COMMONWEALTH OF VIRGINIA
STATE CORPORATION COMMISSION

APPLICATION OF

VIRGINIA ELECTRIC AND POWER COMPANY **CASE NO. PUR-2021-00082**

For approval and certification of electric transmission facilities: Elmont-Ladysmith 500 kV Transmission Line #574 Rebuild and Related Projects

REPORT OF D. MATHIAS ROUSSY, JR., HEARING EXAMINER

February 9, 2022

This case involves Dominion's request for approval of an electric transmission line rebuild of Elmont-Ladysmith Line #574, the replacement of one transmission tower with two towers on Ladysmith-Possum Point Line #568, and associated work at the Elmont and Ladysmith Switching Stations in Hanover and Caroline Counties. The record of this case demonstrates a need to replace the existing structures.

A primary issue in this case is whether the Rebuild Project should be constructed using single-circuit 500 kV structures or, alternatively, using 5-2 structures capable of carrying a 500 kV and 230 kV line. While Dominion only seeks approval of a 500 kV line in the instant case, it asserts the use of 5-2 structures is prudent to accommodate a 230 kV line, if needed in the future. I find that the record indicates that there may be a future need for a 230 kV line between the Elmont and Ladysmith Stations, but that such need is currently uncertain. A more proactive approach to transmission infrastructure, as proposed with the 5-2 structures, risks unnecessary upfront costs, while a more conservative approach risks back-end costs that could have been avoided with upfront investment. To mitigate the customer risk associated with unnecessary upfront costs, I recommend that the Commission approve single-circuit structures for the Rebuild Project unless Dominion agrees to bear the incremental cost of 5-2 structures until the need for a 230 kV line is established.

HISTORY OF THE CASE

On April 27, 2021, Virginia Electric and Power Company d/b/a Dominion Energy Virginia ("Dominion" or "Company") filed with the State Corporation Commission ("Commission") an application for approval and for certificates of public convenience and necessity ("CPCNs") to construct and operate electric transmission facilities in Hanover and Caroline Counties, Virginia ("Application"). Specifically, the Application proposes:

- rebuilding approximately 26.2 miles of the Company's existing 500 kilovolt ("kV") transmission Line #574 (Elmont – Ladysmith);

- removing one tower supporting existing 500 kV Line #568 (Ladysmith – Possum Point) and replacing it with two towers; and

- completing work at the Company's Elmont Switching Station ("Elmont Station") and Ladysmith Switching Station ("Ladysmith Station") to support the new line rating.[1]

On May 26, 2021, the Commission issued an Order for Notice and Hearing that, among other things, directed Dominion to provide notice of its Application; established a procedural schedule, including a hearing to receive telephonic public witness testimony and to receive the evidence of the parties and the Commission's Staff ("Staff"); directed Staff to investigate the Application and file testimony and exhibits summarizing Staff's investigation; provided opportunities for interested persons to intervene and participate in this case; and appointed a Hearing Examiner to conduct all further proceedings in this matter on behalf of the Commission and to file a report.

On June 25, 2021, Dominion filed proof of notice, as required by the Order for Notice and Hearing.[2]

On July 1, 2021, the Department of Environmental Quality ("DEQ") filed its report on Dominion's Application ("DEQ Report"), which includes a Wetland Impact Consultation provided by DEQ's Office of Wetlands and Stream Protection.[3]

On July 6, 2021, the Company filed with the Commission a Motion for Entry of a Protective Ruling. A Hearing Examiner's Protective Ruling was issued on July 19, 2021, to facilitate the handling of confidential information.

On November 17, 2021, a Hearing Examiner's Ruling directed the December 8, 2021 hearing in this proceeding to be conducted using a virtual format.

On December 6, 2021, a Hearing Examiner's Ruling cancelled the public witness component of the hearing because no one signed up to testify.

No parties intervened in this proceeding and no public comments were filed.

On December 8, 2021, the hearing was convened, as scheduled, using Microsoft Teams. Lisa R. Crabtree, Esquire, David J. DePippo, Esquire, and April M. Jones, Esquire, appeared on behalf of Dominion. William H. Chambliss, Esquire, and William H. Harrison, IV, Esquire, represented Staff.

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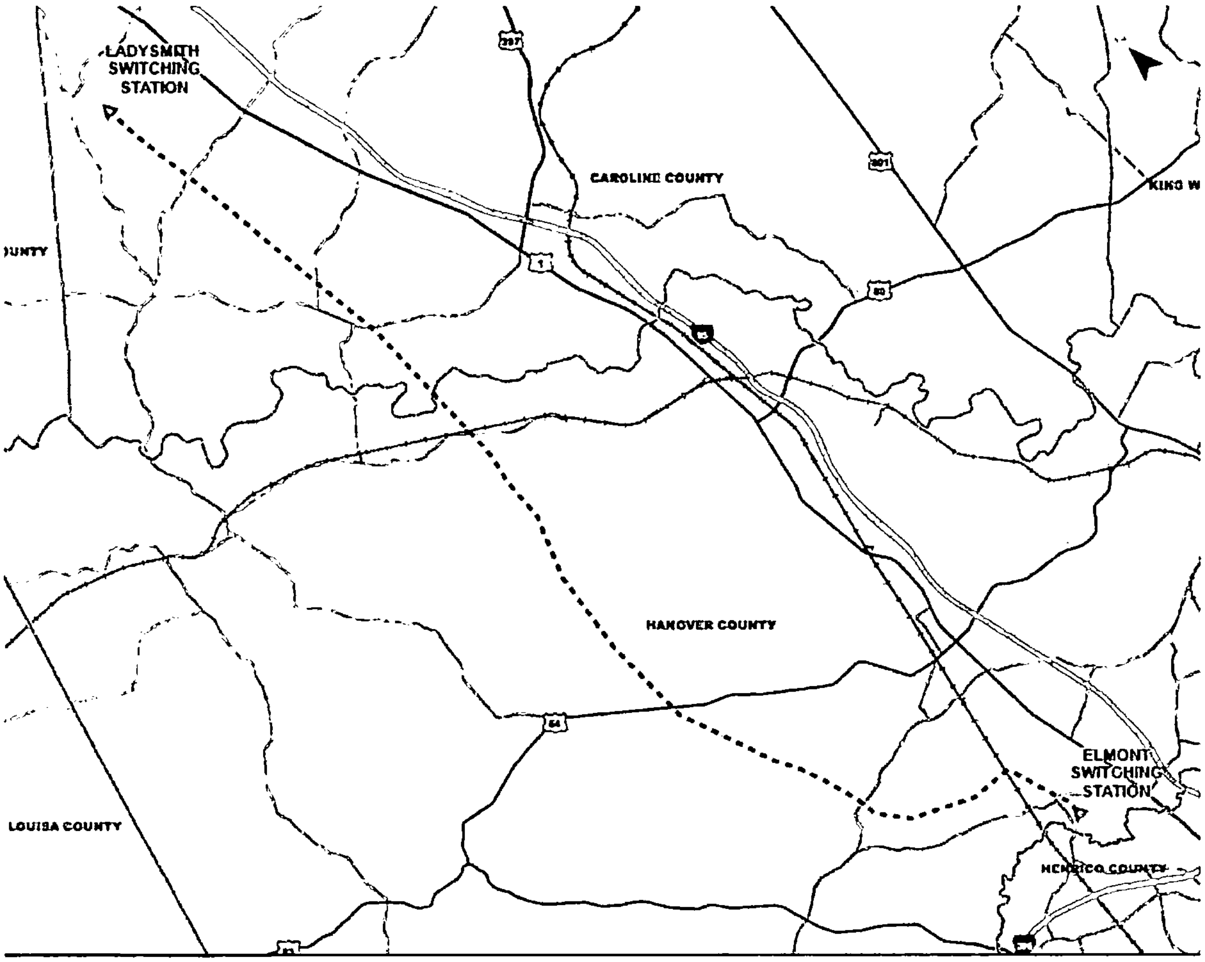
[1] Exhibit ("Ex.") 2 (Application) at 2. Various parts of the Application refer to the Elmont and Ladysmith Stations as either switching stations or substations.
[2] Ex. 1.
[3] Ex. 13.

SUMMARY OF THE RECORD

Dominion's existing 500 kV Line #574 runs approximately 26.2 miles, extending from the Company's Ladysmith Station in Caroline County to its Elmont Station in Hanover County. In its Application, the Company proposed to rebuild this line using the existing right-of-way shown on the map below[4] as the dashed line to the west of Route 1 and Interstate 95.



In the existing right-of-way, Dominion would replace 123 existing 500 kV lattice towers used to support Line #574 with 124 new 500/230 kV or 500 kV structures.[5] The new structures would include 103 lattice towers, 19 three-pole structures, 1 H-frame, and 1 pole. Primarily, existing single-circuit, weathering steel structures would be replaced by double-circuit, dulled, galvanized steel structures with an "underbuild" that could support a future 230 kV line.[6]

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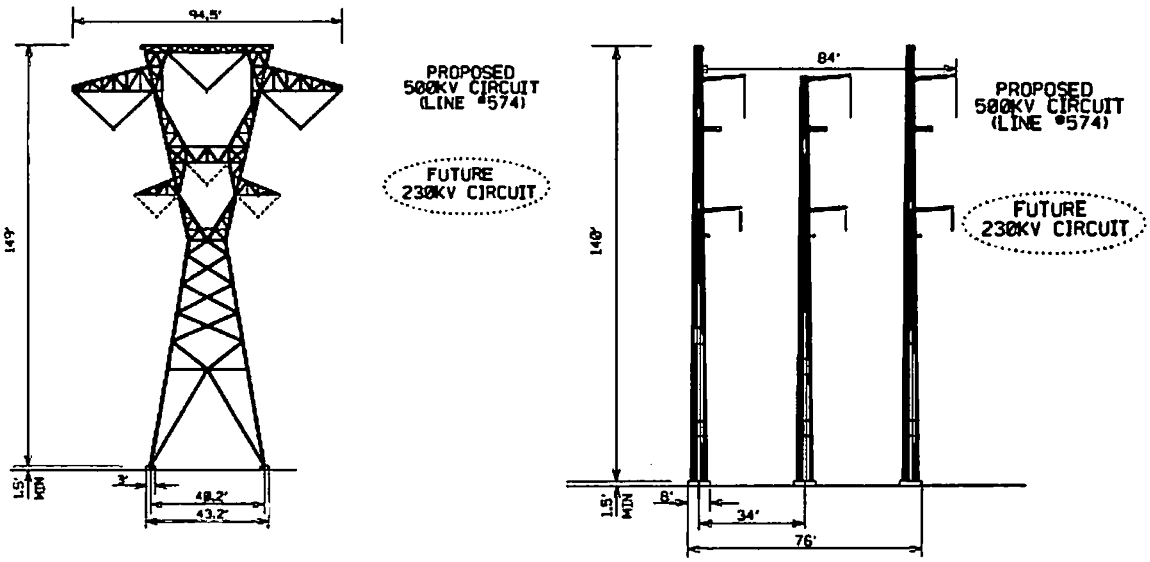
[4] Ex. 2 (Appendix) at 8; Ex. 4 (Company-PE-1).

[5] Two of the new towers would be single-circuit 500 kV structures. Ex. 2 (Appendix) at 22. The additional structure would be within the Company's Elmont Station. *See, e.g., id.* at 116, 289.

[6] Ex. 2 (Appendix) at 22. Two of the existing lattice towers that would be removed are galvanized steel. *Id.*

Below are the preliminary design drawings for the primary structure types that Dominion proposes using to rebuild Line #574.[7] The underbuild for the proposed structures includes a lower set of cross-arms, as shown in the illustrations below. The notation "future 230 kV circuit" indicates that the 230 kV circuit that these cross-arms could carry is *not* part of the Application's proposal. Structures that can carry both 500 kV and 230 kV lines are also referred to as "5-2 towers" or "5-2 structures."[8]



To change the interconnection locations of Lines #574 and #568 at the Ladysmith Station, Dominion would remove and replace one 500 kV lattice tower with two 500 kV lattice towers.[9] The Company would also replace 500 kV conductors, shield wires, and station equipment as part of this project (collectively with the proposed structure replacements, the "Rebuild Project").[10]

Dominion's Direct Testimony

Dominion's Application, Appendix, and DEQ Supplement were sponsored by **Peter Nedwick**, Principal Engineer in Electric Transmission Planning; **Sherrill A. Crenshaw**, Consulting Engineer;[11] **Santosh Bhattarai**, Consulting Engineer – Substation Engineering; and **Greg R. Baka**, Electric Transmission Local Permitting Consultant.

Peter Nedwick sponsored or co-sponsored, among other things, the Company's justification for the Rebuild Project.

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[7] *Id.* at 112-13.
[8] *See, e.g.*, Ex. 11 (Staff Report) at 10-12; Ex. 15 (Nedwick rebuttal) at 3.
[9] Ex. 2 (Appendix) at 7, 22.
[10] Ex. 2 (Application) at 2; Ex. 2 (Appendix) at 7, 22, 185.
[11] Mr. Crenshaw adopted Mr. Shevenock's testimony on July 9, 2021. Ex. 3 (Eratta letter).

