

# **New 500/230kV Bartholow substation, new 500/230kV North Delta substation, new 230kV Grisham switchyard, new 500/230kV Goram substation, and Keeney to Waugh Chapel tie-in.**

## **General Information**

Proposing entity name	Proprietary Company Information
Does the entity who is submitting this proposal intend to be the Designated Entity for this proposed project?	Yes
Company proposal ID	Proprietary Company Information
PJM Proposal ID	948
Project title	New 500/230kV Bartholow substation, new 500/230kV North Delta substation, new 230kV Grisham switchyard, new 500/230kV Goram substation, and Keeney to Waugh Chapel tie-in.
Project description	The Muddy Creek portion of PEBO 215 can be energized in 2027 to incrementally resolve PJM reliability need. New 12-terminal 500/230kV Bartholow substation with 6-terminal 500kV and 6-terminal 230kV, two 500/230kV transformers, two cap banks, and SVC. Interconnected with 500kV Doubs, Conastone, Brighton double circuit, Goram, and interconnected with 230kV Mt. Airy, double circuit Conastone, double circuit Grisham, and Otter Creek. New 230kV double circuit Bartholow to Conastone transmission line, new 230kV double circuit Bartholow to Grisham transmission line, and new 230kV Bartholow to Otter Creek transmission line. New 500kV Bartholow to Goram 500kV transmission line. New 3-terminal 500/230kV Goram substation with one 500/230kV transformer, interconnected with 500kV TMI, Peach Bottom, and Bartholow substations, and interconnected with 230kV Otter Creek substation. New 230kV Goram to Otter Creek transmission line. New 8-terminal 230kV Grisham substation with two cap banks and SVC, interconnected with 230kV Nimbus, Buttermilk, Pacific, BECO, and double circuit Bartholow. New 6-terminal 500/230kV North Delta substation with two 500/230kV transformers, interconnected with 500kV Delta York, Peach Bottom, and Conastone, and interconnected with 230kV Cooper and double circuit Graceton. New 500kV North Delta to Conastone transmission line. New 230kV double circuit North Delta to Graceton transmission lines and new 230kV North Delta to Cooper transmission line. Upgrade limiting elements of lines connecting North Peach Bottom and South Peach Bottom 500kV to achieve required rating. New 230kV double circuit Keeney to Waugh Chapel transmission line. Proposal permitting and overhead costs are captured in component 26A. See attachment 1 for flowgate information.
Email	Proprietary Company Information

Project in-service date	06/2028
Tie-line impact	No
Interregional project	No
Is the proposer offering a binding cap on capital costs?	Yes
Additional benefits	

## Project Components

1. 24e - North Delta to Cooper 230kV rebuild
2. 24f - North Delta to Graceton 230kV rebuild
3. 26A - New 500kV transmission line from new North Delta substation to BGE's Conastone substation.
4. 40AB1 - New two single circuit 230kV transmission lines from new Bartholow substation to new Grisham substation
5. 27d - North Peach Bottom to South Peach Bottom 500kV upgrade
6. 39H1 - New Grisham Substation- 6 terminal
7. 45F1 - New Bartholow Substation - 12 terminal
8. 26b2 - New North Delta Substation - 10 terminal
9. 26c2 - Conastone substation 500kV and 230kV substation expansion
10. 39h1a - Nimbus to Buttermilk 230kV loop in/out work
11. 39h1b - Pacific to Beco 230kV loop in/out work.
12. 47ab - New 230kV transmission from new Goram substation to existing Otter Creek substation
13. 47abc - New 500kV transmission line from new Goram substation to new Bartholow substation
14. 47ad - New 230kV transmission line from existing Otter Creek substation to new Bartholow substation
15. 47b - New double circuit 230kV transmission from the existing Conastone substation to new Bartholow substation
16. 47A - New Goram substation
17. 47ax - Loop in Conastone to Brighton 500kV line to new Bartholow substation
18. 43EF - Mt Airy 230kV substation single breaker expansion
19. 43e - New 230kV transmission line from new Bartholow substation to existing Mt. Airy substation
20. 48b - Two (2) new 230kV single circuit transmission lines from the existing Keeney substation to existing Waugh Chapel substation

- 21. 47ac - Otter Creek 230kV four circuit breaker expansion
- 22. 48C - Keeney substation two (2) new 230kV terminations
- 23. 48d - Waugh Chapel substation two (2) new 230kV terminations
- 24. 50B - Peach Bottom to North Delta 500kV Upgrade

**Transmission Line Upgrade Component**

Component title	24e - North Delta to Cooper 230kV rebuild
Project description	Proprietary Company Information
Impacted transmission line	Cooper sub to Graceton sub 230kV line
Point A	North Delta
Point B	Cooper
Point C	N/A
Terrain description	Rebuild is within existing ROW

**Existing Line Physical Characteristics**

Operating voltage	230
Conductor size and type	Incumbent / Current Transmission owner specific
Hardware plan description	Utilize existing line hardware to extent possible.
Tower line characteristics	Utilize existing towers to extent practicable.

**Proposed Line Characteristics**

	<b>Designed</b>	<b>Operating</b>
Voltage (kV)	230.000000	230.000000
	<b>Normal ratings</b>	<b>Emergency ratings</b>
Summer (MVA)	1573.000000	1810.000000

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	Utilize existing shield wire to extent practicable.	
Rebuild line length	0.75 miles	
Rebuild portion description	Proposing to rebuild the entire line to achieve specific rating.	
Right of way	Use of existing ROW to extent practicable.	
Construction responsibility	Proprietary Company Information	
Benefits/Comments	Resolves reliability issues identified per PJM's Gen. Deliv. Process	

**Component Cost Details - In Current Year \$**

Engineering & design	Proprietary Company Information
Permitting / routing / siting	Proprietary Company Information
ROW / land acquisition	Proprietary Company Information
Materials & equipment	Proprietary Company Information
Construction & commissioning	Proprietary Company Information
Construction management	Proprietary Company Information
Overheads & miscellaneous costs	Proprietary Company Information
Contingency	Proprietary Company Information
Total component cost	\$1,837,500.00
Component cost (in-service year)	\$2,028,256.00

**Transmission Line Upgrade Component**

Component title	24f - North Delta to Graceton 230kV rebuild
Project description	Proprietary Company Information

Impacted transmission line	Cooper sub to Graceton sub 230kV line
Point A	North Delta
Point B	Graceton
Point C	N/A
Terrain description	Rebuild is within existing ROW

**Existing Line Physical Characteristics**

Operating voltage	230
Conductor size and type	Incumbent / Current Transmission owner specific
Hardware plan description	Utilize existing line hardware to extent possible.
Tower line characteristics	New double circuit structures will be required.

**Proposed Line Characteristics**

	<b>Designed</b>	<b>Operating</b>
Voltage (kV)	230.000000	230.000000
	<b>Normal ratings</b>	<b>Emergency ratings</b>
Summer (MVA)	1573.000000	1810.000000
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	Utilize existing shield wire to extent practicable.	
Rebuild line length	6.5 miles	
Rebuild portion description	Proposing to rebuild the entire line to achieve specific rating.	
Right of way	Use of existing ROW to extent practicable.	

Construction responsibility

Proprietary Company Information

Benefits/Comments

Resolves reliability issues identified per PJM's Gen. Deliv. Process

**Component Cost Details - In Current Year \$**

Engineering & design

Proprietary Company Information

Permitting / routing / siting

Proprietary Company Information

ROW / land acquisition

Proprietary Company Information

Materials & equipment

Proprietary Company Information

Construction & commissioning

Proprietary Company Information

Construction management

Proprietary Company Information

Overheads & miscellaneous costs

Proprietary Company Information

Contingency

Proprietary Company Information

Total component cost

\$15,925,000.00

Component cost (in-service year)

\$17,578,220.00

**Greenfield Transmission Line Component**

Component title

26A - New 500kV transmission line from new North Delta substation to BGE's Conastone substation.

Project description

Proprietary Company Information

Point A

North Delta

Point B

Conastone

Point C

N/A

**Normal ratings**

**Emergency ratings**

Summer (MVA)

4295.000000

4357.000000

Winter (MVA)	5066.000000	5196.000000
Conductor size and type	3x 1780 kcmil Chukar ACSR	
Nominal voltage	AC	
Nominal voltage	500	
Line construction type	Overhead	
General route description	<p>Route is approximately 15 miles long. Starting a new dead end structure at the new North Delta substation the lines routes southwest for about 0.75 miles before turning northeast to cross the existing Peach Bottom - Conastone 500kV transmission line. The line routes along the west side of existing Peach Bottom - Conastone 500kV transmission ROW for about 3.5 miles before crossing to the east side of the tranmission ROW to avoid impacting Elixir Farm. The line follows the east side of the existing Peach Bottom - Conastone 500kV transmission ROW for less than a mile and the deviates south-southeast for about 0.75 miles to avoid residential impacts before again following the existing Peach Bottom - Conastone 500kV transmission ROW. The line follows along the southern side of the Peach - Bottom Conastone 500kV transmission ROW for about 9 miles before terminating at the existing Conastone substation, except for at about mile 6 where the line deviates off the existing ROW to avoid residential impacts.</p>	
Terrain description	<p>The Project traverses through Harford County, Maryland into York County, Pennsylvania. Harford County is located in northeastern Maryland in the Piedmont province, characterized by broad, rolling upland with several deep gorges cut by rivers. Features include rolling hills, pasture and fertile farmland, Quarries and iron pits, and the Susquehanna and Monocacy rivers. The Piedmont region's elevation ranges from an average of 350 feet to more than 1,200 feet. In York County the Piedmont Upland is characterized by rolling hills and valleys, generally with gentle to moderately steep slopes. However, steeper slopes with narrow valley bottoms dominate near the Susquehanna River. Many higher ridges are underlain by more resistant bedrock such as quartzite. This Section was formed by fluvial erosion and some peri-glacial wasting and averages about 600-700 feet in elevation. The drainage pattern of the area is considered to be dendritic. Slopes in the range of 0-8% are common throughout York County.</p>	
Right-of-way width by segment	<p>The majority of the new right of way will be an expansion of an existing transmission line corridor, where a 135ft additional width will be required beyond the existing, assumed, ROW edge.</p>	
Electrical transmission infrastructure crossings	<p>See Attachment 4 (Google Earth .kmz) with identified major crossings.</p>	
Civil infrastructure/major waterway facility crossing plan	<p>See Attachment 4 (Google Earth .kmz) with identified major crossings and Attachment 5 - Crossing Plan for more detail.</p>	

