond, Virginia 23219

Mr. Alex Gottschalk
Mecklenburg County Administrator
P.O. Box 307
Boydton, Virginia 23917

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

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

Mr. Tommy Johnson
Residency Administrator
Virginia Department of Transportation
1013 West Atlantic St.
P.O. Box 249
South Hill, Virginia 23970

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

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, a letter dated November 6, 2024, was delivered to Alex Gottschalk, County Administrator of Mecklenburg County, where the Project is located. The letter stated the Company's intention to file this Application and invited the County to consult with the Company about the Project. This letter is included as Attachment V.D.1.

Dominion Energy Services, Inc.
5000 Dominion Boulevard, 3rd Floor
Glen Allen, Virginia 23060
DominionEnergy.com

Alex Gottschalk
County Administrator, Mecklenburg County
350 Washington Street
Boydton, Virginia 23917

November 6, 2024

RE: Dominion Energy Virginia's Proposed Cloud-Nebula-Raines Transmission Project

Notice Pursuant to Va. Code § 15.2-2202 E

Dear Mr. Gottschalk:

In order to ensure that Dominion Energy Virginia (the "Company") can provide service requested by Old Dominion Electric Cooperative ("ODEC") on behalf of Mecklenburg Electric Cooperative ("MEC" or the "Customer"); to relieve identified violations of mandatory North American Electric Reliability Corporation ("NERC") Reliability Standards; and to maintain and improve reliable electric service to customers in the area, the Company is proposing the Cloud-Nebula-Raines Transmission Project in Mecklenburg County, Virginia (the "Project"). The Project includes new 230 kV transmission lines (Cloud-Nebula and Nebula-Raines lines) and a new 230 kV switching station (Nebula Switching Station).

The Company is preparing to file an application for a certificate of public convenience and necessity ("CPCN") from the State Corporation Commission (the "Commission"). Pursuant to § 15.2-2202 of the Code of Virginia, the Company is writing to notify Mecklenburg County of the proposed Project in advance of the CPCN filing and respectfully requests that you submit any comments or additional information you feel would have bearing on the Project within 30 days of the date of this letter.

Enclosed is a Project Overview Map depicting the Project's route alternatives, as well as the general Project location. All final materials, including maps, will be available in the Company's CPCN filing to the Commission.

If you would like to receive a GIS shapefile of the route alternatives to assist in your Project review or if you have any questions, please do not hesitate to contact me at (804) 298-5646 or Hannah.hurst@dominionenergy.com.

Dominion Energy Services, Inc.
5000 Dominion Boulevard, 3rd Floor
Glen Allen, Virginia 23060
DominionEnergy.com

Dominion Energy Virginia appreciates your assistance with this Project review and looks forward to any additional information you may have to offer.

