Axton - Joshua Falls - Mt Ida 765kV transmission lines + Link 500/230kV substation

General Information

Proposing entity name	Proprietary business information.
Does the entity who is submitting this proposal intend to be the Designated Entity for this proposed project?	Proprietary business information.
Company proposal ID	Proprietary business information.
PJM Proposal ID	992
Project title	Axton - Joshua Falls - Mt Ida 765kV transmission lines + Link 500/230kV substation
Project description	Construct a new 765kV transmission line from AEP's Axton substation to AEP's Joshua Falls substation and from Joshua Falls to a new 765/500kV substation Mt Ida. Construct a new 500/230kV substation Link.
Email	Proprietary business information.
Project in-service date	06/2030
Tie-line impact	Yes
Interregional project	No
Is the proposer offering a binding cap on capital costs?	Yes
Additional benefits	Proprietary business information.

Project Components

1. 1F-1) Axton - Joshua Falls 765kV
2. 1A-2) Joshua Falls - Mt Ida 765kV
3. 1D-7) Mt Ida 765/500kV substation
4. 1B-6) Mt Ida - Link (greenfield portion)
5. 1AH-2) Link 500/230 substation

6. 6B-1) 502 Junction - Woodside tap to Black Oak
7. 6C-1) 502 Junction - Woodside tap to Black Oak
8. 10-11TE-1) Cloverdale Upgrades
9. 10TE-2) Jacksons Ferry upgrades
10. 14BF-1) Doubs expansion
11. 14TE-1) Saltville terminal equipment upgrades
12. 14TE-2) Tazewell terminal equipment upgrades
13. 15BF-1) Aspen terminal equipment upgrades
14. 15BF-2) Brambleton terminal equipment upgrades
15. 16BF-1) Brighton terminal equipment upgrade
16. 19TE-1) Heathcote terminal equipment upgrades
17. 1AL-1) Bristers cap bank
18. 1AM-1) Bull Run expansion
19. 1AN-1) Cannon Branch expansion
20. 1AP-1) Youngs Branch expansion
21. 1C-4) Joshua Falls expansion
22. 1I-1) Axton expansion
23. 1M-1) North Anna expansion
24. 1G-3) Chancellor expansion
25. 1TE-1) Mt Zion terminal equipment upgrades
26. 1W-2) Gainesville expansion
27. 20TE-1) Ladysmith terminal equipment upgrades
28. 20TE-2) Elmont expansion and upgrades
29. 24TE-1) Kammer terminal equipment upgrades
30. 6A-1) Black Oak expansion
31. 9TE-1) Broadford upgrades
32. SC-1) Loudoun breaker upgrades
33. SC-10) Carson breaker upgrades
34. SC-11) Lockridge breaker upgrades

35. SC-12) Beaumeade breaker upgrades
36. SC-13) Liberty breaker upgrades
37. SC-14) Braddock breaker upgrades
38. SC-15) Buttermilk breaker upgrades
39. SC-16) Goose Creek breaker upgrades
40. SC-2) Mosby breaker upgrades
41. SC-3) Yardley breaker upgrades
42. SC-4) Vint Hill breaker upgrades
43. SC-5) Roundtable breaker upgrades
44. SC-7A) Remington CT breaker upgrades
45. SC-8) Remington breaker upgrades
46. SC-9) Ox breaker upgrades
47. 16TE-1) Vint Hill terminal equipment upgrades
48. 17TE-2) Marsh Run CT terminal equipment upgrades
49. 17TE-3) Remington CT terminal equipment upgrades
50. 17TE-4) Remington terminal equipment upgrades
51. 1H-10) Morrisville expansion
52. SC-17) Dooms breaker upgrades
53. 1TE-2) West Vaco terminal equipment upgrades
54. 1TE-3) Cross School terminal equipment upgrades
55. 1AO-1) Bull Run - Cannon Branch 230kV
56. 1AQ-1) Morrisville - Loudoun 500kv tap to Youngs Branch
57. 1B-5) Mt Ida to Morrisville 500kV #2
58. 1DA-1) Dooms - Cunningham loop into Mt Ida
59. 1P-3) North Anna - Chancellor 500kV
60. 1V-1) Morrisville - Gainesville 230kV
61. 17TE-1) Remington CT - Marsh Run 230kV reconductor
62. 1AJ-2) Remington - Link and Remington CT - Link tap
63. 1AJ-3) Link - Marsh Run CT 230kV tap

64. 1AK-1) Tap for Meadowbrook - Vint Hill + Mt Ida - Link into Link substation

65. 1AK-3) Vint Hill - Link 500kV tap

66. 1B-11) New Mt Ida - Link 500kV (brownfield portion)

Greenfield Transmission Line Component

Component title	1F-1) Axton - Joshua Falls 765kV
Project description	Proprietary business information.
Point A	Axton
Point B	Joshua Falls
Point C	

	Normal ratings	Emergency ratings
Summer (MVA)	5656.000000	6622.000000
Winter (MVA)	7065.000000	7787.000000

Conductor size and type	4 Square Bundle Dipper ACSR GA2
Nominal voltage	AC
Nominal voltage	765
Line construction type	Overhead
General route description	The route connects the existing Axton substation to the existing Joshua Falls substation, co-locating with existing 138kV and 765kV corridors to the maximum extent practical. See Attachment 11 for further details.

Terrain description	A detailed inspection of the USGS topographic map reveals relatively consistent, rolling lands, with elevations ranging from a high of 1,143 ft above sea level to a low of 520 ft above sea level. The Project is located entirely within one Level IV ecoregion. This ecoregion is the northeastern most region of the Piedmont and is dissected upland composed of hills, irregular plains, and isolated ridges and mountains. According to the NLCD, the Project area (including a 0.5-mi corridor along the proposed line) largely consists of forest (~63.1% of the total land cover) composed of a combination of deciduous (37.6%), evergreen (10.0 %), and mixed species cover (15.5%). Cover type compositions beyond forested covers are concentrated in pasture/hay (23.8 %) followed by developed land (open space, low, medium, and high intensity; 4.8%), and grassland/herbaceous (2.5%). The remaining land cover (5.8%) is composed of cropland, shrub/scrub, wetlands, open water, and barren land.
Right-of-way width by segment	The majority of the route, approximately 99%, will have a ROW width of 200 ft. Approximately 1% of the route will have a ROW width of 175 ft in more congested areas. The proposed right of way will be an expansion of an existing transmission line corridor for approximately 53% of the route length, the remainder will be greenfield ROW.
Electrical transmission infrastructure crossings	See Attachment 4 (Google Earth .kmz file) for crossing locations.
Civil infrastructure/major waterway facility crossing plan	See Attachment 5 (Crossing Plan) and Attachment 4 (Google Earth .kmz file).
Environmental impacts	Environmental constraints were evaluated within a 0.25-mi buffer of the project and are manageable via avoidance, minimization, and mitigation strategies incorporated at the onset of the routing process. The proposed corridor crosses numerous aquatic resources, including wetlands, lakes/ponds, and streams but most features could be spanned & avoided with minimal impacts. According to FEMA, multiple 100-year floodplains are crossed by the corridor. Major watercourses crossed by the Project include the South Prong of Sandy River, Sandy, Banister, Pigg, Roanoke, and Big Otter Rivers, in addition to the Leesville Reservoir, some of which may require authorizations for navigable water crossings. No fatal flaws have been identified for the Project. Multiple previously recorded archaeological sites, cemeteries, & architectural resources were recorded within the corridor. Also, 1 historic district is crossed by the proposed corridor. This represents the total amount of features crossed by the corridor & impacts from the Project would be significantly less. Six federally listed species (2 endangered, 1 threatened, 2 proposed, & 1 candidate species) have known ranges within the proposed corridor. No USFWS designated critical habitat intersects the route. If suitable habitat is identified or regulations change, agency coordination & species-specific surveys will occur. The project intends to follow suggested tree removal windows & general time of year restrictions to avoid/minimize impacts to species such as federally listed bats and migratory birds, among others. Industry standard construction BMPs & avoidance and minimization measures will be used to prevent unanticipated impacts to the maximum extent practicable. There are no environmental concerns with the project that cannot be addressed through agency coordination, mitigation, & an in-depth routing process. Please refer to Attachment 8 for additional information.

Tower characteristics	The majority, approximately 99%, of the proposed structures will be single circuit 765kV lattice towers in a horizontal conductor configuration. Approximately 1% of the structures will be single circuit 765kV lattice towers in a delta conductor configuration in more congested areas. See structure drawing set included in Attachment 10.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.
Component Cost Details - In Current Year $	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$380,714,325.26
Component cost (in-service year)	$441,511,897.24

Greenfield Transmission Line Component

Component title	1A-2) Joshua Falls - Mt Ida 765kV
Project description	Proprietary business information.
Point A	Joshua Falls
Point B	Mt Ida
Point C	

	Normal ratings	Emergency ratings
Summer (MVA)	5656.000000	6622.000000
Winter (MVA)	7065.000000	7787.000000
Conductor size and type	4 Square Bundle Dipper ACSR GA2	
Nominal voltage	AC	
Nominal voltage	765	
Line construction type	Overhead	
General route description	The route follows existing transmission ROWS and infrastructure north from Joshua Falls to the new Mt Ida substation, with deviations to minimize impacts to communities, protected lands, and historically and culturally sensitive sites. See attachment 11 for further details.	
Terrain description	A detailed inspection of the USGS topographic map reveals relatively consistent, rolling lands, with elevations ranging from a high of 1,277 ft above sea level to a low of 286 ft above sea level. The Project is located across 3 Level IV ecoregions including Northern Inner Piedmont, Piedmont Uplands, and Northern Igneous Ridges. The Northern Inner Piedmont ecoregion is the northeastern most region of the Piedmont and is dissected upland composed of hills, irregular plains, and isolated ridges and mountains. Elevations typically range from 200-1,000 ft. The Piedmont Uplands ecoregion is characterized by rounded hills, low ridges, relative high relief, and narrow valleys and has elevations that often range from about 450-1,000 ft. The Northern Igneous Ridges ecoregion is characterized by pronounced ridges separated by high gaps and coves with elevations ranging from 1,000-1,575 ft to a maximum of over 3,750 ft. According to the NLCD, the Project area (including a 0.5-mi corridor along the proposed line) largely consists of forest (~71.3% of the total land cover) composed of a combination of deciduous (43.4 %), evergreen (9.6%), and mixed species cover (18.2%). Cover type compositions beyond forested covers are concentrated in pasture/hay (18.2%) followed by developed land (open space, low, medium, and high intensity; 4.7%), and grassland/herbaceous (2.6%). The remaining land cover (3.5%) is composed of cropland, shrub/scrub, wetlands, open water, and barren land.	
Right-of-way width by segment	The majority of the route, approximately 98%, will have a ROW width of 200 ft. Approximately 2% of the route will have a ROW width of 175 ft in more congested areas. The proposed right of way will be an expansion of existing transmission line corridors for approximately 72% of the route length, the remainder will be greenfield ROW.	
Electrical transmission infrastructure crossings	See Attachment 4 (Google Earth .kmz file) for crossing locations.	
Civil infrastructure/major waterway facility crossing plan	See Attachment 5 (Crossing Plan) and Attachment 4 (Google Earth .kmz file).	

