



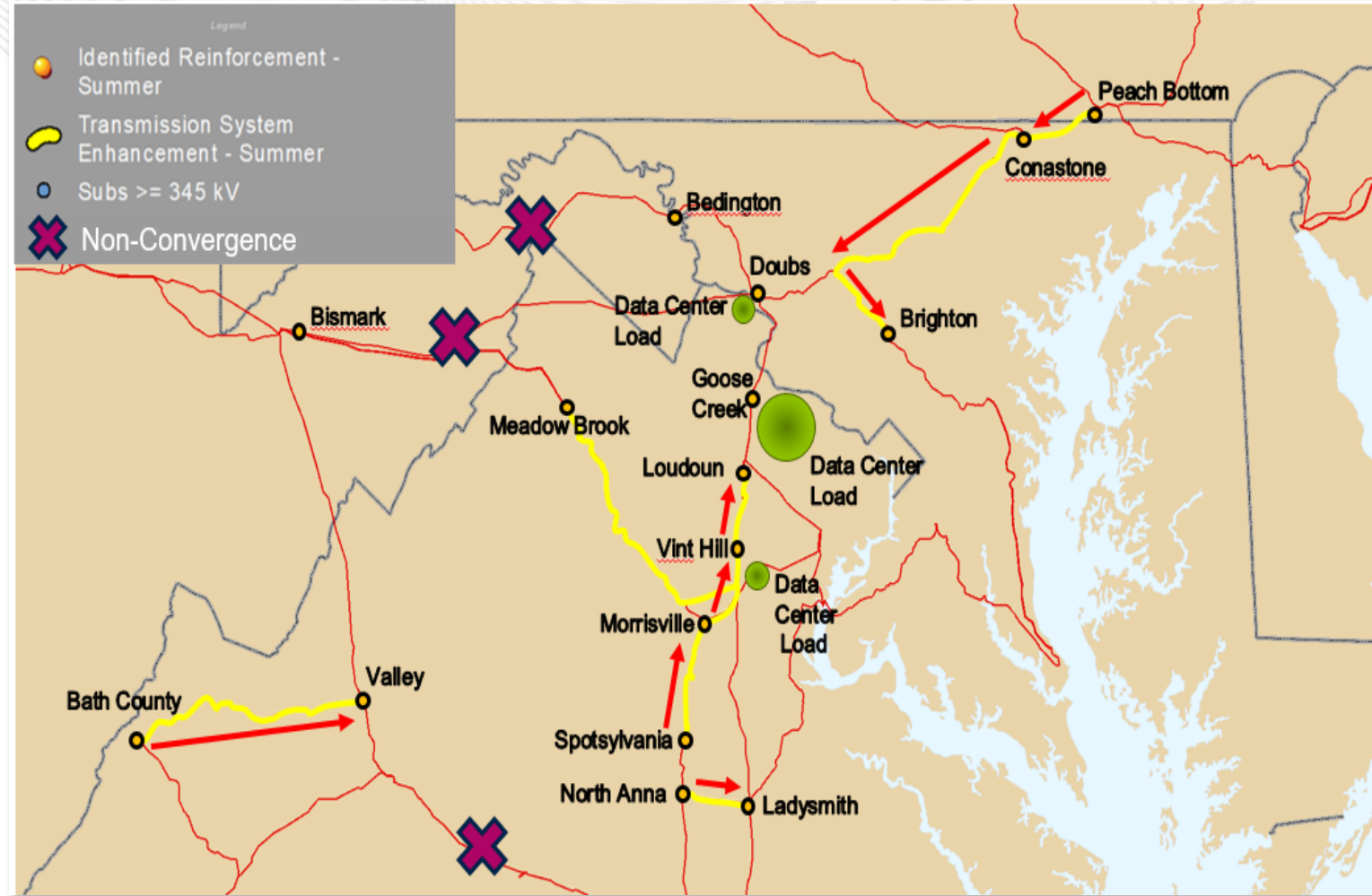
Reliability Analysis Update

Sami Abdulsalam, Senior Manager
PJM Transmission Planning

Transmission Expansion Advisory Committee
December 5, 2023

Changes from 2021 to 2022

- PJM has had unprecedented data center load growth (~7,500 MW) currently forecast by 2027- 28 in Dominion (Northern Virginia) and APS (Doubs)
- 11,100 MW deactivation announced
 - ~ 5,300 MW of retirements occurred after the 2022 RTEP case was created
- The vast majority of the new generation with signed ISAs has been solar
 - Solar has low availability during the winter period
- Replacement generation is coming from the region to the east of Peach Bottom as well as west of Doubs to meet projected load growth.
- PJM has implemented a new block dispatch procedure
 - The old dispatch procedure maintained historical intraregional transfers, dispatching most of the generators in the Dominion zone at 100% or higher.
- Market Efficiency 9A project was suspended



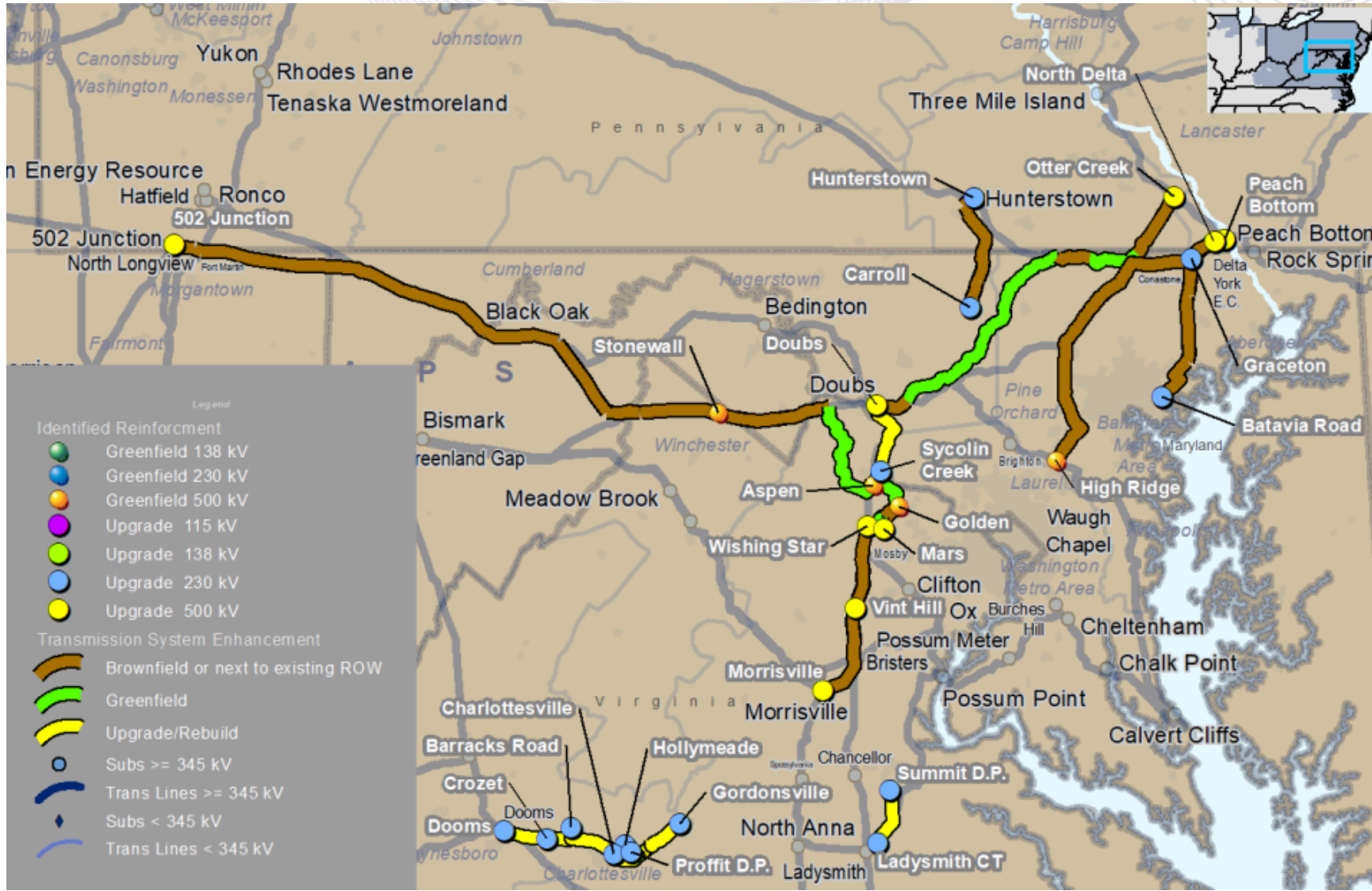
- PJM's mandatory analysis criteria and obligations are developed and monitored by multiple national and regional regulatory agencies:
 - Federal Energy Regulatory Commission
 - North American Electric Reliability Corporation
 - ReliabilityFirst
 - SERC Electric Reliability Corporation
- PJM also includes criteria designed to meet the needs of the PJM markets and operating principals.
- Finally, member Transmission Owners develop criteria design to meet the needs of the local system, including any provisions imposed by state regulatory bodies

