

# Ft. Martin - Black Oak - Pike, Pike SVC + Cap Banks Solution

## 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	719
Project title	Ft. Martin - Black Oak - Pike, Pike SVC + Cap Banks Solution
Project description	New Pike 500/138 kV substation + SVC + Cap Banks, New Fort Martin - Black Oak - Pike 500 kV line plus various modifications to existing substations. Proposal permitting and overhead costs are captured in component 10C2. See attachment 1 for flowgate information.
Email	Proprietary Company Information
Project in-service date	06/2027
Tie-line impact	No
Interregional project	No
Is the proposer offering a binding cap on capital costs?	Yes
Additional benefits	

## Project Components

1. 10C2 - New 500kV transmission line between new Woodside substation and the Goose Creek substation
2. 4C - New 500kV Transmission line from Allegheny Black Oak substation to new Pike substation
3. 10C1 - New 500kv transmission line from new Pike substation to Dominion Goose Creek substation.
4. 10A - Goose Creek 500kV single breaker expansion
5. 23s3 - New Pike Substation - 5 terminal

6. 04AE - Black Oak substation 500kV six breaker and new transformer expansion
7. 28B - Fort Martin substation single 500kV breaker expansion
8. 23s4 - Gore substation single 138kV breaker expansion
9. 28A - New 500kV transmission line from Allegheny's Fort Martin substation to Allegheny's Black Oak substation.

## Greenfield Transmission Line Component

Component title	10C2 - New 500kV transmission line between new Woodside substation and the Goose Creek substation	
Project description	Proprietary Company Information	
Point A	Woodside	
Point B	Goose Creek	
Point C		
	<b>Normal ratings</b>	<b>Emergency ratings</b>
Summer (MVA)	4357.000000	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	Route is approximately 25 miles long. The component begins as a continuation of the 500kV - 138kV underbuild from the new Pike substation or new Woodside substation, depending on the solution. The line continues to follow the existing Doubs - Bismark 500kV transmission ROW for about 0.5 miles before turning south. The line maintains a predominately south-southeast direction for about 17 miles, with minor shifts in route direction to reduce impacts to existing structures, residences, and vegetation. The new line shifts east around Leesburg, Virginia, for about 5 miles, before reaching the Dulles Greenway and turning north for about 2 miles and then terminating at the existing Goose Creek substation.	

Terrain description	<p>Much of the project is located in the rolling hills and pastures of the Piedmont, where the bedrock consists mostly of gneiss, schist, and granite rocks at a typical depth of between 2 and 10 feet. Soils developed from these rocks and minerals form acid, infertile soils, with sandy loam surfaces. The rolling terrain is interrupted by steep ridges associated with the boundary of the Blue Ridge. Historically, much of the Piedmont region was cleared and farmed intensively, causing extreme erosion over much of the region. Many of the agricultural areas have since reverted to forests.</p>
Right-of-way width by segment	<p>The new right of way will have its own corridor and will have a width of 165 ft.</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 18 national wetland inventory (NWI) wetlands and 30 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. A cultural resource professional assisted with the routing process to identify and minimize impacts to known areas with historic sensitivities. This proposed route will require additional consultations with the Waterford Historic District. 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 bumble bee, and clam species, 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 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 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 conductor configuration. Any proposed deadend structure will either be lattice tower or a 3-pole, one phase per pole structure type. See proposed structure drawing set included in attachment 10.</p>
Construction responsibility	<p>Proprietary Company Information</p>
Benefits/Comments	

**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	\$82,683,090.00
Component cost (in-service year)	\$73,448,913.00

**Greenfield Transmission Line Component**

Component title	4C - New 500kV Transmission line from Allegheny Black Oak substation to new Pike substation	
Project description	Proprietary Company Information	
Point A	Black Oak	
Point B	Pike	
Point C	N/A	