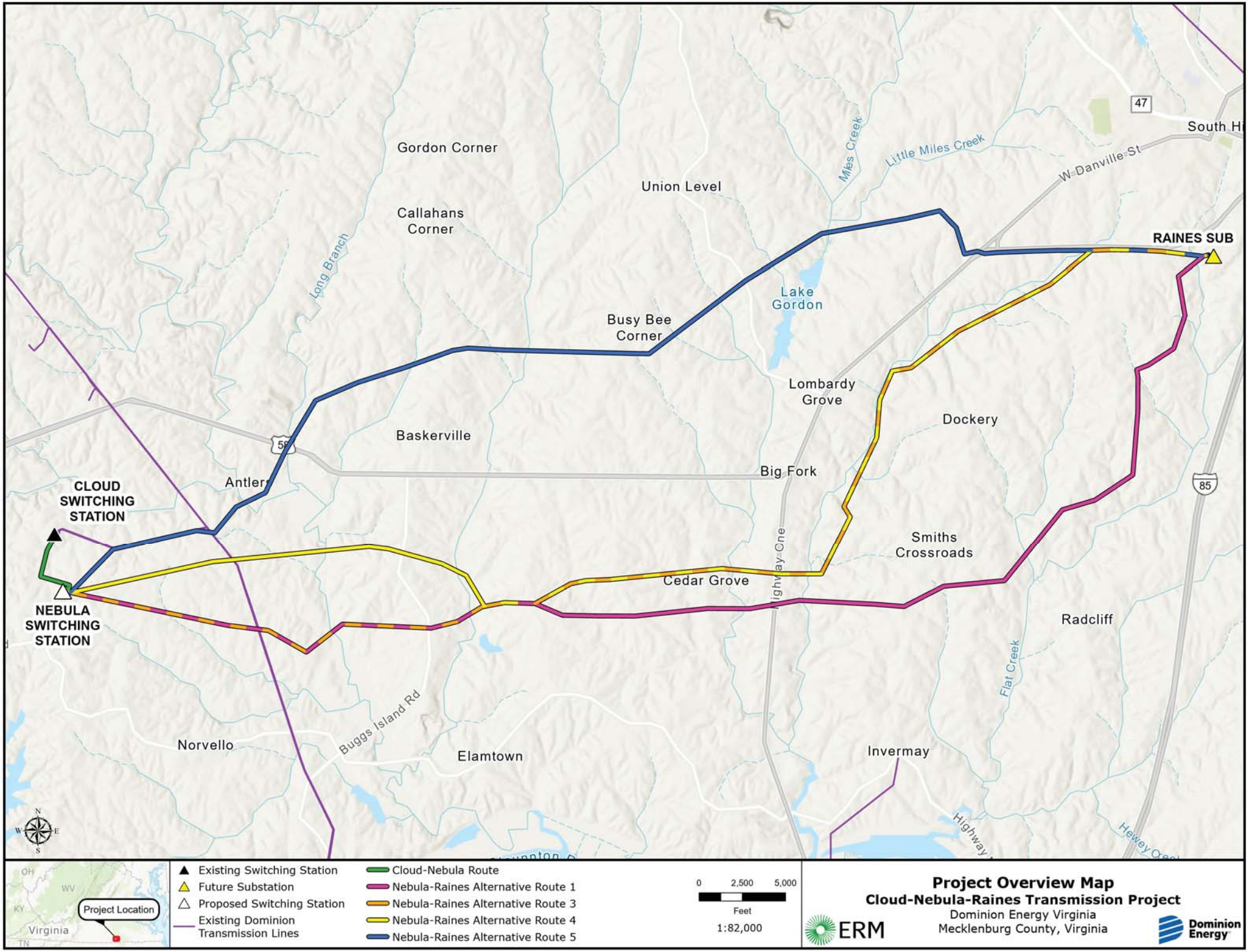
Regards,

Elizabeth Hurst

Hannah Hurst
Senior Siting and Permitting Specialist
Electric Transmission
5000 Dominion Boulevard, 3rd Floor
Glen Allen, Virginia 23060

804-298-5646

Attachment: Project Overview Map


Gordon Corner
Union Level
Callahans Corner
Long Branch
Miles Creek
Little Miles Creek
W Danville St
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South Hi
RAINES SUB
Lake Gordon
Busy Bee Corner
Lombardy Grove
Dockery
Baskerville
58
Antlers
Big Fork
85
CLOUD SWITCHING STATION
NEBULA SWITCHING STATION
Smiths Crossroads
Cedar Grove
Highway One
Radcliff
Flat Creek
Buggs Island Rd
Norvello
Elamtown
Invermay
Highway
Hewey Creek
N
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OH
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KY
Virginia
TN
Project Location
Existing Switching Station
Future Substation
Proposed Switching Station
Existing Dominion Transmission Lines
Cloud-Nebula Route
Nebula-Raines Alternative Route 1
Nebula-Raines Alternative Route 3
Nebula-Raines Alternative Route 4
Nebula-Raines Alternative Route 5
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ERM
Project Overview Map
Cloud-Nebula-Raines Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia
Dominion Energy

COMMONWEALTH OF VIRGINIA

STATE CORPORATION COMMISSION

APPLICATION OF	)	
	)	
VIRGINIA ELECTRIC AND POWER COMPANY	)	Case No. PUR-2025-00014
	)	
For approval and certification of electric transmission facilities: 230 kV Nebula-Raines Line #2399, 230 kV Nebula Switching Station, and 230 kV Cloud-Nebula Line #2402	)	

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

Samuel L. Carter

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

Chloe A. Genova

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

Mohammad M. Othman

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

Hannah Hurst

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

Matt L. Teichert

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

WITNESS DIRECT TESTIMONY SUMMARY

Witness: Samuel L. Carter

Title: Area Planning Engineer – Electric Transmission Planning

Summary:

Company Witness Samuel L. Carter sponsors those portions of the Appendix describing the Company's electric transmission system and the need for, and benefits of, the proposed Project, as follows:

- Section I.B: This section details the engineering justifications for the proposed Project.
- Section I.C: 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: This section describes critical contingencies and associated violations due to the inadequacy of the existing system.
- Section I.E: This section explains feasible project alternatives, when applicable.
- Section I.G: This section provides a system map of the affected area.
- Section I.H: This section provides the desired in-service date of the proposed Project and the estimated construction time.
- Section I.J: This section provides information about the project if approved by the RTO.
- Section I.K: Although not applicable to the proposed Project, 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: Although not applicable to the proposed Project, this section, when applicable, contains information for transmission lines interconnecting a non-utility generator.
- Section I.N: 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.
- Section II.A.10: This section provides details of the construction plans for the proposed Project, including requested line outage schedules.

Additionally, Company Witness Carter co-sponsors the following portions of the Appendix:

- Section I.A (co-sponsored with Company Witnesses Chloe A. Genova, Mohammad O. Othman, Hannah Hurst, and Matt L. Teichert): This section details the primary justifications for the proposed Project.
- Section I.L (co-sponsored with Company Witness Chloe A. Genova): Although not applicable to the proposed Project, this section, when applicable, provides details on the deterioration of structures and associated equipment.

