Dominion Energy®

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

Before the State Corporation Commission of Virginia

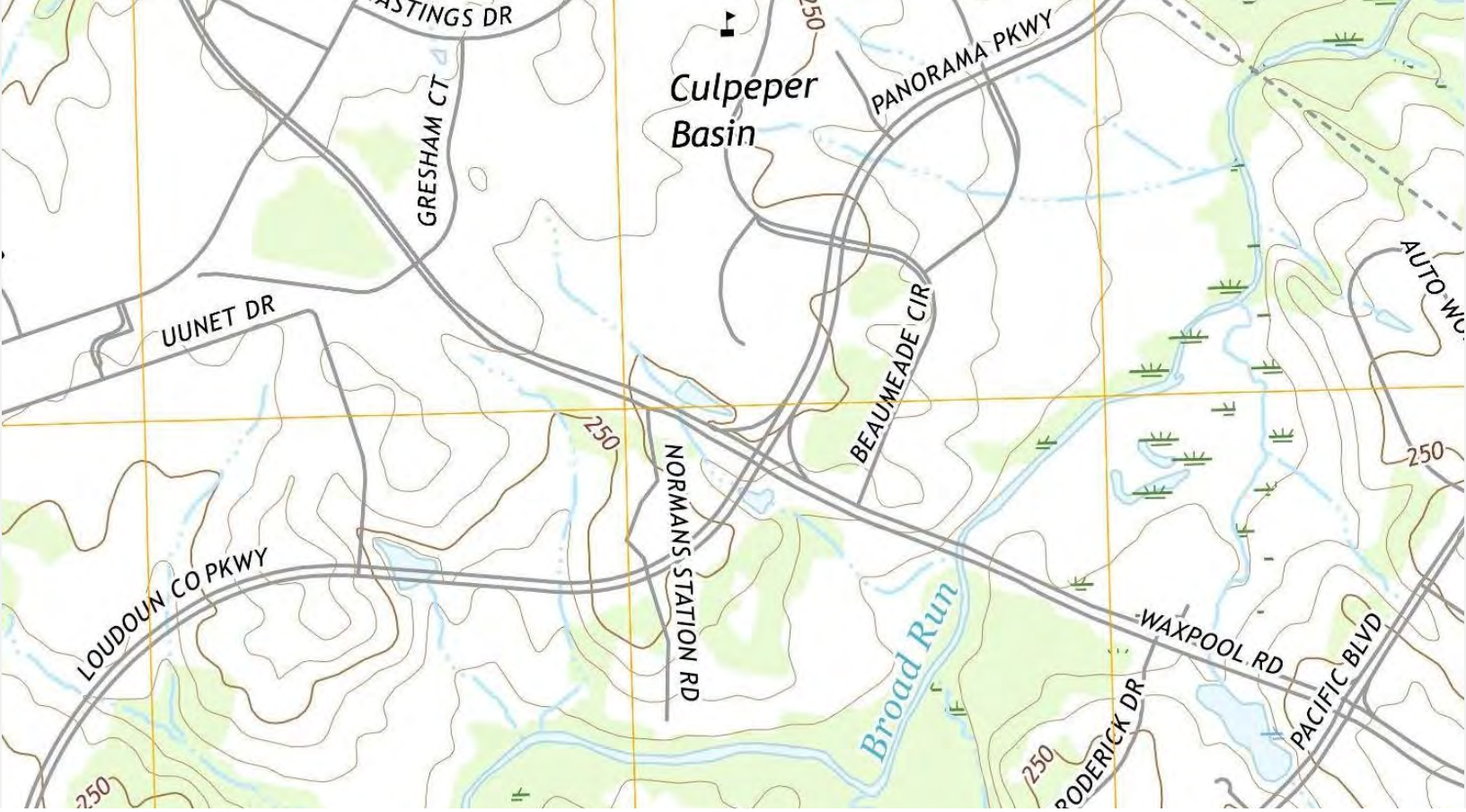
Nimbus 230 kV Line Loop and Nimbus Substation and 230 kV Farmwell-Nimbus Transmission Line

Application No. 314

Case No. PUR-2022-00027

Filed: February 23, 2022

Volume 3 of 3



Dominion Energy®

Environmental Routing Study

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

February 2022

Project No.: 0511487

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ERM

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February 2022

Environmental Routing Study

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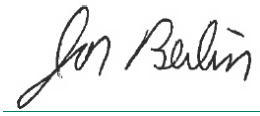

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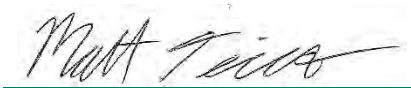

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Acronyms and Abbreviations

Name	Description
ABPP	American Battlefield Protection Program
AMSL	above mean sea level
BOS	Loudoun County Board of Supervisors
CBG	census block group
CCB	Center for Conservation Biology
CFR	Code of Federal Regulations
Company	Virginia Electric and Power Company
CWA	Clean Water Act
D+A	Dutton + Associates, LLC
dB	decibel(s)
Dominion Energy Virginia	Virginia Electric and Power Company
Dominion	Virginia Electric and Power Company
Dulles Airport	Washington Dulles International Airport
EJ	environmental justice
ERM	Environmental Resources Management, Inc.
ESA	Endangered Species Act
FAA	Federal Aviation Administration
GIS	geographic information system
IPaC	Information for Planning and Consultation
KOP	key observation point
kV	kilovolt
NERC	North American Electric Reliability Corporation Reliability
NHD	National Hydrography Dataset
NHDE	Natural Heritage Data Explorer
NHL	National Historic Landmark
NHP	Natural Heritage Program
NRHP	National Register of Historic Places

Name	Description
NWI	National Wetlands Inventory
Project	Nimbus 230 kV Line Loop and Nimbus Substation and 230 kV Farmwell-Nimbus Transmission Line
SCC	State Corporation Commission
SCU	stream conservation unit
TERPS	terminal instrument procedures
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
Va. Code	Code of Virginia
VaFWIS	Virginia Fish and Wildlife Information Service
VCRIS	Virginia Cultural Resource Information System
VDCR	Virginia Department of Conservation and Recreation
VDEQ	Virginia Department of Environmental Quality
VDHR	Virginia Department of Historic Resources
VDHR Guidelines	*Guidelines for Assessing Impacts of Proposed Electric Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia*
VDOT	Virginia Department of Transportation
VDWR	Virginia Department of Wildlife Resources
VOF	Virginia Outdoors Foundation
VSR	visually sensitive resource
W&OD	Washington and Old Dominion

1. INTRODUCTION AND BACKGROUND

This report presents results of the environmental constraint identification and routing study prepared by Environmental Resources Management, Inc. (ERM) on behalf of Virginia Electric and Power Company (herein referred to as Dominion Energy Virginia, Dominion, or the Company) for the proposed Nimbus 230 kilovolt (kV) Line Loop and Nimbus Substation and 230 kV Farmwell-Nimbus Project (Project).

1.1 Project Description

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

- A new double circuit 230 kV transmission line that would cut Dominion's existing Line #2152 at existing structure #2152/19A, east of Loudoun County Parkway and extend to the proposed Nimbus Substation (Nimbus Line Loop). This Project also includes construction of the proposed Nimbus Substation;
- A new 230 kV single circuit transmission line that would be constructed from the existing Farmwell Substation to the proposed Nimbus Substation (Farmwell-Nimbus Line); and
- Install one 230 kV, 4000A circuit breaker, one 230 kV, 4000A disconnect switch and line terminal equipment at the Company's existing Farmwell Substation for one 230 kV transmission line. Additionally, the Project will require relay resets, drawing updates, and field support, as necessary, at the Company's existing Buttermilk and Beaumeade Substations Collectively, the Nimbus Line Loop and Substation, the Farmwell-Nimbus Line, and related substation work comprise the Project. The Project is necessary to assure that Dominion Energy Virginia can maintain and improve reliable electric service to customers in the load area, in compliance with mandatory NERC Reliability Standards.

In developing the Project, the Company considered the facilities required to construct and operate the Project; the length of new rights-of-way that would be required; the amount of existing development in each area; the potential for environmental impacts on communities; and the relative cost of the Project. As discussed in more detail below, ERM reviewed the routing options for the Nimbus Line Loop and the Farmwell-Nimbus Line and ultimately determined that there was one preferred route for each of the two transmission lines associated with the Project.

1.2 Objectives of the Study

The Company requested ERM 's services to define a study area for routing of the Project, collect information on routing constraints and opportunities within the study area, identify and compare alternative transmission line routes, and document the routing efforts. ERM's scope of work for this effort consisted of the following activities:

- Define and describe a study area based on the Company's transmission and service needs;
- Gather information regarding constraints and opportunities to be considered as part of the routing process;
- Identify and map routing constraints and opportunities within the study area;

- Identify buildable potential routes for transmission line segments that meets the siting criteria provided in the Code of Virginia (Va. Code) and included in the Virginia State Corporation Commission's (SCC) minimum filing guidelines for transmission projects;
- Compare the potential routes based on an analysis of environmental impacts and utilization of routing opportunities; and
- Recommend a preferred route(s).

2. METHODOLOGY

A study area was identified that encompassed the area around and between Dominion's existing Waxpool Substation to the west and Dominion's existing Line #2152 to the east. Figures 2.0-1 and 2.0-2 in Appendix A depict the study area boundary, existing Farmwell Substation, proposed Nimbus Substation, Dominion's existing transmission lines, and roads in the vicinity of the Project. The study area encompasses an approximately 3-square-mile area that lies within the heavily developed part of Loudoun County north of Dulles Airport known as "Data Center Alley." The study area includes mixed-use, commercial, and data center developments.

Once the study area was defined, ERM identified and mapped existing land use; planned developments; and environmental, visual, and cultural features within the study area. To complete the initial study, the routing team obtained, reviewed, and utilized the following data sources:

- Loudoun County open geographic information system (GIS) datasets online portal;
- Virginia Department of Transportation (VDOT) projects and studies database;
- National Conservation Easement database;
- Virginia Department of Conservation and Recreation (VDCR) Virginia conservation lands database;
- Virginia Department of Historic Resources (VDHR) Virginia Cultural Resource Information System (VCRIS); and
- Current Aerial imagery taken in May 2021.

Sensitive environmental or constructability-related features were defined as routing constraints. ERM also identified existing electric transmission and distribution lines, pipelines, roads, and other existing rights--of--way within the study area. These features were defined as routing opportunities. ERM then layered the routing opportunities over the constraints in a GIS to identify preliminary routes.

Subsequently, a more sophisticated route selection process was completed. ERM refined the preliminary routes, taking into account potential impacts on environmental resources and utilization of routing opportunities. To the extent practicable, ERM identified routes that both avoid constraints and utilize routing opportunities, where appropriate. ERM conducted an analysis using GIS to quantify potential impacts associated with constraints and the use of opportunities for each route. Crossings of sensitive features were measured and tabulated to facilitate route comparisons. Other factors, such as visual and construction-related impacts, were assessed based on ERM's experience in electric transmission route selection.

After collecting, mapping, and evaluating constraint information within the study area, Dominion Energy Virginia and ERM identified potential routes and then evaluated and compared the routes.

Following a preliminary quantitative assessment of routes, Dominion Energy Virginia engaged the public, including potentially affected landowners; elected officials; and regulatory, planning, and land-managing agencies to gather feedback on the various routes. Some of this feedback resulted in adjustments to optimize the potential routes and, in certain cases, helped to inform the Company's decision to reject a particular route. Routes for the Nimbus Line Loop and the Farmwell-Nimbus Line-were then identified. The process considered both the sensitivity and extent of the constraints affected relative to each route.

2.1 Study Area

As a first step in identifying potential transmission line routes, ERM (as directed by Dominion Energy Virginia) defined a geographic study area for the Project based on Dominion Energy Virginia's electric transmission and service needs as described above. Generally, the study area was defined to encompass the fixed beginning and ending points for the proposed facilities, as well as an area broad enough to allow for the identification of reasonable route alternatives meeting the Project's objectives. Additionally, and to the extent practicable, the study area limits were defined by reference to easily distinguished features, such as roads or other linear features.

The Project study area is rectangular in shape and lies within the heavily developed part of Loudoun County north of Dulles Airport known as "Data Center Alley." The study area's western boundary begins approximately 0.8 mile west of the existing Farmwell Substation and extends south for about 1.5 miles. The southern boundary is located approximately 0.1 mile south of Dominion's Greenway Substation. From west to east, the southern boundary extends approximately 2.0 miles to the eastern boundary. The eastern boundary is located approximately 0.4 mile east of the proposed cut-in location on Line #2152. The eastern boundary traverses through the 1757 Golf Club property. From south to north, the eastern boundary extends approximately 1.5 miles to the northern boundary. The northern boundary is located 0.1 mile south of Dominion's existing Nivo Substation. Figures 2.0-1 and 2.0-2 in Appendix A show the study area.

2.2 Inventory of Constraints and Opportunities

There are a number of environmental features and routing constraints present in the Project study area. The following list highlights the major constraints and routing opportunities that affect transmission line routing in the Project study area; these categories (along with other constraints) are described in more detail within Section 3:

- Existing and planned developments;
- VDOT rights-of-way;
- Dominion's existing transmission infrastructure; and
- Recently approved and planted visual vegetated screening buffers.

2.3 Route Identification

After developing the study area, ERM identified multiple preliminary route alternatives that could meet the Project's objectives. Given the amount of planned development in the general area, ERM focused on developing routes that follow existing roadways, transportation, and utility corridors within the study area. Subsequent to identification of those preliminary routes, ERM conducted site visits and began evaluating the routes. The Company also began stakeholder and agency outreach during this time to assist with route evaluation.

As referenced in Section 1.1, two separate transmission lines are required to provide service requested by the Customer, maintain reliable service for the overall growth in the area, and comply with mandatory NERC Reliability Standards. These two transmission lines are referred to as the Nimbus Line Loop and Farmwell-Nimbus Line.

The Nimbus Line Loop would require a double circuit 230 kV transmission line from the existing Line #2152 located east of Loudoun County Parkway to the proposed Nimbus Substation. Multiple potential routes were identified for the Nimbus Line Loop. However, only one route was deemed feasible and least impacting. The remaining routes were rejected from further consideration for the reasons discussed in Section 2.5.

The Farmwell-Nimbus Line would require a single circuit 230 kV transmission line from the existing Farmwell Substation to the proposed Nimbus Substation. Due to heavy development in the area, the route developed for the Farmwell-Nimbus Line represented the shortest and most direct route option to connect the existing Farmwell Substation and the proposed Nimbus Substation. No other potential routes were identified for the Farmwell-Nimbus Line.

Section 3 describes the various resources found along each of the proposed routes for each Project section. Section 4 discusses how the proposed routes could impact those resources. Finally, Section 5 presents the conclusions and recommendations.

2.4 Proposed Route Alternatives

2.4.1 Nimbus Line Loop

The Nimbus Line Loop would involve the construction of an overhead double circuit 230 kV line from a cut-in located on existing Line #2152, at structure #2152/19A, to the proposed Nimbus Substation. The length of the route is approximately 0.61 mile. The route begins at the cut-in location on Line #2152, which is located along the south side of Waxpool Road. The route then continues west along the south side of Waxpool Road, crossing over Loudoun County Parkway, for a distance of 3,225 linear feet. The route then turns south for a distance of 20 feet and terminates at the proposed Nimbus Substation.

2.4.2 Farmwell-Nimbus Line

The Farmwell-Nimbus Line would involve the construction of an overhead single circuit 230 kV line from the existing Farmwell Substation to the proposed Nimbus Substation. The length of the route is approximately 0.26 mile. Beginning at the Farmwell Substation, the route exits the eastern side of the substation then turns to the southeast and extends parallel to the Digital Realty ACC9 Data Center building for approximately 450 feet. The route then turns to the northeast across a parking area for approximately 430 feet. Upon exiting the parking area, the route next turns southeast and parallels Waxpool Road for approximately 510 feet. The route then turns south and enters into the proposed Nimbus Substation.

2.5 Routes Rejected from Further Consideration

The Company investigated and subsequently rejected four additional route alternatives associated with the Nimbus Line Loop (Alternative Routes 2, 3, 4, and 5). Figure 2.5-1 in Appendix A depicts these route alternatives. Because the route of the Farmwell-Nimbus Line represents the shortest and most direct route option to connect the existing Farmwell Substation and the proposed Nimbus Substation, the Company did not consider any alternative routes for the Farmwell-Nimbus Line. The four routes that were considered, but rejected, for the Nimbus Line Loop are discussed below.

Nimbus Line Loop Alternative Route 2

This route alternative originates at a cut-in on Line #2152 positioned on the north side of Waxpool Road. The route then extends west along the north side of Waxpool Road, crossing Loudoun County Parkway, for a distance of approximately 3,150 feet. At a point near the west side of the Embassy Suites property, the route then turns south, crosses over Waxpool Road, and enters into the proposed Nimbus Substation. This route is approximately 0.65 mile in total length.

Alternative Route 2 was primarily rejected due to the impacts the route would create on the five commercial properties along the north side of Waxpool Road. All the landscaping fronting the commercial properties along the north side of Waxpool Road would need to be removed to construct the route, including the recently planted landscape buffer associated with the Equinix DC21 Data Center located in

the northeast corner of the intersection of Loudoun County Parkway and Waxpool Road. The removal of this landscaping along Waxpool Road would have a significant visual impact on the surrounding area. In addition, the placement of the transmission structures in the parking areas associated with the Ashburn Eats strip mall and Embassy Suites hotel would result in a loss of parking for these businesses.

Nimbus Line Loop Alternative Route 3

This route option originates at a cut-in on Line #2152 on the north side of Waxpool Road and extends west for a distance of approximately 1,520 feet along the north side of Waxpool Road, crossing Loudoun County Parkway. At this point, the route then turns to the southwest and makes a diagonal crossing of Waxpool Road. The route parallels the south side of Waxpool Road for a distance of approximately 1,500 feet and then turns south to enter into the proposed Nimbus Substation. This route is approximately 0.63 mile in total length.

Alternative Route 3 was rejected because it would require a non-perpendicular crossing of Waxpool Road. A non-perpendicular crossing was developed at this location to avoid crossing a large stormwater pond on the north side of Waxpool Road in front of a medical office building and impacting a newly landscaped berm on the south side of Waxpool Road in the southwest corner of the intersection of Waxpool Road and Loudoun County Parkway. Based on discussions with Loudoun County Planning and Zoning staff, the Company understands that the county would not support a non-perpendicular crossing of Waxpool Road at this location. In addition, Waxpool Road is a non-limited access highway managed by VDOT. VDOT does not allow non-perpendicular crossings of non-limited access highways (24 Va Code 30-151-330 (1). Moreover, construction of this route would require the removal of the recently planted landscape buffer associated with the Equinix DC21 Data Center located to the northeast of Loudoun County Parkway, where it intersects with Waxpool Road.

Nimbus Line Loop Alternative Route 4

This route option originates at a cut-in on Line #2152 at the same location as the proposed route alternative of the Nimbus Line Loop. It extends west for 0.2 mile along the south side of Waxpool Road to the intersection of Waxpool Road and Loudoun County Parkway. At this point, the route turns south and parallels Loudoun Parkway along the east/south side of the road for a distance of 0.56 mile. The route also parallels Lines #2152/#2149 for approximately 0.26 mile at the west end of this segment of the route. The route then turns north crossing Loudoun County Parkway, where it then parallels the east side of Uunet Drive and the Lines #2203/#2149 right-of-way for a distance of 0.16 mile until it reaches the northern end of Cumulus Substation. The route then turns northwest for a distance of 0.14 mile, crossing over the north end of Cumulus Substation and enters into the proposed Nimbus Substation. This route is approximately 1.07 miles in total length.

Alternative Route 4 was rejected for several reasons. There is not enough space to expand the existing right-of-way for Lines #2203/#2149 along the southern side of Loudoun County Parkway to the north without significantly overlapping the right-of-way for Loudoun County Parkway. In addition, there is not adequate space to expand the existing right-of-way for Lines #2203/#2149 along Uunet Drive to the west to accommodate another double circuit 230 kV line, nor is there adequate space for a new 100-foot-wide right-of-way for the Nimbus Line Loop between the northern boundary of Cumulus Substation and the southern boundary of the Digital Realty ACC10 Data Center building to the north of the substation. Finally, construction of this route would require the removal of 0.56 mile of the landscape buffer for the Digital Realty Building P Data Center building on the south side of Loudoun County Parkway.

Nimbus Line Loop Alternative Route 5

This route option originates at a cut-in on Line #2152 at the same location as the proposed route alternative of the Nimbus Line Loop. The route then extends southwest and parallels the south side of Lines #2152/#2170 and Lines #2203/#2214 for a distance of 0.43 mile to the south of Buttermilk Substation. The route then turns northeast, crosses over Lines #2149/#2214, parallels Lines #2203/#2149, and then crosses over these lines for a distance of 0.17 mile to where it intersects with Loudoun County Parkway. The route then continues along the south side of Loudoun County Parkway following Lines #2203/#2149 for approximately 0.25 mile. The route then turns north crossing over Loudoun County Parkway to continue adjacent to the east side of Uunet Drive, as well as the east side of Lines #2203/#2149 for a distance of 0.16 mile until it reaches the northern end of Cumulus Substation. The route then turns northwest for a distance of 0.15 crossing over the north end of Cumulus Substation and enters into the proposed Nimbus Substation. The total route length is approximately 1.16 miles.

Alternative Route 5 was rejected for several reasons. As with Alternative Route 4, there is not enough space to expand the existing right-of-way for Lines #2203/#2149 along the southern side of Loudoun County Parkway to the north without significantly overlapping the right-of-way for Loudoun County Parkway. In addition, as also an issue for Alternative Route 4, there is not adequate space to expand the existing right-of-way for Lines #2203/#2149 along Uunet Drive to the west to accommodate another double circuit 230 kV line, nor is there adequate space for a new 100-foot-wide right-of-way for the Nimbus Line Loop between the northern boundary of Cumulus Substation and the southern boundary of the Digital Realty ACC10 Data Center building to the north of the substation. Finally, the segment of this route between the cut-in on Line #2152 and Loudoun County Parkway requires two crossovers of Dominion's existing transmission lines. There is not sufficient space to expand the rights-of-way for Lines #2152/#2170 to the north due to the presence of the Buttermilk Substation and Lines #2203/#2149 to the east due to presence of the Digital Realty Building P Data Center building to accommodate an additional 230 kV line.

2.6 Structure Types and Right-Of-Way Widths

For the Nimbus Line Loop, Dominion would use double circuit mono-pole structures constructed of weathering steel. Structures would range in height from approximately 120 to 140 feet, based on preliminary conceptual design, not including foundation reveal. The required right-of-way width would be 100 feet.

For the Farmwell-Nimbus Line, Dominion would use single circuit mono-pole structures constructed of weathering steel. Structures would be approximately 110 feet in height, based on preliminary conceptual design, not including foundation reveal. The required right-of-way width would be 80 feet.

2.7 Construction, Operation, and Maintenance Process

Construction of new overhead transmission lines may involve some or all of the steps listed below:

- Detailed survey of the route alignment;
- Right-of-way acquisition and clearing;
- Construction of access roads, where necessary;
- Installation of tower foundations;
- Assembly and erection of new structures and/or removal of existing structures;
- Stringing and tensioning of the conductors; and
- Final clean-up and land restoration.

All appropriate materials for the 230 kV structures for the Project would be delivered and assembled at each structure location in the right-of-way. Detailed foundation design would not be completed until prior to construction; however, depending on soil conditions, the foundation design could include poured concrete that requires excavation or steel piles or caissons that might be vibrated, drilled, or driven into place. Structures would be erected with a crane and anchored to the foundation during final assembly. If there is excess soil from foundation construction, it would be evenly distributed at each structure and the soil replanted and stabilized. In wetland areas, excess soil would be removed and evenly distributed on an upland site within Dominion's right-of-way. Typical construction equipment may include hole diggers or drilling equipment, cranes, wire-stringing rigs, tensioners, backhoes, and trucks.

All conductors and shield wires would be strung under tension. This system involves stringing a lead line between structures for the conductors and ground wires. The rope pulls a steel cable that is connected to the conductors and shield wires, which are pulled through neoprene stringing blocks to protect the conductor and shield wire from damage. Stringing the conductors and shield wires under tension protects the wires from possible damage should they be allowed to touch the ground, fences, or other objects.

Maintaining the right-of-way under the transmission lines is essential for reliable operation of the line, as well as public safety. Operation and maintenance of the line would consist of periodic inspections of the line and the right-of-way; occasional replacement of hardware as necessary; periodic clearing of vegetation, either mechanically or by selective, low-volume application of approved herbicides within the corridor; and the cutting of danger trees outside the right-of-way. Danger trees are trees outside the cleared corridor that are sufficiently tall enough to fall into the right-of-way and potentially impact the transmission line. Periodic inspections would utilize both aerial and walking patrols. Normal operation and maintenance would require only infrequent visits by Dominion Energy Virginia or its contractors.

Most maintenance activities consist of selective, low-volume herbicide applications targeting invasive species in the right-of-way every 3 to 5 years and the cutting of danger trees every 3 years. Dominion only uses herbicides that are approved by the U.S. Environmental Protection Agency on power line rights--of-way.

3. INVENTORY OF EXISTING CONDITIONS

After defining the study area, ERM developed a list of routing criteria to help guide the routing process and provide a basis for comparing potential routes (see Table 3-1). The routing criteria includes routing constraints (e.g., sensitive environmental resources and existing and planned developments) and routing opportunities (e.g., existing corridors), as described in more detail in Section 4. ERM inventoried existing conditions, routing constraints, and routing opportunities using information obtained from publicly available GIS databases, agency websites, and databases; published documents, such as county or municipal land use plans; and communication with agency and county staff, stakeholders, and elected officials. In cases where GIS data were not available for a particular environmental resource or other feature, ERM obtained the best available hard-copy or online map and hand digitized the information needed to complete the study.

The existing conditions along the proposed routes are discussed below. Table 3-1 identifies the categories of environmental features considered in the study area. Descriptive information regarding these features within the study area is provided in subsequent sections.

Table 3-1: Environmental Features Considered for Routing

Feature Type	Description
Existing Corridors	
Existing electric facilities	■ Transmission or distribution lines
Other utilities	■ Pipelines
Transportation infrastructure	■ Roads, railroads, and related corridors
Land Ownership	■ Federal, state, and local lands ■ Private lands
Land Uses	
Existing land use and land cover	■ Existing subdivisions ■ Land cover types (e.g., forested, agricultural, developed) ■ Residences, churches, schools, cemeteries
Recreational areas	■ Federal, state, county, or municipal parks ■ Federal-, state-, county- or municipal-managed recreation areas ■ Golf courses ■ Recreation trails (biking, hiking, birding, wildlife)
Land use planning and zoning	■ Zoning districts
Planned developments	■ Planned, proposed, or conceptual residential, commercial, or industrial developments
Conservation lands and easements	■ VOF and VDCR conservation land and easements ■ Loudoun County conservation easements ■ Other conservation lands ■ Wetland mitigation banks ■ Other conservation lands
Transportation	■ Road crossings ■ Railroad crossings ■ Private airport facilities

Feature Type	Description
Natural Resources	
Surface waters	■ Wetlands ■ Waterbodies
Protected or managed areas	■ Resource protection areas ■ Wildlife management areas
Protected species	■ Natural heritage resources ■ Threatened and endangered species ■ Bald eagles
Vegetation	■ Vegetation characteristics ■ Forested land and urban tree canopy
Visual Resources	
Visually sensitive areas	■ Viewsheds to and from visually sensitive areas ■ Scenic rivers ■ Scenic byways
Cultural Resources	
Cultural resource sites	■ Archaeological sites ■ Historical or architectural sites and districts ■ NRHP-listed and eligible properties ■ Battlefields ■ VDHR protected easements
Geological Resources	
Mineral resources	■ Mines or quarries
EJ	
	■ Low-income populations ■ Minority populations ■ Age groups (under age 5 and over age 64) ■ Linguistically isolated communities

EJ = environmental justice; NRHP = National Register of Historic Places; VDCR = Virginia Department of Conservation and Recreation; VDHR = Virginia Department of Historic Resources; VOF = Virginia Outdoors Foundation

3.1 Land Use

3.1.1 Land Ownership

ERM quantified information on land ownership in the study area using publicly available GIS databases and digital parcel data obtained from Loudoun County. These data indicate that all the lands within the study area, with the exception of roadways, are privately owned, with the majority of lands being used as active data centers or for other industrial and commercial uses. The Nimbus Line Loop and Nimbus Substation cross four private parcels, all of which are owned by data centers. The Farmwell-Nimbus Line crosses a total of five private parcels, all of which are owned by data centers or other commercial businesses.

3.1.2 Recreation Areas

ERM reviewed digital data sets and maps, U.S. Geological Survey (USGS) topographic quadrangles, recent (2021) digital aerial photography, and county websites. As discussed below, three existing recreation areas were identified within the study area. Recreation areas within the study area are depicted on Figure 3.1.2-1 in Appendix A and described below.

3.1.2.1 Chick Ford Field and Ryan Bickel Field

The Chick Ford Field and Ryan Bickel Field is a 4.72-acre complex containing two baseball/softball fields, batting cages, a multipurpose paved trail, and a parking lot. This park is adjacent to the Discovery Elementary School and is located 0.7 mile northwest of the Farmwell Substation. Neither the Nimbus Line Loop nor the Farmwell-Nimbus Line are located within close proximity to this recreation area.

3.1.2.2 Washington and Old Dominion Railroad Regional Park

The Washington and Old Dominion (W&OD) Railroad Regional Park (W&OD Park) is a 45-mile paved trail that follows the old Alexandria, Loudoun, and Hampshire Railroad between Shirlington and Purcellville. An adjacent gravel horse trail is also available for a 32-mile stretch of the park. The park is part of the NOVA Parks system, and the first segment of the park opened in 1974 (NOVA Parks 2021). The W&OD Park runs along the northern border of the study area adjacent to Dominion's existing Line #2150. Parking and trail access are available where the trail crosses Pacific Boulevard. The trail is located 0.8 mile north of the route alternatives. Neither the Nimbus Line Loop nor the Farmwell-Nimbus Line are located within close proximity to the W&OD Park.

3.1.2.3 1757 Golf Club

The 1757 Golf Club is a 190-acre 18-hole golf course that opened in 2009 with a learning center, practice facility, clubhouse, and event space. The golf club is located 0.25 mile east of the intersection of Waxpool Road and Loudoun County Parkway. Neither the Nimbus Line Loop nor the Farmwell-Nimbus Line are located within close proximity to the golf club.

3.1.3 Existing Land Use and Land Cover

Land use and land cover within the study area were classified using a combination of local and state-wide datasets (Virginia Geographic Information Network 2016), as well as aerial photo interpretation to identify the most current uses for a given area. Land use and land cover in the Project study area can be broken down into the following four main categories:[1]

- Developed lands: These are areas characterized by medium to high density constructed buildings, such as certain residential subdivisions and commercial areas and impervious surfaces.
- Open space: These are areas primarily covered by planted grasses, including vegetation planted in developed settings for erosion control or aesthetic purposes but also natural herbaceous vegetation and undeveloped land, parks, and open-space recreational facilities.
- Forested lands: These are areas where land cover consists of natural or semi-natural woody vegetation.
- Open water: These are open-water features, including rivers, streams, lakes, canals, waterways, reservoirs, ponds, bays, estuaries, and ocean.

[1] For purposes of land use/land cover, wetland areas have been classified as open space, forested land, or open water depending on wetland type. Wetlands near the routes are discussed separately in Section 4.2.1, Wetlands.

Figure 3.1.3-1 in Appendix A depicts land use/land cover in the study area. Each of the land use/land cover categories described above would be crossed by the routes discussed in this report.

The SCC requires that the number of dwellings and businesses within 500, 250, and 100 feet of the routes for transmission lines be considered. ERM identified buildings (including dwellings), including those within 500, 250, and 100 feet of each route, through review of various digital data sets and maps, USGS topographic quadrangles, and recent (2021) aerial photography. The Cameron Chase residential development is located at the far northern portion of study area, and the Regency residential development is located at the far western portion of the study area. As these developments represent the only residences within the study area, there are no homes or multi-family residences identified within 500 feet of either of the centerlines of the route alternatives. The majority of the study area is highly developed with data center, commercial, and industrial development. The southern portion of the study area is associated with Broad Run and encompasses undeveloped forested areas. There are a number of commercial buildings within 500 feet of the centerlines of the routes for the Project. There are 20 commercial buildings within 500 feet of the centerline of the Nimbus Line Loop and 8 commercial buildings within 500 feet of the centerline of the Farmwell-Nimbus Line.

There are no existing schools, churches, or cemeteries located within 500 feet of the routes for the Project. Discovery Elementary school is located within the study area, approximately 0.5 mile northwest of the Farmwell-Nimbus Line. Loudoun Bible Church is also located within the study area, approximately 2,350 feet northeast of the Nimbus Line Loop within a strip mall southwest of the intersection of Loudoun County Parkway and Cape Court. No cemeteries are located within the study area.

3.1.4 Existing and Planned Developments

ERM obtained information on planned future developments through publicly available data on county websites and consultations with county and city planning officials and other stakeholders. Unless otherwise noted, information on these planned developments was found on the Loudoun County Online Land Application System (Loudoun County 2021). The planned developments that are crossed by or within 0.25 mile of the route alternatives are identified in Table 3.1.4-1 and described below. Figure 3.1.4--1 in Appendix A depicts existing and planned developments.

Table 3.1.4-1: Existing and Planned Developments Within 0.25 Mile of the Nimbus Line Loop and the Farmwell-Nimbus Line

Development Name	Status	Routes Crossed
Centurion	Existing	0.05 mile southwest of the Farmwell-Nimbus Line
Loudoun Center Data Center Campus	Existing and planned	Crossed by the Nimbus Line Loop
Digital Loudoun	Existing and planned	Crossed by the Nimbus Line Loop near intersection of Waxpool Road and Loudoun County Parkway
Equinix East Campus	Existing and planned	0.17 mile northeast of the Nimbus Line Loop (behind Ashburn Eats Strip Mall)
NTT Global Data Centers (NTT VA6 and VA7)	Existing and planned	0.15 mile west of the Farmwell--Nimbus Line

3.1.4.1 Centurion

The Centurion project is an existing development located within the Quantum Park area. In 2017, Centurion submitted an application to Loudoun County to add an entrance from the proposed Lockridge Road and add security fencing to the property perimeter within the Planned Development Office Park district. The development is located 0.05 mile southwest of the Farmwell- Nimbus Line.

3.1.4.2 Loudoun Center Data Center Campus

The Loudoun Center Data Center Campus project is a commercial data center campus that includes three buildings, two of which have been constructed. The Nimbus Line Loop crosses the Loudoun Center Data Center Campus site.

3.1.4.3 Digital Loudoun

The Digital Loudoun project is a commercial data center development that currently includes four data center buildings. The Nimbus Line Loop crosses the Digital Loudoun data center campus east of the intersection of Waxpool Road and Loudoun County Parkway.

3.1.4.4 Equinix East Campus

The Equinix East Campus project is a commercial data center development, which will include six data center buildings. To date, one of the data center building (DC21) has been constructed and is located in the southwest corner of the development. The development is located along the north side of Waxpool Road at the intersection of Waxpool Road and Loudoun County Parkway.

3.1.4.5 NTT Global Data Centers (NTT VA6 and VA7)

The NTT VA6 and VA7 development project is a commercial data center development that includes a total of seven data center buildings. Currently, three of the buildings have been constructed. The project is located approximately 0.15 mile west of the Farmwell Substation. The site development plan for the project was submitted to Loudoun County in the summer of 2021 and approved by the Loudoun County Board of Supervisors (BOS) in September 2021.

3.1.5 Land Use Planning and Zoning

3.1.5.1 Land Use Planning

Section 15.2-2223 of the Va. Code requires local planning commissions to adopt a comprehensive plan that provides guidance for the physical development of the territory within its jurisdiction. The plan looks at existing and future land uses, anticipates development trends, and makes recommendations for guiding long-term development decisions of a city or county. To implement objectives of the comprehensive plan, local governments use zoning. A zoning ordinance creates land use categories that separate incompatible uses and establishes development standards to guide orderly and efficient land use. Virginia requires that a comprehensive plan be reviewed at least once every 5 years to adjust to actual or projected changes in land use conditions or needs. Zoning ordinances may be modified by the local land manager and governing bodies or through requests from residents or businesses to change zoning designations or approved new uses. Loudoun County has adopted a comprehensive plan and zoning ordinances within its jurisdiction. The Loudoun County comprehensive plan was most recently updated in 2019.

3.1.5.2 Zoning

Nimbus Line Loop

The Nimbus Line Loop crosses developed and non-residential zoned lands. The route crosses land located in the Planned Development Office Park Zoning District for the entirety of the route.

Farmwell-Nimbus Transmission Line

The Farmwell-Nimbus Line crosses developed, non-residential zoned lands. The route crosses Park Planned Development Office Park Zoning District for the entirety of the route.

3.1.6 Conservation Easements

The Virginia Open-Space Land Act provides for the creation of open-space easements by public bodies as a means of preserving open -space or significant natural, cultural, and recreational resources on public or private lands. Most easements created under the Virginia Open-Space Land Act are held by the Virginia Outdoors Foundation (VOF), but any state agency is authorized to create and hold an open--space easement. The Virginia Conservation Easement Act similarly provides for the creation of conservation easements on public or private lands but under the auspices of charitable organizations (such as conservation trusts) rather than public agencies. In both cases, these easements are designed to preserve and protect open -space or other resources in perpetuity. Easements negotiated with private landowners allow the lands to remain in private ownership but with protections imposed to limit or restrict land uses on the property. Dominion understands that properties are placed under easement throughout the year, and additional easements may be identified as the Project moves forward. Dominion will continue to consult with the various land managing entities regarding potential new easements in the Project area.

3.1.6.1 Board of Supervisors Open-Space Easements

The BOS Open-Space Easements are gifted easement areas within Loudoun County. These lands are a part of over 75,000 acres of land protected through various conservation easements within Loudoun County. These easements are designed to preserve and protect open- space or other resources in perpetuity.

There are several BOS Open-Space Easements within the Project study area. These easements are located in two locations (see Figure 3.1.6-1 Appendix A). There are approximately 2.2 acres of BOS Open-Space Easements located along the northern boundary of the study area within the Cameron Chase residential development. In addition, there are approximately 20.7 acres of BOS Open-Space Easements in the far western portion of the study area within the Regency residential development. These BOS Open-Space Easements are located no closer than 0.4 mile from Nimbus Line Loop or the Farmwell-Nimbus Line.

3.1.6.2 Virginia Outdoors Foundation

The VOF leads Virginia in land conservation, protecting over 850,000 acres across the state. The VOF was created under the Virginia Open-Space Land Act, described in Section 3.1.6. Most easements created under the Virginia Open-Space Land Act are held by the VOF, but any state agency is authorized to create and hold an open-space easement. These easements are designed to preserve and protect open- space or other resources in perpetuity. Easements negotiated with private landowners allow the lands to remain in private ownership but with protections imposed to limit or restrict land uses on the property (VOF 2021). There are currently no VOF easements located within the study area.

3.1.6.3 Agricultural and Forestal Districts

The Virginia Agricultural and Forestal Districts Act provides for the creation of conservation districts (Commonwealth of Virginia 1997). These districts are designed to conserve, protect, and encourage the development and improvement of a locality's agricultural and forested lands for the production of food and other products while also conserving and protecting land as valued natural and ecological resources. These districts are voluntary agreements between landowners and the locality and offer benefits to landowners when they agree to keep their land in its current use for between 4 and 10 years. A district must contain at least 200 acres. No Virginia Agricultural and Forestal Districts are located within the study area.

3.1.7 Other Conservation Lands

ERM obtained information on other conservation lands through review of a digital dataset obtained from the VDCR and Loudoun County. The dataset identifies "lands of conservation and recreational interest" in Virginia, including federal, state, local, and privately owned lands. There are no VDCR stream conservation units (SCU) or other conservation lands within the study area.

3.1.8 Transportation

Major public roads within the study area include Waxpool Road and Loudoun County Parkway (see Figures 2.0-1 and 2.0-2 in Appendix A). Both these roads are maintained by VDOT. A number of smaller public roads also exist within the study area. Based on consultations with Loudoun County Department of Transportation and Capital Infrastructure and VDOT, one small road project is planned in the study area. This project would entail the addition of an acceleration turn lane from northbound Loudoun County Parkway to eastbound Waxpool Road.

3.1.8.1 Nimbus Line Loop

Beginning at the cut-in location on Line #2152, Nimbus Loop Line extends west and parallels the southern side of Waxpool Road for 0.2 mile, and then crosses Loudoun County Parkway. The route then continues west on the south side of Waxpool Road for 0.4 mile and then turns south into the proposed Nimbus Substation.

3.1.8.2 Farmwell-Nimbus Line

The Farmwell-Nimbus Line exits the eastern side of the Farmwell Substation and continues east--southeast for 0.15 mile before reaching Sir Timothy Drive. The route then turns to the northeast for 0.08 mile toward Waxpool Road. The route then runs parallel to the south side of Waxpool Road for 0.09 mile. The route next pivots to the south for 0.05 mile and then terminates at the proposed Nimbus Substation.

3.1.9 Airport Facilities

Transmission line towers have the potential to affect airspace in and around airports. In routing and building new overhead electric transmission lines, airports are an important consideration. The following is a summary of the airports in the Project vicinity and the airspace regulations that could have an impact on the Project.

3.1.9.1 Airports Near the Project Area

ERM reviewed the Federal Aviation Administration's (FAA) website to identify public use airports, airports operated by a federal agency or the U.S. Department of Defense, airports or heliports with at least one FAA-approved instrument approach procedure, and public use or military airports under construction (FAA 2021). Based on this review, there are seven airports, private airstrips, or heliports located within 10 nautical miles of the Project facilities (see Figure 3.1.9-1 in Appendix A). Table 3.1.9-1 lists the airport, heliport, or private airstrip name/owner in the vicinity of the Project, including airport identification number, distance, and direction from the nearest proposed route or substation, type of use, and maximum runway length.

Table 3.1.9-1: Airports and Heliports Located in the Vicinity of the Project

Airport/Heliport Name	Approximate Distance and Direction from Nearest Project Facility (miles)	Use	Maximum Runway Length (feet)
Washington Dulles International Airport	2.7 – south	Public	11,500
Loudoun Hospital Center Heliport	3.5 – northwest	Private	NA
Reston Hospital Center Heliport	5.8 – southwest	Private	NA
Leesburg Executive Airport	6.0 – northwest	Public	5,500
Stone Springs Hospital Heliport	6.5 – southwest	Private	NA
Goose Hunt Farm Airport	8.4 – west	Private	1,700
Ivona Fair Oaks Hospital Heliport	9.5 – southwest	Private	NA

NA = not applicable

3.1.9.2 Federal Aviation Administration Regulations

The FAA is responsible for overseeing air transportation in the United States. The FAA focuses on air transportation safety, including the enforcement of safety standards for aircraft manufacturing, operation, and maintenance. The FAA also 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 regulations that govern objects that may affect navigable airspace are codified in the Code of Federal Regulations (CFR), Title 14, Part 77 (14 CFR Part 77). A summary of the rule as it relates to the Project is provided below, and the full rule is provided in Appendix C.

Civil Airport Imaginary Surfaces

Civil airport imaginary surfaces have been established with relation to each airport and each runway. The imaginary surfaces were developed to prevent existing or proposed objects from extending from the ground into navigable airspace. Following is a description of the civil imaginary surfaces:

- **Horizontal surface**: This surface is a horizontal plane 150 feet above the established airport elevation, the perimeter of which is constructed by swinging arcs of specified radii from the center of each end of the primary surface of each runway and connecting the adjacent arcs by lines tangent to those arcs.
- **Conical surface**: This is a surface extending outward and upward from the periphery of the horizontal surface at a slope of 20 to 1 for a horizontal distance of 4,000 feet.

- **Primary surface**: This is a surface longitudinally centered on a runway. The primary surface extends 200 feet beyond the end of each runway. The elevation of any point on the primary surface is the same as the elevation of the nearest point on the runway centerline.
- **Approach Surface**: This is a surface longitudinally centered on the extended runway centerline and extending outward and upward from each end of the primary surface. An approach surface is applied to each end of each runway based upon the type of approach available or planned for that runway end (e.g., precision instrument approach, visual approach).
- **Transitional Surface**: These surfaces extend outward and upward at right angles to the runway centerline and the runway centerline extended at a slope of 7 to 1 from the sides of the primary surface and from the sides of the approach surfaces. Transitional surfaces for those portions of the precision approach surface that project through and beyond the limits of the conical surface extend a distance of 5,000 feet measured horizontally from the edge of the approach surface and at right angles to the runway centerline.

Terminal Instrument Procedures

In addition to the civil airport imaginary surfaces, there are imaginary surfaces associated with terminal instrument procedures (TERPS). TERPS are procedures for instrument approach and departure of aircraft to and from civil and military airports. TERPS are used for airport obstruction analysis to protect airspace by establishing restrictions on the height of buildings, antennas, trees, and other objects as necessary to protect the airspace needed for aircraft during preparation for, and completion of, the landing or departure phases of flight. Neither of the Proposed Routes discussed would exceed the TERPS surfaces of the airports identified in Table 3.1.9-1.

Federal Aviation Administration Notice Requirements and Timing

Based on the runway categories and dimensional standards described above, a notice must be filed with the FAA if:

- Any construction or alteration is more than 200 feet above ground level at its site;
- Any construction or alteration exceeds an imaginary surface extending outward and upward at the following slope:
  - 25 to 1 for a horizontal distance of 5,000 feet from the nearest point of the nearest landing and takeoff area of each heliport;
  - 50 to 1 for a horizontal distance of 10,000 feet from the nearest point of the nearest runway that is no more than 3,200 feet in actual length; and
  - 100 to 1 for a horizontal distance of 20,000 feet from the nearest point of the nearest runway that is more than 3,200 feet in actual length; and
- If requested by the FAA.

Construction or alteration of any structure that meets the notification requirements set forth above requires submittal of an FAA Form 7460-1, Notice of Proposed Construction or Alteration, to the FAA regional office with jurisdiction over the area within which construction or alteration will be located or submitted electronically via the FAA website. The information that needs to be provided with the notice includes the coordinates, site elevation, and structure height above ground level for each pole/structure and the height of construction equipment, such as cranes.

Based on the current design plans, the transmission line structures for the Project would range in height from 110 to 140 feet tall. It is anticipated that cranes would be used to install the structures. Based on current plans, the Project would not exceed FAA notification thresholds at any airports. Figure 3.1.9-2 in Appendix A depicts the maximum tower height that would be allowed for each structure location based on airport surfaces.

State and Local Regulations

Commonwealth of Virginia Aviation Regulations

Section 5.1-25.1 of the Va. Code establishes that it is unlawful for a person to erect any structure that penetrates into or through any licensed airport's clear zone, approach zone, imaginary surface, obstruction clearance surface, obstruction clearance zone, or surface or zone as described in regulations of the Virginia Department of Aviation or the FAA without first securing a permit for its erection from the Board of Aviation. However, it also states that this requirement does not apply to any structure erected in a county, city, or town that has an ordinance regulating the height of such structures to prevent the penetration of zones and surfaces provided for in 14 CFR Part 77 and Rule 19 of the Virginia Department of Aviation.