Environmental impacts	<p>Environmental constraints identified are manageable through implementation of an environmental avoidance, minimization, and mitigation strategy incorporated at the beginning of the routing/siting process. Co-location with existing utilities and other infrastructure was prioritized to the greatest extent practicable to minimize the environmental impact on the landscape. The proposed route crosses 4 forested national wetland inventory (NWI) wetlands and 8 waterbodies, but it appears that most features are small and could be avoided without permitting. Consultation with the Army Corps of Engineers, Fish and Wildlife Service, and numerous state agencies in Maryland and Pennsylvania are expected. Fatal flaws have not been identified for proposed route. A cultural resource professional assisted with the routing process to identify and minimize impacts to known areas with historic sensitivities. An investigation to further identify and evaluate historic properties will be conducted to determine the presence of archaeologically or historically significant resources. Federally listed species have been identified including listed bats, Maryland dater, and the bog turtle, but no critical habitat was identified along the proposed route. If suitable habitat is identified or regulations change, agency coordination and species-specific surveys will occur. The project intends to adhere to tree removal seasonal restriction windows to avoid and minimize impacts to protected birds and bats, such as the northern long-eared bat, bald eagle, and other common raptors. Erosion control best management practices and setbacks will be engineered and utilized to prevent sedimentation from leaving the site for the protection of aquatic species and to avoid water quality impacts. There are no unique or sensitive environmental concerns or impacts with the proposed transmission line that cannot be addressed.</p>
Tower characteristics	<p>The proposed structures will be single circuit 500kV lattice towers (TTVS-500) in a horizontal configuration. Any proposed deadend structure will either be a steel lattice tower or a 3-pole, one phase per pole configuration. See proposed structure drawing set included in attachment 10.</p>
Construction responsibility	Proprietary Company Information
Benefits/Comments	Resolves reliability issues identified per PJM's Gen. Deliv. Process
<b>Component Cost Details - In Current Year \$</b>	
Engineering & design	Proprietary Company Information
Permitting / routing / siting	Proprietary Company Information
ROW / land acquisition	Proprietary Company Information
Materials & equipment	Proprietary Company Information
Construction & commissioning	Proprietary Company Information
Construction management	Proprietary Company Information

Overheads & miscellaneous costs	Proprietary Company Information
Contingency	Proprietary Company Information
Total component cost	\$76,235,950.00
Component cost (in-service year)	\$55,750,774.00

### Greenfield Transmission Line Component

Component title	40AB1 - New two single circuit 230kV transmission lines from new Bartholow substation to new Grisham substation	
Project description	Proprietary Company Information	
Point A	Bartholow	
Point B	Grisham	
Point C		

	<b>Normal ratings</b>	<b>Emergency ratings</b>
Summer (MVA)	1870.000000	3100.000000
Winter (MVA)	1870.000000	3100.000000
Conductor size and type	OH: 3x 1780 kcmil Chukar ACSR UG: 4x 6000 kcmil Cables per Phase per Circuit	
Nominal voltage	AC	
Nominal voltage	230	
Line construction type	Overhead, Underground	

## General route description

The route is approximately 35 miles long. The component is two single circuit 230kV transmission lines to satisfy contingency requirements with utilizing a shared tower, however the towers can be designed in such a way that they are staggered and offset as to utilize the same ROW width as a double circuit 230kV transmission line. This provides the reliability of two single circuits and the permitting and constructability requirements similar to a single double circuit tower installation. Starting at a new dead-end structure at the new Bartholow substation, the route follows the existing Doubs - Brighton 500kV transmission ROW west - south west for almost 8 miles, expanding the existing ROW. Minor adjustments may be needed for reducing impacts to buildings and residences. The route turns south where Bennet Creek intersects with the existing Doubs - Brighton 500kV transmission ROW and then routes on the eastern side of Sugarloaf Mountain for about 12 miles before then co-locating with the existing Doubs - Goose Creek 500kV transmission ROW. The route follows the existing transmission ROW on the eastern side, expanding the existing ROW, with slight deviation at the Leesburg Water Treatment Plant to avoid impact to operations at the facility. The route shifts underground on the north side of the Potomac river at the Leesburg Water Treatment Plant to reduce viewshed issues with crossing the river and spatial constraints on the south side of the river. The lines remain underground along the Doubs - Goose Creek 500kV ROW corridor until returning to overhead construction around the south east corner of Crosstrail Blvd and Harry Byrd Hwy. The lines follow the Harry Byrd Hwy until turning south on the east side of Loudoun County Pkwy. The lines shift to the west side of Loudoun County Pkwy near the intersection with the Washington and Old Dominion trail to avoid conflicts with the 1757 Golf Club. The lines then share a common double circuit transmission tower for remaining duration of the route as it is less than 1 mile and is advantageous to utilize a double circuit tower for cost effectiveness.

## Terrain description

The Project is located in the valley south of the Potomac River in Loudon County, traversing north through Montgomery and Frederick Counties in Maryland. A former agricultural region, Loudon County is now densely developed with commercial buildings and planned residential communities within commuting distance to Washington, D.C. Some industrial facilities are located to the south of the project area. Slopes are gentle, approximately 4%. The project terminates on the north side of the Potomac River in Frederick, Maryland where the topography is generally rolling. Elevations range from a low of near sea level along the Potomac River to about 875 feet. The river valley's topography includes little steep terrain, but some steep gradients do exist adjacent to the river. These land elevations and the degree of slope have influenced land use in the watershed. The region's relatively flat topography has made it easily accessible for development and agriculture in some areas next to the river and its tributaries.

## Right-of-way width by segment

The new right of way will have its own corridor for approximately 60% of the route length. The right of way will be an expansion of an existing transmission line corridor for approximately 35% of the route length. The right of way width will be 60 feet and it will accommodate 2-230kV lines. Approximately 5% of the route will be underground in narrower and congested areas where overhead construction was considered not feasible. Where underground transmission line segments are not sited by permits issued by the Authority Having Jurisdiction, a 40 ft wide right of way would be required for construction.

## Electrical transmission infrastructure crossings

See Attachment 4 (Google Earth .kmz) with identified major crossings.

Civil infrastructure/major waterway facility crossing plan	See Attachment 4 (Google Earth .kmz) with identified major crossings and Attachment 5 - Crossing Plan for more detail.
Environmental impacts	<p>Environmental constraints identified are manageable through implementation of an environmental avoidance, minimization, and mitigation strategy incorporated at the beginning of the routing/siting process. Co-location with existing utilities and other infrastructure was prioritized to the greatest extent practicable to minimize the environmental impact on the landscape. The proposed route crosses 21 national wetland inventory (NWI) wetlands and 42 waterbodies, but it appears that most features are small and could be avoided without permitting. Consultation with the Army Corps of Engineers, Fish and Wildlife Service, and numerous state agencies are expected. Fatal flaws have not been identified for proposed route. Additional coordination will be required for the crossing of the Potomac River, including with the Chesapeake and Ohio National Historical Park. A cultural resource professional assisted with the routing process to identify and minimize impacts to known areas with historic sensitivities. The Sugarloaf Mountain Historic Landmark is adjacent to the proposed route and will require further consultations. An investigation to further identify and evaluate historic properties will be conducted to determine the presence of archaeologically or historically significant resources. Federally listed species have been identified including listed bats, the rusty-patched bumblebee, and aquatic species. There is potential for Yellow Lance critical habitat to be identified along the proposed route and will require further consultation with the US Fish and Wildlife Service. If suitable habitat is identified or regulations change, agency coordination and species-specific surveys will occur. The project intends to adhere to tree removal seasonal restriction windows to avoid and minimize impacts to protected birds and bats, such as the northern long-eared bat, bald eagle, and other common raptors. Erosion control best management practices and setbacks will be engineered and utilized to prevent sedimentation from leaving the site for the protection of aquatic species and to avoid water quality impacts. There are no unique or sensitive environmental concerns or impacts with the proposed transmission line that cannot be addressed.</p>
Tower characteristics	<p>The proposed structures for each of the two proposed lines will be single circuit 230kV steel monopoles (TVVS-230) in a vertical conductor configuration. Any proposed dead-end structure will be a steel monopole. The portion of the route proposed to be underground will utilize duct bank construction with 3-cables per phase and splicing vaults at regular intervals. See proposed structure drawing set included in attachment 10.</p>
Construction responsibility	Proprietary Company Information
Benefits/Comments	Resolves reliability issues identified per PJM's Gen. Deliv. Process
<b>Component Cost Details - In Current Year \$</b>	
Engineering & design	Proprietary Company Information
Permitting / routing / siting	Proprietary Company Information
ROW / land acquisition	Proprietary Company Information

Materials & equipment	Proprietary Company Information
Construction & commissioning	Proprietary Company Information
Construction management	Proprietary Company Information
Overheads & miscellaneous costs	Proprietary Company Information
Contingency	Proprietary Company Information
Total component cost	\$273,051,101.00
Component cost (in-service year)	\$301,397,324.00

**Transmission Line Upgrade Component**

Component title	27d - North Peach Bottom to South Peach Bottom 500kV upgrade
Project description	Proprietary Company Information
Impacted transmission line	North Peach Bottom to South Peach Bottom 500kV
Point A	North Peach Bottom
Point B	South Peach Bottom
Point C	N/A
Terrain description	Upgrade is within existing ROW

**Existing Line Physical Characteristics**

Operating voltage	500
Conductor size and type	Incumbent / Current Transmission owner specific
Hardware plan description	Utilize existing line hardware to extent possible.
Tower line characteristics	Utilize existing towers to extent practicable.