Parts of the Appendix co-sponsored by Messrs. Nedwick and Crenshaw indicate that the structures Dominion proposes to replace are primarily 500 kV single-circuit lattice towers constructed in 1966 using COR-TEN.® The Company and other utilities have found these types of towers have problematic design features that enable significant deterioration in the tower connections.[12] A 2013 report by Quanta Technology, LLC ("Quanta Report"), identified the need to replace these towers based on their condition.[13]

Additionally, Mr. Nedwick testified that operational performance of the Company's transmission system may be compromised if Line #574 is not rebuilt.[14] Due to location and function, removing this line would negatively impact the ability to deliver energy from multiple generation projects in the PJM Interconnection, LLC ("PJM"), generation queue.[15] According to Mr. Nedwick, several such generation projects – including some that have received a CPCN from the Commission – depend on Line #574 being in-service and/or rebuilt to a higher capacity.[16]

Mr. Nedwick explained the Company's justification for the proposed tower design that could accommodate a future 230 kV circuit on the underbuild. He testified that as a result of the transmission system's configuration and the large amount of generation located on the 230 kV system in the Rebuild Project area, system stability issues have been identified twice in the past five years.[17] He provided a list of 62 generation projects that are active in the PJM queue in this area.[18] He concluded that given the prior stability issues in this area, if a combination of the queued generation projects are built and interconnected, another stability issue would likely arise and, if so, the only likely solution would be to build additional transmission facilities.[19] He described construction of the Rebuild Project with the option to add a future underbuilt line as prudent utility practice that provides future flexibility to address stability issues.[20]

Based on the foregoing, Dominion submitted the Rebuild Project for PJM review under the planning criteria developed by the Company for its transmission system. More specifically, the Rebuild Project was proposed and evaluated by PJM under the Company's "end-of-life" criteria.[21] The PJM Board approved the Rebuild Project for inclusion in PJM's regional transmission expansion plan.[22]

Sherrill A. Crenshaw sponsored or co-sponsored, among other things, Dominion's cost estimate for the Rebuild Project; drawings depicting the proposed structures[23] and the right-of-

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[12] Ex. 2 (Appendix) at 3-4.
[13] *Id.* at 3.
[14] *Id.* at 5-7, 10.
[15] *Id.* at 5.
[16] *Id.* at 5, 15-16.
[17] *Id.* at 5-6.
[18] Ex. 3 (Errata for Attachment I.A.3).
[19] Ex. 2 (Appendix) at 7.
[20] *Id.* at 7.
[21] *Id.* at 2-7.
[22] *Id.* at 3-4, 9-11.
[23] *Id.* at 78-80 (noting that drawings of proposed structures are preliminary and subject to change based on final design).

way with both the existing and proposed configurations;[24] the line design and operational features; and analysis of electric and magnetic field levels ("EMF"). He also sponsored pictures documenting the current condition of several structures that would be replaced with the Rebuild Project.[25]

The Company estimated the total cost of the proposed Rebuild Project is approximately $92.2 million. Of this total, approximately $80.8 million is for transmission line work and $11.4 million is for station work.[26] Without the underbuild, Dominion estimated the total cost of the Rebuild Project is approximately $71.9 million.[27]

For Line #574, the existing structures that the Company proposes to replace range in height from 75 to 160 feet with an average height of 111 feet. Subject to change based on final engineering design, the proposed replacement structures would range in height from 119 to 174 feet with an average height of 146 feet.[28] Were the Rebuild Project constructed with single-circuit structures (*i.e.*, structures without the underbuild), the proposed structures would range in height from 104 to 164 feet with an average of 136 feet.[29] For Line #568, the one existing structure that the Company proposes to replace is 160 feet, as are the two proposed replacement structures.[30]

The Company provided EMF calculations for the existing Lines #574 and #59, and for these lines after construction of the Rebuild Project.[31] Based on the conclusions of scientific reviews of EMF levels associated with the Rebuild Project, the Company determined that no adverse health effects would result from the operation of the Rebuild Project.[32]

Santosh Bhattarai sponsored the details of the station work associated with the Rebuild Project and the Company's cost estimate for the station work, as discussed above.

The work at the Elmont Station includes replacing two circuit breakers, four switches, bus and line riser conductors with 5000 Amp units. The line termination positions for Line #574 would be relocated within the station. A new control enclosure would be installed for the new relay panels and station service would be upgraded.[33]

The work at the Ladysmith Station includes replacing two circuit breakers, three disconnect switches, bus and line riser conductors with 5000 Amp units. The line termination positions for Lines #574 and #568 would be swapped within the station.[34]

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[24] *Id.* at 105-14 (noting that drawings of proposed structures are preliminary and subject to change based on final design).
[25] *Id.* at 29-61.
[26] *Id.* at 26.
[27] *Id.*
[28] *Id.* at 119.
[29] *Id.* at 115.
[30] *Id.* at 119.
[31] *Id.* at 271-74. Line #59 shares the existing right-of-way with Line #574 for approximately 3.5 miles. *Id.* at 257.
[32] *Id.* at 276.
[33] *Id.* at 185.
[34] *Id.*

At both stations, the terminal equipment of Line #574 would be replaced to support the new line rating, and the fiber on the new shield wire would be brought into the substation control enclosure and terminated in the network panel.[35]

Greg R. Baka explained the Company's route selection and consideration of alternative routes. He also sponsored, among other things, the Company's environmental evaluation of the Rebuild Project, including the DEQ Supplement to the Application.

The Company emphasized the environmental and cost advantages to using existing transmission right-of-way and Company-owned property for the Rebuild Project. The Company did not consider any alternative routes requiring new right-of-way for the Rebuild Project.[36]

The Company assessed the potential environmental impact of the Rebuild Project, including the potential impact on scenic assets and historic properties due to the proposed changes to structure heights.[37] The Company anticipates some potentially moderate and minimal impacts to historic properties where the Rebuild Project is within their viewshed.[38] Mr. Baka recognized that the existing right-of-way crosses 11 named perennial streams and rivers[39] and wetlands.[40]

To reduce glare, Dominion proposed chemical dulling of the proposed galvanized structures, as well as de-glared conductors.[41]

DEQ Report

In the DEQ Report,[42] DEQ advised that the Rebuild Project would likely require the following permits and approvals:[43]

1. Water Permits

> Virginia Water Protection Individual or General Permit (9 VAC 25-210 *et seq.*). Issued by the DEQ for impacts to waters and jurisdictional wetlands, including isolated wetlands.

2. Subaqueous Lands Management

> Subaqueous Lands Permit pursuant to Code § 28.2-1204. Issued by the Virginia Marine Resources Commission for encroachments in, on or over state-owned subaqueous beds.

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[35] *Id.*
[36] Ex. 2 (Appendix) at 64, 84.
[37] *See. e.g., id.* at 186-99, 256-70.
[38] *Id.* at Attachment 2.H.2 (C2 Environmental Report), p. 4.
[39] These include Stony Run, Stagg Creek, Dog Branch, South Anna River, Beaver Creek, Newfound River, Little River, North Anna River, Polecat Creek, Stevens Mill Run, and South River. Ex. 2 (Appendix) at 187.
[40] Ex. 2 (Appendix) at 186-87.
[41] *Id.* at 22, 269.
[42] Ex. 13 (DEQ Report).
[43] *Id.* at 3-5.

3. Erosion and Sediment Control Plan

a. General erosion and sediment control specifications pursuant to Code § 62.1-44.15:55. General erosion and sediment control specifications are subject to annual approval by the DEQ.

b. Erosion and sediment control plans for construction of facilities not covered under Code § 62.1-44.15:55 are subject to approval by the appropriate plan approving authority.

4. Stormwater Management Permit

Virginia Stormwater Management Program General Permit for Discharges of Stormwater from Construction Activities (9 VAC 25-880-70 *et seq.*) of the Virginia Stormwater Management Program Permit Regulations (9 VAC 25-870 *et seq.*) involving land disturbance of one acre or more. Coverage under this general permit is approved by the locality.

5. Chesapeake Bay Preservation Act

Comply with provisions of 9 VAC 10-20-150.B.1 for conditional exemption of transmission lines.

6. Floodplain Management

The conditions set out in the local floodplain management ordinance adopted pursuant to Code § 10.1-603.

7. Air Quality Permits or Approvals

a. Open Burning Permit (9 VAC 5-130 *et seq.*). For open burning involving vegetative and demolition debris.

b. Fugitive dust emissions (9 VAC 5-50-60 *et seq.*). Governs abatement of visible emissions.

8. Solid and Hazardous Waste Management

a. Applicable state laws and regulations include:
- Virginia Waste Management Act (Code § 10.1-1400 *et seq.*);
- Virginia Hazardous Waste Management Regulations (9 VAC 20-60 *et seq.*);
- Virginia Solid Waste Management Regulations (9 VAC 20-81); and
- Virginia Regulations for the Transportation of Hazardous Materials (9 VAC 20-110).

b. Applicable federal laws and regulations include:
- Resource Conservation and Recovery Act, 42 U.S.C. § 6901 *et seq.*, and the applicable regulations contained in Title 40 of the Code of Federal Regulations; and

• U.S. Department of Transportation Rules for Transportation of Hazardous Materials (49 CFR Part 107).

9. Natural Heritage Resources

Coordinate with the U.S. Fish and Wildlife Service [("US FWS")] due to the legal status of the yellow lance, to ensure compliance with the Endangered Species Act (16 U.S.C. § 1531 *et seq.* (1973)).

10. Wildlife Resources and Protected Species

Project activities are subject to the Endangered Species Act which provides for the protection of the Atlantic sturgeon as administered by NOAA Fisheries (16 U.S.C. § 1531 *et seq.* (1973)).

11. Historic and Archaeological Resources

Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulation 36 CFR 800 requires that federally licensed and permitted projects consider its effects on properties that are listed or eligible for listing on the National Register of Historic Places. Section 106 applies if there is federal involvement such as the issuance of a Section 404 Clean Water Act permit, including Nationwide Permits. The applicability of Section 106 to the entire project or any portion thereof must be determined by the responsible federal agency.

12. Aviation Requirements

Federal Aviation Administration Form 7460, Notice of Proposed Construction or Alteration, to ensure compliance with Federal Aviation Regulations Part 77.

The DEQ Report also contained recommendations based on information and analysis submitted by reviewing agencies. DEQ's recommendations, which are in addition to requirements of federal, state, or local law or regulations listed above, are summarized below.

• Follow DEQ recommendations including the avoidance and minimization of impacts to wetlands and streams.[44]

• Take all reasonable precautions to limit emissions of oxides of nitrogen and volatile organic compounds, principally by controlling or limiting the burning of fossil fuels.[45]

• Reduce solid waste at the source, reuse it and recycle it to the maximum extent practicable, and follow DEQ's recommendations to manage waste, as applicable.[46]

[44] *Id.* at 6, 8-10.
[45] *Id.* at 6, 16.
[46] *Id.* at 6, 18.

• Coordinate with the Department of Conservation and Recreation ("DCR") on the development and implementation of an invasive species plan to be included as part of the maintenance practices for the right-of-way.[47]

• Coordinate with the DCR for updates to the Biotics Data System database during the final design stage of engineering and upon any major modifications of the project construction to avoid and minimize impacts to natural heritage resources.[48]

• Coordinate with the Department of Wildlife Resources ("DWR") should instream work resulting in temporary or permanent impacts to Threatened and Endangered Species Water and Anadromous Fish Use Areas.[49]

• Coordinate with the DWR as necessary regarding the general protection of wildlife resources.[50]

• Coordinate with the Virginia Outdoors Foundation ("VOF") on minimizing the impacts of the replacement structures on VOF open-space easements in the vicinity of the Rebuild Project.[51]

• Employ best management practices and Spill Prevention and Control Countermeasures and other measures as appropriate for the protection of water supply sources.[52]

• Follow the principles and practices of pollution prevention to the extent practicable.[53]

• Limit the use of pesticides and herbicides to the extent practicable.[54]

Staff's Report

Staff presented its findings and recommendations through a report prepared and sponsored by **Yousuf Malik**, Utilities Engineer in the Commission's Division of Public Utility Regulation. Mr. Malik evaluated, among other things, the need asserted for the Rebuild Project and various details of the Rebuild Project.

Mr. Malik confirmed the Quanta Report's recommendation to replace towers for Line #574, among other COR-TEN® structures.[55] The Quanta Report found design features that enabled significant deterioration in the connections of these towers.[56] He explained "pack-out" at weathering steel tower joints, which can lead to premature structural failure.[57]

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[47] *Id.* at 6, 20.
[48] *Id.*
[49] *Id.* at 6, 21.
[50] *Id.* at 6, 21-22.
[51] *Id.* at 6-7, 22-23.
[52] *Id.* at 7, 23.
[53] *Id.* at 7, 27-28.
[54] *Id.* at 7, 28.
[55] Ex. 11 (Staff Report) at 4.
[56] *Id.* at 5.
[57] *Id.* at 3.

Mr. Malik elaborated on the end-of-life planning criteria for Dominion's transmission system.[58] Staff agreed that the COR-TEN® towers for Lines #574 are at the end of their lives based on the Quanta Report.[59] Staff further agreed that removal of Line #574 would negatively impact reliable transmission service and the deliverability of multiple PJM generation queue projects.[60]

Staff concluded that the Rebuild Project is needed, with the caveat that Staff took no position on Dominion's proposed use of the 5-2 structures.[61] Mr. Malik expressed Staff's concerns about using 5-2 structures capable of supporting a future, underbuilt 230 kV line.[62] Namely, he observed that "[w]hile the Company references the general presence of several interconnection requests in the PJM [g]eneration [q]ueue and historical stability issues within the Rebuild Project area, the Company has not identified any specific anticipated need that would support constructing the 230 kV underbuild."[63] He identified a Commission decision in 2018 that rejected the use of 5-2 structures in a case Mr. Malik indicated was similar to the instant case.[64]

Mr. Malik provided the following table to compare the Rebuild Project using single-circuit towers with the Rebuild Project using 5-2 structures, as proposed.[65]

Option	Cost	Structure Height (ft) (Min/Max/Average)
Single-circuit Lattice Tower	$71.9 million	104 / 164 / 136
5-2 Tower Design	$92.2 million	119 / 174 / 146

In response to discovery by Staff, Dominion indicated it chose the 5-2 tower design because the existing right-of-way could not accommodate a separate single-circuit 230 kV transmission line. Dominion estimated that the cost of adding a separate 230 kV transmission line along the route of the Rebuild Project is approximately $64.4 million.[66] The response indicates that the new right-of-way would need to be relocated away from the existing corridor in areas to avoid impacts to existing homes.[67]

Mr. Malik described the substation work for the Rebuild Project. He explained that swapping the interconnection locations of Lines #568 and #574 at the Ladysmith Station would accommodate Dominion's "hybrid backbone" restoration strategy, which relies heavily on

[58] *Id.* at 4-7.
[59] *Id.* at 5.
[60] *Id.* at 6.
[61] *Id.* at 9-12, 21-22.
[62] *Id.* at 11-12.
[63] *Id.* at 11.
[64] *Id.* at 11-12 (discussing *Application of Virginia Electric and Power Company, For approval and certification of electric facilities: transmission line rebuild of Dooms-Valley Line 500 kV #569*, Case No. PUR-2017-00114, 2018 S.C.C. Ann. Rep. 257, Final Order (Sep. 10, 2018) ("*Dooms-Valley Order*")).
[65] Ex. 11 (Staff Report) at 11.
[66] *Id.* at 10 and Appendix A (Dominion's response to Staff request 2-8).
[67] *Id.* at Appendix A (Dominion's response to Staff request 2-8).