Local Airport Regulations

Va. Code Sections 15.2-2280, 15.2-2282, 15.2-2293, and 15.2-2294 give local jurisdictions the power to establish and regulate zoning districts, make airspace subject to their zoning ordinance, and establish airport safety zoning. Following is a summary of the zoning regulations applicable to the airports listed in Table 3.1.9-1.

Loudoun County has established restricted-use zones to regulate the use of property in the vicinity of Dulles Airport. The Airport Impact Overlay District is a zoning overlay district administered by the Loudoun County Department of Building and Development. This district is established to acknowledge the unique land use impacts of airports, regulate the siting of noise sensitive uses, ensure the heights of structures are compatible with airport operations, and complement FAA regulations regarding noise and height.

The Airport Impact Overlay District boundaries are based on the 60 decibels (dB) and 65 dB loudness day night noise contours and a 1-mile buffer that extends beyond the 60 dB day-night average sound level contour for Dulles Airport. The zones include all land lying beneath the approach surfaces, transitional surfaces, horizontal surfaces, and conical surfaces as they apply to this airport.

3.1.10 Environmental Justice

ERM completed a desktop environmental justice (EJ) review to identify potential EJ populations that could be affected by the Project. The EJ review followed federal guidance and recommended methodologies outlined by the Council on Environmental Quality and the Federal Interagency Working Group on Environmental Justice and National Environmental Policy Act Committee, as well as definitions provided in the Virginia Environmental Justice Act (Va. Code Sections 2.2-234, 2.2-235). The purpose of conducting the EJ review is to determine if construction or operation of the transmission lines or substation would result in disproportionately high and adverse environmental impacts on minority and low-income populations, age-based vulnerable, or linguistically isolated communities (i.e., EJ populations). This approach is also consistent with requirements outlined in the Virginia Clean Economy Act of 2020 pertaining to the development of new, or expansion of existing, energy resources or facilities (Va. Code Section 56-585.1).

In identifying potential areas of concern, federal guidelines state that the size of the area surrounding a project selected for the EJ assessment should be an appropriate unit of geographic analysis that does not artificially dilute or inflate the affected minority population. Therefore, the census block group (CBG) was used as the primary unit for analysis in the EJ review for each route alternative because it is the smallest geographic unit for which U.S. Census Bureau demographic data is available. All CBGs crossed by and within a 1-mile radius of the routes were included in the screening area. Figure 3.1.10-1 in Appendix A depicts where EJ populations were identified along the routes.

The Commonwealth of Virginia and Loudoun County were used as reference populations for the desktop review. Demographic data for the Commonwealth were compared with individual CBGs to help identify potential EJ populations. For example, if the reported percentage of minority population within an individual CBG was greater than the percentage of minority population in Virginia as a whole, a potential EJ population was identified. Data for Loudoun County were also included in the review as additional reference populations to address regional demographic variations. The U.S. Environmental Protection Agency's EJ mapping and screening tool, EJSCREEN, and census data from the U.S. Census Bureau 2018 American Community Survey 5-year estimates (consistent with data used to populate the EJSCREEN tool) were used to collect CBG, county, and state data.

The Commonwealth of Virginia defines "population of color" as a group of individuals belonging to one or more of the following racial and ethnic categories: "Black, African American, Asian, Pacific Islander, Native American, other, non-white race, mixed race, Hispanic, Latino or linguistically isolated." The EJSCREEN's definition of a minority population is analogous to Virginia's definition of population of color but does not include linguistically isolated individuals. However, EJSCREEN includes a demographic indicator for linguistic isolation.

The Commonwealth of Virginia identifies a minority population, or what it terms a "community of color," if an analysis area has a greater "population of color" percentage than that of the commonwealth as a whole. However, if a "community of color" is composed primarily of a specific "population of color," the percentage population of that single group in the commonwealth is used instead of the percentage for the total "population of color."

The Commonwealth of Virginia's criteria for an identified "community of color" or minority population and what constitutes an EJ population have a lower threshold and are more inclusive than federal guidance. Therefore, the state's criteria were used to identify minority populations in the EJ screening of the routes.

Federal guidelines recommend using an appropriate poverty threshold and comparing the analysis area with a reference population to identify low-income populations. The Commonwealth of Virginia identifies low-income populations in analysis areas as any CBG in which 30 percent of the population is composed of low-income residents. It defines low-income as "having an annual household income equal to or less than the greater of (i) an amount equal to 80 percent of the median income of the area in which the household is located, as reported by the Department of Housing and Urban Development, and (ii) 200 percent of the Federal Poverty Level."

For this EJ screening, if 30 percent or more of the population was characterized as low-income, then low--income populations were identified. The EJSCREEN tool provides percentages of low-income populations by CBG that are defined as households where the income is less than or equal to twice the federal poverty level as reported by the U.S. Census Bureau.

The EJ review assessed the potential for other factors that could limit low-income or minority communities from reviewing and commenting on the various alternatives, including age-based vulnerabilities and populations with less than a high school education. These communities were identified using the federal guidance of a meaningfully greater threshold. Virginia was used as the reference population. A difference of over 20 percentage points compared with the reference population was used to identify age

populations and populations with less than a high school education for this review. Linguistically isolated households fall under the definition of “populations of color” in the Virginia Environmental Justice Act. Therefore, the same parameters were used to identify populations of color and linguistically isolated households.

Virginia has a population under age 5 of 6 percent and a population over age 64 of 15 percent, as well as a population with less than a high school education of 11 percent. When compared with the state, none of the CBGs contain populations that exceed the state average by 20 percentage points. One CBG exceeds the state average for linguistically isolated populations.

3.1.10.1 Desktop Results

The desktop review identified six CBGs within the screening area. One of these CBGs is crossed by the Project (Figure 3.1.10-1 in Appendix A). The remaining five CBGs are within 1 mile and would not be directly affected by the Project. Table 3.1.10-1 shows the EJ demographic indicators for populations within the analysis area of the Project (CBGs crossed by and within a 1-mile radius of the transmission line routes and the Nimbus Substation) and the reference populations.

Table 3.1.10-1: Environmental Justice Demographic Indicators and Populations of Color in Analysis Area

State/County CBG (Census Tract, Block Group)	Population	Total Minority Population (%)[a]	White, non-Hispanic (%)	Black or African American (%)	American Indian and Alaska Native (%)	Asian (%)	Pacific Islander (%)	Some Other Race Alone (%)	More than One Race (%)	Hispanic or Latino (%)	Low-Income Population (%)	Linguistically Isolated Households (%)	Population with Less than High School Education (%)	Population Under Age 5 (%)	Population Over Age 64 (%)
VIRGINIA	8,535,519	38	62	19	<0.1	6	<0.1	1	3	9	25	3	11	6	15
Loudoun County	385,143	43	57	7	<0.1	18	<0.1	1	4	14	11	1	6	7	9
511076110203[b] (Census Tract 6110.20, Block Group 3)	**2,955**	**56**	**44**	**12**	**1**	**25**	**1**	**<0.1**	**3**	**14**	**19**	**3**	**3**	**6**	**5**
511076110061 (Census Tract 6110.06, Block Group 1)	2,642	52	48	4	1	33	<0.1	<0.1	5	9	5	1	1	9	4
511076110062 (Census Tract 6110.06, Block Group 2)	2,939	36	64	9	<0.1	15	<0.1	<0.1	3	10	4	2	1	5	6
511076110181 (Census Tract 6110.18, Block Group 1)	2,088	76	24	31	<0.1	14	<0.1	<0.1	4	27	36	6	15	10	7
511076110182 (Census Tract 6110.18, Block Group 2)	1,001	4	96	2	<0.1	1	<0.1	<0.1	1	1	13	1	3	<0.1	98
511076110192 (Census Tract 6110.19, Block Group 2)	3,421	44	56	6	<0.1	27	<0.1	<0.1	2	9	3	2	2	6	7

Sources: U.S. Environmental Protection Agency 2020; U.S. Census Bureau 2018

CBG = census block group

[a] The minority population numbers in this table have been rounded for presentation purposes. As a result, the total minority population percentages may not reflect the sum of the addends.

[b] Bold indicates the CBG is crossed by the Nimbus 230 kV Line Loop and Nimbus Substation and 230 kV Farmwell-Nimbus Transmission Line.

Gray shaded cells indicate reference populations.

Blue shaded cells indicate identified minority populations.

Orange shaded cells indicate identified low-income populations.

Green shaded cells indicate language barriers.

Yellow shaded cells indicate age populations.

Populations of Color

According to the U.S. Census Bureau 2018 American Community Survey 5-year data, 62 percent of the state's population is White (non-Hispanic), and 38 percent of the total population includes populations of color. These communities include Black / African American (19 percent), Hispanic (9 percent), and Asian (6 percent), and two or more races (4 percent) of the total population. Native Americans and Pacific Islanders make up less than 1 percent each but can occur locally in higher concentrations (Table 3.1.10--1).

The total percentage of populations of color within the analysis area ranges between4 percent and 76 percent. Of the six CBGs within the analysis area, two contain American Indian or Alaska Native populations and one contains Pacific Islander populations. All the CBGs contain Black / African American, Asian, Hispanic, more than one race, or other race communities. Potential EJ populations include four CBGs whose percentage of minority population exceeds the state average of 38 percent. One of these CBGs is crossed by the Project (Table 3.1.10-1).

Low-Income Populations

Virginia has a low-income population of 25 percent. Loudoun County has a low-income population of 11 percent. Among the CBGs in the analysis area, the low-income population percentages range from 4 to 57 percent. Of the six CBGs within the analysis area, one CBG (5110761101810) has a low-income population greater than or equal to the 30 percent threshold for low-income populations identified by the state. This same CBG meets both the minority and low-income definitions (Table 3.1.10-1). No low-income populations are crossed by the transmission line routes or the proposed Nimbus Substation.

Age Populations

One of the six CBGs within 1 mile of the transmission line routes and the Nimbus Substation has a population of 98 percent over age 64. This CBG is home to the Ashby Ponds Senior Living Community. The 1,600 persons residing in this community account for the larger, over age 64 population. This CBG (511076110182) is not crossed by the proposed transmission line routes or the Nimbus Substation.

Linguistically Isolated Households

One of the six CBGs within 1 mile of the transmission line routes and the Nimbus Substation has twice as many linguistically isolated households as the state. This CBG (51107611081) is not crossed by the proposed transmission line routes or the Nimbus Substation.

3.2 Natural Resources

ERM utilized several desktop data sources to map wetlands and waterbodies within the route alternatives right-of-way corridors. These sources included USGS 7.5-minute series topographic quadrangle maps, National Wetlands Inventory (NWI) maps obtained from the U.S. Fish and Wildlife Service (USFWS), soils data from the Natural Resources Conservation Service Web Soil Survey, recent (2021) aerial photography, the National Hydrography Dataset (NHD), and Loudoun County environmental layers. ERM did not conduct an on-site wetland delineation of wetlands or waterbodies within the study area.

ERM also utilized the following to conduct a preliminary review of ecological significance areas and protected species within the study area:

- USFWS Information for Planning and Consultation (IPaC) online system (USFWS 2021);
- VDCR Natural Heritage Program (NHP) (VDCR 2021a);
- Virginia Department of Wildlife Resources (VDWR) Fish and Wildlife Information Service (VaFWIS) (VDWR 2021a); and
- Center for Conservation Biology (CCB) Eagle Nest Locator (CCB 2021).

A more refined search specific to the route alternatives was then conducted to determine if any species observations have occurred in the area crossed by or adjacent to the Project (natural resources Project area).

3.2.1 Wetlands

ERM identified and mapped wetlands in the study area using publicly available GIS databases, National Agricultural Imagery Program Digital Ortho-Rectified Natural Color and Infrared Images, USGS topographic maps (1:24,000), U.S. Department of Agricultural-Natural Resources Conservation Service Soil Survey Geographic database for Loudoun County, and recent (2021) digital aerial photography. The wetlands identified are considered potentially aquatic resources that would be regulated by the U.S. Army Corps of Engineers (USACE) and Virginia Department of Environmental Quality (VDEQ) under Section 404 and Section 401 of the Clean Water Act (CWA), respectively. Wetland types and locations are depicted on Attachment 2 in Appendix D. In addition, an overview map is included as Attachment 1 in Appendix D.

The majority of the wetlands potentially affected by the Project are located adjacent to, or contiguous with, streams and/or drainages and their tributaries that would be considered relatively permanent waters; therefore, a significant nexus to navigable waters is assumed. As such, they would be regulated by the USACE and VDEQ under Sections 404 and 401 of the CWA, respectively.

No wetlands were identified within the right-of-way of the Farmwell-Nimbus Line. Wetlands contained within the right-of-way of the Nimbus Line Loop are freshwater pond, riverine, and palustrine emergent wetlands associated with an unnamed, intermittent tributary of perennial waterbody Broad Run.

3.2.2 Waterbodies

ERM identified and mapped waterbodies in the study area using publicly available GIS databases, USGS topographic maps (1:24,000), and recent (2021) digital aerial photography. The Nimbus Line Loop crosses one intermittent waterbody, which is a tributary to Broad Run. No navigable waterbodies are crossed by either the Nimbus Line Loop or Farmwell-Nimbus Line.

A general location map that illustrates waterbodies crossed by the Nimbus Line Loop or Farmwell-Nimbus Line is included as Attachment 2 in Appendix D. Although crossings of these streams would not require a Rivers and Harbors Act Section 10 authorization, activities within and over subaqueous lands of Virginia with over a 5-square-mile drainage area would require a permit from the Virginia Marine Resources Commission pursuant to Va. Code Section 28.2-1205.

3.2.2.1 Reservoirs, Ponds, and Other Waterbodies

In addition to wetlands and waterbodies, open-water features (e.g., reservoirs, ponds, and other waterbodies visible from review of NWI/NHD datasets and/or aerial imagery) were considered in ERM's review. No open-water features are crossed by either the Nimbus Line Loop or the Farmwell-Nimbus Line.

3.2.3 Areas of Ecological Significance

The initial VDCR NHP review identified areas of ecological significance within a 100-foot buffer around the rights-of-way for the Nimbus Line Loop and the Farmwell-Nimbus Line, which include conservation sites and general location areas for natural heritage resources. SCUs are identified up to 2 miles upstream and 1 mile downstream.

1. Conservation sites identify a planning boundary delineating the NHP's best determination of the land and water area occupied by one or more natural heritage resources (exemplary natural communities and rare species) and are necessary to maintain ecological processes that will facilitate long-term survival of these resources. The size and dimensions of a conservation site are based on the habitat requirements of the natural heritage resources present and the physical features of the surrounding landscape. Features taken into consideration include hydrology, slope, aspect, vegetation structure, current land uses, and potential threats from invasive species. Conservation sites do not necessarily preclude human activities, but a site's viability may be greatly influenced by human activities. Conservation sites may require ecological management, such as invasive species control or water management, to maintain or enhance their viability. Each conservation site is given a biodiversity significance ranking based on rarity, quality, and number of natural heritage resources it contains.
2. General location areas for natural heritage resources represent the approximate locations of documented natural heritage resource occurrences that were not incorporated into conservation sites, either because they are poor quality, their location was not precisely identified, or they have not been verified in over 20 years. These approximate locations, marked with the 100-foot buffer, are included in the screening coverage because they indicate areas with relatively high potential for natural heritage resource occurrences to be documented. Depending on the apparent suitability of local habitat, VDCR may recommend biological surveys when reviewing projects that intersect these locations.
3. SCUs identify stream reaches that contain aquatic natural heritage resources, including upstream and downstream buffers and tributaries associated with the reach. SCUs are given a biodiversity significance ranking based on the rarity, quality, and number of natural heritage resources they contain. SCUs can be used to identify land management needs, protection priorities, and potential conflicts with development activities.

The VDCR reviewed the Project on November 3, 2021, and no SCUs were identified (VDCR 2021b). In addition, the VDCR data did not depict any state natural area preserves; habitat of rare, threatened, or endangered plant or animal species, insects, macrobenthics, bivalves, fish, unique or exemplary natural communities; and/or significant geologic formations.

3.2.4 Protected Species

To protect and recover imperiled species and the ecosystems they depend on, Congress passed the Endangered Species Act (ESA) in 1973, which states that threatened and endangered plant and animal species are of aesthetic, ecological, educational, historic, and scientific value to the United States, and protection of these species and their habitats is required. The ESA is administered by both the National Oceanic and Atmospheric Administration and the USFWS. It protects fish, wildlife, plants, and invertebrates that are federally listed as endangered or threatened by prohibiting the "take" of these species and the interstate or international trade, including their parts and products, unless federally permitted.

Take is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct." A federally endangered species is any species that is in danger of extinction throughout all or a significant portion of its range, with exceptions for certain insect pests. A federally threatened species is any species that is likely to become endangered in the near future throughout all or a significant portion of its range.

Virginia has adopted separate acts for protecting animals and plants in the state. The Virginia ESA (Va. Code Sections 29.1-563 - 29.1-570) designates the VDWR as the state agency with jurisdiction over state-listed endangered or threatened fish and wildlife. The Virginia ESA authorizes the Board of the VDWR to adopt the federal list of endangered and threatened species and identify and protect state-listed wildlife. The Virginia ESA prohibits by regulation the taking, transportation, processing, sale, or offer for sale of those species.

Under the Endangered Plant and Insect Species Act (2 VAC 5-320-10), the taking or possession of endangered or threatened plant and insect species is prohibited. The VDCR represents the Virginia Department of Agriculture and Consumer Services, which is responsible for state-listed plants and insects, in providing comments regarding potential effects on state-listed plant and insect species.

ERM obtained query results from the VDCR's Natural Heritage Data Explorer (NHDE), VDWR VaFWIS, and the USFWS IPaC to identify federally and state-listed species that may occur within the natural resources Project area. Digital data were obtained from the VDCR NHDE to identify locations within the rights-of-way of the route alternatives and associated 100-foot buffer that potentially support protected species. Query results from NHDE include species known to occur in the area and communities known to historically or currently contain protected species (VDCR 2021a). Query results from USFWS IPaC includes species that may occur within the rights-of-way of the route alternatives and associated 100-foot buffer (USFWS 2021). Query results from VaFWIS include species known to occur or likely to occur within a 2-mile radius from the geographic center of the route alternatives (VDWR 2021a).

The VDCR's element occurrence representations are mapped representations of plants, animals, and exemplary natural communities, which are tracked by the VDCR NHP due to their rarity. Each occurrence is represented by a polygon indicating its known location. The polygons are intended to indicate the full known aerial extent of the occurrence, modified to account for the locational uncertainty of the source data. VDWR's Species Observation dataset includes all verified species documentations maintained by the VDWR.

Three federally- listed and 13 state-listed threatened or endangered species (which includes the 3 federally listed species) were reviewed for potential of occurrence within and adjacent to the Nimbus Line Loop and the Farmwell-Nimbus Line. A summary of the findings is provided in Section 3.2.4.1 and Section 3.2.4.2.

3.2.4.1 Federally and State-Listed Endangered and Threatened Species

Because the various queries that indicate potential or actual occurrences of protected species in the Project vicinity do not specify exact occurrence locations, a summary of the federally and state-listed species documented in the Project vicinity is presented in Table 3.2.4-1. Rare species are summarized in Section 3.2.4.2.

The database queries identified three federally listed species: Northern long-eared bat (*Myotis septentrionalis),* Dwarf wedgemussel (*Alasmidonta heterodon*), and Yellow lance (*Elliptio lanceolata*). According to the review, each of these species has potential to occur in and/or within a 2-mile radius of the Project. The VDWR operates a northern long-eared bat winter habitat and roost trees online mapping system, which shows general locations of known Northern long-eared bat hibernacula and roost trees. A review of this system did not show a hibernaculum or roost tree(s) in Loudoun County. Dwarf wedgemussel and Yellow lance have potential to occur in perennial waterbodies.

The Dwarf wedgemussel is described by the VDWR as a habitat “generalist” in terms of its preference for stream size, substrate, and flow conditions. This mussel species can live in a range of habitats, from small streams less than approximately 16 feet wide, to large rivers more than 328 feet wide. It can inhabit a variety of substrate types including clay, sand, gravel, and pebble, and sometimes in silt depositional areas near banks. Dwarf wedgemussel occurrences are usually associated with hydrologically stable areas, including very shallow water along streambanks and under root mats of trees along streambanks (VDWR 2021a).

The Yellow lance is a mussel species that buries deep into clean, coarse to medium sand substrate, although it can sometimes be found in gravel substrates. The species are often moved with shifting sand and eventually settle in sand at the downstream end of stable sand and gravel bars. This species depends on clean, moderate flowing water with high dissolved oxygen and is found in medium-sized rivers to smaller streams (VDWR 2021a).

The database queries identified 13 state-listed species (which includes the 3 federally listed species described above) that may occur or are known to occur within 2 miles of the geographic center of the route alternatives. The VDWR operates a Little Brown Bat and Tri-colored Bat Winter Habitat and Roosts Application online mapping system, which shows general locations of known little brown bat and tri--colored bat hibernacula and roost trees. A review of this system did not show a hibernaculum or roost trees in Loudoun County (VDWR 2021b).

Table 3.2.4-1: Potential Federally- and State-Listed Species in the Project Area

Common Name	Scientific Name	Federal Status	State Status	Global Rank	Habitat	Potential Route Occurrence	Source
FEDERALLY LISTED SPECIES							
Mammals							
Northern long-eared bat	*Myotis septentrionalis*	LT	LT	G4	Generally associated with old-growth or late successional interior forests. Partially dead or decaying trees are used for breeding, summer day roosting, and foraging. Hibernation occurs primarily in caves, mines, and tunnels.	All	IPaC VaFWIS VDWR - Winter Habitat and Roost Tree Map
Invertebrates							
Dwarf wedgemussel	*Alasmidonta heterodon*	LE	LE	G1	Deep quick running water on cobble, fine gravel, or on firm silt or sandy bottoms.	All	IPaC VaFWIS
Yellow lance	*Elliptio lanceolata*	LT	None	G3/G4	Main channels of drainages and streams as small as approximately 3.28 feet across with clean, coarse, medium-sized sand or gravel substrate.	All	VaFWIS
STATE-LISTED SPECIES							
Mammals							
Little brown bat	*Myotis lucifugus*	None	LE	G3	Roosts in caves, buildings, rocks, trees, under bridges, and in mines and tunnels. Found in all forested regions of the state.	All	VaFWIS VDWR - Winter Habitat and Roost Tree Map
Tri-colored bat	*Perimyotis subflavus*	None	LE	G3	Typically roost in trees near forest edges during summer. Hibernate deep in caves or mines in areas with warm, stable temperatures during winter.	All	VaFWIS VDWR - Winter Habitat and Roost Tree Map
Invertebrates							
Appalachian grizzled skipper	*Pyrgus Wyandot*	None	LT	G5	Semi-open slopes with sparse herbaceous vegetation and exposed rock or soil.	All	VaFWIS

Common Name	Scientific Name	Federal Status	State Status	Global Rank	Habitat	Potential Route Occurrence	Source
Brook floater	*Alasmidonta varicosa*	None	LE	G3	Creeks and small rivers, found among rocks in gravel substrates and in sandy shoals, flowing-water habitats only.	All	VaFWIS
Green floater	*Lasmigona subviridis*	None	LT	G3	Small to medium streams in quiet pools and eddies with gravel and sand substrates.	All	VaFWIS
Birds							
Henslow's sparrow	*Ammodramus henslowii*	None	LT	G4	Open grasslands with few or no woody plants and tall dense grasses and litter layer.	All	VaFWIS
Loggerhead shrike	*Lanius ludovicianus*	None	LT	G4	Open country with scattered shrubs and trees or other tall structures for perching.	All	VaFWIS
migrant Loggerhead shrike	*(Lanius ludovicianus migrans)*	None	LT	G4	Open country with scattered shrubs and trees or other tall structures for perching.	All	VaFWIS
Peregrine falcon	*Falco peregrinus*	None	LT	G4	Tall structures, such as power line poles, buildings, and rock ledges, in generally open landscapes.	All	VaFWIS
Reptiles							
Wood turtle	*Glyptemys insculpta*	None	LT	G3	Forested floodplains, fields, wet meadows, and farmland with a perennial stream nearby.	All	VaFWIS

Sources: USFWS 2021; VDCR 2021a; VDWR 2021a, 2021b

IPaC = Information for Planning and Consultation; VaFWIS = Virginia Fish and Wildlife Information Service; VDWR = Virginia Department of Wildlife Resources
Federal/State Status:
LE Listed as endangered
LT Listed as threatened
Global Rank:
G1 Critically imperiled: At very high risk of extinction due to extreme rarity (often five or fewer populations), very steep declines, or other factors
G2 Imperiled: At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors
G3 Vulnerable: At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors

G4 Apparently secure: Uncommon but not rare; some cause for long-term concern due to declines or other factors
G5 Secure: Common, widespread, and abundant

3.2.4.2 Bald Eagle Management

The bald eagle (*Haliaeetus leucocephalus*) is no longer federally listed under the ESA, but it is a state--listed threatened species in Virginia under the Virginia ESA and is protected under Va. Code Section 29.1-521 and VDWR regulations (4 VAC 15-30-10). The bald eagle is also protected under the federal Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. *The Management of Bald Eagle Nests, Concentration Areas, and Communal Roosts in Virginia: A Guide for Landowners*, issued by the then Virginia Department of Game and Inland Fisheries (now the VDWR) provides management practices for avoiding the take of bald eagles and outlines restrictions on construction activities within defined management zones. Proposed activities that have the potential to affect bald eagles are evaluated by the agency on a case-by-case basis (Virginia Department of Game and Inland Fisheries and the Center for Conservation Biology at the College of William and Mary and Virginia Commonwealth University 2012).

To obtain the most current eagle nest data, ERM reviewed the CCB website (CCB 2021), which provides information about the Virginia bald eagle population, including the results of the CCB's annual eagle nest survey. According to the CCB database, there is one known bald eagle nest within 5 miles of the study area. The nest is located approximately 0.30 mile (1,605 feet) south of the most eastern point of the Nimbus Line Loop. Nest LD 1901 was documented to be occupied in 2019. Neither of the route alternatives are within the 660-foot management buffer for the nest.

3.2.4.3 Species of Concern and Other Documented Occurrences

The VDCR review documented no species of concern within the rights-of-way of the Nimbus Line Loop or the Farmwell-Nimbus Line, including the expanded 100-foot buffer.

3.2.5 Vegetation

3.2.5.1 Local Vegetation Characteristics

The vegetation of the Northern Piedmont has been severely altered by clearing as part of ongoing agricultural and silvicultural practices occurring since European settlement. Prior to the effects of European settlement, the vegetation was influenced by the practices of Native Americans. Writings from early explorers indicate that parts of the Piedmont were once open, savanna-like woodlands and grasslands. Native American practices included burning the forests to drive game and keep the understory of forests clear for hunting. More recently, forests in this area have undergone a cycle of clearing, farming, and regenerating. The fallow farmlands, if left unattended, undergo a successional regeneration process that generally results in a prevalence of early successional trees such as Virginia pine (*Pinus virginiana*) and tulip-poplar (*Liriodendron tulipifera*), which ultimately matures into oak-hickory forest (VDCR 2021c).

The effects of man's influence on the landscape for centuries has resulted in a patchwork of secondary forests, pastures, and agricultural fields. The remaining vegetation throughout the Project area is now predominantly herbaceous grasses that are maintained with small forested pockets of pine (*Pinus* sp.) and hardwood species, likely including hickories (*Carya* sp.) and oaks (*Quercus* sp.).

ERM reviewed publicly available forest conservation values prepared by VDCR to assess the value of forest resources crossed by the Project (VDCR 2021d). The area of forested habitat through which the route alternatives pass is ranked by the VDCR as "Average." Furthermore, no ecological cores are mapped by the VDCR within either of the route alternatives. Overall, the habitats through which the route alternative pass are not designated as high-ranking areas for conservation planning by the VDCR.

ERM reviewed the route alternatives using recent (June 2021) Google Earth aerial imagery to assess vegetative cover in the study area. Descriptions of the vegetation communities crossed by the route alternatives are provided below.

Nimbus Line Loop

The Nimbus Line Loop would involve construction of an overhead double circuit 230 kV line from a cut-in located on existing Line #2152 at structure #2152/19A to the proposed Nimbus Substation. The length of the route is approximately 0.61 mile. The vegetative cover along the first segment of the route, which extends for a distance of 0.2 mile along the south side of Waxpool Road between Line #2152 and Loudoun County Parkway, is dominated by herbaceous species with scattered shrub and trees. After crossing Loudoun County Parkway (0.03 mile), the route extends for a distance of 0.08 mile across a landscaped berm, which has been planted with small trees and shrubs. From this point, the remaining 0.3 mile of the route crosses an active construction site with open soil.

Proposed Nimbus Substation

The proposed location for the Nimbus Substation is currently located in an active construction site dominated by open soil.

Farmwell-Nimbus -Line

The Farmwell-Nimbus Line would involve construction of an overhead single circuit 230 kV transmission line extending from the existing Farmwell Substation to the proposed Nimbus Substation. The length of the route is approximately 0.26 mile. Beginning at the Farmwell Substation, the route exits the eastern side of the substation then turns to the southeast and extends parallel to the Digital Realty ACC9 Data Center building for approximately 450 feet. The route next turns to the northeast across a parking area for approximately 430 feet. Upon exiting the parking area, the route next turns southeast and parallels Waxpool Road for approximately 510 feet. The route then turns south and enters into the proposed Nimbus Substation. The dominant ground cover for the first segment of the route, which begins at the Farmwell Substation and generally trends in a southeastward direction for approximately 0.20 mile, consists of asphalt with small islands of maintained herbaceous grasses. The remaining 0.06 mile of the route to the Nimbus Substation crosses an active construction site with open soil.

3.3 Visual Conditions

ERM conducted the following analyses to understand the existing visual conditions and potential impact from the installation of Project components:

- Identification of visually sensitive resources (VSR) through the review of recent (2021) digital photography;
- Site reconnaissance and local outreach;
- Definition of the potential user groups;
- Review of visual simulations of the Project facilities; and
- Evaluation of the Project facilities with respect to visual impacts.

VSRs were defined as areas where the Project components and associated vegetative alterations (removals and additions) would change the visual characteristics of the surrounding landscape and/or affected resources possessing unique scenic qualities or sensitive viewsheds. Examples of visually sensitive areas include residential or recreational areas, historic landscapes or districts, open space,

natural features, and areas of high public concentration. VSRs that were identified and reviewed as part of this analysis include the Embassy Suites hotel (44610 Waxpool Road) and the collection of restaurants known as Ashburn Eats (44640 Waxpool Road).

User groups present in the Project study area include local residents/workers, commuter/through travelers, hotel occupants, and restaurant diners. Local residents/workers may experience visual impacts due to their sensitivity to change in the landscape; however, this is often centered around static views from their residence or workplace. Restaurant diners may also experience a level of sensitivity to landscape changes but primarily only when they choose to dine at those restaurants. While some of the restaurants at this location are dine-in, several are also take-out restaurants. Those who choose to take their food and dine elsewhere would generally experience reduced visual impacts compared with those who dine-in. Commuter/through travelers have the lowest sensitivity to visual change in the landscape based on their activity and average speed associated with the roadway (the speed limit on this portion of Waxpool Road is 45 miles per hour). A description of each VSR and its associated user groups is provided in Table 3.3--1.

Table 3.3-1: Visually Sensitive Resources and User Groups

VSR Name	VSR Type	Impacted User Group	General Information/Visual Sensitivity
Embassy Suites hotel (KOP 1)	Medium/high-use public resource	Hotel occupants and local residents/workers	Hotel with 154 guestrooms, some with windows facing south toward the proposed route and Project facilities
Ashburn Eats (KOP 2)	High-use public resource	Restaurant diners and local residents/workers	Three buildings, containing eight dining options on 5 acres of land The restaurant front is south toward the proposed route and Project facilities, including the outdoor dining areas

KOP = key observation point; VSR = visually sensitive resource

To illustrate the potential change from the installation of the proposed route and Project facility, five visual simulations were prepared from five KOPs, associated with the Nimbus Line Loop (see Appendix E). All visual simulations are located on or immediately adjacent to Waxpool Road. No KOPs were prepared for the Farmwell-Nimbus Line as no visually sensitive resources were identified along this route.

3.4 Cultural Resources

Dutton + Associates, LLC (D+A) conducted an analysis of potential cultural resource impacts for the route alternatives under consideration in accordance with the VDHR January 2008 *Guidelines for Assessing Impacts of Proposed Electric Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia* (VDHR 2008) (herein referred to as VDHR Guidelines) and the *Commonwealth of Virginia State Corporation Commission Division of Public Utility Regulation Guidelines for Transmission Line Applications Filed Under Title 56 of the Code of Virginia* (SCC 2017). For the pre--application analysis of cultural resources, D+A considered National Historic Landmark (NHL) properties located within a 1.5-mile radius of the centerline; National Register of Historic Places (NRHP)--listed properties, NHLs, battlefields, and historic landscapes within a 1-mile radius of the centerline; NRHP eligible and listed properties, NHLs, battlefields, and historic landscapes within a 0.5-mile radius of the centerline; and all of the above qualifying architectural resources, as well as archaeological sites located within the right-of-way for each route alternative. Information on the resources in each tier was collected from the VCRIS (VDHR 2020). D+A also sought information on battlefields surveyed and assessed by the National Park Service's American Battlefield Protection Program (ABPP) (National Park Service 2009). In its focus on nationally significant Civil War battlefields,

the ABPP identifies the historic extent of the battle (study area), the areas of fighting on the battlefield (core area located within the study area), and potential NRHP boundaries. Mapping of those ABPP boundaries in the form of ArcGIS shape files was reviewed as part of the analysis of potential cultural resource impacts. In addition to those resources, Dominion Energy Virginia is considering potential effects on VDHR easements.

Three resources are currently under consideration per the VDHR tiers as described above. These include one historic resource that the VDHR considers potentially eligible for the NRHP: the Broad Run Ford and Ox Road (053-6416), a resource consisting of a road trace located approximately 0.25 mile from the Nimbus Line Loop at its nearest point and a ford located 0.4 mile from the Nimbus Line Loop. The Farmwell--Nimbus Line's southeast end is located approximately 0.5 mile from the Broad Run Ford. Although the Broad Run Ford and Ox Road has not been formally determined eligible for the NRHP by the VDHR, it is being treated as such for the purpose of this analysis. The other considered resources are two archaeological sites (44LD1602 and 44LD1603), neither of which have been evaluated for NRHP eligibility by the VDHR. Site 44LD1602 is intersected by the right-of-way of the Farmwell-Nimbus Line, while 44LD1603 is intersected by the right-of-way of the Nimbus Line Loop.

Many cultural resources in the Project vicinity have not been assessed for NRHP eligibility and, therefore, they are not included in the pre-application analysis, per VDHR Guidelines. Until they have been assessed and a determination has been made by the VDHR, they should be considered potentially eligible for listing in the NRHP. Likewise, there may be as-yet unreported historic and archaeological resources that may ultimately be affected by the proposed undertaking. Any such, resources will be addressed during the full cultural resource survey to be conducted following SCC approval of the Project routes.

Along with the records review carried out for the four tiers defined by the VDHR, D+A conducted field assessments of resource 053-6416 to characterize the nature of potential viewshed impacts that would result from each route alternative in accordance with VDHR Guidelines. Digital photographs of the resource and views toward the alternative transmission line routes were taken.

The S*tage I Pre-Application Analysis of Cultural Resources* report prepared by D+A is provided in Appendix F.

3.4.1 Archaeological Sites

Crossings of archaeological sites were considered a constraint in this study due to the potential for an electric transmission line to impact archaeological deposits in these areas (e.g., due to transmission structure placement, tree clearing or heavy equipment usage within a site). There are two known archaeological sites within the proposed rights-of-way of the route alternatives, and neither have been assessed for NRHP eligibility (Table 3.4.1-1). Although archaeological investigations are beyond the scope of the pre-application analysis, a preliminary review of aerial imagery suggests that the portions of these sites in the proposed rights-of-way are likely to have been destroyed by modern land use impacts.

Table 3.4.1-1: Archaeological Sites Mapped in Rights-of-Way for the Nimbus Line Loop and Farmwell-Nimbus Line

Location	Site Number	Description	NRHP Status
Farmwell-Nimbus Line	44LD1602	Twentieth century domestic site	Unevaluated
Nimbus Line Loop	44DL1603	Twentieth century road trace	Unevaluated

NRHP = National Register of Historic Places

3.4.2 Historic Resources and Architectural Sites

According to VDHR's tiered study area model, both route alternatives have the potential to affect one architectural resource (Table 3.4.2-1). The location of the resource in relation to the routes is depicted in Figure 3.4.2-1 in Appendix A. No ABPP study area, core area, or potential NRHP boundaries for battlefields are within the relevant tiers for the Nimbus Line Loop and Farmwell-Nimbus Line.

The considered resource that lies within VDHR tiers is presented in Table 3.4.2-1. It was subjected to field reconnaissance and a preliminary assessment of effects. The results of that assessment are summarized in Section 4.4.

Table 3.4.2-1: Historic Resources in Virginia Department of Historic Resources Tiers for Nimbus Line Loop and Farmwell-Nimbus Line

	Buffer (miles)	Considered Resources	Resource Number	Description
Nimbus Line Loop	1.0 to 1.5	NHLs	NA	No resources identified
Farmwell-Nimbus Line			NA	No resources identified
Nimbus Line Loop	0.5 to 1.0	NRHP properties (listed)	NA	No resources identified
Farmwell-Nimbus Line			NA	No resources identified
Nimbus Line Loop	0.0 to 0.5	NRHP properties (listed)	NA	No resources identified
Farmwell-Nimbus Line			NA	No resources identified
Nimbus Line Loop		NRHP-eligible	053-6416	Broad Run Ford and Ox Road
Farmwell-Nimbus Line			053-6416	Broad Run Ford and Ox Road
Nimbus Line Loop	within right-of-way	NRHP properties (listed)	NA	No resources identified
Farmwell-Nimbus Line			NA	No resources identified
Nimbus Line Loop		NRHP-eligible	NA	No resources identified
Farmwell-Nimbus Line			NA	No resources identified

NA = not applicable; NHL = National Historic Landmark; NRHP = National Register of Historic Places

3.4.3 Summary of Existing Survey Data Performed Under Section 106 or Section 110 of the National Historic Preservation Act

The majority of the area encompassed by the Project has been subject to previous cultural resource survey coverage. Research indicates that four prior Phase I cultural resource surveys have intersected portions of the transmission line routes (Table 3.4.3-1). The entire Farmwell-Nimbus Line has been surveyed, and all but two small segments (one consisting of the Loudoun County Parkway right-of-way) of the Nimbus Line Loop have been surveyed. All of the investigations were conducted in the relatively recent past and likely conformed to contemporary VDHR standards for systematic archaeological survey coverage.

Table 3.4.3-1: Cultural Resource Surveys Covering Portions of the Nimbus Line Loop and Farmwell- Nimbus Line

VDHR Survey #	Title	Author	Date
LD-332	Phase I Cultural Resources Survey of the Approximately 350-Acre DuPont-Fabros Development Tract, Loudoun County, Virginia	Circa-Cultural Resource Management, LLC	2011
LD-335	Phase I Architectural and Archaeological Survey of the Proposed Waxpool Route D Transmission Line Right-of-Way, Loudoun County, Virginia	Dutton & Associates	2013
LD-404	Roundtable Property, Loudoun County, Virginia: Phase I Cultural Resources Investigation	Thunderbird Archaeological Associates (Thunderbird Research Corp.)	2016
LD-412	Phase I Archeological Survey of the Proposed Presidential Golf Course, Dulles, Loudoun County, Virginia	Ottery Group	2005

3.5 Geological Constraints

The area traversed by the Project is located within the Piedmont geologic province, which is characterized by strongly weathered bedrock due to the humid climate, thick soils overlying saprolite (weathered bedrock), and rolling topography that becomes more rugged west near the Blue Ridge mountains. In general, the Piedmont province consists of several complex geologic terranes where faults separate rock units with differing igneous and metamorphic histories. Based on review of the Geologic Map of Virginia, the route alternatives are located within a basin that formed as the Atlantic Ocean began opening during the early Mesozoic Era. Within this Mesozoic-age basin, the bedrock underlying the Project area comprises Triassic-age sandstones, shales, and siltstones that were deposited between approximately 225 and 190 million years ago and subsequently intruded by fine-grained, dark-colored igneous dikes (William and Mary Department of Geology 2021).

3.5.1 Mineral Resources

ERM reviewed publicly available Virginia Department of Energy (2021) and USGS Mineral Resources Data System (1996) datasets, USGS topographic quadrangles, and recent (2021) digital aerial photographs to identify mineral resources in the Project area. Based on the review, no active mineral resources were identified within 0.5 mile of the Nimbus Line Loop or Farmwell-Nimbus Line. The closest active quarry is located approximately 2.7 miles southeast of the Nimbus Line Loop on the southeast corner of Route 606 and Route 636 near Herndon. The closest mineral occurrence is a copper mineralization located in a road outcrop on the northeast corner of Highway 28 and Route 625, approximately 1.1 miles east of the Nimbus Line Loop.

3.6 Existing and Planned Corridors within the Project Study Area

ERM identified existing and planned corridors within the Project study area through review of recent (2021) digital aerial photography, the *Loudoun County 2019 General Plan* (Loudoun County 2019a), the Loudoun County *2019 Countywide Transportation Plan* (Loudoun County 2019b), meetings with Loudoun County Department of Planning and Zoning, and various publicly available data layers. The existing corridors within the Project study area consist of existing electric transmission, electric distribution lines, utility easements, and major road corridors. The existing corridors were identified for the purpose of

assessing their potential use as routing or collocation opportunities. These existing corridors are described below.

3.6.1 Electric Transmission Corridors

Existing electrical transmission or distribution facilities are found within the Project study area, but none are suitable for collocation purposes. Rather, the Nimbus Line Loop would tap into Dominion's Line #2152 to connect with the Nimbus Substation. Electric transmission corridors also are located south of the Farmwell-Nimbus Line and Nimbus Line Loop, as well as east of the Numbs Line Loop. Figures 2.0-1 and 2.0-2 in Appendix A show the locations of the existing transmission corridors in relation to the route alternatives.

3.6.2 Major Road Corridors

Major road corridors within the Project study area include Loudoun County Parkway and Waxpool Road. The Nimbus Line Loop is collocated with Waxpool Road for a distance of 0.61 mile. This represents the most direct alignment for this route. Collocation of a route along Loudoun County Parkway was deemed infeasible due to a lack of space for the development a new transmission line along this roadway. The Farmwell-Nimbus Line is also collocated with Waxpool Road for a distance of 0.1 mile, and represent the most direct alignment for this route.

4. RESOURCES AFFECTED

Environmental conditions along the Nimbus Line Loop and the Farmwell-Nimbus Line were identified, mapped, and reviewed, as discussed in Section 3. Refer to Table 3-1 for a list of environmental features considered during the evaluation process. To further evaluate and consider the environmental advantages and disadvantages of each proposed route, the environmental features potentially affected by the routes were quantified for comparison purposes. A quantified environmental features comparison table for the route alternatives is presented in Table 4-1. Impacts associated with construction and operation of the Nimbus Substation are included in the existing environmental conditions and resources affected for Nimbus Line Loop. The locations of the Nimbus Line Loop and the Farmwell-Nimbus Line are described in Section 2.4. A discussion and comparison of each route's environmental advantages and disadvantages is presented below.

Table 4-1: Feature Crossings Table [a, b]

Environmental Feature	Unit	Nimbus Line Loop	Farmwell-Nimbus Line
Route			
Centerline length	miles	0.61	0.26
New right-of-way area [c]	acres	10.98	3.25
Land Use Features/Constraints			
Existing road crossings	number	1	1
Planned road crossings	number	0	0
Parcels crossed by right-of-way (total)	number	4	5
Private	number	4	5
Loudoun County Open-Space Easements crossed	acres	0.0	0.0
Planned developments crossed	number	2	0
Zoning			
Planned development-office park	miles acres	0.61 10.98	0.34 3.25
Planned development-industrial park	miles acres	0.0 0.0	0.0 0.0
Planned development-mixed use business	miles acres	0.0 0.0	0.0 0.0
Dwellings within 500 feet of centerline	number	0	0
Dwellings within 250 feet of centerline	number	0	0
Dwellings within 100 feet of centerline	number	0	0
Dwellings within right-of-way	number	0	0
Commercial buildings within right-of-way	number	0	0
Forest	acres	0.0	0.0
Developed	acres	6.46	2.53
Open space	acres	4.52	0.72

Environmental Feature	Unit	Nimbus Line Loop	Farmwell-Nimbus Line
Open water	acres	0.0	0.0
Waterbody crossings [d]	number	1	0
Perennial	number	0	0
Intermittent	number	1	0
Wetlands crossed by right-of-way total [d]	miles acres	0.02 0.39	0.0 0.0
Palustrine forested wetlands	acres	0.0	0.0
Palustrine emergent wetlands	acres	0.22	0.0
Riverine wetlands	acres	0.13	0.0
Freshwater pond	acres	0.04	0.0
Forested land crossed	acres	0.0	0.0
Areas of ecological significance crossed (SCUs)	number	0	0
Bald eagle nests within 330 feet (CCB 202)	number	0	0
Bald Eagle Nests Within 660 Feet (CCB 2021)	number	0	0
Archaeological sites (VDHR) within right-of-way	number	1	1
Architectural resources (VDHR) within right-of-way (battlefields listed below)	number	0	0
NRHP-eligible and NRHP-listed properties, battlefields, historic landscapes, and NHLs within 0.5 mile	number	1	1
NRHP-listed properties, battlefields, historic landscapes, and NHLs between 0.5 and 1.0 mile	number	0	0
NHLs between 1.0 and 1.5 miles	number	0	0
Historic districts (VDHR) crossed	miles	0	0
NRHP-listed battlefield (VDHR) crossed	number	0	0
NRHP-eligible battlefield (VDHR) crossed	number	0	0
Easements (VDHR) crossed	number	0	0
Battlefields (National Park Service ABPP)	number	0	0
Total collocation	miles	0.61	0.14
Existing transmission lines	miles	0.0	0.02
Roads	miles	0.61	0.10

ABPP = American Battlefield Protection Program; NHL = National Historic Landmark; NRHP = National Register of Historic Places; SCU = stream conservation unit; VDHR = Virginia Department of Historic Resources

[a] The sum of the addends may not equal the totals due to rounding.

[b] The crossing lengths presented in this table for all feature categories are based on hypothetical centerlines within the right-of-way for each route alternative.

[c] Each route would require new right-of-way easements for its entire length. This number represents the total right-of-way required for each route and includes the Nimbus Substation.

[d] This is based on results of the desktop waterbody and wetlands study (see Appendix D).