72 Proposals Were Received From 10 Entities

6 incumbent, 4 non-incumbent	22 projects are upgrades, while 50 are greenfield	Total ~\$48.5B (sum of all proposal costs – not all are required)	Anticipated Cost for Recommended Solution ~\$5 B
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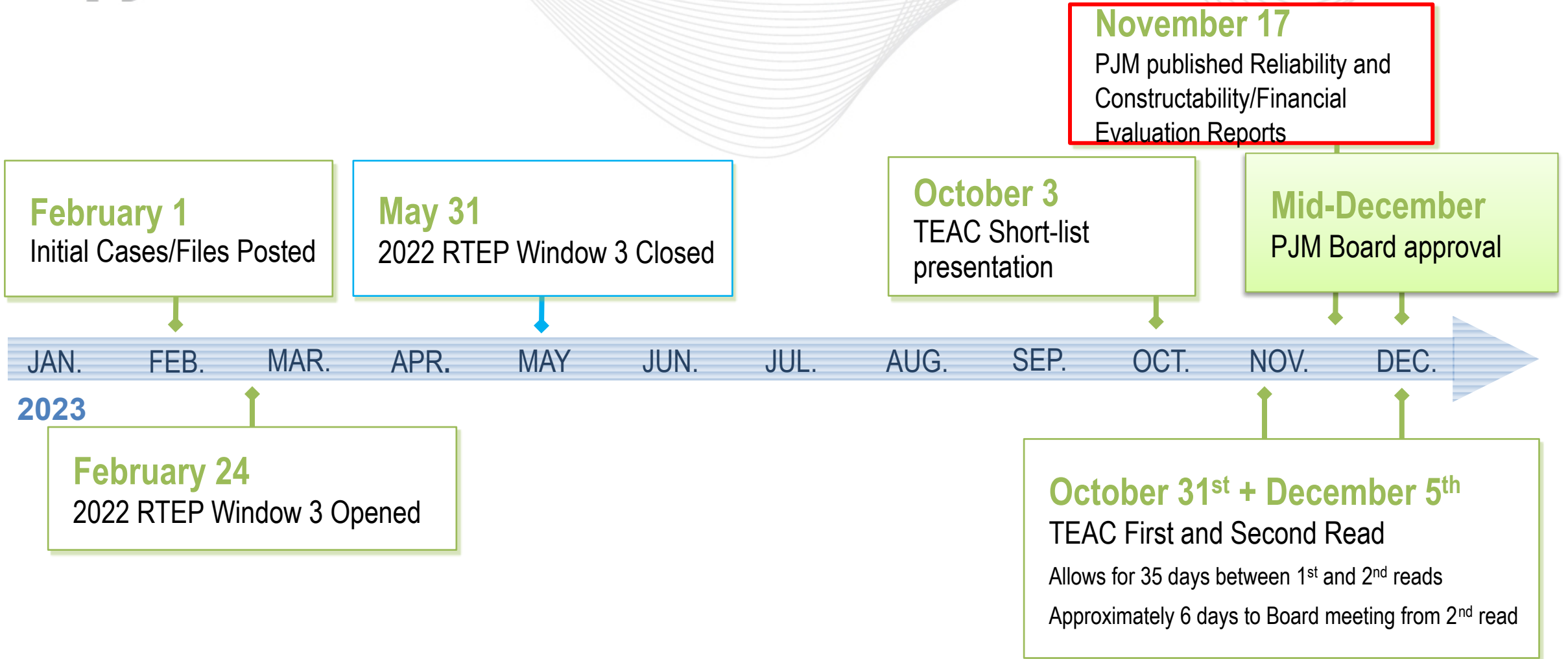
Proposals include:

- 230 kV, 500 kV and 765 kV developments
- 500 kV GIS substations
- UG 500 kV AC cable developments
- Double circuit 500 kV proposals
- HVDC developments



NOTE: This map is only intended to illustrate the general electrical connectivity of the projects, and should not be relied upon for exact geographical substation locations or line routes.

Cluster	Overview	Proposal Cost (\$M)
East	New and upgrade 500 kV lines New and expanded 500 kV stations	\$1,443.12
West	New 500 kV line New 500 kV station New voltage support devices	\$940.85
Northern VA	New 500 kV and 230 kV lines New 500 kV station	\$1,418.3
South	New and upgraded 500 kV and 230 kV lines New voltage support devices	\$1,265.85
Local	Station reconfiguration	\$11.59
Short Circuit	500kV and 230KV Breaker replacement	\$63.27
Total		\$5,142.98



Recommended Solution – 2022 Window 3

Second Read

Baseline Reliability Projects

- Develop robust, holistic and expandable solutions that address the 2027-28 baseline violations associated with:
 - Local constraints: resulting from directly serving data center loads in APS / Dominion
 - Regional constraints resulting from imports into load center areas (500 kV primarily):
 - Needed reactive power VAR reinforcements, both static and dynamic as necessary.
 - Address reliability impacts due to the deactivation of 11GWs of generation.
- Adhere to all applicable planning criteria, including PJM, NERC, SERC, RFC and Local Transmission Owner Criteria.
- Evaluation on both 2027 and 2028 RTEP cases
 - Generation deliverability analysis
 - Load deliverability analysis
 - N-1-1 analysis
 - Baseline contingency analysis
 - Short circuit analysis
 - Dynamic analysis
 - Critical Substation Planning Analysis-CSPA

- Holistic solutions are to be designed such that they are robust and expandable as the load grows within the study area.
- A scalable solution ensures, at a minimum, near-term reliability needs are addressed while also enabling future expansion (beyond the 2027-28 baseline levels).
 - Consider flexibility, robustness and scalability of 2027-28-baseline solutions against the Interim 2027-28 Summer, Winter and Light Load basecases.
 - Evaluate proposals for their effectiveness towards existing reactive interfaces in the area, particularly those supporting the Dominion and APS zones.
 - Evaluate the effectiveness of the proposed solutions towards the transmission system load deliverability into the Dominion and APS zones (CETL).