	<b>Normal ratings</b>	<b>Emergency ratings</b>
Summer (MVA)	4357.000000	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 38 miles long. Starting a new dead end structure at the existing Black Oak substation, the line routes east along the south side of the existing Black Oak - Bedington 500kV transmission ROW. The route follows the existing for 8 miles before deviating south from the existing ROW and creating a new ROW for 2.5 miles around Fort Ashbury to minimize structure and residential impacts. The line co-locates with the existing ROW east of Fort Ashbury and follows the southern side of the existing ROW for about 4.5 miles before turning south at the intersection of Black Oak - Bedington 500kV transmission line and Hampshire - Ridgeley 138kV transmission line. The line follows the existing Hampshire - Ridgeley transmission ROW for almost 17 miles before turning east at the existing Hampshire substation. The line then follows the existing Hampshire - Gore 138kV transmission ROW for about 4.5 miles until the Hampshire - Gore 138kV transmission line begins to co-locate with the Doubs - Bismark 500kV transmission line. The new line then follows the existing Doubs - Bismark 500kV transmission ROW on the northern side for almost 2.5 miles before terminating at the new Pike substation.</p>
Terrain description	<p>The project is located in the geological region known as the Ridge and Valley Province due to extensive river valleys between long ridges characterized by low hills with steep slopes with oak-hickory forest. Wide lowlands and rolling uplands with sandy or silty loam predominate the area.</p>
Right-of-way width by segment	<p>The new right of way will be an expansion of an existing transmission line corridor. The majority of the route, approximately 75%, will have a ROW width of 165 ft. Approximately 25% of the route will have a ROW width of 125 ft in congested areas.</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 8 national wetland inventory (NWI) wetlands and 44 waterbodies, but it appears that most features are small and could be avoided without permitting. Crossing of the branches of the Potomac River and North River will require additional agency consultations. 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, the rusty patched bumble bee, and clam species, 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 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. Routing through the Appalachian Mountains will require additional control measures and monitoring. 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 conductor configuration. Any proposed deadend structure will either be lattice tower or a 3-pole, one phase per pole structure type. See proposed structure drawing set included in attachment 10.</p>
Construction responsibility	<p>Proprietary Company Information</p>
Benefits/Comments	<p>Resolves reliability issues identified per PJM's Gen. Deliv. Process</p>
<b>Component Cost Details - In Current Year \$</b>	
Engineering & design	<p>Proprietary Company Information</p>
Permitting / routing / siting	<p>Proprietary Company Information</p>
ROW / land acquisition	<p>Proprietary Company Information</p>
Materials & equipment	<p>Proprietary Company Information</p>
Construction & commissioning	<p>Proprietary Company Information</p>
Construction management	<p>Proprietary Company Information</p>

Overheads & miscellaneous costs	Proprietary Company Information
Contingency	Proprietary Company Information
Total component cost	\$108,993,710.00
Component cost (in-service year)	\$120,308,662.00

**Greenfield Transmission Line Component**

Component title	10C1 - New 500kv transmission line from new Pike substation to Dominion Goose Creek substation.	
Project description	Proprietary Company Information	
Point A	Pike	
Point B	Goose Creek	
Point C	N/A	