4.1 Land Use

4.1.1 Land Ownership/Land Use

The Nimbus Line Loop crosses a total of 0.61 mile of land affecting 10.98 acres of right-of-way (including 3.60 acres for the proposed Nimbus Substation). A total of four parcels are crossed by the route, all of which are privately owned lands. Land use crossed by the Nimbus Line Loop includes 4.52 acres of open space and 6.46 acres of developed land. No forested lands or open water land use classes are crossed.

The Farmwell-Nimbus Line crosses a total of 0.26 mile of land affecting 6.85 acres of right-of-way. A total of five parcels are crossed by the route, all of which are privately owned lands. The land uses crossed by the Farmwell-Nimbus Line includes 0.72 acre of open space and 2.53 acres of developed land. No forested lands or open water land use classes are crossed.

4.1.2 Recreational Use

No existing recreation areas are located within 0.25 mile of either the Nimbus Line Loop or the Farmwell--Nimbus Line. The Chick Ford Field and Ryan Bickel Field is located 0.7 mile west of the Farmwell Substation. Views of the Project would be blocked by trees and buildings in-between the route and the park. Therefore, no impacts on the park are anticipated. The W&OD Park is located 0.8 mile north of the Nimbus Line Loop and would not be visible from the Project. The intervening area between the Project and the W&OD Park has been heavily developed. Finally, the 1757 Golf Club is located 0.1 mile east of the cut-in location for the Nimbus Line Loop. Significant tree cover is present along Broad Run, which is located between the route and the golf course. In addition, multiple existing transmission lines are located in this area.

4.1.3 Existing and Planned Development

4.1.3.1 Centurion

The Centurion project, which is located within the Quantum Park area, is an existing commercial development. The Farmwell-Nimbus Line is situated within 0.05 mile of this development. The Farmwell--Nimbus Line would have no direct impacts on the Centurion development.

4.1.3.2 Loudoun Center Data Center Campus

The Loudoun Center Data Center Campus project is a commercial use data center development. Two buildings have been have completed at the site, and the final building is under construction. The Nimbus Line Loop would cross the northern boundary of this development, adjacent to Waxpool Road. Dominion coordinately closely with property owner regarding the siting of the Nimbus Line Loop and the Farmwell-Nimbus Line to ensure that the Project would not impact the development and operation of the Loudoun Center Data Center Campus.

4.1.3.3 Digital Loudoun

The Digital Loudoun project is an existing, commercial data center development that currently includes four data center buildings. The Nimbus Line Loop would cross the northern boundary of the Digital Loudoun development adjacent to Waxpool Road. Dominion has coordinated closely with Digital Loudoun to ensure that the Nimbus Line Loop would not impact operation of the data center complex.

4.1.3.4 Equinix East Campus

The Equinix East Campus project is a commercial data center development that will include six data center buildings. One of the data center buildings has been constructed. The development is located along the north side of Waxpool Road at the intersection of Waxpool Road and Loudoun County Parkway. The Equinix East Campus is situated 0.2 mile north of the Nimbus Line Loop and would not be directly impacted by the construction of the Project.

4.1.3.5 NTT Global Data Centers (NTT VA6 and VA7)

The NTT VA6 and VA7 development project is a commercial data center development that includes seven data center buildings. Currently, three of the buildings have been constructed. The project is located approximately 0.15 mile west of the Farmwell Substation. The development would not be directly impacted by the construction of the Project.

4.1.4 Conservation Lands

As discussed in Section 3.1.6, several different types of easements are located throughout Loudoun County; however, none of them are located in the Project study area or within 0.5 mile of either of the route alternatives.

The BOS Open-Space Easements are located at the far northern and western ends of the Project study area and are not crossed by either the Nimbus Loop Line or the Farmwell to Nimbus Line. The Project would have no impacts on these easements.

4.1.5 Transportation

Most of the Nimbus Line Loop and a segment of the Farmwell-Nimbus Line parallel Waxpool Road. The Nimbus Line Loop crosses Loudoun County Parkway at the intersection of Loudoun County Parkway and Waxpool Road. The crossing of the roadway would be spanned. As discussed in Section 3.1.7, a small road construction project is planned at the intersection of Loudoun County Parkway and Waxpool Road. The project would entail the addition of an acceleration turn lane from northbound Loudoun County Parkway to eastbound Waxpool Road. The Nimbus Line Loop would not impact this road project, as the transmission structures for the Nimbus Line Loop would span the additional lane area.

Temporary closures of roads and or traffic lanes would be required during Project construction. No long-term impacts on roads are anticipated. The Company will comply with VDOT requirements for access to the rights-of-way from public roads, as well as the underground crossings of the roads. At the appropriate time, the Company will obtain the necessary VDOT permits as required and comply with permit conditions.

4.1.6 Airports

Dominion reviewed the height limitation associated with FAA-defined imaginary surveys for all runways associated with the Dulles Airport and all other public or private registered airfields to determine whether any of the tower heights associated with each specific tower location would penetrate any of the relevant flight surfaces for any of the runways. Dominion conducted a preliminary evaluation of the tower heights and locations using the FAA-defined Civil and Department of Defense Airport Imaginary Surfaces and applying standard GIS tools, including ESRI's ArcMap 3D and Spatial Extension software. This software was used to create and geo-reference the imaginary surfaces in space and in relationship to the transmission towers.

Dulles Airport was the only airport/heliport that had the potential to impact the height limitations of the Project towers. The ground surface data for the Project area was derived by using USGS 10-Meter Digital Elevation Model. Civil airport imaginary surfaces have been established by the FAA with relation to each airport and each runway. The imaginary surfaces were developed to prevent existing or proposed objects from extending from the ground into navigable airspace. The civil Airport Imaginary Surfaces evaluated for the Project include the following:

- **Horizontal surface at 463 feet above mean sea level (AMSL):** This is a horizontal plane 150 feet above the established airport elevation of 313 feet AMSL, the perimeter of which is constructed by swinging arcs of radius 10,000 feet from the center of each end of the primary surface of each runway and connecting the adjacent arcs by lines tangent to those arcs.
- **Conical surface**: This is a surface extending outward and upward from the periphery of the horizontal surface at a slope of 20 to 1 for a horizontal distance of 4,000 feet. The conical surfaces for this airport have an elevation that extends from 313 feet to 513 feet AMSL.
- **Primary surface**: This is a surface longitudinally centered on the runway. The primary surface extends 200 feet beyond each end of the runway. The elevation of any point on the primary surface is the same as the elevation of the nearest point on the runway centerline (313 feet AMSL). The width of the primary surface is 1,000 feet.
- **Approach surface**: This is a surface longitudinally centered on the extended runway centerline and extending outward and upward from the end of each primary surface. The inner edge of the approach surface is the same width as the primary surface, and it expands uniformly to a width of 16,000 feet. The approach surfaces extend for a horizontal distance of 10,000 feet at a slope of 50 to 1 with an additional 40,000 feet at a slope of 40 to 1.
- **Transitional surface**: These surfaces extend outward and upward at right angles to the runway centerline and the runway centerline extended at a slope of 7 to 1 from the sides of the primary surface and from the sides of the approach surfaces.

The Project would be within approximately 2.7 miles of Runway 19C of the Dulles Airport. The airport surveyed ground elevation is 313 feet AMSL. The ground elevation in the Project vicinity ranges from 225 feet AMSL on the eastern end of the Project to 270 feet AMSL at the western end. The Project is located approximately 14,000 feet north of the end of Runway 19C. Based on the ground elevation in the Project area and the distance from the end of the nearest runway, there would be no potential for impacts on any of the imaginary surfaces or TERPS imaginary surfaces associated with the Dulles Airport. Structures associated with the Project area would range from 110 to 140 feet in height. Based on the proposed structure heights, the tops of the towers would be no closer than 230 feet below the approach surface for Runway 19C.

Since the FAA manages air traffic in the United States, it will evaluate any physical objects that may affect the safety of aeronautical operations through an obstruction evaluation. If required during the permitting process, Dominion will submit an FAA Form 7460-1, Notice of Proposed Construction or Alteration, pursuant to 14 CFR Part 77, for any tower locations that meet the review criteria.

4.1.7 Environmental Justice

The Project study area extends far beyond areas where Project impacts are anticipated. The Nimbus Line Loop and Substation and the Farmwell-Nimbus Line cross one CBG with populations of color that exceeds the state and Loudoun County averages. No CBGs with low-income populations, minority and low-income populations, linguistically isolated, or age populations are crossed that exceed the state average. However, potential EJ communities were identified within the desktop analysis area. Because

one of the CBGs contains households with language barriers that exceeds the state average, Dominion translated Project materials to Spanish, and posted the English and Spanish versions of the postcard to the Project website to provide an opportunity for feedback and participation in the Project's virtual public community meetings.

In assessing whether a community would bear a disproportionate impact of the negative environmental and health-related effects of the Project, ERM considered temporary construction impacts, visual impacts, property values, and electric and magnetic fields.

Impacts associated with the construction of the Project are considered temporary. Various regulations, industry standards, and best management practices would guide construction and restoration of the rights-of-way. The temporary construction impacts may include noise, general ground disturbance, and changes in traffic patterns.

During construction, temporary, localized noise from heavy equipment is expected to occur along the right-of-way during daytime hours. Because the land is zoned for industrial / commercial use and development, residences (typical noise receptors) are about 0.4 mile or more from the Project, and no residences are located within 500 feet of the routes (see Section 3.1.3). Exceedances of local noise limits are not expected.

Construction may require occasional road lane closures. However, lane closures would be short-term and only last for the duration of construction activity in a given area (e.g., likely a few hours). Dominion will acquire a VDOT permit and comply with stipulations to mitigate traffic disruptions. During operation, the long-term presence of the new facilities associated with the Project are not expected to result in visual impacts on EJ populations because they cross developed areas and commercial/industrial land rather than visually sensitive areas. The visual assessment generally identifies the main viewers as commuters/through travelers, as well as hotel and restaurant staff and customers. Overall, there would be low, and in a few cases moderate, impacts on the scenic quality for these viewer groups (see Section 4.3).

Indirect impacts on property value caused by direct visual impacts of high-voltage transmission lines (i.e., lines carrying more than 69 kV) depend on proximity, visibility, size and type of transmission structures, easement landscaping, and surrounding topography. Based on a review of peer-reviewed and industry research published in peer-reviewed journals and trade journals, residential property values and sales prices are primarily affected by factors unrelated to the presence of a transmission line. Other factors, such as location, type and condition of improvements to the property, neighborhood, and local real estate market conditions, are shown through research to have greater influence on the value of residential property than the presence of a transmission line (Jackson and Pitts 2010; Anderson et al. 2017). Because the Project crosses developed areas and commercial/industrial land, and no residential dwellings are close proximity to the routes, the Project is unlikely to result in property devaluation.

Scientific evidence does not show that common sources of electric and magnetic fields in the environment, including transmission lines and other parts of the electric system, appliances, etc., are a cause of any adverse health effects. As such, the impacts of constructing and operating either of the route alternatives on the natural and human environments are not anticipated to be significant.

The desktop review does not suggest that an EJ population would bear disproportionate impacts related to negative environmental and health-related effects of the Project. Should outreach reveal that there are EJ community concerns in the Project area, Dominion developed project communications or outreach designed to allow stakeholders, including EJ communities, to participate in review of the Project and provide meaningful input so their views can be considered by Dominion.

4.2 Natural Resources

4.2.1 Wetlands

To minimize impacts on wetland areas, the transmission lines have been designed to span or avoid wetlands where possible. Most of the wetlands in the area are associated with streams and rivers, and it is anticipated that these features can be spanned keeping tower locations outside of wetlands. Where the removal of trees or shrubby vegetation occurs within wetlands, Dominion would use the least intrusive method reasonably possible to clear the corridor. Hand-cutting of vegetation would be conducted, where needed, to avoid and minimize impacts on streams and/or wetlands. There would be no change in contours or redirection of the flow of water, and the amount of spoilage from foundations and structure placement would be minimal. Excess soil in wetlands generated through foundation construction would be removed from the wetland.

Mats or temporary bridging would be used for construction equipment to travel over wetlands, as appropriate. Due to the absence of an existing right-of-way, some new access roads may be necessary along the route. If a section of line cannot be accessed from existing roads, Dominion may need to install a culvert, ford, or temporary bridge along the right-of-way to cross small streams. In such cases, some temporary fill material in wetlands adjacent to such crossings may be required. This fill would be placed on erosion control fabric and removed when work is completed, returning ground elevations to original contours. Potential direct impacts on wetlands would be temporary in nature.

Upon SCC approval of a route and final line engineering, Dominion will obtain the appropriate permits from the USACE and VDEQ for work within wetlands and waterbodies to ensure full compliance with Section 404 and 401 of the CWA and minimize potential impacts on aquatic resources located within the transmission line corridor.

The Nimbus Line Loop is approximately 0.61 mile and encompasses a total of approximately 10.98 acres. Based on the methodology utilized for ERM's desktop wetland and waterbody analysis in Appendix D, the right-of-way would encompass approximately 4.2 percent (0.46 acre) of land with a medium or higher probability of containing wetlands. Of the 0.46 acre, 0.04 acre are freshwater pond, 0.21 acre consist of palustrine emergent, and 0.21 acre consist of riverine wetland area.

The Farmwell-Nimbus Line is approximately 0.26 mile and encompasses a total of approximately 3.25 acres of right-of-way. Based on the methodology utilized in ERM's desktop wetland and waterbody analysis in Appendix D, the right-of-way would not encompass land with a medium/high or higher probability of containing wetlands and waterbodies.

4.2.2 Waterbodies

Short-term, minor water quality impacts could occur during the construction of the Project. Such impacts would be associated with the soils from disturbed areas being transported by stormwater into adjacent waters during rain events. Increased turbidity and localized sedimentation of the stream bottom may occur as a result of the runoff. However, these impacts would be significantly reduced by implementation of Dominion Energy Virginia's erosion control measures, including the installation of erosion control structures and materials.

Waterways crossed by the Project would be spanned; therefore, direct impacts are not anticipated. Where clearing of trees and/or woody shrubs is required, clearing within 100 feet of a stream would be conducted by hand. Vegetation would be at or slightly above ground level, and there would be no grubbing of stumps. Dominion Energy Virginia would use sediment barriers along waterways and steep slopes during construction to protect waterways from soil erosion and sedimentation. If a section of line cannot be accessed from existing roads, Dominion Energy Virginia may need to install a culvert or

temporary bridge to cross small streams. In such case, there may be some temporary fill material required that would be placed on erosion control fabric and removed when work is completed, returning the surface to original contours.

The Nimbus Line Loop is approximately 0.61 mile and encompasses a total of approximately 10.98 acres. Based on ERM's desktop wetland and waterbody analysis, the right-of-way contains one intermittent waterbody, a tributary to Broad Run, located west of the intersection of Waxpool Road and Loudoun County Parkway. As the waterbody would be spanned by the route, minimal impacts on this waterbody are anticipated. Within the proposed Nimbus Substation footprint, one waterbody feature was identified by NHD and NWI within the substation footprint; however, based on current aerial photographs (2021), this feature no longer appears to exist.

The Farmwell-Nimbus Line is approximately 0.26 mile and encompasses a total of approximately 3.25 acres of right-of-way. Based on ERM's desktop wetland and waterbody analysis, the right-o-way for the Farmwell-Nimbus Line would not impact any waterbodies.

4.2.3 Areas of Ecological Significance

According to the Project review completed by the VDCR on November 3, 2021, the Nimbus Line Loop and the Farmwell-Nimbus Line do not cross any areas of ecological significance and, therefore, they would not affect conservation sites, SCUs, general location areas for natural heritage resources, or state natural area preserves. The VDCR did not identify any ecological cores that would be crossed by the Project.

4.2.4 Protected Species

4.2.4.1 Federally and/or State-Listed Species

Three federally listed and 13 state-listed species (which includes the 3 federally listed species) were identified that may potentially occur within the Project area. These species are identified in Table 4.2.4-1, along with potential impacts anticipated to result from the Project according to this study. Based on landscape and vegetation within the Project area, it is unlikely these habitat types each would have potential to provide suitable habitat for one or more of the species identified in Table 4.2.4-1.

Of the 13 species identified, only the Wood turtle and Henslow's sparrow have been historically documented by state agencies to have the potential to occur in areas adjacent to or crossed by the Nimbus Line Loop or the Farmwell-Nimbus Line. Dominion will coordinate with state and federal agencies as needed to determine if any surveys, construction-timing windows, or other mitigation would be required for the Project.

Table 4.2.4-1: Federal and State-Listed Species

Common Name	Scientific Name	Species Information/Habitat	Results and Potential Impacts
FEDERALLY LISTED SPECIES			
Mammals			
Northern long-eared bat	*Myotis septentrionalis*	Generally associated with old-growth or late successional interior forests. Partially dead or decaying trees are used for breeding, summer day roosting, and foraging. Hibernation occurs	Species not confirmed as present, and no known hibernacula or maternity roost trees are documented within the Project area. Project would require minimal tree clearing; however, given lack of confirmed species presence, impacts are not anticipated.

Common Name	Scientific Name	Species Information/Habitat	Results and Potential Impacts
		primarily in caves, mines, and tunnels.	
Invertebrates			
Dwarf wedgemussel	*Alasmidonta heterodon*	Deep quick running water on cobble, fine gravel, or on firm silt or sandy bottoms.	Species not confirmed as present, and no instream work would be performed. No impacts are anticipated.
Yellow lance	*Elliptio lanceolata*	Main channels of drainages and streams as small as approximately 3.28 feet across with clean, coarse, medium-sized sand or gravel substrate.	Species not confirmed as present, and no instream work would be performed. No impacts are anticipated.
STATE-LISTED SPECIES			
Mammals			
Little brown bat	*Myotis lucifugus*	Roosts in caves, buildings, rocks, trees, under bridges, and in mines and tunnels. Found in all forested regions of the state.	Species not confirmed as present, and no hibernaculum identified within 0.5-mile-radius of the Project. No impacts are anticipated.
Tri-colored bat	*Perimyotis subflavus*	Typically roost in trees near forest edges during summer. Hibernate deep in caves or mines in areas with warm, stable temperatures during winter.	Species not confirmed as present, and no hibernaculum identified within 0.5-mile-radius of the Project. No impacts are anticipated.
Invertebrates			
Appalachian grizzled skipper	*Pyrgus Wyandot*	Semi-open slopes with sparse herbaceous vegetation and exposed rock or soil.	VaFWIS Search Report listed as not confirmed. No impacts are anticipated.
Brook floater	*Alasmidonta varicosa*	Creeks and small rivers, found among rocks in gravel substrates and in sandy shoals, flowing-water habitats only.	VaFWIS Search Report listed as not confirmed, and no instream work would be performed. No impacts are anticipated.
Green floater	*Lasmigona subviridis*	Small to medium streams in quiet pools and eddies with gravel and sand substrates.	VaFWIS Search Report listed as not confirmed, and no instream work would be performed. No impacts are anticipated.
Birds			
Henslow's sparrow	*Ammodramus henslowii*	Open grasslands with few or no woody plants and tall dense grasses and litter layer.	Confirmed as "Potential" in VAFWIS Search Report. This species lives among dense grasses and spends much of their time on the ground. Appropriate habitat does not seem to be present. Coordination with the VDWR will be needed to determine if surveys and/or construction timing windows are needed for the Project.
Loggerhead shrike	*Lanius ludovicianus*	Open country with scattered shrubs and trees or other tall structures for perching.	VaFWIS Search Report listed as not confirmed. No impacts are anticipated.

Common Name	Scientific Name	Species Information/Habitat	Results and Potential Impacts
Migrant Loggerhead shrike	*Lanius ludovicianus migrans*	Open country with scattered shrubs and trees or other tall structures for perching.	VaFWIS Search Report listed as not confirmed. No impacts are anticipated.
Peregrine falcon	*Falco peregrinus*	Tall structures, such as power line poles, buildings, and rock ledges, in generally open landscapes.	VaFWIS Search Report listed as not confirmed. No impacts are anticipated.
Reptiles			
Wood turtle	*Glyptemys insculpta*	Forested floodplains, fields, wet meadows, and farmland with a perennial stream nearby.	Confirmed as "Potential" in VAFWIS Search Report. No instream work would be performed, and no forested floodplains would be cleared. Coordination with the VDWR will be needed to determine if surveys and/or construction timing windows are needed for the Project.

Sources: USFWS 2021; VDCR 2021a; VDWR 2021a, 2021b

VaFWIS = Virginia Fish and Wildlife Information Service; VDWR = Virginia Department of Wildlife Resources

4.2.4.2 Bald Eagle Management

The study area is not located within an eagle concentration area, and neither the Nimbus Line Loop or the Farmwell-Nimbus Line are located within the primary or secondary buffers of any documented eagle nest locations. The cut-in location of the Nimbus Line Loop is approximately 1,605 feet (0.30 mile) north of a known eagle nest (nest code LD 1901); the nest is outside the 660-foot management buffer. The nest was last occupied in 2019. If additional eagle nests are identified within 660 feet of the Project's right-of-way, Dominion will work with the appropriate jurisdictional agencies to minimize any impacts on this species.

4.2.4.3 Federally Listed Species of Concern and Other Documented Occurrences

No federally listed species of concern were identified in the USFWS IPaC review of the Project area.

4.2.5 Vegetation

ERM reviewed publicly available recent (2021) Loudoun County aerial photography to calculate impacts on vegetation. Herbaceous vegetation could be temporarily affected by construction and vehicular movement. In forested areas, trees would be cleared from the right-of-way during construction and maintained with an herbaceous cover during operation. Disturbed areas resulting from use of temporary workspace would revert back to preconstruction vegetative conditions. As shown in Table 4.2.5-1, the vegetation resource primarily affected by the route alternatives would be developed and open space land.

Table 4.2.5-1: Vegetation Impacts

Vegetation Type	Nimbus Line Loop (acres)	Farmwell-Nimbus Line (acres)
Developed	6.46	2.53
Open space	4.53	0.72

Vegetation Type	Nimbus Line Loop (acres)	Farmwell-Nimbus Line (acres)
Forested	0.0	0.0
Open water	0.0	0.0
Total	**10.98**	**3.25**

4.3 Visual Assessment

The purpose of this visual assessment was to:

- Define the aesthetic components evaluated for the Nimbus Line Loop and the Farmwell-Nimbus Line;
- Inventory and evaluate existing visual sensitive features and user groups within the study area;
- Describe the appearance of the visible components of the Project facility;
- Evaluate potential facility visibility within the study area;
- Identify key observation points (KOP) for visual assessment;
- Assess the visual impacts associated with the Project facility; and
- Determine the need for visual mitigation and propose conceptual mitigation options.

To assess potential visual impact on VSRs associated with the Nimbus Line Loop and the Farmwell--Nimbus Line, ERM reviewed aerial photographs, online resources, and local outreach. Specific user groups considered, as identified above, include local residents/workers, commuters/through travelers, hotel occupants, and restaurant diners. In addition, visual simulations were prepared for the proposed route and substation expansion. Five visual simulations were prepared from five KOPs, associated with the Nimbus Line Loop, aimed at capturing potential views that represent associated VSRs and user groups. No KOPs were prepared for the Farmwell-Nimbus Line as no visually sensitive resources were identified along this route. A field investigation was undertaken on September 30, 2021, to assess possible visual impacts on visually sensitive features and user groups that each alternative introduces.

For the routes considered, the new rights-of way would result in a visible change due to vegetation clearing and a new transmission line crossing an area where clearing, structures, and associated equipment did not previously exist. There are a number of existing transmission and distribution corridors both in and adjacent to the study area, which primarily are concentrated south and east of the Project area. The Project would have potential impacts on users of Waxpool Road and Loudoun County Parkway.

As discussed in Section 3.3, Waxpool Road has the highest number of users traveling along its corridor within the study area; however, the landscape is not highly scenic, and the most common user group (commuters/through travelers) have a low sensitivity to visual change. The hotel occupants and staff at the Embassy Suites hotel on Waxpool Road, just north across the street from the Nimbus Substation, are another user group that would likely be impacted by the Project facilities. Restaurant diners and staff at Ashburn Eats rounds out the VSRs and user groups possibly affected in the study area that would experience the landscape on a daily basis. This user group would have a similar sensitivity to the commuters/through travelers in the area.

4.3.1 Key Observation Point Selections

In evaluating visual impacts for Project, KOPs were identified in consultation with Dominion. KOP coordinates were loaded into a resource-grade global positioning system and prepared for further data collection.

Based on VSR research, the use of aerial photography, and on-site reconnaissance, a total of five KOPs were identified and chosen to be developed into visual simulations. The KOPs were chosen to represent the criteria/conditions below:

- Illustrate visibility from specific VSRs;
- Illustrate representative views that would be available to identified user groups;
- Illustrate the proposed route and the construction of the Nimbus Substation; and
- Provide open views of the Project structures and vegetative clearing.

Table 4.3-1 lists the selected KOPs, information about their individual locations, and reason for being included.

Table 4.3-1: Key Observation Points

KOP #	Latitude/Longitude	Location	Reason for Inclusion
1	39.013465°, 77.462778°	Entrance to Embassy Suites hotel along Waxpool Road	■ View of Nimbus Substation, proposed route, and associated clearing ■ Represents views from hotel, as well as views from travelers along Waxpool Road ■ An identified VSR
2	39.013685°, 77.460889°	Ashburn Eats dining area (44640 Waxpool Road)	■ View of the proposed route associated with restaurant diners and local workers ■ An identified VSR
3	39.012534°, 77.459637°	On Waxpool Road adjacent to Extra Space Storage	■ View of the proposed route associated with commuters / through travellers
4	39.011969°, 77.457022°	At the intersection of Loudoun County Parkway and Waxpool Road	■ View of the proposed route associated with commuters / through travellers and local residents/workers
5	39.010434°, 77.454515°	On Waxpool Road	■ View of proposed route

KOP = key observation point; VSR = visually sensitive resource

4.3.2 Visual Simulation Development Approach

4.3.2.1 Visualization Tools Approach

Visual resources in both urban and rural environments are becoming increasingly important to the public. Often these impacts are perceived rather than actual. This analysis relies on visual simulations to accurately depict the potential changes to the landscape.

A visual simulation is a photorealistic computer representation of a proposed project based on site photography and engineered data. These simulations are routinely used to demonstrate before and after construction conditions, alternative analysis, material/design comparison, mitigation measures and long--term maintenance and monitoring plans. Visual simulations explain visual changes to the environment, within the context of the public viewshed.

4.3.2.2 Visual Simulation Methodology

Visual simulations of the proposed Project were developed according to the steps and conditions below:

- Photographic imagery: Imagery of the proposed Project location were captured using the appropriate focal length to accurately represent the proposed technology.
    - Reference conditions: The following conditions / information were documented to enhance rendering accuracy.
        - Date, time of day (hour/minutes): Determines color of sunlight, shadow location, and irradiance levels.
        - Atmospheric conditions: Haze and light diffusion have an impact on contrast at distance and amount of ambient light.
        - Lens length: Determines amount of parallax and depth of field between objects in view.
        - Available reference photography: Used to accurately represent color temperature, saturation, and contrast.
- 3D existing conditions modeling: An existing conditions 3D model of the study area, including terrain, vegetation, and structures, was created. The 3D model was geo-referenced and compiled with aerial imagery and available LiDAR data to ensure spatial accuracy. Structures, vegetation clusters, and skylines were cross referenced with LiDAR data and reference imagery to ensure accurate representation of scale and placement within the visual simulation.
- 3D sun and atmospheric conditions: Atmospheric data were imported into the 3D model to develop a sun and atmospheric system that matches the location specific reference data.
- 3D proposed Project development: Based on computer aided design, GIS and power line systems computer-aided design data provided by the client, a 3D model of the Project was constructed. All information was imported into the 3D existing conditions model using the same geo-reference and projection was then validated for accuracy. 3D materials and associated specular reflectance information was applied to the proposed 3D information.
- Visual simulation: After all information was properly located in the 3D model, a photograph that best represents the resource highlighted is aligned, atmospherics checked, and materials applied. The 3D information was then rendered using highly accurate raytraced render engines. Rendered elements were separated into multiple passes including foreground and background layers to allow for precise compositing and fine-tuning using photo editing software.
- Photo editing software: The use of photo editing software was necessary to achieve realistic representation of referenced 3D components within the photograph. Atmospherics, grunge, and vegetation depicted in the 3D model were then fine-tuned to match the existing conditions photo. Additional imagery was cross-referenced to ensure accurate depiction camera effects like chromatic aberration, noise, and depth of field.

Each KOP has a selection of visual simulations representing the Project. Below is an assessment of the existing conditions and potential changes that may occur from the Project. Visual simulations are provided in Appendix E. The proposed structure locations for the various routes are depicted on Figure 4.3-1 in Appendix A.

Key Observation Point 1

Existing Conditions: KOP 1 is looking south from the parking lot entrance to the Embassy Suites hotel at 44610 Waxpool Road. This KOP faces Waxpool Road at a stoplight intersection of the six-lane arterial road. A grassy median separates the westbound and eastbound lanes. The intersection allows for a view of the current location of the proposed Nimbus Substation and the LC2 - Data Center.

Visual Simulation: The visual simulation illustrates the change in visual conditions from the installation of the proposed transmission lines and construction of the Nimbus Substation. At this viewpoint, the proposed transmission lines would be visible as they transition into the proposed Nimbus Substation on the right side of the frame, across Waxpool Road. A slightly noticeable change would be observed from the removal of young trees that are currently immediately adjacent to the substation and located on the southern side of Waxpool Road. From this viewpoint, the most noticeable change would be from installation of the transmission lines and construction of the Nimbus Substation, including the border fencing and infrastructure that would still be noticeable above the fence line. Viewers' sensitivity to visual change at this location would be mixed, with commuters / through travelers and hotel staff being the most affected, while hotel occupants would likely not notice the change, as they would likely not be local residents and would not be aware of the existing conditions. The proposed transmission line structures would be a silver / metallic color that would partially blend in with the surrounding infrastructure but would still be noticeable to all user groups. The change in landscape based on introduction of the Nimbus Line Loop and the Farmwell-Nimbus Line and construction of the Nimbus Substation has a moderate impact on scenic quality at this KOP. Overall, introduction of the transmission lines and construction of the Nimbus Substation would have low to moderate impact on the scenic quality from KOP 1, which has been identified as a VSR.

Key Observation Point 2

Existing Conditions: The viewpoint from KOP 2 is facing south across Waxpool Road and the parking lot at Ashburn Eats, located at 44640 Waxpool Road. Parked cars and maintained trees associated with islands in the parking lot dominate the foreground with the LC2 - Data Center visible in the background. Mature trees are scattered throughout the foreground, with additional mature trees, shrubs, and the existing transmission lines in the middle ground. The existing parking lot lights and trees create vertical elements that are backlit by the sky, creating a visual contrast.

Visual Simulation: This simulation was completed to represent the viewpoint of diners and staff at Ashburn Eats and how their daily views might be altered by the Nimbus Line Loop. Noticeable in the simulation is the existing LC2 - Data Center located in the center background of the view. Because of the distance from the viewer, the existing trees, and light poles, the building remains below the tallest element in the view limiting the visibility and potential impact. The proposed transmission line is the primary addition to the viewpoint. Because there is an existing distribution line present on the north side of Waxpool Road that is present in the viewpoint, the visual impact is minimized but not eliminated. Viewers from this vantage point would notice the taller Nimbus Line Loop, particularly the conductors, and not necessarily the new transmission line structures. The introduction of the proposed transmission line would not dominate the view but would rather only be slightly noticeable for the diners and staff at Ashburn Eats. The existing vegetation in the foreground and middle ground would remain, and no vegetation removal would occur. Overall, the introduction of the Nimbus Line Loop would have low impact on the scenic quality from KOP 2, which has been identified as a VSR.

Key Observation Point 3

Existing Conditions: KOP 3 is looking southwest from the northern sidewalk of Waxpool Road, just outside of the Extra Space Storage facility. The view captures the six-lane road divided by a median that is partially covered in grass. The middle ground captures the southern side of Waxpool Road and the vegetative cover consisting of grass, low lying shrubs, and young trees. The background is dominated by the LC2 - Data Center. The right side of the view faces west down Waxpool Road, with some existing distribution lines and poles visible on the north sides of the road, which add to the human-made vertical elements.

Visual Simulation: This simulation illustrates the Nimbus Line Loop running parallel to Waxpool Road on the south side of the road and turning south into the Nimbus Substation. The introduction of the tall transmission line structures and conductors would create a slightly more industrial feel than the existing condition, as well as clearing a portion of the adjacent vegetation on the southern side of Waxpool Road. Considering the metallic-colored LC2 - Data Center in the background dominates the view, the introduction of the transmission line and metallic-colored structures in the middle ground would create vertical and linear contrasts, resulting in minor to moderate impacts on the scenic quality. Vegetation removal would be limited to the existing young trees in the proposed right-of-way. The trees would be replaced with shorter shrub vegetation and reduce the adverse impacts. However, the user group most impacted would be commuters / through travelers, who would be exposed to the proposed transmission line for a short distance as they travel east or west on Waxpool Road. Therefore, the introduction of the Nimbus Line Loop would have low impact on the scenic quality from KOP 3.

Key Observation Point 4

Existing Conditions: KOP 4 faces south near the four-way intersection of Loudoun County Parkway and Waxpool Road. This viewpoint includes a grassy traffic median and three trees in the foreground, the stoplights at the intersection and the Digital Realty Building P Data Center in the middle ground, and mature trees that fade into the distance in the background. On the right side of this view is an elevated vegetated berm, with several young trees and covered with grass.

Visual Simulation: This simulation illustrates the Nimbus Line Loop as it runs east/west along Waxpool Road. At this viewpoint, the introduction of the transmission line is clearly visible, primarily because there are no existing transmission lines or distribution lines in this corridor. The proposed transmission line structures are taller than the Digital Realty Building P Data Center and the vegetation in the area, adding a new vertical element to the view. The Digital Realty Building P Data Center in the middle ground still dominates the view. Limited vegetation removal is noticeable on the elevated berm on the right side of this simulation. The trees in the foreground partially obstruct the view of the proposed transmission line from this vantage point. The user group most impacted would be commuters / through travelers, who would be exposed to the proposed transmission line for a short distance as they travel through this four--way intersection at Waxpool Road and Loudoun County Parkway. Overall, the introduction of the Nimbus Line Loop within this view would have a low impact on the scenic quality, and minimal impacts are anticipated for the commuter / through traveler user group.

Key Observation Point 5

Existing Conditions: KOP 5 has the lowest scenic quality of all the views, looking west across Waxpool Road at the intersection of Beaumeade Circle and Waxpool Road. The Digital Realty Building P Data Center dominates the view from this KOP while the existing distribution lines in the middle ground are also noticeable. The LC2 - Data Center is visible in the background on the right side of this frame. The elevated vegetated berm is also noticeable on the right side of the frame in the background. There are also trees on the left side of this frame adjacent to the Digital Realty Building P Data Center. Traffic

signals at the intersection of Waxpool Road and Loudoun County Parkway are visible to the west and provide contrast in color against the blue background sky.

Visual Simulation: This simulation illustrates the introduction of the Nimbus Line Loop and limited vegetative removal associated with the Project. At this viewpoint, the introduction of the proposed transmission line is the most noticeable change to the landscape. The tall transmission line structures extend high above Waxpool Road and appear to be taller than the Digital Realty Building P Data Center. The Nimbus Line Loop line continues west into the background, eventually fading away into the distance. The removal of vegetation is also noticeable along Waxpool Road. This includes a noticeable amount of trees on the left side of the simulation, as well as limited removal of trees and shrubs adjacent to the Nimbus Substation. The metallic-color of the proposed transmission line structures match the color of the Digital Realty Building P Data Center. The user group most impacted would be commuters / through travelers, who would be exposed to the proposed transmission line for a short distance as they travel east or west on Waxpool Road. Overall, the introduction of the Nimbus Line Loop within this view would have a noticeable impact on the scenic quality, and minimal to moderate impacts are anticipated for the commuter / through traveler user group.

4.3.2.3 Conclusions

The impact of changes in visual conditions is a function of the nature of the change (i.e., the presence of new Project structures and rights-of-way, where no such development currently exist) and the sensitivity of user groups to such changes. User group / viewer sensitivity is inherently subjective, and each user group has their own opinion of what constitutes a positive or negative change in visual conditions within the landscape. However, as discussed in Section 3.3, specific user groups have a preset interaction with visual changes to the landscape.

This analysis identifies VSRs within the study area, user groups and their associated sensitivity to visual changes in the landscape, and visual simulations that represent the various views that would be experienced from not only the chosen VSRs and KOPs, but from throughout the study area as a whole. The available information provided through the analysis indicates that overall visual impacts of the Project would be relatively low and would not be perceived as a fundamental change in the landscape conditions within the study area. The visibility of the transmission structures and vegetative clearing from the five KOPs evaluated is broadly representative of views and potential impacts of the Project throughout the study area. Based on the identified VSRs, potential user groups, and visual simulations, the proposed Project would have minor to moderate visual impact on sensitive user groups and activities.

4.4 Cultural Resources

Effects for the considered resources relevant to each route alternative are discussed below. The full *Stage I Pre-Application Analysis of Cultural Resource* report prepared by D+A is provided in Appendix F.

4.4.1 Archaeology Findings

A review of the VDHR VCRIS indicates that one previously recorded archaeological site (44LD1602) falls within the right-of-way for the Farmwell-Nimbus Line and one previously recorded archaeological site (44LD1603) falls within the right-of-way for the Nimbus Line Loop (VDHR 2020). Neither have been evaluated for NRHP eligibility by the VDHR. A formal archaeological survey has not been conducted as part of this review, but a review of contemporary aerial imagery suggests that the portions of both sites in the proposed rights-of-way have been destroyed by modern land use impacts. However, pending archaeological field investigations to assess the nature of the site's deposits in the Project area, these resources should be considered for existing conditions and potential Project impacts.

4.4.2 Aboveground Historic Properties

Only one considered resource defined in accordance with VDHR Guidelines is associated with both routes. The Broad Run Ford and Ox Road (053-6416) is a remnant of a road built in the 1720s through 1740s and used into the twentieth century along with the ford at Broad Run; the route south of the ford has not been surveyed and is not included in the defined resource boundary. Because the overall road to Occoquan, of which 053-6416 is a part, continued to be used for over two centuries, maintenance and upgrades have obscured the original roadbed in many places; although in the portion recorded as 053-6416, the road is largely unchanged from its earliest form. The Broad Run Ford and Ox Road has been deemed potentially eligible for the NRHP by the VDHR, and it is being treated as eligible for the purpose of the analysis.

The Ox Road portion of 053-6416 is located approximately 0.25 mile south of the Nimbus Line Loop at its nearest point, and the Broad Run Ford is located 0.4 mile from the Nimbus Line Loop. The Farmwell--Nimbus Line's southeast end is located approximately 0.5 mile from the Broad Run Ford.

Visual impacts are defined as the introduction of visual elements that might diminish or alter the setting of any historic property listed on or eligible for listing on the NRHP. The Broad Run Ford and Ox Road is potentially significant for its associations with Virginia's early transportation network. As such, its setting is important to its interpretation and its ability to convey its significance. At the time of the analysis, the resource's setting had already been compromised by large-scale modern development and placement of infrastructure in the surrounding area just beyond the thin stand of trees that border the stream in the location of the resource. A utility line crosses Broad Run just east of the ford, and the shoreline of the stream has been modified with riprap and fill. The cleared utility easement continues north of the stream, paralleling the Ox Road trace as it traverses woodlands. The trace then merges with a gravel road that follows the alignment of the old Ox Road. The area between the Broad Run Ford and Ox Road and the Project contains multiple large data centers built in the recent past on lots that have been substantially impacted by cut and fill. The divided four-lane Loudoun County Parkway and an existing 230- kV transmission line also traverse the area between the resource and the Project.

D+A conducted a field reconnaissance and prepared photosimulations from vantage points at the north end of the road trace, closest to the Project, and from the south side of the ford on Broad Run. The ford and southern portion of the road trace were on private property and not accessible. From the vantage point of the north end of the resource, D+A concluded that any view of the Project would be screened almost entirely by several large data center warehouses in the intervening distance. The one area where line of sight to the Project could exist is straight up Loudoun County Parkway to the northeast, where a view of the Nimbus Line Loop could exist, as the line is suspended across the road. No transmission line structures would be visible along this sight line, and the viewshed is already dominated by modern development. An existing transmission line parallels the south side of Loudoun County Parkway, and a transmission structure is located immediately adjacent to the north end of the road trace. Thus, the resource's viewshed already contains transmission infrastructure that is closer and more obtrusive than what is proposed as part of the Project. From the vantage point south of the ford, D+A found that the Project would be entirely screened by vegetation and development.

It is D+A's opinion that the historical setting of the Broad Run Ford and Ox Road (053-6416) has been compromised by modern development. It is anticipated that there would be minimal visibility of Nimbus Line Loop from the north end of the resource, as illustrated in the ground-level photography and photosimulations prepared for the analysis (see Appendix F, Figures 5-1 through 5-11). Therefore, the Project's Nimbus Line Loop would have minimal impact on the Broad Run Ford and Ox Road. The Farmwell--Nimbus Line would have no impact on the resource, as it is entirely screened from view.

4.5 Geological Constraints

There are no mineral operations located within 0.5 mile of the Nimbus Line Loop or the Farmwell-Nimbus Line. Therefore, the Project would not impact any identified mineral resources.

4.6 Collocation Opportunities

4.6.1 Nimbus Line Loop

The Nimbus Line Loop is collocated with Waxpool Road for a total of 0.60 mile.

4.6.2 Farmwell-Nimbus Line

The Farmwell-Nimbus Line is collocated with Waxpool Road for a total of 0.1 mile.

5. ANALYSIS OF ALTERNATIVES AND CONCLUSION

5.1 Route Alternatives

In developing routes for the Project, ERM considered the facilities required to construct and operate the Project; the length of new rights-of-way that would be required; the locations and types of existing rights-of-way in the area; the amount of existing development in the area; and the potential for environmental impacts on the community. Based on the results of an assessment of these factors and consultations with Loudoun County, ERM determined that the Nimbus Line Loop and the Farmwell-Nimbus Line were each best served by a single route option as discussed below.

The route developed for the Nimbus Line Loop is the most direct and shortest route option available. In addition, with the exception of the crossing of Loudoun County Parkway, the route traverses property entirely owned by two data center operators. In addition, the majority of the route (0.45 of 0.61 mile or 74 percent) is located on the customer's property. Moreover, Dominion has worked closely with the owners of the two data centers to ensure that the siting of the Nimbus Line Loop was acceptable to each party and would not interfere with the development and operation of their facilities. The rejected route options considered for the Nimbus Line Loop were longer and would result in greater impacts.

The route developed for the Farmwell-Nimbus Line represents the shortest and most direct route option to connect the existing Farmwell Substation and the proposed Nimbus Substation. The route is almost entirely located on data center properties . Dominion has worked closely with the owners of the data centers to ensure that the siting of the Farmwell-Nimbus Line was acceptable to the data center developers and would not interfere with the development and operation of their facilities.

Finally, based on discussions with the two data center owners, these landowners plan to provide the easements for the Nimbus Line Loop and the Farmwell-Nimbus Line voluntarily, subject to the parties' negotiations regarding compensation[2]. For the reasons discussed above, ERM recommends the Nimbus Line Loop and the Farmwell-Nimbus Line as the proposed routes for the Project.

[2] Mr. McBride provided a letter to the Company on behalf of the landowner stating that landowner plans to provide the easement to cross the property along the Nimbus Line Loop, subject to the parties' negotiations regarding compensation. This correspondence is included as Attachment II.A.6.b of the SCC Appendix.