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

DIRECT TESTIMONY
OF
SAMUEL L. CARTER
ON BEHALF OF
VIRGINIA ELECTRIC AND POWER COMPANY
BEFORE THE
STATE CORPORATION COMMISSION OF VIRGINIA
CASE NO. PUR-2025-00014

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

A. My name is Samuel L. Carter, and I am an Area Planning Engineer in the Electric Transmission Planning Department for the Company. My business address is 5000 Dominion Boulevard, 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 Old Dominion Electric Cooperative ("ODEC") on behalf of Mecklenburg Electric Cooperative ("MEC" or the "Customer") for MEC to provide service to its data center customer in Mecklenburg County, Virginia; to relieve identified violations of mandatory North American Electric Reliability Corporation ("NERC") Reliability Standards; and to maintain the structural integrity and reliability of the transmission system, Dominion Energy Virginia proposes in Mecklenburg County, Virginia, to:

(i) Construct a new overhead single circuit 230 kilovolt ("kV") transmission line from the Company's future Raines Substation to a proposed switching station,

resulting in 230 kV Nebula-Raines Line #2399 (or "Nebula-Raines Line"). Specifically, Line #2399 will extend approximately 14.4 miles within a new 100-foot-wide right-of-way, supported by weathering steel double circuit monopoles with an idle conductor, and utilizing three-phase twin-bundled 768.2 Aluminum Conductor Steel Supported/Trapezoidal Wire/High Strength ("ACSS/TW/HS") conductor with a summer transfer capability of 1,573 MVA.

(ii) Construct a new 230 kV switching station in Mecklenburg, County, Virginia on property owned by the Customer (the "Nebula Switching Station" or "Nebula Station").

(iii) Construct a new overhead single circuit 230 kV transmission line from the Company's existing 230-115 kV Cloud Switching Station to the proposed 230 kV Nebula Station, resulting in 230 kV Cloud-Nebula Line #2402 (or "Cloud-Nebula Line"). Specifically, Line #2402 will extend approximately 0.9 mile within a new 100-foot-wide right-of-way, supported by weathering steel double circuit monopoles with an idle conductor, and utilizing three-phase twin-bundled 768.2 ACSS/TW/HS conductor with a summer transfer capability of 1,573 MVA.

(iv) Perform minor station-related work at the future Raines Substation and the existing Cloud Switching Station.

The Nebula-Raines Line, the Nebula Switching Station, the Cloud-Nebula Line, and station-related work are collectively referred to as the "Cloud-Nebula-Raines Transmission Project" or "Project."

The Project is needed to ensure that Dominion Energy Virginia can provide service requested by MEC to serve its data center customer in Mecklenburg County, Virginia; and to relieve identified violations of mandatory NERC Reliability Standards in order to maintain reliable electric service to customers in the load area, which, for purposes of this Application, extends generally east from the Town of Boydton, Virginia (the "Boydton Load Area") and also includes the load area surrounding the Company's existing South Hill Substation, inclusive of the Town of South Hill in Mecklenburg County, Virginia (the "South Hill Load Area").

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 sponsor Sections I.B, I.C, I.D, I.E, I.G, I.H, I.J, I.K, I.M, I.N, and II.A.10 of the Appendix. Additionally, I co-sponsor the Executive Summary and Sections I.A with Company Witnesses Chloe A. Genova, Mohammad O. Othman, Hannah Hurst, and Matt L. Teichert; and Section I.L with Company Witness Chloe A. Genova.

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

A. Yes, it does.

APPENDIX A

BACKGROUND AND QUALIFICATIONS
OF
SAMUEL L. CARTER

Samuel L. Carter received a Bachelor of Science degree in Electrical Engineering from Virginia Polytechnic Institute and State University in 1979. He is licensed as a Professional Engineer in the Commonwealth of Virginia. Before rejoining Dominion Energy Virginia as a contractor in 2020, Mr. Carter worked for Westinghouse as a transformer design engineer from 1979 to 1988 and for Dominion Energy from 1988 to 2019 in various positions including Distribution Standards Engineer, East Richmond District Operations Supervisor, Distribution Planning Engineer and Transmission Planning Engineer (2008-2019).

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

WITNESS DIRECT TESTIMONY SUMMARY

Witness: Chloe A. Genova

Title: Engineering Technical Specialist III

Summary:

Company Witness Chloe A. Genova sponsors those portions 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 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.
- Section 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 Genova co-sponsors the following portions of the Appendix:

- Section I.A (co-sponsored with Company Witnesses Samuel L. Carter, Mohammad O. Othman, Hannah Hurst, and Matt L. Teichert): This section details the primary justifications for the proposed Project.
- Section I.I (co-sponsored with Company Witness Mohammad O. Othman): This section provides the estimated total cost of the proposed Project.
- Section I.L (co-sponsored with Company Witness Mohammad O. Othman): 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 Hannah Hurst): These sections, when applicable, provide supporting structure details along the proposed and alternative routes.
- Section II.B.6 (co-sponsored with Company Witnesses Hannah Hurst and Matt L. Teichert): This section provides photographs of existing facilities, representations of proposed facilities, and visual simulations.
- Section V.A (co-sponsored with Company Witnesses Hannah Hurst and Matt L. Teichert): This section provides the proposed route description and structure heights for notice purposes.