115 kV and 230 kV transmission facilities.[68] He reported that the estimated cost for this component of the Rebuild Project is approximately $1.4 million.[69]

Mr. Malik summarized some of the environmental impacts of the Rebuild Project and addressed environmental justice considerations.[70] He indicated that Staff agreed: (1) that the proposed route reasonably minimizes impacts to environmental, historic, and scenic resources; and (2) the Rebuild Project does not appear to have a disproportionate adverse impact on historically economically disadvantaged communities or environmental justice communities.[71]

Mr. Malik concluded as follows:

> [B]ased on the information provided by the Company, Staff was not able to verify the need for the Company's proposed use of a 5-2 [t]ower [d]esign to support a future 230 kV underbuild. While the Company's proposed 5-2 [t]ower [d]esign may be a cost-effective and least impactful solution within the [right-of-way], the Company has not identified a specific need or established a reasonable estimate as to when the underbuild would ever be needed. While recognizing that the single-circuit option is adequate to resolve the present need but may not adequately resolve an unidentified future need for a 230 kV line, Staff believes that the potential future benefits of the Company's proposed 5-2 [s]tructures must be weighed against the certainty of the immediate increases in cost and height. In the instant case, using the Company's proposed 5-2 [t]ower [d]esign results in an incremental cost of approximately $20.3 million and an average height increase of approximately 10 feet (approximately 6.1%) compared to the single-circuit option.[72]

Dominion's Rebuttal Testimony

Dominion offered the rebuttal testimonies of **Mr. Nedwick** and **Rachel Studebaker**, Environmental Specialist III for the Company.

Mr. Nedwick reiterated Dominion's position that the 5-2 structure design is appropriate for the Rebuild Project because of the history of stability issues in the "Stability Study Area"[73] and the likely need for a transmission solution to address future stability issues.[74] He also found

[68] *Id.* at 14-15 and Appendix A (Dominion's response to Staff request 3-10).
[69] *Id.*
[70] *Id.* at 18-20.
[71] *Id.* at 21-22.
[72] *Id.* at 22.
[73] The Application defines generation or queued generation within the "Stability Study Area" as any generation units located within five buses of the Elmont or Ladysmith Stations. Ex. 2 (Appendix, Executive Summary) at i.
[74] Ex. 15 (Nedwick rebuttal) at 4.

it notable that 58 of the 62 queued projects identified by the Application,[75] are renewable energy projects.[76]

Mr. Nedwick agreed with Staff that a high-level cost/benefit analysis can be appropriate for determining structure type and he highlighted additional factors for such an analysis.[77] In addition to immediate cost and impacts, Mr. Nedwick testified that appropriate consideration should be given to future system needs and prudent utility planning, including stability issues identified in the Application, and approval of the Rebuild Project as a PJM baseline project. According to Mr. Nedwick, PJM's stakeholders and Board of Directors considered that there were benefits to maximizing use of the existing right-of-way to allow for future transmission expansion based on historical reliability issues that existed when the Rebuild Project was considered.[78]

Mr. Nedwick indicated that Commission approval of the Rebuild Project on single-circuit (rather than 5-2) structures would require a Federal Energy Regulatory Commission ("FERC") filing by PJM. He further asserted that until FERC accepts such a filing, future evaluations of PJM generation queue projects will automatically consider the ability to potentially construct a new 230 kV circuit between Elmont and Ladysmith by installing an underbuilt 230 kV circuit on these structures. The cost responsibility for a 230 kV circuit using the 5-2 tower design is already determined for the existing queue projects because of PJM's approval. However, if a more expensive solution like the wreck and rebuild or a 230 kV in a new corridor are pursued in the future (in the event the 5-2 design is not approved), the queue projects would not be responsible for the entire cost of these more expensive projects as the incremental costs would be assigned as baseline project costs.[79]

Mr. Nedwick provided a one-page excerpt from a system impact study report for a generation project in PJM's queue listing nine such projects that have an identified need for a 230 kV line to be constructed on the vacant underbuild arms of the 5-2 towers for the Rebuild Project.[80] The need identified in PJM's studies was based on thermal violations projected by load flow modeling.[81] Mr. Nedwick indicated that the earliest projected in-service date for one of these queue projects is June 2023.[82]

Mr. Nedwick recognized that PJM's queue "is in the middle of a temporary pause as PJM tries to clear its current backlog" of queue projects. However, once one of the nine queue projects, or another project, with an identified need for this line executes an interconnection service agreement ("ISA") with PJM and Dominion, Dominion has an obligation to use its best efforts to obtain Commission approval to build the proposed 230 kV line and construct that facility according to the proposed in-service dates provided in the respective ISAs.[83]

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[75] Ex. 3 (Errata for Attachment I.A.3).
[76] Ex. 15 (Nedwick rebuttal) at 4.
[77] *Id.* at 4-5.
[78] *Id.* at 5.
[79] *Id.* at 6.
[80] *Id.* and Rebuttal Sched. 2.
[81] Tr. at 37 (Nedwick).
[82] Ex. 15 (Nedwick rebuttal) at 7.
[83] *Id.*

If the Commission approves the Rebuild Project using single-circuit structures, the only options for adding a new 230 kV circuit between the Ladysmith and Elmont Stations would be: (1) to wreck and rebuild the Rebuild Project at an estimated incremental cost of $80.8 million; or (2) use new right-of-way in an adjacent corridor at an estimated cost of $64.4 million.[84] Mr. Nedwick believes the high-level cost-benefit analysis for the 5-2 tower design should compare the range of estimated costs for these two options, $64-$81 million, to the $20.3 million estimated incremental cost of the 5-2 tower design.[85] Based on engineering judgment, Mr. Nedwick has "every reason to believe" a reliability solution will occur.[86] He also noted the adjacent corridor option would involve additional environmental and location specific impacts that the Rebuild Project avoids.[87]

Mr. Nedwick concluded as follows:

> There is a fundamental transition going on in the utility industry right now as it transitions from a carbon-based energy resource mix to a renewable (carbon free) resource mix. The Commonwealth of Virginia itself is well into the implementation of the requirements of the [Virginia Clean Energy Act ("VCEA")]. Currently in the Dominion Zone there are over 60,000 MW ... of potential new generation resources, with most of these resources being renewable resources (solar, batteries, and wind). As the Company plans for future transmission needs, the Company has an obligation to customers to make prudent transmission investments in new transmission infrastructure that maximizes the use of existing facilities and rights-of-way, while reasonably minimizing future costs and impacts to its customers. The Company has demonstrated in this proceeding that the Stability Study Area applicable to the Rebuild Project has experienced reliability issues in the past, which have driven the need for new transmission infrastructure. It can be reasonably expected in the near future that the transition to a carbon-free energy resource mix will drive the need of a new 230 kV Circuit between Elmont and Ladysmith Substations.[88]

Ms. Studebaker recommended that the Commission reject the following five recommendations from the DEQ Report:[89]

- DCR's recommendation to coordinate with the US FWS to ensure compliance with protected species legislation;

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[84] *Id.* at 8-9 (indicating the $60.5 and $80.8 million figures include only transmission-related costs).
[85] *Id.* at 9.
[86] *Id.*
[87] *Id.*
[88] *Id.* at 9-10.
[89] Ex. 14 (Studebaker rebuttal) at 2-3.

- DCR's recommendation to develop and implement an invasive species plan to be included as part of the maintenance practices for the right-of-way;

- DWR's recommendation to coordinate with agency staff on any permanent or temporary impacts to Threatened and Endangered Species Water and Confirmed Anadromous Fish Use Areas;

- DWR's recommendations related to significant tree removal or tree clearing activities outside of certain seasons; and

- DEQ's recommendation to consider developing an effective Environmental Management System.

Ms. Studebaker asserted that the first recommendation shown above is unnecessary because the Rebuild Project involves no instream work.[90] Asserting it would be duplicative and unnecessary, she recommended rejection of DCR's recommendation for Dominion to develop an invasive species plan to be included as part of the maintenance practices for the right-of-way.[91] She identified four transmission line orders in which the Commission rejected similar recommendations.[92]

Regarding DWR's recommendation involving anadromous fish use areas, Ms. Studebaker reiterated that the Rebuild Project involves no instream work. She also indicated, among other things, that Atlantic sturgeon did not appear in the Company's analysis for threatened and endangered species that included an online database review through US FWS, DWR, and DCR; the location of the Rebuild Project in the upper reaches of the York River Watershed does not provide suitable habitat for the Atlantic sturgeon; and the location of the Rebuild Project would not impact the Atlantic sturgeon.[93]

Ms. Studebaker identified two Commission orders that rejected seasonal transmission construction restrictions similar to those proposed by DWR.[94] However, she committed that Dominion would: (1) conduct a survey if significant tree and/or ground clearing activities are

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[90] *Id.* at 3.
[91] *Id.* at 3-4.
[92] *Id.* at 5, n.2 (citing *Application of Virginia Electric and Power Company, For approval and certification of electric facilities, Fudge Hollow-Low Moor Line #112 and East Mill-Low Moor Line #161 138 kV Transmission Line Partial Rebuild*, Case No. PUR-2018-00139, 2019 S.C.C. Ann. Rep. 264, Final Order (Apr. 23, 2019) ("*Fudge Hollow-Low Moor Order*"); *Application of Virginia Electric and Power Company, For approval and certification of electric facilities: Evergreen Mills 230 kV Line Loops and Evergreen Mills Switching Station*, Case No. PUR-2019-00191, 2020 S.C.C. Ann. Rep. 357, Final Order (May 22, 2020) ("*Evergreen Mills Order*"); *Application of Virginia Electric and Power Company, For approval and certification of electric facilities: Loudoun-Ox 230 kV Transmission Line Partial Rebuild Projects*, Case No. PUR-2019-00128, 2020 S.C.C. Ann. Rep. 306, Final Order (June 2, 2020) ("*Loudoun-Ox Order*"); *Application of Virginia Electric and Power Company, For approval and certification of electric Transmission facilities: Lockridge 230 kV Line Loop and Lockridge Substation*, Case No. PUR-2019-00215, 2020 S.C.C. Ann. Rep. 391, Final Order (Oct. 1, 2020) ("*Lockridge Loop Order*")).
[93] Ex. 14 (Studebaker rebuttal) at 5.
[94] *Id.* at 6, n.3 (citing *Application of Virginia Electric and Power Company, For approval and certification of electric facilities: Landstown-Thrasher Line #231 230 kV Transmission Line Rebuild*, Case No. PUR-2018-00096, 2018 S.C.C. Ann. Rep. 461, Final Order (Dec. 3, 2018) ("*Landstown-Thrasher Order*"); *Loudoun-Ox Order*).

required during the primary songbird nesting season; and (2) coordinate with DWR to create appropriate construction restrictions in the event songbird nesting colonies are found during the Company survey.[95]

According to Ms. Studebaker, DEQ's recommendation to develop an effective Environmental Management System is unnecessarily duplicative of a manual Dominion already has in place.[96] She identified a Commission order that rejected a similar recommendation.[97]

Ms. Studebaker also offered an alternative to the Department of Health's recommendation that wells within a 1,000-foot radius from the Rebuild Project site should be field marked and protected from accidental damage during construction. Since all such wells are on private property, she indicated that Dominion is unable to mark them as recommended, but would instead plot and call out the wells on erosion and sediment control plans.[98]

Staff's Surrebuttal

Staff witness Malik sponsored surrebuttal testimony. He provided the following table to illustrate that, according to PJM, projects in PJM's generation queue have only a 21% completion rate.[99]

Milestone	Number of Projects	Percent of total Applications
Applications Received by PJM	4747	-
Feasibility Study Phase	3934	83%
System Impact Study Phase	2901	61%
Facilities Study Phase	2228	47%
Final Agreement Executed	1811	38%
Construction of Facilities	1299	27%
In Service	1009	21%

Mr. Malik elaborated further that only 13% of new facilities are constructed while the completion rate for uprate projects is approximately 54%, according to PJM.[100]

Mr. Malik provided the following table with additional information about the nine projects that Dominion witness Nedwick indicated are in PJM's generation queue and have an identified need for a 230 kV line to be constructed on the vacant underbuild arms of the 5-2 towers for the Rebuild Project.[101]

[95] Ex. 14 (Studebaker rebuttal) at 6.
[96] *Id.* at 7.
[97] *Id.* at 7, n.5 (citing *Application of Virginia Electric and Power Company, For approval and certification of electric transmission facilities: Allied-Chesterfield 230 kV Transmission Line #2049 Partial Rebuild Project*, Case No. PUR-2020-00239, Doc. Con. Cen. No. 210330038, Final Order (Mar. 23, 2021) ("*Allied-Chesterfield Order*").
[98] Ex. 14 (Studebaker rebuttal) at 7-8 and Rebuttal Sched. 1.
[99] Ex. 12 (Malik surrebuttal) at 2. Staff could not find Virginia-specific completion rates. *Id.*
[100] *Id.* at 3.
[101] *Id.*

PJM Queue	New Facility or Uprate of existing	Capacity	Status (as of 12/1/2021)	Latest Study	Allocated Costs**
AF2-035	New	80 MW	Active	System Impact (Facility Study in Progress)	$10,776,127 (25.83%)
AF2-049	Uprate	120 MW uprate to 180 MW	Active	System Impact (Facility Study in Progress)	$8,082,434 (19.38%)
AF2-300	Uprate	44 MW uprate to 64 MW	Active	System Impact (Facility Study in Progress)	$2,693,693 (6.46%)
AG1-019	Uprate	100 MW uprate to 200 MW	Active	System Impact (Facility Study in Progress)	$2,430,960 (5.83%)
AG1-183	New	50 MW	Withdrawn (9/1/2021)	System Impact	$4,784,725 (11.47%)
AG1-187	New	50 MW uprate to 50 MW*	Withdrawn (9/1/2021)	System Impact	$1,950,185 (4.68%)
AG1-322	New	70 MW	Withdrawn (10/1/2021)	System Impact	$2,074,780 (4.97%)
AG1-412	New	200 MW	Active	System Impact (Facility Study in Progress)	$4,611,375 (11.05%)
AG1-541	New	75 MW	Active	System Impact (Facility Study in Progress)	$4,310,722 (10.33%)

* These values represent- capacity uprates and not uprates of maximum facility output.