Two Rounds of PJM Meetings With Proposing Entities:

- Discussions to clarify details of proposed developments, assumptions, rationale of proposed alternatives/variatioins
- First round was conducted in June/July 2023.
- Second round was initiated in late July and concluded mid-August:
 - Focus on outage scheduling, routing, risk and cost assumptions/considerations

Scenario Development and Analysis

To date, PJM developed and analyzed:

- >30 scenarios for the 2027 model (Combination of proposals and components from different proposals)
- >80 scenarios for the 2028 model

Scenarios Were Built Based On:

- Full combination scenarios by proposing entities (Incumbents, Nextera, LS Power and Transource)
- Optimized scenarios using components from incumbent and non-incumbent proposing entities

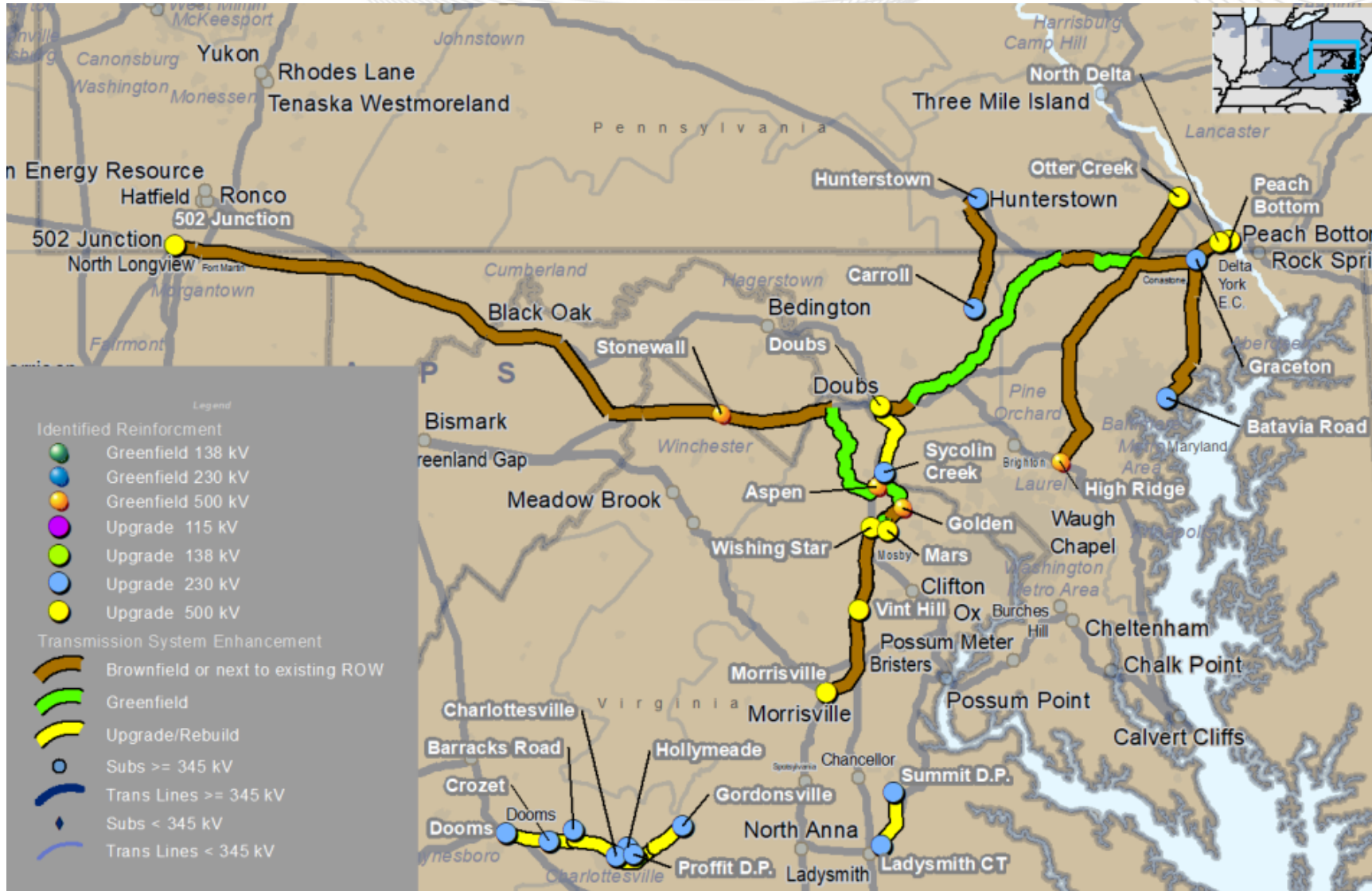
Scenarios With Their Associated Proposed Developments Will Be Evaluated Based On the Following Principles:

<p><u>Performance</u></p> <p>Meeting the system needs of 2027 and being flexible to address 2028 needs</p>	<p><u>Scalability</u></p> <p>Scenario/development longevity – system robustness and utilization</p>	<p><u>Impact</u></p> <p>Utilization of existing ROWs where possible and efficient.</p>	<p><u>Validated Cost</u></p> <p>Cost evaluation using third-party benchmarking metrics</p>
<p><u>Risks</u></p> <ul style="list-style-type: none"> • Triggering additional costs: <ul style="list-style-type: none"> – Substation rebuilds due to extreme short-circuit levels – Avoid extended critical outages (Peach Bottom / Conastone rebuilds) • Imposing high permitting • Inability to meeting in-service date 		<p><u>Efficiencies</u></p> <ul style="list-style-type: none"> • Avoidance of redundant capital investment including recognizing synergies with EOL facilities and overlaps of previously approved (or imminent) supplemental/baseline upgrades. 	