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

DIRECT TESTIMONY
OF
CHLOE A. GENOVA
ON BEHALF OF
VIRGINIA ELECTRIC AND POWER COMPANY
BEFORE THE
STATE CORPORATION COMMISSION OF VIRGINIA
CASE NO. PUR-2025-00014

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

A. My name is Chloe A. Genova, and I am an Engineering Technical Specialist III in the Electric Transmission Line Engineering Department of the Company. My business address is 5000 Dominion Boulevard, 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 Old Dominion Electric Cooperative ("ODEC") on behalf of Mecklenburg Electric Cooperative ("MEC" or the "Customer") for MEC to provide service to its data center customer in Mecklenburg County, Virginia; to relieve identified violations of mandatory North American Electric Reliability Corporation ("NERC") Reliability Standards; and to maintain the structural integrity and reliability of the transmission system, Dominion Energy Virginia proposes in Mecklenburg County, Virginia, to:

(i) Construct a new overhead single circuit 230 kilovolt ("kV") transmission

line from the Company's future Raines Substation to a proposed switching station, resulting in 230 kV Nebula-Raines Line #2399 (or "Nebula-Raines Line"). Specifically, Line #2399 will extend approximately 14.4 miles within a new 100-foot-wide right-of-way, supported by weathering steel double circuit monopoles with an idle conductor, and utilizing three-phase twin-bundled 768.2 Aluminum Conductor Steel Supported/Trapezoidal Wire/High Strength ("ACSS/TW/HS") conductor with a summer transfer capability of 1,573 MVA.

(ii) Construct a new 230 kV switching station in Mecklenburg, County, Virginia on property owned by the Customer (the "Nebula Switching Station" or "Nebula Station").

(iii) Construct a new overhead single circuit 230 kV transmission line from the Company's existing 230-115 kV Cloud Switching Station to the proposed 230 kV Nebula Station, resulting in 230 kV Cloud-Nebula Line #2402 (or "Cloud-Nebula Line"). Specifically, Line #2402 will extend approximately 0.9 mile within a new 100-foot-wide right-of-way, supported by weathering steel double circuit monopoles with an idle conductor, and utilizing three-phase twin-bundled 768.2 ACSS/TW/HS conductor with a summer transfer capability of 1,573 MVA.

(iv) Perform minor station-related work at the future Raines Substation and the existing Cloud Switching Station.

The Nebula-Raines Line, the Nebula Switching Station, the Cloud-Nebula Line, and station-related work are collectively referred to as the "Cloud-Nebula-Raines Transmission Project" or "Project."

The Project is needed to ensure that Dominion Energy Virginia can provide service requested by MEC to serve its data center customer in Mecklenburg County, Virginia; and to relieve identified violations of mandatory NERC Reliability Standards in order to maintain reliable electric service to customers in the load area, which, for purposes of this Application, extends generally east from the Town of Boydton, Virginia (the "Boydton Load Area") and also includes the load area surrounding the Company's existing South Hill Substation, inclusive of the Town of South Hill in Mecklenburg County, Virginia (the "South Hill Load Area").

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 levels. I sponsor 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 Sections I.A with Company Witnesses Samuel L. Carter, Mohammad O. Othman, Hannah Hurst, and Matt L. Teichert; Section I.I with Company Witness Mohammad O. Othman; Section I.L with Company Witness Samuel L. Carter; Sections II.B.3 to II.B.5 with Company Witness Hannah Hurst; Section II.B.6 and V.A with Company Witnesses Hannah Hurst and Matt L. Teichert.

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

A. Yes, it does.

APPENDIX A

BACKGROUND AND QUALIFICATIONS
OF
CHLOE A. GENOVA

Chloe A. Genova received a Bachelor of Science degree in Civil Engineering Technology from the Pennsylvania College of Technology in 2018. She currently possesses an Engineer-in-Training certification in Virginia. She worked as a contractor for Dominion Energy for three years before being hired as a full-time employee in July 2021. Ms. Genova's experience with the Company includes Overhead Electric Transmission Line Design (July 2018-Present).

Ms. Genova has previously submitted pre-filed testimony to the State Corporation Commission of Virginia.

WITNESS DIRECT TESTIMONY SUMMARY

Witness: Mohammad M. Othman

Title: Engineer III – Substation Engineering

Summary:

Company Witness Mohammad M. Othman 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 Samuel L. Carter, Chloe A. Genova, Hannah Hurst, and Matt L. Teichert): This section details the primary justifications for the proposed Project.

- Section I.I (co-sponsored with Company Witness Chloe A. Genova): This section provides the estimated total cost of the proposed Project.