** These values are taken from the AG1-541 System Impact Study dated August 2021 and represent only those costs associated with the building of the new 230 kV line from Elmont to Ladysmith.

Mr. Malik pointed out that because the six projects that remain active in the queue have yet to complete the interconnection study process, their interconnection requirements are not fully known.[102] In addition to the estimated cost allocations associated with a new 230 kV line from Elmont to Ladysmith, Mr. Malik provided the following table that summarizes additional estimated costs allocated to the nine generation projects in PJM system impact studies.[103]

PJM Queue	Total Physical Interconnection Costs	Allocation towards System Network Upgrade Costs	Total Costs
AF2-035	TBD	$41,652,674	$41,652,674
AFT-049	$0	$19,199,011	$19,199,011
AF2-300	$0	$6,367,413	$6,367,413
AG1-019	$0	$40,683,374	$40,683,374
AG1-183	$8,800,000	$20,735,532	$29,535,532
AG1-187	-	$5,536,132	$5,536,132
AG1-322	$3,300,000	$50,825,225	$54,125,225
AG1-412	$10,400,000	$33,077,810	$43,477,810
AG1-541	TBD	$104,992,719	$104,992,719

[102] *Id.*

[103] *Id.* at 4.

CODE

Code § 56-265.2 A 1 provides that "it shall be unlawful for any public utility to construct, enlarge or acquire ... facilities for use in public utility service, except ordinary extensions or improvements in the usual course of business, without first having obtained a certificate from the Commission that the public convenience and necessity require the exercise of such right or privilege." For the construction of any overhead transmission line of 138 kV or more that requires a CPCN, the Code also requires compliance with Code § 56-46.1.[104]

Code § 56-46.1 A states in part as follows:

> Whenever the Commission is required to approve the construction of any electrical utility facility, it shall give consideration to the effect of that facility on the environment and establish such conditions as may be desirable or necessary to minimize adverse environmental impact. . . . In every proceeding under this subsection, the Commission shall receive and give consideration to all reports that relate to the proposed facility by state agencies concerned with environmental protection; and if requested by any county or municipality in which the facility is proposed to be built, to local comprehensive plans that have been adopted pursuant to Article 3 (§ 15.2-2223 *et seq.*) of Chapter 22 of Title 15.2. Additionally, the Commission (a) shall consider the effect of the proposed facility on economic development within the Commonwealth . . . and (b) shall consider any improvements in service reliability that may result from the construction of such facility.

Code § 56-46.1 B further provides, in part, that:

> As a condition to approval the Commission shall determine that the line is needed and that the corridor or route chosen for the line will avoid or reasonably minimize adverse impact to the greatest extent reasonably practicable on the scenic assets, historic resources recorded with the Department of Historic Resources [("DHR")], and environment of the area concerned. To assist the Commission in this determination, as part of the application for Commission approval of the line, the applicant shall summarize its efforts to avoid or reasonably minimize adverse impact to the greatest extent reasonably practicable on the scenic assets, historic resources recorded with [DHR], and environment of the area concerned.

In addition, the Code requires consideration of existing right-of-way when siting transmission lines. Code § 56-46.1 C provides that "[i]n any hearing the public service company

[104] Code §§ 56-265.2 A 1 and 56-46.1 J.

shall provide adequate evidence that existing rights-of-way cannot adequately serve the needs of the company." In addition, Code § 56-259 C provides that "[p]rior to acquiring any easement of right-of-way, public service corporations will consider the feasibility of locating such facilities on, over, or under existing easements of rights-of-way."[105]

The Virginia Environmental Justice Act ("VEJ Act") sets forth that "[i]t is the policy of the Commonwealth to promote environmental justice and ensure that it is carried out throughout the Commonwealth, with a focus on environmental justice communities and fenceline communities."[106] As previously recognized by the Commission,[107] the Commonwealth's policy on environmental justice is broad, including "the fair treatment and meaningful involvement of every person, regardless of race, color, national origin, income, faith, or disability, regarding the development, implementation, or enforcement of any environmental law, regulation, or policy."[108]

DISCUSSION

Section I of this Discussion applies the above Code provisions to the Rebuild Project, but does not address the prudence of Dominion's proposed 230 kV underbuild. Section II analyzes the prudence of the proposed 230 kV underbuild.

I. Rebuild Project

A. Need for a Rebuild

Dominion identified system reliability needs supporting a rebuild of Line #574, which the Company and PJM evaluated under the Company's end-of-life transmission planning criteria. These planning criteria direct the Company to "either replac[e] ...facilities with in-kind infrastructure that meets current Dominion ... standards or employ[] an alternative solution to ensure the Dominion ... transmission system satisfies all applicable reliability criteria" if (1) a "[f]acility is nearing, or has already passed, its end of life;" and (2) "[c]ontinued operation risks negatively impacting reliability of the transmission system."[109] The end-of-life planning criteria further specify, among other things, that "[t]he reliability impact of continued operation of a facility will be determined based on a planning power flow assessment and operational

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[105] The conclusion in the Staff Report indicates Code § 56-585.1 A 6 requires environmental justice considerations in this case. Ex. 11 (Staff Report) at 21-22. Regardless of the applicability of this rate adjustment clause statute to a transmission line application, the Commission has broad discretion to determine what the public convenience and necessity requires.

[106] Code § 2.2-235.

[107] *See, e.g., Application of Appalachian Power Company, For approval and certification of the Central Virginia Transmission Reliability Project under Title 56 of the Code of Virginia,* Case No. PUR-2021-00001, Doc. Con. Cen. No. 210920108, Final Order at 14 (Sept. 9, 2021); *Commonwealth of Virginia, ex rel. State Corporation Commission, Ex Parte: Establishing 2020 RPS Proceeding for Virginia Electric and Power* Company, Case No. PUR-2020-00134, Doc. Con. Cen. No. 210440236, Final Order at 25 (Apr. 30, 2021); *Commonwealth of Virginia, ex rel. State Corporation Commission, In re: Virginia Electric and Power Company's Integrated Resource Plan filing pursuant to Va. Code § 56-597 et seq.*, Case No. PUR-2020-00035, Doc. Con. Cen. No. 210210007, Final Order at 14-15 (Feb. 1, 2021).

[108] Code § 2.2-234.

[109] *See, e.g.*, Ex. 2 (Appendix) at 3.

performance considerations."[110] The operational performance test under this standard is "based on input from PJM and/or Dominion Energy System Operations as to the impact on reliably operating the system without the facility."[111] Staff concurred that Dominion met both metrics of its end-of-life transmission planning criteria.[112]

I find that the record establishes that the relevant structures for Line #574, which are primarily single-circuit COR-TEN® steel lattice towers constructed in 1966, are approaching the end of their useful service lives.[113] The record also demonstrates system reliability risks if Line #574 is not in service. More specifically, system reliability would be diminished because Line #574 is an integral component of Dominion's 500 kV network, which is the backbone of Dominion's transmission system. Additionally, removal of the line would negatively impact the deliverability of generation, including some facilities recently placed into service.[114] Generation projects that have received a CPCN from the Commission also depend on Line #574 being in-service and/or rebuilt to a higher capacity.[115]

I find that the Company has demonstrated reliability needs that justify a transmission system project to address the aging infrastructure on Line #574.[116]

B. Cost

The Company estimates the total cost of the proposed Rebuild Project is approximately $92.2 million. Without the underbuild, Dominion estimated the total cost of the Rebuild Project is approximately $71.9 million.[117] Both of these totals include an estimate of $11.4 million for station work.[118]

C. Route and Environmental Impact

The areas traversed by the existing transmission line right-of-way are mostly agricultural and forested, with some developed land.[119] The Rebuild Project would use the existing

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[110] *Id.* at 4.
[111] *Id.* at 5.
[112] Ex. 11 (Staff Report) at 5-6.
[113] *See, e.g.,* Ex. 2 (Appendix) at 4, 29-61; Ex. 11 (Staff Report) at 4-5.
[114] Ex. 2 (Appendix) at 15.
[115] *Id.* at 5 (citing *Application of Pleinmont Solar, LLC, et al., For certificates of public convenience and necessity for a 500 MW solar generating facility in Spotsylvania County pursuant to §§ 56-46.1 and 56-580 D of the Code of Virginia,* Case No. PUR-2017-00162, 2018 S.C.C. Ann. Rep. 310, Order Granting Certificates (Aug. 8, 2018); *Application of Skipjack Solar Center, LLC et al., For certificates of public convenience and necessity for solar generating facilities totaling up to 320 MWac in Charles City County, Virginia,* Case No. PUR-2019-00073, 2020 S.C.C. Ann. Rep. 262, Order Granting Certificates (Mar. 5, 2020)); Ex. 11 (Staff Report) at 6.
[116] The Rebuild Project would also change the interconnection locations of Lines #574 and #568 at the Ladysmith Station to improve reliability for the North Anna Power Station. Ex. 2 (Appendix) at 7, 22.
[117] *Id.* at 26.
[118] *See, e.g.,* Ex. 11 (Staff Report) at 17. The station work estimate includes $7.7 million at the Elmont Station and $3.7 million at the Ladysmith Station. *Id.* The estimated cost to swap the interconnection locations of Lines #568 and #574 at the Ladysmith Station to accommodate Dominion's "hybrid backbone" restoration strategy is approximately $1.4 million. Ex. 11 (Staff Report) at 14-15 and Appendix A (Dominion's response to Staff request 3-10).
[119] *See, e.g.,* Ex. 2 (Appendix) at 186.

transmission right-of-way occupied by Line #574 and Company-owned property.[120] The Rebuild Project largely involves structure-for-structure replacements. The only two additional structures would be located at the Ladysmith and Elmont Stations.[121]

The primary impacts associated with the Rebuild Project are visual. Dulled galvanized steel structures and triple-bundled conductors would replace structures that are predominantly weathering steel and twin-bundled conductors.[122] As illustrated in the Attachment to this Report, all but one of the new structures for Line #574 would be taller than the existing structures to be replaced.[123] Based on the preliminary design of the Rebuild Project, the new structures would be approximately 32% taller, on average, than the existing structures for Line #574.[124] If the underbuild design is not used, the new structures would be approximately 23% taller, on average, than the existing structures.[125]

DHR anticipates a moderate visual impact to two historic resources that may warrant mitigation.[126] The Application includes visual simulations of the impacts for these two resources, which are: (1) Cool Water, Ridge Road; and (2) North Anna Battlefield.[127] The existing transmission line right-of-way crosses through these properties.[128] For the Cool Water property, two proposed structures would be more visible than the existing structures and an additional structure would become visible from certain locations on the property.[129] Additionally, the Cool Water property is one of five properties for which VOF holds open-space easements within 1.5 miles of the Rebuild Project.[130]

The Rebuild Project crosses 11 named perennial streams and rivers, including the North Anna and South Anna Rivers.[131] The Rebuild Project involves no instream work.[132]

While the heights of the replacement structures within the existing right-of-way will vary from the existing structures, including many substantial increases, the associated environmental impacts would be mostly, if not entirely, incremental given the present impacts of the existing structures. Based on the record of this case – including, but not limited to, the preliminary design heights, visual simulations, photographs of existing structures, and the Rebuild Project's

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[120] *Id.* at 64.
[121] *See, e.g.*, Ex. 2 (Appendix) at 120, 128 and Attachment 2.D.1 (C2 Environmental Report), p. 11, 41.
[122] *See, e.g.*, Ex. 2 (Appendix) at 22.
[123] The structure heights used to create this Attachment are from the Application. Ex. 2 (Appendix) at 116-19. Dominion expects the height of the two new structures supporting Line #568 to be comparable to the one structure that would be replaced for this line. *Id.* at 119.
[124] *Id.* (146-111)/111=31.5%.
[125] *Id.* at 115. (136-111)/111=22.5%.
[126] *See* Ex. 2 (Appendix) at Attachment 2.H.2 (C2 Environmental Report) at 4, 127-28; Ex. 13 (DEQ Report) at DHR Attachment; Tr. at 18 (Crabtree).
[127] *See* Ex. 2 (Appendix) at 149, 155, 158, 161, 164.
[128] *Id.* at 70 (designated as HAN-VOF-2872 on the map) and Attachment 2.H.2 (C2 Environmental Report), p. 83.
[129] Ex. 2 (Appendix) at 163-64 and Attachment 2.H.2 (C2 Environmental Report) at 83-98.
[130] *See, e.g.*, Ex. 13 (DEQ Report) at 22. Several of VOF's easements are adjacent to, or near, Scotchtown Road in Hanover County. Ex. 2 (Appendix) at 89.
[131] Ex. 2 (Appendix) at 187. The North Anna and South Anna Rivers are qualified state scenic rivers that have not yet been designated by DCR. *Id.* at 263.
[132] *See, e.g.*, Ex. 14 (Studebaker rebuttal) at 3.

exclusive use of existing right-of-way – I conclude that the route of the Rebuild Project would avoid or reasonably minimize adverse impact to the greatest extent reasonably practicable on the scenic assets, historic districts, and environment of the area concerned.