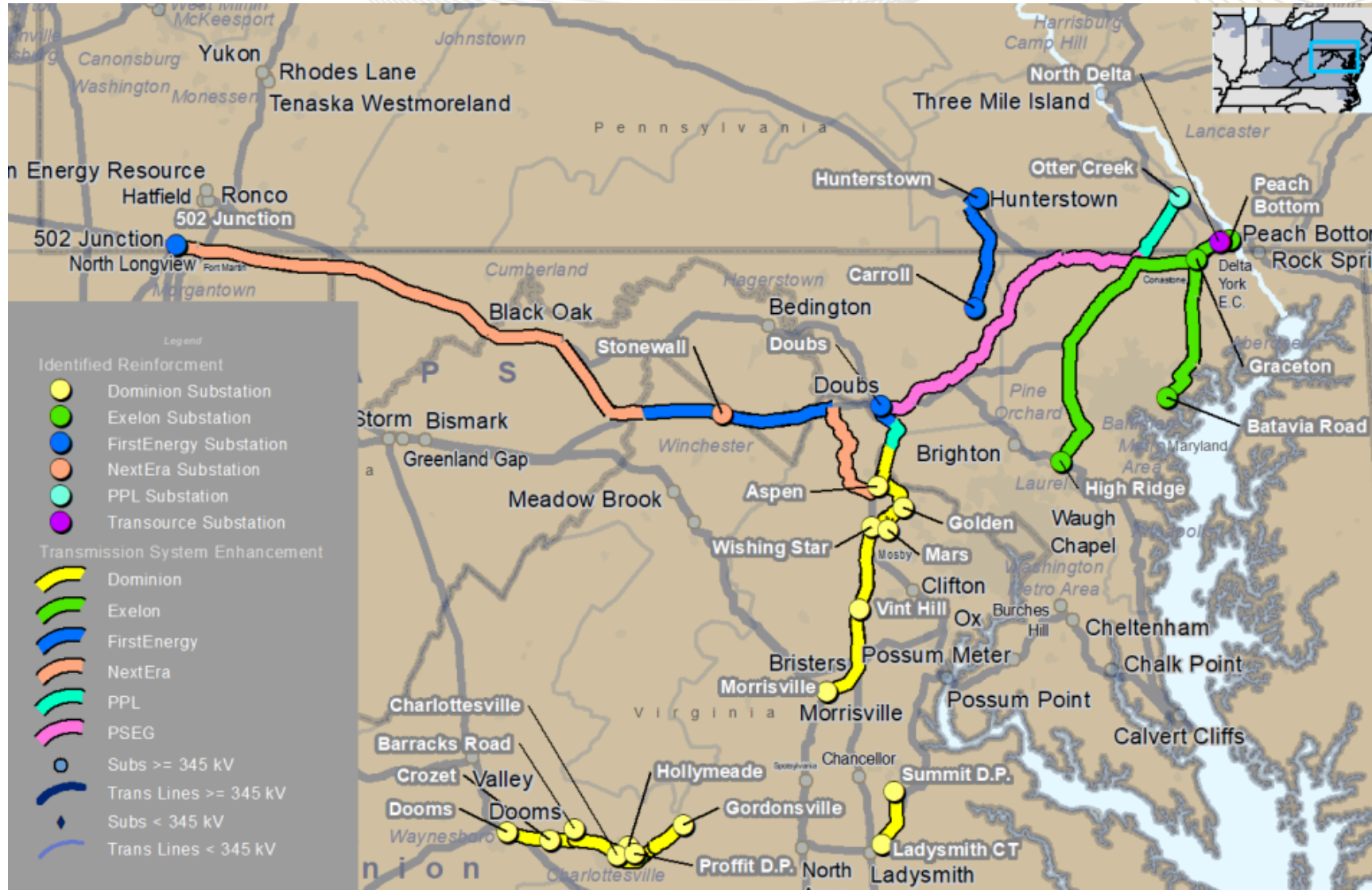
- Initial 2022 Window 3 (2027 basecase) has Brandon Shores generators modeled and dispatched
- The 2022 Window 3 (2028 basecase) has Brandon Shores generators removed as per the deactivation notice
- As will be shown, PJM received proposals from PSEG, NextEra, and Exelon addressing the Brandon Shores deactivation covering 2028 robustness test
- All proposals submitted to address only 2027 base case needs do not consider Brandon Shores deactivation
- PJM evaluated effectiveness of all submitted proposals to address Brandon Shores deactivation against the PJM Board approved project.
- Later in 2023, Wagner submitted its deactivation notice and PJM is currently evaluating its reliability impact in 2025 considering both the Brandon Shores deactivation reliability upgrades and the 2022W3 proposed solutions.
 - Reliability evaluations currently ongoing

- Selected proposals were previously presented at the Oct 31st TEAC
- The selected proposals are robust and expandable while also being the more effective or cost efficient solutions to address the bulk transfer, regional and local transmission needs in the study area.
- In the slides to follow, PJM will walk through the selected proposals in each cluster (South, Northern Virginia/Doubs, East, and West)
- PJM recommended changes to earlier approved projects (either expansions, adjustments or cancellations)
- PJM identified additional upgrades for each cluster