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

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

DIRECT TESTIMONY
OF
MOHAMMAD O. OTHMAN
ON BEHALF OF
VIRGINIA ELECTRIC AND POWER COMPANY
BEFORE THE
STATE CORPORATION COMMISSION OF VIRGINIA
CASE NO. PUR-2025-00014

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

A. My name is Mohammad O. Othman. I am an Engineer III in the Substation Engineering section of the Electric Transmission group with 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. Please describe your areas of responsibility with the Company.

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 Old Dominion Electric Cooperative ("ODEC") on behalf of Mecklenburg Electric Cooperative ("MEC" or the "Customer") for MEC to provide service to its data center customer in Mecklenburg County, Virginia; to relieve identified violations of mandatory North American Electric Reliability Corporation ("NERC") Reliability Standards; and to maintain the structural integrity and reliability of the transmission system, Dominion Energy Virginia proposes in Mecklenburg County, Virginia, to:

(i) Construct a new overhead single circuit 230 kilovolt ("kV") transmission line from the Company's future Raines Substation to a proposed switching station, resulting in 230 kV Nebula-Raines Line #2399 (or "Nebula-Raines Line"). Specifically, Line #2399 will extend approximately 14.4 miles within a new 100-foot-wide right-of-way, supported by weathering steel double circuit monopoles with an idle conductor, and utilizing three-phase twin-bundled 768.2 Aluminum Conductor Steel Supported/Trapezoidal Wire/High Strength ("ACSS/TW/HS") conductor with a summer transfer capability of 1,573 MVA.

(ii) Construct a new 230 kV switching station in Mecklenburg, County, Virginia on property owned by the Customer (the "Nebula Switching Station" or "Nebula Station").

(iii) Construct a new overhead single circuit 230 kV transmission line from the Company's existing 230-115 kV Cloud Switching Station to the proposed 230 kV Nebula Station, resulting in 230 kV Cloud-Nebula Line #2402 (or "Cloud-Nebula Line"). Specifically, Line #2402 will extend approximately 0.9 mile within a new 100-foot-wide right-of-way, supported by weathering steel double circuit monopoles with an idle conductor, and utilizing three-phase twin-bundled 768.2 ACSS/TW/HS conductor with a summer transfer capability of 1,573 MVA.

(iv) Perform minor station-related work at the future Raines Substation and the existing Cloud Switching Station.

The Nebula-Raines Line, the Nebula Switching Station, the Cloud-Nebula Line, and station-related work are collectively referred to as the "Cloud-Nebula-Raines Transmission Project" or "Project."

The Project is needed to ensure that Dominion Energy Virginia can provide service requested by MEC to serve its data center customer in Mecklenburg County, Virginia; and to relieve identified violations of mandatory NERC Reliability Standards in order to maintain reliable electric service to customers in the load area, which, for purposes of this Application, extends generally east from the Town of Boydton, Virginia (the "Boydton Load Area") and also includes the load area surrounding the Company's existing South Hill Substation, inclusive of the Town of South Hill in Mecklenburg County, Virginia (the "South Hill Load Area").

The purpose of my testimony, which I am submitting on behalf of Dominion Energy Virginia, is to describe the 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 Samuel L. Carter, Chloe A. Genova, Hannah Hurst, and Matt L. Teichert; and Section I.I of the Appendix with Company Witness Chloe A. Genova.

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

A. Yes, it does.

APPENDIX A

BACKGROUND AND QUALIFICATIONS OF MOHAMMAD M. OTHMAN

Mohammad M. Othman received a Bachelor of Science degree in Electrical Engineering from Virginia Commonwealth University in 2008. Mr. Othman's responsibilities include the evaluation of the substation project requirements, development of scope documents and schedules, preparation of estimates and proposals, preparation of specifications and bid documents, material procurement, design substation physical layout, development of detailed physical drawings, bill of materials, electrical schematics and wiring diagrams. Mr. Othman joined the Dominion Energy Virginia Substation Engineering department in 2010 as an Engineer II and was later promoted to Engineer III, the title he currently holds.

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

WITNESS DIRECT TESTIMONY SUMMARY

Witness: Hannah Hurst
Title: Senior Siting and Permitting Specialist
Summary:

Company Witness Hannah Hurst will sponsor those portions 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, Ms. Hurst co-sponsors the following section of the Appendix:

- Section I.A (co-sponsored with Company Witnesses Samuel L. Carter, Chloe A. Genova, Mohammad O. Othman, and Matt L. Teichert): This section details the primary justifications for the proposed Project.
- Section II.A.1 (co-sponsored with Company Witness Matt L. Teichert): 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 Matt L. Teichert): 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.3 (co-sponsored with Company Witness Matt L. Teichert): This section provides color maps of existing or proposed rights-of-way in the vicinity of the proposed Project.
- Section II.A.4 (co-sponsored with Company Witness Matt L. Teichert): 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 Matt L. Teichert): These sections provide detail regarding the right-of-way for the proposed Project.
- Section II.A.9 (co-sponsored with Company Witness Matt L. Teichert): This section describes the proposed route selection procedures and details alternative routes considered.
- Section II.A.11 (co-sponsored with Company Witness Matt L. Teichert): 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 Chloe A. Genova): These sections, when applicable, provide supporting structure details along the proposed and alternative routes.
- Section II.B.6 (co-sponsored with Company Witnesses Chloe A. Genova and Matt L. Teichert): This section provides photographs of existing facilities, representations of proposed facilities, and visual simulations.
- Section III (co-sponsored with Company Witness Matt L. Teichert): This section details the impact of the proposed project on scenic, environmental, and historic features.
- Section V.A (co-sponsored with Company Witnesses Chloe A. Genova and Matt L. Teichert): This section provides the proposed route description and structure heights for notice purposes.

Finally, Ms. Hurst co-sponsors the DEQ Supplement filed with the Application with Company Witness Matt L. Teichert. A statement of Ms. Hurst's background and qualifications is attached to her testimony as Appendix A.

DIRECT TESTIMONY
OF
HANNAH HURST
ON BEHALF OF
VIRGINIA ELECTRIC AND POWER COMPANY
BEFORE THE
STATE CORPORATION COMMISSION OF VIRGINIA
CASE NO. PUR-2025-00014

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

A. My name is Hannah Hurst, and I am a Senior Siting and Permitting Specialist for the Company. My business address is 5000 Dominion Boulevard, 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 any non-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 Old Dominion Electric Cooperative ("ODEC") on behalf of Mecklenburg Electric Cooperative ("MEC" or the "Customer") for MEC to provide service to its data center customer in Mecklenburg County, Virginia; to relieve identified violations of mandatory North American Electric Reliability Corporation ("NERC") Reliability Standards; and to maintain the structural integrity and reliability of

the transmission system, Dominion Energy Virginia proposes in Mecklenburg County, Virginia, to:

(i) Construct a new overhead single circuit 230 kilovolt ("kV") transmission line from the Company's future Raines Substation to a proposed switching station, resulting in 230 kV Nebula-Raines Line #2399 (or "Nebula-Raines Line"). Specifically, Line #2399 will extend approximately 14.4 miles within a new 100-foot-wide right-of-way, supported by weathering steel double circuit monopoles with an idle conductor, and utilizing three-phase twin-bundled 768.2 Aluminum Conductor Steel Supported/Trapezoidal Wire/High Strength ("ACSS/TW/HS") conductor with a summer transfer capability of 1,573 MVA.

(ii) Construct a new 230 kV switching station in Mecklenburg, County, Virginia on property owned by the Customer (the "Nebula Switching Station" or "Nebula Station").

(iii) Construct a new overhead single circuit 230 kV transmission line from the Company's existing 230-115 kV Cloud Switching Station to the proposed 230 kV Nebula Station, resulting in 230 kV Cloud-Nebula Line #2402 (or "Cloud-Nebula Line"). Specifically, Line #2402 will extend approximately 0.9 mile within a new 100-foot-wide right-of-way, supported by weathering steel double circuit monopoles with an idle conductor, and utilizing three-phase twin-bundled 768.2 ACSS/TW/HS conductor with a summer transfer capability of 1,573 MVA.

(iv) Perform minor station-related work at the future Raines Substation and the existing Cloud Switching Station.

The Nebula-Raines Line, the Nebula Switching Station, the Cloud-Nebula Line, and station-related work are collectively referred to as the "Cloud-Nebula-Raines Transmission Project" or "Project."

The Project is needed to ensure that Dominion Energy Virginia can provide service requested by MEC to serve its data center customer in Mecklenburg County, Virginia; and to relieve identified violations of mandatory NERC Reliability Standards in order to maintain reliable electric service to customers in the load area, which, for purposes of this Application, extends generally east from the Town of Boydton, Virginia (the "Boydton Load Area") and also includes the load area surrounding the Company's existing South

Hill Substation, inclusive of the Town of South Hill in Mecklenburg County, Virginia (the "South Hill Load Area").

The purpose of my testimony is to provide an overview of the route and permitting for the proposed Project. I sponsor Sections II.A.11 and V.B to V.D of the Appendix. Additionally, I co-sponsor the Executive Summary and Section I.A with Company Witnesses Samuel L. Carter, Chloe A. Genova, Mohammad O. Othman, and Matt L. Teichert; Sections II.A.1, II.A.2, II.A.3, II.A.4, II.A.6 to II.A.9, II.A.11, and III with Company Witness Matt L. Teichert; Sections II.B.3 to II.B.5 with Company Witness Chloe A. Genova; and Sections II.B.6 and V.A with Company Witnesses Chloe A. Genova and Matt L. Teichert. Finally, I co-sponsor the DEQ Supplement with Company Witness Matt L. Teichert.