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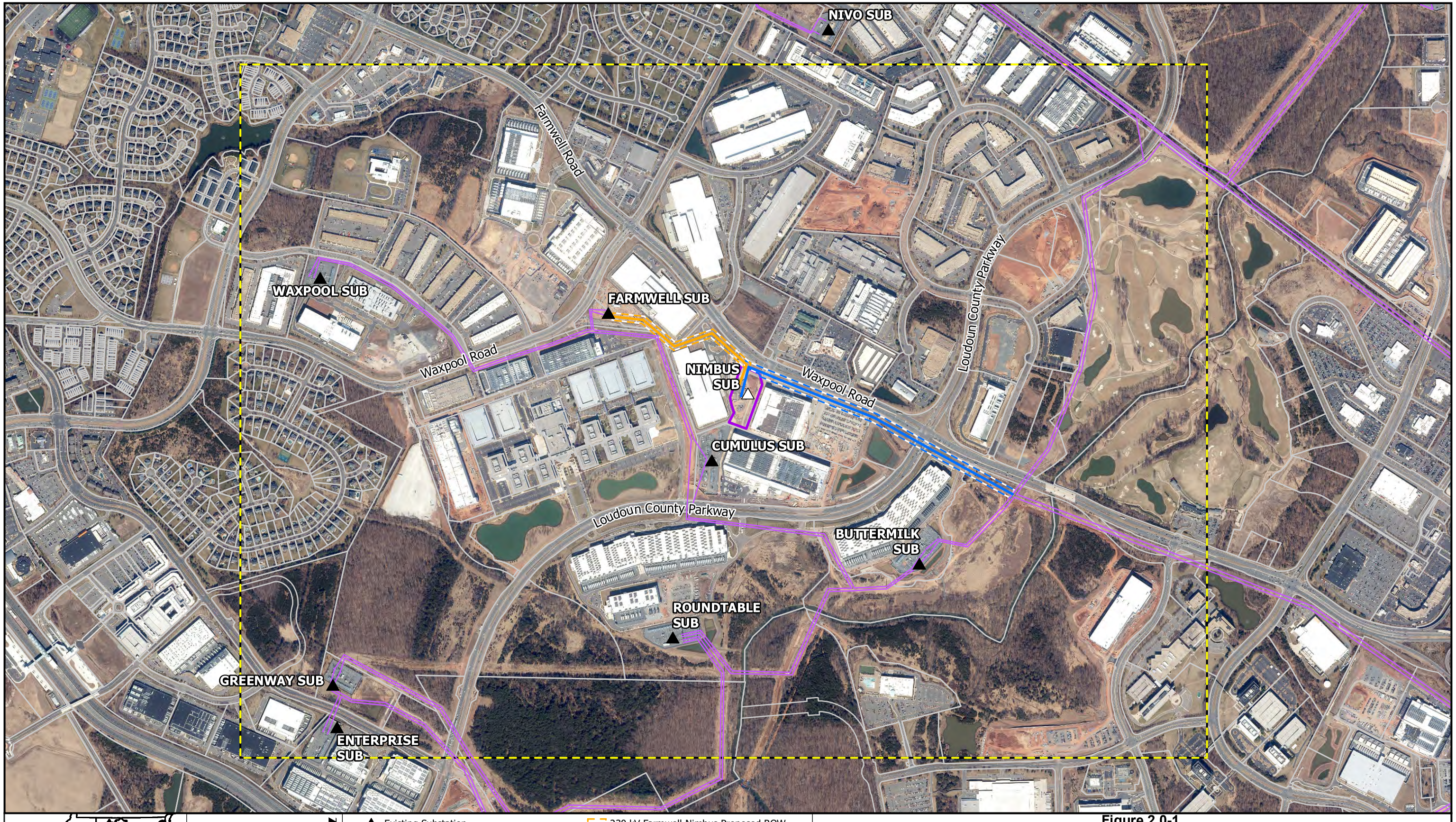
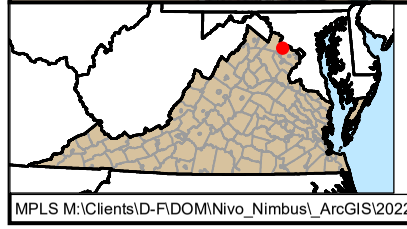
APPENDIX A FIGURES





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Feet

N

- Existing Substation
- Proposed Substation
- Nimbus 230 kV Line Loop Proposed Route
- 230 kV Farmwell-Nimbus Proposed Route
- Nimbus 230 kV Line Loop Proposed ROW
- 230 kV Farmwell-Nimbus Proposed ROW
- Proposed Nimbus Substation Boundary
- Study Area
- Existing Dominion Transmission Lines
- Parcel Boundary

Dominion Energy

Figure 2.0-1
Overview Map - Aerial
Nimbus 230 kV Line Loop and Nimbus Substation
and 230 kV Farmwell-Nimbus Transmission Line
Dominion Energy Virginia
Loudoun County, Virginia

ERM

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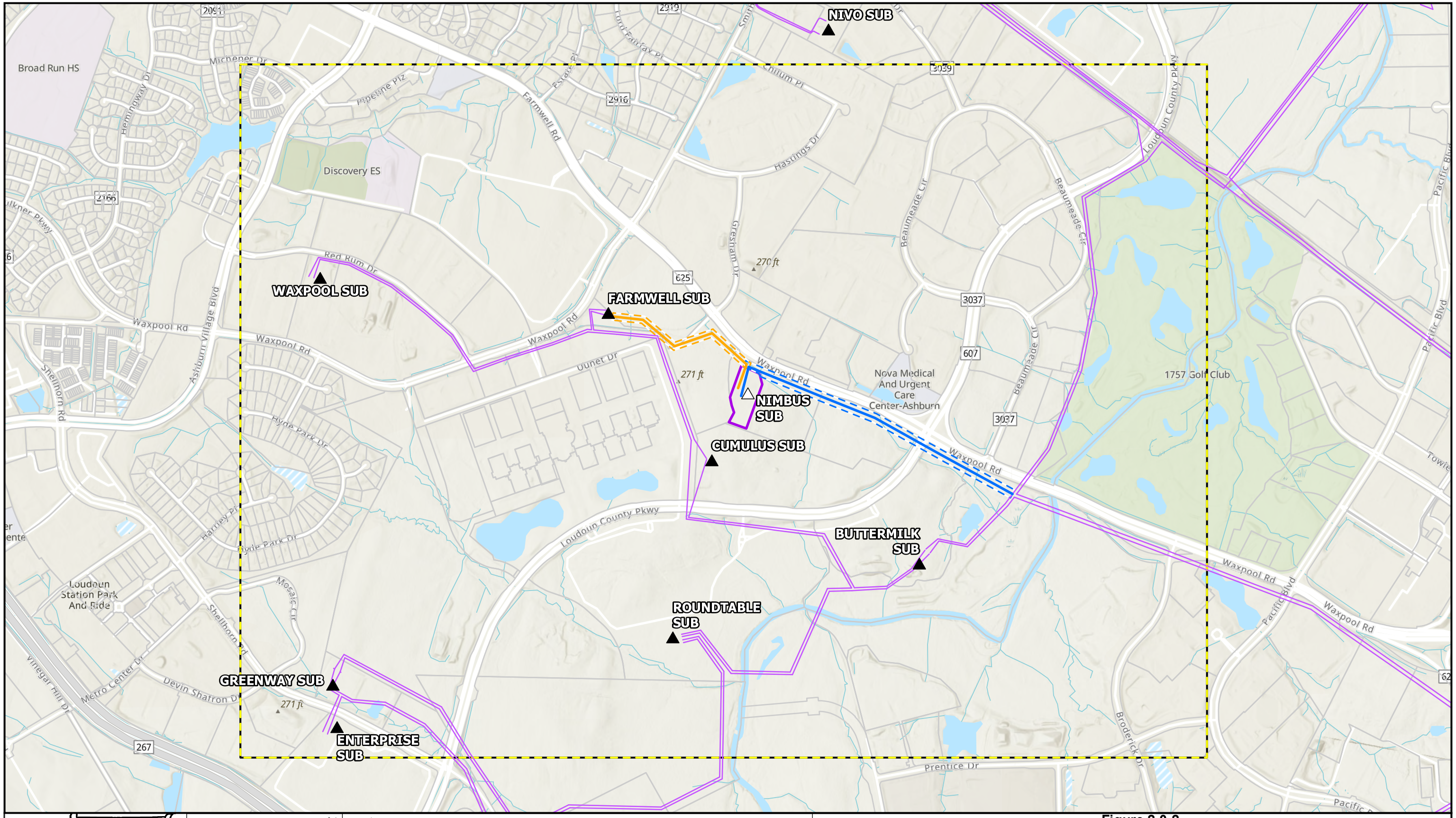

Existing Substation
Proposed Substation
Nimbus 230 kV Line Loop Proposed Route
230 kV Farmwell-Nimbus Proposed Route
Nimbus 230 kV Line Loop Proposed ROW
230 kV Farmwell-Nimbus Proposed ROW
Proposed Nimbus Substation Boundary
Existing Dominion Transmission Lines
Study Area
Parcel Boundary

0 500 1,000
Feet

N

Figure 2.0-2
Overview Map - Topographic
Nimbus 230 kV Line Loop and Nimbus Substation
and 230 kV Farmwell-Nimbus Transmission Line
Dominion Energy Virginia
Loudoun County, Virginia

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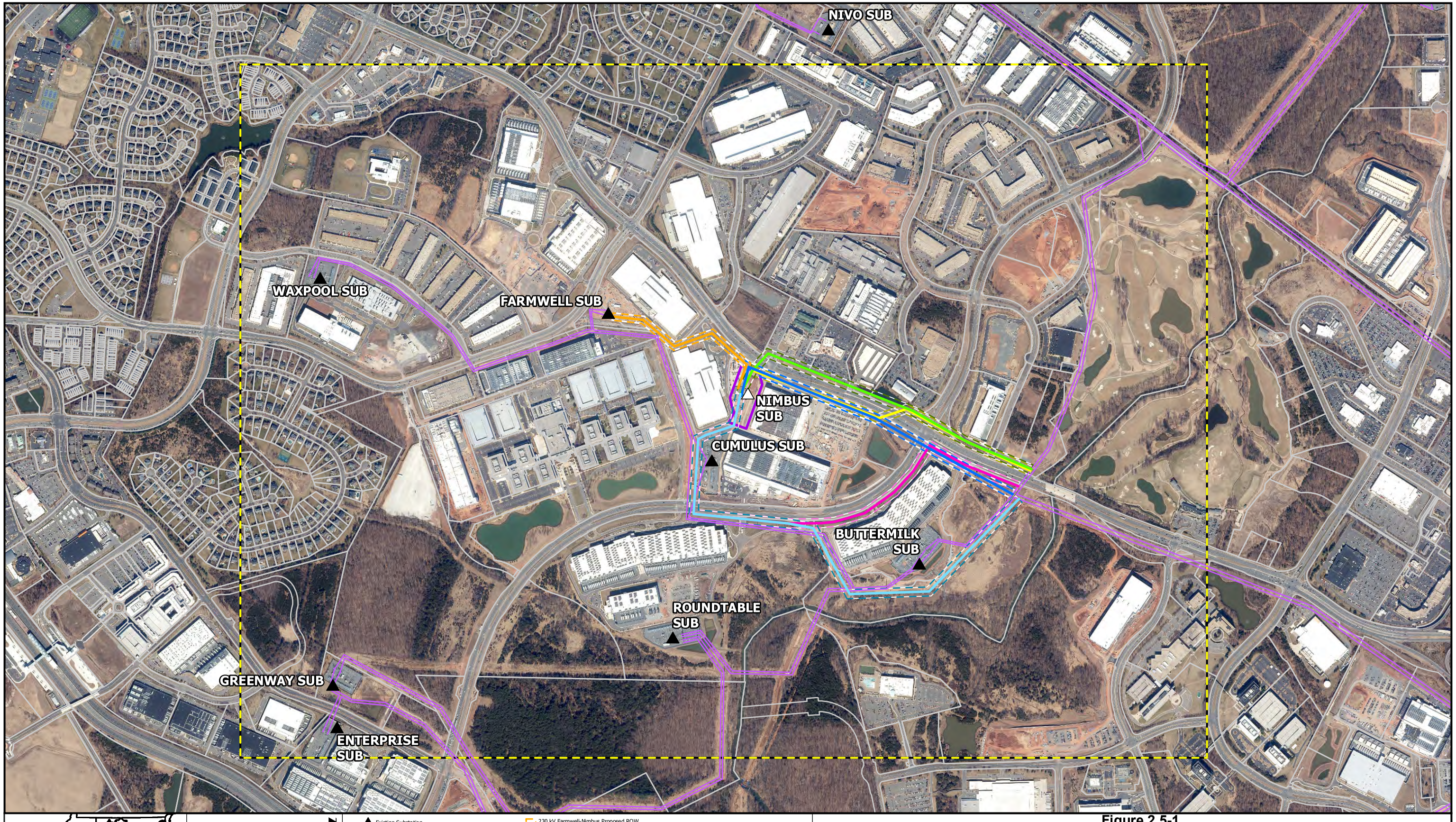

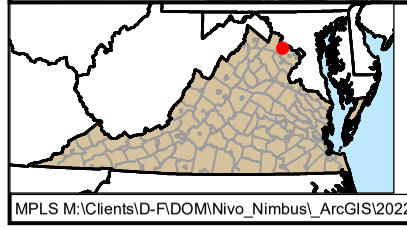

0 500 1,000
Feet

N

- Existing Substation
- Proposed Substation
- Nimbus 230 kV Line Loop Proposed Route
- 230 kV Farmwell-Nimbus Proposed Route
- Nimbus 230 kV Line Loop Alternative Route 2 Centerline
- Nimbus 230 kV Line Loop Alternative Route 3 Centerline
- Nimbus 230 kV Line Loop Alternative Route 4 Centerline
- Nimbus 230 kV Line Loop Alternative Route 5 Centerline
- Nimbus 230 kV Line Loop Proposed ROW
- 230 kV Farmwell-Nimbus Proposed ROW
- Nimbus 230 kV Line Loop Alternative Route 2 ROW
- Nimbus 230 kV Line Loop Alternative Route 3 ROW
- Nimbus 230 kV Line Loop Alternative Route 4 ROW
- Nimbus 230 kV Line Loop Alternative Route 5 ROW
- Proposed Nimbus Substation Boundary
- Study Area
- Existing Dominion Transmission Lines
- Parcel Boundary

Dominion Energy

Figure 2.5-1
Routes Rejected from Further Consideration
Nimbus 230 kV Line Loop and Nimbus Substation
and 230 kV Farmwell-Nimbus Transmission Line
Dominion Energy Virginia
Loudoun County, Virginia

ERM

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NIVO SUB
Washington & Old Dominion Railroad Regional Park
Farmwell Road
Chick Ford Field and Ryan Bickel Field
WAXPOOL SUB
FARMWELL SUB
Waxpool Road
NIMBUS SUB
Waxpool Road
Loudoun County Parkway
1757 Golf Club
CUMULUS SUB
Loudoun County Parkway
BUTTERMILK SUB
ROUNDTABLE SUB
GREENWAY SUB
ENTERPRISE SUB

0 500 1,000
Feet

- Existing Substation
- Proposed Substation
- Nimbus 230 kV Line Loop Proposed Route
- 230 kV Farmwell-Nimbus Proposed Route
- Existing Dominion Transmission Lines
- Nimbus 230 kV Line Loop Proposed ROW
- 230 kV Farmwell-Nimbus Proposed ROW
- Proposed Nimbus Substation Boundary
- Golf Course
- Loudoun County Park
- Northern Virginia Regional Park Authority
- Study Area
- Parcel Boundary

Dominion Energy

Figure 3.1.2-1
Recreation Areas
Nimbus 230 kV Line Loop and Nimbus Substation
and 230 kV Farmwell-Nimbus Transmission Line
Dominion Energy Virginia
Loudoun County, Virginia

ERM

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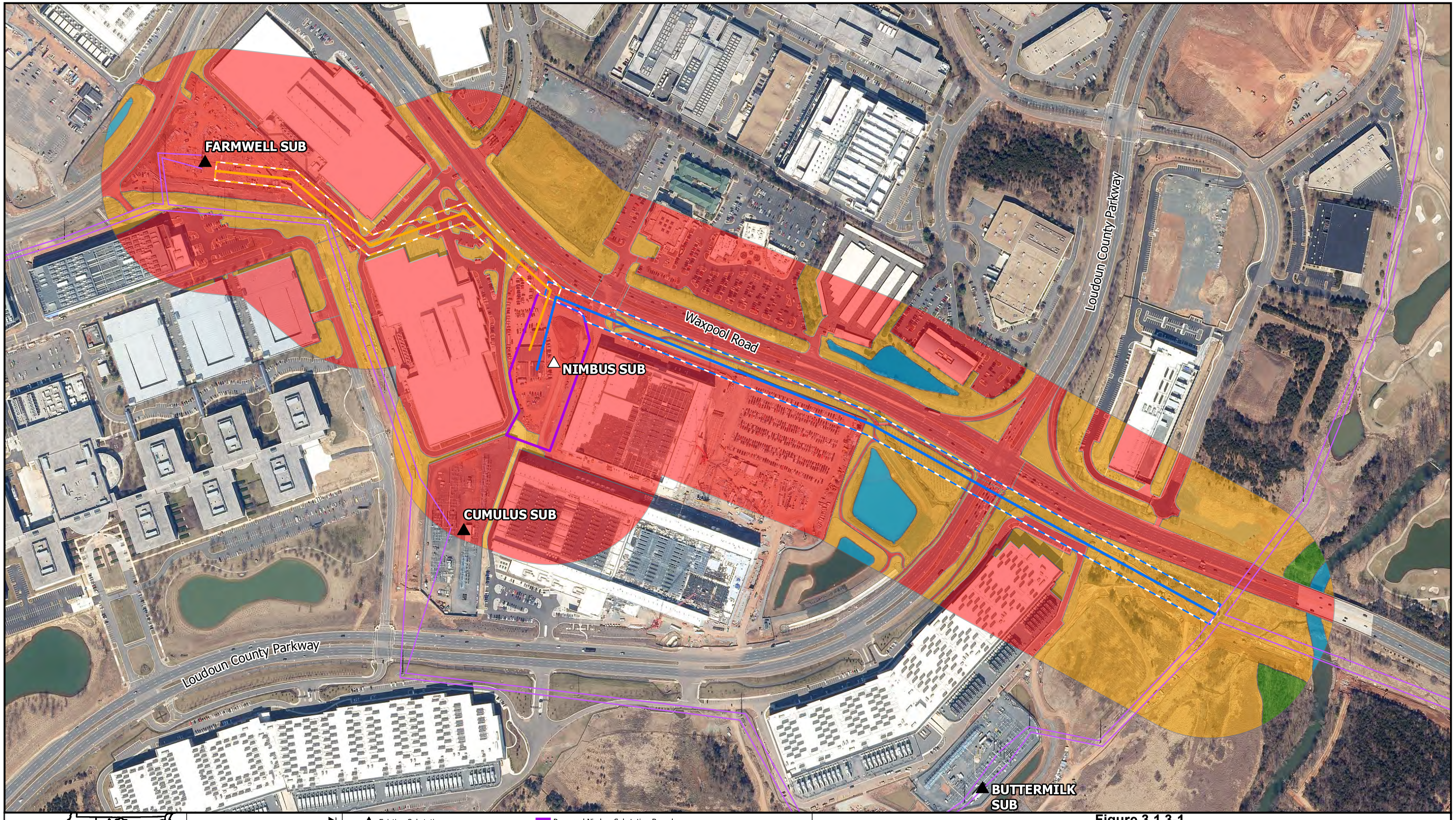

Figure 3.1.3-1
Existing Land Cover Type
Nimbus 230 kV Line Loop and Nimbus Substation
and 230 kV Farmwell-Nimbus Transmission Line
Dominion Energy Virginia
Loudoun County, Virginia

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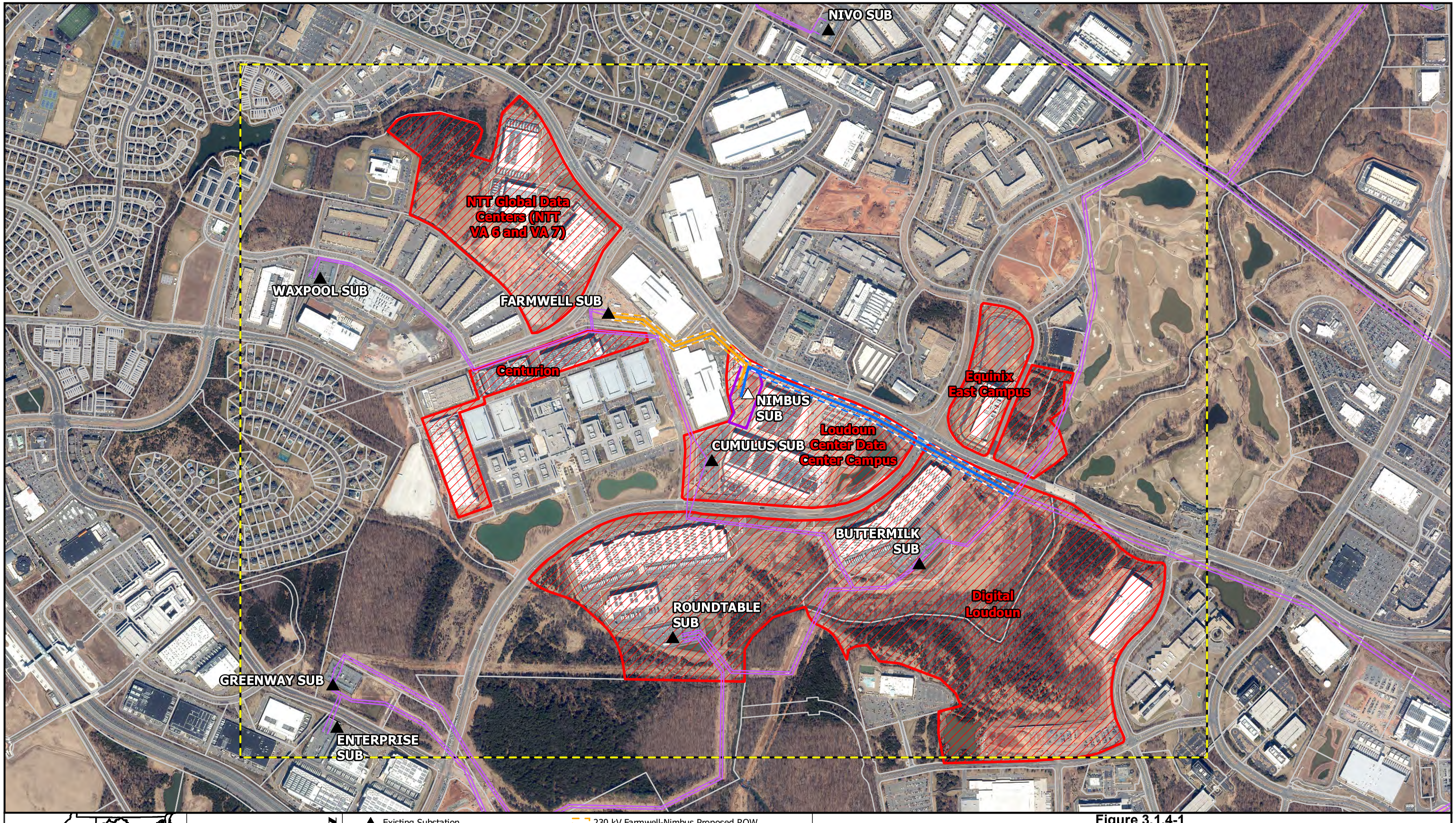

Figure 3.1.4-1
Planned Developments
Nimbus 230 kV Line Loop and Nimbus Substation
and 230 kV Farmwell-Nimbus Transmission Line
Dominion Energy Virginia
Loudoun County, Virginia

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NIVO SUB
WAXPOOL SUB
FARMWELL SUB
NIMBUS SUB
CUMULUS SUB
BUTTERMILK SUB
ROUNDTABLE SUB
GREENWAY SUB
ENTERPRISE SUB

0 500 1,000
Feet

N

Existing Substation
Proposed Substation
Nimbus 230 kV Line Loop Proposed Route
230 kV Farmwell-Nimbus Proposed Route
Existing Dominion Transmission Lines
Nimbus 230 kV Line Loop Proposed ROW
230 kV Farmwell-Nimbus Proposed ROW
Proposed Nimbus Substation Boundary
Board of Supervisors Open Space Easements
Study Area
Parcel Boundary

Figure 3.1.6-1
Conservation Easements
Nimbus 230 kV Line Loop and Nimbus Substation
and 230 kV Farmwell-Nimbus Transmission Line
Dominion Energy Virginia
Loudoun County, Virginia

Dominion Energy

ERM

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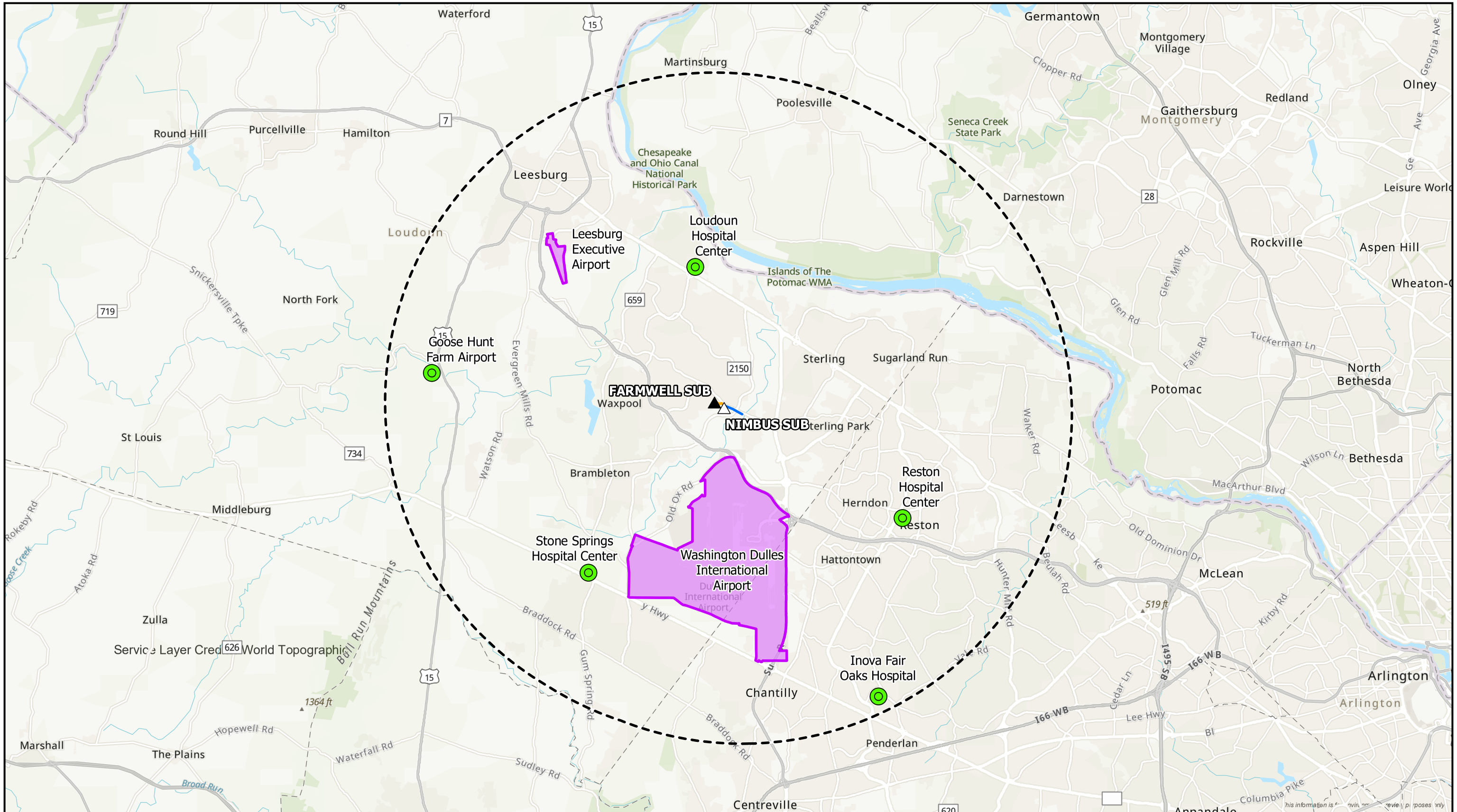

Figure 3.1.9-1
Airports within 10 Miles
Nimbus 230 kV Line Loop and Nimbus Substation
and 230 kV Farmwell-Nimbus Transmission Line
Dominion Energy Virginia
Loudoun County, Virginia

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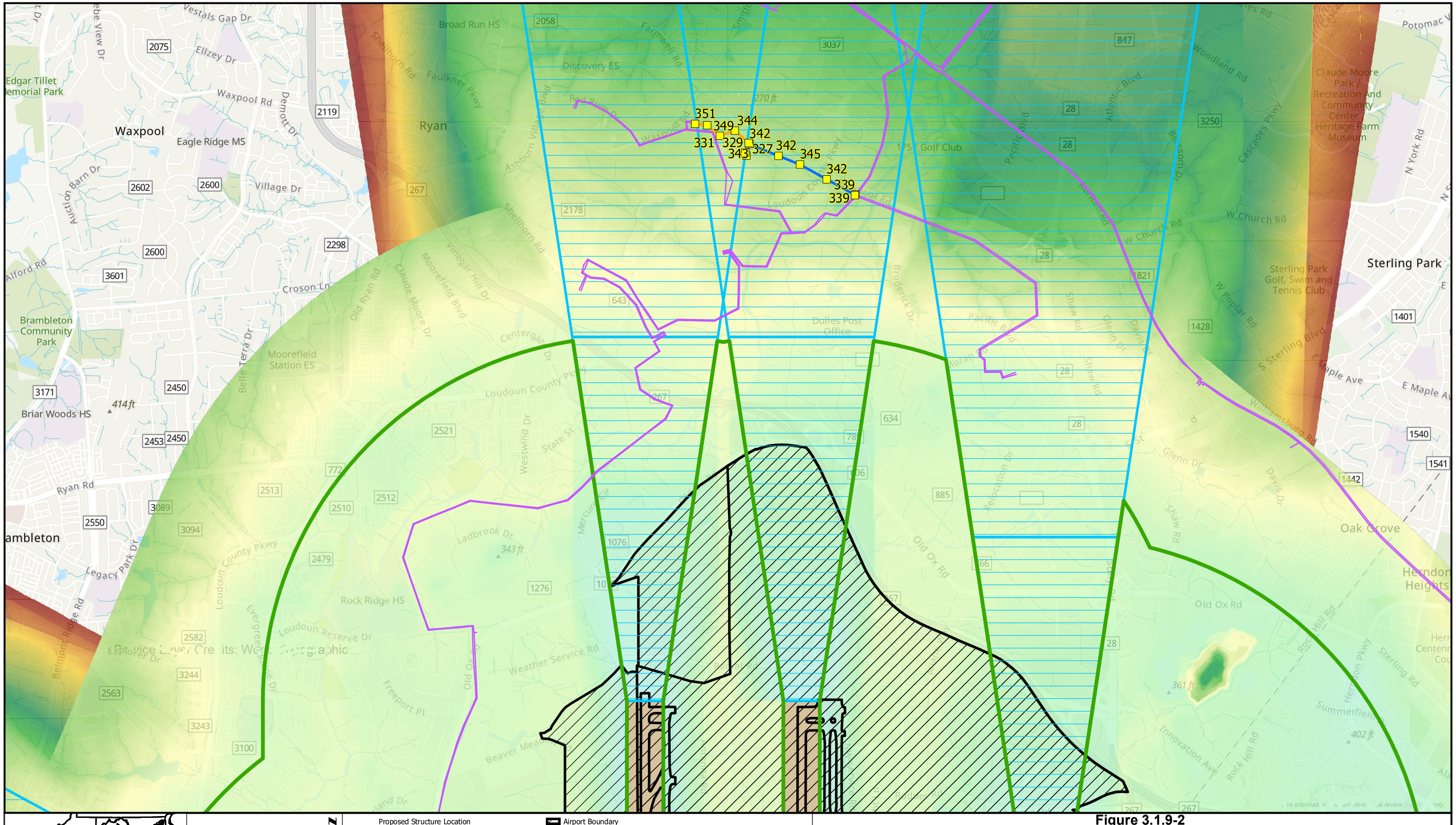

0 1,000 2,000
Feet

Proposed Structure Location
Labeled with Maximum Allowable FAA Structure Height in Feet
Nimbus 230 kV Line Loop Proposed Route
230 kV Farmwell-Nimbus Proposed Route
Existing Dominion Transmission Lines
Inner Horizontal Surface
Approach Surface/Approach Clearance Surface
Airport Boundary
Primary Surface
Maximum Structure Height Feet
1000
0

Figure 3.1.9-2
Dulles Airport Surfaces and Maximum Structure Heights
Nimbus 230 kV Line Loop and Nimbus Substation
and 230 kV Farmwell-Nimbus Transmission Line
Dominion Energy Virginia
Loudoun County, Virginia

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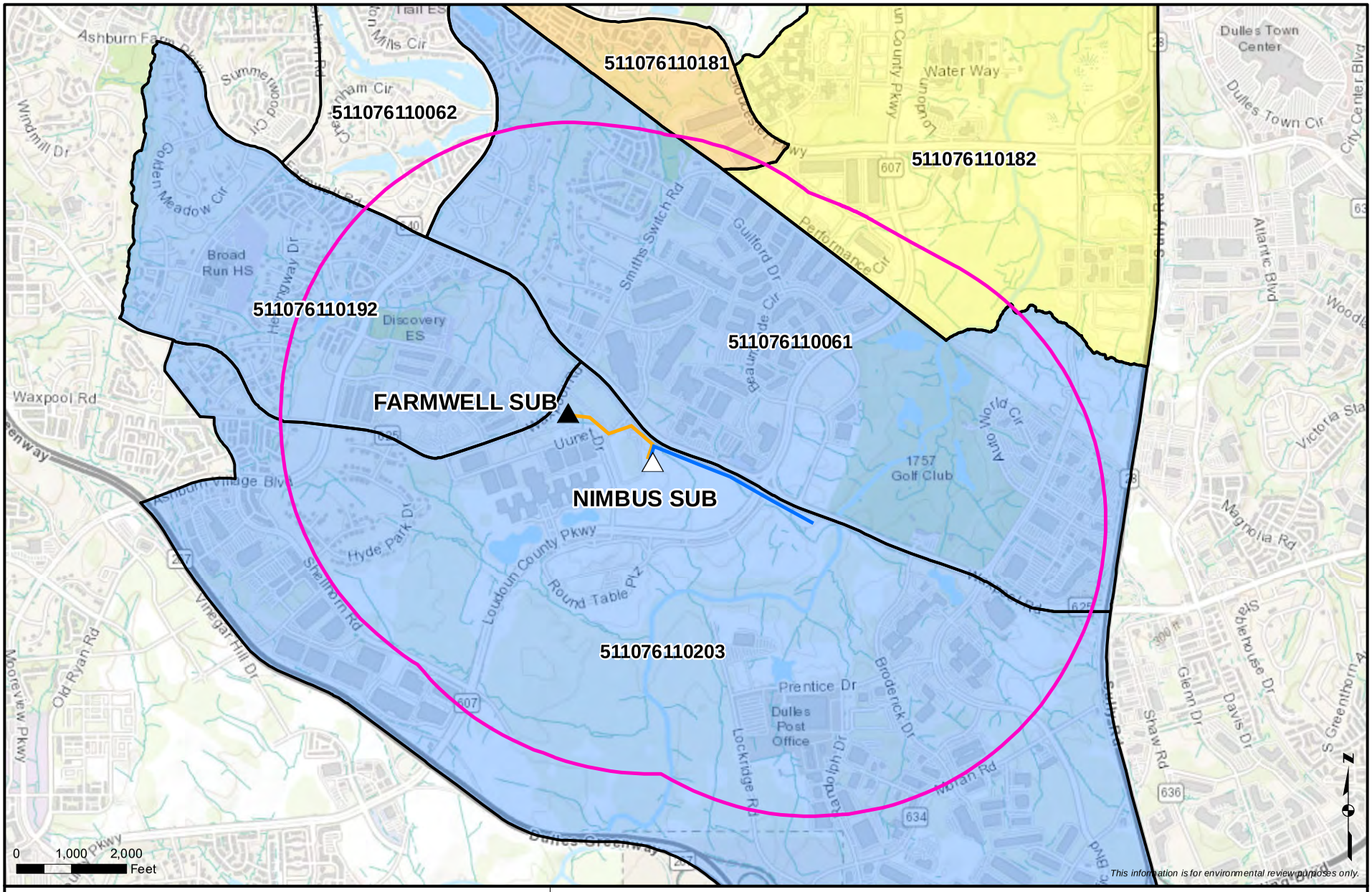

Existing Substation
Proposed Substation
Nimbus 230 kV Line Loop Proposed Route
230 kV Farmwell-Nimbus Proposed Route
1 Mile Buffer of Project

Census Block Group
Minority Population (> 38%)
Low-Income (>= 30%) and Minority Population (> 38%) and Linguistically Isolated Population
Over Age 64 Population (> 15%)

Figure 3.1.10-1
Census Block Groups
Nimbus 230 kV Line Loop and Nimbus Substation and 230 kV Farmwell-Nimbus Transmission Line
Dominion Energy Virginia
Loudoun County, Virginia

Dominion Energy

ERM

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NIVO SUB

WAXPOOL SUB

FARMWELL SUB

NIMBUS SUB

CUMULUS SUB

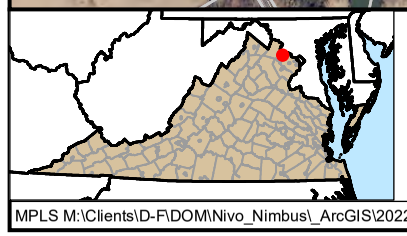
BUTTERMILK SUB

053-6416
Broad Run Ford and Ox Road

ROUNDTABLE SUB

GREENWAY SUB

ENTERPRISE SUB



0 500 1,000
Feet

N

- Existing Substation
- Proposed Substation
- Nimbus 230 kV Line Loop Proposed Route
- 230 kV Farmwell-Nimbus Proposed Route
- Nimbus 230 kV Line Loop Proposed ROW
- 230 kV Farmwell-Nimbus Proposed ROW
- Proposed Nimbus Substation Boundary
- Considered Historic Resource (potentially eligible for NRHP)
- 0.5 Mile Tier for Considered Resources
- Study Area
- Existing Dominion Transmission Lines
- Parcel Boundary

Dominion Energy

Figure 3.4.2-1
Considered Historic Resources
Nimbus 230 kV Line Loop and Nimbus Substation
and 230 kV Farmwell-Nimbus Transmission Line
Dominion Energy Virginia
Loudoun County, Virginia

ERM

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DRAWN BY: MPLS GIS

Digital Realty Building ACC9 Data Center
FARMWELL SUB
Gresham Dr
Filigree Ct
Beaumeade Cir
Embassy Suites
Ashburn Eats Strip Mall
Guaranty Self Storage
Uunet Dr
Digital Realty Building ACC10 Data Center
Waxpool Rd
NIMBUS SUB
Clear Dermatology
Loudoun County Pky
Equinix DC21 Data Center
Quantum Park
Loudoun Center Data Center Campus
CUMULUS SUB
Panaroma Pky
Waxpool Rd
Digital Realty Building P Data Center
Loudoun County Pky
This information is for environmental review purposes only.

0 250 500
Feet

N

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

Figure 4.3-1
Proposed Structure Locations
Nimbus 230 kV Line Loop and Nimbus Substation and
230 kV Farmwell-Nimbus Transmission Line
Dominion Energy Virginia
Loudoun County, Virginia

Dominion Energy

ERM

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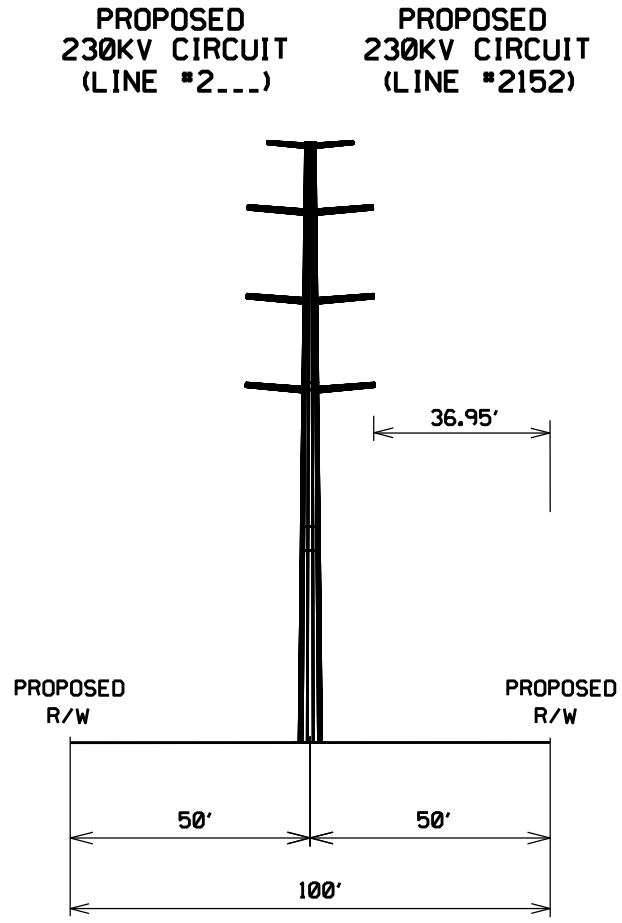
APPENDIX B STRUCTURAL DRAWINGS

LINE 2152 LOOP TO NIMBUS

PRELIMINARY



PROPOSED CONFIGURATION
TYPICAL CORRIDOR LOOKING TO NIMBUS

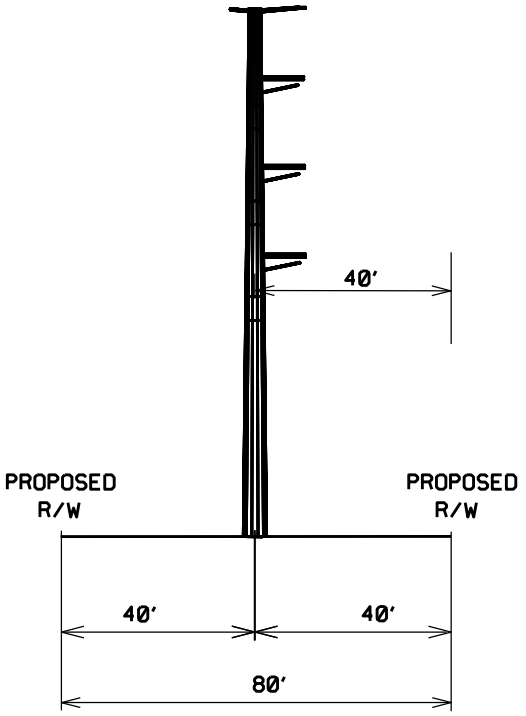
NOTE: Information contained on drawing is to be considered preliminary in nature and subject to change based on final design.

$DGNSPEC$

FARMWELL - NIMBUS 230kV LINE

PRELIMINARY

PROPOSED
230KV CIRCUIT
(LINE #2___)



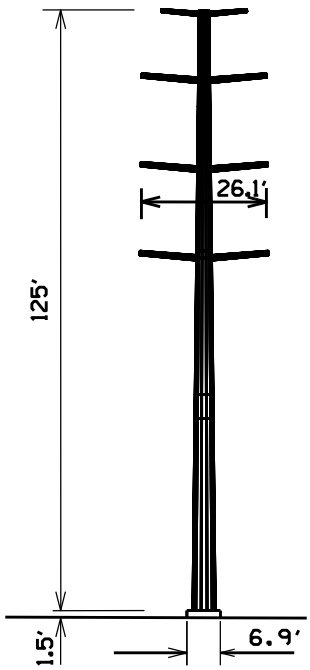
PROPOSED CONFIGURATION
TYPICAL CORRIDOR LOOKING TO NIMBUS

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

$DGNSPEC$

DOUBLE CIRCUIT DOUBLE DEADEND STEEL POLE

PRELIMINARY



PROPOSED STRUCTURES

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

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

c. NUMBER OF EACH TYPE OF STRUCTURE AND LENGTH OF EACH PORTION OF THE R/W: 4 AND 0.66 MILES (LINE 2____) & 0.67 MILES (LINE 2152)

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

e. FOUNDATION MATERIAL: CONCRETE

f. AVERAGE WIDTH AT CROSSARM: 26.1'

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

h. MAX, MIN, AND AVERAGE STRUCTURE HEIGHTS: 130 FEET, 120', AND 125' (DOES NOT INCLUDE FOUNDATION REVEAL)

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

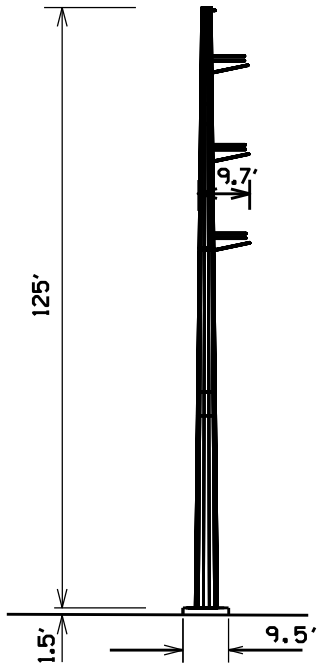
j. MINIMUM CONDUCTOR-GROUND CLEARANCE UNDER MAXIMUM OPERATING CONDITIONS: 22.5'

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

$DGNSPEC$

SINGLE CIRCUIT DOUBLE DEADEND STEEL POLE

PRELIMINARY



PROPOSED STRUCTURES

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

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

c. NUMBER OF EACH TYPE OF STRUCTURE AND LENGTH OF EACH PORTION OF THE R/W:
3 AND 0.66 MILES (LINE 2___) & 0.67 MILES (LINE 2152)

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

e. FOUNDATION MATERIAL: CONCRETE

f. AVERAGE WIDTH AT CROSSARM: 9.7'

G. AVERAGE WIDTH AT BASE: 9.5' DIAMETER

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

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

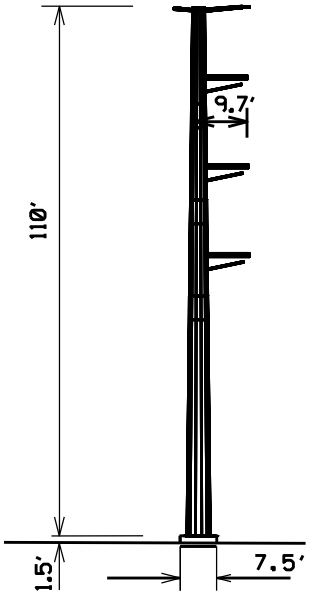
j. MINIMUM CONDUCTOR-GROUND CLEARANCE UNDER MAXIMUM OPERATING CONDITIONS: 22.5'

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

$DGNSPEC$

SINGLE CIRCUIT DOUBLE DEADEND STEEL POLE

PRELIMINARY



PROPOSED STRUCTURES

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

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

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

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

e. FOUNDATION MATERIAL: CONCRETE

f. AVERAGE WIDTH AT CROSSARM: 9.7'

G. AVERAGE WIDTH AT BASE: 7.5' DIAMETER

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

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

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

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

$DGNSPEC$

APPENDIX C DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION 14 CODE OF FEDERAL REGULATIONS PART 77. JULY 21, 2010. FINAL RULE: SAFE EFFICIENT USE AND PRESERVATION OF THE NAVIGABLE AIRSPACE.

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 77

[Docket No. FAA–2006–25002; Amendment No. 77–13]

RIN 2120–AH31

Safe, Efficient Use and Preservation of the Navigable Airspace

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule.

SUMMARY: This action amends the regulations governing objects that may affect the navigable airspace. These rules have not been revised in several decades, and the FAA has determined it is necessary to update the regulations, incorporate case law and legislative action, and simplify the rule language. These changes will improve safety and promote the efficient use of the National Airspace System.

DATES: This amendment becomes effective January 18, 2011.

FOR FURTHER INFORMATION CONTACT: For technical questions about this final rule contact Ellen Crum, Air Traffic Systems Operations, Airspace and Rules Group, AJR–33, Federal Aviation Administration, 800 Independence Ave., SW., Washington, DC 20591; telephone (202) 267–8783, facsimile (202) 267–9328. For legal questions about this final rule contact Lorelei Peter, Office of the Chief Counsel–Regulations Division, Federal Aviation Administration, 800 Independence Ave., SW., Washington, DC 20591; telephone (202) 267–3134, facsimile 202–267–7971.

SUPPLEMENTARY INFORMATION:

Authority for This Rulemaking

The Administrator has broad authority to regulate the safe and efficient use of the navigable airspace (49 U.S.C. 40103(a)). The Administrator is also authorized to issue air traffic rules and regulations to govern the flight, navigation, protection, and identification of aircraft for the protection of persons and property on the ground, and for the efficient use of the navigable airspace (49 U.S.C. 40103(b)). The Administrator may also conduct investigations and prescribe regulations, standards, and procedures in carrying out the authority under this part (49 U.S.C. 40113). The Administrator is authorized to protect civil aircraft in air commerce (49 U.S.C. 44070(a)(5)).

Under § 44701(a)(5), the Administrator promotes safe flight of civil aircraft in air commerce by prescribing regulations and minimum standards for other practices, methods, and procedures necessary for safety in air commerce and national security. Also, § 44718 provides that under regulations issued by the Administrator, notice to the agency is required for any construction, alteration, establishment, or expansion of a structure or sanitary landfill, when the notice will promote safety in air commerce, and the efficient use and preservation of the navigable airspace and airport traffic capacity at public use airports. This statutory provision also provides that, under regulations issued by the Administrator, the agency determines whether such construction or alteration is an obstruction of the navigable airspace, or an interference with air navigation facilities and equipment or the navigable airspace. If a determination is made that the construction or alteration creates an obstruction or otherwise interferes, the agency then conducts an aeronautical study to determine adverse impacts on the safe and efficient use of the airspace, facilities, or equipment.

I. Background

A. Summary of the Notice of Proposed Rulemaking (NPRM)

On June 13, 2006, the FAA published an NPRM that proposed to amend the regulations governing objects that may affect the navigable airspace (71 FR 34028). The FAA proposed to: Establish notification requirements and obstruction standards for transmitting on certain frequencies; revise obstruction standards for civil airport imaginary surfaces to more closely align these standards with FAA airport design and instrument approach procedure (IAP) criteria; revise current definitions and include new definitions; require proponents to file with the FAA a notice of proposed construction or alteration for structures near private use airports that have an FAA-approved IAP; and increase the number of days in which a notice must be filed with the FAA before beginning construction or alteration. The comment period closed on September 11, 2006.