**Proposed Line Characteristics**

**Designed**

**Operating**

Voltage (kV)	500.000000	500.000000
	<b>Normal ratings</b>	<b>Emergency ratings</b>
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	Utilize existing shield wire to extent practicable	
Rebuild line length	1.03 miles	
Rebuild portion description	Proposing to upgrade limiting elements to achieve specific rating.	
Right of way	Use of existing ROW to extent practicable.	
Construction responsibility	Proprietary Company Information	
Benefits/Comments	Resolves reliability issues identified per PJM's Gen. Deliv. Process	
<b>Component Cost Details - In Current Year \$</b>		
Engineering & design	Proprietary Company Information	
Permitting / routing / siting	Proprietary Company Information	
ROW / land acquisition	Proprietary Company Information	
Materials & equipment	Proprietary Company Information	
Construction & commissioning	Proprietary Company Information	
Construction management	Proprietary Company Information	
Overheads & miscellaneous costs	Proprietary Company Information	
Contingency	Proprietary Company Information	
Total component cost	\$1,514,100.00	
Component cost (in-service year)	\$1,671,283.00	

## Greenfield Substation Component

Component title	39H1 - New Grisham Substation- 6 terminal
Project description	Proprietary Company Information
Substation name	Grisham
Substation description	AC Air Insulated Substation (AIS): New proposed 230 kV Substation. New Breaker and a Half (BAAH) switchyard, three (3) bay, six (6) line terminals, two (2) 150 MVAR shunt capacitor banks, one (1) -300 to +500 MVAR Static VAR Compensator (SVC), eleven (11) 230kV, 5000A, 80kAIC Breakers
Nominal voltage	AC
Nominal voltage	230

## Transformer Information

None

Major equipment description	AC Air Insulated Substation (AIS): New proposed 230 kV Substation. New Breaker and a Half (BAAH) switchyard, three (3) bay, six (6) line terminals, two (2) 150 MVAR shunt capacitor banks, one (1) -300 to +500 MVAR Static VAR Compensator (SVC), eleven (11) 230kV, 5000A, 80kAIC Breakers
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	<b>Normal ratings</b>	<b>Emergency ratings</b>
Summer (MVA)	0.000000	0.000000
Winter (MVA)	0.000000	0.000000

## Environmental assessment

Environmental constraints identified are manageable through implementation of an environmental avoidance, minimization, and mitigation strategy incorporated at the beginning of the routing/siting process. Co-location with existing utilities and other infrastructure was prioritized to the greatest extent practicable to minimize the environmental impact on the landscape. The proposed site crosses one national wetland inventory (NWI) waterbody and no NWI mapped wetlands. Fatal flaws have not been identified for proposed site. A cultural resource professional assisted with the siting process to identify and minimize impacts to known areas with historic sensitivities. An investigation to further identify and evaluate historic properties will be conducted to determine the presence of archaeologically or historically significant resources. Federally listed species have been identified with potential to occur in the area including listed bats and listed mussels, but no critical habitat was identified in the area of the substation site. If suitable habitat is identified or regulations change, agency coordination and species-specific surveys will occur. The project intends to adhere to tree removal seasonal restriction windows to avoid and minimize impacts to protected birds and bats, such as the northern long-eared bat, bald eagle, and other common raptors. Erosion control best management practices and setbacks will be engineered and utilized to prevent sedimentation from leaving the site for the protection of aquatic species and to avoid water quality impacts. There are no unique or sensitive environmental concerns or impacts with the proposed substation site that cannot be addressed.

## Outreach plan

The Company is committed to working with all interested stakeholders through a robust public outreach program to address/respond to community concerns and inform the public about the project to the greatest extent practicable. The Company believes 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 Company'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 that have the least amount of cultural, environmental, and social impacts on the community. The plans will reflect avoidance of impacts rather than mitigation. However, in some cases, if avoidance is not possible, then the Company will involve the community in providing appropriate and practical mitigation measures. the Company will commence its public outreach activities following project award.

## Land acquisition plan

See Attachment 9 for Land Acquisition Plan.

Construction responsibility

Proprietary Company Information

Benefits/Comments

Resolves reliability and market efficiency issues identified per PJM's. process. Substation is a switchyard with no voltage transformation.

**Component Cost Details - In Current Year \$**

Engineering & design

Proprietary Company Information

Permitting / routing / siting

Proprietary Company Information

ROW / land acquisition

Proprietary Company Information

Materials & equipment

Proprietary Company Information

Construction & commissioning

Proprietary Company Information

Construction management

Proprietary Company Information

Overheads & miscellaneous costs

Proprietary Company Information

Contingency

Proprietary Company Information

Total component cost

\$40,920,600.00

Component cost (in-service year)

\$4,516,868.00

**Greenfield Substation Component**

Component title

45F1 - New Bartholow Substation - 12 terminal

Project description

Proprietary Company Information

Substation name

Bartholow

Substation description

AC Air Insulated Substation (AIS): New proposed 500 - 230 kV Substation. New Breaker and a Half (BAAH) 500 kV switchyard with three (3) bays, six (6) line terminals, twelve (12) 500kV, 5000A, 63kAIC Breakers, two (2) shunt 150 MVAR capacitor banks, one (1) -300 to +500 MVAR Static VAR Compensator (SVC), two (2) 500 - 230 kV transformer banks. New BAAH 230 kV switchyard with three (3) bays, six (6) line terminals, eleven (11) 230 kV, 5000A, 80 kAIC breakers.

Nominal voltage

AC

Nominal voltage 500/230

### Transformer Information

	<b>Name</b>	<b>Capacity (MVA)</b>	
Transformer	Transformer 1	1559/1940	
	<b>High Side</b>	<b>Low Side</b>	<b>Tertiary</b>
Voltage (kV)	500	230	N/A
	<b>Name</b>	<b>Capacity (MVA)</b>	
Transformer	Transformer 2	1559/1940	
	<b>High Side</b>	<b>Low Side</b>	<b>Tertiary</b>
Voltage (kV)	500	230	N/A
Major equipment description	AC Air Insulated Substation (AIS): New proposed 500 - 230 kV Substation. New Breaker and a Half (BAAH) 500 kV switchyard with three (3) bays, six (6) line terminals, twelve (12) 500kV, 5000A, 63kAIC Breakers, two (2) shunt 150 MVAR capacitor banks, one (1) -300 to +500 MVAR Static VAR Compensator (SVC), two (2) 500 - 230 kV transformer banks. New BAAH 230 kV switchyard with three (3) bays, six (6) line terminals, eleven (11) 230 kV, 5000A, 80 kAIC breakers.		
	<b>Normal ratings</b>	<b>Emergency ratings</b>	
Summer (MVA)	1559.000000	1940.000000	
Winter (MVA)	1785.000000	2168.000000	

## Environmental assessment

Environmental constraints identified are manageable through implementation of an environmental avoidance, minimization, and mitigation strategy incorporated at the beginning of the routing/siting process. Co-location with existing utilities and other infrastructure was prioritized to the greatest extent practicable to minimize the environmental impact on the landscape. The proposed site crosses no national wetland inventory (NWI) wetlands or waterbodies. Fatal flaws have not been identified for proposed site. A cultural resource professional assisted with the siting process to identify and minimize impacts to known areas with historic sensitivities. An investigation to further identify and evaluate historic properties will be conducted to determine the presence of archaeologically or historically significant resources. Federally listed species have been identified with potential to occur in the area including listed bats, but no critical habitat was identified in the area of the substation site. If suitable habitat is identified or regulations change, agency coordination and species-specific surveys will occur. The project intends to adhere to tree removal seasonal restriction windows to avoid and minimize impacts to protected birds and bats, such as the northern long-eared bat, bald eagle, and other common raptors. Erosion control best management practices and setbacks will be engineered and utilized to prevent sedimentation from leaving the site for the protection of aquatic species and to avoid water quality impacts. There are no unique or sensitive environmental concerns or impacts with the proposed substation site that cannot be addressed.

## Outreach plan

The Company is committed to working with all interested stakeholders through a robust public outreach program to address/respond to community concerns and inform the public about the project to the greatest extent practicable. The Company believes 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 Company'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 that have the least amount of cultural, environmental, and social impacts on the community. The plans will reflect avoidance of impacts rather than mitigation. However, in some cases, if avoidance is not possible, then the Company will involve the community in providing appropriate and practical mitigation measures. the Company will commence its public outreach activities following project award.

## Land acquisition plan

See Attachment 9 for Land Acquisition Plan.

Construction responsibility	Proprietary Company Information
Benefits/Comments	Resolves reliability and market efficiency issues identified per PJM's Gen. Delivery process.