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

A. Yes. In accordance with Va. Code § 15.2-2202 E, a letter dated November 6, 2024, was delivered to Mr. Alex Gottschalk, County Administrator of Mecklenburg County, Virginia, where the Project is located. The letter stated the Company's intention to file this Application and invited the County to consult with the Company about the proposed Project. A copy of this letter is included as Attachment V.D.1 to the Appendix.

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

A. Yes, it does.

APPENDIX A

BACKGROUND AND QUALIFICATIONS
OF
HANNAH HURST

Ms. Hannah Hurst received a bachelor's degree in environmental Horticulture from Virginia Tech Polytechnic Institute in 2016. Ms. Hurst has been employed by the Company since 2022 as a Siting and Permitting Specialist. Prior to joining the Company, she worked as an Environmental Planner for New Kent County working on permitting procedures and inspections. Ms. Hurst's area of expertise are in local zoning, planning, and local environmental permitting.

Ms. Hurst has previously submitted pre-filed testimony to the State Corporation Commission of Virginia.

WITNESS REBUTTAL TESTIMONY SUMMARY

Witness: Matt L. Teichert

Title: Principal Consultant, Environmental Resource Management

Summary:

Company Witness Matt L. Teichert sponsors the Environmental Routing Study provided as part of the Company's Application.

Additionally, Mr. Teichert co-sponsors the following portion of the Appendix:

- Section I.A (co-sponsored with Company Witnesses Samuel L. Carter, Chloe A. Genova, Mohammad M. Othman, and Hannah Hurst): This section details the primary justifications for the proposed Project.
- Section II.A.1 (co-sponsored with Company Witness Hannah Hurst): 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 Hannah Hurst): 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.3 (co-sponsored with Company Witness Hannah Hurst): This section provides color maps of existing or proposed rights-of-way in the vicinity of the proposed Project.
- Section II.A.4 (co-sponsored with Company Witness Hannah Hurst): 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 Hannah Hurst): These sections provide detail regarding the right-of-way for the proposed Project.
- Section II.A.9 (co-sponsored with Company Witness Hannah Hurst): This section describes the proposed route selection procedures and details alternative routes considered.
- Section II.A.11 (co-sponsored with Company Witness Hannah Hurst): 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 Chloe A. Genova and Hannah Hurst): This section provides photographs of existing facilities, representations of proposed facilities, and visual simulations.
- Section III (co-sponsored with Company Witness Hannah Hurst): This section details the impact of the proposed Project on scenic, environmental, and historic features.
- Section V.A (co-sponsored with Company Witnesses Chloe A. Genova and Hannah Hurst): This section provides the proposed route description and structure heights for notice purposes.

Finally, Mr. Teichert co-sponsors the DEQ Supplement filed with this Application with Company Witness Hannah Hurst.

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

DIRECT TESTIMONY
OF
MATT L. TEICHERT
ON BEHALF OF
VIRGINIA ELECTRIC AND POWER COMPANY
BEFORE THE
STATE CORPORATION COMMISSION OF VIRGINIA
CASE NO. PUR-2025-00014

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

A. My name is Matt L. Teichert. I am employed as an Associate 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, ERM served as routing consultant to Dominion Energy Virginia for many projects over the last 15 years, including:

- Cannon Branch-Cloverhill 230 kV transmission line project in the City of Manassas and Prince William County (Case No. PUE-2011-00011);
- Dahlgren 230 kV double circuit transmission line project in King George County (Case No. PUE-2011-00113);
- Surry-Skiffes Creek-Whealton 500 and 230 kV transmission lines (Case No. PUE-2012-00029);
- Remington CT-Warrenton 230 kV double circuit transmission line (Case No. PUE-2014-00025);
- Haymarket 230 kV Line and Substation Project (Case No. PUE-2015-00107);
- Remington-Gordonsville Electric Transmission Project (Case No. PUE-2015-00117);
- Norris Bridge (Case No. PUE-2016-00021);
- Idylwood-Tysons 230 kV single circuit underground transmission line, Tysons Substation rebuild, and related transmission facilities (Case No. PUR-2017-00143);
- Lockridge 230 kV Line Loop and Substation (Case No. PUR-2019-00215);
- Coastal Virginia Offshore Wind Commercial Project (Case No. PUR-2021-00142);
- DTC 230 kV Line Loop and DTC Substation (Case No. PUR-2021-00280);

- Aviator 230 kV Line Loop and Substation (Case. No. PUR-2022-00012);
- Nimbus Substation and 230 Farmwell-Nimbus Transmission Line (Case No. PUR-2022-00027);
- 500-230 kV Wishing Star Substation, 500 kV and 230 kV Mars-Wishing Star Lines, 500-230 kV Mars Substation, and Mars 230 kV Loop (Case No. PUR-2022-00183);
- 500-230 kV Unity Switching Station, 230 kV Tunstall-Unity Lines #2259 and #2262, 230-36.5 kV Tunstall, Evans Creek, Raines Substations, and 230 kV Substation Interconnect Lines (Case No. PUR-2022-00167);
- Butler Farm to Clover 230 kV Line and Butler Farm to Finneywood 230 kV Line (Case No. PUR-2022-00175);
- 230 kV Altair Loop and Altair Switching Station (Case No. PUR-2022-00197);
- 230 kV Finneywood-Jeffress Lines and Jeffress Switching Station Conversion (Case No. PUR-2023-00088);
- 230 kV White Oak Lines and White Oak Substation Expansion (Case No. PUR-2023-00110);
- 230 kV Germanna Lines and Germanna Substation (Case No. PUR-2023-00206); and
- Daves Store 230 kV Line Extension (Case No. PUR 2024-00021).