B. Summary of the Final Rule

The following is a discussion of the major changes contained in the final rule. The provisions of the final rule that were modified based on comments the FAA received are discussed in the "Discussion of the Final Rule" section. Most of the amendments implemented by the rule are intended to simplify the existing regulations.

This rule adds § 77.29 to incorporate the specific factors listed in P.L. 100–223 for consideration during an aeronautical study. The specific factors are listed in Appendix A to this preamble. Including this language in part 77 does not add or remove any of the factors currently considered in an aeronautical study.

This rule provides for an FAA Determination of Hazard or Determination of No Hazard to become effective 40 days after the date of issuance, unless a petition for discretionary review is received by the FAA within 30 days of issuance. In addition, the rule stipulates that a Determination of No Hazard to air navigation will expire 18 months after the effective date of the determination, or on the date the proposed construction or alteration is abandoned. Also, the rule specifies that a Determination of Hazard to Air Navigation does not expire.

This final rule adds information about the processing of petitions for discretionary review. It also excludes determinations for temporary structures and recommendations for marking and lighting from the discretionary review process. Because of the nature of temporary structures, it is not possible to apply the lengthy discretionary review process to these structures. Also, since marking and lighting recommendations are simply recommendations, there is a separate process for a waiver of, or deviation from, the recommendations.

This rule expands the requirements for notice to be sent to the FAA for proposed construction or alteration of structures on or near private use airports that have an IAP. Accordingly, if a private use airport has an FAA-approved IAP, then a construction sponsor must notify the FAA of a proposed construction or alteration that exceeds the notice criteria in § 77.17. This action will give the FAA enough time to adjust the IAP, if needed, and to inform those who use the IAP.

Also, IAPs at private use airports or heliports are not currently listed in any aeronautical publication. Sponsors of construction or alteration at or near a private use airport or heliport should consult the FAA Web site to determine whether an FAA-approved IAP is listed for that airport.[1] If the airport is listed on the Web site, the sponsor must file notice with the FAA.

Lastly, this rule incorporates minor edits to the regulatory text to distinguish

[1] *https://oeaaa.faa.gov.*

FAA surveillance systems from communication facilities.

C. Summary of Comments

The FAA received approximately 115 comments from individuals, aviation associations, industry spectrum users, airlines, and other aviation businesses. Many commenters, including the Air Transport Association, generally supported the NPRM. Commenters supported specific proposals concerning evaluating the aeronautical impact of proposed construction on IAPs at private use airports; evaluating antenna installations that might affect air traffic or navigation; and the update and reformat of the regulations. Comments that did not support the proposed rule, and suggested changes, are discussed more fully in the "Discussion of the Final Rule" section.

The FAA received substantive comments on the following general areas of the proposal:

- Frequency notification requirements
- Time requirement to file notice with the FAA
- Civil Airport Imaginary Surfaces [2]
- One Engine Inoperative Procedures (OEI)
- Definitions
- Miscellaneous

II. Discussion of the Final Rule

A. Frequency Notification

The FAA's primary focus during the obstruction evaluation process is safety and efficiency of the navigable airspace. It is critical for the agency to be notified of pending construction of physical objects that may affect the safety of aeronautical operations. (*See* 49 U.S.C. 44718.) In today's National Airspace System (NAS), however, electromagnetic transmissions can adversely affect on-board flight avionics, navigation, communication, and surveillance facilities. The FAA has extensive authority to prescribe regulations and minimum standards necessary for safety in air commerce. (*See* 49 U.S.C. § 44701(a)(5).) In addition, the FAA has broad authority to develop policy and plans for the use of the navigable airspace. (*See* 49 U.S.C. 40103.) The FAA relied on these authorities in proposing the notice requirements for broadcast transmissions in the specified bands. As stated in the proposal, broadcast transmission on certain frequencies can pose serious safety threats to avionics and ground based facilities. At the same time, the FAA recognizes the authority of the National Telecommunications and Information Administration (NTIA) and the Federal Communications Commission (FCC) to manage use of the radio spectrum.

The FAA concludes that its proposal to require notice for the proposed frequency bands was too broad. The proposed frequencies from the NPRM are listed in Appendix B to this preamble. The proposed frequencies in the shared (Federal and Non-Federal) bands are managed by an existing process involving several Federal agencies with an interest in spectrum use, which NTIA oversees under the Department of Commerce. It is not the FAA's intent to add a duplicative review and coordination process to that already stated above. In addition, the FAA has determined that some of the proposed frequencies originally listed and not in shared bands do not present concern. Therefore, the agency withdraws the proposed notice and obstruction standards on the shared frequency bands and those frequency bands that, historically, have not posed electromagnetic concerns,[3] when operating under typical specifications.

FM broadcast service transmissions operating in the 88.0–107.9 MHz frequency band pose the greatest concern to FAA navigation signals. The FAA, FCC and NTIA are collaborating on the best way to address this issue. A resolution of this issue is expected soon. Therefore, the proposals on FM broadcast service transmissions in the 88.0–107.9 MHz frequency band remain pending. The FAA will address the comments filed in this docket about the proposed frequency notice requirements and proposed EMI obstruction standards when a formal and collaborative decision is announced.

This rule does include evaluating electromagnetic effect (§§ 77.29 and 77.31), and it codifies the agency's current practices of studying the effects on aircraft navigation and communication facilities. These amendments in no way should be construed to affect the authority of NTIA and the FCC.

B. Time Requirement To File Notice With the FAA

Automation improvements to the FAA's obstruction evaluation program allow the public to file notices of proposed construction electronically, which facilitates the aeronautical study process and has reduced the overall processing time for these cases. The FAA proposed to require that notices of proposed construction or alterations must be filed with the FAA at least 60 days before construction starts or the application filing date for a construction permit, whichever is earliest. The current rule requires 30 days, which the FAA found inadequate for cases to be processed, particularly if additional information, via public comment period, was necessary to complete the study. At the time the FAA published the NPRM, the automation system was in the early stages, and the full benefits of the automation were not yet known. Commenters were split on their support of this proposal, depending on their interests. Comments from the aviation industry largely supported the extended time period. Comments filed by the building industry, however, opposed the extended time period, saying it was too long and would cause undue delay.

The FAA has seen great success with the automation system and concludes that requiring notice to be filed 60 days before construction or the permit application is not necessary. There are cases where circulating the proposal for public comment may be necessary and, consequently, these cases may require up to 45 days for processing. Therefore, the FAA adopts the requirement that notice must be filed with the FAA for proposed construction or alteration at least 45 days before either the date that construction begins, or the date of the construction permit application, whichever is earliest.

Because applications are required within 45 days of construction, the FAA, Department of Defense, and Department of Homeland Security should work together to conduct timely reviews. To that end, the FAA will respond to inquiries from applicants regarding the status of applications, the reason(s) for any delay, and the projected date of completion. As appropriate, the FAA will engage with other Federal Agencies such as the Department of Defense, the Department of Homeland Security, the Department of Energy, and the Department of Interior to expedite any further regulatory modifications and improvements to 14 CFR Part 77 to ensure there is a predictable, consistent, transparent, and timely application process for the wind industry.

Several commenters recommended separate notice requirements for reviewing a temporary structure that might be necessary under emergency-type circumstances. An example

[2] Civil airport imaginary surfaces are established surfaces based on the runway that are used to identify objects that may impact airport plans or aircraft departure/arrival procedures or routes. Section 77.19 describes five types of imaginary surfaces: horizontal, conical, primary, approach and transitional.

[3] 54–88 MHz; 150–216 MHz; 406–430 MHz; 931–940 MHz; 952–960 MHz; 1390–1400 MHz; 2500–2700 MHz; 3700–4200 MHz; 5000–5650 MHz; 5925–6225 MHz; 7450–8550 MHz; 14.2–14.4 GHz.

submitted in the comments was a construction crane that was necessary to replace air conditioning units on the roof of factories. The commenters contend that it is neither logical nor feasible to shut down a factory for 30 days while the FAA studies this temporary structure.

Situations like the one presented by these commenters are not uncommon. Regardless of whether the structure is temporary, it remains critical for the FAA to have notice of tall structures that can affect aeronautical operations. In most cases, the proponent of the structure contacts the FAA Obstruction Evaluation (OE) specialist and identifies the need for a quick review, for which the agency readily responds. While the FAA regrets any past delay in taking quick action on a particular case, the agency declines to set-up special procedures to address such cases. On the FAA's OE Web site,[4] the agency lists the contact information for the FAA specialist. If a sponsor is concerned with the time frame for the FAA's review, the agency encourages the sponsor to contact the FAA specialist directly.

C. Civil Airport Imaginary Surfaces

The NPRM proposed, for a visual runway used by small aircraft or restricted to day-only instrument operations, that the width of the imaginary approach surface expand uniformly to 1,250 ft. If the runway is a visual runway, used by other than small aircraft or for instrument night circling, the surface width expands uniformly from 1,500 ft. to 3,500 ft. If the runway is a non-precision instrument or precision instrument runway, the surface width expands uniformly to 4,000 ft. and 16,000 ft., respectively. Other changes include removing approach surface widths of 1,500 ft. and 2,000 ft., and increasing the width for some non-precision runways from 2,000 ft. to 4,000 ft. The NPRM also proposed expanding the width of the primary approach surface of a non-precision instrument runway or precision instrument runway from 500 feet to 1,000 ft.

Many commenters opposed the proposed expansion of the primary surface. They argued that the proposed expansion would require airport operators to remove existing structures that would fall within the proposed expanded surface, which would result in a financial burden to airport owners and managers. Southwest Airlines, on the other hand, supported the proposal and stated the ability to study and review more proposed structures is positive for airport safety.

Several comments stated that the imaginary surfaces in part 77 do not comport clearly with the surfaces used for obstacle clearance under the United States Standard for Terminal Instrument Procedures (TERPS) and, therefore, makes the part 77 surfaces useless as a project planning tool for airport development.

Similarly, another commenter argued that the Required Navigation Performance (RNP) lateral protection area is greater than the width of the primary surface and the RNP procedures TERPS surface is outside the part 77 imaginary surface. The commenter contends that an obstacle can adversely impact an RNP procedure, but not be characterized as an obstruction. This commenter recommends that the imaginary surfaces be expanded to include RNP procedures.

Several commenters specifically questioned whether current obstructions that fall within the newly expanded primary surface could impact an instrument procedure and result in the airport losing the instrument procedure. One airport authority was concerned about marking and lighting recommendations for existing structures that will now fall under the expanded primary surface.

The FAA proposed these changes to more closely align regulatory provisions in part 77 with TERPS criteria and airport design standards. The inconsistency between IAP criteria, airport design standards, and part 77 surfaces has been a source of confusion for both airport managers and the FAA. These specific proposals would not have altered the notice criteria. Instead, the proposals were meant to identify more proposed structures as obstructions that the FAA could study to determine if they would adversely affect the NAS.

However, since publication of the NPRM, the FAA has begun a coordinated effort to consolidate all agency requirements for the treatment of obstacles in the airport environment. Once completed, the new requirements will form the basis for revised civil airport imaginary surfaces. Thus, it would not be prudent to codify the proposals. Further, amending or expanding any of the civil airport imaginary surfaces at this time would not be in the best interest of the public. The FAA, therefore, withdraws all proposed modifications to the civil airport imaginary surfaces, including the chart format. The FAA will keep the civil airport imaginary surfaces rule as it is currently described in 14 CFR 77.25.

D. One Engine Inoperative Procedures

The NPRM specifically states that OEI procedures were not a part of the rulemaking. The NPRM further notes that the FAA has tasked the Airport Obstruction Standards Committee (AOSC) with examining this issue. Comments from the Air Transport Association, individual airlines, local airport authorities, and aviation organizations, asked the FAA to address OEI procedures. These comments have been forwarded to the AOSC for consideration. As appropriate, the FAA will advise the aviation industry and other interested persons, through the AOSC, of any policy changes.

E. Definitions

The NPRM proposed replacing the term "utility runway" with the phrase "runway used by small aircraft". In addition, the NPRM proposed amending the definitions for precision, non-precision, and visual runways, as these definitions were no longer up-to-date with industry practices. The term "utility runway" is not widely used in industry so the NPRM proposed replacing the term. In addition, the NPRM proposed amending the definitions for precision and non-precision runways to address approaches that use other than ground based navigational aids, such as flight management systems (FMS) and global navigation satellite systems (GNSS). Because of technological advances, the former definitions for precision and non-precision runways are no longer accurate.

By removing the term "utility runway", commenters stated the portions of the rule that include the term became confusing. They note that the runway classifications and corresponding widths for the primary and approach surfaces in the tables in § 77.19(d)(e) are difficult to understand.

Several commenters confused the proposed definitions for precision and non-precision instrument runways with the definitions for precision and non-precision instrument approach procedures.[5] One commenter suggested the non-precision runway definition should exclude a runway that has a developed instrument approach procedure with visibility minimums of

[4] *https://oeaaa.faa.gov.*

[5] The FAA proposed definitions for the terms "precision instrument runway" and "non-precision instrument runway" to be based on the use of visibility minimums, rather than approach procedure classification, given that visibility is the critical factor during the visual portion of the approach.

one statute mile. This commenter contends that many small, general aviation airports have published procedures with one mile visibility under the current obstruction criteria of a utility runway. The commenter also notes that if the FAA adopts the proposal to limit non-precision runways to procedures with visibility minimums of one statute mile, then these small airports would need to have the more demanding primary surfaces and approach criteria. The commenter further says this could result in financial hardship for these airports and the airports may need to double the designated airspace around the runway. Another commenter stated that the new definition for a non-precision runway conflicts with FAA Advisory Circular 150/5300–13, Airport Design.

Commenters also indicated that the new definition and associated surfaces would take runways that currently qualify as utility into the non-precision category. They say these modifications could result in unfunded economic burdens on outlying airports with IAPs to utility runways that experience lower traffic densities. Additionally, commenters noted that many of these airports are configured with minimal infrastructure and could face significant airport expansion to obtain IAP services if the runway is categorized as non-precison.

Several commenters also stated that the proposed definitions of precision and non-precision runways try to redefine the current precision and non-precision instrument procedures because satellite technology could, in the future, enable non-precision approaches to become precision approaches.

Although the FAA proposed to revise these definitions, on further review, the agency has determined it should not revise them at this time. The definitions were proposed to support implementing satellite-based navigation. However, as the satellite-based navigation program has evolved during development of this rulemaking, the agency has learned of unintended consequences of the proposed definitions. For example, changing the runway definition creates infrastructure requirements that may be needed as the technology evolves. The FAA believes a more measured approach is needed before making any changes to the definitions. Thus, the agency will not adopt the proposed revisions to the definitions in this final rule.

F. Extension to a Determination of No Hazard

The NPRM proposed a provision for which an extension to the expiration date for a Determination of No Hazard may be granted. Specifically, it proposed that for structures not subject to FCC review, a Determination of No Hazard can be extended for a maximum of 18 months, if necessary. If more than 18 months is necessary, then a new aeronautical study would be initiated. For structures that require an FCC construction permit, the NPRM proposed that a Determination of No Hazard can be extended for up to 12 months, provided the sponsor submits evidence that an application for a construction permit was filed within 6 months of the date of issuance. The NPRM also proposed that if the FCC extends the original FCC construction completion date, the sponsor must request an extension of the FAA's Determination of No Hazard.

Many commenters found that the two time periods (18 and 12 months) were confusing. The FAA's review of this matter concluded that it is not necessary to continue the distinction between structures subject to FCC review from structures that do not need this review, simply to extend the expiration date. Therefore, for simplification and standardization, the FAA amends the time period for extensions to determinations of structures to 18 months, regardless of whether an FCC construction permit is necessary.

In addition, the FAA unintentionally omitted a section of the current rule from the NPRM. That section states that if the FCC denies a construction permit, the final determination expires on the date of the denial. The FAA has reinserted that section in this final rule.

G. Effective Date

The effective date of this final rule is 180 days from the date the rule is published in the **Federal Register**. The FAA needs this time to amend the automation system it uses to evaluate obstructions, amend relevant FAA orders, train employees, and educate the public.

H. Miscellaneous

One commenter said the requirement to file notice should extend to structures that would penetrate an imaginary surface relative to a planned or proposed airport. Specifically, this commenter seeks to incorporate the imaginary surfaces for evaluating obstructions under § 77.19(a) in the notice requirements for structures that are on or around a planned airport.

Section 77.9 requires notice for construction on an existing airport or an airport under construction. This section specifies an imaginary surface extending from the runway (in increments of 20,000 feet, 10,000 ft., or 5,000 ft., depending on the length of the airport's runway or heliport) at a specific slope for which notice is required if it would penetrate one of the surfaces for either an existing airport or an airport under construction. The above referenced surfaces, for which the longest surface would extend approximately 3.78 miles from the end of the runway, do not apply to a planned airport for which construction has yet to begin.

The effect of this commenter's request would be to require notice for up to approximately 3.5 miles (for the longest runway) for any construction that penetrates the 100 to 1 surface for a planned or proposed airport.

This comment is outside the scope of the NPRM. The essence of this comment would be a new notice requirement for planned or proposed airports. To accommodate this comment without providing the public an opportunity to comment on its impact would violate the Administrative Procedure Act.

Notwithstanding the above scope issue, to apply the imaginary surface from the notice requirements to planned or proposed airports would be difficult to implement. A planned or proposed airport can be at varying stages of development, with runway(s) location and configuration undetermined, navigational aids not sited, and instrument approach and departure procedures yet to be developed. It would be impossible for the FAA to study (and apply the obstruction standards) with any degree of certainty, to a proposed structure when the above listed airport issues are not defined. In addition, airport development can be subject to environmental laws and lengthy processes with alternative plans that must be analyzed. The FAA cannot "reserve" airspace on such speculative plans. The agency does study the impact of structures that are identified as obstructions on planned or proposed airports that are on file with the FAA. As the details of a planned airport become part of the "plan on file" with the FAA or the Airport Layout Plan, on which the FAA can rely, the FAA includes those details during the study.

Several commenters questioned the proposed removal of the regulatory provisions addressing antenna farms and whether any antenna farms currently exist. The FAA has not established any antenna farm area. Moreover, the regulations governing structures addresses the FAA needs

here. Thus, this rule removes the provisions governing antenna farms.

One commenter questioned why an object that is shielded by another structure is not subject to the notice requirements. This commenter contends that if the structure that shields an unreported structure is dismantled, there is no record of the first structure, nor is there any requirement to notify the FAA of this structure if the shielding structure is dismantled.

Section 77.15(a) provides that notice is not required for a structure if the shielding structure is of a substantial and permanent nature and is located in a congested area of a city, town, or settlement where the shielded structure will not adversely affect safety in air navigation. This exception does not apply in areas where there are only one or two other structures. The FAA has not experienced a situation like the one described by the commenter that can be attributed to this exception. This rule does expand the current supplemental notice requirements in § 77.11, and specifies that if a construction or alteration is abandoned, dismantled, or destroyed, notice must be provided to the FAA within 5 days after the construction is abandoned, dismantled, or destroyed. In the rare case where a shielding structure is abandoned, dismantled, or destroyed, the proponent must notify the FAA so that appropriate actions concerning adjacent structures can be initiated.

Prior to this rule, part 77 provided that a proposed or existing structure was an obstruction to air navigation if it was higher than 500 ft. above ground level (AGL). The minimum altitude to operate an aircraft over non-congested areas is 500 feet above the surface.[6] Consequently, an aircraft could be operating at 500 ft. AGL and encounter a structure that was 500 ft. AGL that might not have been studied by the FAA during the obstacle evaluation process. The FAA adopts the proposal that lowers the height of a structure identified as an obstruction from above 500 ft. to above 499 ft. Accordingly, all structures that are above 499 ft. tall will be obstructions, and the FAA will study them to determine their effect on the navigable airspace. This will ensure that all usable airspace at and above 500 ft. AGL is addressed during the aeronautical study and that this airspace is protected from obstructions that may create a hazard to air navigation.

[6] 14 CFR Section 91.119(c) provides that "Except when necessary for takeoff and landing, no person may operate an aircraft below the following altitudes: (b) Over other than congested areas. An altitude of 500 feet above the surface except over open water or sparely populated areas. In those cases, the aircraft may not be operated closer than 500 feet to any person, vessel, vehicle, or structure."

III. Paperwork Reduction Act

The Paperwork Reduction Act of 1995 (44 U.S.C. 3507(d)) requires that the FAA consider the impact of paperwork and other information collection burdens imposed on the public. According to the 1995 amendments to the Paperwork Reduction Act (5 CFR 1320.8(b)(2)(vi)), an agency may not collect or sponsor the collection of information, nor may it impose an information collection requirement unless it displays a currently valid Office of Management and Budget (OMB) control number. As required by the Paperwork Reduction Act of 1995 (44 U.S.C. 3507(d)), the FAA submitted a copy of the new information collection requirements(s) discussed below to OMB for its review. Notice of OMB approval for this information collection will be published in a future **Federal Register** document.

Title 49 U.S.C. 44718 states, "By regulation or by order when necessary, the Secretary of Transportation shall require a person to give adequate public notice, in the form and way the Secretary prescribes, of the construction, alteration, establishment, or expansion, of a structure or sanitary landfill when public notice will promote:

(1) safety in air commerce; and

(2) the efficient use and preservation of the navigable airspace and of airport traffic capacity at public use airports."

This final rule implements the requirement for notification by requiring that notice be submitted to the FAA for proposed construction or alteration of structures on or near private use airports that have an IAP. Accordingly, if a private use airport has an FAA-approved IAP, then a construction sponsor is required to notify the FAA of a proposed construction or alteration that exceeds the notice criteria in § 77.17. This action will give the FAA adequate time to adjust the IAP, if needed, and to inform those who use the IAP. While IAPs at private use airports or heliports are not currently listed in any aeronautical publication, sponsors of construction or alteration at or near a private use airport or heliport can consult the FAA Web site[7] to determine whether an FAA-approved IAP is listed for that airport. If the airport is listed on the Web site, the sponsor must file notice with the FAA. The intent of these changes is to improve safety and promote the efficient use of the National Airspace System.

The FAA estimates that on average, 3,325 Form 7460–1s would be filed annually. It is estimated to take 19 minutes, or 0.32 hours, to fill out each form. Hence, the estimated hour burden is: 0.32 hours × 3,325 = 1,064 hours.

The average cost for a firm to prepare the form itself is approximately $40 per form. It is estimated that 20 percent of the forms filed would be filed this way. Thus, the estimated average annual reporting burden for companies to process this form in-house would be: (FAA Form 7460–1) $40 × 665 = $26,600.

The average cost for a company to outsource this function to a contractor is approximately $480 per report. It is estimated that 80 percent of the forms filed would be filed this way. Thus, the estimated average annual reporting burden for companies to outsource this function is: (FAA Form 7460–1) $480 × 2,660 = $1,276,800.

It is estimated that roughly 30 percent of firms filing FAA Form 7460–1 will need to perform a site survey to complete the form. The cost of a site survey is $790. Thus, the estimated annual reporting burden for companies who require a site survey would be: (FAA Form 7460–1) $790 × 998 = $788,420.

Hence, the total annual cost to firms that fill out FAA Form 7460–1 is $2,091,820.

In the proposed rule, the FAA asked for comments on the information collection burden. You may view the FAA's specific request in the proposed rule.[8] The FAA received comments from multiple commenters. The following is a summary of the comments with the FAA's response:

Several commenters stated that the FAA underestimated the costs, in terms of time and paperwork, associated with preparing a Form 7460–1, as well as the costs of filing an OE notice, so the FAA should revise its estimates. One commenter surveyed its members and the survey indicated that the cost of processing a Form 7460–1 in-house was $406 and took about 1.6 hours per form. Further, the average hourly labor cost was found to be $36 per hour. The commenter also stated that in addition to maps, a site survey is needed to complete Form 7460–1, which ensures the accuracy of the location and costs an average of $768. Another commenter supported the notion of including the cost of a site survey in the cost estimation for filing a Form 7460–1. Another commenter suggested that the

[7] *https://oeaaa.faa.gov.*

[8] 71 FR 34028; June 13, 2006.

FAA increase its estimate for processing a Form 7460–1 in-house to $40.

The FAA omitted the cost of a site survey in the preliminary analysis because a site survey is not required to complete a Form 7460–1. However, a site survey must be completed if it is requested by the FAA's Flight Procedure Office. The agency has revised the cost analysis to reflect the wider range of costs as supplied by the commenters. The FAA also revised its cost and paperwork analyses to include the cost of filing a form in-house, as well as the costs of a site survey.

A few commenters claimed that the FAA underestimated the time and paperwork costs associated with filing additional notices. Another commenter believed that the FAA underestimated the paperwork burden that will be placed on radio spectrum users.

The FAA completed a paperwork reduction package for the proposed rule, which did show the estimated paperwork costs. The paperwork costs were also shown in the initial regulatory evaluation and were available for review in the docket. However, the FAA has elected not to adopt the radio frequency notice requirements in this final rule. As a result, there will be no additional paperwork burden placed on radio spectrum users at this time.

A commenter stated that requiring applicants to provide notice to the FAA 60 days in advance could also increase the number of filings because of the rule change. Another commenter stated that extending the notice period for all proposed projects will cause undue delay in securing FAA approval and will delay the ability of utilities to develop new sites.

The FAA has reduced the filing time period from 60 days to 45 days. This should mitigate the delay expected by the commenters and allow them to continue their operations without much change. Thus, the FAA does not expect any delays in construction or operational deficiencies resulting from the final rule.

International Compatibility

In keeping with U.S. obligations under the Convention on International Civil Aviation, it is FAA policy to comply with International Civil Aviation Organization (ICAO) Standards and Recommended Practices to the maximum extent practicable. The FAA has reviewed the corresponding ICAO Standards and Recommended Practices and has identified no new differences with these proposed regulations.

IV. Regulatory Evaluation, Regulatory Flexibility Determination, International Trade Impact Assessment, and Unfunded Mandates Assessment

Changes to Federal regulations must undergo several economic analyses. First, Executive Order 12866 directs that each Federal agency shall propose or adopt a regulation only upon a reasoned determination that the benefits of the intended regulation justify its costs. Second, the Regulatory Flexibility Act of 1980 (Pub. L. 96–354) requires agencies to analyze the economic impact of regulatory changes on small entities. Third, the Trade Agreements Act (Pub. L. 96–39) prohibits agencies from setting standards that create unnecessary obstacles to the foreign commerce of the United States. In developing U.S. standards, this Trade Act requires agencies to consider international standards and, where appropriate, that they be the basis of U.S. standards. Fourth, the Unfunded Mandates Reform Act of 1995 (Pub. L. 104–4) requires agencies to prepare a written assessment of the costs, benefits, and other effects of proposed or final rules that include a Federal mandate likely to result in the expenditure by state, local, or tribal governments, in the aggregate, or by the private sector, of $100 million or more annually (adjusted for inflation with base year of 1995). This portion of the preamble summarizes the FAA's analysis of the economic impacts of this final rule. Readers seeking greater detail should read the full regulatory evaluation, a copy of which is in the docket for this rulemaking.

In conducting these analyses, the FAA has determined that this final rule has benefits that justify its costs and is not economically significant under Executive Order 12866; however, it is otherwise "significant" because of concerns raised by the National Telecommunications and Information Administration (NTIA) and the Federal Communications Commission (FCC) regarding the FAA's evaluation of potential electromagnetic effect during aeronautical studies. The final rule, if adopted, will not have a significant economic impact on a substantial number of small entities, will not create unnecessary obstacles to international trade, and will not impose an unfunded mandate on state, local, tribal governments, or on the private sector.

This final rule amends 14 CFR part 77. These amendments refer to the rules for obstruction evaluation standards, aeronautical studies, and notice provisions about objects that could create hazards to air navigation.

The FAA estimates the cost of this final rule to private industry will be approximately $20.9 million ($14.1 million, present value) over the next 10 years. The estimated cost of the final rule to the FAA will be approximately $18.7 million ($12.6 million, present value) over the next 10 years. Therefore, the total cost associated with the final rule will be approximately $39.6 million ($26.8 million, present value) over the next 10 years.

The final rule will enhance protection of aircraft approaches from unknown obstructions and unknown alteration projects on or near private use airports with FAA-approved instrument approach procedures (IAPs). The FAA contends that these qualitative benefits justify the costs of the final rule.

Final Regulatory Flexibility Analysis

The Regulatory Flexibility Act of 1980 establishes "as a principle of regulatory issuance that agencies shall endeavor, consistent with the objective of the rule and of applicable statutes, to fit regulatory and informational requirements to the scale of the business, organizations, and governmental jurisdictions subject to regulation." To achieve that principle, the Act requires agencies to solicit and consider flexible regulatory proposals and to explain the rationale for their actions. The Act covers a wide range of small entities, including small businesses, not-for-profit organizations and small governmental jurisdictions.

Agencies must perform a review to determine whether a proposed or final rule will have a significant economic impact on a substantial number of small entities. If the determination is that it will, the agency must prepare a regulatory flexibility analysis (RFA) as described in the Act.

However, if an agency determines that a proposed or final rule is not expected to have a significant economic impact on a substantial number of small entities, section 605(b) of the 1980 Act provides that the head of the agency may so certify and an RFA is not required. The certification must include a statement providing the factual basis for this determination, and the reasoning should be clear.

While the FAA does not maintain data on the size of businesses that file notices, the FAA estimates that approximately 40 percent of the OE notices will be filed by small businesses (comprised of business owners and private use airport owners) as defined by the Small Business Administration. Thus, in 2010 when the rule is expected to take effect, the FAA expects approximately 2,400 more OE notices

will be filed by affected parties. Of those applications filed, approximately 960 notices are estimated to be filed by small businesses (using 40 percent assumption).

For those small businesses that are inexperienced in submitting the necessary paperwork, the FAA believes they would either hire a consultant or spend as much as the consultant fee ($480) in staff time to understand, research, complete, and submit the form(s). For the purpose of this regulatory flexibility assessment, the FAA assumes that it will cost all small entities approximately $480 per case to meet the requirements of part 77.

It is unlikely that any individual small entity will file more than three OE notices in a calendar year. As a result, the FAA estimates that in virtually all cases, the cost of this rule to small businesses will not exceed $1500 per small entity, a cost the FAA does not consider significant. Therefore, as the FAA Administrator, I certify that this rule will not have a significant economic impact on a substantial number of small entities.

International Trade Impact Assessment

The Trade Agreements Act of 1979 (Pub. L. 96–39), as amended by the Uruguay Round Agreements Act (Pub. L. 103–465), prohibits Federal agencies from establishing standards or engaging in related activities that create unnecessary obstacles to the foreign commerce of the United States. Pursuant to these Acts, the establishment of standards is not considered an unnecessary obstacle to the foreign commerce of the United States, so long as the standard has a legitimate domestic objective, such as the protection of safety, and does not operate in a manner that excludes imports that meet this objective. The statute also requires consideration of international standards and, where appropriate, that they be the basis for U.S. standards. The FAA has assessed the potential effect of this final rule and determined that it will have only a domestic impact and, therefore, will not create unnecessary obstacles to the foreign commerce of the United States.

Unfunded Mandates Assessment

Title II of the Unfunded Mandates Reform Act of 1995 (Pub. L. 104–4) requires each Federal agency to prepare a written statement assessing the effects of any Federal mandate in a proposed or final agency rule that may result in an expenditure of $100 million or more (in 1995 dollars) in any one year by state, local, and tribal governments, in the aggregate, or by the private sector; such a mandate is deemed to be a "significant regulatory action." The FAA currently uses an inflation-adjusted value of $136.1 million in lieu of $100 million. This final rule does not contain such a mandate; therefore, the requirements of Title II of the Act do not apply.

Executive Order 13132, Federalism

The FAA has analyzed this final rule under the principles and criteria of Executive Order 13132, Federalism. The FAA determined that this action will not have a substantial direct effect on the States, or the relationship between the Federal Government and the States, or on the distribution of power and responsibilities among the various levels of government, and, therefore, does not have federalism implications.

Environmental Analysis

FAA Order 1050.1E identifies FAA actions that are categorically excluded from preparation of an environmental assessment or environmental impact statement under the National Environmental Policy Act in the absence of extraordinary circumstances. The FAA has determined this rulemaking action qualifies for the categorical exclusion identified in paragraph 312f and involves no extraordinary circumstances.

Regulations That Significantly Affect Energy Supply, Distribution, or Use

The FAA has analyzed this final rule under Executive Order 13211, Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use (May 18, 2001). We have determined that it is not a "significant energy action" under the executive order because it is not a "significant regulatory action" under Executive Order 12866, and it is not likely to have a significant adverse effect on the supply, distribution, or use of energy.

Availability of Rulemaking Documents

You can get an electronic copy of rulemaking documents using the Internet by—

1. Searching the Federal eRulemaking Portal (*http://www.regulations.gov*);

2. Visiting the FAA's Regulations and Policies Web page at *http://www.faa.gov/regulations_policies/;* or

3. Accessing the Government Printing Office's Web page at *http://www.gpoaccess.gov/fr/index.html.*

You can also get a copy by sending a request to the Federal Aviation Administration, Office of Rulemaking, ARM–1, 800 Independence Avenue, SW., Washington, DC 20591, or by calling (202) 267–9680. Make sure to identify the amendment number or docket number of this rulemaking.

Anyone is able to search the electronic form of all comments received into any of our dockets by the name of the individual submitting the comment (or signing the comment, if submitted on behalf of an association, business, labor union, etc.). You may review DOT's complete Privacy Act statement in the **Federal Register** published on April 11, 2000 (Volume 65, Number 70; Pages 19477–78) or you may visit *http://DocketsInfo.dot.gov*.

Small Business Regulatory Enforcement Fairness Act

The Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996 requires FAA to comply with small entity requests for information or advice about compliance with statutes and regulations within its jurisdiction. If you are a small entity and you have a question regarding this document, you may contact your local FAA official, or the person listed under the **FOR FURTHER INFORMATION CONTACT** heading at the beginning of the preamble. You can find out more about SBREFA on the Internet at *http://www.faa.gov/regulations_policies/rulemaking/sbre_act/*.

Appendix A to the Preamble

Under regulations (49 U.S.C. 44718) prescribed by the Secretary, if the Secretary decides that constructing or altering a structure may result in an obstruction of the navigable airspace or an interference with air navigation facilities and equipment or the navigable airspace, the Secretary shall conduct an aeronautical study to decide the extent of any adverse impact on the safe and efficient use of the airspace, facilities, or equipment. In conducting the study, the Secretary shall consider factors relevant to the efficient and effective use of the navigable airspace, including—

(A) The impact on arrival, departure, and en route procedures for aircraft operating under visual flight rules;

(B) The impact on arrival, departure, and en route procedures for aircraft operating under instrument flight rules;

(C) The impact on existing public use airports and aeronautical facilities;

(D) The impact on planned public use airports and aeronautical facilities; and

(E) The cumulative impact resulting from the proposed construction or alteration of a structure when combined with the impact of other existing or proposed structures.

Appendix B to the Preamble

The NPRM proposed that notice must be filed with the FAA for any construction of a new, or modification of an existing facility, *i.e.*—building, antenna structure, or any other man-made structure, which supports a radiating element(s) for the purpose of radio frequency transmissions operating on the following frequencies:

(i) 54–108 MHz
(ii) 150–216 MHz
(iii) 406–430 MHz
(iv) 931–940 MHz
(v) 952–960 MHz
(vi) 1390–1400 MHz
(vii) 2500–2700 MHz
(viii) 3700–4200 MHz
(ix) 5000–5650 MHz
(x) 5925–6525 MHz
(xi) 7450–8550 MHz
(xii) 14.2–14.4 GHz
(xiii) 21.2–23.6 GHz

In addition, the NPRM proposed that any changes or modification to a system operating on one of the previously mentioned frequencies when specified in the original FAA determination, including:

(i) Change in the authorized frequency;

(ii) Addition of new frequencies;

(iii) Increase in effective radiated power (ERP) equal or greater than 3 decibels;

(iv) modification of radiating elements, including: (A) Antenna mounting locations(s) if increased 100 feet or more irrespective of whether the overall height is increased; (B) changes in antenna specification (including gain, beam-width, polarization, pattern); and (C) change in antenna azimuth/bearing (*e.g.* point-to-point microwave systems).

List of Subjects in 14 CFR Part 77

Administrative practice and procedure, Airports, Airspace, Aviation safety, Navigation (air), Reporting and recordkeeping requirements.

V. The Amendment

■ In consideration of the foregoing, the Federal Aviation Administration amends Chapter I of title 14, Code of Federal Regulations by revising part 77 to read as follows:

PART 77—SAFE, EFFICIENT USE, AND PRESERVATION OF THE NAVIGABLE AIRSPACE

Subpart A—General

Sec.
77.1 Purpose.
77.3 Definitions.

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77.7 Form and time of notice.
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Subpart E—Petitions for Discretionary Review

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77.41 Discretionary review results.

Authority: 49 U.S.C. 106 (g), 40103, 40113–40114, 44502, 44701, 44718, 46101–46102, 46104.

Subpart A—General

§ 77.1 Purpose.

This part establishes:

(a) The requirements to provide notice to the FAA of certain proposed construction, or the alteration of existing structures;

(b) The standards used to determine obstructions to air navigation, and navigational and communication facilities;

(c) The process for aeronautical studies of obstructions to air navigation or navigational facilities to determine the effect on the safe and efficient use of navigable airspace, air navigation facilities or equipment; and

(d) The process to petition the FAA for discretionary review of determinations, revisions, and extensions of determinations.

§ 77.3 Definitions.

For the purpose of this part:

Non-precision instrument runway means a runway having an existing instrument approach procedure utilizing air navigation facilities with only horizontal guidance, or area type navigation equipment, for which a straight-in non-precision instrument approach procedure has been approved, or planned, and for which no precision approach facilities are planned, or indicated on an FAA planning document or military service military airport planning document.

Planned or proposed airport is an airport that is the subject of at least one of the following documents received by the FAA:

(1) Airport proposals submitted under 14 CFR part 157.

(2) Airport Improvement Program requests for aid.

(3) Notices of existing airports where prior notice of the airport construction or alteration was not provided as required by 14 CFR part 157.

(4) Airport layout plans.

(5) DOD proposals for airports used only by the U.S. Armed Forces.

(6) DOD proposals on joint-use (civil-military) airports.

(7) Completed airport site selection feasibility study.

Precision instrument runway means a runway having an existing instrument approach procedure utilizing an Instrument Landing System (ILS), or a Precision Approach Radar (PAR). It also means a runway for which a precision approach system is planned and is so indicated by an FAA-approved airport layout plan; a military service approved military airport layout plan; any other FAA planning document, or military service military airport planning document.

Public use airport is an airport available for use by the general public without a requirement for prior approval of the airport owner or operator.

Seaplane base is considered to be an airport only if its sea lanes are outlined by visual markers.

Utility runway means a runway that is constructed for and intended to be used by propeller driven aircraft of 12,500 pounds maximum gross weight and less.

Visual runway means a runway intended solely for the operation of aircraft using visual approach procedures, with no straight-in instrument approach procedure and no instrument designation indicated on an FAA-approved airport layout plan, a military service approved military airport layout plan, or by any planning document submitted to the FAA by competent authority.

Subpart B—Notice Requirements

§ 77.5 Applicability.

(a) If you propose any construction or alteration described in § 77.9, you must provide adequate notice to the FAA of that construction or alteration.

(b) If requested by the FAA, you must also file supplemental notice before the start date and upon completion of certain construction or alterations that are described in § 77.9.

(c) Notice received by the FAA under this subpart is used to:

(1) Evaluate the effect of the proposed construction or alteration on safety in air commerce and the efficient use and preservation of the navigable airspace and of airport traffic capacity at public use airports;

(2) Determine whether the effect of proposed construction or alteration is a hazard to air navigation;

(3) Determine appropriate marking and lighting recommendations, using FAA Advisory Circular 70/7460–1, Obstruction Marking and Lighting;

(4) Determine other appropriate measures to be applied for continued safety of air navigation; and

(5) Notify the aviation community of the construction or alteration of objects that affect the navigable airspace, including the revision of charts, when necessary.

§ 77.7 Form and time of notice.

(a) If you are required to file notice under § 77.9, you must submit to the FAA a completed FAA Form 7460–1, Notice of Proposed Construction or Alteration. FAA Form 7460–1 is available at FAA regional offices and on the Internet.

(b) You must submit this form at least 45 days before the start date of the proposed construction or alteration or the date an application for a construction permit is filed, whichever is earliest.

(c) If you propose construction or alteration that is also subject to the licensing requirements of the Federal Communications Commission (FCC), you must submit notice to the FAA on or before the date that the application is filed with the FCC.

(d) If you propose construction or alteration to an existing structure that exceeds 2,000 ft. in height above ground level (AGL), the FAA presumes it to be a hazard to air navigation that results in an inefficient use of airspace. You must include details explaining both why the proposal would not constitute a hazard to air navigation and why it would not cause an inefficient use of airspace.

(e) The 45-day advance notice requirement is waived if immediate construction or alteration is required because of an emergency involving essential public services, public health, or public safety. You may provide notice to the FAA by any available, expeditious means. You must file a completed FAA Form 7460–1 within 5 days of the initial notice to the FAA. Outside normal business hours, the nearest flight service station will accept emergency notices.

§ 77.9 Construction or alteration requiring notice.

If requested by the FAA, or if you propose any of the following types of construction or alteration, you must file notice with the FAA of:

(a) Any construction or alteration that is more than 200 ft. AGL at its site.

(b) Any construction or alteration that exceeds an imaginary surface extending outward and upward at any of the following slopes:

(1) 100 to 1 for a horizontal distance of 20,000 ft. from the nearest point of the nearest runway of each airport described in paragraph (d) of this section with its longest runway more than 3,200 ft. in actual length, excluding heliports.

(2) 50 to 1 for a horizontal distance of 10,000 ft. from the nearest point of the nearest runway of each airport described in paragraph (d) of this section with its longest runway no more than 3,200 ft. in actual length, excluding heliports.

(3) 25 to 1 for a horizontal distance of 5,000 ft. from the nearest point of the nearest landing and takeoff area of each heliport described in paragraph (d) of this section.

(c) Any highway, railroad, or other traverse way for mobile objects, of a height which, if adjusted upward 17 feet for an Interstate Highway that is part of the National System of Military and Interstate Highways where overcrossings are designed for a minimum of 17 feet vertical distance, 15 feet for any other public roadway, 10 feet or the height of the highest mobile object that would normally traverse the road, whichever is greater, for a private road, 23 feet for a railroad, and for a waterway or any other traverse way not previously mentioned, an amount equal to the height of the highest mobile object that would normally traverse it, would exceed a standard of paragraph (a) or (b) of this section.

(d) Any construction or alteration on any of the following airports and heliports:

(1) A public use airport listed in the Airport/Facility Directory, Alaska Supplement, or Pacific Chart Supplement of the U.S. Government Flight Information Publications;

(2) A military airport under construction, or an airport under construction that will be available for public use;

(3) An airport operated by a Federal agency or the DOD.

(4) An airport or heliport with at least one FAA-approved instrument approach procedure.

(e) You do not need to file notice for construction or alteration of:

(1) Any object that will be shielded by existing structures of a permanent and substantial nature or by natural terrain or topographic features of equal or greater height, and will be located in the congested area of a city, town, or settlement where the shielded structure will not adversely affect safety in air navigation;

(2) Any air navigation facility, airport visual approach or landing aid, aircraft arresting device, or meteorological device meeting FAA-approved siting criteria or an appropriate military service siting criteria on military airports, the location and height of which are fixed by its functional purpose;

(3) Any construction or alteration for which notice is required by any other FAA regulation.

(4) Any antenna structure of 20 feet or less in height, except one that would increase the height of another antenna structure.

§ 77.11 Supplemental notice requirements.

(a) You must file supplemental notice with the FAA when:

(1) The construction or alteration is more than 200 feet in height AGL at its site; or

(2) Requested by the FAA.

(b) You must file supplemental notice on a prescribed FAA form to be received within the time limits specified in the FAA determination. If no time limit has been specified, you must submit supplemental notice of construction to the FAA within 5 days after the structure reaches its greatest height.

(c) If you abandon a construction or alteration proposal that requires supplemental notice, you must submit notice to the FAA within 5 days after the project is abandoned.

(d) If the construction or alteration is dismantled or destroyed, you must submit notice to the FAA within 5 days after the construction or alteration is dismantled or destroyed.

Subpart C—Standards for Determining Obstructions to Air Navigation or Navigational Aids or Facilities

§ 77.13 Applicability.

This subpart describes the standards used for determining obstructions to air navigation, navigational aids, or navigational facilities. These standards apply to the following:

(a) Any object of natural growth, terrain, or permanent or temporary construction or alteration, including equipment or materials used and any permanent or temporary apparatus.

(b) The alteration of any permanent or temporary existing structure by a change in its height, including appurtenances, or lateral dimensions, including equipment or material used therein.

§ 77.15 Scope.

(a) This subpart describes standards used to determine obstructions to air navigation that may affect the safe and efficient use of navigable airspace and the operation of planned or existing air navigation and communication facilities. Such facilities include air navigation aids, communication equipment, airports, Federal airways, instrument approach or departure procedures, and approved off-airway routes.

(b) Objects that are considered obstructions under the standards

described in this subpart are presumed hazards to air navigation unless further aeronautical study concludes that the object is not a hazard. Once further aeronautical study has been initiated, the FAA will use the standards in this subpart, along with FAA policy and guidance material, to determine if the object is a hazard to air navigation.

(c) The FAA will apply these standards with reference to an existing airport facility, and airport proposals received by the FAA, or the appropriate military service, before it issues a final determination.

(d) For airports having defined runways with specially prepared hard surfaces, the primary surface for each runway extends 200 feet beyond each end of the runway. For airports having defined strips or pathways used regularly for aircraft takeoffs and landings, and designated runways, without specially prepared hard surfaces, each end of the primary surface for each such runway shall coincide with the corresponding end of the runway. At airports, excluding seaplane bases, having a defined landing and takeoff area with no defined pathways for aircraft takeoffs and landings, a determination must be made as to which portions of the landing and takeoff area are regularly used as landing and takeoff pathways. Those determined pathways must be considered runways, and an appropriate primary surface as defined in § 77.19 will be considered as longitudinally centered on each such runway. Each end of that primary surface must coincide with the corresponding end of that runway.

(e) The standards in this subpart apply to construction or alteration proposals on an airport (including heliports and seaplane bases with marked lanes) if that airport is one of the following before the issuance of the final determination:

(1) Available for public use and is listed in the Airport/Facility Directory, Supplement Alaska, or Supplement Pacific of the U.S. Government Flight Information Publications; or

(2) A planned or proposed airport or an airport under construction of which the FAA has received actual notice, except DOD airports, where there is a clear indication the airport will be available for public use; or,

(3) An airport operated by a Federal agency or the DOD; or,

(4) An airport that has at least one FAA-approved instrument approach.

§ 77.17 Obstruction standards.

(a) An existing object, including a mobile object, is, and a future object would be an obstruction to air navigation if it is of greater height than any of the following heights or surfaces:

(1) A height of 499 feet AGL at the site of the object.