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

Route is approximately 37 miles long. Starting at a new dead end structure at the new Pike substation, the line routes east along the existing Gore - Stonewall 138kV transmission line ROW. The line utilizes the existing 138kV transmission ROW by rebuilding the Gore - Stonewall 138kV circuit under the new 500kV circuit. At about 7 miles, the line deviates from the existing 138kV transmission ROW to a new ROW to avoid crossing the Bismark - Doubs 500kV transmission line. The deviation is about 0.75 miles before the line resumes using the existing Gore - Stonewall 138kV transmission ROW. At mile 15, the line again deviates from the existing ROW to avoid impact at the existing Stonewall substation, with a slight reroute around the existing substation, and then resumes using the existing 138kV transmission ROW between Stonewall and Feagan's Mill. The new line continues east for 11 miles with the entire Stonewall - Feagan's Mill 138kV transmission line rebuilt under the new greenfield transmission line. The new line routes around the existing Feagan's Mill substation and then resumes using the existing 138kV transmission ROW between Feagan's Mill and Millville, for about 2 miles where the 138kV transmission ROW separates from the existing Bismark - Doubs 500kV transmission ROW. The line routes adjacent to the existing 500kV transmission ROW for almost 4 miles before resumes using the existing Millville - Lovettsville 138kV transmission line. The line uses the Millville - Lovettsville 138kV transmission line ROW for approximately 4 miles to the east before deviating from the existing 138kV transmission ROW to create a new ROW. It is advantageous to rebuild the existing 138kV transmission circuits underneath the new 500kV transmission line to minimize viewshed impacts, reduce ROW acquisition costs, reduce residential and infrastructure impacts, and reduce tree clearing requirements, especially for the furthest east section where the new line crosses the Appalachian Trail. This line component ends east of the Appalachian Trail, where line component 10c2 begins to continue the route to Goose Creek substation.

Terrain description

This project is located in the Shenandoah Valley region with roads spread throughout the valley connecting towns, farms, and wineries with scenic roads for tourists. Shenandoah Valley is known for its natural beauty and rich history and was considered the Confederacy's Breadbasket during the Civil War. Because of its limestone base, the Shenandoah Valley is karst, a terrain type with distinctive landforms and water resources. Slightly acidic water wore through the bedrock over many millions of years, leaving behind caves, caverns, sinkholes and intermittent streams.

Right-of-way width by segment

The new right of way will be an expansion of an existing transmission line corridor for approximately 45% of the route length, where a 30 ft additional width will be required beyond the existing, assumed, ROW edge. For approximately 40% of the route length, the existing transmission line ROW will be utilized and will require no additional ROW. For approximately 15% of the route length, the right of way will have its own corridor with a width of 115 ft (10%) and 165 ft (5%).

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 1 national wetland inventory (NWI) wetlands and 32 waterbodies, but it appears that most features are small and could be avoided without permitting. The crossing of the Shenandoah River around Millville Dam will require additional agency consultations. The crossing of the Appalachian Trail will also require additional agency coordination and permitting with the National Parks Service. Consultation with the Army Corps of Engineers, Fish and Wildlife Service, and numerous state agencies is 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. This proposed route will require additional consultations with the Beverly Historic Distric. 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 bumble bee, and clam species, 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 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. Routing through the Appalachian Mountains will require additional control measures and monitoring. There are no unique or sensitive environmental concerns or impacts with the proposed transmission line that cannot be addressed."

Tower characteristics

The majority, approximately 85%, of the proposed structures will be single circuit 500kV lattice towers with 138kV (TTVS-500-138) in a horizontal conductor configuration. The 138kV line to be underbuilt is an existing line. Approximately 15% of the structures will be single circuit 500kV lattice towers (TTVS-500) in a horizontal conductor configuration. Any proposed deadend structure will either be lattice tower or a 3-pole, one phase per pole structure type. See proposed structure drawing set included in attachment 10.

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	\$107,187,220.00
Component cost (in-service year)	\$118,314,635.00

### **Substation Upgrade Component**

Component title	10A - Goose Creek 500kV single breaker expansion
Project description	Proprietary Company Information
Substation name	Goose Creek
Substation zone	Dominion
Substation upgrade scope	Expand existing 500kV Goose Creek ring bus by adding one 500kV breaker and two MODs.