Most recently, ERM served as the routing consultant for the Company's the Aspen-Golden 500-230 kV Electric Transmission Project, in Case No. PUR-2024-00032; the Apollo-Twin Creeks Electric Transmission Project, in Case No. PUR-2024-00044; the Line #588 Rebuild & Fentress-Yadkin Line #5005, in Case No. PUR-2024-00105; 230 kV Rebuild, Reconductoring, and New Line Projects to Network Takeoff Substation, in Case No. PUR-2024-00131; and Centreport 230 kV Electric Transmission Project, in Case No. PUR-2024-00170.

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 were you asked to do in connection with this case?

A. In order to provide service requested by Old Dominion Electric Cooperative ("ODEC") on behalf of Mecklenburg Electric Cooperative ("MEC" or the "Customer") for MEC to provide service to its data center customer in Mecklenburg County, Virginia; to relieve identified violations of mandatory North American Electric Reliability Corporation ("NERC") Reliability Standards; and to maintain the structural integrity and reliability of the transmission system, Dominion Energy Virginia proposes in Mecklenburg County, Virginia, to:

(i) Construct a new overhead single circuit 230 kilovolt ("kV") transmission line from the Company's future Raines Substation to a proposed switching station, resulting in 230 kV Nebula-Raines Line #2399 (or "Nebula-Raines Line"). Specifically, Line #2399 will extend approximately 14.4 miles within a new 100-foot-wide right-of-way, supported by weathering steel double circuit monopoles with an idle conductor, and utilizing three-phase twin-bundled 768.2 Aluminum Conductor Steel Supported/Trapezoidal Wire/High Strength ("ACSS/TW/HS") conductor with a summer transfer capability of 1,573 MVA.

(ii) Construct a new 230 kV switching station in Mecklenburg, County, Virginia on property owned by the Customer (the "Nebula Switching Station" or "Nebula Station").

(iii) Construct a new overhead single circuit 230 kV transmission line from the Company's existing 230-115 kV Cloud Switching Station to the proposed 230 kV Nebula Station, resulting in 230 kV Cloud-Nebula Line #2402 (or "Cloud-Nebula Line"). Specifically, Line #2402 will extend approximately 0.9 mile within a new 100-foot-wide right-of-way, supported by weathering steel double circuit monopoles with an idle conductor, and utilizing three-phase twin-bundled 768.2 ACSS/TW/HS conductor with a summer transfer capability of 1,573 MVA.

(iv) Perform minor station-related work at the future Raines Substation and the existing Cloud Switching Station.

The kV Nebula-Raines Line, the Nebula Switching Station, the Cloud-Nebula Line, and station-related work are collectively referred to as the "Cloud-Nebula-Raines Transmission Project" or "Project."

The Project is needed to ensure that Dominion Energy Virginia can provide service requested by MEC to serve its data center customer in Mecklenburg County, Virginia; and to relieve identified violations of mandatory NERC Reliability Standards in order to maintain reliable electric service to customers in the load area, which, for purposes of this Application, extends generally east from the Town of Boydton, Virginia (the "Boydton Load Area") and also includes the load area surrounding the Company's existing South Hill Substation, inclusive of the Town of South Hill in Mecklenburg County, Virginia (the "South Hill Load Area").

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 Samuel L. Carter, Chloe A. Genova, Mohammad O. Othman, and Hannah Hurst; Sections II.A.1, II.A.2, II.A.3, II.A.4, II.A.6 to II.A.9, II.A.11, and III with Company Witness Hanna Hurst; and Sections II.B.6 and V.A with Company Witnesses Chloe A. Genova and Hannah Hurst. Lastly, I co-sponsor the DEQ Supplement with Company Witness Hannah Hurst.

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

A. Yes, it does.

APPENDIX A

BACKGROUND AND QUALIFICATIONS OF MATT L. TEICHERT

Matt L. Teichert earned a Bachelor of Arts degree from University of Minnesota-Duluth. He has approximately 15 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 3 years with Natural Resource Group and 14 years with ERM, a privately-owned consulting company specializing in the siting, licensing and environmental construction compliance of large, multi-state energy transportation facilities.

Mr. Teichert'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 the identification and evaluation of over 75 miles of 230 kV and 500 kV transmission line route alternatives in the Commonwealth for Virginia Electric and Power Company.

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