(2) A height that is 200 feet AGL, or above the established airport elevation, whichever is higher, within 3 nautical miles of the established reference point of an airport, excluding heliports, with its longest runway more than 3,200 feet in actual length, and that height increases in the proportion of 100 feet for each additional nautical mile from the airport up to a maximum of 499 feet.

(3) A height within a terminal obstacle clearance area, including an initial approach segment, a departure area, and a circling approach area, which would result in the vertical distance between any point on the object and an established minimum instrument flight altitude within that area or segment to be less than the required obstacle clearance.

(4) A height within an en route obstacle clearance area, including turn and termination areas, of a Federal Airway or approved off-airway route, that would increase the minimum obstacle clearance altitude.

(5) The surface of a takeoff and landing area of an airport or any imaginary surface established under § 77.19, 77.21, or 77.23. However, no part of the takeoff or landing area itself will be considered an obstruction.

(b) Except for traverse ways on or near an airport with an operative ground traffic control service furnished by an airport traffic control tower or by the airport management and coordinated with the air traffic control service, the standards of paragraph (a) of this section apply to traverse ways used or to be used for the passage of mobile objects only after the heights of these traverse ways are increased by:

(1) 17 feet for an Interstate Highway that is part of the National System of Military and Interstate Highways where overcrossings are designed for a minimum of 17 feet vertical distance.

(2) 15 feet for any other public roadway.

(3) 10 feet or the height of the highest mobile object that would normally traverse the road, whichever is greater, for a private road.

(4) 23 feet for a railroad.

(5) For a waterway or any other traverse way not previously mentioned, an amount equal to the height of the highest mobile object that would normally traverse it.

§ 77.19 Civil airport imaginary surfaces.

The following civil airport imaginary surfaces are established with relation to the airport and to each runway. The size of each such imaginary surface is based on the category of each runway according to the type of approach available or planned for that runway. The slope and dimensions of the approach surface applied to each end of a runway are determined by the most precise approach procedure existing or planned for that runway end.

(a) *Horizontal surface.* A horizontal plane 150 feet above the established airport elevation, the perimeter of which is constructed by SW.inging arcs of a specified radii from the center of each end of the primary surface of each runway of each airport and connecting the adjacent arcs by lines tangent to those arcs. The radius of each arc is:

(1) 5,000 feet for all runways designated as utility or visual;

(2) 10,000 feet for all other runways. The radius of the arc specified for each end of a runway will have the same arithmetical value. That value will be the highest determined for either end of the runway. When a 5,000-foot arc is encompassed by tangents connecting two adjacent 10,000-foot arcs, the 5,000-foot arc shall be disregarded on the construction of the perimeter of the horizontal surface.

(b) *Conical surface.* A surface extending outward and upward from the periphery of the horizontal surface at a slope of 20 to 1 for a horizontal distance of 4,000 feet.

(c) *Primary surface.* A surface longitudinally centered on a runway. When the runway has a specially prepared hard surface, the primary surface extends 200 feet beyond each end of that runway; but when the runway has no specially prepared hard surface, the primary surface ends at each end of that runway. The elevation of any point on the primary surface is the same as the elevation of the nearest point on the runway centerline. The width of the primary surface is:

(1) 250 feet for utility runways having only visual approaches.

(2) 500 feet for utility runways having non-precision instrument approaches.

(3) For other than utility runways, the width is:

(i) 500 feet for visual runways having only visual approaches.

(ii) 500 feet for non-precision instrument runways having visibility minimums greater than three-fourths statue mile.

(iii) 1,000 feet for a non-precision instrument runway having a non-precision instrument approach with visibility minimums as low as three-fourths of a statute mile, and for precision instrument runways.

(iv) The width of the primary surface of a runway will be that width prescribed in this section for the most precise approach existing or planned for either end of that runway.

(d) *Approach surface.* A surface longitudinally centered on the extended runway centerline and extending outward and upward from each end of the primary surface. An approach surface is applied to each end of each runway based upon the type of approach available or planned for that runway end.

(1) The inner edge of the approach surface is the same width as the primary surface and it expands uniformly to a width of:

(i) 1,250 feet for that end of a utility runway with only visual approaches;

(ii) 1,500 feet for that end of a runway other than a utility runway with only visual approaches;

(iii) 2,000 feet for that end of a utility runway with a non-precision instrument approach;

(iv) 3,500 feet for that end of a non-precision instrument runway other than utility, having visibility minimums greater that three-fourths of a statute mile;

(v) 4,000 feet for that end of a non-precision instrument runway, other than utility, having a non-precision instrument approach with visibility minimums as low as three-fourths statute mile; and

(vi) 16,000 feet for precision instrument runways.

(2) The approach surface extends for a horizontal distance of:

(i) 5,000 feet at a slope of 20 to 1 for all utility and visual runways;

(ii) 10,000 feet at a slope of 34 to 1 for all non-precision instrument runways other than utility; and

(iii) 10,000 feet at a slope of 50 to 1 with an additional 40,000 feet at a slope of 40 to 1 for all precision instrument runways.

(3) The outer width of an approach surface to an end of a runway will be that width prescribed in this subsection for the most precise approach existing or planned for that runway end.

(e) *Transitional surface.* These surfaces extend outward and upward at right angles to the runway centerline and the runway centerline extended at a slope of 7 to 1 from the sides of the primary surface and from the sides of the approach surfaces. Transitional surfaces for those portions of the precision approach surface which project through and beyond the limits of the conical surface, extend a distance of 5,000 feet measured horizontally from the edge of the approach surface and at right angles to the runway centerline.

§ 77.21 Department of Defense (DOD) airport imaginary surfaces.

(a) *Related to airport reference points.* These surfaces apply to all military airports. For the purposes of this section, a military airport is any airport operated by the DOD.

(1) *Inner horizontal surface.* A plane that is oval in shape at a height of 150 feet above the established airfield elevation. The plane is constructed by scribing an arc with a radius of 7,500 feet about the centerline at the end of each runway and interconnecting these arcs with tangents.

(2) *Conical surface.* A surface extending from the periphery of the inner horizontal surface outward and upward at a slope of 20 to 1 for a horizontal distance of 7,000 feet to a height of 500 feet above the established airfield elevation.

(3) *Outer horizontal surface.* A plane, located 500 feet above the established airfield elevation, extending outward from the outer periphery of the conical surface for a horizontal distance of 30,000 feet.

(b) *Related to runways.* These surfaces apply to all military airports.

(1) *Primary surface.* A surface located on the ground or water longitudinally centered on each runway with the same length as the runway. The width of the primary surface for runways is 2,000 feet. However, at established bases where substantial construction has taken place in accordance with a previous lateral clearance criteria, the 2,000-foot width may be reduced to the former criteria.

(2) *Clear zone surface.* A surface located on the ground or water at each end of the primary surface, with a length of 1,000 feet and the same width as the primary surface.

(3) *Approach clearance surface.* An inclined plane, symmetrical about the runway centerline extended, beginning 200 feet beyond each end of the primary surface at the centerline elevation of the runway end and extending for 50,000 feet. The slope of the approach clearance surface is 50 to 1 along the runway centerline extended until it reaches an elevation of 500 feet above the established airport elevation. It then continues horizontally at this elevation to a point 50,000 feet from the point of beginning. The width of this surface at the runway end is the same as the primary surface, it flares uniformly, and the width at 50,000 is 16,000 feet.

(4) *Transitional surfaces.* These surfaces connect the primary surfaces, the first 200 feet of the clear zone surfaces, and the approach clearance surfaces to the inner horizontal surface, conical surface, outer horizontal surface or other transitional surfaces. The slope of the transitional surface is 7 to 1 outward and upward at right angles to the runway centerline.

§ 77.23 Heliport imaginary surfaces.

(a) *Primary surface.* The area of the primary surface coincides in size and shape with the designated take-off and landing area. This surface is a horizontal plane at the elevation of the established heliport elevation.

(b) *Approach surface.* The approach surface begins at each end of the heliport primary surface with the same width as the primary surface, and extends outward and upward for a horizontal distance of 4,000 feet where its width is 500 feet. The slope of the approach surface is 8 to 1 for civil heliports and 10 to 1 for military heliports.

(c) *Transitional surfaces.* These surfaces extend outward and upward from the lateral boundaries of the primary surface and from the approach surfaces at a slope of 2 to 1 for a distance of 250 feet measured horizontally from the centerline of the primary and approach surfaces.

Subpart D—Aeronautical Studies and Determinations

§ 77.25 Applicability.

(a) This subpart applies to any aeronautical study of a proposed construction or alteration for which notice to the FAA is required under § 77.9.

(b) The purpose of an aeronautical study is to determine whether the aeronautical effects of the specific proposal and, where appropriate, the cumulative impact resulting from the proposed construction or alteration when combined with the effects of other existing or proposed structures, would constitute a hazard to air navigation.

(c) The obstruction standards in subpart C of this part are supplemented by other manuals and directives used in determining the effect on the navigable airspace of a proposed construction or alteration. When the FAA needs additional information, it may circulate a study to interested parties for comment.

§ 77.27 Initiation of studies.

The FAA will conduct an aeronautical study when:

(a) Requested by the sponsor of any proposed construction or alteration for which a notice is submitted; or

(b) The FAA determines a study is necessary.

§ 77.29 Evaluating aeronautical effect.

(a) The FAA conducts an aeronautical study to determine the impact of a proposed structure, an existing structure that has not yet been studied by the FAA, or an alteration of an existing structure on aeronautical operations, procedures, and the safety of flight. These studies include evaluating:

(1) The impact on arrival, departure, and en route procedures for aircraft operating under visual flight rules;

(2) The impact on arrival, departure, and en route procedures for aircraft operating under instrument flight rules;

(3) The impact on existing and planned public use airports;

(4) Airport traffic capacity of existing public use airports and public use airport development plans received before the issuance of the final determination;

(5) Minimum obstacle clearance altitudes, minimum instrument flight rules altitudes, approved or planned instrument approach procedures, and departure procedures;

(6) The potential effect on ATC radar, direction finders, ATC tower line-of-sight visibility, and physical or electromagnetic effects on air navigation, communication facilities, and other surveillance systems;

(7) The aeronautical effects resulting from the cumulative impact of a proposed construction or alteration of a structure when combined with the effects of other existing or proposed structures.

(b) If you withdraw the proposed construction or alteration or revise it so that it is no longer identified as an obstruction, or if no further aeronautical study is necessary, the FAA may terminate the study.

§ 77.31 Determinations.

(a) The FAA will issue a determination stating whether the proposed construction or alteration would be a hazard to air navigation, and will advise all known interested persons.

(b) The FAA will make determinations based on the aeronautical study findings and will identify the following:

(1) The effects on VFR/IFR aeronautical departure/arrival operations, air traffic procedures, minimum flight altitudes, and existing, planned, or proposed airports listed in § 77.15(e) of which the FAA has received actual notice prior to issuance of a final determination.

(2) The extent of the physical and/or electromagnetic effect on the operation of existing or proposed air navigation facilities, communication aids, or surveillance systems.

(c) The FAA will issue a Determination of Hazard to Air Navigation when the aeronautical study concludes that the proposed construction or alteration will exceed an obstruction standard and would have a substantial aeronautical impact.

(d) A Determination of No Hazard to Air Navigation will be issued when the aeronautical study concludes that the proposed construction or alteration will exceed an obstruction standard but would not have a substantial aeronautical impact to air navigation. A Determination of No Hazard to Air Navigation may include the following:

(1) Conditional provisions of a determination.

(2) Limitations necessary to minimize potential problems, such as the use of temporary construction equipment.

(3) Supplemental notice requirements, when required.

(4) Marking and lighting recommendations, as appropriate.

(e) The FAA will issue a Determination of No Hazard to Air Navigation when a proposed structure does not exceed any of the obstruction standards and would not be a hazard to air navigation.

§ 77.33 Effective period of determinations.

(a) A determination issued under this subpart is effective 40 days after the date of issuance, unless a petition for discretionary review is received by the FAA within 30 days after issuance. The determination will not become final pending disposition of a petition for discretionary review.

(b) Unless extended, revised, or terminated, each Determination of No Hazard to Air Navigation issued under this subpart expires 18 months after the effective date of the determination, or on the date the proposed construction or alteration is abandoned, whichever is earlier.

(c) A Determination of Hazard to Air Navigation has no expiration date.

§ 77.35 Extensions, terminations, revisions and corrections.

(a) You may petition the FAA official that issued the Determination of No Hazard to Air Navigation to revise or reconsider the determination based on new facts or to extend the effective period of the determination, provided that:

(1) Actual structural work of the proposed construction or alteration, such as the laying of a foundation, but not including excavation, has not been started; and

(2) The petition is submitted at least 15 days before the expiration date of the Determination of No Hazard to Air Navigation.

(b) A Determination of No Hazard to Air Navigation issued for those construction or alteration proposals not requiring an FCC construction permit may be extended by the FAA one time for a period not to exceed 18 months.

(c) A Determination of No Hazard to Air Navigation issued for a proposal requiring an FCC construction permit may be granted extensions for up to 18 months, provided that:

(1) You submit evidence that an application for a construction permit/license was filed with the FCC for the associated site within 6 months of issuance of the determination; and

(2) You submit evidence that additional time is warranted because of FCC requirements; and

(3) Where the FCC issues a construction permit, a final Determination of No Hazard to Air Navigation is effective until the date prescribed by the FCC for completion of the construction. If an extension of the original FCC completion date is needed, an extension of the FAA determination must be requested from the Obstruction Evaluation Service (OES).

(4) If the Commission refuses to issue a construction permit, the final determination expires on the date of its refusal.

Subpart E—Petitions for Discretionary Review

§ 77.37 General.

(a) If you are the sponsor, provided a substantive aeronautical comment on a proposal in an aeronautical study, or have a substantive aeronautical comment on the proposal but were not given an opportunity to state it, you may petition the FAA for a discretionary review of a determination, revision, or extension of a determination issued by the FAA.

(b) You may not file a petition for discretionary review for a Determination of No Hazard that is issued for a temporary structure, marking and lighting recommendation, or when a proposed structure or alteration does not exceed obstruction standards contained in subpart C of this part.

§ 77.39 Contents of a petition.

(a) You must file a petition for discretionary review in writing and it must be received by the FAA within 30 days after the issuance of a determination under § 77.31, or a revision or extension of the determination under § 77.35.

(b) The petition must contain a full statement of the aeronautical basis on

which the petition is made, and must include new information or facts not previously considered or presented during the aeronautical study, including valid aeronautical reasons why the determination, revisions, or extension made by the FAA should be reviewed.

(c) In the event that the last day of the 30-day filing period falls on a weekend or a day the Federal government is closed, the last day of the filing period is the next day that the government is open.

(d) The FAA will inform the petitioner or sponsor (if other than the petitioner) and the FCC (whenever an FCC-related proposal is involved) of the filing of the petition and that the determination is not final pending disposition of the petition.

§ 77.41 Discretionary review results.

(a) If discretionary review is granted, the FAA will inform the petitioner and the sponsor (if other than the petitioner) of the issues to be studied and reviewed. The review may include a request for comments and a review of all records from the initial aeronautical study.

(b) If discretionary review is denied, the FAA will notify the petitioner and the sponsor (if other than the petitioner), and the FCC, whenever a FCC-related proposal is involved, of the basis for the denial along with a statement that the determination is final.

(c) After concluding the discretionary review process, the FAA will revise, affirm, or reverse the determination.

Issued in Washington, DC, on July 13, 2010.

J. Randolph Babbitt,

Administrator.

[FR Doc. 2010–17767 Filed 7–20–10; 8:45 am]

BILLING CODE 4910–13–P

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 97

[Docket No. 30734; Amdt. No. 3382]

Standard Instrument Approach Procedures, and Takeoff Minimums and Obstacle Departure Procedures; Miscellaneous Amendments

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule.

SUMMARY: This establishes, amends, suspends, or revokes Standard Instrument Approach Procedures (SIAPs) and associated Takeoff Minimums and Obstacle Departure Procedures for operations at certain airports. These regulatory actions are needed because of the adoption of new or revised criteria, or because of changes occurring in the National Airspace System, such as the commissioning of new navigational facilities, adding new obstacles, or changing air traffic requirements. These changes are designed to provide safe and efficient use of the navigable airspace and to promote safe flight operations under instrument flight rules at the affected airports.

DATES: This rule is effective July 21, 2010. The compliance date for each SIAP, associated Takeoff Minimums, and ODP is specified in the amendatory provisions.

The incorporation by reference of certain publications listed in the regulations is approved by the Director of the Federal Register as of July 21, 2010.

ADDRESSES: Availability of matters incorporated by reference in the amendment is as follows:

For Examination—

1. FAA Rules Docket, FAA Headquarters Building, 800 Independence Avenue, SW., Washington, DC 20591;

2. The FAA Regional Office of the region in which the affected airport is located;

3. The National Flight Procedures Office, 6500 South MacArthur Blvd., Oklahoma City, OK 73169; or

4. The National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to: *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.*

Availability—All SIAPs and Takeoff Minimums and ODPs are available online free of charge. Visit *http://www.nfdc.faa.gov* to register. Additionally, individual SIAP and Takeoff Minimums and ODP copies may be obtained from:

1. FAA Public Inquiry Center (APA–200), FAA Headquarters Building, 800 Independence Avenue, SW., Washington, DC 20591; or

2. The FAA Regional Office of the region in which the affected airport is located.

FOR FURTHER INFORMATION CONTACT: Harry J. Hodges, Flight Procedure Standards Branch (AFS–420), Flight Technologies and Programs Divisions, Flight Standards Service, Federal Aviation Administration, Mike Monroney Aeronautical Center, 6500 South MacArthur Blvd., Oklahoma City, OK 73169 (Mail Address: P.O. Box 25082, Oklahoma City, OK 73125) Telephone: (405) 954–4164.

SUPPLEMENTARY INFORMATION: This rule amends Title 14 of the Code of Federal Regulations, Part 97 (14 CFR part 97), by establishing, amending, suspending, or revoking SIAPS, Takeoff Minimums and/or ODPS. The complete regulators description of each SIAP and its associated Takeoff Minimums or ODP for an identified airport is listed on FAA form documents which are incorporated by reference in this amendment under 5 U.S.C. 552(a), 1 CFR part 51, and 14 CFR part 97.20. The applicable FAA Forms are FAA Forms 8260–3, 8260–4, 8260–5, 8260–15A, and 8260–15B when required by an entry on 8260–15A.

The large number of SIAPs, Takeoff Minimums and ODPs, in addition to their complex nature and the need for a special format make publication in the **Federal Register** expensive and impractical. Furthermore, airmen do not use the regulatory text of the SIAPs, Takeoff Minimums or ODPs, but instead refer to their depiction on charts printed by publishers of aeronautical materials. The advantages of incorporation by reference are realized and publication of the complete description of each SIAP, Takeoff Minimums and ODP listed on FAA forms is unnecessary. This amendment provides the affected CFR sections and specifies the types of SIAPs and the effective dates of the associated Takeoff Minimums and ODPs. This amendment also identifies the airport and its location, the procedure, and the amendment number.

The Rule

This amendment to 14 CFR part 97 is effective upon publication of each separate SIAP, Takeoff Minimums and ODP as contained in the transmittal. Some SIAP and Takeoff Minimums and textual ODP amendments may have been issued previously by the FAA in a Flight Data Center (FDC) Notice to Airmen (NOTAM) as an emergency action of immediate flight safety relating directly to published aeronautical charts. The circumstances which created the need for some SIAP and Takeoff Minimums and ODP amendments may require making them effective in less than 30 days. For the remaining SIAPS and Takeoff Minimums and ODPS, an effective date at least 30 days after publication is provided.

Further, the SIAPs and Takeoff Minimums and ODPS contained in this amendment are based on the criteria contained in the U.S. Standard for Terminal Instrument Procedures

APPENDIX D WETLAND AND WATERBODY DESKTOP SUMMARY

ERM

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February 23, 2022

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

Subject: Wetland and Waterbody Desktop Summary
Nimbus 230 kV Line Loop and Nimbus Substation and 230 kV Farmwell-Nimbus Transmission Line Project
New SCC Filing

Dear Ms. Rayfield:

Environmental Resources Management (ERM), on behalf of Virginia Electric and Power Company ("Dominion Energy Virginia," "Dominion" or the "Company"), conducted a desktop wetland and waterbody review of publically-available information for the proposed Nimbus 230 kV Line Loop and Nimbus Substation and 230 kV Farmwell-Nimbus Transmission Line Project (Project) located in Loudoun County, Virginia. Field delineations were not performed as part of this analysis and would be required to verify the accuracy and extent of aquatic resource boundaries. Attachment 1 depicts the general location of the proposed Project. Attachment 2 illustrates the wetland boundaries that were identified as part of the desktop review. Dominion Energy Virginia is filing an application with the State Corporation Commission (SCC) for the following:

- A new double circuit 230 kV transmission line that would cut Dominion's existing Line #2152, at existing structure #2152/19A, east of Loudoun County Parkway and extend to the proposed Nimbus Substation (Nimbus Line Loop). This project also includes construction of the proposed Nimbus Substation.
- A new 230 kV single circuit transmission line that would be constructed from the existing Farmwell Substation to the proposed Nimbus Substation (Farmwell-Nimbus Line).

The Project is necessary in order to provide service requested by the Customer in Loudoun County, Virginia, to maintain reliable service for the overall growth on the Project area, and to comply with mandatory NERC Reliability Standards. The Company considered the facilities required to construct and operate the new feeds; the length of new rights-of-way that will be required; the amount of existing development in each area; the potential for environmental impacts on communities; and the relative cost of the Project.

The purpose of this desktop analysis was to identify and evaluate potential impacts of the Project on wetlands and waterbodies (streams, creeks, runs, and open water features). In accordance with Virginia Department of Environmental Quality (DEQ) and the SCC's Memorandum of Agreement, the evaluation was conducted using various data sets that may indicate wetland location and type. The information summarized in this report will be submitted to the DEQ as part of the DEQ Wetland Impacts Consultation.

This assessment did not include the field investigations required for wetland delineations in accordance with the U.S. Army Corps of Engineers Wetland Delineation Manual (Environmental Laboratory, 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0).

Project Study Area and Potential Routes

The Project study area is rectangular in shape and lies within the heavily developed part of Loudoun County north of Dulles Airport known as "Data Center Alley". The study area encompasses an approximately 3-square-mile area and includes mixed-use, commercial, and data center developments. The study area encompasses the area around and between Dominion's existing Farmwell Substation to the west, and Dominion's existing Line #2152 to the east.

As referenced and discussed above, two separate transmission lines are required to provide service requested by the Customer, maintain reliable service for the overall growth in the area, and comply with mandatory NERC Reliability Standards. These two transmission lines are referred to as the Nimbus Line Loop and Farmwell-Nimbus Line.

Multiple potential routes were identified for the Nimbus Line Loop. However, only one route was deemed viable. The remaining routes were rejected from further consideration.

Due to heavy development in the area, the route developed for the Farmwell-Nimbus Line represented the only viable route option to connect the existing Farmwell Substation and the proposed Nimbus Substation. No other potential routes were identified for the Farmwell-Nimbus Line.

Route Alternatives

Nimbus Line Loop

The Nimbus Line Loop would involve the construction of an overhead double circuit 230 kV line from a cut in located on existing Line #2152, at structure #2152/19A, to the proposed Nimbus Substation. The length of the route is approximately 0.61 mile. The route begins at the cut in location on Line #2152, which is located along the south side of Waxpool Road. The route then continues west along the south side of Waxpool Road, crossing over Loudoun County Parkway, for a distance of 3,225 linear feet. The route then turns south for a distance of 20 feet and terminates at the proposed Nimbus Substation.

Farmwell-Nimbus Line

The Farmwell-Nimbus Line would involve the construction of an overhead single circuit 230 kV line from the existing Farmwell Substation to the proposed Nimbus Substation. The length of the route is approximately 0.26 mile. Beginning at the Farmwell Substation, the route exits the eastern side of the substation then turns to the southeast and extends parallel to the Digital Realty ACC9 Data Center building for approximately 450 feet. The route then turns to the northeast across a parking area for approximately 430 feet. Upon exiting the parking area, the route next turns southeast and parallels Waxpool Road for approximately 510 feet. The route then turns south and enters into the proposed Nimbus Substation.

Desktop Evaluation Methodology

The area of effect considered for this study consists of the proposed rights-of-way identified above within which the electric transmission lines would be constructed and operated. Data sources used for this review include the following, each of which is described briefly below:

- National Agricultural Imagery Program (NAIP) Digital Ortho-Rectified Natural Color Images, Virginia, 1-meter pixel resolution, photo date 2020;
- NAIP Digital Ortho-Rectified Infrared Images, Virginia, 1-meter pixel resolution, photo date 2020;
- U.S. Geological Survey (USGS) 7.5-minute current (2014);
- U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) mapping (2020);
- U.S. Department of Agriculture-Natural Resources Conservation Service (USDA-NRCS) Soil Survey Geographic (SSURGO) database for Loudon County, Virginia (2021); and
- Loudoun County, Virginia Weblogis – Online Mapping System (2021)

Natural Color and Infrared Aerial Photography

Recent (2021) natural color aerial photography was used to provide a visual overview of the Project area and to assist in evaluating current conditions. Recent (2020) infrared aerial photography was used to identify the potential presence of wetlands based on signatures associated with the levels of reflectance. For example, areas that are inundated with water appear very dark (almost black) due to the low level of reflectance in the infrared spectrum. The presence of these dark colors can be used as a potential indicator of hydric or inundated soils that are likely associated with wetlands.

USGS Topographic Maps

The recent (2014) USGS topographic maps show the topography of the area. The USGS topographic maps also depict other important landscape features such as forest cover, development, buildings, agricultural areas, streams, lakes, and wetlands.

NWI Maps

NWI maps provide the boundaries and classifications of potential wetland areas as mapped by the USFWS. However, NWI data is based primarily on aerial photo interpretations with limited ground-truthing and may represent incorrect boundaries or wetland cover types. NWI data can be unreliable in some areas, especially in forested landscapes, when aerial photography is used as the major data source. The classifications of the majority of the NWI polygons in the study area appear to be accurate based on a review of the cover types observed in the aerial photography. However, in areas where there was an obvious discrepancy between the NWI classification and the aerial photography, ERM modified the classification to more accurately reflect current conditions. For example, an area mapped by NWI data as open water was adjusted to an emergent wetland type. For the purposes of this review, wetlands mapped as unconsolidated bottom or riverine were considered open water. In order to acknowledge ERM's adjustment of NWI classifications where appropriate, all of the wetland types referenced in this assessment are referred to as "assigned wetland cover types" regardless of whether the cover type was actually modified from the NWI classification.

USDA-NRCS Soils Data

Soils in the study area were identified and assessed using the SSURGO database, which is a digital version of the original county soil surveys. The attribute data within the SSURGO database provides the proportionate extent of the component soils and their properties (e.g., hydric rating) for each soil map unit. The soils in the study area were grouped into three categories based on the hydric rating of the component soils within each map unit: hydric, partially hydric, and non-hydric. Hydric soils were defined as those where the major component soils, and minor components in some cases, are designated as hydric. Hydric components in these map units account for more than 80 percent of the map unit. Partially hydric soils include map units that only contain minor component soils that are designated as hydric. The partially hydric map units in the Project area contain 10 percent or less hydric soils. The remaining map units do not contain any component soils that are designated as hydric. Areas mapped as hydric or partially hydric have a higher probability of containing wetlands than areas with no hydric soils.

USGS Hydrography and Loudoun County Waterbody Datasets

The National Hydrography Dataset (NHD) and Loudoun County Waterbody datasets contain features such as lakes, ponds, streams, rivers, and canals. The waterbodies mapped by the NHD appeared consistent with those visible on the USGS maps and aerial photography. The Loudoun County Waterbody datasets were used in coordination with the USGS Hydrography dataset for additional refinement.

Probability Analysis

ERM used a stepwise process to identify probable wetland areas along the Nimbus Line Loop and Farmwell-Nimbus Line, as follows:

1. Infrared and natural color aerial photography was used in conjunction with USGS topographic maps and soils maps to identify potential wetland areas. Boundaries were assigned to the areas that appeared to exhibit wetland signatures based on this review and a cover type was determined based on aerial photo interpretation. For the purpose of the study, these areas are referred to as Interpreted Wetlands.

2. To further determine the probability of a wetland occurring within a given location, the Interpreted Wetland polygon shape files were digitally layered with the NWI mapping and soils information from the SSURGO database.

3. The probability of a wetland occurring was assigned based on the number of overlapping data layers (i.e., indicators of potential wetland presence) that occurred in a particular area.

The criteria assigned to each probability are outlined in Table 1.

Table 1: Criteria Used to Rank the Probability of Wetland Occurrence

Probability	Criteria
High	Areas where layers of hydric soils, Interpreted Wetlands, and NWI data overlap
Medium/High	NWI data overlaps hydric soils; or NWI data overlaps Interpreted Wetlands with or without partially hydric soils; or Hydric soils overlap Interpreted Wetlands
Medium	Interpreted Wetlands with or without overlap by partially hydric soils

Medium/Low	Hydric soils only; or NWI data with or without overlap by partially hydric soils
Low	Partially hydric soils only
Very Low	Non-hydric soils only

Wetland and Waterbody Crossings

The desktop analysis provides a probability of wetlands and waterbody occurrence within each route. As stated above, field delineations were not performed and would be required to verify the accuracy and extent of aquatic resource boundaries. A range of wetland occurrence probabilities are reported by this study from very low to high. The probability of wetland occurrence increases as multiple indicators begin to overlap towards the "high" end of the spectrum. The medium, medium-high and high probability category are the most reliable representation of in-situ conditions, due to overlapping data sets, and these categories are reported in the summary below as a percentage of the total acreage of each route. Attachment 2 depicts the interpreted wetlands displayed on color base map images.

Results

Results of the probability analysis are presented in Table 2 below. Summaries of impacts by route are provided in the sections following the table. Impacts associated with the Nimbus Substation are included in the impacts for Nimbus Line Loop.

Table 2: Summary of the Probabilities of Wetland and Waterbody Occurrence along Project Routes [a, b]

Probability	Total right-of-way Acres [c]	Wetland and Waterbody type (acres)		
		PEM Emergent	Riverine Stream	Freshwater Pond
Nimbus Line Loop				
High	0.00	0.00	NA	NA
Medium/High	**0.40**	**0.16**	**0.21**	**0.04**
Medium	**0.06**	**0.06**	NA	NA
Medium/Low	2.11	NA	NA	NA
Low	NA	NA	NA	NA
Very Low	8.41	NA	NA	NA
Farmwell-Nimbus Line				
High	NA	NA	NA	NA
Medium/High	NA	NA	NA	NA
Medium	NA	NA	NA	NA
Medium/Low	1.23	NA	NA	NA
Low	NA	NA	NA	NA
Very Low	2.03	NA	NA	NA

NA Not applicable due to absence of wetland or waterbody type within the alternative route
a The numbers in this table have been rounded for presentation purposes; as a result, the totals may not reflect the sum of the addends.
b Nimbus Substation wetlands and waterbodies are included in the Nimbus Line Loop.
c Total acres may not total the sum of wetland and waterbody types. This is due to the fact that some of the lower probability rankings do not overlap with NWI or interpreted wetlands, and therefore do not have a wetland/waterbody type associated with them.

Nimbus Line Loop

The length of the corridor for the Nimbus Line Loop is approximately 0.61 mile, and encompasses a total of approximately 10.98 acres (including 3.60 acres for the proposed Nimbus Substation). Based on the methodology discussed above, the right-of-way and substation footprint will encompass approximately 4.2 percent (0.46 acres) of land with a medium or higher probability of containing wetlands and waterbodies. Based on recent aerial photography (2021), previously existing wetlands and waterbodies are no longer present within the proposed substation footprint due to land development; however, due to the desktop probability methodology, which assigns a medium/high probability based on overlapping NWI and hydric soil layers, there is a probability assigned even though aquatic resources no longer appear to be present

Farmwell-Nimbus Line

The length of the corridor for the Farmwell-Nimbus Line is approximately 0.26 mile, and encompasses a total of approximately 3.25 acres of right-of-way. Based on the methodology discussed above, the right-of-way will not encompass land with a medium or higher probability of containing wetlands and waterbodies.

Waterbody Crossings

Based on the NHD, there is one waterbody crossing within the Project boundaries. An unnamed intermittent tributary to Broad Run crosses the Nimbus Line Loop west of the intersection of Waxpool Road and Loudoun County Parkway.

Project Impacts

Avoiding or minimizing new impacts on wetlands and streams was among the criteria Dominion Energy Virginia used in developing routes for the Project. Dominion Energy Virginia has minimized crossings of these features to the extent practicable by designing the proposed lines to span wetlands and waterbodies, therefore no permanent impacts to aquatic resources are anticipated.

Where the removal of shrubby vegetation occurs within wetlands, Dominion Energy Virginia would use the least intrusive method reasonably possible to clear the corridor. Hand-cutting of vegetation would be conducted, where needed, to avoid and minimize impacts on streams and/or wetlands. There would be no change in contours or redirection of the flow of water, and the amount of spoil from trenching would be minimal. Excess soil in wetlands generated during construction would be removed from the wetland.

Mats would be used for construction equipment to travel over wetlands, as appropriate. Grading in wetlands will consist of the minimum necessary for safe and efficient equipment operation. Potential direct impacts on wetlands would be temporary in nature.

Summary

This Wetland and Waterbody Summary report was prepared in accordance with the Memorandum of Agreement between the DEQ and the SCC for purposes of initiating a Wetlands Impact Consultation. Please note that a formal onsite wetland delineation was not conducted as part of this review.

In addition, we have a Project website where the SCC application will be available after filing, as well as maps and discussions about the Project. It can be accessed by going to https://www.dominionenergy.com/nimbus. If you have any questions regarding this wetland assessment please contact me at 804-338-9099 or by email at mariah.weitzenkamp@erm.com.

Yours sincerely,

Mariah Weitzenkamp
Environmental Resources Management

cc: Charles Weil, Virginia Electric and Power Company
James Young, Virginia Electric and Power Company

Enclosures: Attachments 1 and 2

References

County of Loudoun (VA) GIS Office. 2021. Environmental GIS Layers. Available online at https://logis.loudoun.gov/weblogis/. Accessed October 2021.

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ATTACHMENT 1

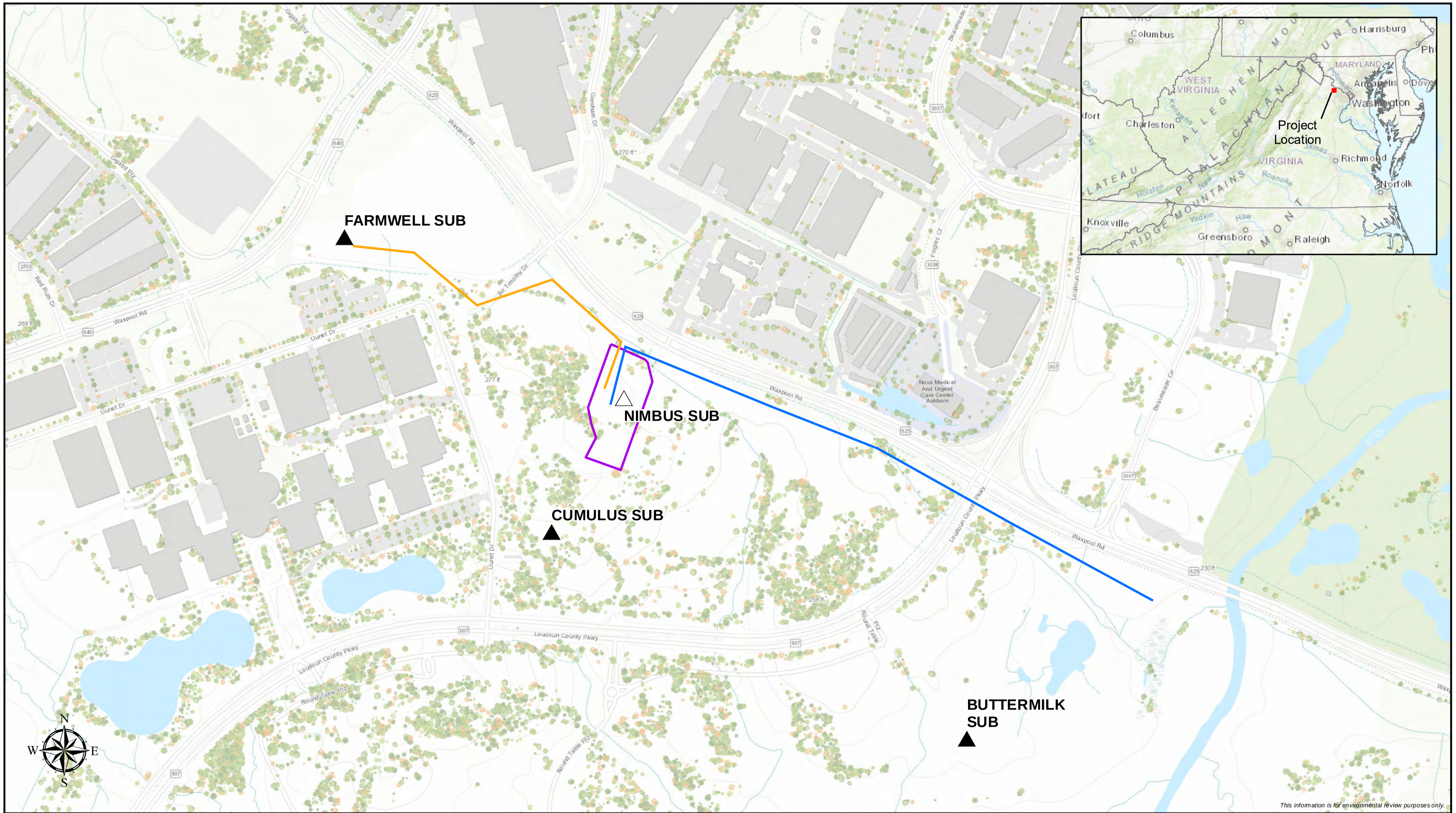

Figure 1
Project Overview Map
Nimbus 230 kV Delivery Project and Nimbus to Farmwell Project
Loudoun County, Virginia

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ATTACHMENT 2

FARMWELL SUB

Page 1

NIMBUS SUB

CUMULUS SUB

Page 2

BUTTERMILK SUB

This information is for environmental review purposes only.

0 500 1,000
Feet

- Existing Substation
- Proposed Substation
- Nimbus 230 kV Line Loop Proposed Route
- 230 kV Farmwell-Nimbus Proposed Route
- Proposed Nimbus Substation Boundary
- Page Index

Figure 2
Wetland and Waterbody Index Map
Nimbus 230 kV Delivery Project and Nimbus to Farmwell Project
Loudoun County, Virginia

Dominion Energy

ERM

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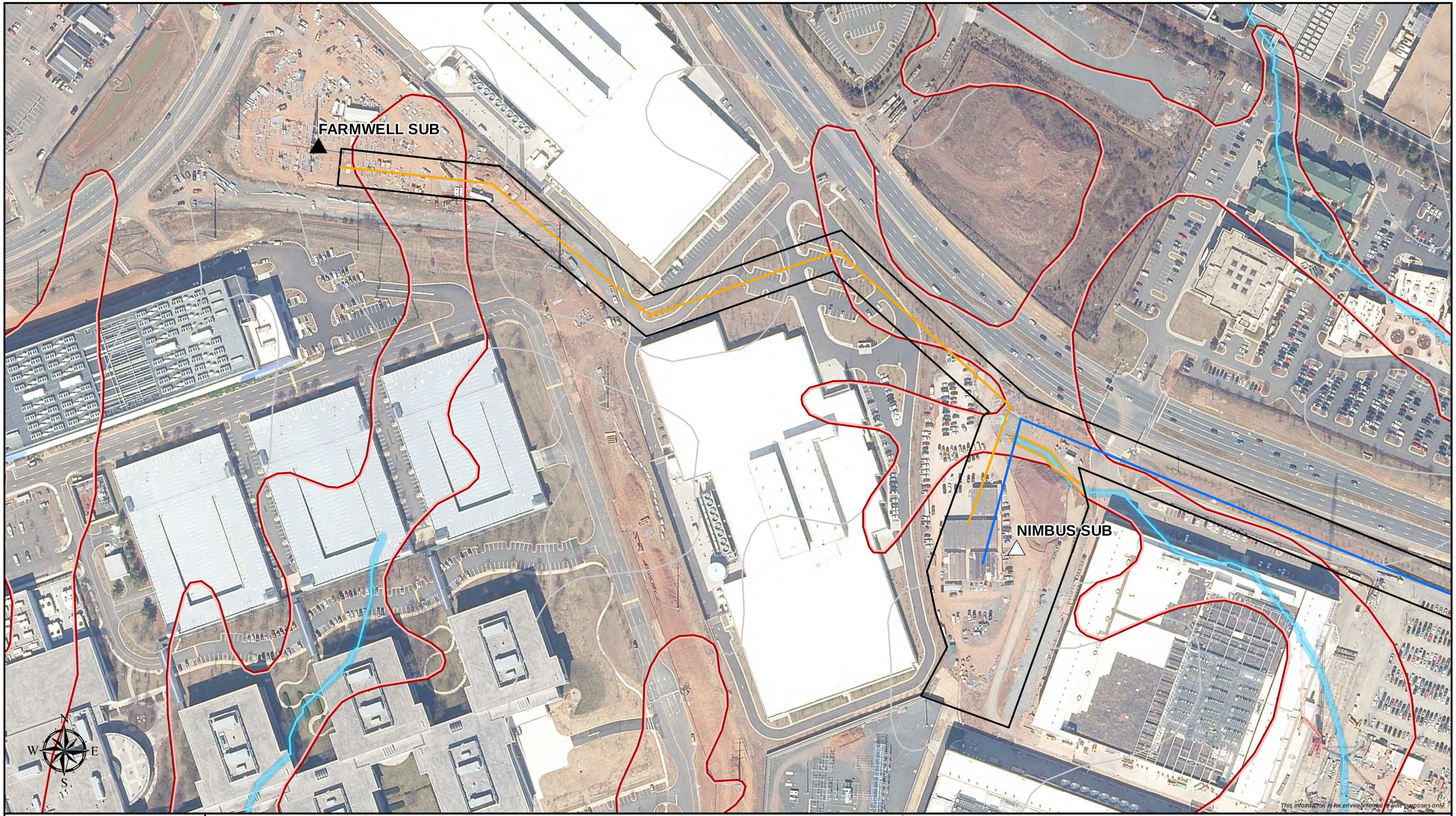
DRAWN BY: JPB

The wetlands and waterbodies depicted on this map are an estimate of possible wetland and waterbody extent based on desktop data review only, and are subject to change in extent and location based on actual field delineation of wetlands and waterbodies.



0 200 400
Feet

- Existing Substation
- Proposed Substation
- Nimbus 230 kV Line Loop Proposed Route
- 230 kV Farmwell-Nimbus Proposed Route
- Project Limits

Wetland Probability

- Medium/High
- Not Hydric Soil
- Hydric Soil
- NHD Waterbody
- NWI Wetland

Dominion Energy

Figure 2
Wetland and Waterbody Mapset
Nimbus 230 kV Delivery Project and Nimbus to Farmwell Project
Loudoun County, Virginia

ERM

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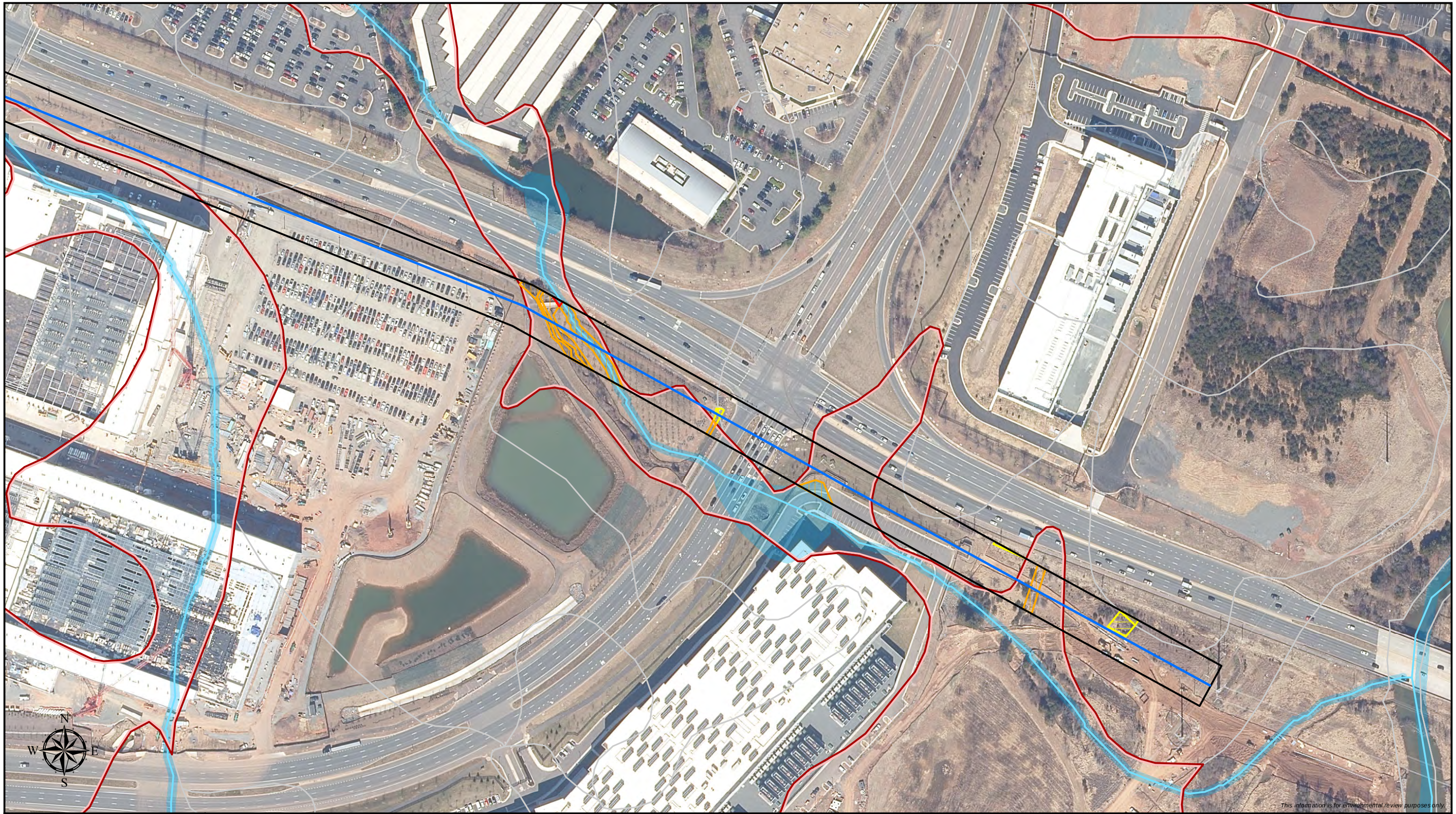
DRAWN BY: JPB

The wetlands and waterbodies depicted on this map are an estimate of possible wetland and waterbody extent based on desktop data review only, and are subject to change in extent and location based on actual field delineation of wetlands and waterbodies.