I also note that the engineering reason for increased structure heights is that the present-day clearance standards of the National Electrical Safety Code differ from the clearance standards when the existing transmission line was constructed.[133] Several projects to rebuild 500 kV electric transmission lines of a vintage similar to Line #574 have been approved by the Commission for construction with taller structures to meet present-day clearance standards.[134]

I also conclude that there are no adverse environmental impacts that should prevent the construction of the Rebuild Project. Dominion should be required to obtain all necessary environmental permits and approvals that are needed to construct and operate the Rebuild Project.

D. Dulled Structures

The estimated incremental costs to dull the proposed double-circuit structures and the single-circuit structures are $1.7 million and $0.9 million, respectively.[135] Based on the record in this proceeding, including the visual impact of the Rebuild Project, and incremental cost, I find that using dulled structures is reasonable.

E. DEQ Report

Dominion opposed the following recommendations from the DEQ Report:

- DCR's recommendation to coordinate with the US FWS to ensure compliance with protected species legislation;
- DWR's recommendation to coordinate with the National Oceanic and Atmospheric Administration on potential project impacts on the Atlantic sturgeon;
- DCR's recommendation to develop and implement an invasive species plan to be included as part of the maintenance practices for the right-of-way;
- DWR's recommendation that Dominion conduct significant tree removal or tree clearing activities outside of the primary songbird nesting season of March 15 through August 15; and

[133] Tr. at 17 (Crabtree).
[134] *See, e.g., Application of Virginia Electric and Power Company, For approval and certification of electric transmission facilities: Bristers-Chancellor Line #552 and Chancellor-Ladysmith Line #581 500 kV Transmission Line Rebuild and Related Projects,* Case No. PUR-2020-00080, Doc. Con. Cen. No. 210210310, Final Order (Feb. 11, 2021).
[135] Ex. 6 (Company-PE-3).

- DEQ's recommendation to consider developing an effective Environmental Management System.

Dominion witness Studebaker asserted that the first two recommendations shown above are unnecessary because the Rebuild Project involves no instream work.[136] For the Atlantic sturgeon recommendation, the DEQ Report indicated that the South Anna River has been designated a Threatened and Endangered Species Water due to the presence of the Atlantic sturgeon,[137] and that the South Anna River, North Anna River, and Little River have been designated Confirmed Anadromous Fish Use Areas.[138] However, the Atlantic sturgeon did not appear in the results of a database search that the Company conducted to identify threatened and endangered species in the Rebuild Project area.[139] Additionally, Ms. Studebaker indicated that the location of the Rebuild Project in the upper reaches of the York River Watershed does not provide suitable habitat for the Atlantic sturgeon.[140]

Dominion witness Studebaker recognized that the Commission has rejected the other three recommendations shown above in several recent proceedings and offered reasons why such rejections were appropriate.[141] She further committed that Dominion would: (1) conduct a survey if significant tree and/or ground clearing activities are required during the primary songbird nesting season; and (2) coordinate with DWR to create appropriate construction restrictions in the event songbird nesting colonies are found during the Company survey.[142]

I agree with Dominion that the first two recommendations shown above are unnecessary. This finding recognizes not only the route of the Rebuild Project and lack of instream work, but also that Dominion would be required to obtain all necessary environmental permits and approvals needed to construct and operate the Rebuild Project. Any requirements of federal, state, or local environmental law would be unaffected by Commission rejection of these two recommendations.

I find that that rejection of the remaining recommendations to which Dominion objects is consistent with Commission precedent.[143] I also find it reasonable, and consistent with Commission precedent, for Dominion to conduct a survey in the event significant clearing

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[136] Ex. 14 (Studebaker rebuttal) at 3, 5.
[137] The DEQ Report indicated that the dwarf wedgemussel is also present in the South Anna River. Ex. 13 (DEQ Report) at 21.
[138] *Id.* The right-of-way crosses these three rivers. Ex. 2 (Appendix) at 187.
[139] Ex. 14 (Studebaker rebuttal) at 5; Ex. 2 (DEQ Supplement) at Attachment 2.F.1, pp. 36-37.
[140] Ex. 14 (Studebaker rebuttal) at 5.
[141] *Id.* at 4-6.
[142] *Id.* at 6.
[143] *See, e.g., Fudge Hollow-Low Moor Order*, 2019 S.C.C. Ann. Rep. at 267; *Evergreen Mills Order*, 2020 S.C.C. Ann. Rep. at 360; *Loudoun-Ox Order*, 2020 S.C.C. Ann. Rep. at 309; *Lockridge Loop Order*, 2020 S.C.C. Ann. Rep. at 393-94 (orders rejecting similar invasive species recommendations). *See, e.g., Landstown-Thrasher Order*, 2018 S.C.C. Ann. Rep. at 464; *Loudoun-Ox Order*, 2020 S.C.C. Ann. Rep. at 310; *Application of Virginia Electric and Power Company, For approval and certification of electric transmission facilities: Lanexa-Northern Neck 230 kV Line #224 Rebuild and new 230 kV Line #2208*, Case No. PUR-2020-00247, Doc. Con. Cen. No. 211210030, Final Order at 9-10 (Dec. 2, 2021) ("*Lanexa-Northern Neck Order*") (orders directing conditional coordination, rather than similar songbird nesting recommendations); *See, e.g., Allied-Chesterfield Order* at 8; *Lanexa-Northern Neck Order* at 10 (orders rejecting similar environmental management system recommendations).

activities are required during the primary songbird nesting season and to coordinate with DWR to create appropriate construction restrictions if songbird nesting colonies are found.[144]

Accordingly, I recommend that Dominion comply with the summary recommendations of the DEQ Report, except for the five recommendations to which Dominion objected.

Dominion witness Studebaker also offered an alternative to the Department of Health's recommendation that wells within a 1,000-foot radius from the Rebuild Project site should be field marked and protected from accidental damage during construction. Since all such wells are on private property, she indicated that Dominion is unable to mark them as recommended, but would instead plot and call out the wells on erosion and sediment control plans.[145]

I find it reasonable for Dominion to mark and call out on erosion and sediment control plans any wells located within 1,000 feet of the Rebuild Project site.

F. Environmental Justice

Dominion asserted that it researched the demographics of the communities surrounding the Rebuild Project using 2020/2025 ESRI Updated Demographics, HUD's Tribal Directory Assessment Tool, and EPA's EJScreen, from which Dominion identified populations within the study area that meet the VEJA threshold to be defined as "environmental justice communities" ("EJ Communities"). The Company further asserted that the Rebuild Project will be constructed entirely within existing right-of-way and will not require additional permanent or temporary right-of-way, the construction of a temporary line, or an increase in operating voltage.[146] Citing Code §§ 56-46.1 C and 56-259 C, Dominion identified the "strong" statutory preference for using existing utility right-of-way, when feasible.[147] The Company does not anticipate disproportionately high or adverse impacts to the surrounding community and the EJ Communities located within the study area.[148] Staff concluded that the Rebuild Project does not appear to adversely impact any goal established by the VEJ Act.[149]

Based on the record, the Rebuild Project does not appear to adversely impact the goals established by the VEJ Act. Additionally, the Commission recently indicated its expectation that Dominion abide by the Company's environmental justice policy.[150]

G. Economic Development

The Rebuild Project will maintain transmission system reliability by replacing aging transmission line infrastructure that the evidence in this case demonstrates is needed for system reliability. As such, the Rebuild Project promotes economic development.

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[144] *See, e.g., Loudoun-Ox Order*, 2020 S.C.C. Ann. Rep. at 310; *Lanexa-Northern Neck Order* at 10.
[145] Ex. 14 (Studebaker rebuttal) at 7-8 and Rebuttal Sched. 1.
[146] Ex. 2 (Appendix) at 201.
[147] *Id.* Dominion also indicated FERC guidelines support this preference. *Id.*
[148] *Id.*
[149] Ex. 11 (Staff Report) at 20.
[150] *Lanexa-Northern Neck Order* at 13-15.

II. 230 kV Underbuild

Dominion proposed construction of the Rebuild Project with a 230 kV underbuild component, which Company witness Nedwick described as prudent utility practice that provides flexibility to address future power flow or stability issues.[151] If 500 kV structures (rather than 5-2 structures capable of carrying a future 230 kV line) are used for the Rebuild Project, Mr. Nedwick testified that the only way to add a 230 kV line between Ladysmith and Elmont Stations would be to: (1) wreck and rebuild the 500 kV structures (again), replacing the rebuilt 500 kV structures with 5-2 structures; or (2) use new right-of-way in an adjacent corridor.[152]

However, Staff concluded that it could not verify the need for the 230 kV underbuild component.[153] Staff believes that "the potential future benefits of the Company's proposed 5-2 [s]tructures must be weighed against the certainty of the immediate increases in cost and height."[154]

As discussed above, the record supports a finding that the environmental impact of the proposed Rebuild Project, if built using the taller 5-2 design, is acceptable under the Code.[155] Accordingly, while I agree with Staff that the Commission should consider the incremental height increases associated with using 5-2 structures instead of single-circuit structures,[156] the analysis below focuses on evidence of (A) comparative cost and (B) future need – both of which can be components of a prudence inquiry, in my view.[157]

A. Comparative Cost

Constructing the Rebuild Project with 5-2 structures that have an underbuild capable of accommodating a future 230 kV line (*i.e.*, Dominion's proposal) costs approximately $20.3 million more than constructing the Rebuild Project using single-circuit structures.[158] Dominion witness Nedwick asserted that "the appropriate high level cost/benefit analysis for the Commission to consider is whether to approve the expenditure of approximately $20.3 million now to approve the 5-2 [t]ower [d]esign or approve approximately $64-$81 million later…."[159]

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[151] *See, e.g.*, Ex. 15 (Nedwick rebuttal) at Rebuttal Sched. 1, pp. 1-2.

[152] *Id.* at 8. Dominion indicated that the new right-of-way would need to be relocated away from the existing corridor in areas to avoid impacts to existing homes. Ex. 11 (Staff Report) at Appendix A (Dominion's response to Staff request 2-8).

[153] *See, e.g.*, Ex. 12 (Malik surrebuttal) at 1.

[154] Ex. 11 (Staff Report) at 22.

[155] As shown by the *Dooms-Valley Order* block quote below, in Case No. PUR-2017-00114 (unlike the instant case) public commenters and a case participant recommended using shorter structures to mitigate environmental impacts.

[156] *See, e.g.*, Ex. 11 (Staff Report) at 12.

[157] There would be environmental impacts associated with the proposed Rebuild Project and the other two conceptual 230 kV line options presented by Dominion. Dominion's proposed 5-2 structures are ten feet taller, on average, than single-circuit structures. Ex. 2 (Appendix) at 115, 119; Ex. 11 (Staff Report) at 11. A future wreck and rebuild of a single-circuit structure Rebuild Project would involve, at a minimum, temporary construction impacts and impacts associated with increased structure heights. A 230 kV line in a new right-of-way would involve temporary and permanent environmental impacts. The extent of such impacts for the conceptual alternatives has not been analyzed in this case. *See, e.g.*, Ex. 15 (Nedwick rebuttal) at 9.

[158] Ex. 2 (Appendix) at 26; Ex. 11 (Staff Report) at 11.

[159] Ex. 15 (Nedwick rebuttal) at 9.

Mr. Nedwick's comparison of the incremental cost of the 230 kV underbuild ($20.3 million) to the low ($64 million) and high ($81 million) ends of his range are each discussed below.