Environmental impacts	Environmental constraints were evaluated within a 0.25-mi buffer of the project and are manageable through avoidance, minimization, and mitigation strategies incorporated at the onset of the routing process. The proposed corridor crosses numerous aquatic resources, including wetlands, lakes/ponds, and streams but most features could be spanned & avoided with minimal impacts. According to FEMA, multiple 100-year floodplains are crossed by the corridor.. Major watercourses crossed by the Project include the Tye, Rockfish, Piney, Hardware, Buffalo, & James Rivers, some of which will require agency authorizations for navigable water and State Scenic River crossings. Multiple previously recorded archaeological sites, cemeteries, & architectural resources were recorded within the corridor. Also, 1 historic district is crossed by the proposed corridor. This represents the total amount of features crossed by the corridor & impacts from the Project would be significantly less. No fatal flaws have been identified for the Project. Seven federally listed species (3 endangered, 1 threatened, 2 proposed, & 1 candidate species) have known ranges within the proposed corridor. Also, proposed critical habitat for 1 federally listed species intersects the route. If suitable habitat is identified or regulations change, agency coordination & species-specific surveys will occur. The project intends to follow suggested tree removal windows & general time of year restrictions to avoid/minimize impacts to species such as federally listed bats and migratory birds, among others. Industry standard construction BMPs & avoidance and minimization measures will be used to prevent unanticipated impacts to natural resources to the maximum extent practicable. There are no environmental concerns with the proposed project that cannot be addressed through agency coordination, mitigation, & an in-depth routing process. Please refer to Attachment 8 for additional information.
Tower characteristics	The majority, approximately 98%, of the proposed structures will be single circuit 765kV lattice towers in a horizontal conductor configuration. Approximately 2% of the structures will be single circuit 765kV lattice towers in a delta conductor configuration in more congested areas. See structure drawing set included in Attachment 10.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.
Component Cost Details - In Current Year $	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.

Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$359,557,754.74
Component cost (in-service year)	$416,976,761.65

Greenfield Substation Component

Component title	1D-7) Mt Ida 765/500kV substation
Project description	Proprietary business information.
Substation name	Mt Ida
Substation description	AC Air Insulated Substation (AIS): New proposed 765-500kV Substation. New 500kV Breaker and a Half (BAAH) switchyard with four (4) bays, seven (7) line positions, eleven (11) 500kV, 5000A, 63kAIC breakers, two (2) 500kV circuit switchers, two (2) 500kV, 300MVAR capacitor banks, one (1) 500kV, ±500MVAR STATCOM, two (2) 765-500kV, 2250MVA transformer banks comprised of a total of six (6) 750MVA units. New 765kV ring switchyard with three (3) 765kV, 5000A, 63kAIC breakers.
Nominal voltage	AC
Nominal voltage	765/500

Transformer Information

	Name		Capacity (MVA)
Transformer	Transformer 1		2250
	High Side	Low Side	Tertiary
Voltage (kV)	765	500	

	Name	Capacity (MVA)
Transformer	Transformer 2	2250

	High Side	Low Side	Tertiary
Voltage (kV)	765	500	

Major equipment description	AC Air Insulated Substation (AIS): New proposed 765-500kV Substation. New 500kV Breaker and a Half (BAAH) switchyard with four (4) bays, seven (7) line terminals, eleven (11) 500kV, 5000A, 63kAIC breakers, two (2) 500kV circuit switchers, two (2) 500kV, 300MVAR capacitor banks, one (1) 500kV, ±500MVAR STATCOM, two (2) 765-500kV, 2250MVA transformer banks comprised of a total of six (6) 750MVA units. New 765kV ring switchyard with three (3) 765kV, 5000A, 63kAIC breakers.

	Normal ratings	Emergency ratings
Summer (MVA)	2250.000000	3000.000000
Winter (MVA)	2250.000000	3000.000000

Environmental assessment	Environmental constraints were evaluated within the proposed substation parcel and are manageable through avoidance, minimization, and mitigation strategies. The proposed parcel contains approximately 5.25 ac NWI-mapped wetlands and waterbodies. According to FEMA, no portion of the proposed substation contains any 100-year floodplains or regulated floodways. No major watercourses are located within the proposes parcel. However, it is assumed any overland flow will drain to Middle Fork Cunningham Creek and its downstream tributaries. These numbers represent total acres within the parcel & impacts from the Project would be significantly less based on design in Attachment 3. No fatal flaws have been identified for the Project. Based on publicly available data, no previously recorded archaeological sites, cemeteries, or architectural resources were recorded within the proposed substation parcel. Additionally, no historic districts located within the immediate vicinity of the Site. One federally proposed species (Tricolored Bat) and one candidate species (Monarch Butterfly) have known ranges within the vicinity of the site. No critical habitat was identified within the vicinity of the proposed substation parcel. If suitable habitat is identified or regulations change, agency coordination & species-specific surveys will occur. The project intends to follow suggested tree removal windows & general time of year restrictions to avoid/minimize impacts to species such as federally listed bats and migratory birds, among others. Industry standard construction BMPs & avoidance and minimization measures will be used to prevent unanticipated impacts to natural resources to the maximum extent practicable. There are no environmental concerns with the proposed project that cannot be addressed through agency coordination, and mitigation.

Outreach plan	The proposer is committed to informing the public about the project to the greatest extent practicable while working with all interested stakeholders through a robust public outreach program to address and respond to community concerns. A well-designed public outreach program can have numerous benefits, including fostering a cooperative relationship with landowners and other stakeholders, expediting the regulatory permitting process, and assisting with project development. In general, the purpose of the community outreach plan is to gain community support for the project. In the affected communities, the proposer's public outreach plan will educate the public and relevant stakeholders on specific project details to enable timely regulatory approvals and construction activities. Elements of the public outreach plan will include the following: 1) Identify potential issues at an early stage by engagement with key community stakeholders at the outset; 2) Broaden the community engagement process to identify potential and relevant community benefits that can facilitate community support for the proposed project; 3) Develop a broad base of community support for the proposed project before the regulatory agencies; and 4) Develop a comprehensive administrative record documenting the community outreach process that can be presented to the regulatory agency or, in the event of a legal challenge, to the appropriate court. The outreach plan proposes to dedicate considerable time and resources in engaging the community, and specifically the affected community during the planning process to identify highly sensitive areas in order to develop a project that has the least amount of cultural, environmental, and social impacts. The plans will reflect avoidance of impacts rather than mitigation. However, in some cases, if avoidance is not possible, then the proposer will involve the community in providing appropriate and practical mitigation measures. Public outreach activities by the proposer will begin following project award.
Land acquisition plan	Proposer has a signed Letter of Intent and is actively working with Landowner at targeted substation parcel to execute Purchase Agreement and secure site control. See Attachment 9 for copy of LOI with landowner at targeted parcel.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.
Component Cost Details - In Current Year $	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.

Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$293,800,872.22
Component cost (in-service year)	$340,718,937.77

Greenfield Transmission Line Component

Component title	1B-6) Mt Ida - Link (greenfield portion)
Project description	Proprietary business information.
Point A	Mt Ida
Point B	Mt Eagle - Bremo corridor north of Cunningham
Point C	

	Normal ratings	Emergency ratings
Summer (MVA)	4295.000000	4357.000000
Winter (MVA)	5066.000000	5196.000000

Conductor size and type	2 Horizontal Bundle Bluebird ACSS MA3
Nominal voltage	AC
Nominal voltage	500
Line construction type	Overhead
General route description	The route connects the proposed Mt Ida substation to the Bremo - Mt Eagle 230kV corridor.
Terrain description	A detailed inspection of the USGS topographic map reveals relatively consistent, rolling lands, with elevations ranging from a high of 360 ft above sea level to a low of around 325 ft above sea level. The Project is located entirely within one Level IV ecoregion. This ecoregion is the Inner Piedmont ecoregion is dissected upland composed of hills, irregular plains, and isolated ridges and mountains. Elevations typically range from 200-1,000 ft. According to the NLCD, the Project area is mostly forested, interspersed with agricultural, and developed land.

Right-of-way width by segment	The route will have a ROW width of 200 ft throughout its length. The ROW will be entirely greenfield.
Electrical transmission infrastructure crossings	See Attachment 4 (Google Earth .kmz file) for crossing locations.
Civil infrastructure/major waterway facility crossing plan	See Attachment 5 (Crossing Plan) and Attachment 4 (Google Earth .kmz file).
Environmental impacts	Environmental constraints that intersect the proposed project were evaluated and are manageable through avoidance, minimization, and mitigation strategies incorporated at the onset of the routing/siting process. The proposed transmission crosses multiple NWI-mapped wetlands/waterbodies. However, they will be avoided to the maximum extent practicable. Additionally, according to FEMA, no portion of the approximately 1.52-mi proposed transmission line lies within any 100-year floodplains or floodways. No major watercourses are crossed by the Project. However, it is anticipated that any overland flow will drain to Middle Fork Cunningham Creek and its downstream tributaries. No fatal flaws have been identified for the Project. Based on publicly available data, one architectural resource was recorded within the immediately vicinity of the proposed transmission line. However, it is not anticipated to be directly impacted. No historic districts are crossed by the proposed corridor. Two federally listed species (one proposed endangered and one candidate species) have known ranges within the proposed corridor. No critical habitat was identified within the vicinity of the proposed line. If suitable habitat is identified or regulations change, agency coordination & species-specific surveys will occur. The project intends to follow suggested tree removal windows & general time of year restrictions to avoid/minimize impacts to species such as federally listed bats and migratory birds, among others. Industry standard construction BMPs & avoidance and minimization measures will be used to prevent unanticipated impacts to natural resources to the maximum extent practicable. There are no environmental concerns with the proposed project that cannot be addressed through agency coordination, mitigation, & an in-depth routing/siting process.
Tower characteristics	The proposed structures will be single circuit 500kV lattice towers in a horizontal conductor configuration. See structure drawing set included in Attachment 10.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.
Component Cost Details - In Current Year $	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.

Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$9,603,945.50
Component cost (in-service year)	$11,137,632.39

Greenfield Substation Component

Component title	1AH-2) Link 500/230 substation
Project description	Proprietary business information.
Substation name	Link
Substation description	AC Air Insulated Substation (AIS): New proposed 500-230kV Substation. New 500kV Breaker and a Half (BAAH) switchyard with two (2) bays, four (4) line terminals, eight (8) 500kV, 5000A, 63kAIC breakers, two (2) 500kV circuit switchers, two (2) 500kV, 300MVAR capacitor banks, one (1) 500kV, ±500MVAR STATCOM, two (2) 500-230kV, 1440MVA transformer banks comprised of a total of six (6) 480MVA single phase units. New 230kV ring switchyard expandable to breaker and a half (BAAH) with six (6) 230kV, 5000A, 63kAIC breakers.
Nominal voltage	AC
Nominal voltage	500/230

Transformer Information

	Name	Capacity (MVA)
Transformer	Transformer 1	1440

	High Side	Low Side	Tertiary
Voltage (kV)	500	230	

	Name	Capacity (MVA)
Transformer	Transformer 2	1440

	High Side	Low Side	Tertiary
Voltage (kV)	500	230	

Major equipment description	AC Air Insulated Substation (AIS): New proposed 500-230kV Substation. New 500kV Breaker and a Half (BAAH) switchyard with two (2) bays, four (4) line terminals, eight (8) 500kV, 5000A, 63kAIC breakers, two (2) 500kV circuit switchers, two (2) 500kV, 300MVAR capacitor banks, one (1) 500kV, ±500MVAR STATCOM, two (2) 500-230kV, 1440MVA transformer banks. New 230kV ring switchyard expandable to breaker and a half (BAAH) with six (6) 230kV, 5000A, 63kAIC breakers.