0 200 400
Feet

- Nimbus 230 kV Line Loop Proposed Route
- Project Limits

Wetland Probability

- High
- Medium/High
- Medium
- Not Hydric Soil
- Hydric Soil
- NHD Waterbody
- NWI Wetland

Dominion Energy

Figure 2
Wetland and Waterbody Mapset
Nimbus 230 kV Delivery Project and Nimbus to Farmwell Project
Loudoun County, Virginia

ERM

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DRAWN BY: JPB

APPENDIX E VISUAL SIMULATIONS

NIMBUS LOOP & SUBSTATION

PROJECT RIGHT-OF-WAY

PROPOSED TRANSMISSION LINE

SUBSTATION

PHOTO LOCATION

Dominion Energy®

NIMBUS LOOP & SUBSTATION

SIMULATION 1

Looking South from 625 toward Proposed Nimbus Substation.

9/30/2021 • 11:33 am

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

Dominion Energy®

EXISTING Conditions

PROPOSED Conditions

NIMBUS LOOP & SUBSTATION

SIMULATION 2

Looking South from restaurant courtyard on north side of 625.

9/30/2021 • 11:22 am

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

Dominion Energy®

EXISTING Conditions

PROPOSED Conditions

NIMBUS LOOP & SUBSTATION

SIMULATION 3

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

9/30/2021 • 11:13 am

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

Dominion Energy®

EXISTING Conditions

PROPOSED Conditions

NIMBUS LOOP & SUBSTATION

SIMULATION 4

Looking South from parking lot of Clear Dermatology

9/30/2021 • 10:12 am

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

Dominion Energy®

EXISTING Conditions

PROPOSED Conditions

NIMBUS LOOP & SUBSTATION

SIMULATION 5

Looking West down 625 from east of Loudoun County Pkwy.

9/30/2021 • 9:54 am

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

Dominion Energy®

NIMBUS LOOP & SUBSTATION

PROJECT RIGHT-OF-WAY

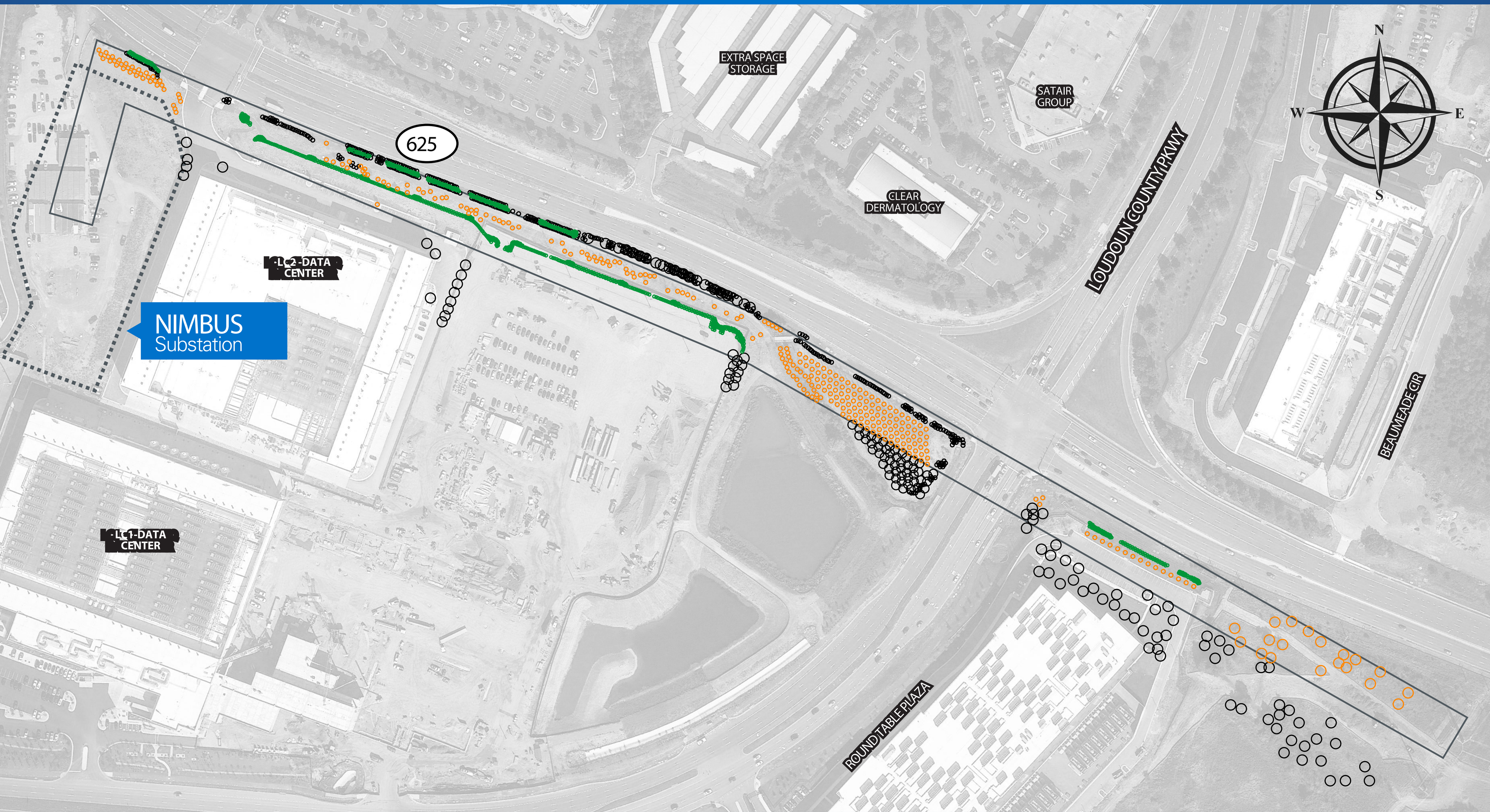
SUBSTATION

EXISTING VEGETATION TO REMAIN

EXISTING VEGETATION TO BE REMOVED

VEGETATION TO BE ADDED

Dominion Energy®



APPENDIX F STAGE 1 PRE-APPLICATION ANALYSIS OF CULTURAL RESOURCES

REPORT >

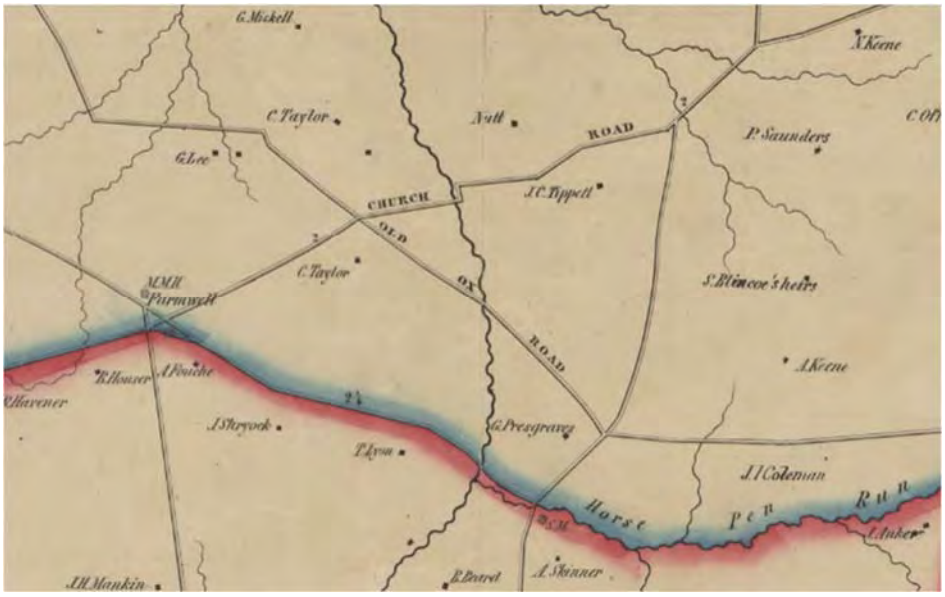
Pre-Application Analysis Of Cultural Resources for the Nimbus 230kV Line Loop and Substation and Farmwell-Nimbus 230kV Transmission Line Projects

LOCATION > Loudoun County, Virginia

DATE> FEBRUARY 2022

PREPARED FOR >

Dominion Energy



PREPARED BY >

Dutton + Associates, LLC

PROJECT REVIEW # >

Dutton + Associates

CULTURAL RESOURCE SURVEY, PLANNING, AND MANAGEMENT

SCC Pre-Application Analysis of Cultural Resources for the Nimbus 230kV Line Loop and Substation and Farmwell-Nimbus 230kV Transmission Line Projects

Loudoun County, Virginia

***PREPARED FOR*:**
DOMINION ENERGY
10900 Nuckols Road, 4TH FLOOR
Glen Allen, VIRGINIA 23060
804.771.6948

***PREPARED BY*:**
DUTTON + ASSOCIATES, LLC
1115 Crowder Drive
Midlothian, Virginia 23236
804.644.8290

PRINCIPAL INVESTIGATOR:
Robert J. Taylor, Jr. M.A.

February 2022

ABSTRACT

In January 2022, Dutton + Associates, LLC (D+A) conducted a Pre-Application Analysis (analysis) of cultural resources for the Nimbus 230kV Line Loop and Substation and Farmwell-Nimbus 230kV Transmission Line projects in Loudoun County, Virginia. Collectively, these are referred to as "the projects." The analysis was performed for Dominion Energy Virginia (Dominion) in support of a State Corporation Commission (SCC) application. The analysis was conducted in accordance with Virginia Department of Historic Resources' (VDHR) guidance titled Guidelines for Assessing Impacts of Proposed Electric Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia (January 2008) and Commonwealth of Virginia State Corporation Commission Division of Public Utility Regulation Guidelines for Transmission Line Applications Filed Under Title 56 of the Code of Virginia (August 2017).

The Nimbus 230kV Line Loop and Substation and Farmwell-Nimbus 230kV Transmission Line are two projects that entail the construction of transmission line to connect an existing transmission line with an existing substation in the Sterling vicinity of Loudoun County, Virginia. The projects are proposed in order to provide service requested by a retail electric service customer (the Customer); to maintain reliable service for the overall growth in the area; and to comply with mandatory North American Electric Reliability Corporation (NERC) Reliability Standards. The Nimbus 230 kV Line Loop and Nimbus Substation project entails the construction of a new 230 kV overhead double circuit line, cutting into Beaumeade-Buttermilk Line #2152 at Structure #2152/19A ("Nimbus Line Loop"), and extending to a new 230-34.5 kV Nimbus Substation ("Nimbus Substation"). The project will be constructed within a new 100-foot right-of-way. The proposed structures will be steel monopoles with a galvanized finish that range from 120-feet to 130-feet tall. The 230 kV Farmwell-Nimbus Transmission Line project entails the construction of a new 230 kV overhead single circuit line, originating at the existing Farmwell Substation and terminating at the new Nimbus Substation. The project will be constructed within a new 80-foot right-of-way. The proposed structures will be steel monopoles with a galvanized finish that will be 110-feet tall.

The background research conducted as part of this analysis was consistent with VDHR guidance and designed to identify all previously recorded National Historic Landmarks (NHL) located within 1.5-miles of the proposed projects, all National Register of Historic Places (NRHP)-listed properties, battlefields, and historic landscapes located within 1-mile of the proposed projects, all historic properties considered eligible for listing in the NRHP located within 0.5-miles of the proposed projects, and archaeological sites located directly within the proposed project ROWs. Historic properties include architectural and archaeological (terrestrial and underwater) resources, historic and cultural landscapes, battlefields, and historic districts. For each historic property within the defined tiers, a review of existing documentation and a field reconnaissance was undertaken to assess each property's significant character-defining features, as well as the character of its current setting. Following identification of historic properties, D+A assessed the potential for impacts to any identified properties as a result of the proposed projects. Specific attention was given to determining whether or not construction related to the projects could introduce new visual elements into the property's viewshed or directly impact the property through

construction, which would either directly or indirectly alter those qualities or characteristics that qualify the historic property for listing in the NRHP.

A review of VDHR records in VCRIS reveals there are no NHLs located within 1.5-miles of the projects, no NRHP-listed properties, battlefields, or historic landscapes located within 1-mile of the projects, one property that is considered potentially eligible for listing in the NRHP within 0.5-miles of the projects, and two archaeological sites located directly within or crossed by the project ROWs (Table 6-1).

Previously recorded historic properties within their respective tiered buffer zones

Buffer (miles)	***Considered Resources***	***VDHR #***	***Description***	***Associated Project***
1.5	*National Historic Landmarks*	*None*	*None*	*N/A*
1.0	*National Historic Landmarks*	*None*	*None*	*N/A*
	National Register- Listed	*None*	*None*	*N/A*
	Battlefields	*None*	*None*	*N/A*
	Historic Landscapes	*None*	*None*	*N/A*
0.5	*National Historic Landmarks*	*None*	*None*	*N/A*
	National Register- Listed	*None*	*None*	*N/A*
	Battlefields	*None*	*None*	*N/A*
	Historic Landscapes	*None*	*None*	*N/A*
	National Register-Eligible	*053-6416*	*Broad Run Ford and Ox Road*	*Nimbus 230kV Line Loop and Nimbus Substation/ 230kV Farmwell-Nimbus Transmission Line*
0.0 (ROW)	*All Above*	*None*	*None*	*N/A*
	Archaeology Sites	*44LD1602*	*Twentieth Century Domestic Site (Not Evaluated)*	*230kV Farmwell-Nimbus Transmission Line*
		44LD1603	*Twentieth Century Road Trace (Not Evaluated)*	*Nimbus 230kV Line Loop and Nimbus Substation*

For the purposes of this analysis, an impact is one that alters, either directly or indirectly, those qualities or characteristics that qualify a particular property for listing in the NRHP and does so in a manner that diminishes the integrity of a property's materials, workmanship, design, location,

setting, feeling, and/or association. With respect to transmission lines, direct impacts typically are associated with ground disturbance resulting from ROW clearing and structure construction. Indirect impacts typically are associated with the introduction of new visual elements or changes to the physical features of a property's setting or viewshed. According to VDHR guidance, project impacts are characterized as such:

- ***None** – Project is not visible from the property*
- ***Minimal** – Occur within viewsheds that have existing transmission lines, locations where there will only be a minor change in tower height, and/or views that have been partially obstructed by intervening topography and vegetation.*
- ***Moderate** – Include viewsheds with expansive views of the transmission line, more dramatic changes in the line and tower height, and/or an overall increase in the visibility of the route from the historic properties.*
- ***Severe** – Occur within viewsheds that do not have existing transmission lines and where the views are primarily unobstructed, locations where there will be a dramatic increase in tower visibility due to the close proximity of the route to historic properties, and viewsheds where the visual introduction of the transmission line is a significant change in the setting of the historic properties.*

*With regard to architectural resources, just one considered property is located within the defined tiers for assessment. This is the potentially NRHP-eligible Broad Run Ford and Ox Road. Field inspection and desktop analysis reveal that this resource has historical significance related to early transportation in the region and is considered significant for its representation of a colonial-era ford and road, however, its setting has been compromised by a variety of nonhistoric development in the vicinity. This includes private development in the form of large warehouse-style data centers, and public utility corridors, including an existing transmission line corridor between it and the project. As shown by ground-based photography, views from the resource are already interrupted by these features, and the proposed projects would be set beyond the compromised setting and be completely screened, with the exception of a short length of the proposed Nimbus Line Loop that may be visible from the Ox Road trace portion of the property between buildings as it is suspended across the Loudoun County Parkway. Photo simulation confirmed that all proposed structures associated with both projects would be completely screened from view from the Broad Run portion of the property by intervening development and vegetation. As such, the project is not anticipated to introduce any substantial new or uncharacteristic features into the already compromised setting or viewshed from the resource, and therefore, the Nimbus 230kV Line Loop and Substation Project will have no more than a **minimal impact** on the Broad Run Ford and Ox Road and the Farmwell-Nimbus 230kV Transmission Line Project will have **no impact** on the Broad Run Ford and Ox Road..*

Potential impacts summary for architectural resources.

VDHR#	*Resource Name*	*NRHP Status*	*Impact*
053-6416	*Broad Run Ford and Ox Road*	*Potentially NRHP-Eligible*	*Nimbus Line Loop - Minimal Impact* *Farmwell-Nimbus - No Impact*

With regard to archaeology, there are two previously recorded sites located within the proposed ROW for the projects. Site 44LD1602 is located within the proposed ROW of the Farmwell-Nimbus Transmission Line Project and Site 44LD1603 is located within the proposed ROW of the Nimbus Line Loop Project. Neither site has been formally evaluated for NRHP-eligibility by the VDHR, and their current condition is unknown as they were not subject to investigation as part of this effort, although recent aerial photography suggests substantial disturbance has occurred as a result of development in the vicinity of both sites. Therefore, these two sites should be investigated further and assessed for impacts as additional project details become available.

Potential impacts summary for archaeological resources.

VDHR#	*Resource Name*	*NRHP Status*	*Impact*
44LD1602	*Twentieth Century Domestic Site (Not Evaluated)*	*Not Evaluated*	*Farmwell-Nimbus - TBD*
44LD1603	*Twentieth Century Road Trace (Not Evaluated)*	*Not Evaluated*	*Nimbus Line Loop - TBD*

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1. INTRODUCTION

In January 2022, Dutton + Associates, LLC (D+A) conducted a Pre-Application Analysis (analysis) of cultural resources for the Nimbus 230kV Line Loop and Substation and Farmwell-Nimbus 230kV Transmission Line projects in Loudoun County, Virginia. Collectively, these are referred to as "the projects." The analysis was performed for Dominion Energy Virginia (Dominion) in support of a State Corporation Commission (SCC) application. The analysis was conducted in accordance with Virginia Department of Historic Resources' (VDHR) guidance titled *Guidelines for Assessing Impacts of Proposed Electric Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia* (January 2008) and Commonwealth of Virginia State Corporation Commission Division of Public Utility Regulation *Guidelines for Transmission Line Applications Filed Under Title 56 of the Code of Virginia* (August 2017).

This analysis was performed at a level that meets the purpose and intent of VDHR and the SCC's guidance. It provides information on the presence of previously recorded National Historic Landmark (NHL) properties located within a 1.5-mile buffer area established around the project areas, properties listed on the National Register of Historic Places (NRHP), battlefields, and historic landscapes located within a 1-mile buffer around the project areas, and properties previously determined eligible for listing in the NRHP located within a 0.5-mile buffer area around the project areas, and previously identified archaeological resources directly within the project areas. This analysis will not satisfy Section 106 identification and evaluation requirements in the event federal permits or licenses are needed; however, it can be used as a planning document to assist in making decisions under Section 106 as to whether further cultural resource identification efforts may be warranted.

This report contains a research design which describes the scope and methodology of the analysis, discussion of previously identified historic properties, and an assessment of potential impacts. D+A Senior Architectural Historian Robert J. Taylor, Jr. M.A. served as Principal Investigator and oversaw the general course of the project and supervised all aspects of the work. Copies of all notes, maps, correspondence, and historical research materials are on file at the D+A main office in Midlothian, Virginia.

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2. PROJECT DESCRIPTION

The Nimbus 230kV Line Loop and Substation and Farmwell-Nimbus 230kV Transmission Line are two projects that entail the construction of transmission line to connect an existing transmission line with an existing substation in the Sterling vicinity of Loudoun County, Virginia (Figure 2-1). The projects are proposed in order to provide service requested by a retail electric service customer (the Customer), to maintain reliable service for the overall growth in the area, and to comply with mandatory North American Electric Reliability Corporation (NERC) Reliability Standards.

The Nimbus 230 kV Line Loop and Nimbus Substation project entails the construction of a new 230 kV overhead double circuit line, cutting into Beaumeade-Buttermilk Line #2152 at Structure #2152/19A ("Nimbus Line Loop"), and extending to a new 230-34.5 kV Nimbus Substation ("Nimbus Substation"). The project will be constructed within a new 100-foot right-of-way. The proposed structures will be steel monopoles with a galvanized finish that range from 120-feet to 140-feet tall.

The 230 kV Farmwell-Nimbus Transmission Line project entails the construction of a new 230 kV overhead single circuit line, originating at the existing Farmwell Substation and terminating at the new Nimbus Substation. The project will be constructed within a new 80-foot right-of-way. The proposed structures will be steel monopoles with a galvanized finish that will be 110-feet tall.

Figures 2-1 and 2-2 illustrate the general location and alignments of the projects. Figure 2-3 provides a representative schematic of proposed structures for the Nimbus 230kV Line Loop and Figure 2-4 provides a representative schematic of proposed structures for the 230kV Farmwell-Nimbus Transmission Line.

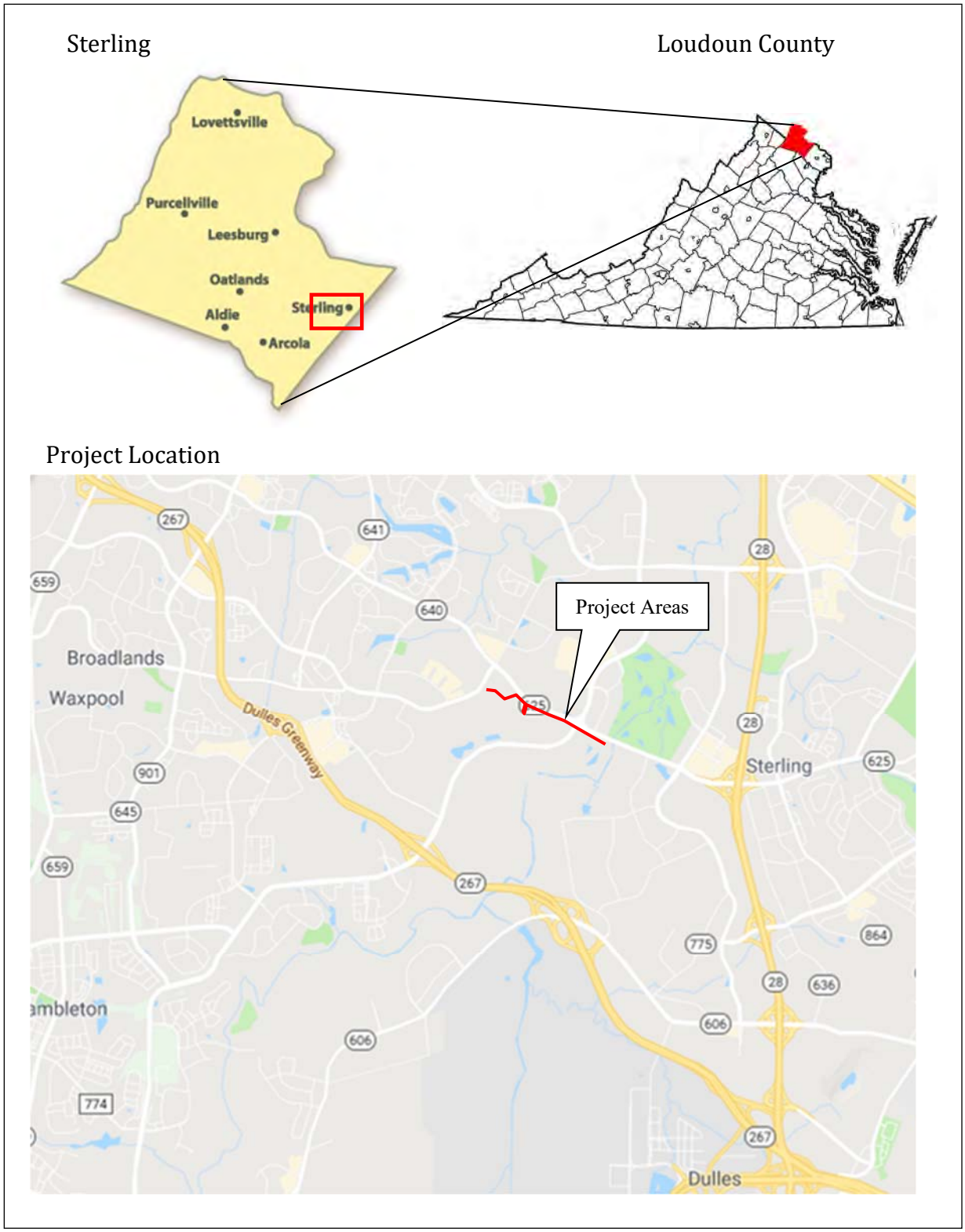

Figure 2-1: General location of the projects.

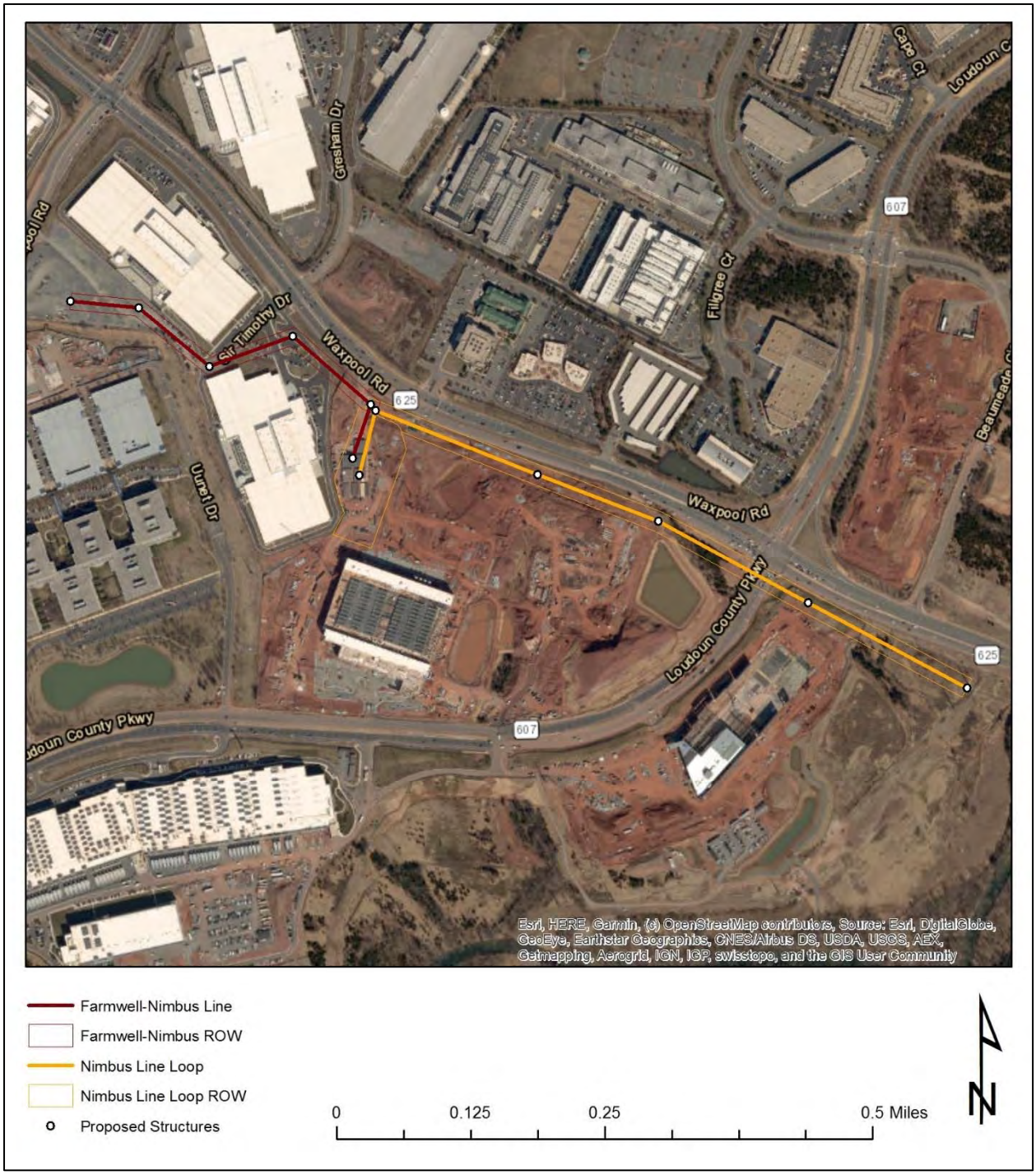

Figure 2-2: Detail of the project setting with project alignments, proposed structure locations, and ROW.

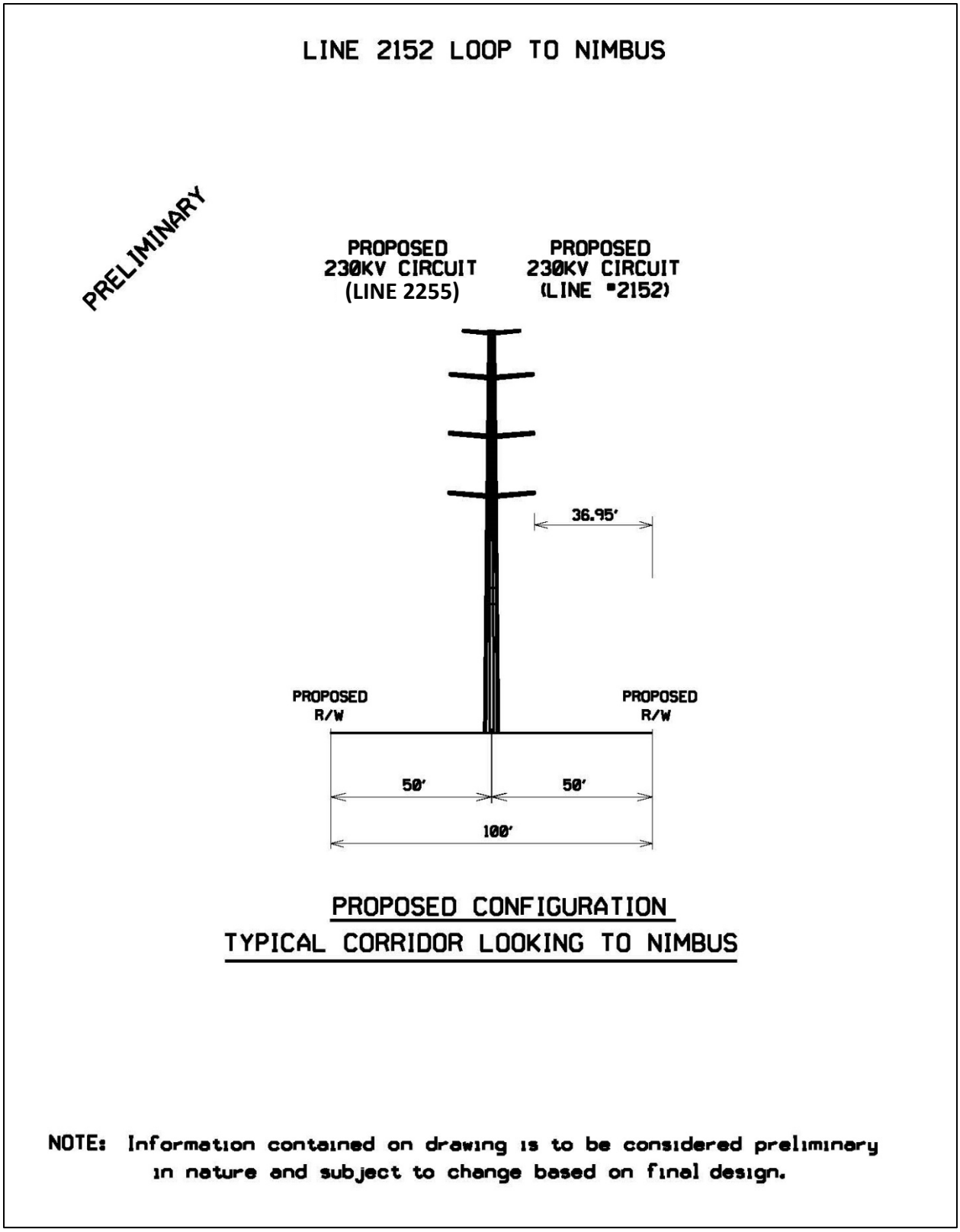

Figure 2-3: Nimbus 230kV Line Loop representative typical structure. Source: Dominion Energy Virginia

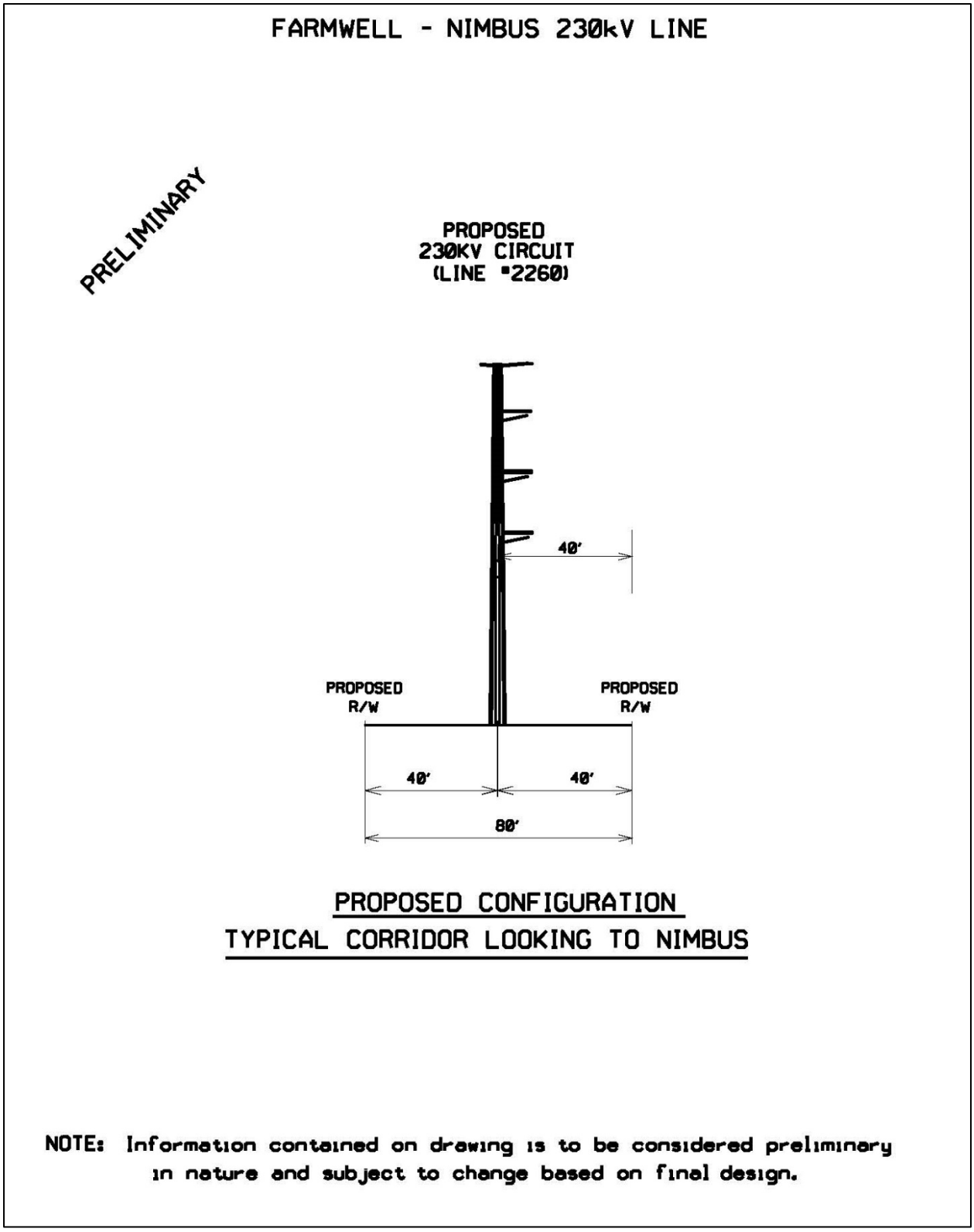

Figure 2-4: Farmwell-Nimbus 230kV Line representative typical structure. Source: Dominion Energy Virginia

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3. RESEARCH DESIGN

The intent of this effort was to identify all known historic properties within the vicinity of the proposed project area in order to assess significant properties for potential impacts brought about by the project. Historic properties include architectural and archaeological (terrestrial and underwater) resources, historic and cultural landscapes, battlefields, and historic districts. Significant properties are those designated National Historic Landmarks, listed in the NRHP, or determined-eligible for listing in the NRHP by the VDHR, as well as those resources designated as historic by the local municipality. For each significant historic property, an examination of property documentation, current aerial photography, field reconnaissance, and photo simulation was undertaken to assess each property's integrity of feeling, setting, and association, and to provide documentation and assessment of the property including views toward the proposed project. The D+A personnel who directed and conducted this survey meet the professional qualification standards of the Department of the Interior (48 FR 44738-9).

ARCHIVAL RESEARCH

In January 2022, D+A conducted archival research with the goal of identifying all previously recorded historic properties and any additional historic property locations referred to in historic documents and other archives, as well as consultation with local informants and other professionals with intimate knowledge of the project area as appropriate. Background research was conducted at the VDHR and on the internet and included the following sources:

- VDHR Virginia Cultural Resource Information System (VCRIS) site files; and
- National Park Service (NPS), American Battlefield Protection Program (ABPP), maps and related documentation.
- Loudoun County Department of Planning and Zoning Historic Sites Interactive Map.

Data collection was performed according to VDHR guidance in *Guidelines for Assessing Impacts of Proposed Electric Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia* (January 2008) and was organized in a multi-tier approach. As such, the effort was designed to identify all previously recorded NHL's located within 1.5-miles of the proposed project area, all NRHP-listed properties, battlefields, and historic landscapes located within 1-mile of the project area, all historic properties previously determined eligible for listing in the NRHP located within 0.5-mile of the project area. Additional previously recorded resources located directly within the project area are also noted.

FIELD RECONNAISSANCE

Field reconnaissance included visual inspection of those historic properties that are located within the respective study tiers. Visual inspection included digital photo documentation of each property's existing conditions including its setting and views toward the proposed project. Representative photographs were taken of the resource, general setting, and existing viewsheds. All photographs were taken from public right-of-way or where property access was granted. No subsurface archaeological testing was conducted as part of this effort.

ASSESSMENT OF POTENTIAL IMPACTS

Following identification and field inspection of historic properties, D+A assessed each NRHP-listed or eligible resource for potential impacts brought about by the proposed project. Assessment included pedestrian inspection from historic properties towards the project area, ground-based photography, review of aerial photography, and photo simulation as appropriate. When utilized, photo simulation was conducted from vantage points within or near each resource property deemed most likely to have a change in visibility as a result of the project. The photo simulation entailed digital photography, towards the project, which was then loaded into a computer with location coordinates and ground-elevation. The transmission line structures to be built as part of the project were then also computer modeled to represent the location, height, and configuration following construction. These models were then overlaid onto the digital photograph so that the existing (unaltered) view can be compared with the simulated view that illustrates the proposed structures, as they would appear on the landscape.

When assessing impacts, D+A considered those qualities and characteristics that qualify the property for listing and whether the project had the potential to alter or diminish the integrity of the property and its associated significance. Specific attention was given to determining whether or not the proposed project would introduce new visual elements into a property's setting or viewshed, which would either directly or indirectly alter those qualities or characteristics that qualify the historic property for listing in the NRHP. Identified impacts were characterized according to VDHR guidance and definitions as follows:

- **None** – Project is not visible from the property
- **Minimal** – Occur within viewsheds that have existing transmission lines, locations where there will only be a minor change in tower height, and/or views that have been partially obstructed by intervening topography and vegetation.
- **Moderate** – Include viewsheds with expansive views of the transmission line, more dramatic changes in the line and tower height, and/or an overall increase in the visibility of the route from the historic properties.
- **Severe** – Occur within viewsheds that do not have existing transmission lines and where the views are primarily unobstructed, locations where there will be a dramatic increase in tower visibility due to the close proximity of the route to historic properties, and viewsheds where the visual introduction of the transmission line is a significant change in the setting of the historic properties.

REPORT PREPARATION

The results of the archival research, field inspection, and analysis were synthesized and summarized in a summary report accompanied by maps, illustrations, and photographs as appropriate. All research material and documentation generated by this project is on file at D+A's office in Midlothian, Virginia.

4. ARCHIVAL RESEARCH

This section includes a summary of efforts to identify previously known and recorded cultural resources within the tiered project buffers. It includes lists, maps, and descriptive data on all previously conducted cultural resource surveys, and previously recorded architectural resources and archaeological sites according to the VDHR archives and VCRIS database.

PREVIOUSLY SURVEYED AREAS

VDHR and VCRIS records indicate that there have been thirty-one (31) prior Phase I cultural resource surveys within 1-mile of the projects, including four (4) that overlap portions of the project ROWs. These surveys are at a minimum archaeological in nature, although some include architectural resources as well. The four surveys that include portions of the project ROWs were conducted as part of private development projects as well as utility projects. As a result of these prior surveys, the entirety of the project areas for both the Nimbus 230kV Line Loop and Substation and the 230kV Farmwell-Nimbus Transmission Line have been subject to Phase I archaeological identification. The previously conducted cultural resource surveys are listed in Table 4-1 and illustrated in Figure 4-1.

Table 4-1: Previously conducted cultural resource surveys that include portions of the Project Area Source: VDHR.

VDHR Survey #	Title	Author	Date
LD-332	Phase I Cultural Resources Survey of the Approximately 350-Acre DuPont-Fabros Development Tract, Loudoun County, Virginia	Circa-Cultural Resource Management, LLC	2011
LD-335	Phase I Architectural and Archaeological Survey of the Proposed Waxpool Route D Transmission Line Right-of-Way, Loudoun County, Virginia	Dutton & Associates	2013
LD-404	Roundtable Property, Loudoun County, Virginia: Phase I Cultural Resources Investigation	Thunderbird Archaeological Associates (Thunderbird Research Corp.)	2016
LD-412	Phase I Archeological Survey of the Proposed Presidential Golf Course, Dulles, Loudoun County, Virginia	Ottery Group	2005

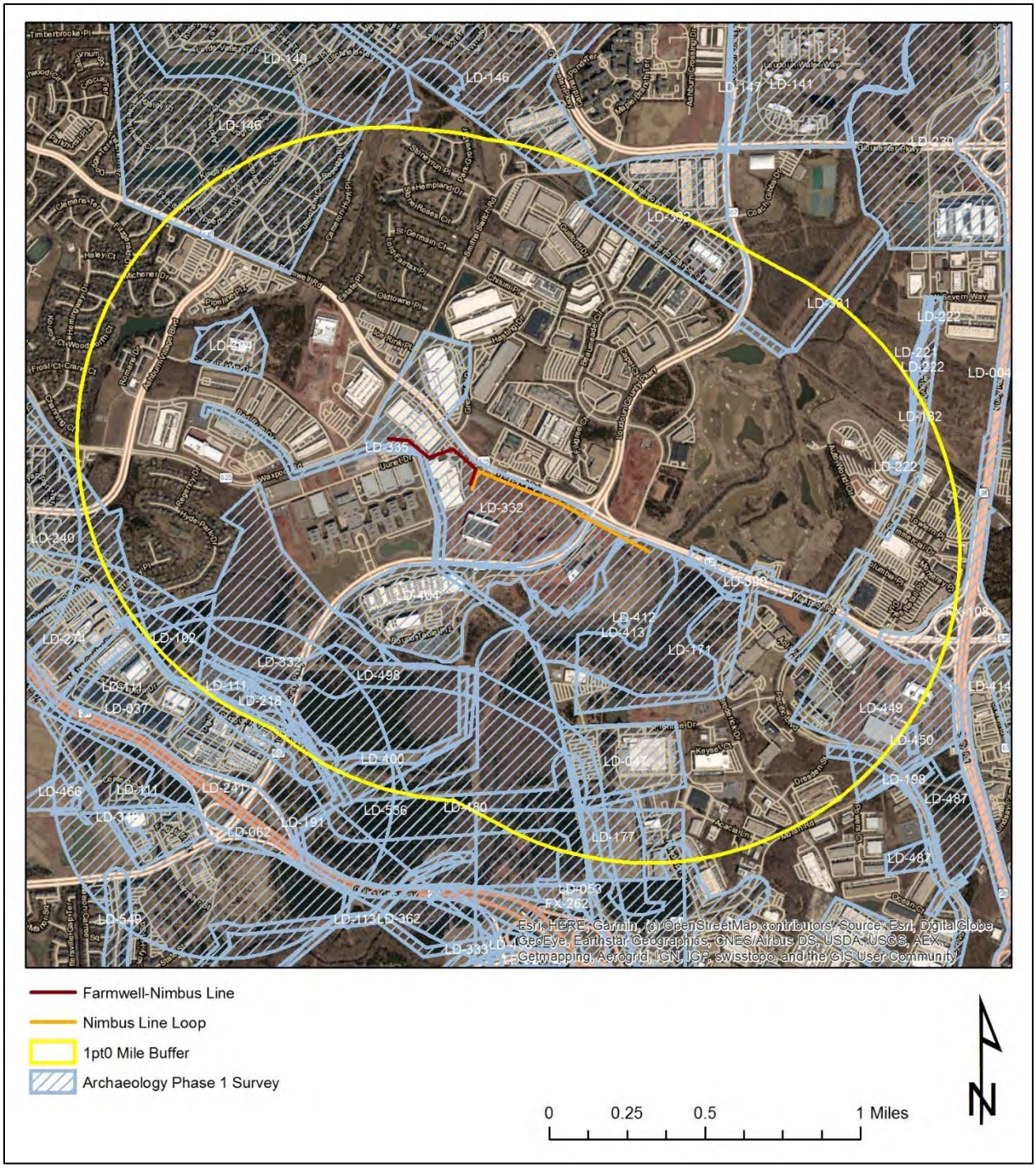

Figure 4-1: Previously conducted phase I surveys within 1-mile of the project. Source: VCRIS

Figure 4-2: Detail of previously conducted phase I surveys that include portions of the project ROWs. Source: VCRIS

ARCHITECTURAL RESOURCES

Review of the VDHR VCRIS inventory records revealed a total of 41 previously recorded architectural resources are located within 1.5-miles of the projects. Of these, there are no NHLs located within 1.5-miles of either project, no NRHP-listed properties, battlefields, or historic landscapes located within 1-mile of either project, and one property that has been noted as potentially eligible for listing in the NRHP by the VDHR within 0.5-mile of the projects and will be treated as eligible for the purposes of this effort. This one NRHP-eligible resource is located within 0.5 mile of both the Nimbus 230kV Line Loop and Nimbus Substation project and the 230kV Farmwell-Nimbus Transmission Line project. It is further noted that no previously recorded architectural resources are located directly within the ROW of the projects.

Table 4-2 lists NRHP-listed and eligible resources within their respective buffered tiers. A map of all previously recorded architectural resources within 1.5-miles of the project is depicted in Figure 4-3 and the location of NRHP-listed and eligible resources is illustrated in Figure 4-4.