Major Proposals Selected in 2022 Window 3

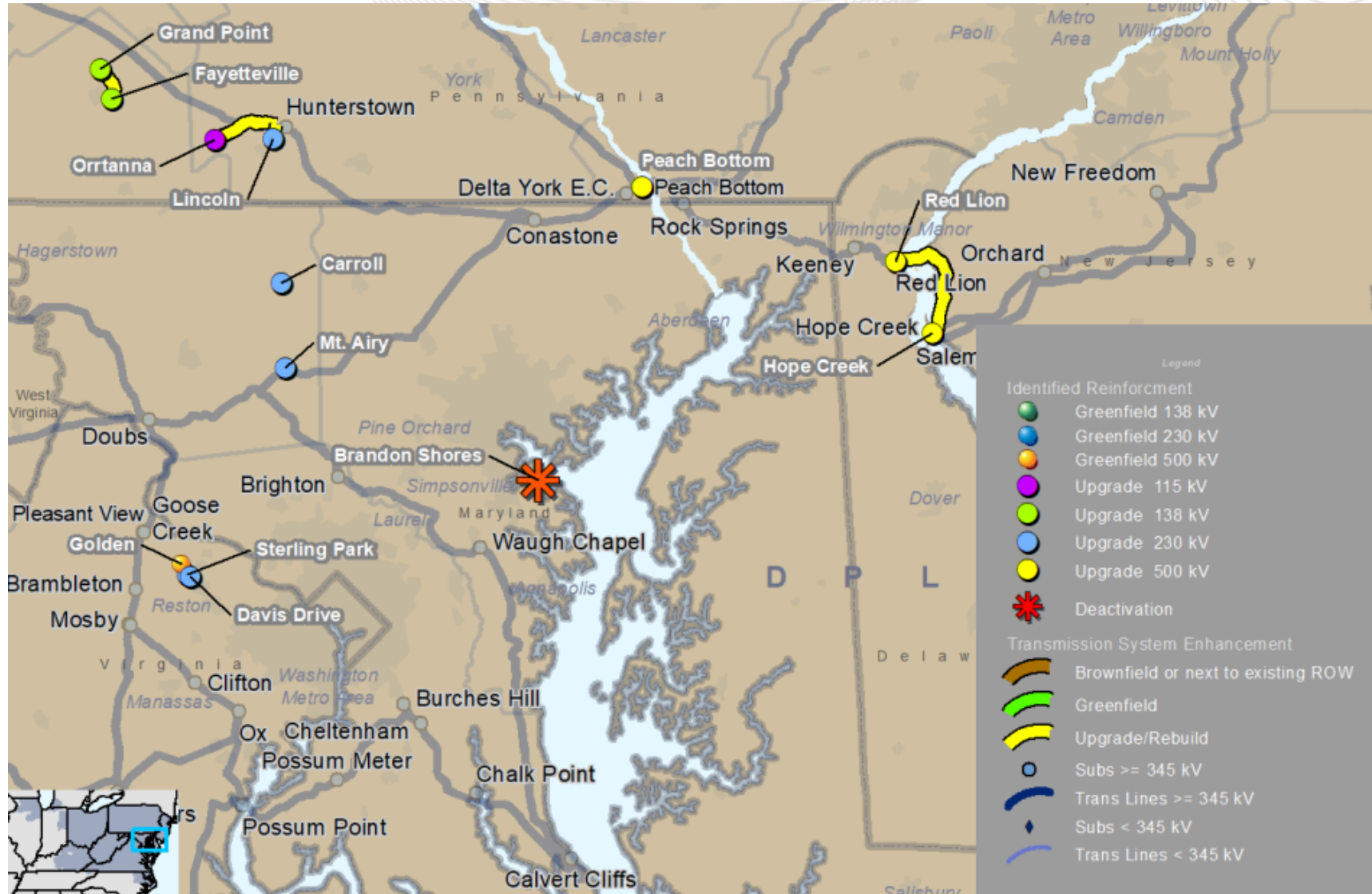


Major Proposals Selected in 2022 Window 3 - by Designated Entity



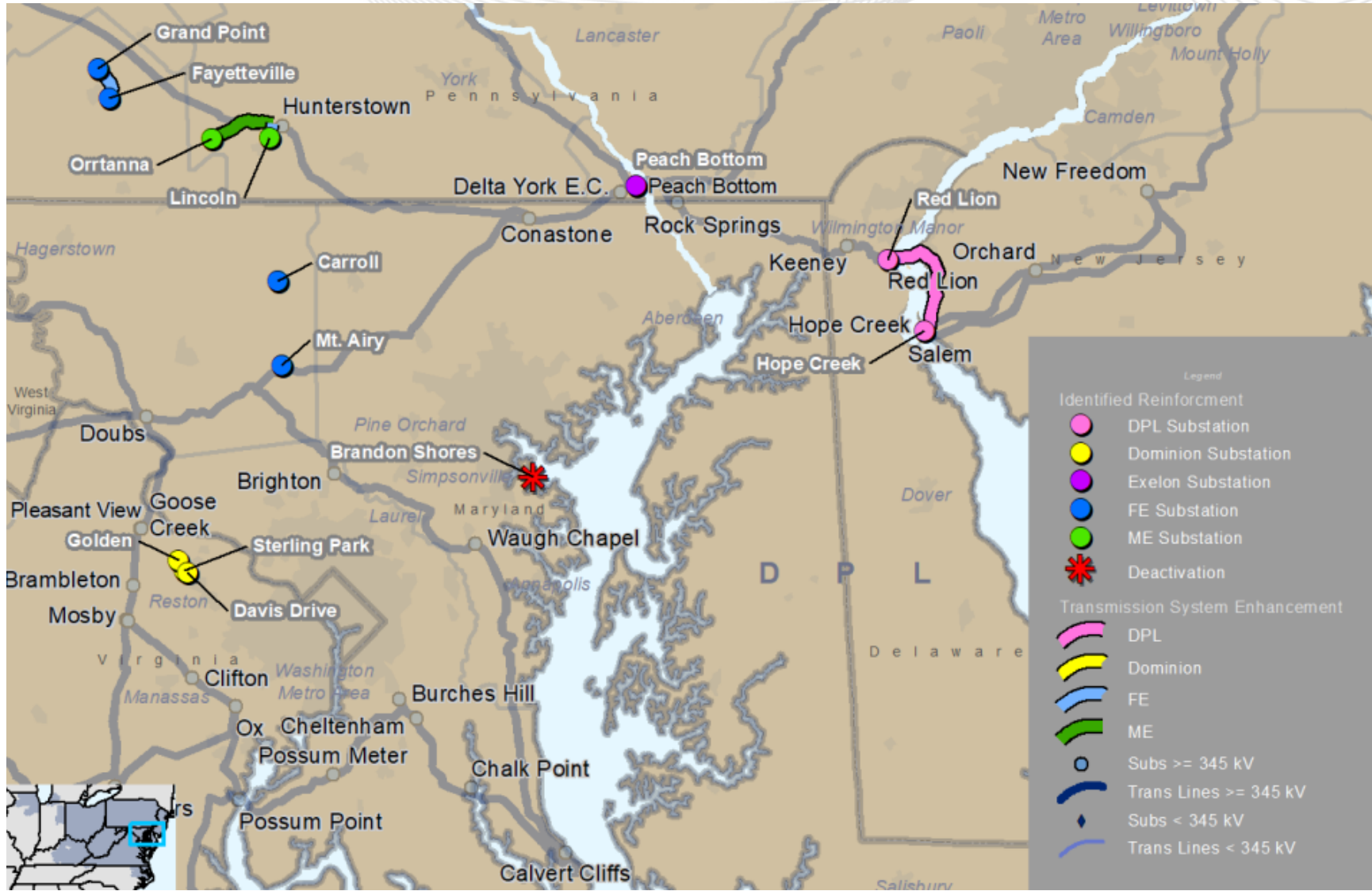
NOTE: This map is only intended to illustrate the general electrical connectivity of the projects, and should not be relied upon for exact geographical substation locations or line routes.

Additional upgrades needed in 2022 Window 3



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Additional upgrades needed in 2022 Window 3 – by TO



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Adjustments to Earlier Approved Projects