**Component Cost Details - In Current Year \$**

Engineering & design	Proprietary Company Information
Permitting / routing / siting	Proprietary Company Information
ROW / land acquisition	Proprietary Company Information
Materials & equipment	Proprietary Company Information
Construction & commissioning	Proprietary Company Information
Construction management	Proprietary Company Information
Overheads & miscellaneous costs	Proprietary Company Information
Contingency	Proprietary Company Information
Total component cost	\$99,291,150.00
Component cost (in-service year)	\$109,598,851.00

**Greenfield Substation Component**

Component title	26b2 - New North Delta Substation - 10 terminal
Project description	Proprietary Company Information
Substation name	North Delta
Substation description	AC Air Insulated Substation (AIS): New proposed 500 - 230 kV Substation. New 500 kV Breaker and a Half (BAAH) switchyard with two (2) bays, three (3) line terminals, seven (7) 500 kV, 5000A, 63kAIC breakers, two (2) 500 kV - 230 kV transformer banks. New 230 kV BAAH switchyard with two (2) bays, three (3) line terminals, seven (7) 230 kV, 5000A, 80kAIC breakers.
Nominal voltage	AC
Nominal voltage	500/230

## Transformer Information

	<b>Name</b>	<b>Capacity (MVA)</b>	
Transformer	Transformer 1	1559/1940	
	<b>High Side</b>	<b>Low Side</b>	<b>Tertiary</b>
Voltage (kV)	500	230	N/A
	<b>Name</b>	<b>Capacity (MVA)</b>	
Transformer	Transformer 2	1559/1940	
	<b>High Side</b>	<b>Low Side</b>	<b>Tertiary</b>
Voltage (kV)	500	230	N/A
Major equipment description	AC Air Insulated Substation (AIS): New proposed 500 - 230 kV Substation. New 500 kV Breaker and a Half (BAAH) switchyard with two (2) bays, three (3) line terminals, seven (7) 500 kV, 5000A, 63kAIC breakers, two (2) 500 kV - 230 kV transformer banks. New 230 kV BAAH switchyard with two (2) bays, three (3) line terminals, seven (7) 230 kV, 5000A, 80kAIC breakers.		
	<b>Normal ratings</b>	<b>Emergency ratings</b>	
Summer (MVA)	1559.000000	1940.000000	
Winter (MVA)	1785.000000	2168.000000	

## Environmental assessment

Environmental constraints identified are manageable through implementation of an environmental avoidance, minimization, and mitigation strategy incorporated at the beginning of the siting process. Co-location with existing utilities and other infrastructure was prioritized to the greatest extent practicable to minimize the environmental impact on the landscape. The proposed site is an actively maintained agricultural field and no national wetland inventory (NWI) wetlands or waterbodies are crossed. There is no documented floodplain at this location, and fatal flaws have not been identified. A cultural resource professional assisted with the siting process to identify and minimize impacts to known areas with historic sensitivities. An investigation to further identify and evaluate historic properties will be conducted to determine the presence of archaeologically or historically significant resources. Federally listed species have been identified in the general area, including listed bats and bog turtles. However at this time no tree clearing is required for this location. If suitable habitat for bats, or any other protected species, is identified or regulations change, agency consultation and species-specific surveys will occur. The project intends to adhere to tree removal seasonal restriction windows to avoid and minimize impacts to protected birds and bats, such as the Tri-colored Bat, Northern Long-eared Bat, Bald Eagle, and other common raptors. Erosion control best management practices and setbacks will be engineered and utilized to prevent sedimentation from leaving the site for the protection of aquatic species and to avoid water quality impacts. There are no unique or sensitive environmental concerns or impacts with the proposed substation site that cannot be addressed.

## Outreach plan

The Company is committed to working with all interested stakeholders through a robust public outreach program to address/respond to community concerns and inform the public about the project to the greatest extent practicable. The Company believes 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 Company'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 that have the least amount of cultural, environmental, and social impacts on the community. The plans will reflect avoidance of impacts rather than mitigation. However, in some cases, if avoidance is not possible, then the Company will involve the community in providing appropriate and practical mitigation measures. The Company will commence its public outreach activities following project award.

## Land acquisition plan

The substation is being proposed to be built on a parcel that is already under purchase option.

Construction responsibility

Proprietary Company Information

Benefits/Comments

Resolves reliability and market efficiency issues identified per PJM's. process. Substation is a switchyard with no voltage transformation.

**Component Cost Details - In Current Year \$**

Engineering & design

Proprietary Company Information

Permitting / routing / siting

Proprietary Company Information

ROW / land acquisition

Proprietary Company Information

Materials & equipment

Proprietary Company Information

Construction & commissioning

Proprietary Company Information

Construction management

Proprietary Company Information

Overheads & miscellaneous costs

Proprietary Company Information

Contingency

Proprietary Company Information

Total component cost

\$71,442,000.00

Component cost (in-service year)

\$78,858,601.00

**Substation Upgrade Component**

Component title

26c2 - Conastone substation 500kV and 230kV substation expansion

Project description

Proprietary Company Information

Substation name

Conastone

Substation zone

BG&E

Substation upgrade scope

Add one new 500kV CB at Conastone Substation for new greenfield North Delta to Conastone 500kV transmission line. Install 230 kV CB and perform work to terminate two new 230 kV lines.

**Transformer Information**

None	
New equipment description	AC Substation: Add one (1) new 500 kV breaker to existing bay in breaker and a half (BAAH) bus.
Substation assumptions	The use of a position within a bay appears to be available and the two lines can be terminated into the two positions created by the new breaker.
Real-estate description	No expansion of substation fence anticipated
Construction responsibility	Proprietary Company Information
Benefits/Comments	Proprietary Company Information
<b>Component Cost Details - In Current Year \$</b>	
Engineering & design	Proprietary Company Information
Permitting / routing / siting	Proprietary Company Information
ROW / land acquisition	Proprietary Company Information
Materials & equipment	Proprietary Company Information
Construction & commissioning	Proprietary Company Information
Construction management	Proprietary Company Information
Overheads & miscellaneous costs	Proprietary Company Information
Contingency	Proprietary Company Information
Total component cost	\$2,800,000.00
Component cost (in-service year)	\$3,090,676.00
<b>Transmission Line Upgrade Component</b>	
Component title	39h1a - Nimbus to Buttermilk 230kV loop in/out work
Project description	Proprietary Company Information
Impacted transmission line	Nimbus - Buttermilk
Point A	Nimbus

Point B	Buttermilk	
Point C	N/A	
Terrain description	Work required is within existing ROW.	
<b>Existing Line Physical Characteristics</b>		
Operating voltage	230	
Conductor size and type	Incumbent / Current Transmission owner specific	
Hardware plan description	Utilize existing line hardware to extent possible.	
Tower line characteristics	Utilize existing towers to extent practicable.	
<b>Proposed Line Characteristics</b>		
	<b>Designed</b>	<b>Operating</b>
Voltage (kV)	230.000000	230.000000
	<b>Normal ratings</b>	<b>Emergency ratings</b>
Summer (MVA)	1573.000000	1573.000000
Winter (MVA)	1648.000000	1648.000000
Conductor size and type	Incumbent / Transmission Owner to select conductor to achieve the required ratings	
Shield wire size and type	Utilize existing shield wire to extent practicable	
Rebuild line length	0	
Rebuild portion description	Proposing to upgrade limiting elements to achieve specific rating.	
Right of way	Use of existing ROW to extent practicable.	
Construction responsibility	Proprietary Company Information	
Benefits/Comments	Resolves reliability issues identified per PJM's Gen. Deliv. Process	

**Component Cost Details - In Current Year \$**

Engineering & design	Proprietary Company Information
Permitting / routing / siting	Proprietary Company Information
ROW / land acquisition	Proprietary Company Information
Materials & equipment	Proprietary Company Information
Construction & commissioning	Proprietary Company Information
Construction management	Proprietary Company Information
Overheads & miscellaneous costs	Proprietary Company Information
Contingency	Proprietary Company Information
Total component cost	\$5,000,000.00
Component cost (in-service year)	\$5,519,064.00

**Transmission Line Upgrade Component**

Component title	39h1b - Pacific to Beco 230kV loop in/out work.
Project description	Proprietary Company Information
Impacted transmission line	Pacific - BECO
Point A	Pacific
Point B	BECO
Point C	N/A
Terrain description	Work required is within existing ROW.

**Existing Line Physical Characteristics**

Operating voltage	230
Conductor size and type	Incumbent / Current Transmission owner specific

Hardware plan description	Utilize existing line hardware to extent possible.
Tower line characteristics	Utilize existing towers to extent practicable.

**Proposed Line Characteristics**

	<b>Designed</b>	<b>Operating</b>
Voltage (kV)	230.000000	230.000000
	<b>Normal ratings</b>	<b>Emergency ratings</b>
Summer (MVA)	1047.000000	1047.000000
Winter (MVA)	1160.000000	1160.000000
Conductor size and type	Incumbent / Transmission Owner to select conductor to achieve the required ratings	
Shield wire size and type	Utilize existing shield wire to extent practicable	
Rebuild line length	0	
Rebuild portion description	Proposing to upgrade limiting elements to achieve specific rating.	
Right of way	Use of existing ROW to extent practicable.	
Construction responsibility	Proprietary Company Information	
Benefits/Comments	Resolves reliability issues identified per PJM's Gen. Deliv. Process	

**Component Cost Details - In Current Year \$**

Engineering & design	Proprietary Company Information
Permitting / routing / siting	Proprietary Company Information
ROW / land acquisition	Proprietary Company Information
Materials & equipment	Proprietary Company Information
Construction & commissioning	Proprietary Company Information

Construction management	Proprietary Company Information
Overheads & miscellaneous costs	Proprietary Company Information
Contingency	Proprietary Company Information
Total component cost	\$5,000,000.00
Component cost (in-service year)	\$5,519,064.00

### Greenfield Transmission Line Component

Component title	47ab - New 230kV transmission from new Goram substation to existing Otter Creek substation
Project description	Proprietary Company Information
Point A	Goram
Point B	Otter Creek
Point C	N/A

	Normal ratings	Emergency ratings
Summer (MVA)	1573.000000	1809.000000
Winter (MVA)	1648.000000	1896.000000
Conductor size and type	3x 1780 kcmil Chukar ACSR	
Nominal voltage	AC	
Nominal voltage	230	
Line construction type	Overhead	
General route description	The route is less than 1 mile long. Starting a new dead-end structure at the new Goram substation, the line routes southwest for about a half mile toward the Otter Creek substation. The line then turns west at the Otter Creek substation and terminates to connect the two subs.	