### **Transformer Information**

None	
New equipment description	AC Substation: Add one (1) new 500 kV breaker to existing ring.
Substation assumptions	Area south of substation fence is available.
Real-estate description	Expected expansion of fenceline is within utility owned property.
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	\$1,400,000.00
Component cost (in-service year)	\$1,545,338.00

### **Greenfield Substation Component**

Component title	23s3 - New Pike Substation - 5 terminal
Project description	Proprietary Company Information
Substation name	Pike
Substation description	New 5-terminal, 500kV breaker and a half configuration substation with a 500/138kV transformer, a +500/-300 MVAR STATCOM, and two 150 MVAR static cap banks on about 15 acres adjacent to the existing Gore substation. Terminate the new Black Oak - Gore 500kV transmission line and new Gore - Goose Creek 500kV transmission line. Loop in the existing Doubs - Bismark 500kV transmission line.
Nominal voltage	AC
Nominal voltage	500/138

### **Transformer Information**

	<b>Name</b>	<b>Capacity (MVA)</b>
Transformer	Transformer 1	485/619

	<b>High Side</b>	<b>Low Side</b>	<b>Tertiary</b>
Voltage (kV)	500	138	N/A
Major equipment description	AC Air Insulated Substation (AIS): New proposed 500 - 138 kV Substation. New Breaker and a Half (BAAH) 500kV Switchyard with three (3) bays, five (5) line terminals, eleven (11) 500kV, 5000A, 63kAIC Breakers, two (2) 500 kV, 150 MVAR shunt capacitor banks, one (1) -300 to +500 MVAR Static VAR Compensator (SVC), one (1) 500 KV - 138 kV transformer bank, one (1) 138kV, 5000A, 80kAIC breaker.		
	<b>Normal ratings</b>	<b>Emergency ratings</b>	
Summer (MVA)	485.000000	619.000000	
Winter (MVA)	569.000000	654.000000	
Environmental assessment	<p>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 crosses no national wetland inventory (NWI) wetlands or waterbodies. 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. 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.</p>		

Outreach plan	<p>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.</p>
Land acquisition plan	See Attachment 9 for Land Acquisition Plan
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	\$104,415,500.00
Component cost (in-service year)	\$115,255,175.00

### Substation Upgrade Component

Component title	04AE - Black Oak substation 500kV six breaker and new transformer expansion
Project description	Proprietary Company Information
Substation name	Black Oak
Substation zone	Allegheny Power
Substation upgrade scope	Expand the existing Black Oak 500 kV yard by adding two new 500 kV bays. Re-use the existing bay that ties the West and East by installing two circuit breakers as shown in the one line diagram. Re-terminate Black Oak Bedington 500 kV line in that bay position (second bay from the top). Terminate the new Black Oak-Gore 500 kV line in the third bay position from the top Re-terminate the SVC in the fourth bay position from the top Terminate the new Fort Martin-Black Oak line in the second bay east position Total 6 new 500 kV circuit breakers and 12 MODs need to be installed for above work Add a second 500-138 kV transformer to the West Bus (provide same rating as the existing current transformer) Upgrade the protection scheme to remove non-redundancy (single point of failure).

### Transformer Information

	Name		Capacity (MVA)
Transformer	Transformer 1		760
	High Side	Low Side	Tertiary
Voltage (kV)	500	138	N/A
New equipment description	AC Substation: Add three (3) new 500 kV breakers to existing bay in breaker and a half (BAAH) bus. Add one (1) new 500 - 138 kV transformer bank and one (1) 500 kV breaker.		
Substation assumptions	The use of a spare bay appears to be available. Open area west of the control house is 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	\$14,000,000.00
Component cost (in-service year)	\$15,453,380.00

**Substation Upgrade Component**

Component title	28B - Fort Martin substation single 500kV breaker expansion
Project description	Proprietary Company Information
Substation name	Fort Martin
Substation zone	Allegheny Power
Substation upgrade scope	Add one 500kV circuit breaker and two MODs at Fort Martin for new Fort Martin to Black Oak line.

**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.
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	23s4 - Gore substation single 138kV breaker expansion
Project description	Proprietary Company Information
Substation name	Gore
Substation zone	Allegheny Power



Substation upgrade scope

Add a new 138kV circuit breaker and 2 MODs for terminating the greenfield 500/138kV transformer at Gore.