	Normal ratings	Emergency ratings
Summer (MVA)	1440.000000	2000.000000
Winter (MVA)	1440.000000	2000.000000

Environmental assessment	Environmental constraints were evaluated within the proposed substation parcel and are manageable through avoidance, minimization, and mitigation strategies. The proposed parcel does contain approximately 2.5 acres of NWI-mapped wetlands. According to FEMA, the entirety of the proposed substation parcel does not contain any 100-year floodplains or regulated floodways. No major watercourses are located within the proposed parcel, and it is assumed any overland flow will drain to Marsh Run and its downstream tributaries. These numbers represent total acres within the parcel & impacts from the Project would be significantly less. No fatal flaws have been identified for the Project. Based on publicly available data, no previously recorded archaeological sites, cemeteries, or architectural resources were recorded within the proposed substation parcel. Additionally, one historic district was identified within the immediate vicinity of the Site. One federally listed species (Northern Long-eared Bat) and one candidate species (Monarch Butterfly) have known ranges within the vicinity of the site. No critical habitat was identified within the vicinity of the proposed substation parcel. If suitable habitat is identified or regulations change, agency coordination & species-specific surveys will occur. The project intends to follow suggested tree removal windows & general time of year restrictions to avoid/minimize impacts to species such as federally listed bats and migratory birds, among others. Industry standard construction BMPs & avoidance and minimization measures will be used to prevent unanticipated impacts to natural resources to the maximum extent practicable. There are no environmental concerns with the proposed project that cannot be addressed through agency coordination, mitigation, & an in-depth routing/siting process.

Outreach plan	The proposer is committed to informing the public about the project to the greatest extent practicable while working with all interested stakeholders through a robust public outreach program to address and respond to community concerns. A well-designed public outreach program can have numerous benefits, including fostering a cooperative relationship with landowners and other stakeholders, expediting the regulatory permitting process, and assisting with project development. In general, the purpose of the community outreach plan is to gain community support for the project. In the affected communities, the proposer's public outreach plan will educate the public and relevant stakeholders on specific project details to enable timely regulatory approvals and construction activities. Elements of the public outreach plan will include the following: 1) Identify potential issues at an early stage by engagement with key community stakeholders at the outset; 2) Broaden the community engagement process to identify potential and relevant community benefits that can facilitate community support for the proposed project; 3) Develop a broad base of community support for the proposed project before the regulatory agencies; and 4) Develop a comprehensive administrative record documenting the community outreach process that can be presented to the regulatory agency or, in the event of a legal challenge, to the appropriate court. The outreach plan proposes to dedicate considerable time and resources in engaging the community, and specifically the affected community during the planning process to identify highly sensitive areas in order to develop a project that has the least amount of cultural, environmental, and social impacts. The plans will reflect avoidance of impacts rather than mitigation. However, in some cases, if avoidance is not possible, then the proposer will involve the community in providing appropriate and practical mitigation measures. Public outreach activities by the proposer will begin following project award.
Land acquisition plan	See Attachment 9.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.
Component Cost Details - In Current Year $	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.

Contingency	Proprietary business information.
Total component cost	$161,674,702.67
Component cost (in-service year)	$187,493,088.59

Greenfield Transmission Line Component

Component title	6B-1) 502 Junction - Woodside tap to Black Oak
Project description	Proprietary business information.
Point A	502 Junction - Woodside corridor
Point B	Black Oak
Point C	

	Normal ratings	Emergency ratings
Summer (MVA)	4295.000000	4357.000000
Winter (MVA)	5066.000000	5196.000000

Conductor size and type	3 Bundle Chukar ACSR GA2
Nominal voltage	AC
Nominal voltage	500
Line construction type	Overhead
General route description	This route is proposing to connect the to-be-built 502 Junction - Woodside 500kV line into Black Oak substation.
Terrain description	The route is entirely located within the North Potomac River Valley, on level terrain currently used for agriculture and the existing substation.
Right-of-way width by segment	The route will have a ROW width of 100 ft throughout its length. The ROW will be entirely greenfield.
Electrical transmission infrastructure crossings	See Attachment 4 (Google Earth .kmz file) for crossing locations.

Civil infrastructure/major waterway facility crossing plan	See Attachment 5 (Crossing Plan) and Attachment 4 (Google Earth .kmz file).
Environmental impacts	Environmental constraints that intersect the proposed project were evaluated and are manageable through avoidance, minimization, and mitigation strategies incorporated at the onset of the routing/siting process. The proposed transmission line does not cross any NWI-mapped wetlands or waterbodies. However, according to FEMA, half of the approximately 0.3-mi proposed transmission line lies within the 100-year floodplain of the North Branch of the Potomac River. This represents the total amount of features crossed by the proposed line and impacts from the Project would be significantly less. No major watercourses are crossed by the Project. However, it is anticipated that any overland flow will drain to the North Branch of the Potomac River and its downstream tributaries. No fatal flaws have been identified for the Project. No previously recorded archaeological sites, cemeteries, or architectural resources were recorded within the immediately vicinity of the proposed transmission line. Also, no historic districts were identified within the vicinity of the proposed corridor. Four federally listed species (2 endangered, 1 proposed, & 1 candidate species) have known ranges within the proposed corridor. Also, no critical habitat was identified within the vicinity of the proposed line. If suitable habitat is identified or regulations change, agency coordination & species-specific surveys will occur. The project intends to follow suggested tree removal windows & general time of year restrictions to avoid/minimize impacts to species such as federally listed bats and migratory birds, among others. Industry standard construction BMPs & avoidance and minimization measures will be used to prevent unanticipated impacts to natural resources to the maximum extent practicable. There are no environmental concerns with the proposed project that cannot be addressed through agency coordination, mitigation, & an in-depth routing/siting process.
Tower characteristics	The proposed structures will be single circuit 500kV steel monopoles in a vertical conductor configuration. See structure drawing set included in Attachment 10.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.
Component Cost Details - In Current Year $	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.

Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$3,803,712.00
Component cost (in-service year)	$4,411,139.76

Greenfield Transmission Line Component

Component title	6C-1) 502 Junction - Woodside tap to Black Oak
Project description	Proprietary business information.
Point A	Black Oak
Point B	502 Junction - Woodside corridor
Point C	

	Normal ratings	Emergency ratings
Summer (MVA)	4295.000000	4357.000000
Winter (MVA)	5066.000000	5196.000000

Conductor size and type	3 Bundle Chukar ACSR GA2
Nominal voltage	AC
Nominal voltage	500
Line construction type	Overhead
General route description	This route is proposing to connect the to-be-built 502 Junction - Woodside 500kV line into Black Oak substation.
Terrain description	The route is entirely located within the North Potomac River Valley, on level terrain currently used for agriculture and the existing substation.

Right-of-way width by segment	The route will have a ROW width of 200 ft throughout its length. The ROW will be entirely greenfield.
Electrical transmission infrastructure crossings	See Attachment 4 (Google Earth .kmz file) for crossing locations.
Civil infrastructure/major waterway facility crossing plan	See Attachment 5 (Crossing Plan) and Attachment 4 (Google Earth .kmz file).
Environmental impacts	Environmental constraints which intersect the proposed project were evaluated and are manageable through avoidance, minimization, and mitigation strategies incorporated at the onset of the routing/siting process. The proposed transmission line does not cross any NWI-mapped wetlands or waterbodies. However, according to FEMA, the entirety of the approximately 0.3-mi proposed transmission line lies within the 100-year floodplain of the North Branch of the Potomac River. This represents total amount of features crossed by the proposed line and impacts from the Project would be significantly less. No major watercourses are crossed by the Project. However, it is anticipated that any overland flow will drain to the North Branch of the Potomac River and its downstream tributaries. No fatal flaws have been identified for the Project. No previously recorded archaeological sites, cemeteries, or architectural resources were recorded within the immediately vicinity of the proposed project. Also, no historic districts were identified within the vicinity of the proposed project. Four federally listed species (2 endangered, 1 proposed, & 1 candidate species) have known ranges within the proposed corridor. Also, no critical habitats were identified within the vicinity of the proposed line. If suitable habitat is identified or regulations change, agency coordination & species-specific surveys will occur. The project intends to follow suggested tree removal windows & general time of year restrictions to avoid/minimize impacts to species such as federally listed bats and migratory birds, among others. Industry standard construction BMPs & avoidance and minimization measures will be used to prevent unanticipated impacts to natural resources to the maximum extent practicable. There are no environmental concerns with the proposed project that cannot be addressed through agency coordination, mitigation, & an in-depth routing/siting process.
Tower characteristics	The proposed structures will be single circuit 500kV steel monopoles in a horizontal conductor configuration. See structure drawing set included in Attachment 10.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.
Component Cost Details - In Current Year $	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.

Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$3,863,780.21
Component cost (in-service year)	$4,480,800.48

Substation Upgrade Component

Component title	10-11TE-1) Cloverdale Upgrades
Project description	Proprietary business information.
Substation name	Cloverdale
Substation zone	AEP
Substation upgrade scope	1. Replace terminal equipment at Cloverdale limiting Cloverdale - Jacksons Ferry and Cloverdale - Joshua Falls 765kV line 2. Switch 765kV shunt reactor (towards Joshua Falls or Jacksons Ferry) per seasonal requirements 3. Replace 11-138kV 63kAIC breakers with 80kAIC breakers

Transformer Information

None

New equipment description	Transmission owner to upgrade terminal equipment currently limiting the lines from Cloverdale to Jacksons Ferry and Joshua Falls, using 5000A, 63kAIC breaker. Replace 11-138kV 63kAIC breakers with 80kAIC breakers.
Substation assumptions	Assumes required equipment upgrades occur in existing footprint.
Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.
Construction responsibility	Proprietary business information.

Benefits/Comments	Proprietary business information.
Component Cost Details - In Current Year $	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$16,000,000.00
Component cost (in-service year)	$18,555,095.00

Substation Upgrade Component

Component title	10TE-2) Jacksons Ferry upgrades
Project description	Proprietary business information.
Substation name	Jacksons Ferry
Substation zone	AEP
Substation upgrade scope	Replace terminal equipment at Jacksons Ferry limiting Cloverdale - Jacksons Ferry 765kV line, the Axton - Jacksons Ferry 765kV line, and the Broadford - Jacksons Ferry 765kV line.

Transformer Information

None

New equipment description	Transmission owner to replace terminal equipment currently limiting the 765kV lines from Jackson's Ferry to Joshua Falls, Axton, and Broadford using 5000A, 63kAIC breaker.