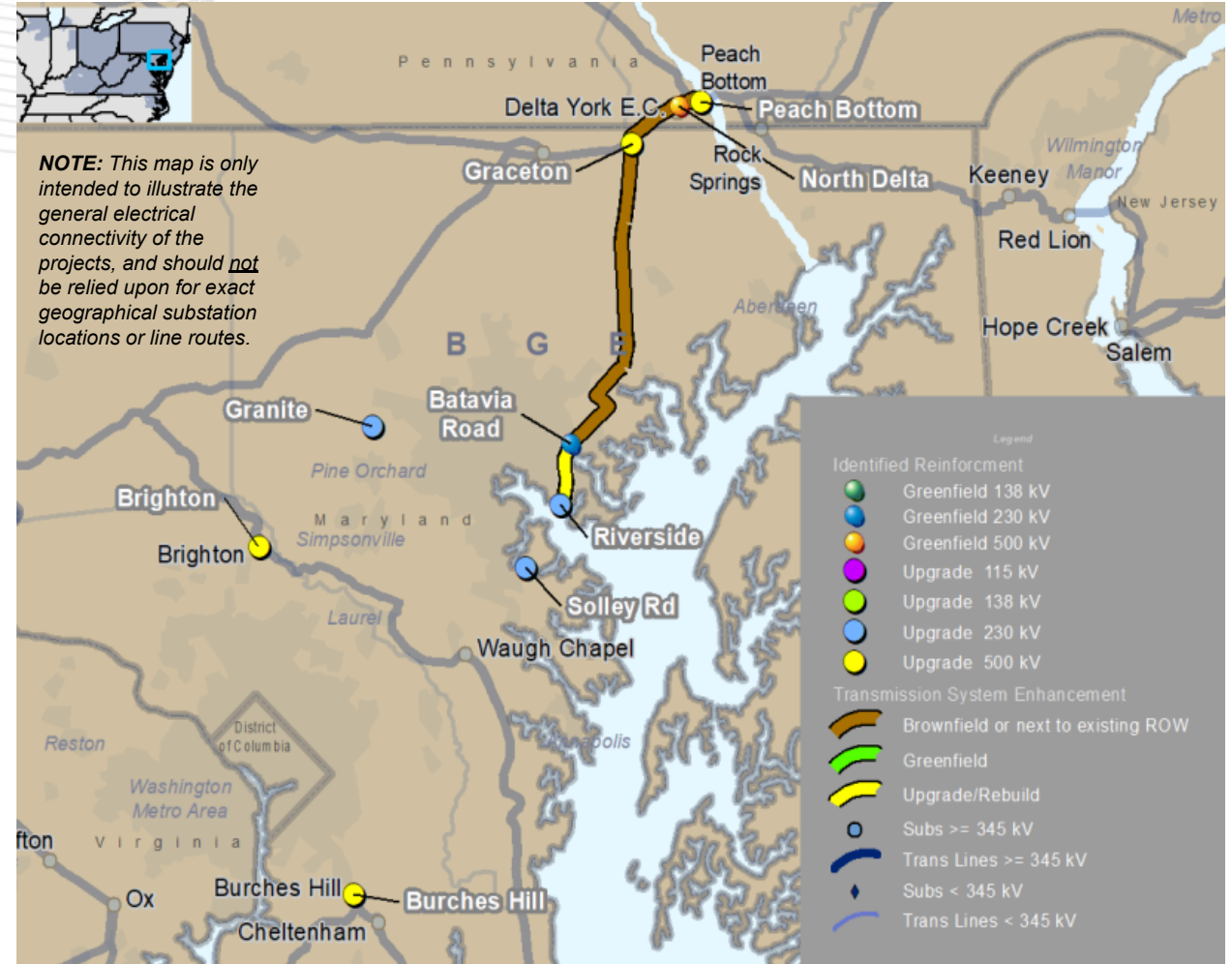
Baseline Reliability Projects

PJM recommended adjustments to Earlier Approved Brandon Shores De-Activation Scope

B3780 - Substation Projects: (Approved components under Brandon Shores Deactivation Immediate Need)

- **B3780 – (assigned by PJM to Transource) Substation Projects**
 - Modify the planned North Delta 500/230 kV substation (cut into Peach Bottom – Delta/Calpine 500 kV line)
 - Cut into Peach Bottom – Conastone 500 kV (5012) line
 - Three breaker ring bus configuration
 - Install one 500/230 kV transformer
 - This scope will amend the approved B3737.47 (NJOSW-SAA 1.0)
- **B3780 – Exelon Scope -Substation Projects**
 - Expand Peach Bottom North yard to accommodate additional 500kV circuits to BGE (Graceton).
 - Build Graceton 500 kV substation – adjacent to the existing Graceton 230kV yard
 - Three bay breaker and half configuration
 - Two 500/230 kV transformers
 - Build new Batavia Rd. 230 kV switching station (cut in to the existing Northeast – Riverside 230 kV circuits)
 - Four bay 8-position GIS BAAH switching station
- **Cancel B3780.3** (Build 500/230 kV West Cooper substation) (Cost Estimate: \$60M)

B3780 Continue on next slide ...



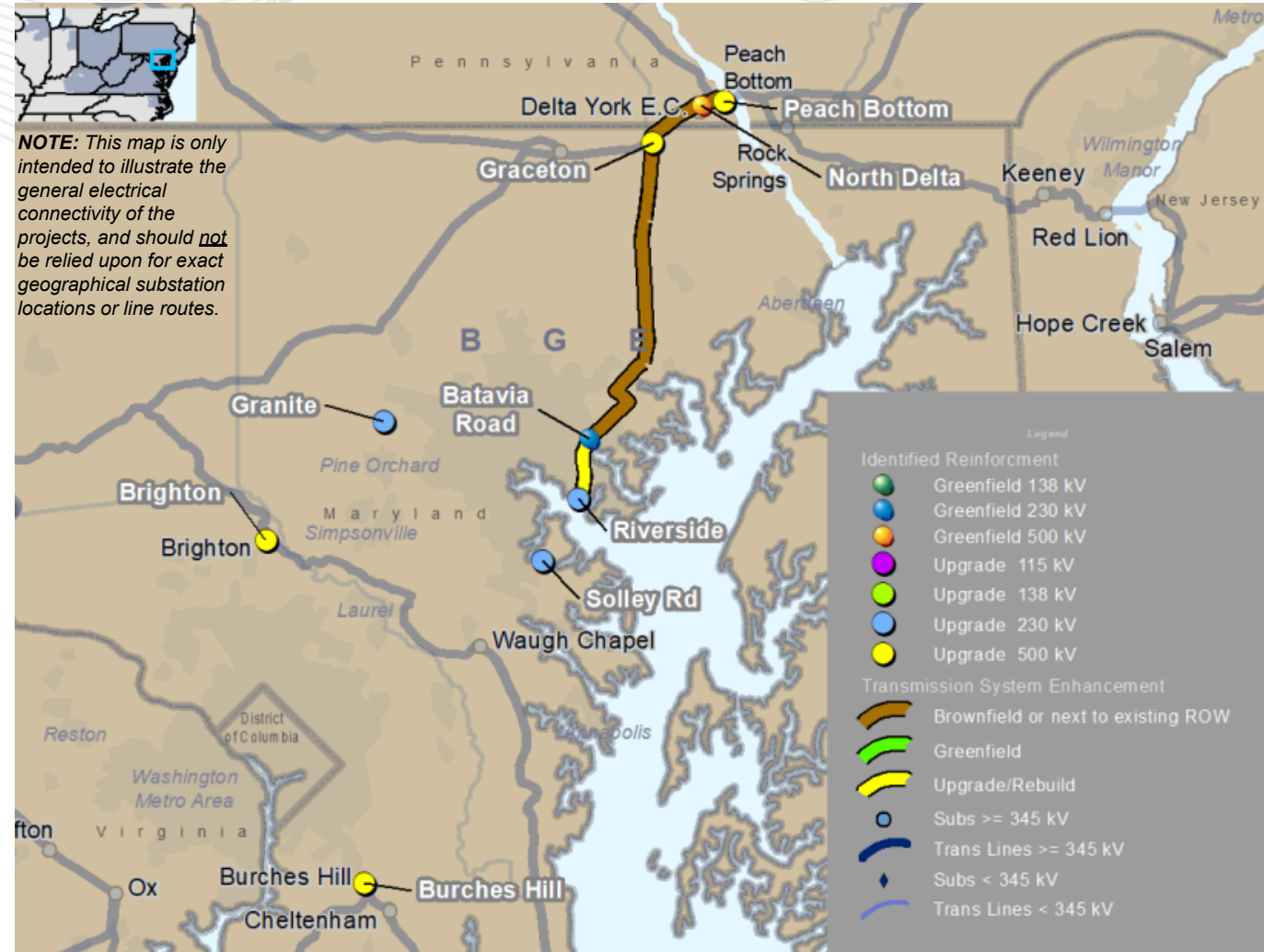
PJM recommended adjustments to Earlier Approved Brandon Shores De-Activation Scope

B3780 - Transmission Projects: (Approved components under Brandon Shores Deactivation Immediate Need)