Terrain description	<p>The Project is located in York County, within the Appalachian Highlands, a region characterized by a rounded/forested landscape with an elevation of 6,000 feet or less on average. The Appalachian Highlands Region is further broken down into provinces based on different land forms. York County lies almost entirely within the Piedmont Province, except for small areas in the northern portion of the County that are located within the Blue Ridge Province and the Ridge and Valley Province. The Piedmont Upland Section is located in the southern third of the County. The Piedmont Upland is characterized by rolling hills and valleys, generally with gentle to moderately steep slopes. However, steeper slopes with narrow valley bottoms dominate near the Susquehanna River. Many higher ridges are underlain by more resistant bedrock such as quartzite. This Section was formed by fluvial erosion and some peri-glacial wasting and averages about 600-700 feet in elevation. The drainage pattern of the area is considered to be dendritic. Slopes in the range of 0-8% are common throughout York County. The Piedmont Upland of Pennsylvania has a humid continental climate. Weather systems that affect the area generally originate in the central United States and move eastward over the Appalachians. Periodically, moist northward moving weather systems bring moderate and heavy precipitation to the area.</p>
Right-of-way width by segment	The new right of way will have its own corridor and will have a width of 45 ft.
Electrical transmission infrastructure crossings	See Attachment 4 (Google Earth .kmz) with identified major crossings.
Civil infrastructure/major waterway facility crossing plan	See Attachment 4 (Google Earth .kmz) with identified major crossings and Attachment 5 - Crossing Plan for more detail.
Environmental impacts	<p>Environmental constraints identified are manageable through implementation of an environmental avoidance, minimization, and mitigation strategy incorporated at the beginning of the routing/siting process. Co-location with existing utilities and other infrastructure was prioritized to the greatest extent practicable to minimize the environmental impact on the landscape. The proposed route crosses 1 national wetland inventory (NWI) waterbody and no mapped wetlands. Fatal flaws have not been identified for proposed route. A cultural resource professional assisted with the routing process to identify and minimize impacts to known areas with historic sensitivities. An investigation to further identify and evaluate historic properties will be conducted to determine the presence of archaeologically or historically significant resources. Federally listed species have been identified with potential to occur in the area including listed bats, but no critical habitat was identified in the area. If such habitat is identified or regulations change, agency coordination and species-specific surveys will occur. The project intends to adhere to tree removal seasonal restriction windows to avoid and minimize impacts to protected birds and bats, such as the northern long-eared bat, bald eagle, and other common raptors. Erosion control best management practices and setbacks will be engineered and utilized to prevent sedimentation from leaving the site for the protection of aquatic species and to avoid water quality impacts.</p>
Tower characteristics	The proposed structures will be single circuit 230kV steel monopoles (TVS-230) in a delta conductor configuration. Any proposed deadend structure will be a steel monopole. See proposed structure drawing set included in attachment 10.

Construction responsibility	Proprietary Company Information
Benefits/Comments	Resolves reliability issues identified per PJM's Gen. Deliv. Process

**Component Cost Details - In Current Year \$**

Engineering & design	Proprietary Company Information
Permitting / routing / siting	Proprietary Company Information
ROW / land acquisition	Proprietary Company Information
Materials & equipment	Proprietary Company Information
Construction & commissioning	Proprietary Company Information
Construction management	Proprietary Company Information
Overheads & miscellaneous costs	Proprietary Company Information
Contingency	Proprietary Company Information
Total component cost	\$2,372,999.00
Component cost (in-service year)	\$2,619,348.00

**Greenfield Transmission Line Component**

Component title	47abc - New 500kV transmission line from new Goram substation to new Bartholow substation	
Project description	Proprietary Company Information	
Point A	Goram	
Point B	Bartholow	
Point C	N/A	

	<b>Normal ratings</b>	<b>Emergency ratings</b>
Summer (MVA)	4295.000000	4357.000000

Winter (MVA)	5066.000000	5196.000000
Conductor size and type	3x 1780 kcmil Chukar ACSR	
Nominal voltage	AC	
Nominal voltage	500	
Line construction type	Overhead	
General route description	<p>The route is approximately 61 miles long. Starting a new dead end structure at the new Bartholow substation, the line routes northeast along the north side of the existing Brighton to Conastone 500kV transmission ROW. The line follows the existing ROW for about 49 miles and then turns north where the Otter Creek to Conastone 230kV transmission ROW coincides with the Conastone to Brighton 500kV transmission ROW. The line then follows along the west side of the Conastone to Otter Creek 230kV transmission ROW until it reaches the new Goram substation where it terminates.</p>	
Terrain description	<p>The project is located in Maryland's Frederick, Carroll and Baltimore counties east of the Monocacy River. The Frederick Valley, through which the Monocacy flows, is nestled between the Catocin Mountains to the west, and the lower Parrs Ridge to the east. The river valley's topography includes little steep terrain, but some steep gradients do exist adjacent to the river. These land elevations and the degree of slope have influenced land use in the watershed. The region's relatively flat topography has made it easily accessible for development and agriculture in some areas next to the river and its tributaries. The project continues north into the Piedmont Upland area of York County, Pennsylvania, characterized by rolling hills and valleys, generally with gentle to moderately steep slopes. However, steeper slopes with narrow valley bottoms dominate near the Susquehanna River. Many higher ridges are underlain by more resistant bedrock such as quartzite. This Section was formed by fluvial erosion and some peri-glacial wasting and averages about 600-700 feet in elevation. The drainage pattern of the area is considered to be dendritic. Slopes in the range of 0-8% are common throughout York County.</p>	
Right-of-way width by segment	<p>The new right of way will be an expansion of an existing transmission line corridor and will be 55 ft wide.</p>	
Electrical transmission infrastructure crossings	<p>See Attachment 4 (Google Earth .kmz) with identified major crossings.</p>	
Civil infrastructure/major waterway facility crossing plan	<p>See Attachment 4 (Google Earth .kmz) with identified major crossings and Attachment 5 - Crossing Plan for more detail.</p>	

Environmental impacts	<p>Environmental constraints identified are manageable through implementation of an environmental avoidance, minimization, and mitigation strategy incorporated at the beginning of the routing/siting process. Co-location with existing utilities and other infrastructure was prioritized to the greatest extent practicable to minimize the environmental impact on the landscape. The proposed route crosses 80 national wetland inventory (NWI) waterbodies and 21 mapped wetlands. Fatal flaws have not been identified for proposed route. A cultural resource professional assisted with the routing process to identify and minimize impacts to known areas with historic sensitivities. An investigation to further identify and evaluate historic properties will be conducted to determine the presence of archaeologically or historically significant resources. Federally listed species have been identified with potential to occur in the area including listed bats and bog turtles, but no critical habitat was identified in the area. If such habitat is identified or regulations change, agency coordination and species-specific surveys will occur. The project intends to adhere to tree removal seasonal restriction windows to avoid and minimize impacts to protected birds and bats, such as the northern long-eared bat, bald eagle, and other common raptors. Erosion control best management practices and setbacks will be engineered and utilized to prevent sedimentation from leaving the site for the protection of aquatic species and to avoid water quality impacts.</p>
Tower characteristics	<p>The proposed structures will be single circuit 500kV steel monopoles (TVVS-500) in a vertical delta configuration. Any proposed dead-end structure will either be a 3-pole, one phase per pole configuration. See proposed structure drawing set included in attachment 10.</p>
Construction responsibility	Proprietary Company Information
Benefits/Comments	Resolves reliability issues identified per PJM's Gen. Deliv. Process
<b>Component Cost Details - In Current Year \$</b>	
Engineering & design	Proprietary Company Information
Permitting / routing / siting	Proprietary Company Information
ROW / land acquisition	Proprietary Company Information
Materials & equipment	Proprietary Company Information
Construction & commissioning	Proprietary Company Information
Construction management	Proprietary Company Information
Overheads & miscellaneous costs	Proprietary Company Information
Contingency	Proprietary Company Information

Total component cost	\$165,081,876.00
Component cost (in-service year)	\$185,801,105.00

### Greenfield Transmission Line Component

Component title 47ad - New 230kV transmission line from existing Otter Creek substation to new Bartholow substation

Project description Proprietary Company Information

Point A Otter Creek

Point B Bartholow

Point C N/A

	Normal ratings	Emergency ratings
Summer (MVA)	1573.000000	1809.000000
Winter (MVA)	1648.000000	1896.000000

Conductor size and type 3x 1780 kcmil Chukar ACSR

Nominal voltage AC

Nominal voltage 230

Line construction type Overhead

General route description The route is approximately 61 miles long. Starting a new dead-end structure at the new Bartholow substation, the line routes northeast along the north side of the existing Brighton to Conastone 500kV transmission ROW. The line follows the existing ROW for about 49 miles and then turns north where the Otter Creek to Conastone 230kV transmission ROW coincides with the Conastone to Brighton 500kV transmission ROW. The line then follows along the west side of the Conastone to Otter Creek 230kV transmission ROW until it reaches the Otter Creek substation where it terminates.

Terrain description	<p>The project is located in Maryland's Frederick, Carroll and Baltimore counties east of the Monocacy River. The Frederick Valley, through which the Monocacy flows, is nestled between the Catoctin Mountains to the west, and the lower Parris Ridge to the east. The river valley's topography includes little steep terrain, but some steep gradients do exist adjacent to the river. These land elevations and the degree of slope have influenced land use in the watershed. The region's relatively flat topography has made it easily accessible for development and agriculture in some areas next to the river and its tributaries. The project continues north into the Piedmont Upland area of York County, Pennsylvania, characterized by rolling hills and valleys, generally with gentle to moderately steep slopes. However, steeper slopes with narrow valley bottoms dominate near the Susquehanna River. Many higher ridges are underlain by more resistant bedrock such as quartzite. This Section was formed by fluvial erosion and some peri-glacial wasting and averages about 600-700 feet in elevation. The drainage pattern of the area is considered to be dendritic. Slopes in the range of 0-8% are common throughout York County.</p>
Right-of-way width by segment	<p>The new right of way will be an expansion of an existing transmission line corridor for the entirety of its route length. For approximately 1 mile, the right of way width will be 45 ft, for approximately 3.3 miles, the right of way will be 60 ft and will accommodate an additional greenfield line within it. For the remainder of the route, the right of way will be 40 ft wide.</p>
Electrical transmission infrastructure crossings	<p>See Attachment 4 (Google Earth .kmz) with identified major crossings.</p>
Civil infrastructure/major waterway facility crossing plan	<p>See Attachment 4 (Google Earth .kmz) with identified major crossings and Attachment 5 - Crossing Plan for more detail.</p>
Environmental impacts	<p>Environmental constraints identified are manageable through implementation of an environmental avoidance, minimization, and mitigation strategy incorporated at the beginning of the routing/siting process. Co-location with existing utilities and other infrastructure was prioritized to the greatest extent practicable to minimize the environmental impact on the landscape. The proposed route crosses 80 national wetland inventory (NWI) waterbodies and 20 mapped wetlands. Fatal flaws have not been identified for proposed route. A cultural resource professional assisted with the routing process to identify and minimize impacts to known areas with historic sensitivities. An investigation to further identify and evaluate historic properties will be conducted to determine the presence of archaeologically or historically significant resources. Federally listed species have been identified with potential to occur in the area including listed bats, but no critical habitat was identified in the area. If such habitat is identified or regulations change, agency coordination and species-specific surveys will occur. The project intends to adhere to tree removal seasonal restriction windows to avoid and minimize impacts to protected birds and bats, such as the northern long-eared bat, bald eagle, and other common raptors. Erosion control best management practices and setbacks will be engineered and utilized to prevent sedimentation from leaving the site for the protection of aquatic species and to avoid water quality impacts.</p>