In asserting that $20.3 million now should be compared to approximately $81 million later, Dominion estimated an approximately $80.8 million incremental cost if 5-2 structures capable of carrying a future 230 kV line are not used for the Rebuild Project, but the new structures are subsequently wrecked and rebuilt with 5-2 structures.[160] The $80.8 million amount excludes station work.[161] The exclusion of 500 kV station work appears appropriate because while the 500 kV line would have to be rebuilt (again) under this scenario, the 500 kV station work would not.[162] The exclusion of 230 kV station work also appears appropriate because the additional cost of such work would be incurred under any outcome in which 230 kV is later added. The $80.8 million incremental cost estimate for this outcome also excludes the cost of 230 kV conductor or related equipment,[163] which appears appropriate for an apples-to-apples comparison since such conductor and equipment would also have to be added to the Rebuild Project, if ultimately needed. Accordingly, Dominion's $80.8 million incremental cost estimate for the subsequent wreck-and-rebuild outcome appears reasonable to compare, at a high-level, against the $20.3 million incremental cost associated with the 230 kV underbuild component of the proposed Rebuild Project.[164]

In asserting that $20.3 million now should be compared to approximately $64 million later, Dominion estimated a $64.4 million incremental cost of constructing a new 230 kV line between the Ladysmith and Elmont Stations in new right-of-way adjacent to the existing right-of-way.[165] However, the $64.4 million estimate necessarily includes an estimated cost of 230 kV conductor and equipment,[166] while the $20.3 million estimated incremental cost of the Rebuild Project attributed to the 5-2 tower design does not.[167] Consequently, adding a cost of 230 kV conductor and equipment to the $20.3 million incremental cost that Dominion attributed to the taller 5-2 tower design, would appear a more appropriate total for comparison against Dominion's $64.4 million incremental cost estimate for a 230 kV line in a new right-of-way.[168] In other words, the comparison should not be $20.3 million now vs. $64.4 million later; it should be $20.3 million now plus another amount later (for a 230 kV line) vs. $64.4 million later. The record includes an estimated cost of $41.7 million to add the 230 kV line and breakers to the Rebuild Project,[169] although Dominion witness Nedwick cautioned that this is a planning level estimate that is not subject to the same rigor as the estimated costs presented in the Application.[170] Accordingly, the different rigor used to calculate the cost estimates, and the

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[160] *Id.* at 8-9. Mr. Nedwick recognized that timing delays could result in inflation differences. *Id.* at 8.
[161] *Id.* at 9.
[162] Tr. at 82 (Nedwick).
[163] *Id.*
[164] Ex. 15 (Nedwick rebuttal) at 9.
[165] *Id.* at 8-9. Mr. Nedwick recognized that timing delays could result in inflation differences. *Id.* at 8.
[166] Tr. at 82 (Nedwick).
[167] The $20.3 million figure is part of the cost of the Rebuild Project, which does not include 230 kV conductor or associated equipment. *See, e.g.*, Ex. 2 (Appendix) at 26; Ex. 15 (Nedwick rebuttal) at 3.
[168] If a 230 kV line between Elmont and Ladysmith is ultimately needed, 230 kV conductor and associated equipment, such as insulators, would need to be added on either: (i) the 230 kV underbuild (if approved); or (ii) separate structures, which would be required for a 230 kV line in a new right-of-way.
[169] Ex. 15 (Nedwick rebuttal) at Rebuttal Sched. 2.
[170] Tr. at 87 (Nedwick).

inclusion of breakers in the $41.7 million estimate, indicate that the cost estimates in the record may not allow for a high-level, apples-to-apples comparison of (1) the incremental cost of building the Rebuild Project as proposed now, then later adding a 230 kV line, if needed; with (2) the incremental cost of building a stand-alone 230 kV line. However, the record indicates these cost estimates are much closer than the $44 million difference suggested by Dominion.

In sum, a high-level cost comparison based on the record supports the following:

If a 230 kV line between the Elmont and Ladysmith Stations ***is not*** ultimately needed:

- Approval of the Rebuild Project with a 5-2 structure design, as proposed, would result in an approximately $20 million incremental cost.

- Approval of the Rebuild Project with single-circuit structures would result in estimated savings of approximately $20 million.

If a 230 kV line between the Elmont and Ladysmith Stations ***is*** ultimately needed:

- Approval of the Rebuild Project with a 5-2 structure design, as proposed, would result in estimated savings of: (1) approximately $60 million if Dominion otherwise would have had to wreck Line #574 a second time to rebuild it with 5-2 structures; or (2) far less than the approximately $44 million estimated by Dominion if the Company otherwise would have had to build a stand-alone 230 kV line.

- Approval of the Rebuild Project with single-circuit structures could result in an estimated incremental cost of: (1) approximately $60 million if Dominion must wreck Line #574 a second time and rebuild it with 5-2 structures; or (2) far less than the approximately $44 million estimated by Dominion if the Company must build a stand-alone 230 kV line.[171]

Put simply, the record of the instant case indicates that a more proactive approach to transmission infrastructure, as proposed with the 5-2 structures, risks unnecessary "upfront" costs, while a more conservative approach risks "back-end" costs that could have been avoided with upfront investment.

B. Future Need for 230 kV Between the Elmont and Ladysmith Stations

In its Application, Dominion described construction of the Rebuild Project with 5-2 structures as prudent utility practice that provides future flexibility to address stability issues.[172]

[171] Dominion witness Nedwick also testified that this scenario could result in a lower cost allocation to interconnecting generators. Ex. 15 (Nedwick rebuttal) at 5-6. At the customer level, cost responsibility could ultimately depend in part on how many of the relevant queued projects are developed by or for Dominion – a fact not in the record. Additionally, FERC has issued an advance notice of proposed rulemaking to consider possible changes to transmission cost allocation. 176 FERC ¶ 61,024.

[172] *See, e.g.*, Ex. 2 (Appendix) at 7.

Due to the transmission system's configuration and the large amount of generation located on the 230 kV system in the Rebuild Project area, system stability issues have been identified twice in the past five years.[173] Additionally, Mr. Nedwick sponsored a list of 62 generation projects that are active in the PJM queue and that, if constructed, would interconnect within five buses of the Elmont or Ladysmith Stations.[174] He asserted that these queued resources – which total more than 9,450 MW (energy)[175] – are electrically close enough to impact dynamic performance of generation units at the Ladysmith Station and the Company's Four Rivers Substation.[176] Mr. Nedwick concluded that given prior stability issues in this area, if a combination of the queued generation projects are built and interconnected, another stability issue would likely arise and, if so, the only likely solution would be to build additional transmission facilities.[177] Accordingly, Dominion's conclusion that a 230 kV line between the Elmont and Ladysmith Stations will likely be needed in the future for stability is based on Dominion's judgment, given prior stability issues in the area and the extent of generation in PJM's queue. This conclusion is not based on modeling results that specifically identify such a need.

Staff witness Malik observed that "[w]hile the Company references the general presence of several interconnection requests in the PJM [g]eneration [q]ueue and historical stability issues within the Rebuild Project area, the Company has not identified any specific anticipated need that would support constructing the 230 kV underbuild."[178] Mr. Malik also identified the 2018 *Dooms-Valley Order* that rejected the use of 5-2 structures in a case Mr. Malik indicated was similar to the instant case.[179]

The *Dooms-Valley Order* stated in part as follows:

> The Commission does not find, however, that the public convenience and necessity requires approval of the taller 5-2 Structures with capability for a 230 kV underbuild. First, we note that Dominion does not assert that the 230 kV underbuild is currently needed. Indeed, the Company acknowledges that "the need to install" a 230 kV underbuild has not been established in the instant proceeding. Furthermore, although Dominion discussed future "scenarios" that could support an underbuild, the Company has not established a reasonable estimate as to when the 230 kV underbuild would be needed during the expected 60-year service life of these facilities. Rather, Dominion seeks 230 kV underbuild capability "for changes that may occur" related to "as of yet unknown, electrical needs."
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> The Hearing Examiner explained that, in response to Dominion's request,

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[173] *Id.* at 5-6.
[174] Ex. 3 (Errata for Attachment I.A.3); Ex. 2 (Appendix, Executive Summary) at i.
[175] Ex. 3 (Errata for Attachment I.A.3) at final line (showing totals of 11,116.4 MW maximum facility output; 9,543.6 MW energy; and 7,293.8 MW capacity).
[176] Ex. 2 (Appendix) at 7. The five-bus distance from the Elmont or Ladysmith Stations includes most of Dominion's 500 kV transmission system, but is a much smaller electrical footprint for Dominion's 230 kV system. Tr. at 28-32 (Nedwick).
[177] Ex. 2 (Appendix) at 7.
[178] Ex. 11 (Staff Report) at 11.
[179] *Id.* at 11-12 (discussing the *Dooms-Valley Order*").

> "numerous public commenters, including most notably the [Augusta County Board of Supervisors ('Augusta Board')], have expressed a preference for the use of shorter towers with a less significant visual impact." The Hearing Examiner also noted that "DHR has concluded that the 5-2 Structures will have a moderate detrimental impact upon several historic properties." In this regard, DHR specifically recommends avoidance, minimization, and/or mitigation of that detrimental impact. The Meyer Trust, which owns one of those historic properties (i.e., Belvidere Farm), further "submits that the impact of the towers can be mitigated, in part, by reducing their height to only what is necessary to accommodate the applied for 500 kV transmission line...."
>
> The Company, however, argues that the Commission has previously approved 230 kV underbuild capability and should likewise do so here. Dominion posits that, "[w]eighed appropriately," the benefits of the taller structures exceed the negative impacts. Dominion "requests the Commission therefore strike the appropriate balance and approve the double circuit structures proposed in the Application." In this regard, the Commission has balanced the Company's arguments supporting the 230 kV underbuild capability against the impacts of the taller structures, and we conclude that Dominion's request is not in the public interest and is not required by the public convenience and necessity.[180]

On rebuttal, Dominion witness Nedwick expanded Dominion's rationale for a future 230 kV line between the Elmont and Ladysmith Stations beyond potential stability issues. He provided an excerpt from a PJM system impact study report for a generation project in PJM's queue that lists nine projects in PJM's AG1 queue with an identified need for a 230 kV line to be constructed on the vacant underbuild arms of the 5-2 towers for the Rebuild Project.[181] The need identified in PJM's studies was based on thermal violations projected by load flow modeling.[182] Mr. Nedwick testified that "the driver for the need of the 230 kV Underbuild Circuit is the AG1Queue Projects."[183] He indicated that the earliest projected in-service date for one of these AG1 queue projects is June 2023.[184] He testified that once any queue project with an identified need for this 230 kV line executes an ISA[185] with PJM and Dominion, Dominion has an obligation to use its best efforts to obtain Commission approval to build the 230 kV line.[186]

However, none of the nine AG1 projects identified by Dominion witness Nedwick have completed PJM's study process and three of these projects have already withdrawn from the queue.[187] Mr. Nedwick recognized the reason the study process is not yet completed is that

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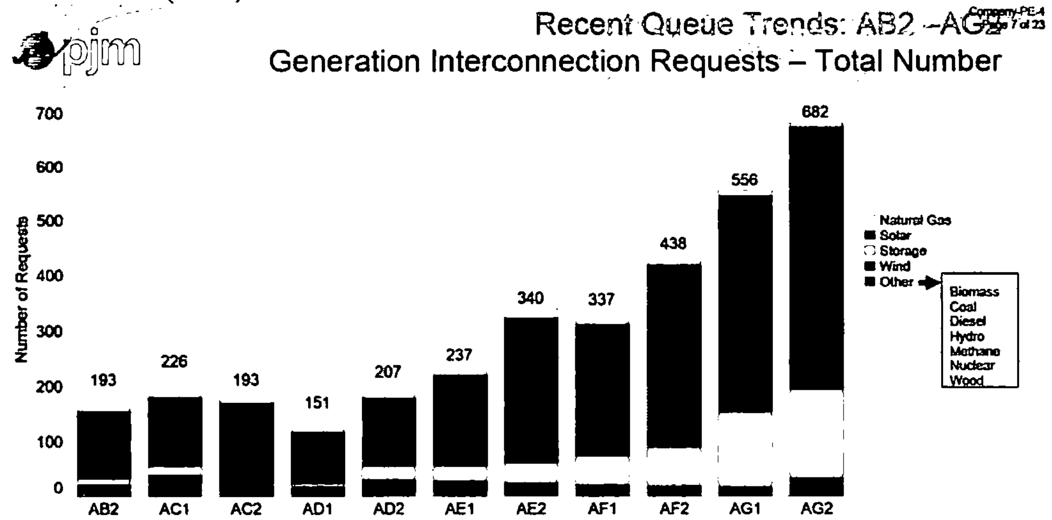
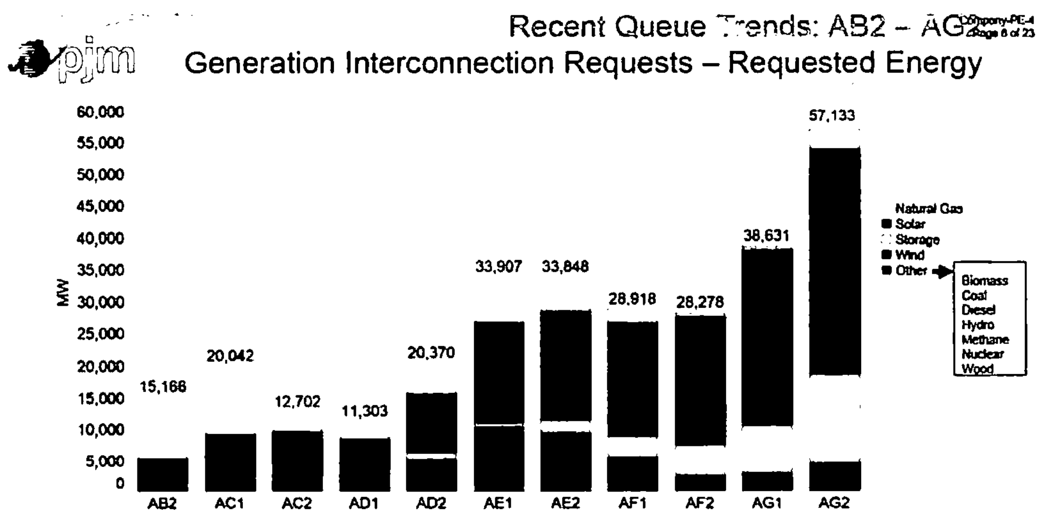
[180] *Dooms-Valley Order* at 260 (footnotes omitted).
[181] Ex. 15 (Nedwick rebuttal) at 6 and Rebuttal Sched. 2.
[182] Tr. at 37 (Nedwick).
[183] Ex. 15 (Nedwick rebuttal) at 7.
[184] *Id.*
[185] As defined above, an ISA is a PJM Interconnection Service Agreement.
[186] Ex. 15 (Nedwick rebuttal) at 7.
[187] Ex. 12 (Malik surrebuttal) at 3.