- Build new Peach Bottom North - Graceton 500kV Line - (~10 miles)
 - New Rating - 4503SN/5022SE/5206WN/5802WE MVA
- Build new 230 kV double circuit from Graceton to Batavia Road with 2 x 1590kcm 54/19 ACSR (~29 miles)
 - New Rating – 1331SN/1594SE/1534WN/1795WE MVA
- Reconductor 230 kV double circuit from Batavia Road to Riverside with bundled 1622kcm 38/19 ACCR/TW (~6 miles)
 - New Rating – 1941SN/2181SE/WN2065/WE2302 MVA
- Install Statcom at Granite 230 kV (+/- 350MVAR) and Solley 230kV (+/- 350 MVAR), and 250 MVAR capacitor at Graceton 230 kV
- Install Statcom at Brighton 500 kV (+/- 350MVAR), Capacitors - 350 MVAR at Brighton 500 kV, 250 MVAR at Burches Hill 500 kV, and 350 MVAR at Conastone 500 kV

Required In-Service Date : June 2025

Projected In-Service Date: 2026-2028



AEP Local - Selected Proposals

Baseline Reliability Projects

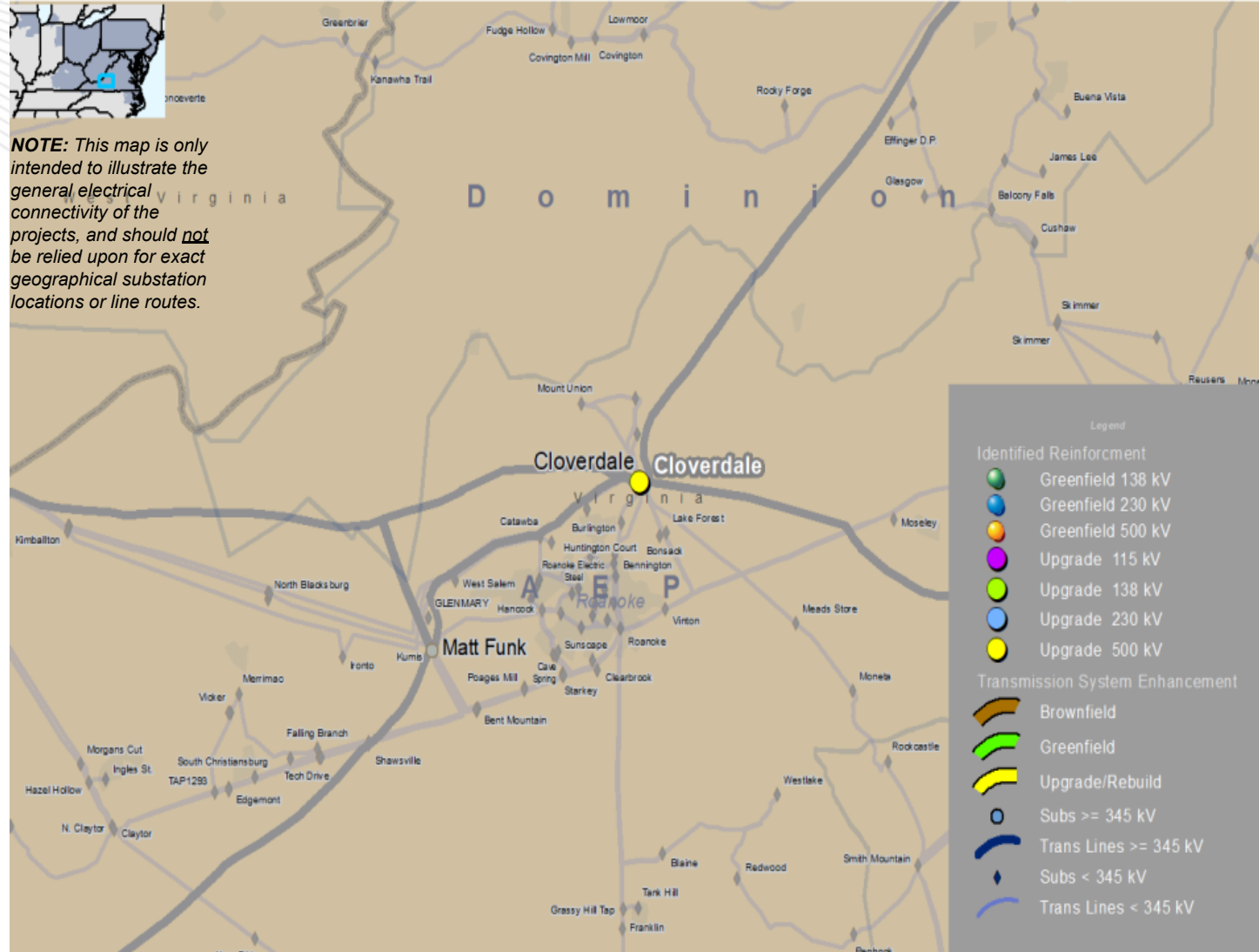
AEP: 2022-W3-410

- Establish a new 500 kV breaker position for the low-side of the existing 765/500 kV transformer at Cloverdale Station. The new position will be between two new 500 kV circuit breakers located in a new breaker string, electrically converting the 500 kV yard to "double-bus double-breaker" configuration. (B3800.100)