Tower characteristics	The majority, approximately 98%, of the proposed structures will be single circuit 230kV steel monopoles (TVVS-230) in a vertical conductor configuration. Approximately 2% of the structures will be double circuit 230kV steel monopoles (TVVS-230DC) in a vertical conductor configuration. Any proposed dead-end structure will be a steel monopole. See proposed structure drawing set included in attachment 10.
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Construction responsibility	Proprietary Company Information
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Benefits/Comments	Resolves reliability issues identified per PJM's Gen. Deliv. Process
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**Component Cost Details - In Current Year \$**

Engineering & design	Proprietary Company Information
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Permitting / routing / siting	Proprietary Company Information
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ROW / land acquisition	Proprietary Company Information
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Materials & equipment	Proprietary Company Information
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Construction & commissioning	Proprietary Company Information
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Construction management	Proprietary Company Information
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Overheads & miscellaneous costs	Proprietary Company Information
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Contingency	Proprietary Company Information
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Total component cost	\$141,430,800.00
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Component cost (in-service year)	\$156,113,140.00
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**Greenfield Transmission Line Component**

Component title	47b - New double circuit 230kV transmission from the existing Conastone substation to new Bartholow substation
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Project description	Proprietary Company Information
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Point A	Conastone
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Point B	Bartholow
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Point C	N/A	
	<b>Normal ratings</b>	<b>Emergency ratings</b>
Summer (MVA)	1573.000000	1809.000000
Winter (MVA)	1648.000000	1896.000000
Conductor size and type	3x 1780 kcmil Chukar ACSR	
Nominal voltage	AC	
Nominal voltage	230	
Line construction type	Overhead	
General route description	The route is approximately 48 miles long. Starting a new dead-end structure at the new Bartholow substation, the line routes northeast along the north side of the existing Brighton to Conastone 500kV transmission ROW. The line follows the existing ROW for almost the entire route and then terminates into Conastone.	
Terrain description	Part of the project is located in Maryland's Frederick and Carroll counties east of the Monocacy River. The Frederick Valley, through which the Monocacy flows, is nestled between the Catoclin Mountains to the west, and the lower Parris Ridge to the east. The river valley's topography includes little steep terrain, but some steep gradients do exist adjacent to the river. These land elevations and the degree of slope have influenced land use in the watershed. The region's relatively flat topography has made it easily accessible for development and agriculture in some areas next to the river and its tributaries. The project continues through Baltimore and Harford counties, in the Piedmont province, characterized by broad, rolling upland with several deep gorges cut by rivers. Features include rolling hills, pasture and fertile farmland, Quarries and iron pits, and the Susquehanna and Monocacy rivers. The Piedmont region's elevation ranges from an average of 350 feet to more than 1,200 feet.	
Right-of-way width by segment	The new right of way will be an expansion of an existing transmission line corridor and will be 45 ft wide.	
Electrical transmission infrastructure crossings	See Attachment 4 (Google Earth .kmz) with identified major crossings.	
Civil infrastructure/major waterway facility crossing plan	See Attachment 4 (Google Earth .kmz) with identified major crossings and Attachment 5 - Crossing Plan for more detail.	

Environmental impacts	<p>Environmental constraints identified are manageable through implementation of an environmental avoidance, minimization, and mitigation strategy incorporated at the beginning of the routing/siting process. Co-location with existing utilities and other infrastructure was prioritized to the greatest extent practicable to minimize the environmental impact on the landscape. The proposed route crosses 64 national wetland inventory (NWI) waterbodies and 16 mapped wetlands. Fatal flaws have not been identified for proposed route. A cultural resource professional assisted with the routing process to identify and minimize impacts to known areas with historic sensitivities. An investigation to further identify and evaluate historic properties will be conducted to determine the presence of archaeologically or historically significant resources. Federally listed species have been identified with potential to occur in the area including listed bats and bog turtles, but no critical habitat was identified in the area. If such habitat is identified or regulations change, agency coordination and species-specific surveys will occur. The project intends to adhere to tree removal seasonal restriction windows to avoid and minimize impacts to protected birds and bats, such as the northern long-eared bat, bald eagle, and other common raptors. Erosion control best management practices and setbacks will be engineered and utilized to prevent sedimentation from leaving the site for the protection of aquatic species and to avoid water quality impacts.</p>
Tower characteristics	<p>The proposed structures will be double circuit 230kV steel monopoles (TVVS-230DC) in a vertical conductor configuration. Any proposed dead-end structure will be a steel monopole. See proposed structure drawing set included in attachment 10.</p>
Construction responsibility	Proprietary Company Information
Benefits/Comments	Resolves reliability issues identified per PJM's Gen. Deliv. Process
<b>Component Cost Details - In Current Year \$</b>	
Engineering & design	Proprietary Company Information
Permitting / routing / siting	Proprietary Company Information
ROW / land acquisition	Proprietary Company Information
Materials & equipment	Proprietary Company Information
Construction & commissioning	Proprietary Company Information
Construction management	Proprietary Company Information
Overheads & miscellaneous costs	Proprietary Company Information
Contingency	Proprietary Company Information

Total component cost \$142,214,100.00  
 Component cost (in-service year) \$156,977,757.00

**Greenfield Substation Component**

Component title 47A - New Goram substation  
 Project description Proprietary Company Information  
 Substation name Goram  
 Substation description AC Air Insulated Substation (AIS): New proposed 500 - 230 kV Substation. New Breaker and a half (BAAH) switchyard with two (2) bays, three (3) line terminals, six (6) 500 kV, 5000A, 63kAIC breakers, one (1) 500 - 230 kV transformer bank and one 230 kV, 5000A, 80 kAIC breaker.  
 Nominal voltage AC  
 Nominal voltage 500/230

**Transformer Information**

	Name		Capacity (MVA)
Transformer	Transformer 1		1559/1940
	High Side	Low Side	Tertiary
Voltage (kV)	500	230	N/A
Major equipment description	AC Air Insulated Substation (AIS): New proposed 500 - 230 kV Substation. New Breaker and a half (BAAH) switchyard with two (2) bays, three (3) line terminals, six (6) 500 kV, 5000A, 63kAIC breakers, one (1) 500 - 230 kV transformer bank and one 230 kV, 5000A, 80 kAIC breaker.		
	Normal ratings		Emergency ratings
Summer (MVA)	1559.000000		1940.000000
Winter (MVA)	1785.000000		2168.000000

## Environmental assessment

Environmental constraints identified are manageable through implementation of an environmental avoidance, minimization, and mitigation strategy incorporated at the beginning of the routing/siting process. Co-location with existing utilities and other infrastructure was prioritized to the greatest extent practicable to minimize the environmental impact on the landscape. The proposed site crosses no mapped national wetland inventory (NWI) waterbodies and no NWI mapped wetlands. Fatal flaws have not been identified for proposed site. A cultural resource professional assisted with the siting process to identify and minimize impacts to known areas with historic sensitivities. An investigation to further identify and evaluate historic properties will be conducted to determine the presence of archaeologically or historically significant resources. Federally listed species have been identified with potential to occur in the area including listed bats and listed mussels, but no critical habitat was identified in the area of the substation site. If suitable habitat is identified or regulations change, agency coordination and species-specific surveys will occur. The project intends to adhere to tree removal seasonal restriction windows to avoid and minimize impacts to protected birds and bats, such as the Indiana bat, northern long-eared bat, bald eagle, and other common raptors. Erosion control best management practices and setbacks will be engineered and utilized to prevent sedimentation from leaving the site for the protection of aquatic species and to avoid water quality impacts. There are no unique or sensitive environmental concerns or impacts with the proposed substation site that cannot be addressed.

## Outreach plan

The Company is committed to working with all interested stakeholders through a robust public outreach program to address/respond to community concerns and inform the public about the project to the greatest extent practicable. The Company believes 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 Company'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 that have the least amount of cultural, environmental, and social impacts on the community. The plans will reflect avoidance of impacts rather than mitigation. However, in some cases, if avoidance is not possible, then the Company will involve the community in providing appropriate and practical mitigation measures. The Company will commence its public outreach activities following project award.

## Land acquisition plan

See Attachment 9 for Land Acquisition Plan.

Construction responsibility	Proprietary Company Information
Benefits/Comments	Resolves reliability and market efficiency issues identified per PJM's Gen. Delivery process.
<b>Component Cost Details - In Current Year \$</b>	
Engineering & design	Proprietary Company Information
Permitting / routing / siting	Proprietary Company Information
ROW / land acquisition	Proprietary Company Information
Materials & equipment	Proprietary Company Information
Construction & commissioning	Proprietary Company Information
Construction management	Proprietary Company Information
Overheads & miscellaneous costs	Proprietary Company Information
Contingency	Proprietary Company Information
Total component cost	\$53,269,300.00
Component cost (in-service year)	\$58,799,340.00

**Transmission Line Upgrade Component**

Component title	47ax - Loop in Conastone to Brighton 500kV line to new Bartholow substation
Project description	Proprietary Company Information
Impacted transmission line	Conastone - Brighton
Point A	Conastone
Point B	Brighton
Point C	N/A
Terrain description	Work required is within existing ROW.