Table 4-2: Previously recorded architectural resources within their respective tiered buffer zones

Buffer (miles)	Considered Resources	VDHR #	Description	Associated Project
1.5	National Historic Landmarks	None	None	N/A
1.0	National Historic Landmarks	None	None	N/A
	National Register- Listed	None	None	N/A
	Battlefields	None	None	N/A
	Historic Landscapes	None	None	N/A
0.5	National Historic Landmarks	None	None	N/A
	National Register- Listed	None	None	N/A
	National Register- Listed	None	None	N/A
	National Register-Eligible	053-6416	Broad Run Ford and Ox Road	Nimbus 230kV Line Loop and Nimbus Substation/ 230kV Farmwell-Nimbus Transmission Line
0.0 (ROW)	All Above	None	None	N/A

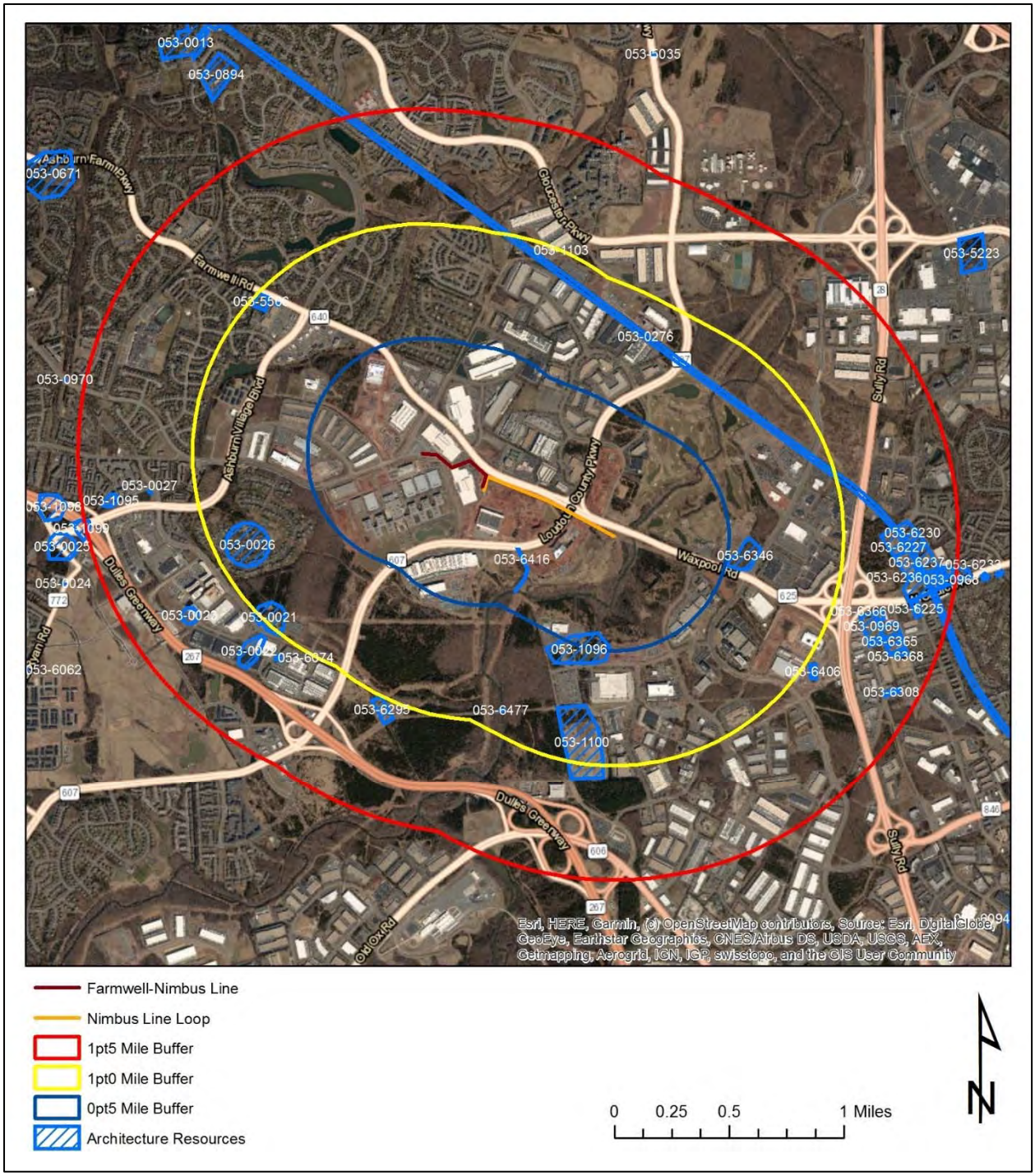

Figure 4-3: All previously identified architectural resources within 1.5-miles of the project. Source: VCRIS

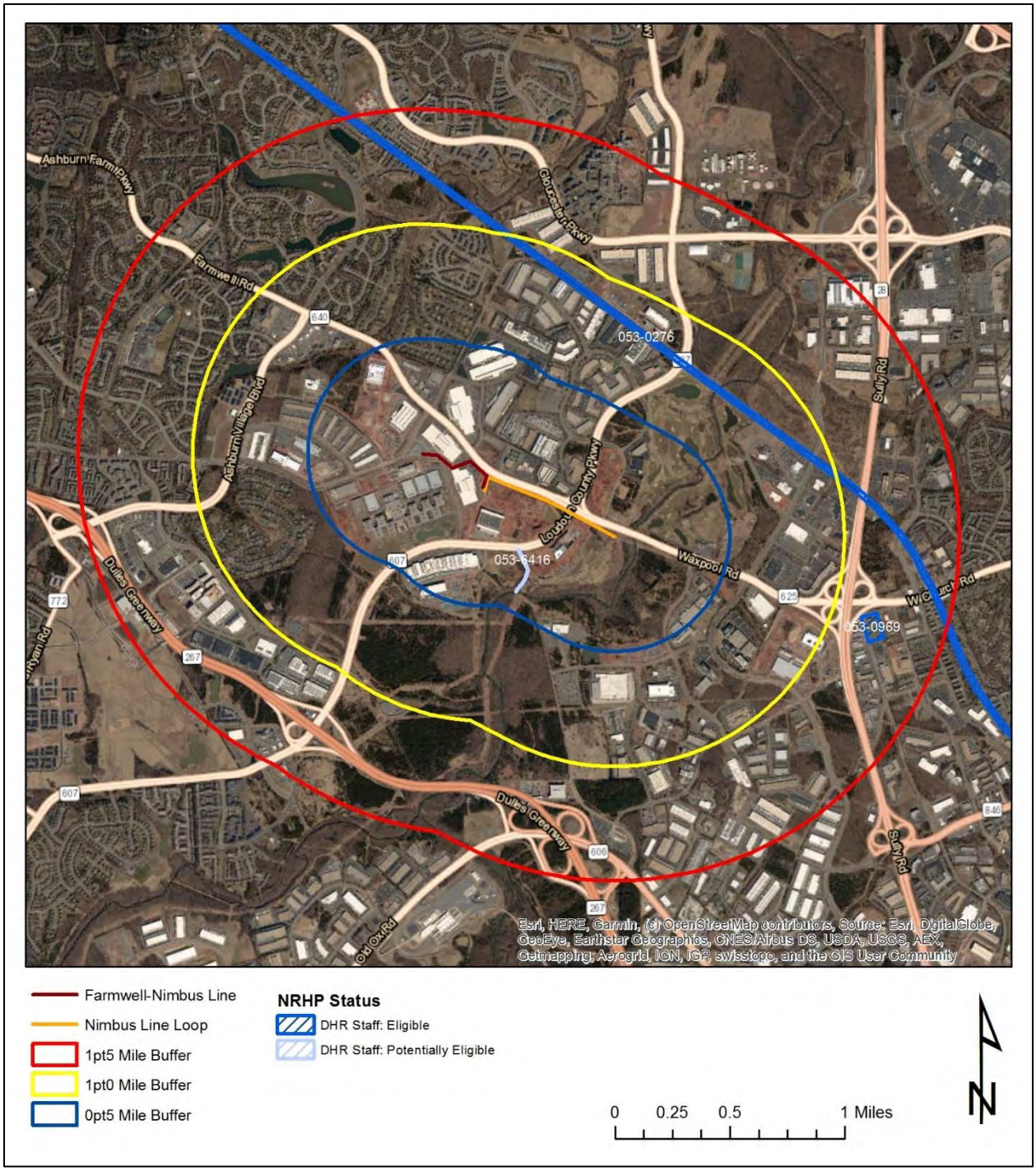

Figure 4-4: NRHP-Listed and Eligible architectural resources within 1.5-miles of the study area. Source: VCRIS

NPS AMERICAN BATTLEFIELD PROTECTION PROGRAM (ABPP)

A review of the National Park Service (NPS) ABPP records reveals that the project is not located within one mile of any portions of any delineated battlefields.

ARCHAEOLOGICAL SITES

Review of the VDHR VCRIS records reveals there are forty-one (41) previously recorded archaeological sites within one mile of the projects. These include prehistoric lithic scatters and camps; as well as historic domestic sites, farmsteads, trash scatters, a cemetery, and road trace. Of these, nine (9) have been determined not eligible for listing in the NRHP by the VDHR and the remaining sites have not been formally evaluated. Two of these sites are located directly within the ROW for the projects, including one (1) within the ROW for the Nimbus 230kV Line Loop and Nimbus Substation Project and one (1) within the ROW for the 230kV Farmwell-Nimbus Transmission Line Project. Neither of the sites within the project ROWs have been formally evaluated for NRHP-eligibility by the VDHR.

Table 4-3 lists the previously recorded archaeological resources within one-mile of the projects and Figure 4-5 illustrates the locations of the previously recorded sites in relation to the projects. Figure 4-6 details the locations of previously recorded sites in the vicinity of the project ROWs.

Table 4-3: Previously recorded archaeological resources within 1- mile of the projects. Orange highlight denotes site is located within the project ROWs

VDHR #	Type	Temporal Association	NRHP Status	Associated Project
44LD0027	Camp	Middle Archaic Period (6500 - 3001 B.C.), Early Woodland (1200 B.C. - 299 A.D.), Middle Woodland (300 - 999 A.D.), Late Woodland (1000 - 1606)	Not Evaluated	N/A
44LD0110	Artifact scatter	Late Archaic Period (3000 - 1201 B.C.E), Early Woodland (1200 B.C.E - 299 C.E)	DHR Staff: Not Eligible	N/A
44LD0111	Camp, temporary	Early Archaic Period (8500 - 6501 B.C.E)	Not Evaluated	N/A
44LD0137	Camp, temporary	Archaic (8500 - 1201 B.C.)	Not Evaluated	N/A
44LD0138	Camp, temporary	Historic/Unknown, Prehistoric/Unknown (15000 B.C. - 1606 A.D.)	Not Evaluated	N/A
44LD0140	Barn, Camp, temporary, Dwelling, single	Prehistoric/Unknown (15000 B.C. - 1606 A.D.), 19th Century (1800 - 1899), 20th Century: 1st half (1900 - 1949)	Not Evaluated	N/A
44LD0141	Camp, temporary	Woodland (1200 B.C. - 1606 A.D.)	Not Evaluated	N/A
44LD0142	Camp, temporary	Pre-Contact	DHR Staff: Not Eligible	N/A
44LD0143	Camp, temporary	Late Woodland (1000 - 1606)	Not Evaluated	N/A
44LD0144	Camp, temporary	Pre-Contact	Not Evaluated	N/A
44LD0147	Camp, temporary	Prehistoric/Unknown (15000 B.C. - 1606 A.D.)	Not Evaluated	N/A
44LD0149	Camp, temporary	Pre-Contact	Not Evaluated	N/A
44LD0150	Camp, temporary	Pre-Contact	Not Evaluated	N/A
44LD0154	Camp, temporary	<Null>	Not Evaluated	N/A
44LD0374	Dwelling, single, Farmstead	Historic/Unknown	Not Evaluated	N/A
44LD0409	Camp, temporary	Prehistoric/Unknown (15000 B.C. - 1606 A.D.)	Not Evaluated	N/A
44LD0435	Camp	Prehistoric/Unknown (15000 B.C. - 1606 A.D.)	Not Evaluated	N/A

VDHR #	Type	Temporal Association	NRHP Status	Associated Project
44LD0445	Camp, temporary	Prehistoric/Unknown (15000 B.C. - 1606 A.D.)	Not Evaluated	N/A
44LD0447	Farmstead	19th Century: 4th quarter (1875 - 1899), 20th Century (1900 - 1999)	Not Evaluated	N/A
44LD0537	Camp, temporary	Prehistoric/Unknown (15000 B.C. - 1606 A.D.)	Not Evaluated	N/A
44LD0646	Farmstead	20th Century (1900 - 1999)	Not Evaluated	N/A
44LD0844	Dwelling, single	19th Century (1800 - 1899), 19th Century: 2nd half (1850 - 1899), 20th Century (1900 - 1999), 20th Century: 1st half (1900 - 1949)	Not Evaluated	N/A
44LD0845	Trash scatter	19th Century: 2nd half (1850 - 1899), 20th Century: 1st half (1900 - 1949)	Not Evaluated	N/A
44LD0994	<Null>	World War I to World War II (1917 - 1945), The New Dominion (1946 - 1991)	Not Evaluated	N/A
44LD1240	Trash scatter	19th Century: 4th quarter (1875 - 1899), 20th Century (1900 - 1999)	DHR Staff: Not Eligible	N/A
44LD1242	Farmstead	Antebellum Period (1830 - 1860), Civil War (1861 - 1865), Reconstruction and Growth (1866 - 1916), World War I to World War II (1917 - 1945), The New Dominion (1946 - 1991), Post Cold War (1992 - Present)	DHR Staff: Not Eligible	N/A
44LD1340	Lithic scatter	Prehistoric/Unknown (15000 B.C. - 1606 A.D.)	DHR Staff: Not Eligible	N/A
44LD1435	Farmstead	19th Century: 2nd half (1850 - 1899), 20th Century: 1st quarter (1900 - 1924)	Not Evaluated	N/A
44LD1436	Outbuilding, Road	18th Century: 4th quarter (1775 - 1799), 19th Century: 4th quarter (1875 - 1899), 20th Century: 1st half (1900 - 1949)	Not Evaluated	N/A
44LD1456	Lithic scatter	Pre-Contact	Not Evaluated	N/A
44LD1467	Farmstead	19th Century: 4th quarter (1875 - 1899), 20th Century (1900 - 1999)	Not Evaluated	N/A
44LD1594	Dwelling, single	18th Century: 4th quarter (1775 - 1799), 19th Century (1800 - 1899), 19th Century: 1st quarter (1800 - 1825)	DHR Staff: Not Eligible	N/A
44LD1595	Dwelling, single	20th Century (1900 - 1999)	DHR Staff: Not Eligible	N/A
44LD1601	Trash scatter	Reconstruction and Growth (1866 - 1916), World War I to World War II (1917 - 1945), The New Dominion (1946 - 1991)	Not Evaluated	N/A
44LD1602	Road	Reconstruction and Growth (1866 - 1916), World War I to World War II (1917 - 1945), The New Dominion (1946 - 1991)	Not Evaluated	230kV Farmwell-Nimbus Transmission Line
44LD1603	Dwelling, single	20th Century: 1st half (1900 - 1949)	Not Evaluated	Nimbus 230kV Line Loop and Nimbus Substation

VDHR #	Type	Temporal Association	NRHP Status	Associated Project
44LD1723	Farmstead	Reconstruction and Growth (1866 - 1916), World War I to World War II (1917 - 1945), The New Dominion (1946 - 1991), Post Cold War (1992 - Present)	DHR Staff: Not Eligible	N/A
44LD1743	Artifact scatter, Cemetery, Church	Reconstruction and Growth (1866 - 1916), World War I to World War II (1917 - 1945), The New Dominion (1946 - 1991), Post Cold War (1992 - Present)	Not Evaluated	N/A
44LD1908	Artifact scatter	World War I to World War II (1917 - 1945), The New Dominion (1946 - 1991), Post Cold War (1992 - Present)	Not Evaluated	N/A
44LD1909	Dwelling, single	The New Dominion (1946 - 1991), Post Cold War (1992 - Present)	Not Evaluated	N/A
44LD1916	Lithic scatter	Pre-Contact	DHR Staff: Not Eligible	N/A

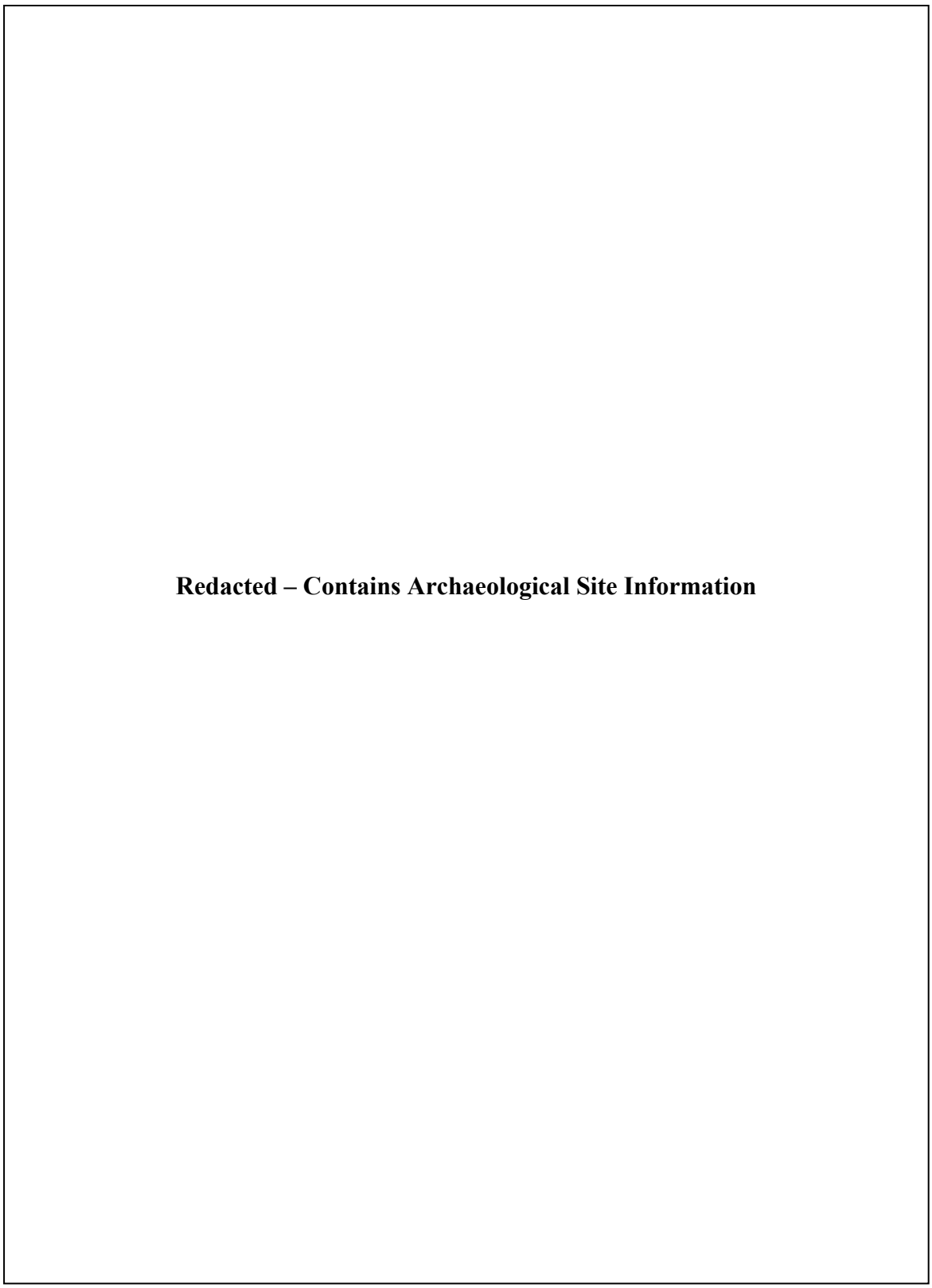

Figure 4-5: Previously recorded archaeological resources located within 1- mile of projects. (Source: VCRIS)

Redacted – Contains Archaeological Site Information

Figure 4-6: Previously recorded archaeological resources located within the vicinity of the project ROWs. (Source: VCRIS)

5. RESULTS OF FIELD RECONNAISSANCE

In accordance with the VDHR guidelines for assessing impacts of proposed electric transmission lines on historic resources, each of the considered historic properties within the VDHR-defined study tiers around the projects were field verified for existing conditions and photo documented. An emphasis was given to views towards the project area in order to assess potential project impacts. The results of the field reconnaissance for each resource are summarized below.

Broad Run Ford and Ox Road (VDHR ID# 053-6416)

Ox Road was built in the 1720s, as an effort to commercially dominate Northern Virginia by competitors Thomas Lee and Robert "King" Carter. Lee endeavored to control waterways and did so by purchasing land on the Potomac River and Goose Creek. In an effort to control transportation, Carter purchased land in mountain passes. Along the Potomac, Lee had control of many of the tobacco warehouses and to avoid paying storage fees Carter instead began construction on a road that would connect his mine to his plantation. Construction began in 1728 by Carter's enslaved laborers along ridges wide enough for an ox cart. The road was completed in the 1740s by Carter's son and remained a valuable route to bring tobacco from plantations to Occoquan until 1820. At this time, the macadam Leesburg Turnpike became the primary route and Ox Road became secondary (Kimball and Covington 2014). Parts of the road were consistently used and received upgrades into major thoroughfares eliminating evidence of the old road. However, near Broad Run, the road remained largely unchanged and use of the Broad Run Ford continued into the third-quarter of the twentieth century. The Broad Run Ford and Ox Road north of Broad Run was evaluated as potentially eligible for listing in the NRHP by VDHR under Criteria A, B and C in 2016. The resource has not been formally surveyed or evaluated south of Broad Run.

The Broad Run Ford and Ox Road is located just south of the projects study area. The nearest portion of the previously recorded resource to the projects is the northern end of the recorded Ox Road trace, which is roughly 0.25 mile from the Nimbus 230kV Line Loop and 0.32 mile from the Farmwell-Nimbus Transmission Line. The Broad Run Ford portion of the resource is nearly 0.4 mile from the Nimbus Line Loop and 0.5 mile from the Farmwell-Nimbus Transmission Line. The intervening landscape between the resource and both projects is densely developed by large warehouse-styled data centers and a network of multi-lane roads.

In order to assess the potential impact of the proposed project, visual inspection was conducted of the setting around Broad Run Ford and Ox Road and photo simulation was prepared with views from the resource towards the project. Although the resource is located on private property and could not be directly accessed, inspection and analysis were performed from the northern end of the mapped boundaries of Ox Road near Loudoun County Parkway (nearest location to the project) as well as from the south side of Broad Run, immediately across from the ford.

Visual inspection revealed that the current landscape surrounding the ford and road trace has been subject to extensive development and manipulation in recent years. The ford and a short length of road trace leading to it from the north are set within a small cluster of trees bordering the creek, however, the area beyond the creek has been cleared, graded, and improved. An existing utility easement crosses Broad Run immediately to the east of the ford, and the shoreline has been heavily

altered by filling and rip-rap. The trace of Ox Road to the north of the ford extends through a narrow wooded area that borders the cleared utility easement before adjoining a graded gravel road that extends along the former Ox Road alignment. The south side of the Broad Run Ford is also next to the cleared utility easement with the filled rip-rap shoreline immediately adjacent to the former ford. Aerial photography indicates a trace of Ox Road may be present as a dirt path extending through the utility easement but then disappears into a wooded area before re-emerging as an improved dirt and gravel road that extends south to Lockridge Road. The landscape between the Broad Run Ford and Ox Road and the project is developed with multiple large data centers. The divided four-lane Loudoun County Parkway and an existing 230kV transmission line also extend through the landscape between the resource and the project.

Inspection from public right-of-way at the north end of the Ox Road trace along Loudoun County Parkway revealed that the several large data center warehouses lining the road generally block all views in the direction of the project. Because of the proximity of the buildings to the road and the angle of view, it is anticipated that both of the projects will be mostly to completely screened. The exception is looking straight up Loudoun County Parkway where the break between buildings may allow a short length of the proposed Nimbus Line Loop to be visible as it is suspended across the road, however, all proposed structures will be behind buildings. It is also noted that an existing transmission line that parallels the south side of Loudoun County Parkway and a transmission structure set immediately adjacent to the north end of the Ox Road trace is clearly visible from this location. Inspection from the south side of Broad Run in the vicinity of the ford revealed that several existing transmission lines and structures are currently visible in the immediate vicinity, however, the large data center buildings, and a patch of vegetation bordering the Ox Road trace inhibit views in the direction of the projects and will likely screen all proposed structures related to both projects. It is further noted that this location is within utility ROW and private property, and therefore not generally accessible to the public.

Photo simulation was also conducted from the south side of Broad Run in the vicinity of the ford to model the project and proposed structures. This confirmed that the project and all proposed structures will be screened by intervening development and vegetation.

As such, both visual inspection and photo simulation show that not only is the setting surrounding the Broad Run Ford and Ox Road compromised by nonhistoric development, but the ford itself is now immediately flanked by an existing utility easement that resulted in a substantial change in the character of the shoreline of Broad Run, including filling, grading, and rip-rap. The setting of the north side of the ford and road trace, between it and the project, is further compromised by ongoing large-scale private development obscuring the original landscape and its relationship to the ford and former Ox Road. On the south side of the ford, the landscape has also been heavily altered and the setting compromised by existing transportation and utility corridors. These existing intrusions dominate views from the ford and road in all directions, and will mostly to completely inhibit any visibility of improvements made as part of the Nimbus 230kV Line Loop and Substation and Farmwell-Nimbus 230kV Transmission Line projects beyond.

As proposed project improvements will be set amongst and behind existing nonhistoric development and utility corridors and are anticipated to not be visible from the resource or publicly-accessible vantage points in the vicinity with the exception of a short length of line

suspended across the road, the project will not introduce any noticeable changes to the setting or viewshed from the resource, which is already considered compromised by existing utilities and large-scale modern development. Therefore, it is D+A's opinion that the Nimbus 230kV Line Loop and Substation Project will have no more than a ***minimal impact*** on the Broad Run Ford and Ox Road and the Farmwell-Nimbus 230kV Transmission Line Project will have ***no impact*** on the Broad Run Ford and Ox Road.

Figure 5-1 illustrates the location of the Broad Run Ford and Ox Road in relation to the project, as well as the location and direction of all photographs and photo simulations. Figures 5-2 through 5-8 provide photographs of the setting and views from the resource and Figures 5-9 through 5-14 provide photo simulation including the location, and existing and proposed views.

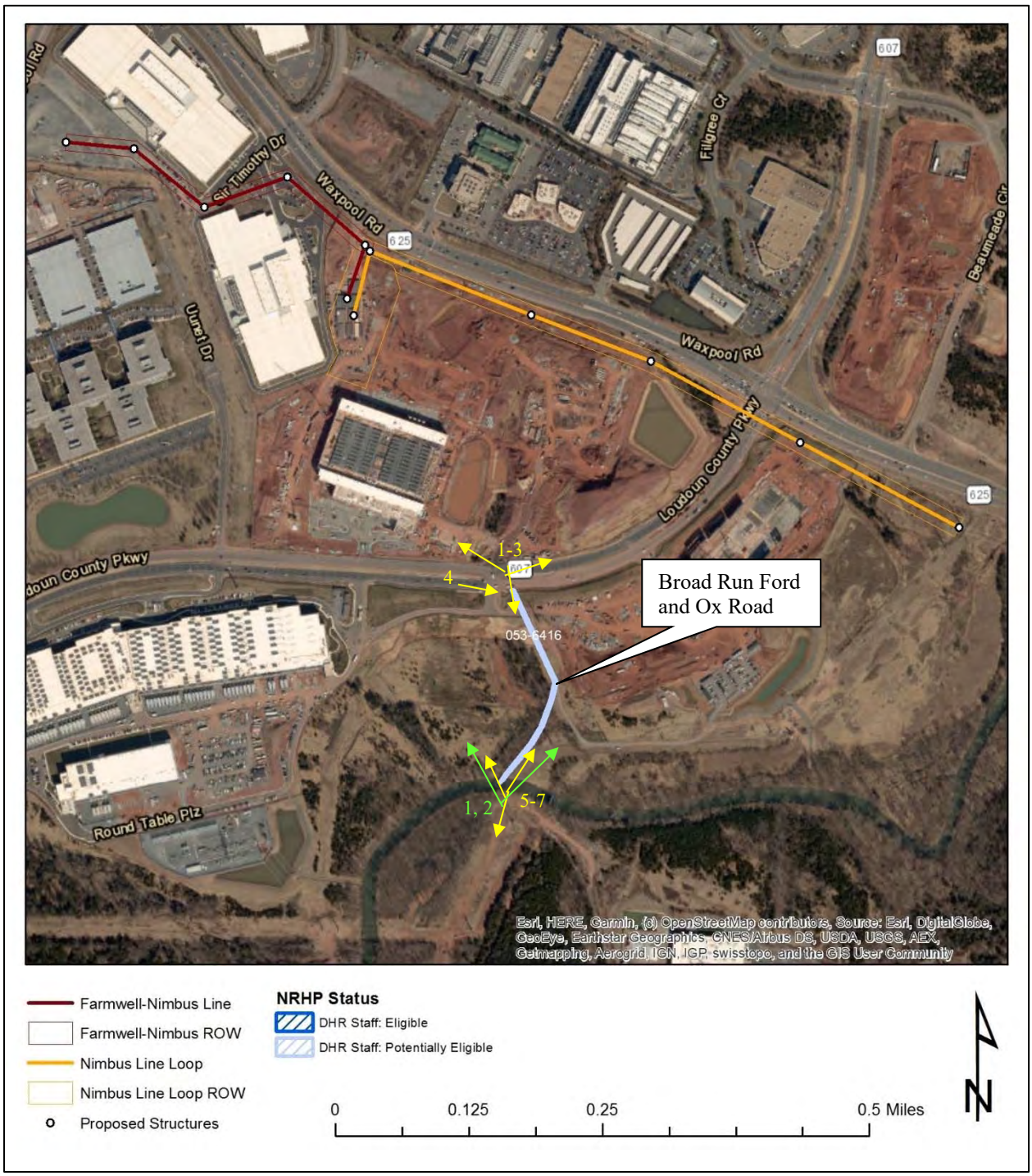

Figure 5-1: Broad Run Ford and Ox Road in relation to the projects with location and direction of representative photographs depicted in yellow and photo simulations depicted in green.

Figure 5-2: Photo location 1- View from Loudoun County Parkway at northern end of Broad Run Ford and Ox Road towards the Nimbus Line Loop Project, facing northeast.

Figure 5-3: Photo location 2- View from Loudoun County Parkway at northern end of Broad Run Ford and Ox Road towards the projects, facing northwest.

Figure 5-4: Photo location 3- View from Loudoun County Parkway towards Broad Run Ford and Ox Road, facing south.

Figure 5-5: Photo location 4- View from Loudoun County Parkway towards Broad Run Ford and Ox Road, facing east.

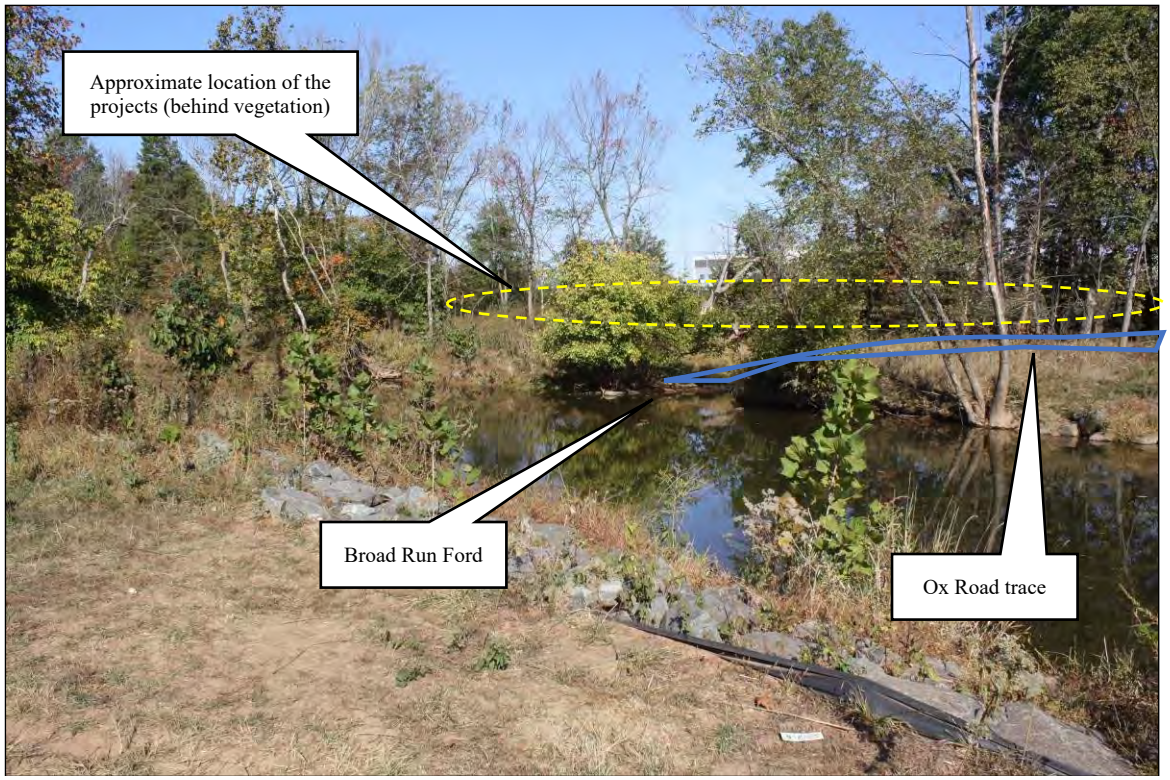

Figure 5-6: Photo location 5- View of and from Broad Run Ford and Ox Road from south bank of Broad Run towards the projects, facing northwest.

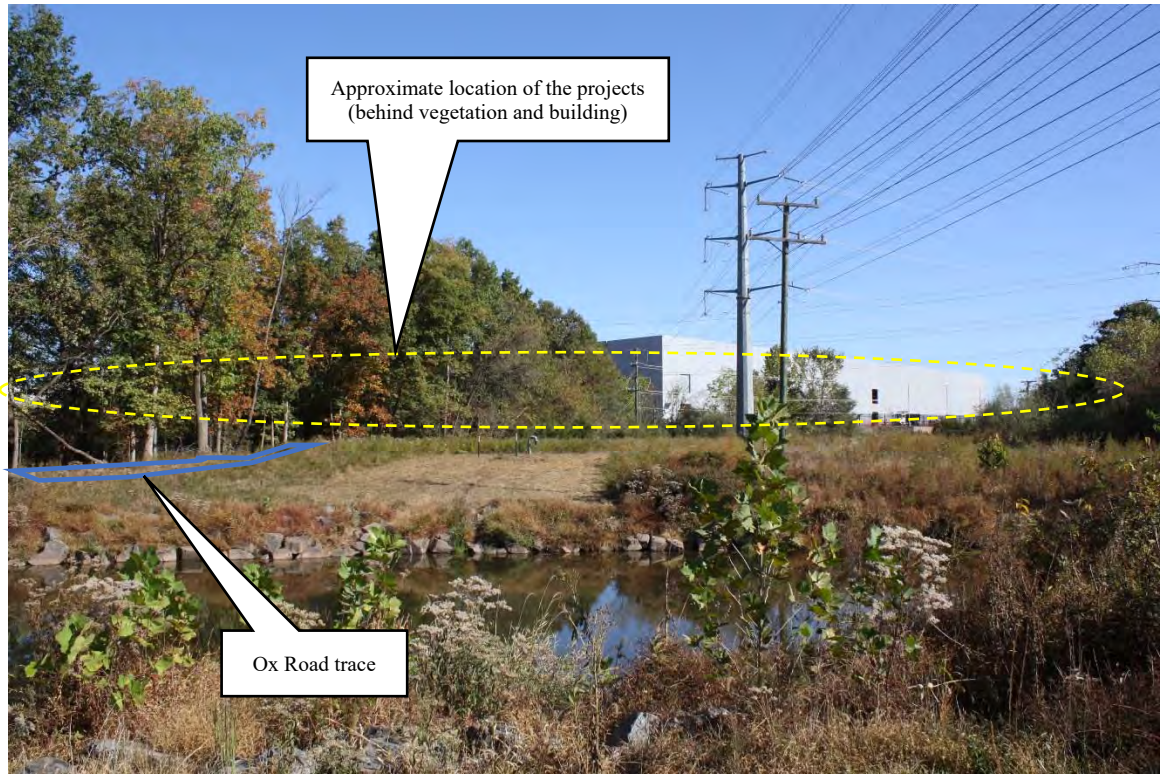

Figure 5-7: Photo location 6- View from Broad Run Ford and Ox Road towards the Nimbus Line Loop Project, facing north.

Figure 5-8: Photo location 7- View of setting to the south of Broad Run Ford and Ox Road illustrating other existing infrastructure within immediate vicinity, facing south.

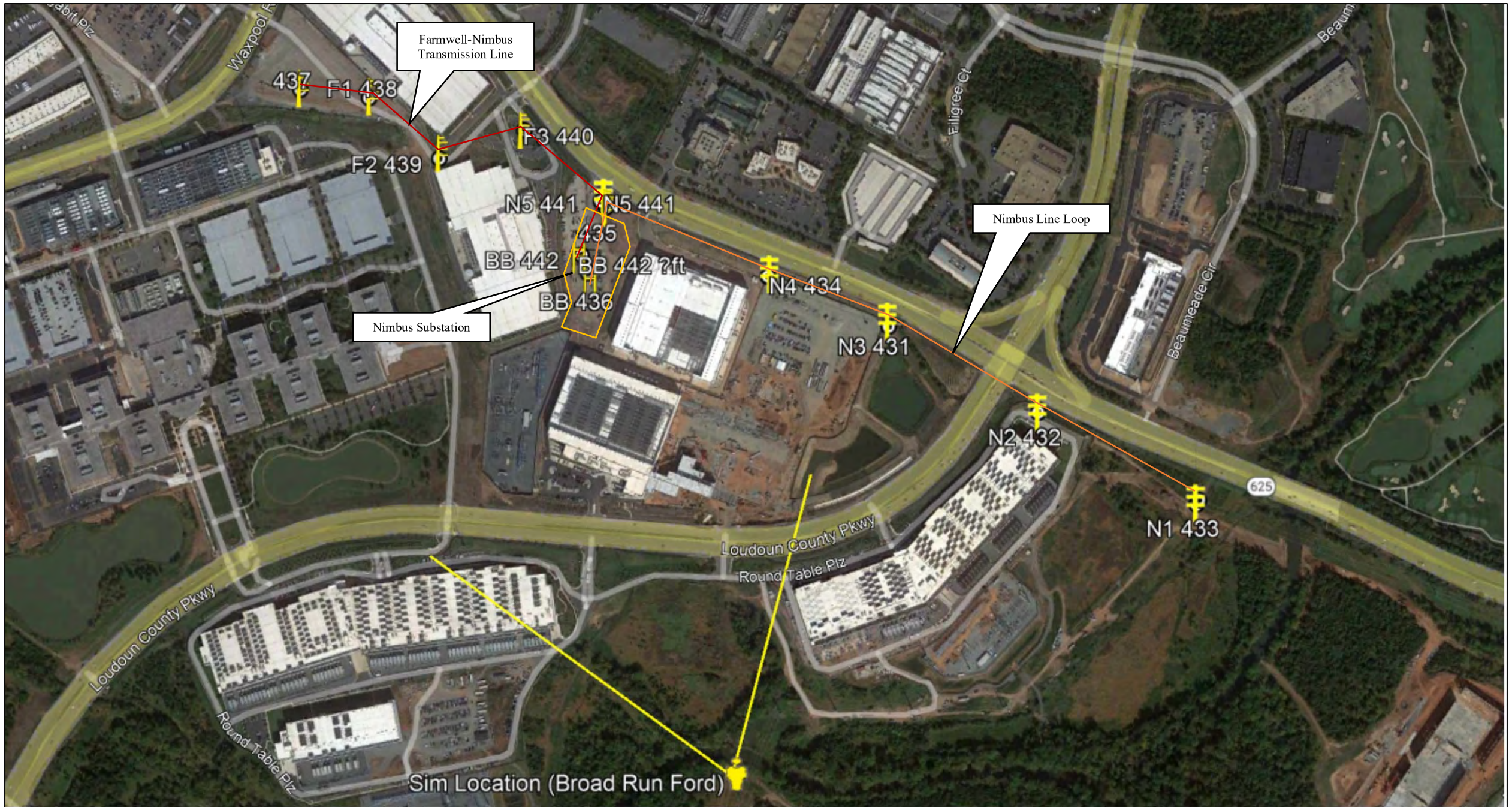

Photo simulations prepared by:
GTTE LLC
email:
info@gttellc.com
703 447 1350

Location: Broad Run Ford and Ox Road

Project:
Nimbus 230kV Line Loop and Substation

Farmwell-Nimbus Transmission Line

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

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

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

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

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

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

Location: Broad Run Ford 2

Project:
Nimbus 230kV Line Loop and Substation

Farmwell-Nimbus Transmission Line

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

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

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

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

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

6. CONCLUSIONS AND SUMMARY OF POTENTIAL IMPACTS

As part of this pre-application analysis of cultural resources for the Nimbus 230kV Line Loop and Substation and Farmwell-Nimbus Transmission Line projects, potential impacts to previously recorded historic properties listed or considered eligible for listing in the NRHP within the VDHR-defined buffered tiers were assessed in accordance with the VDHR guidelines. This includes National Historic Landmark (NHL) properties located within a 1.5-mile buffer area established around the projects, properties listed on the National Register of Historic Places (NRHP), battlefields, and historic landscapes located within a 1-mile buffer around the projects, and properties previously determined eligible for listing in the NRHP located within a 0.5-mile buffer area around the projects; as well as previously identified archaeological resources directly within the project ROWs.

A review of VDHR records in VCRIS reveals there are no NHLs located within 1.5-miles of the projects, no NRHP-listed properties, battlefields, or historic landscapes located within 1-mile of the projects, one property that is considered potentially eligible for listing in the NRHP within 0.5-miles of the projects, and two archaeological sites located directly within or crossed by the project ROWs (Table 6-1).

Table 6-1: Previously recorded historic properties within their respective tiered buffer zones

Buffer (miles)	Considered Resources	VDHR #	Description	Associated Project
1.5	National Historic Landmarks	None	None	N/A
1.0	National Historic Landmarks	None	None	N/A
	National Register- Listed	None	None	N/A
	Battlefields	None	None	N/A
	Historic Landscapes	None	None	N/A
0.5	National Historic Landmarks	None	None	N/A
	National Register- Listed	None	None	N/A
	Battlefields	None	None	N/A
	Historic Landscapes	None	None	N/A
	National Register-Eligible	053-6416	Broad Run Ford and Ox Road	Nimbus 230kV Line Loop and Nimbus Substation/ 230kV Farmwell-Nimbus Transmission Line

0.0 (ROW)	All Above	None	None	N/A
	Archaeology Sites	44LD1602	Twentieth Century Domestic Site (Not Evaluated)	230kV Farmwell-Nimbus Transmission Line
		44LD1603	Twentieth Century Road Trace (Not Evaluated)	Nimbus 230kV Line Loop and Nimbus Substation

For the purposes of this analysis, an impact is one that alters, either directly or indirectly, those qualities or characteristics that qualify a particular property for listing in the NRHP and does so in a manner that diminishes the integrity of a property's materials, workmanship, design, location, setting, feeling, and/or association. With respect to transmission lines, direct impacts typically are associated with ground disturbance resulting from ROW clearing and structure construction. Indirect impacts typically are associated with the introduction of new visual elements or changes to the physical features of a property's setting or viewshed. According to VDHR guidance, project impacts are characterized as such:

- **None** – Project is not visible from the property
- **Minimal** – Occur within viewsheds that have existing transmission lines, locations where there will only be a minor change in tower height, and/or views that have been partially obstructed by intervening topography and vegetation.
- **Moderate** – Include viewsheds with expansive views of the transmission line, more dramatic changes in the line and tower height, and/or an overall increase in the visibility of the route from the historic properties.
- **Severe** – Occur within viewsheds that do not have existing transmission lines and where the views are primarily unobstructed, locations where there will be a dramatic increase in tower visibility due to the close proximity of the route to historic properties, and viewsheds where the visual introduction of the transmission line is a significant change in the setting of the historic properties.

With regard to architectural resources, just one considered property is located within the defined tiers for assessment. This is the potentially NRHP-eligible Broad Run Ford and Ox Road. Field inspection and desktop analysis reveal that this resource has historical significance related to early transportation in the region and is considered significant for its representation of a colonial-era ford and road, however, its setting has been compromised by a variety of nonhistoric development in the vicinity. This includes private development in the form of large warehouse-style data centers, and public utility corridors, including an existing transmission line corridor between it and the project. As shown by ground-based photography, views from the resource are already interrupted by these features, and the proposed projects would be set beyond the compromised setting and be completely screened, with the exception of a short length of the proposed Nimbus Line Loop that may be visible from the Ox Road trace portion of the property between buildings as it is suspended across the Loudoun County Parkway. Photo simulation confirmed that all proposed structures associated with both projects would be completely screened from view from the Broad Run portion of the property by intervening development and vegetation. As such, the project is not anticipated to introduce any substantial new or uncharacteristic features into the already compromised setting or viewshed from the resource, and therefore, the Nimbus 230kV Line Loop and Substation Project will have no more

than a ***minimal impact*** on the Broad Run Ford and Ox Road and the Farmwell-Nimbus 230kV Transmission Line Project will have ***no impact*** on the Broad Run Ford and Ox Road..

Table 6-2: Potential impacts summary for architectural resources.

VDHR#	Resource Name	NRHP Status	Impact
053-6416	Broad Run Ford and Ox Road	Potentially NRHP-Eligible	Nimbus Line Loop - Minimal Impact Farmwell-Nimbus - No Impact

With regard to archaeology, there are two previously recorded sites located within the proposed ROW for the projects. Site 44LD1602 is located within the proposed ROW of the Farmwell-Nimbus Transmission Line Project and Site 44LD1603 is located within the proposed ROW of the Nimbus Line Loop Project. Neither site has been formally evaluated for NRHP-eligibility by the VDHR, and their current condition is unknown as they were not subject to investigation as part of this effort, although recent aerial photography suggests substantial disturbance has occurred as a result of development in the vicinity of both sites. Therefore, these two sites should be investigated further and assessed for impacts as additional project details become available.

Table 6-3: Potential impacts summary for archaeological resources.

VDHR#	Resource Name	NRHP Status	Impact
44LD1602	Twentieth Century Domestic Site (Not Evaluated)	Not Evaluated	Farmwell-Nimbus - TBD
44LD1603	Twentieth Century Road Trace (Not Evaluated)	Not Evaluated	Nimbus Line Loop - TBD

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7. REFERENCES

National Park Service
2009 "Civil War Sites Advisory Commission Report Update and Resurvey," American Battlefield Protection Program

Virginia Department of Historic Resources
2008 *Guidelines for Assessing Impacts of Proposed Electric Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia*

Virginia Department of Historic Resources
2022 Virginia Cultural Resource Information System (VCRIS) database and GIS server.

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