## Transformer Information

None

New equipment description

AC Substation: add one (1) new 138kV breaker and terminate new 138 kV line into existing ring bus.

Substation assumptions

The use of a spare position within existing ring bus 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

\$4,200,000.00

Component cost (in-service year)

\$4,636,014.00

## Greenfield Transmission Line Component

Component title	28A - New 500kV transmission line from Allegheny's Fort Martin substation to Allegheny's Black Oak substation.
Project description	Proprietary Company Information
Point A	Fort Martin
Point B	Black Oak
Point C	

	<b>Normal ratings</b>	<b>Emergency ratings</b>
Summer (MVA)	4295.000000	4357.000000
Winter (MVA)	5066.000000	5166.000000
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 60 miles long. Starting at a new dead end structure at the Fort Martin substation the line routes south-southwest for less than a mile before crossing over the Monongahela River. As the line continues east of the river, it routes for about 1.5 miles before coinciding with the existing West Run - Lake Lynn 138kV transmission ROW, which the route follows for about 4 miles, with small deviations from the ROW to minimize residential impacts. The line turns east at Lake Lynn substation and detours southeast to avoid residential impacts at McMelin for about 3 miles and then crosses to the north side of the existing Lake Lynn - Hazelton 138kV transmission ROW to avoid impacts at the quarry about 1.6 miles east of McMelin. About 1 mile east of the quarry, the line crosses back over to the south side of the transmission line ROW for about 21 miles, with short detours off the transmission ROW to minimize residential impacts, to the intersection of Hazelton - Jennings 138kV transmission line and Black Oak - Hatfield 500kV transmission line. The line then routes east-southeast to follow along the Black Oak - Hatfield 500kV transmission ROW for about 28 miles until it terminates at the Black Oak substation.</p>	

Terrain description	The Project is located in Monongalia and Preston Counties, West Virginia, traversing east through Garrett and Allegany Counties, Maryland. The western part of the project, in the Allegheny and Cumberland Plateaus of West Virginia is predominantly covered by hardwood forests, while the eastern part of the project lies in the Allegheny Mountains, which form the western flank of the Appalachian Mountain Range. As is typical in the Allegheny region, broad flats generally lie below the ridge crests at elevations of approximately 500 feet (150 m). River valleys are generally narrow and deep, with ravines typically 1,000 to 1,800 feet (550 m) below surrounding peaks.
Right-of-way width by segment	The new right of way will be an expansion of an existing transmission line corridor for approximately 85% of the route length, will be 125 ft wide, with select congested areas where the ROW width was reduced to 75 ft. The route will have its own right of way corridor for approximately 15% of its length with a width of 165 ft and 120 ft in select congested areas.
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 4 forested national wetland inventory (NWI) wetlands and 39 waterbodies, but it appears that most features are small and could be avoided without permitting. The crossing of the Monongahela River and Cheat Lake will require additional agency consultations. Consultation with the Army Corps of Engineers, Fish and Wildlife Service, and numerous state agencies is 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, the flat spired three-toothed snail, and snuffbox mussel, 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 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. Routing through the Appalachian Mountains will require additional control measures and monitoring. There are no unique or sensitive environmental concerns or impacts with the proposed transmission line that cannot be addressed."

Tower characteristics 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.

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 \$176,617,630.00

Component cost (in-service year) \$194,952,817.00

**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) 45

## 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. 10C2 - New 500kV transmission line between new Woodside substation and the Goose Creek substation - NEETMA
2. 4C - New 500kV Transmission line from Allegheny Black Oak substation to new Pike substation - NEETMA
3. 10C1 - New 500kv transmission line from new Pike substation to Dominion Goose Creek substation. - NEETMA
4. 23s3 - New Pike Substation - 5 terminal - NEETMA
5. 28A - New 500kV transmission line from Allegheny's Fort Martin substation to Allegheny's Black Oak 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