Substation assumptions	Assumes required equipment upgrades occur in existing footprint.
Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.
Component Cost Details - In Current Year $	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$5,000,000.00
Component cost (in-service year)	$5,798,467.00

Substation Upgrade Component

Component title	14BF-1) Doubs expansion
Project description	Proprietary business information.
Substation name	Doubs
Substation zone	APS

Substation upgrade scope	1. Cut into the Woodside - Goose Creek 500kV circuit, and loop in and out of the Doubs station, to establish Woodside - Doubs #2 500kV and Doubs - Goose Creek #2 500kV circuits 2. Establish a new breaker string, by installing three new 500kV circuit breakers. 3. Move Otter Creek - Doubs line into the new breaker string, shared with the Doubs - Goose Creek #2 500kV line 4. Terminate Doubs - Woodside #2 into the open breaker position created by moving Doubs - Otter Creek 500kV line into the newly established breaker string. The Doubs - Woodside line will share the breaker string with the Doubs - Brighton 500kV line 5. Upgrade terminal equipment limiting the Doubs - Brighton 500kV line and replace two breakers with higher interrupting capability

Transformer Information

None

New equipment description	Add three (3) 500kV, 5000A, 63kAIC breakers to form a new breaker and a half (BAAH) bay with two line positions. Uprate two existing 500kV breakers to 500kV, 5000A, 63kAIC breakers.
Substation assumptions	Assumes expansion of existing fenceline to the southwest, remaining on utility owned property.
Real-estate description	The substation fenceline likely requires expansion but work can be contained on utility property.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.
Component Cost Details - In Current Year $	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$25,000,000.00

Component cost (in-service year)	$28,992,335.00

Substation Upgrade Component

Component title	14TE-1) Saltville terminal equipment upgrades
Project description	Proprietary business information.
Substation name	Saltville
Substation zone	AEP
Substation upgrade scope	Replace terminal equipment limiting Saltville - Tazewell 138kV line

Transformer Information

None

New equipment description	Transmission owner to upgrade terminal equipment currently limiting the Saltville - Tazewell line.
Substation assumptions	Assumes required equipment upgrades occur in existing footprint.
Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.

Component Cost Details - In Current Year $

Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.

Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$1,000,000.00
Component cost (in-service year)	$1,159,693.00

Substation Upgrade Component

Component title	14TE-2) Tazewell terminal equipment upgrades
Project description	Proprietary business information.
Substation name	Tazewell
Substation zone	AEP
Substation upgrade scope	Replace terminal equipment limiting Saltville - Tazewell 138kV line

Transformer Information

None

New equipment description	Transmission owner to upgrade terminal equipment currently limiting the Saltville - Tazewell line.
Substation assumptions	Assumes required equipment upgrades occur in existing footprint.
Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.

Component Cost Details - In Current Year $

Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.

Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$1,000,000.00
Component cost (in-service year)	$1,159,693.00

Substation Upgrade Component

Component title	15BF-1) Aspen terminal equipment upgrades
Project description	Proprietary business information.
Substation name	Aspen
Substation zone	Dominion
Substation upgrade scope	Upgrade terminal equipment limiting the Aspen - Brambleton 500kV line

Transformer Information

None

New equipment description	Transmission owner to upgrade terminal equipment currently limiting the Aspen-Brambleton line
Substation assumptions	Assumes required equipment upgrades occur in existing footprint.
Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.

Component Cost Details - In Current Year $

Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$2,000,000.00
Component cost (in-service year)	$2,319,387.00

Substation Upgrade Component

Component title	15BF-2) Brambleton terminal equipment upgrades
Project description	Proprietary business information.
Substation name	Brambleton
Substation zone	Dominion
Substation upgrade scope	Upgrade terminal equipment limiting the Aspen - Brambleton 500kV line

Transformer Information

None

New equipment description	Transmission owner to upgrade terminal equipment currently limiting the Aspen-Brambleton line
Substation assumptions	Assumes required equipment upgrades occur in existing footprint.
Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.

Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.
Component Cost Details - In Current Year $	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$2,000,000.00
Component cost (in-service year)	$2,319,387.00

Substation Upgrade Component

Component title	16BF-1) Brighton terminal equipment upgrade
Project description	Proprietary business information.
Substation name	Brighton
Substation zone	PEPCO
Substation upgrade scope	Upgrade terminal equipment limiting the Brighton - Doubs 500kV line

Transformer Information

None

New equipment description	Transmission owner to upgrade terminal equipment currently limiting the Brighton - Doubs line

Substation assumptions	Assumes required equipment upgrades occur in existing footprint.
Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.
Component Cost Details - In Current Year $	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$2,000,000.00
Component cost (in-service year)	$2,319,387.00

Substation Upgrade Component

Component title	19TE-1) Heathcote terminal equipment upgrades
Project description	Proprietary business information.
Substation name	Heathcote
Substation zone	Dominion
Substation upgrade scope	Upgrade terminal equipment limiting the Heathcote - Youngs Branch 230kV line. Replace two 230kV 50kAIC breakers with 63kAIC breakers

Transformer Information

None

New equipment description	Transmission owner to upgrade terminal equipment currently limiting the Youngs Branch - Heathcote line and replace two 230kV 50kAIC breakers with 63kAIC breakers
Substation assumptions	Assumes required equipment upgrades occur in existing footprint.
Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.

Component Cost Details - In Current Year $

Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$1,500,000.00
Component cost (in-service year)	$1,739,540.00

Substation Upgrade Component

Component title	1AL-1) Bristers cap bank
Project description	Proprietary business information.

Substation name	Bristers
Substation zone	Dominion
Substation upgrade scope	Install one 500kV 300MVAR cap bank and a circuit switcher at the Bristers substation

Transformer Information

None

New equipment description	Add one (1) 500kV, 300MVAR capacitor bank and one (1) 500kV circuit switcher.
Substation assumptions	Assumes space available within Bristers substation. If not, parcel is large enough to accommodate fenceline expansion on utility property (based on publicly available data).
Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.

Component Cost Details - In Current Year $

Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$3,000,000.00
Component cost (in-service year)	$3,479,080.00

Substation Upgrade Component

Component title	1AM-1) Bull Run expansion
Project description	Proprietary business information.
Substation name	Bull Run
Substation zone	Dominion
Substation upgrade scope	Expand the 230kV breaker and a half (BAAH) switchyard by adding three (3) 230kV breakers and one bay with two line positions. Terminate the new line to Cannon Branch into the new position and move circuit 244 currently terminated off the bus into the second newly created breaker position. Replace one 50kAIC breaker with a new 63kAIC breaker

Transformer Information

None

New equipment description	Add three (3) 230kV, 5000A, 63kAIC breakers to create one (1) new BAAH bay and two line positions. Replace one 50kAIC breaker with a new 63kAIC breaker
Substation assumptions	Imagery indicates empty space available both within the fenceline and external to fenceline on utility property that could be used for expansion.
Real-estate description	Space available on utility property for expansion. No land acquisition required.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.

Component Cost Details - In Current Year $

Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.

Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$9,000,000.00
Component cost (in-service year)	$10,437,241.00

Substation Upgrade Component

Component title	1AN-1) Cannon Branch expansion
Project description	Proprietary business information.
Substation name	Cannon Branch
Substation zone	Dominion
Substation upgrade scope	Expand the existing 230kV ring switchyard by adding one (1) 230kV breaker and one (1) line position.

Transformer Information

None

New equipment description	Add one (1) 230kV, 5000A, 63kAIC breaker into existing ring bus.
Substation assumptions	Assumes open position available between the Sandlot line and Ckt 2011 line to install new breaker and terminate new line.
Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.

Component Cost Details - In Current Year $

Engineering & design	Proprietary business information.

Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$1,500,000.00
Component cost (in-service year)	$1,739,540.00

Substation Upgrade Component

Component title	1AP-1) Youngs Branch expansion
Project description	Proprietary business information.
Substation name	Youngs Branch
Substation zone	Dominion
Substation upgrade scope	Expand the existing Youngs Branch 230kV yard by adding two 230kV breakers and two line positons. Add two 500-230kV transformers, a 500kV breaker and a half (BAAH) switchyard with two bays and six breakers. Upgrade terminal equipment currently limiting Heathcote - Youngs Branch 230kV line.

Transformer Information

	Name		Capacity (MVA)
Transformer	Transformer #1		1440 (normal) / 2000 (emergency)
	High Side	Low Side	Tertiary
Voltage (kV)	500	230	

	Name		Capacity (MVA)
Transformer	Transformer #2		1440 (normal) / 2000 (emergency)
	High Side	Low Side	Tertiary
Voltage (kV)	500	230	

New equipment description	Add two (2) 230kV, 5000A, 63kAIC breakers. Add (2) 500-230kV, 1440 MVA transformer banks, six (6) 500kV, 5000A, 63kAIC breakers, and two (2) breaker and a half (BAAH) 500kV bays with three (3) line positions. Upgrade terminal equipment currently limiting Heathcote - Youngs Branch 230kV line.
Substation assumptions	Assumes space is available on undeveloped land north of the substation.
Real-estate description	The substation fenceline requires expansion but work can be contained on the same parcel (based on publicly available parcel information).
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.
Component Cost Details - In Current Year $	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$50,000,000.00

Component cost (in-service year)	$57,984,671.00

Substation Upgrade Component

Component title	1C-4) Joshua Falls expansion
Project description	Proprietary business information.
Substation name	Joshua Falls
Substation zone	AEP
Substation upgrade scope	Expand the 765kV switchyard into a four breaker ring by adding three breakers.

Transformer Information

None

New equipment description	Add three (3) 765kV, 5000A, 63kAIC breakers and expand the substation into a four (4) breaker ring configuration. Replace terminal equipment limiting the Cloverdale - Joshua Falls line.
Substation assumptions	Assumes relocation of the Cloverdale line to the northern position of expanded ring bus to accommodate routing of Axton and Mt Ida lines.
Real-estate description	The substation fenceline requires expansion but work can be contained in utility property.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.

Component Cost Details - In Current Year $

Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.

Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$12,000,000.00
Component cost (in-service year)	$13,916,321.00

Substation Upgrade Component

Component title	1I-1) Axton expansion
Project description	Proprietary business information.
Substation name	Axton
Substation zone	AEP
Substation upgrade scope	Expand 765kV yard into a three (3) breaker ring yard by adding three (3) 765kV breakers. Reposition existing reactor per Attachments 2 and 3 (single line diagram and general arrangement)

Transformer Information

None

New equipment description	Add three (3) 765kV, 5000A, 63kAIC breakers and expand the substation into a three (3) breaker ring configuration. Transmission owner to upgrade terminal equipment limiting the Axton - Jacksons Ferry 765kV line.
Substation assumptions	Assumes space to the east is available for expansion of substation fenceline.
Real-estate description	The substation fenceline requires expansion but work can be contained in utility property.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.
Component Cost Details - In Current Year $	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.

ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$12,000,000.00
Component cost (in-service year)	$13,916,321.00

Substation Upgrade Component

Component title	1M-1) North Anna expansion
Project description	Proprietary business information.
Substation name	North Anna
Substation zone	Dominion
Substation upgrade scope	Expand the 500kV breaker and a half (BAAH) switchyard by adding one (1) 500kV breaker into a spare position of an existing BAAH bay and adding one (1) line position.

Transformer Information

None

New equipment description	Add one (1) 500kV, 5000A, 63kAIC breaker to spare position in existing breaker and a half (BAAH) bay. Transmission owner to upgrade five (5) 500kV 40kAIC breakers with 63kAIC breakers
Substation assumptions	Assumes spare position exists to install new breaker.
Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.
Construction responsibility	Proprietary business information.