**Existing Line Physical Characteristics**

Operating voltage	500
Conductor size and type	Incumbent / Current Transmission owner specific
Hardware plan description	Utilize existing line hardware to extent possible.
Tower line characteristics	Utilize existing towers to extent practicable.

**Proposed Line Characteristics**

	<b>Designed</b>	<b>Operating</b>
Voltage (kV)	500.000000	500.000000
	<b>Normal ratings</b>	<b>Emergency ratings</b>
Summer (MVA)	2920.000000	3589.000000
Winter (MVA)	3594.000000	4264.000000
Conductor size and type	Incumbent / Transmission Owner to select conductor to achieve the required ratings	
Shield wire size and type	Utilize existing shield wire to extent practicable.	
Rebuild line length	0	
Rebuild portion description	Proposing to upgrade limiting elements to achieve specific rating.	
Right of way	Use of existing ROW to extent practicable.	
Construction responsibility	Proprietary Company Information	
Benefits/Comments	Proprietary Company Information	

**Component Cost Details - In Current Year \$**

Engineering & design	Proprietary Company Information
Permitting / routing / siting	Proprietary Company Information
ROW / land acquisition	Proprietary Company Information

Materials & equipment	Proprietary Company Information
Construction & commissioning	Proprietary Company Information
Construction management	Proprietary Company Information
Overheads & miscellaneous costs	Proprietary Company Information
Contingency	Proprietary Company Information
Total component cost	\$5,000,000.00
Component cost (in-service year)	\$5,519,064.00

### **Substation Upgrade Component**

Component title	43EF - Mt Airy 230kV substation single breaker expansion
Project description	Proprietary Company Information
Substation name	Mt Airy
Substation zone	Allegheny Power
Substation upgrade scope	Install new 230 kV circuit breaker at Mt. Airy substation for terminating new Bartholow to Mt Airy 230 kV line.

### **Transformer Information**

None	
New equipment description	AC Substation: Add one (1) new 230 kV circuit breaker to existing ring.
Substation assumptions	The use of one (1) spare position within the existing ring appears to be available.
Real-estate description	No expansion of substation fence anticipated
Construction responsibility	Proprietary Company Information
Benefits/Comments	Resolves reliability issues identified per PJM's Gen. Deliv. Process

### **Component Cost Details - In Current Year \$**

Engineering & design	Proprietary Company Information
Permitting / routing / siting	Proprietary Company Information
ROW / land acquisition	Proprietary Company Information
Materials & equipment	Proprietary Company Information
Construction & commissioning	Proprietary Company Information
Construction management	Proprietary Company Information
Overheads & miscellaneous costs	Proprietary Company Information
Contingency	Proprietary Company Information
Total component cost	\$2,800,000.00
Component cost (in-service year)	\$3,090,676.00

### **Greenfield Transmission Line Component**

Component title	43e - New 230kV transmission line from new Bartholow substation to existing Mt. Airy substation	
Project description	Proprietary Company Information	
Point A	Bartholow	
Point B	Mt. Airy	
Point C		

	<b>Normal ratings</b>	<b>Emergency ratings</b>
Summer (MVA)	1573.000000	1809.000000
Winter (MVA)	1648.000000	1896.000000
Conductor size and type	OH: 3x 1780 kcmil Chukar ACSR	
Nominal voltage	AC	

Nominal voltage	500
Line construction type	Overhead
General route description	The route is approximately 5 miles long. Starting at a new dead-end structure at the new Bartholow substation, the line routes northeast along the northside of the existing Conastone to Brighton 500kV transmission ROW. The line follows the existing ROW for about 4.25 miles before turning north, routing to the Mt Airy substation and then terminating at the substation.
Terrain description	The project is located in the Piedmont Upland portion of Maryland's Frederick County. The Frederick Valley, through which the Monocacy flows, is nestled between the Catoctin Mountains to the west, and the lower Parrs Ridge to the east. The river valley's topography includes little steep terrain, but some steep gradients do exist adjacent to the river. These land elevations and the degree of slope have influenced land use in the watershed. This section is underlain by metamorphic, igneous, and sedimentary materials, related to volcanic activity that occurred in Precambrian time. The region is comprised of rolling upland with herringbone texture and underlain with siltstones and quartzites.
Right-of-way width by segment	The new right of way will be an expansion of an existing transmission line corridor for approximately 90% of the route length. The right of way will have its own corridor for approximately 10% of the route length. For approximately 1 mile, the right of way width will be 45 ft, for approximately 3.3 miles, the right of way will be 60 ft and will accommodate an additional greenfield line within it. For approximately 0.5 miles the right of way will be 40 ft wide.
Electrical transmission infrastructure crossings	See Attachment 4 (Google Earth .kmz) with identified major crossings.
Civil infrastructure/major waterway facility crossing plan	See Attachment 4 (Google Earth .kmz) with identified major crossings and Attachment 5 - Crossing Plan for more detail.

Environmental impacts	<p>Environmental constraints identified are manageable through implementation of an environmental avoidance, minimization, and mitigation strategy incorporated at the beginning of the routing/siting process. Co-location with existing utilities and other infrastructure was prioritized to the greatest extent practicable to minimize the environmental impact on the landscape. The proposed site crosses 2 national wetland inventory (NWI) mapped wetlands and 6 mapped waterbodies. Fatal flaws have not been identified for proposed site. A cultural resource professional assisted with the siting process to identify and minimize impacts to known areas with historic sensitivities. An investigation to further identify and evaluate historic properties will be conducted to determine the presence of archaeologically or historically significant resources. Federally listed species have been identified with potential to occur in the area including listed bats, but no critical habitat was identified in the area. If such habitat is identified or regulations change, agency coordination and species-specific surveys will occur. The project intends to adhere to tree removal seasonal restriction windows to avoid and minimize impacts to protected birds and bats, such as the northern long-eared bat, bald eagle, and other common raptors. Erosion control best management practices and setbacks will be engineered and utilized to prevent sedimentation from leaving the site for the protection of aquatic species and to avoid water quality impacts. There are no unique or sensitive environmental concerns or impacts with the proposed substation site that cannot be addressed.</p>
Tower characteristics	<p>The majority, approximately 80% of the proposed structures will be single circuit 230kV steel monopoles (TVVS-230) in a vertical conductor configuration. Approximately 20% of the structures will be double circuit 230kV steel monopoles (TVVS-230DC) in a vertical conductor configuration. Any proposed dead-end structure will be a steel monopole. See proposed structure drawing set included in attachment 10.</p>
Construction responsibility	Proprietary Company Information
Benefits/Comments	Resolves reliability issues identified per PJM's Gen. Deliv. Process
<b>Component Cost Details - In Current Year \$</b>	
Engineering & design	Proprietary Company Information
Permitting / routing / siting	Proprietary Company Information
ROW / land acquisition	Proprietary Company Information
Materials & equipment	Proprietary Company Information
Construction & commissioning	Proprietary Company Information
Construction management	Proprietary Company Information
Overheads & miscellaneous costs	Proprietary Company Information

Contingency	Proprietary Company Information
Total component cost	\$11,868,151.00
Component cost (in-service year)	\$13,100,217.00

### Greenfield Transmission Line Component

Component title	48b - Two (2) new 230kV single circuit transmission lines from the existing Keeney substation to existing Waugh Chapel substation
Project description	Proprietary Company Information
Point A	Bartholow
Point B	Mt. Airy
Point C	

	<b>Normal ratings</b>	<b>Emergency ratings</b>
Summer (MVA)	1575.000000	1810.000000
Winter (MVA)	1650.000000	1900.000000
Conductor size and type	OH: 3x 1780 kcmil Chukar ACSR; Submarine: Three, One Core Cables per phase / Circuit	
Nominal voltage	AC	
Nominal voltage	230	
Line construction type	Overhead, Submarine	

General route description

"The route is approximately 104 miles long with roughly 34 miles of submarine cable and roughly 70 miles of overhead transmission line installation. The component is two single circuit 230kV transmission lines to satisfy contingency requirements with utilizing a shared tower, however the towers can be designed in such a way that they are staggered and offset as to utilize the same ROW width as a double circuit 230kV transmission line. This provides the reliability of two single circuits and the permitting and constructability requirements similar to a single double circuit tower installation. Starting a new dead-end structure at the Keeney substation the lines route west-southwest adjacent to the S College Ave ROW, which turns into Summit Bridge Rd. The line continues south alongside the ROW for about 5 miles before turning west at Chesapeake City Rd and then crossing the Back Creek on the east side of Maryland/Delaware state border. The lines route south for 9 miles then shifts southwest to follow the US-301 ROW for another 9 miles. The lines then turn west-southwest and routes a new greenfield ROW for about 24 miles. The lines then transition into submarine cables to cross the Chesapeake Bay. The submarine cables route south in the bay under the William Preston Lane Jr. Memorial Bay Bridge. The submarine cables land just north of Galesville, Maryland, and transition back to overhead transmission lines. The lines route west toward the Waugh Chapel to Calvert Cliffs 500kV transmission ROW and then follow along the west side of the existing transmission ROW north toward Waugh Chapel where both new circuits terminate."

Terrain description

The project is located in Anne Arundel and Kent counties in Maryland, traversing the Chesapeake River to New Castle County in Delaware. Anne Arundel and Kent lie almost entirely within the Atlantic Coastal Plain, with elevations ranging from sea level at the Chesapeake and tidal tributaries to about 300 feet in western areas near the fall line. The terrain is mostly flat or gently rolling, but more dramatic banks and bluffs can be found where waterways cut through areas of higher elevations. These counties are underlain by thick deposits of gravel, sand, silt, and clay. Once crossing the Chesapeake River, the project is in the Coastal Plain region of Delaware, which rises to about 100 feet above sea level. Its streams drain into the rivers or bays, and for much of their length they are tidal. The Coastal Plain is made up of sediments, mostly silt, sand, and gravel, that have been eroded off the Piedmont and adjacent Appalachian Mountains.

Right-of-way width by segment

The new right of way will have its own corridor for approximately 85% of the route length. The new right of way will be an expansion of an existing transmission line corridor for approximately 15% of the route length. The right of way will be 60 ft wide and will accommodate both circuits part of this component. Approximately 30% of the route length will be submarine.