PJM's queue "is in the middle of a temporary pause as PJM tries to clear its current backlog" of queue projects.[188]

PJM charts and a map in the record help illustrate why PJM's queue currently has a "backlog." Generation (including storage) developers have recently flooded PJM's interconnection queue, where the impacts on the transmission system of each potential generator must be studied by PJM to determine, among other things, what upgrades to the transmission network are required to accommodate interconnection. The two charts below illustrate the increase of generation – largely solar – that entered PJM's queue from November 2015 (AB2) through March 2021 (AG2).[189]





Of the 57,133 MW (energy) in PJM's AG2 queue alone – as identified in the bar on the far right of the above charts – 17,578 MW (energy) is attributed to Virginia.[190]

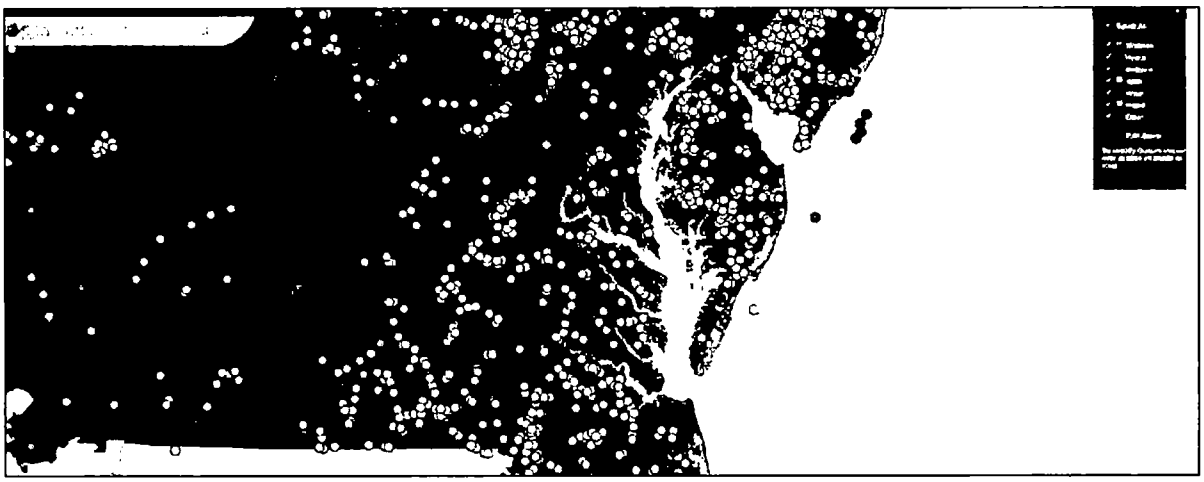
[188] Ex. 15 (Nedwick rebuttal) at 7.
[189] Ex. 16 (Company PE-4) at 5, 7-8.
[190] *Id.* at 12.

The above charts also show that, prior to the AG2 queue (the bars to the left of AG2 above), a significant amount of generation had already entered PJM's queue and still remains pending. Dominion's Application identified 62 active generation projects with queue positions preceding the AG2 queue[191] and that could impact existing generation located within five buses of the Ladysmith or Elmont Stations.[192] Of these 62 projects, 58 are renewable.[193] These projects represent an additional 11,116 MW (maximum facility output) or 9,543 MW (energy) in total.[194]

Panning all the way out, Dominion witness Nedwick testified that in the entire Dominion Zone, there are over 60,000 MW (maximum facility output) of potential new generation resources, most of which is renewable.[195] He testified that the utility industry is undergoing a fundamental transition to a renewable (carbon free) resource mix and that the Commonwealth's implementation of the VCEA is underway.[196] The map below is a PJM illustration of how many queued renewable resources are pending across Virginia.[197]

PJM Renewable Queue Projects in Virginia

Company-PE-6
Page 1 of 1



In Mr. Nedwick's view, "it can be reasonably expected in the near future that the transition to a carbon-free energy resource mix will drive the need of a new 230 kV [c]ircuit" between the Elmont and Ladysmith Stations.[198]

For a new generation development that enters PJM's queue, PJM evaluates and identifies the facilities needed to interconnect the generator physically and electrically to the system. There may also be transmission system improvements needed for the existing transmission network to handle the injection of additional generation. A future 230 kV line, as described by Dominion's Application, would fit within this latter category of network upgrades.[199]

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[191] Ex. 3 (Errata for Attachment I.A.3).
[192] Ex. 2 (Appendix) at 7.
[193] Ex. 15 (Nedwick rebuttal) at 4. Mr. Nedwick includes batteries as renewable. *Id.* at 9-10.
[194] Ex. 3 (Errata for Attachment I.A.3).
[195] Ex. 15 (Nedwick rebuttal) at 9-10.
[196] *Id.* at 9.
[197] Ex. 18 (Company PE-6).
[198] Ex. 15 (Nedwick rebuttal) at 10.
[199] *See, e.g.*, Ex. 15 (Nedwick rebuttal) at Rebuttal Sched. 2.

A legally significant milestone in a generation developers' willingness to pursue construction within PJM is the developer's execution of an ISA after the study process is completed. By executing an ISA, the generation developer agrees to become responsible for applicable transmission interconnection and network upgrade costs identified in PJM's studies.[200] The execution of an ISA also triggers an obligation by the transmission owner (*e.g.*, Dominion) to use its best efforts to obtain any necessary regulatory approvals to build such transmission interconnection and network upgrade facilities according to the proposed in-service dates provided in the respective ISAs.[201] Most of the generators that execute PJM ISAs construct their facilities.[202]

Significantly, PJM studies the impact each queued generation project would have on the transmission system based on the date projects entered the queue. When a new generation project is ready to be studied, PJM (when not paused) analyzes it assuming active generation projects that entered the queue previously are in service and operating.[203]

The primary basis for Dominion's assertion that a 230 kV line between the Elmont and Ladysmith Stations will be needed in the future is that when PJM studies some combination of the potential generation in PJM's queue (depicted by all the dots in the above map) at least one such completed study will identify the need for such a line and the developer will decide to move forward with construction. More specifically, Dominion witness Nedwick testified that "the driver for the need of the 230 kV Underbuild Circuit is the AG1 Queue Projects,"[204] which have not yet completed the study process. While Mr. Nedwick recognized that the identified need for upgrades could go away as PJM clears its study backlog and as projects in AG1 and earlier queues withdraw, he also pointed out that 1,200 generation projects in the regional queues after AG1 have not yet begun the study process.[205]

Based on record evidence of the current magnitude of queued generation and the way PJM conducts its studies, I find there is a reasonable likelihood that generation PJM determines needs a 230 kV line between the Elmont and Ladysmith Stations will execute an ISA, thereby triggering the obligation for Dominion to use its best efforts to obtain Commission approval of such a 230 kV line.[206] As illustrated by the above charts and map, there is a staggering amount of unconstructed generation in PJM's queue that PJM's studies can assume are constructed and operating for purposes of determining whether transmission network upgrades are needed. Six projects active in PJM's AG1 queue have an identified need for a 230 kV line to be constructed on the vacant underbuild arms of the 5-2 towers for the Rebuild Project, although the study process is not yet completed for these projects.[207] Even if none of the six active AG1 projects signs an ISA, an unprecedented wave of AG2 projects is waiting to start the study process.[208]

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[200] *See, e.g.*, Tr. at 79-81 (Nedwick).
[201] Ex. 15 (Nedwick rebuttal) at 7.
[202] *See, e.g.*, Ex. 16 (Company-PE-4) at 14; Ex. 12 (Malik surrebuttal) at 2.
[203] *See, e.g.*, Tr. at 37 (Nedwick).
[204] Ex. 15 (Nedwick rebuttal) at 7. Mr. Nedwick testified that the relevant PJM studies identified thermal violations. Tr. at 37 (Nedwick).
[205] Tr. at 72-73 (Nedwick).
[206] Ex. 15 (Nedwick rebuttal) at 7.
[207] *Id.* at 6 and Rebuttal Sched. 2; Ex. 12 (Malik surrebuttal) at 3.
[208] *See, e.g.*, Ex. 16 (Company PE-4) at 7-8; Tr. at 78 (Nedwick).

However, I find this evidence only indicates there may be a future need. The potential for stability or thermal issues, as explained by Dominion, is driven by generation projects in PJM's queue. But not all of the generation projects in PJM's queue can or will be built. By the time of the hearing, three of the nine relevant AG1 projects had already withdrawn from PJM's queue.[209] Indeed, historically 79% of projects that enter PJM's queue do not become operational,[210] although the historic drop-out percentage decreases to 55% at the phase in which the six remaining AG1 projects are paused.[211] The fact that PJM's interconnection study process assumes undeveloped generation is operational in studies for later queues adds a level of uncertainty regarding transmission system needs.[212] And such additional uncertainty could be significant with the unprecedented magnitude of generation that the record indicates is currently in PJM's queue. While most of these projects are renewable, I note that one of the largest queued generators identified in the record is the Chickahominy Power Station, which obtained a CPCN in 2018 but has not yet been constructed.[213]

There is also no immediate need for all 60,000 MW of potential generation that is currently in the queue in the Dominion transmission zone.[214] Undoubtedly, the VCEA incentivizes generation – renewable generation in particular – and generation resources will continue to be added to Dominion's system. However, Dominion's mandatory renewable portfolio standard escalates gradually over a 25-year period culminating in 2045 using percentages tied to Dominion's energy load.[215] The cumulative amount of renewable generation (construction, acquisition, or purchase) the VCEA directs Dominion to petition for Commission approval is 16,100 MW, by December 31, 2035.[216] Additionally, Dominion's peak load has recently been around 20,000 to 21,000 MW.[217] In other words, the amount of generation currently in the queue far outstrips Dominion's near-term compliance obligations under the VCEA and system requirements.

I do not doubt that integrating large amounts of new renewable generation at the scale contemplated by the VCEA will require additional transmission infrastructure. But the needs of the transmission system depend in part on the location, output, and timing of new resources. The challenge of predicting where and when new transmission infrastructure will likely be needed requires, in my view, more certainty than the record provides for a potential future 230 kV line that Dominion has not proposed in this case. Should Dominion propose such a line in the future based on generator interconnection modeling studies, the extent to which unconstructed

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[209] Ex. 17 (Company PE-5); Ex. 12 (Malik surrebuttal) at 3.

[210] *See, e.g.*, Tr. at 54-55 (Nedwick); Ex. 16 (Company PE-4) at 14; Ex. 12 (Malik surrebuttal) at 2. Dominion believes that the fundamental shift towards renewables will lead to the construction of queued generation at a percentage higher than the historic level. Tr. at 65 (Nedwick).

[211] *See, e.g.*, Ex. 12 (Malik surrebuttal) at 2-3; Tr. at 56, 66 (Nedwick). 1,009 projects that reached in-service milestone/2,228 projects that reached facilities study phase = 45.3%. Three of these remaining projects are solar facilities and the other three are storage facilities. *See, e.g.*, Ex. 17 (Company PE-5).

[212] *See, e.g.*, Tr. at 37, 72-73 (Nedwick).

[213] Ex. 3 (Corrected Attachment I.A.3); Tr. at 33 (Nedwick). *See Application of Chickahominy Power, LLC, For certification of an electric generating facility in Charles City County pursuant to § 56-580 D of the Code of Virginia*, Case No. PUR-2017-00033, 2018 S.C.C. Ann. Rep. 209, Final Order (May 8, 2018).

[214] Ex. 15 (Nedwick rebuttal) at 9-10.

[215] Code § 56-585.5 C.

[216] Code § 56-585.5 D 2.

[217] Tr. at 71 (Nedwick).

generation influences modeling results could warrant scrutiny. The execution of an ISA by a generation developer that requires a public utility to propose a transmission network upgrade is an initiating event; it does not preempt or predetermine the Commission's exercise of siting authority under the Code to evaluate the need asserted for such an upgrade.

Given the current uncertainties regarding the need for a 230 kV line between the Elmont and Ladysmith Stations, and the incremental cost associated with the 230 kV underbuild for the Rebuilt Project, I recommend the Commission approve single-circuit structures for the Rebuild Project unless the Company agrees to bear the incremental cost of 5-2 structures until the need for a 230 kV line is established. Dominion witness Nedwick expressed the Company's confidence that the need for a 230 kV line will materialize[218] and its expectation that such need will materialize in the near term.[219] A voluntary decision to not charge customers for 230 kV costs until and unless there is a demonstrated need for a 230 kV line would be consistent with such confidence.

While I recommend rejection (or conditional approval) of the 5-2 structures based on my balancing of the relevant record evidence – including evidence regarding cost, environmental impact, need, and the capability of a 230 kV underbuild – the Commission could weigh the evidence differently. I also recognize the Commission's authority to consider whether the VCEA's promotion of new generation resources affects the Commission's evaluation of transmission in the Commonwealth. The VCEA, enacted in 2020, and the extent of renewable generation that is currently in PJM's queue are new circumstances that have arisen since the 2018 *Dooms-Valley Order* rejected the use of 5-2 structures. Absent a demonstrated need for a 230 kV line, which Dominion did not propose in the instant case, the question for the Commission could be whether the public convenience and necessity requires more proactive transmission investment with incremental (cost and height) impacts and potential benefits. There are risks and potential benefits associated with conservative and more proactive approaches. From a cost perspective, as discussed above, the record of the instant case indicates that a more proactive approach risks unnecessary upfront costs, while a more conservative approach risks back-end costs that could have been avoided with upfront investment. The potential benefit of constructing the Rebuild Project with 5-2 structures is that this could "be a cost-effective and least impactful solution within the [right-of-way],"[220] as Staff recognized. Given the statutory preference for existing right-of-way, and based on the record, 5-2 structures appear to be a prudent type of transmission infrastructure if the Commission adopts a more proactive approach.

FINDINGS AND RECOMMENDATIONS

Based on applicable law and the record in this proceeding, I find that:

1. A transmission project to rebuild Line #574 and partially rebuild Line #568 is needed to address aging infrastructure and maintain transmission system reliability;

[218] Ex. 15 (Nedwick rebuttal) at 9 (indicating the 230 kV reliability solution is one "that we have every reason to believe, in our engineering judgment, will occur").
[219] *Id.* at 10.
[220] Ex. 12 (Staff Report) at 22.