Benefits/Comments	Proprietary business information.
Component Cost Details - In Current Year $	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$3,000,000.00
Component cost (in-service year)	$3,479,080.00

Substation Upgrade Component

Component title	1G-3) Chancellor expansion
Project description	Proprietary business information.
Substation name	Chancellor
Substation zone	Dominion
Substation upgrade scope	Expand 500kV breaker and a half (BAAH) yard by adding two (2) 500kV breakers, one (1) BAAH bay and one (1) line position.

Transformer Information

None

New equipment description	Add two (2) 500kV, 5000A, 63kAIC breakers and one breaker and a half (BAAH) bay with one (1) line position.

Substation assumptions	Assumes, based on imagery and publicly available parcel data, that space is available on utility property to expand the substation to the west.
Real-estate description	The substation fenceline requires expansion but work can be contained in utility property by expanding the substation to the west.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.
Component Cost Details - In Current Year $	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$7,500,000.00
Component cost (in-service year)	$8,697,701.00

Substation Upgrade Component

Component title	1TE-1) Mt Zion terminal equipment upgrades
Project description	Proprietary business information.
Substation name	Mt Zion - Cross School
Substation zone	APS
Substation upgrade scope	Replace terminal equipment limiting Mt Zion - Westva - Cross School 138kV lines

Transformer Information

None

New equipment description	Transmission owner to replace terminal equipment currently limiting the Mt Zion - WestVaco - Cross School line
Substation assumptions	Assumes required equipment upgrades occur in existing footprint.
Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.
Component Cost Details - In Current Year $	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$1,500,000.00
Component cost (in-service year)	$1,739,540.00

Substation Upgrade Component

Component title	1W-2) Gainesville expansion
Project description	Proprietary business information.

Substation name	Gainesville
Substation zone	Dominion
Substation upgrade scope	Expand 230kV breaker and a half (BAAH) switchyard by adding one (1) 230kV breaker to existing spare position and one line position.

Transformer Information

None

New equipment description	Add one (1) 230kV, 4000A, 63kAIC breaker to existing position in breaker and a half (BAAH) bay. Replace one 50kAIC breaker with a new 63kAIC breaker
Substation assumptions	Assumes empty position available to install new breaker.
Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.
Component Cost Details - In Current Year $	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$2,000,000.00
Component cost (in-service year)	$2,319,387.00

Substation Upgrade Component

Component title	20TE-1) Ladysmith terminal equipment upgrades
Project description	Proprietary business information.
Substation name	Ladysmith
Substation zone	Dominion
Substation upgrade scope	Replace terminal equipment at Ladysmith limiting Ladysmith - Elmont 500kV line during contingency events.

Transformer Information

None

New equipment description	Transmission owner to upgrade terminal equipment currently limiting the 500kV line from Ladysmith to Elmont. Replace one 50kAIC breaker with a new 63kAIC breaker
Substation assumptions	Assumes required equipment upgrades occur in existing footprint.
Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.

Component Cost Details - In Current Year $

Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.

Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$2,000,000.00
Component cost (in-service year)	$2,319,387.00

Substation Upgrade Component

Component title	20TE-2) Elmont expansion and upgrades
Project description	Proprietary business information.
Substation name	Elmont
Substation zone	Dominion
Substation upgrade scope	Replace terminal equipment at Elmont limiting Ladysmith - Elmont 500kV line. Add a 500kV breaker in spare breaker and a half (BAAH) bay position and re-terminate trasnformer terminal position to have a redundant breaker between Chickahominy - Elmont 500kV line and the 500/230kV transfromer.

Transformer Information

None

New equipment description	Add one (1) new 500kV, 5000A, 63kAIC breaker and replace an existing 500kV breaker with one (1) new 500kV, 5000A, 63kAIC breaker.
Substation assumptions	Assumes required equipment upgrades occur in existing footprint and spare position exists for new breaker.
Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.

Component Cost Details - In Current Year $

Engineering & design	Proprietary business information.

Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$2,000,000.00
Component cost (in-service year)	$2,319,387.00

Substation Upgrade Component

Component title	24TE-1) Kammer terminal equipment upgrades
Project description	Proprietary business information.
Substation name	Kammer
Substation zone	AEP
Substation upgrade scope	Upgrade terminal equipment limiting the Kammer 765/500kV transformer.

Transformer Information

None

New equipment description	Transmission owner to replace terminal equipment currently limiting the Kammer 765/500 transformer.
Substation assumptions	Assumes required equipment upgrades occur in existing footprint.
Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.
Construction responsibility	Proprietary business information.

Benefits/Comments	Proprietary business information.
Component Cost Details - In Current Year $	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$2,000,000.00
Component cost (in-service year)	$2,319,387.00

Substation Upgrade Component

Component title	6A-1) Black Oak expansion
Project description	Proprietary business information.
Substation name	Black Oak
Substation zone	APS
Substation upgrade scope	Add three breakers to the existing 500kV bay to create two line positions.

Transformer Information

None

New equipment description	Add (3) three 500kV, 5000A, 63kAIC breakers to the existing 500kV breaker and a half (BAAH) bay.
Substation assumptions	Assumed empty space available to install new terminal per Attachments 2 and 3.

Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.
Component Cost Details - In Current Year $	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$8,000,000.00
Component cost (in-service year)	$9,277,547.00

Substation Upgrade Component

Component title	9TE-1) Broadford upgrades
Project description	Proprietary business information.
Substation name	Broadford
Substation zone	AEP
Substation upgrade scope	Relocate existing 765kV breaker into spare position. Re-terminate existing 765-500kV trasnfromer into new line position. Replace terminal equipment limiting Broadford - Jacksons Ferry 765kV line.

Transformer Information

None

New equipment description	Transmission owner to upgrade terminal equipment currently limiting the 765kV line from Broadford to Jacksons Ferry.
Substation assumptions	Assumes required equipment upgrades occur in existing footprint.
Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.
Component Cost Details - In Current Year $	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$2,000,000.00
Component cost (in-service year)	$2,319,387.00

Substation Upgrade Component

Component title	SC-1) Loudoun breaker upgrades
Project description	Proprietary business information.

Substation name	Loudoun
Substation zone	Dominion
Substation upgrade scope	1. Replace six 500V 50kAIC breakers with new 63kAIC breakers 2. Replace four 230kV 63kAIC breakers with 80kAIC breaker and one 50kAIC 230kV breaker with 80kAIC breaker

Transformer Information

None

New equipment description	Six (6) 500V, 5000A, 63kAIC breakers, five (5) 230kV, 4000A, 80kAIC breakers
Substation assumptions	Assumes required equipment upgrades occur in existing footprint.
Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.

Component Cost Details - In Current Year $

Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$10,000,000.00
Component cost (in-service year)	$11,596,934.00

Substation Upgrade Component

Component title	SC-10) Carson breaker upgrades
Project description	Proprietary business information.
Substation name	Carson
Substation zone	Dominion
Substation upgrade scope	Replace two 230kV 40kAIC breakers with 63kAIC breakers

Transformer Information

None

New equipment description	Two (2) 230kV, 4000A, 63kAIC breakers
Substation assumptions	Assumes required equipment upgrades occur in existing footprint.
Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.

Component Cost Details - In Current Year $

Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.

Contingency	Proprietary business information.
Total component cost	$2,000,000.00
Component cost (in-service year)	$2,319,387.00

Substation Upgrade Component

Component title	SC-11) Lockridge breaker upgrades
Project description	Proprietary business information.
Substation name	Lockridge
Substation zone	Dominion
Substation upgrade scope	Replace two 230kV 63kAIC breakers with 80kAIC breakers

Transformer Information

None

New equipment description	Two (2) 230kV, 4000A, 80kAIC breakers
Substation assumptions	Assumes required equipment upgrades occur in existing footprint.
Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.

Component Cost Details - In Current Year $

Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.

Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$2,000,000.00
Component cost (in-service year)	$2,319,387.00

Substation Upgrade Component

Component title	SC-12) Beaumeade breaker upgrades
Project description	Proprietary business information.
Substation name	Beumeade
Substation zone	Dominion
Substation upgrade scope	Replace one 230kV 63kAIC breaker with 80kAIC breaker

Transformer Information

None

New equipment description	One (1) 230kV, 4000A, 80kAIC breaker
Substation assumptions	Assumes required equipment upgrades occur in existing footprint.
Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.
Component Cost Details - In Current Year $	
Engineering & design	Proprietary business information.

Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$1,500,000.00
Component cost (in-service year)	$1,739,540.00

Substation Upgrade Component

Component title	SC-13) Liberty breaker upgrades
Project description	Proprietary business information.
Substation name	Liberty
Substation zone	Dominion
Substation upgrade scope	Replace one 230kV 50kAIC breaker with 63kAIC breaker

Transformer Information

None

New equipment description	One (1) 230kV, 4000A, 63kAIC breaker
Substation assumptions	Assumes required equipment upgrades occur in existing footprint.
Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.
Construction responsibility	Proprietary business information.

Benefits/Comments	Proprietary business information.
Component Cost Details - In Current Year $	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$1,500,000.00
Component cost (in-service year)	$1,739,540.00

Substation Upgrade Component

Component title	SC-14) Braddock breaker upgrades
Project description	Proprietary business information.
Substation name	Braddock
Substation zone	Dominion
Substation upgrade scope	Replace four 230kV 40kAIC breakers with 63kAIC breakers

Transformer Information

None

New equipment description	Four (4) 230kV, 4000A, 63kAIC breakers
Substation assumptions	Assumes required equipment upgrades occur in existing footprint.

Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.
Component Cost Details - In Current Year $	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$3,000,000.00
Component cost (in-service year)	$3,479,080.00

Substation Upgrade Component

Component title	SC-15) Buttermilk breaker upgrades
Project description	Proprietary business information.
Substation name	Buttermilk
Substation zone	Dominion
Substation upgrade scope	Replace five 230kV 63kAIC breakers with 80kAIC breakers

Transformer Information

None

New equipment description	Five (5) 230kV, 4000A, 80kAIC breakers
Substation assumptions	Assumes required equipment upgrades occur in existing footprint.
Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.
Component Cost Details - In Current Year $	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$5,000,000.00
Component cost (in-service year)	$5,798,467.00

Substation Upgrade Component

Component title	SC-16) Goose Creek breaker upgrades
Project description	Proprietary business information.
Substation name	Goosecreek
Substation zone	Dominion

Substation upgrade scope	Replace one 500kV 50kAIC breakers with 63kAIC breaker

Transformer Information

None

New equipment description	One (1) 500kV, 5000A 63kAIC breaker
Substation assumptions	Assumes required equipment upgrades occur in existing footprint.
Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.
Component Cost Details - In Current Year $	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$2,000,000.00
Component cost (in-service year)	$2,319,387.00

Substation Upgrade Component

Component title	SC-2) Mosby breaker upgrades

Project description	Proprietary business information.
Substation name	Mosby
Substation zone	Dominion
Substation upgrade scope	Replace 11 500kV 50kAIC breakers with 63kAIC breakers

Transformer Information

None

New equipment description	Eleven (11) 500kV, 5000A, 63kAIC breakers
Substation assumptions	Assumes required equipment upgrades occur in existing footprint.
Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.