Electrical transmission infrastructure crossings

See Attachment 4 (Google Earth .kmz) with identified major crossings.

Civil infrastructure/major waterway facility crossing plan

See Attachment 4 (Google Earth .kmz) with identified major crossings and Attachment 5 - Crossing Plan for more detail.

Environmental impacts	Environmental constraints identified are manageable through implementation of an environmental avoidance, minimization, and mitigation strategy incorporated at the beginning of the routing/siting process. Co-location with existing utilities and other infrastructure was prioritized to the greatest extent practicable to minimize the environmental impact on the landscape. The proposed route crosses approximately 41 national wetland inventory (NWI) waterbodies, including crossing the Chesapeake and Delaware Canal and Chesapeake Bay, and approximately 87 mapped wetlands. Fatal flaws have not been identified for proposed route. A cultural resource professional assisted with the routing process to identify and minimize impacts to known areas with historic sensitivities. An investigation to further identify and evaluate historic properties will be conducted to determine the presence of archaeologically or historically significant resources. Federally listed species have been identified with potential to occur in the area including listed bats, but no critical habitat was identified in the area. If such habitat is identified or regulations change, agency coordination and species-specific surveys will occur. The project intends to adhere to tree removal seasonal restriction windows to avoid and minimize impacts to protected birds and bats, such as the northern long-eared bat, bald eagle, and other common raptors. Erosion control best management practices and setbacks will be engineered and utilized to prevent sedimentation from leaving the site for the protection of aquatic species and to avoid water quality impacts.
Tower characteristics	The proposed structures will be single circuit 230kV steel monopoles (TVVS-230) in a vertical conductor configuration. Any proposed deadend structure will be a steel monopole. The submarine cables will require landfall construction and transition vaults at either end of the submarine cables. See proposed structure drawing set included in attachment 10.
Construction responsibility	Proprietary Company Information
Benefits/Comments	Resolves reliability issues identified per PJM's Gen. Deliv. Process
<b>Component Cost Details - In Current Year \$</b>	
Engineering & design	Proprietary Company Information
Permitting / routing / siting	Proprietary Company Information
ROW / land acquisition	Proprietary Company Information
Materials & equipment	Proprietary Company Information
Construction & commissioning	Proprietary Company Information
Construction management	Proprietary Company Information
Overheads & miscellaneous costs	Proprietary Company Information

Contingency Proprietary Company Information

Total component cost \$490,310,099.00

Component cost (in-service year) \$541,210,609.00

### **Substation Upgrade Component**

Component title 47ac - Otter Creek 230kV four circuit breaker expansion

Project description Proprietary Company Information

Substation name Otter Creek

Substation zone ME

Substation upgrade scope Install four new CBs for termination of new 230kV transmission lines (new Goram to existing Otter Creek and existing Otter Creek to new Bartholow)

### **Transformer Information**

None

New equipment description AC Substation: Add one (1) new BAAH bay and four (4) 230 kV circuit breakers.

Substation assumptions Space within the substation fence appears to be available.

Real-estate description No expansion of substation fence anticipated

Construction responsibility Proprietary Company Information

Benefits/Comments Resolves reliability issues identified per PJM's Gen. Deliv. Process

### **Component Cost Details - In Current Year \$**

Engineering & design Proprietary Company Information

Permitting / routing / siting Proprietary Company Information

ROW / land acquisition Proprietary Company Information

Materials & equipment Proprietary Company Information

Construction & commissioning	Proprietary Company Information
Construction management	Proprietary Company Information
Overheads & miscellaneous costs	Proprietary Company Information
Contingency	Proprietary Company Information
Total component cost	\$1,400,000.00
Component cost (in-service year)	\$1,545,338.00

### **Substation Upgrade Component**

Component title	48C - Keeney substation two (2) new 230kV terminations
Project description	Proprietary Company Information
Substation name	Keeney
Substation zone	DPL
Substation upgrade scope	Extend existing Keeney substation by adding two (2) new bays, using four (4) 230kV circuit breakers, for terminating two (2) new 230kV transmission lines from Keeney to Waugh Chapel.

### **Transformer Information**

None	
New equipment description	AC Substation: Add two (2) new BAAH bay and four (4) 230 kV circuit breakers.
Substation assumptions	Space within the substation fence appears to be available.
Real-estate description	No expansion of substation fence anticipated
Construction responsibility	Proprietary Company Information
Benefits/Comments	Resolves reliability issues identified per PJM's Gen. Deliv. Process

### **Component Cost Details - In Current Year \$**

Engineering & design	Proprietary Company Information
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Permitting / routing / siting	Proprietary Company Information
ROW / land acquisition	Proprietary Company Information
Materials & equipment	Proprietary Company Information
Construction & commissioning	Proprietary Company Information
Construction management	Proprietary Company Information
Overheads & miscellaneous costs	Proprietary Company Information
Contingency	Proprietary Company Information
Total component cost	\$5,000,000.00
Component cost (in-service year)	\$5,519,064.00

### **Substation Upgrade Component**

Component title	48d - Waugh Chapel substation two (2) new 230kV terminations
Project description	Proprietary Company Information
Substation name	Waugh Chapel
Substation zone	BG&E
Substation upgrade scope	Install two new 230kV circuit breakers and four MODs to create two new BAAH bays for terminating two new 230kV lines from Keeney.

### **Transformer Information**

None	
New equipment description	AC Substation: Install two (2) new 230kV circuit breakers in existing BAAH bays.
Substation assumptions	Spare positions within two existing BAAH bays appears to be available.
Real-estate description	No expansion of substation fence anticipated
Construction responsibility	Proprietary Company Information

Benefits/Comments	Resolves reliability issues identified per PJM's Gen. Deliv. Process
<b>Component Cost Details - In Current Year \$</b>	
Engineering & design	Proprietary Company Information
Permitting / routing / siting	Proprietary Company Information
ROW / land acquisition	Proprietary Company Information
Materials & equipment	Proprietary Company Information
Construction & commissioning	Proprietary Company Information
Construction management	Proprietary Company Information
Overheads & miscellaneous costs	Proprietary Company Information
Contingency	Proprietary Company Information
Total component cost	\$2,800,000.00
Component cost (in-service year)	\$3,090,676.00

**Transmission Line Upgrade Component**

Component title	50B - Peach Bottom to North Delta 500kV Upgrade
Project description	Proprietary Company Information
Impacted transmission line	Peach Bottom to Delta York 500kV
Point A	Peach Bottom
Point B	Delta York
Point C	
Terrain description	Work required is within existing ROW.

**Existing Line Physical Characteristics**

Operating voltage	500
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Conductor size and type	Incumbent / Current Transmission owner specific
Hardware plan description	Utilize existing line hardware to extent possible.
Tower line characteristics	Utilize existing towers to extent practicable.

**Proposed Line Characteristics**

	<b>Designed</b>	<b>Operating</b>
Voltage (kV)	500.000000	500.000000
	<b>Normal ratings</b>	<b>Emergency ratings</b>
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	Utilize existing shield wire to extent practicable	
Rebuild line length	3	
Rebuild portion description	Proposing to upgrade limiting elements to achieve specific rating.	
Right of way	Use of existing ROW to extent practicable.	
Construction responsibility	Proprietary Company Information	
Benefits/Comments	Resolves reliability issues identified per PJM's Gen. Deliv. Process	

**Component Cost Details - In Current Year \$**

Engineering & design	Proprietary Company Information
Permitting / routing / siting	Proprietary Company Information
ROW / land acquisition	Proprietary Company Information
Materials & equipment	Proprietary Company Information

Construction & commissioning	Proprietary Company Information
Construction management	Proprietary Company Information
Overheads & miscellaneous costs	Proprietary Company Information
Contingency	Proprietary Company Information
Total component cost	\$5,000,000.00
Component cost (in-service year)	\$5,519,064.00

### **Congestion Drivers**

None

### **Existing Flowgates**

None

### **New Flowgates**

Proprietary Company Information

### **Financial Information**

Capital spend start date	09/2023
Construction start date	07/2025
Project Duration (In Months)	57

### **Cost Containment Commitment**

Cost cap (in current year)	Proprietary Company Information
Cost cap (in-service year)	Proprietary Company Information

## Components covered by cost containment

1. 26A - New 500kV transmission line from new North Delta substation to BGE's Conastone substation. - NEETMA
2. 40AB1 - New two single circuit 230kV transmission lines from new Bartholow substation to new Grisham substation - NEETMA
3. 39H1 - New Grisham Substation- 6 terminal - NEETMA
4. 45F1 - New Bartholow Substation - 12 terminal - NEETMA
5. 26b2 - New North Delta Substation - 10 terminal - NEETMA
6. 47ab - New 230kV transmission from new Goram substation to existing Otter Creek substation - NEETMA
7. 47abc - New 500kV transmission line from new Goram substation to new Bartholow substation - NEETMA
8. 47ad - New 230kV transmission line from existing Otter Creek substation to new Bartholow substation - NEETMA
9. 47b - New double circuit 230kV transmission from the existing Conastone substation to new Bartholow substation - NEETMA
10. 47A - New Goram substation - NEETMA
11. 43e - New 230kV transmission line from new Bartholow substation to existing Mt. Airy substation - NEETMA
12. 48b - Two (2) new 230kV single circuit transmission lines from the existing Keeney substation to existing Waugh Chapel substation - NEETMA

## Cost elements covered by cost containment

Engineering & design	Yes
Permitting / routing / siting	Yes
ROW / land acquisition	Yes
Materials & equipment	Yes
Construction & commissioning	Yes
Construction management	Yes
Overheads & miscellaneous costs	Yes
Taxes	Yes
AFUDC	No
Escalation	No

Additional Information

Proprietary Company Information

Is the proposer offering a binding cap on ROE?

Yes

Would this ROE cap apply to the determination of AFUDC?

Yes

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 Company Information

Additional cost containment measures not covered above

Proprietary Company Information

**Additional Comments**

None