2. The Rebuild Project would maximize the use of existing right-of-way;

3. The Rebuild Project, which will use dulled structures, would avoid or reasonably minimize adverse impact to the greatest extent reasonably practicable on the scenic assets, historic districts, and environment of the area concerned;

4. The unopposed recommendations in the DEQ Report should be adopted by the Commission as conditions of approval;

5. Dominion should coordinate with DWR to create appropriate construction restrictions in the event significant clearing activities occur and songbird nesting colonies are found during a Company survey of the Rebuild Project area;

6. Dominion should mark and call out on erosion and sediment control plans any well's location within 1,000 feet of the Rebuild Project site;

7. The Rebuild Project does not appear to adversely impact any goals established by the VEJ Act;

8. The Rebuild Project would support economic development;

9. The Application does not propose the construction of a 230 kV line, but does propose structures with an underbuild component that would be capable of carrying a future 230 kV line;

10. Compared to using single-circuit 500 kV structures, Dominion's proposal to use 5-2 structures capable of carrying a 500 kV and 230 kV line increases the cost of the Rebuild Project, from approximately $71.9 million to $92.2 million, and increases the average proposed structure height, from approximately 136 feet to 146 feet;

11. The record indicates that there may be a future need for a 230 kV line between the Elmont and Ladysmith Stations;

12. A more proactive approach to transmission infrastructure, as proposed with the 5-2 structures, risks unnecessary upfront costs, while a more conservative approach risks back-end costs that could have been avoided with upfront investment; and

13. The customer risk associated with unnecessary upfront costs could be mitigated by approving 500 kV single-circuit structures for the Rebuild Project unless the Company agrees to bear the incremental cost of 5-2 structures until the need for 230 kV is established in the future.

Accordingly, **I RECOMMEND** the Commission enter an order that:

1. ***ADOPTS*** the findings in this Report;

2. ***AUTHORIZES*** the Company to construct and operate the Rebuild Project using single-circuit structures, subject to the findings and conditions recommended herein;

3. ***ISSUES*** appropriate CPCNs for the Rebuild Project; and

4. ***DISMISSES*** this case from the Commission's docket of active cases.

COMMENTS

Staff and parties are advised that, pursuant to Rule 5 VAC 5-20-120 C of the Commission's Rules of Practice and Procedure and Code § 12.1-31, any comments on this Report must be filed on or before March 2, 2022. In accordance with the directives of the Commission's *COVID-19 Electronic Service Order*[221] the parties are encouraged to file electronically. If not filed electronically, an original and fifteen (15) copies must be submitted in writing to the Clerk of the Commission, c/o Document Control Center, P.O. Box 2118, Richmond, Virginia 23218. Any party filing such comments shall attach a certificate to the foot of such document certifying that copies have been sent by electronic mail to all counsel of record and any such party not represented by counsel.

Respectfully submitted,

D. Mathias Roussy, Jr.
Hearing Examiner

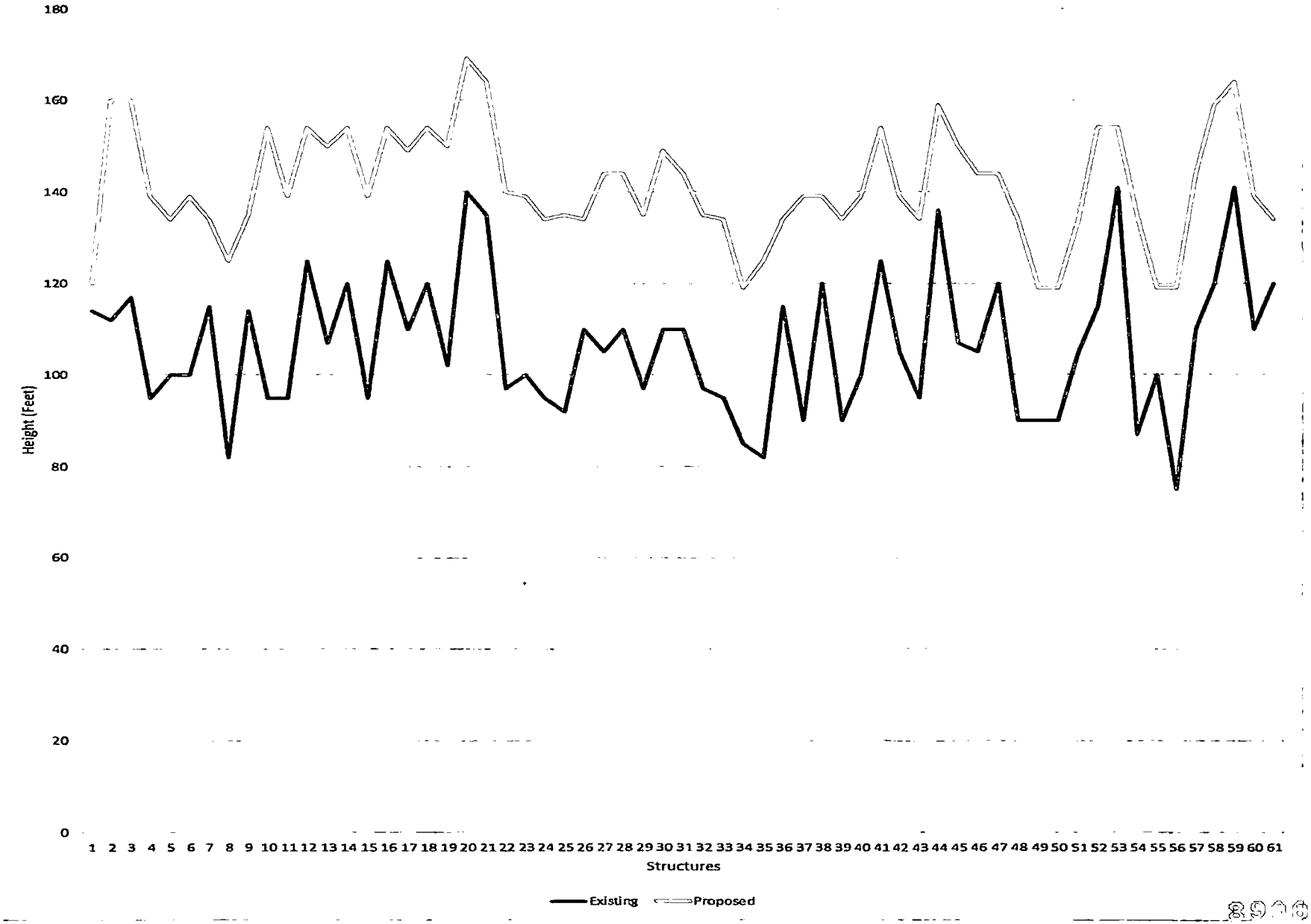
Document Control Center is requested to send a copy of the above Report to all persons on the official Service List in this matter. The Service List is available from the Clerk of the State Corporation Commission, c/o Document Control Center, 1300 East Main Street, Tyler Building, First Floor, Richmond, VA 23219.

[221] *Commonwealth of Virginia, ex rel State Corporation Commission, Ex Parte: Electronic service among parties during COVID-19 emergency*, Case No. CLK-2020-00007, Doc. Con. Cen. No. 200410009, Order Requiring Electronic Service (Apr. 1, 2020) ("*COVID-19 Electronic Service Order*").

ATTACHMENT TO THE HEARING EXAMINER'S REPORT

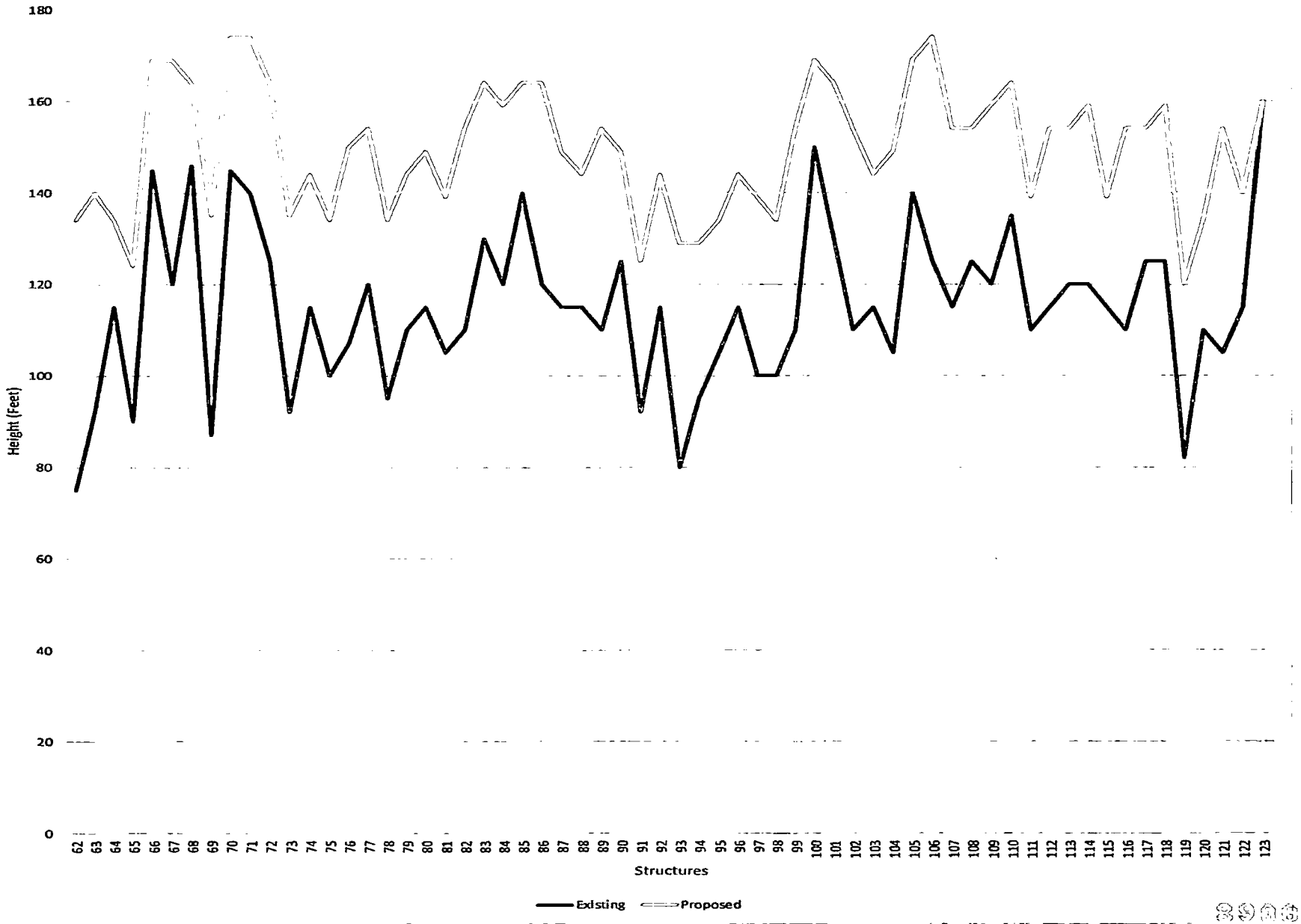
HEIGHTS FOR 1:1 STRUCTURE REPLACEMENTS

Elmont to Ladysmith Segment 1



HEIGHTS FOR 1:1 STRUCTURE REPLACEMENTS

Elmont to Ladysmith Segment 2



ELMONT TO LADYSMITH (Segment 1)

Line 574 Structure #	Existing Height	Proposed Height	Delta
1	114	120	6
2	112	160	48
3	117	160	43
4	95	139	44
5	100	134	34
6	100	139	39
7	115	134	19
8	82	125	43
9	114	135	21
10	95	154	59
11	95	139	44
12	125	154	29
13	107	150	43
14	120	154	34
15	95	139	44
16	125	154	29
17	110	149	39
18	120	154	34
19	102	150	48
20	140	169	29
21	135	164	29
22	97	140	43
23	100	139	39
24	95	134	39
25	92	135	43
26	110	134	24
27	105	144	39
28	110	144	34
29	97	135	38
30	110	149	39
31	110	144	34
32	97	135	38
33	95	134	39
34	85	119	34
35	82	125	43
36	115	134	19
37	90	139	49
38	120	139	19
39	90	134	44
40	100	139	39
41	125	154	29
42	105	139	34

43	95	134	39
44	136	159	23
45	107	150	43
46	105	144	39
47	120	144	24
48	90	134	44
49	90	119	29
50	90	119	29
51	105	134	29
52	115	154	39
53	141	154	13
54	87	135	48
55	100	119	19
56	75	119	44
57	110	144	34
58	120	159	39
59	141	164	23
60	110	139	29
61	120	134	14
average	107	141	35

ELMONT TO LADYSMITH (Segment 2)

Line 574 Structure #	Existing Height	Proposed Height	Delta
62	75	134	59
63	92	140	48
64	115	134	19
65	90	124	34
66	145	169	24
67	120	169	49
68	146	164	18
69	87	135	48
70	145	174	29
71	140	174	34
72	125	164	39
73	92	135	43
74	115	144	29
75	100	134	34
76	107	150	43
77	120	154	34
78	95	134	39
79	110	144	34
80	115	149	34
81	105	139	34
82	110	154	44

83	130	164	34
84	120	159	39
85	140	164	24
86	120	164	44
87	115	149	34
88	115	144	29
89	110	154	44
90	125	149	24
91	92	125	33
92	115	144	29
93	80	129	49
94	95	129	34
95	105	134	29
96	115	144	29
97	100	139	39
98	100	134	34
99	110	154	44
100	150	169	19
101	130	164	34
102	110	154	44
103	115	144	29
104	105	149	44
105	140	169	29
106	125	174	49
107	115	154	39
108	125	154	29
109	120	159	39
110	135	164	29
111	110	139	29
112	115	154	39
113	120	154	34
114	120	159	39
115	115	139	24
116	110	154	44
117	125	154	29
118	125	159	34
119	82	120	38
120	110	134	24
121	105	154	49
122	115	140	25
123	160	160	0
average	115	150	35

Average for entire line (without A1 or Line #568)	111	145	31.4%