Component Cost Details - In Current Year $

Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$11,000,000.00
Component cost (in-service year)	$12,756,628.00

Substation Upgrade Component

Component title	SC-3) Yardley breaker upgrades
Project description	Proprietary business information.
Substation name	Yardley
Substation zone	Dominion
Substation upgrade scope	Replace four 230kV 63kAIC breakers with 80kAIC breakers

Transformer Information

None

New equipment description	Four (4) 230kV, 4000A, 80kAIC breakers
Substation assumptions	Assumes required equipment upgrades occur in existing footprint.
Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.

Component Cost Details - In Current Year $

Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.

Contingency	Proprietary business information.
Total component cost	$4,000,000.00
Component cost (in-service year)	$4,638,774.00

Substation Upgrade Component

Component title	SC-4) Vint Hill breaker upgrades
Project description	Proprietary business information.
Substation name	Vint Hill
Substation zone	Dominion
Substation upgrade scope	Replace three 230kV 63kAIC breakers with 80kAIC breakers

Transformer Information

None

New equipment description	Three (3) 230kV, 4000A, 80kAIC breakers
Substation assumptions	Assumes required equipment upgrades occur in existing footprint.
Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.

Component Cost Details - In Current Year $

Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.

Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$3,000,000.00
Component cost (in-service year)	$3,479,080.00

Substation Upgrade Component

Component title	SC-5) Roundtable breaker upgrades
Project description	Proprietary business information.
Substation name	Roundtable
Substation zone	Dominion
Substation upgrade scope	Replace six 230kV 63kAIC breakers with 80kAIC breakers

Transformer Information

None

New equipment description	Six (6) 230kV, 4000A, 80kAIC breakers
Substation assumptions	Assumes required equipment upgrades occur in existing footprint.
Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.
Component Cost Details - In Current Year $	
Engineering & design	Proprietary business information.

Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$6,000,000.00
Component cost (in-service year)	$6,958,161.00

Substation Upgrade Component

Component title	SC-7A) Remington CT breaker upgrades
Project description	Proprietary business information.
Substation name	Remington CT
Substation zone	Dominion
Substation upgrade scope	Replace one 230kV 40kAIC breaker with 63kAIC breaker

Transformer Information

None

New equipment description	One (1) 230kV, 4000A, 63kAIC breaker
Substation assumptions	Assumes required equipment upgrades occur in existing footprint.
Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.
Construction responsibility	Proprietary business information.

Benefits/Comments	Proprietary business information.
Component Cost Details - In Current Year $	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$1,500,000.00
Component cost (in-service year)	$1,739,540.00

Substation Upgrade Component

Component title	SC-8) Remington breaker upgrades
Project description	Proprietary business information.
Substation name	Remington
Substation zone	Dominion
Substation upgrade scope	Replace four 230kV 40kAIC breakers with 63kAIC breakers

Transformer Information

None

New equipment description	Four (4) 230kV, 4000A, 63kAIC breakers
Substation assumptions	Assumes required equipment upgrades occur in existing footprint.

Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.
Component Cost Details - In Current Year $	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$4,000,000.00
Component cost (in-service year)	$4,638,774.00

Substation Upgrade Component

Component title	SC-9) Ox breaker upgrades
Project description	Proprietary business information.
Substation name	OX
Substation zone	Dominion
Substation upgrade scope	1. Replace 3 500kV 40kAIC breakers with 63kAIC breakers 2. Replace one 230kV 63kAIC breaker with 80kAIC breaker

Transformer Information

None

New equipment description	Three (3) 500kV, 5000A, 63kAIC breakers One (1) 230kV, 4000A, 80kAIC breaker
Substation assumptions	Assumes required equipment upgrades occur in existing footprint.
Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.
Component Cost Details - In Current Year $	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$5,000,000.00
Component cost (in-service year)	$5,798,467.00

Substation Upgrade Component

Component title	16TE-1) Vint Hill terminal equipment upgrades
Project description	Proprietary business information.

Substation name	Vint Hill
Substation zone	Dominion
Substation upgrade scope	Upgrade terminal equipment at Vint Hill limiting the current Meadowbrook - Vint Hill 500kV line. Replace three 230kV 63kAIC breakers with 80kAIC breakers

Transformer Information

None

New equipment description	Transmission owner to upgrade terminal equipment currently limiting the 500kV line from Meadowbrook to Vint Hill. Replace three 230kV 63kAIC breakers with 80kAIC breakers
Substation assumptions	Assumes required equipment upgrades occur in existing footprint.
Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.

Component Cost Details - In Current Year $

Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$2,000,000.00
Component cost (in-service year)	$2,319,387.00

Substation Upgrade Component

Component title	17TE-2) Marsh Run CT terminal equipment upgrades
Project description	Proprietary business information.
Substation name	Marsh Run CT
Substation zone	Dominion
Substation upgrade scope	1. Upgrade terminal equipment at Marsh Run CT substation limiting Marsh Run CT - Remington CT 230kV line and the Marsh Run CT - Remington 230kV line. Also upgrade terminal equipment to increase capabilities of Marsh Run CT - Morrisville 230kV lines and replace six 230kV 50kAIC breakers with 63kAIC breakers

Transformer Information

None

New equipment description	Transmission owner to upgrade terminal equipment currently limiting the Marsh Run CT - Remington and Remington CT 230kV lines, as well as the Marsh Run - Morrisville 230kV lines. Replace six 230kV 50kAIC breakers with 63kAIC breakers
Substation assumptions	Assumes required equipment upgrades occur in existing footprint.
Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.

Component Cost Details - In Current Year $

Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.

Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$1,000,000.00
Component cost (in-service year)	$1,159,693.00

Substation Upgrade Component

Component title	17TE-3) Remington CT terminal equipment upgrades
Project description	Proprietary business information.
Substation name	Remington CT
Substation zone	Dominion
Substation upgrade scope	Upgrade terminal equipment at Remington CT limiting Marsh Run CT - Remington CT 230kV line and the Remington CT - Remington 230kV line.

Transformer Information

None

New equipment description	Transmission owner to upgrade terminal equipment currently limiting the Remington CT to Marsh Run CT and Remington CT to Remington 230kV lines.
Substation assumptions	Assumes required equipment upgrades occur in existing footprint.
Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.

Component Cost Details - In Current Year $

Engineering & design	Proprietary business information.

Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$1,000,000.00
Component cost (in-service year)	$1,159,693.00

Substation Upgrade Component

Component title	17TE-4) Remington terminal equipment upgrades
Project description	Proprietary business information.
Substation name	Remington
Substation zone	Dominion
Substation upgrade scope	Upgrade terminal equipment at Remington limiting Marsh Run CT - Remington 230kV line and the Remington CT - Remington 230kV line.

Transformer Information

None

New equipment description	Transmission owner to upgrade terminal equipment currently limiting the Remington - Remington CT and Marsh Run CT lines
Substation assumptions	Assumes required equipment upgrades occur in existing footprint.
Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.

Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.
Component Cost Details - In Current Year $	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$1,000,000.00
Component cost (in-service year)	$1,159,693.00

Substation Upgrade Component

Component title	1H-10) Morrisville expansion
Project description	Proprietary business information.
Substation name	Morrisville
Substation zone	Dominion
Substation upgrade scope	Expand 500kV breaker and a half (BAAH) switchyard by adding one (1) 500kV breaker to future BAAH bay and one (1) line position. Expand 230kV double breaker double bus (DBDB) switchyard by adding two (2) 230kV breakers and one line position. Upgrade existing 230kV terminal equipment that is limiting the Morrisville - Marsh Run 230kV lines.

Transformer Information

None

New equipment description	Add one (1) 500kV, 5000A, 63kAIC breaker to future breaker and a half (BAAH) bay and one line position. Add two (2) 230kV, 5000A, 63kAIC breakers to 230kV double breaker double bus (DBDB) switchyard.
Substation assumptions	Future substation design associated with Dominion baseline projects b3800.306 and b3800.346 is unknown to proposer. An assumed workable design shown in Attachments 2 and 3 includes the previously awarded baseline upgrades as well as the proposed expansion.
Real-estate description	The substation fenceline requires expansion but work can be contained in utility property.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.
Component Cost Details - In Current Year $	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$10,000,000.00
Component cost (in-service year)	$11,596,934.00

Substation Upgrade Component

Component title	SC-17) Dooms breaker upgrades
Project description	Proprietary business information.

Substation name	Dooms
Substation zone	Dominion
Substation upgrade scope	Replace four 230kV 40kAIC breakers with 63kAIC breakers

Transformer Information

None

New equipment description	Four (4) 230kV, 4000A, 63kAIC breakers
Substation assumptions	Assumes required equipment upgrades occur in existing footprint.
Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.
Component Cost Details - In Current Year $	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$4,000,000.00
Component cost (in-service year)	$4,638,774.00

Substation Upgrade Component

Component title	1TE-2) West Vaco terminal equipment upgrades
Project description	Proprietary business information.
Substation name	West Vaco
Substation zone	APS
Substation upgrade scope	Replace terminal equipment limiting Mt Zion - Westva - Cross School 138kV lines

Transformer Information

None

New equipment description	Transmission owner to replace terminal equipment currently limiting the Mt Zion - West Vaco - Cross School line
Substation assumptions	Assumes required equipment upgrades occur in existing footprint.
Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.

Component Cost Details - In Current Year $

Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.

Contingency	Proprietary business information.
Total component cost	$1,500,000.00
Component cost (in-service year)	$1,739,540.00

Substation Upgrade Component

Component title	1TE-3) Cross School terminal equipment upgrades
Project description	Proprietary business information.
Substation name	Cross School
Substation zone	APS
Substation upgrade scope	Replace terminal equipment limiting Mt Zion - West Vaco - Cross School 138kV lines

Transformer Information

None

New equipment description	Transmission owner to replace terminal equipment currently limiting the Mt Zion - West Vaco - Cross School line
Substation assumptions	Assumes required equipment upgrades occur in existing footprint.
Real-estate description	Based on publicly available parcel data and imagery, upgrades are expected to fit fully within existing fenceline on incumbent owned property.
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.

Component Cost Details - In Current Year $

Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.

Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$1,500,000.00
Component cost (in-service year)	$1,739,540.00

Transmission Line Upgrade Component

Component title	1AO-1) Bull Run - Cannon Branch 230kV
Project description	Proprietary business information.
Impacted transmission line	Bull Run to Cannon Branch
Point A	Bull Run
Point B	Cannon Branch
Point C	
Terrain description	Additional circuit to be installed in existing ROW. ROW is mostly through developed, suburban area with minimal elevation changes.
Existing Line Physical Characteristics	
Operating voltage	115
Conductor size and type	Per incumbent system
Hardware plan description	Incumbent / Transmission Owner to select preferred hardware
Tower line characteristics	115kV monopoles
Proposed Line Characteristics	

	Designed	Operating

Voltage (kV)	230.000000	230.000000
	Normal ratings	Emergency ratings
Summer (MVA)	1573.000000	1809.000000
Winter (MVA)	1648.000000	1896.000000
Conductor size and type	Incumbent / Transmission Owner to select conductor to achieve the required ratings	
Shield wire size and type	Incumbent / Transmission Owner to select preferred shield wire	
Rebuild line length	6.8	
Rebuild portion description	Rebuild the Cannon Branch - Harrison - Woods - Bull Run 115kV line to double circuit 230/115kV terminate line into Bull Run and Cannon Branch	
Right of way	Use of existing ROW to extent practicable	
Construction responsibility	Proprietary business information.	
Benefits/Comments	Proprietary business information.	
Component Cost Details - In Current Year $		
Engineering & design	Proprietary business information.	
Permitting / routing / siting	Proprietary business information.	
ROW / land acquisition	Proprietary business information.	
Materials & equipment	Proprietary business information.	
Construction & commissioning	Proprietary business information.	
Construction management	Proprietary business information.	
Overheads & miscellaneous costs	Proprietary business information.	
Contingency	Proprietary business information.	
Total component cost	$15,000,000.00	

Component cost (in-service year)	$17,395,401.00

Transmission Line Upgrade Component

Component title	1AQ-1) Morrisville - Loudoun 500kv tap to Youngs Branch
Project description	Proprietary business information.
Impacted transmission line	Morrisville to Loudoun
Point A	Morrisville to Loudoun corridor north of Youngs Branch
Point B	Youngs Branch
Point C	Youngs Branch to Morrisville to Loudoun corridor north of Youngs Branch
Terrain description	Route is a short deviation from existing ROW in the suburban area of Manassas. Terrain is mostly flat and crosses an undeveloped forested parcel within a broader industrial area.

Existing Line Physical Characteristics

Operating voltage	500
Conductor size and type	Per incumbent system
Hardware plan description	Incumbent / Transmission Owner to select preferred hardware
Tower line characteristics	500kV monopoles at the proposed tap location

Proposed Line Characteristics

	Designed	Operating
Voltage (kV)	500.000000	500.000000
	Normal ratings	Emergency ratings
Summer (MVA)	4357.000000	4357.000000
Winter (MVA)	5155.000000	5155.000000

Conductor size and type	Incumbent / Transmission Owner to select conductor to achieve the required ratings

Shield wire size and type	Incumbent / Transmission Owner to select preferred shield wire
Rebuild line length	0.17
Rebuild portion description	Break the Morrisville to Loudoun 500kV line, extend the line in and out of the Youngs Branch substation on double circuit structures
Right of way	ROW required from existing Loudoun - Morrisville corridor to existing Young's Branch substation
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.
Component Cost Details - In Current Year $	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$1,500,000.00
Component cost (in-service year)	$1,739,540.00

Transmission Line Upgrade Component

Component title	1B-5) Mt Ida to Morrisville 500kV #2
Project description	Proprietary business information.
Impacted transmission line	Dooms - Cunningham - Elmont and Midlothian - North Anna - Spotsylvania - Morrisville

Point A	Mt Ida
Point B	Morrisville
Point C	
Terrain description	Project is to be built within existing ROW. A detailed inspection of the USGS topographic map reveals relatively consistent, rolling lands with elevations ranging from 520ft to 200ft. According to the NLCD, the Project area largely consists of forest composed of a combination of deciduous, evergreen, and mixed species cover. Cover type compositions beyond forested covers are concentrated in pasture/hay followed by cultivated crops, developed land, and scrub/shrub.

Existing Line Physical Characteristics

Operating voltage	500
Conductor size and type	Per incumbent system
Hardware plan description	Incumbent / Transmission Owner to select preferred hardware
Tower line characteristics	Existing single circuit 500kV on lattice towers

Proposed Line Characteristics

	Designed	Operating
Voltage (kV)	500.000000	500.000000
	Normal ratings	Emergency ratings
Summer (MVA)	4295.000000	4357.000000
Winter (MVA)	5066.000000	5196.000000

Conductor size and type	Incumbent / Transmission Owner to select conductor to achieve the required ratings
Shield wire size and type	Incumbent / Transmission Owner to select preferred shield wire
Rebuild line length	88.7

Rebuild portion description	Rebuild a portion of the Dooms - Cunningham - Elmont corridor and rebuild a portion of the Midlothian - North Anna - Spotsylvania - Morrisville Corridor between Mt Ida and Morrisville to accommodate the proposed single circuit 500kV line. Rebuild existing 500kV structures as two, single circuit 500kV monopoles. See Attachment 10 for proposed configuration by route segment and Attachment 4 for segment locations.
Right of way	Use of existing ROW to extent practicable
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.
Component Cost Details - In Current Year $	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$365,515,000.00
Component cost (in-service year)	$423,885,340.00

Transmission Line Upgrade Component

Component title	1DA-1) Dooms - Cunningham loop into Mt Ida
Project description	Proprietary business information.
Impacted transmission line	Dooms - Cunningham
Point A	Dooms - Cunningham corridor north of Mt Ida

Point B	Mt Ida
Point C	
Terrain description	Work will occur in existing ROW. Terrain features rolling hills with forested land in a rural area.
Existing Line Physical Characteristics	
Operating voltage	500
Conductor size and type	Per incumbent system
Hardware plan description	Incumbent / Transmission Owner to select preferred hardware
Tower line characteristics	Lattice tower, horizontal configuration at the location the line is proposed to be intercepted for the loop into Mt. Ida
Proposed Line Characteristics	

	Designed	Operating
Voltage (kV)	500.000000	500.000000
	Normal ratings	Emergency ratings
Summer (MVA)	4295.000000	4330.000000
Winter (MVA)	4980.000000	5023.000000

Conductor size and type	Incumbent / Transmission Owner to select conductor to achieve the required ratings
Shield wire size and type	Incumbent / Transmission Owner to select preferred shield wire
Rebuild line length	0.1
Rebuild portion description	Incumbent / Transmission Owner to propose preferred structure types and configurations
Right of way	Use of existing ROW to extent practicable
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.

Component Cost Details - In Current Year $	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$300,000.00
Component cost (in-service year)	$347,908.00

Transmission Line Upgrade Component

Component title	1P-3) North Anna - Chancellor 500kV
Project description	Proprietary business information.
Impacted transmission line	Lady Smith to Chancellor
Point A	North Anna
Point B	Chancellor
Point C	
Terrain description	Work will occur in existing ROW. Terrain is features rolling hills with maximum elevation of ~360ft and minimum elevation of ~180ft. The majority of the route is largely rural with a mix of agricultural and forested lands. As the route approaches Chancellor substation, it begins to enter rural residential areas with more development.

Existing Line Physical Characteristics

Operating voltage	500
Conductor size and type	Per incumbent system
Hardware plan description	Incumbent / Transmission Owner to select preferred hardware
Tower line characteristics	Segment 1: Existing corridor contains the existing 500kV North Anna to Ladysmith line on lattice towers, and has adequate space for construction of a second, stand alone line. Segment 2: 500kV lattice towers in a horizontal conductor configuration See Attachment 4 for segment locations.

Proposed Line Characteristics

	Designed	Operating
Voltage (kV)	500.000000	500.000000
	Normal ratings	Emergency ratings
Summer (MVA)	4295.000000	4357.000000
Winter (MVA)	5066.000000	5196.000000

Conductor size and type	Incumbent / Transmission Owner to select conductor to achieve the required ratings
Shield wire size and type	Incumbent / Transmission Owner to select preferred shield wire
Rebuild line length	29.3
Rebuild portion description	Build a new line within the North Anna to Lady Smith existing ROW and rebuild the Lady Smith to Chancellor corridor to accommodate the proposed 500kV line. Segment 1: Build the proposed 500kV lattice towers within the available space in the existing ROW Segment 2: Rebuild existing 500kV structures as two, single circuit 500kV monopoles. See Attachment 10 for proposed configuration by route segment and Attachment 4 for segment locations.
Right of way	Use of existing ROW to extent practicable
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.

Component Cost Details - In Current Year $

Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$118,900,000.00
Component cost (in-service year)	$137,887,547.00

Transmission Line Upgrade Component

Component title	1V-1) Morrisville - Gainesville 230kV
Project description	Proprietary business information.
Impacted transmission line	Morrisville - Vint Hill - Wishing Star
Point A	Morrisville
Point B	Gainesville
Point C	
Terrain description	New line will be contained within existing ROW to maximum extent possible. The southern portion of the route is largely rural with a mix of forested and agricultural land across rolling hills. Elevation ranges from ~450ft to ~180ft with mostly gradual slopes. The northern portion of the route enters the more developed area around Manassas with subdivisions and industrial areas built along the ROW.
Existing Line Physical Characteristics	
Operating voltage	500

Conductor size and type	Per incumbent system
Hardware plan description	Incumbent / Transmission Owner to select preferred hardware
Tower line characteristics	This corridor will be rebuilt via baseline projects b3800.356 and b3800.357 and b3800.11-13 to enable the construction of new Morrisville-Vint Hill-Wishing Star 500kV line. The resulting corridor is expected to consist of three segments with different tower configurations: Segment 1: Three, single circuit 500kV lines on individual monopoles. Segment 2: A 500/230kV monopole, and a 500/115kV monopole Segment 3: Two, double circuit 500/230kV monopoles and one single circuit 500kV monopole.

Proposed Line Characteristics

	Designed	Operating
Voltage (kV)	230.000000	230.000000
	Normal ratings	Emergency ratings
Summer (MVA)	1573.000000	1809.000000
Winter (MVA)	1648.000000	1896.000000

Conductor size and type	Incumbent / Transmission Owner to select conductor to achieve the required ratings
Shield wire size and type	Incumbent / Transmission Owner to select preferred shield wire
Rebuild line length	24
Rebuild portion description	Underbuild the proposed 230kV line on the previously awarded 500kV line Morrisville - Vint Hill - Wishing Star. Segment 1: Redesign a 500kV monopole to 500/230kV for proposed Morrisville - Gainesville line Segment 2: Redesign the 500/115kV monopole to 500/230/115 for the proposed Morrisville-Gainesville line. Segment 3: Redesign the 500kV monopole to be 500/230kV for the proposed Morrisville-Gainesville line. See Attachment 10 for proposed ROW configuration.
Right of way	Use of existing ROW to extent practicable
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.

Component Cost Details - In Current Year $	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$12,000,000.00
Component cost (in-service year)	$13,916,321.00

Transmission Line Upgrade Component

Component title	17TE-1) Remington CT - Marsh Run 230kV reconductor
Project description	Proprietary business information.
Impacted transmission line	Remington CT to Marsh Run CT
Point A	Marsh Run CT
Point B	Remington CT
Point C	
Terrain description	Reconductor will occur in existing ROW. ROW is through rural agricultural area on mostly flat terrain.
Existing Line Physical Characteristics	
Operating voltage	230

Conductor size and type	Per incumbent system	
Hardware plan description	Incumbent / Transmission Owner to select preferred hardware	
Tower line characteristics	Existing double circuit 230kV towers	
Proposed Line Characteristics		
	Designed	Operating
Voltage (kV)	230.000000	230.000000
	Normal ratings	Emergency ratings
Summer (MVA)	1573.000000	1809.000000
Winter (MVA)	1648.000000	1896.000000
Conductor size and type	Incumbent / Transmission Owner to select conductor to achieve the required ratings	
Shield wire size and type	Incumbent / Transmission Owner to select preferred shield wire	
Rebuild line length	0.5	
Rebuild portion description	Reconductor the existing line to achieve higher ratings	
Right of way	Use of existing ROW to extent practicable	
Construction responsibility	Proprietary business information.	
Benefits/Comments	Proprietary business information.	
Component Cost Details - In Current Year $		
Engineering & design	Proprietary business information.	
Permitting / routing / siting	Proprietary business information.	
ROW / land acquisition	Proprietary business information.	
Materials & equipment	Proprietary business information.	

Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$250,000.00
Component cost (in-service year)	$289,923.00

Transmission Line Upgrade Component

Component title	1AJ-2) Remington - Link and Remington CT - Link tap
Project description	Proprietary business information.
Impacted transmission line	Remington to Marsh Run CT and Remington CT to Marsh Run CT
Point A	Remington CT - Marsh Run corridor
Point B	Link
Point C	
Terrain description	Terrain is mostly flat, agricultural land in a rural area.
Existing Line Physical Characteristics	
Operating voltage	230
Conductor size and type	Per incumbent system
Hardware plan description	Incumbent / Transmission Owner to select preferred hardware
Tower line characteristics	Existing double circuit 230kV on lattice towers
Proposed Line Characteristics	

	Designed	Operating
Voltage (kV)	230.000000	230.000000

	Normal ratings	Emergency ratings
Summer (MVA)	1573.000000	1809.000000
Winter (MVA)	1648.000000	1896.000000
Conductor size and type	Incumbent / Transmission Owner to select conductor to achieve the required ratings	
Shield wire size and type	Incumbent / Transmission Owner to select preferred shield wire	
Rebuild line length	0.1	
Rebuild portion description	Tap the Remington to Marsh Run CT and Remington CT to Marsh Run CT 230kV lines and loop into the new Link substation on double circuit structures	
Right of way	Proposed route on land to be procured for Link substation.	
Construction responsibility	Proprietary business information.	
Benefits/Comments	Proprietary business information.	
Component Cost Details - In Current Year $		
Engineering & design	Proprietary business information.	
Permitting / routing / siting	Proprietary business information.	
ROW / land acquisition	Proprietary business information.	
Materials & equipment	Proprietary business information.	
Construction & commissioning	Proprietary business information.	
Construction management	Proprietary business information.	
Overheads & miscellaneous costs	Proprietary business information.	
Contingency	Proprietary business information.	
Total component cost	$1,000,000.00	
Component cost (in-service year)	$1,159,693.00	

Transmission Line Upgrade Component

Component title	1AJ-3) Link - Marsh Run CT 230kV tap
Project description	Proprietary business information.
Impacted transmission line	Remington to Marsh Run CT and Remington CT to Marsh Run CT
Point A	Link
Point B	Remington CT to Marsh Run corridor
Point C	
Terrain description	Terrain is mostly flat, agricultural land in a rural area.
Existing Line Physical Characteristics	
Operating voltage	230
Conductor size and type	Per incumbent system
Hardware plan description	Incumbent / Transmission Owner to select preferred hardware
Tower line characteristics	Existing double circuit 230kV on lattice towers
Proposed Line Characteristics	

	Designed	Operating
Voltage (kV)	230.000000	230.000000
	Normal ratings	Emergency ratings
Summer (MVA)	1573.000000	1809.000000
Winter (MVA)	1648.000000	1896.000000

Conductor size and type	Incumbent / Transmission Owner to select conductor to achieve the required ratings
Shield wire size and type	Incumbent / Transmission Owner to select preferred shield wire

Rebuild line length	0.25
Rebuild portion description	Loop out from the Link substation to the tap on the Remington to Marsh Run CT and Remington CT to Marsh Run CT 230kV lines
Right of way	Proposed route on land to be procured for Link substation
Construction responsibility	Proprietary business information.
Benefits/Comments	Proprietary business information.
Component Cost Details - In Current Year $	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$1,000,000.00
Component cost (in-service year)	$1,159,693.00

Transmission Line Upgrade Component

Component title	1AK-1) Tap for Meadowbrook - Vint Hill + Mt Ida - Link into Link substation
Project description	Proprietary business information.
Impacted transmission line	Meadowbrook to Vint Hill
Point A	Meadowbrook to Vint Hill corridor south of Remington

Point B	Link	
Point C		
Terrain description	Terrain is mostly flat, agricultural land in a rural area.	
Existing Line Physical Characteristics		
Operating voltage	500	
Conductor size and type	NA	
Hardware plan description	NA	
Tower line characteristics	NA	
Proposed Line Characteristics		
	Designed	Operating
Voltage (kV)	500.000000	500.000000
	Normal ratings	Emergency ratings
Summer (MVA)	4357.000000	4357.000000
Winter (MVA)	5155.000000	5155.000000
Conductor size and type	Incumbent / Transmission Owner to select conductor to achieve the required ratings	
Shield wire size and type	Incumbent / Transmission Owner to select preferred shield wire	
Rebuild line length	0.39	
Rebuild portion description	Tap the Meadowbrook- Vint Hill 500kV line and loop into the new Link substation on double circuit structures where the second circuit position will be dedicated to the new Mt Ida - Link line	
Right of way	Proposed route on incumbent owned land and land to be procured for Link substation	
Construction responsibility	Proprietary business information.	
Benefits/Comments	Proprietary business information.	

Component Cost Details - In Current Year $	
Engineering & design	Proprietary business information.
Permitting / routing / siting	Proprietary business information.
ROW / land acquisition	Proprietary business information.
Materials & equipment	Proprietary business information.
Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$500,000.00
Component cost (in-service year)	$579,847.00

Transmission Line Upgrade Component

Component title	1AK-3) Vint Hill - Link 500kV tap
Project description	Proprietary business information.
Impacted transmission line	Meadowbrook to Vint Hill
Point A	Link
Point B	Meadowbrook to Vint Hill corridor south of Remington
Point C	
Terrain description	Terrain is mostly flat, agricultural land in a rural area.
Existing Line Physical Characteristics	
Operating voltage	500
Conductor size and type	Per incumbent system.

Hardware plan description	New hardware required for tap	
Tower line characteristics	No existing towers for tap to Link.	
Proposed Line Characteristics		
	Designed	Operating
Voltage (kV)	500.000000	500.000000
	Normal ratings	Emergency ratings
Summer (MVA)	4357.000000	4357.000000
Winter (MVA)	5155.000000	5155.000000
Conductor size and type	Incumbent / Transmission Owner to select conductor to achieve the required ratings	
Shield wire size and type	Incumbent / Transmission Owner to select preferred shield wire	
Rebuild line length	0.51	
Rebuild portion description	Tap the Meadowbrook - Vint Hill 500kV line and loop into new Link substation, creating the single circuit 500kV Link - Vint Hill line.	
Right of way	Proposed route on incumbent owned land and land to be procured for Link substation	
Construction responsibility	Proprietary business information.	
Benefits/Comments	Proprietary business information.	
Component Cost Details - In Current Year $		
Engineering & design	Proprietary business information.	
Permitting / routing / siting	Proprietary business information.	
ROW / land acquisition	Proprietary business information.	
Materials & equipment	Proprietary business information.	
Construction & commissioning	Proprietary business information.	

Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$750,000.00
Component cost (in-service year)	$869,770.00

Transmission Line Upgrade Component

Component title	1B-11) New Mt Ida - Link 500kV (brownfield portion)
Project description	Proprietary business information.
Impacted transmission line	Bremo - Mt Eagle - Charlottesville - Gordonsville - Remington
Point A	Bremo to Mt Eagle corridor north of Mt Ida
Point B	Link
Point C	
Terrain description	Project is to be built within existing ROW. A detailed inspection of the USGS topographic map reveals relatively consistent, rolling lands with elevations between ~620ft and ~280ft. According to the NLCD, the Project area largely consists of forest composed of a combination of deciduous, evergreen, and mixed species cover. Cover type compositions beyond forested covers are concentrated in pasture/hay followed by cultivated crops, developed land, and scrub/shrub.
Existing Line Physical Characteristics	
Operating voltage	230/115
Conductor size and type	Per incumbent system
Hardware plan description	Incumbent / Transmission Owner to select preferred hardware
Tower line characteristics	Existing corridor has various tower configurations: Segment 1: 230kV H-Frames Segment 2: 115/230kV lattice towers Segment 3: 230kV line on 500/230kV double circuit capable towers, per baseline projects b3800.300-304 and b3800.360-372 Segment 4: 230/115kV monopoles See Attachment 4 for segment locations.

Proposed Line Characteristics

	Designed	Operating
Voltage (kV)	500.000000	500.000000
	Normal ratings	Emergency ratings
Summer (MVA)	4295.000000	4357.000000
Winter (MVA)	5066.000000	5196.000000
Conductor size and type	Incumbent / Transmission Owner to select conductor to achieve the required ratings	
Shield wire size and type	Incumbent / Transmission Owner to select preferred shield wire	
Rebuild line length	66.73	
Rebuild portion description	Rebuild the Bremo - Mt Eagle - Charlottesville - Remington corridor between Bremo to Mt Eagle corridor north of Mt.Ida and Link to accommodate the proposed 500kV line. Segment 1: Rebuild existing 230kV structures as 500/230kV Segment 2: Rebuild existing 230/115kV structures as 500/230/115kV Segment 3: String 500kV proposed line on the available line position on new 500/230kV structures (to be built as part of baseline projects b3800.300-304 and b3800.360-372) Segment 4: Rebuild existing 230/115kV structures as 500/230/115kV. See Attachment 10 for proposed configuration by route segment and Attachment 4 for segment locations.	
Right of way	Use of existing ROW to extent practicable	
Construction responsibility	Proprietary business information.	
Benefits/Comments	Proprietary business information.	
Component Cost Details - In Current Year $		
Engineering & design	Proprietary business information.	
Permitting / routing / siting	Proprietary business information.	
ROW / land acquisition	Proprietary business information.	
Materials & equipment	Proprietary business information.	

Construction & commissioning	Proprietary business information.
Construction management	Proprietary business information.
Overheads & miscellaneous costs	Proprietary business information.
Contingency	Proprietary business information.
Total component cost	$270,000,000.00
Component cost (in-service year)	$313,117,223.00

Congestion Drivers

None

Existing Flowgates

None

New Flowgates

Proprietary business information.

Financial Information

Capital spend start date	01/2025
Construction start date	10/2028
Project Duration (In Months)	65

Cost Containment Commitment

Cost cap (in current year)	Proprietary business information.
Cost cap (in-service year)	Proprietary business information.

Components covered by cost containment

1. 1F-1) Axton - Joshua Falls 765kV - Proposer
2. 1A-2) Joshua Falls - Mt Ida 765kV - Proposer
3. 1D-7) Mt Ida 765/500kV substation - Proposer
4. 1B-6) Mt Ida - Link (greenfield portion) - Proposer
5. 1AH-2) Link 500/230 substation - Proposer

Cost elements covered by cost containment

Engineering & design	Yes
Permitting / routing / siting	Yes
ROW / land acquisition	No
Materials & equipment	Yes
Construction & commissioning	Yes
Construction management	Yes
Overheads & miscellaneous costs	Yes
Taxes	Yes
AFUDC	No
Escalation	No
Additional Information	Proprietary business information.
Is the proposer offering a binding cap on ROE?	Yes
Would this ROE cap apply to the determination of AFUDC?	No
Would the proposer seek to increase the proposed ROE if FERC finds that a higher ROE would not be unreasonable?	No
Is the proposer offering a Debt to Equity Ratio cap?	Proprietary business information.

Additional cost containment measures not covered above	Proprietary business information.

Additional Comments

None