Estimated Cost: \$11.59 M

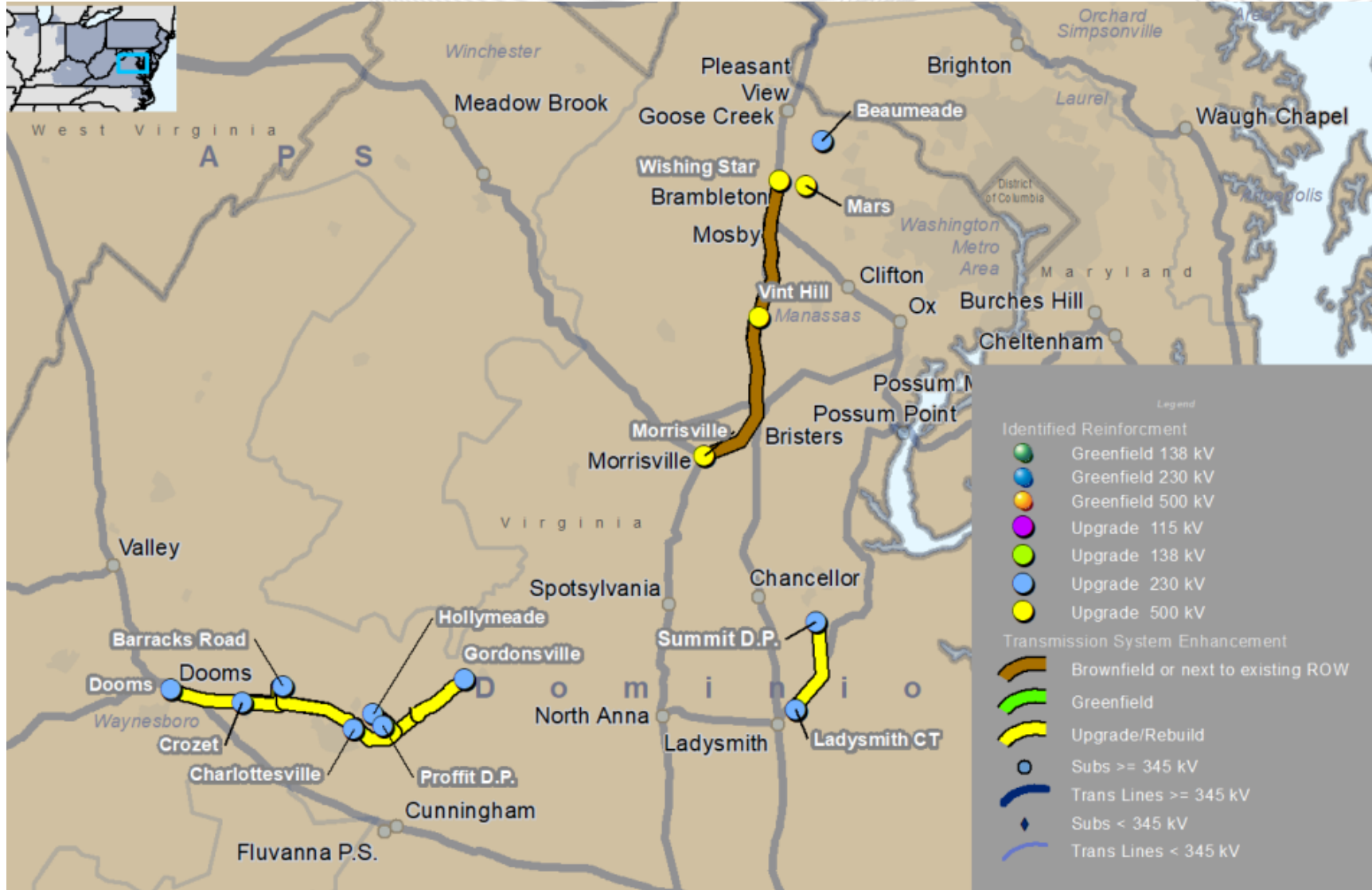
Required IS Date: 6/1/2027

Projected IS Date: 10/31/2026



South Cluster - Selected Proposals

Baseline Reliability Projects



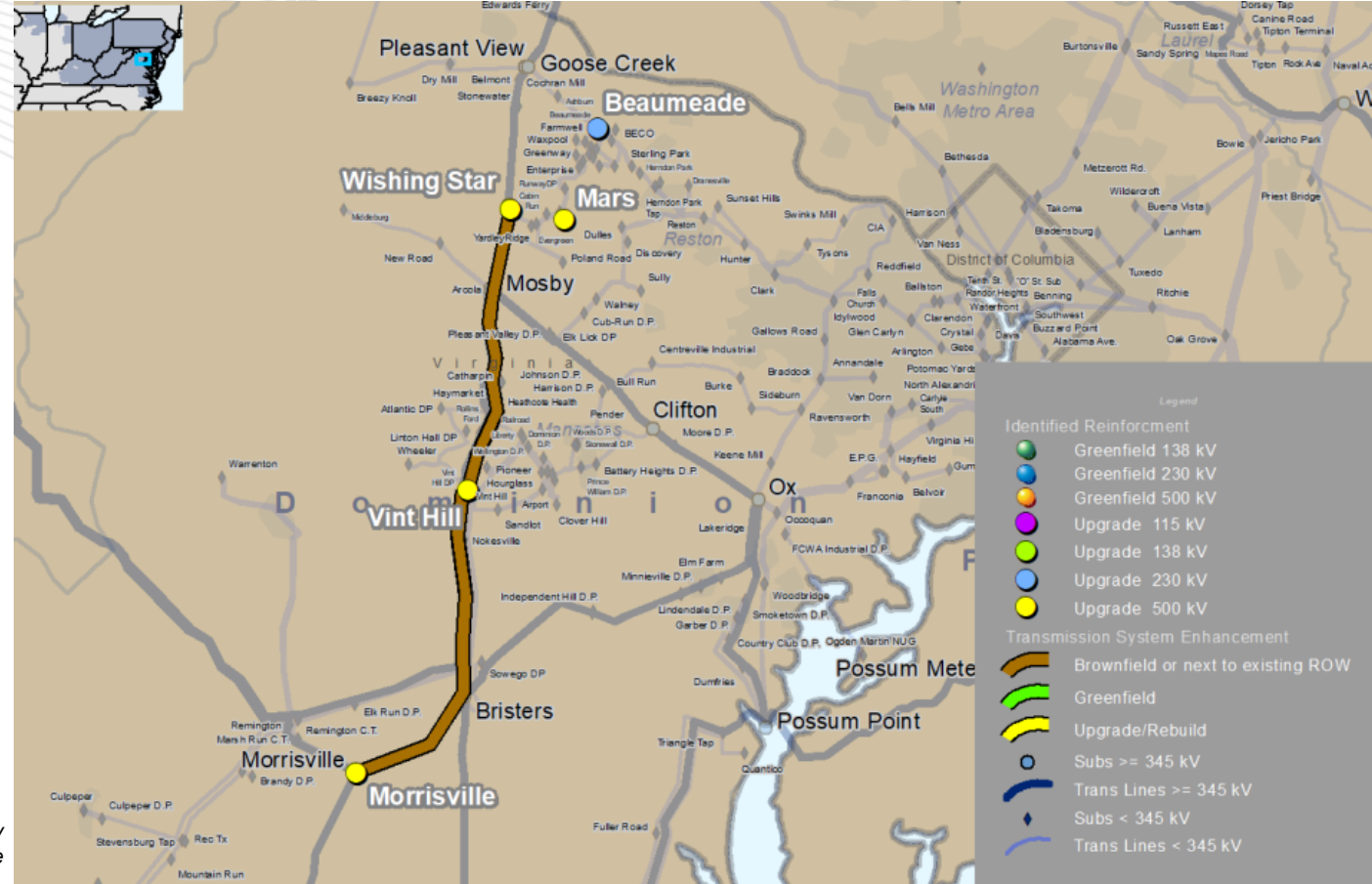
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NOTE: This map is only intended to illustrate the general electrical connectivity of the projects, and should not be relied upon for exact geographical substation locations or line routes.

Recommended Solution: 2022-W3-711 (Partial)

- Build a new 500kV line from Morrisville – Vint Hill – Wishing Star (approximately 36.3 miles) while maximizing the use of existing ROW within this corridor.
- Wrecking and rebuilding both the 5-2 towers in the Morrisville-Loudoun-Brambleton corridor to free up space for the new single-500kV monopole within the same corridor.
 - 500kV Line #545 Bristers - Morrisville rebuild
 - 500kV Line #569 Loudoun to Morrisville rebuild
 - 500kV Line #535 Meadowbrook - Loudoun rebuild
 - 500kV Line #546 Mosby - Wishing Star rebuild
 - 500kV Line #590 Mosby - Wishing Star rebuild
 - 230kV Line #2030 Gainesville - Loudoun rebuild
 - 230kV Line #2045 Loudoun - Brambleton rebuild
 - 230kV Line #2094 & 2227 Brambleton - Racefield - Loudoun rebuild
 - 230kV Line #2101 Bristers - Vint Hill rebuild
 - 230kV Line #2114 Remington CT - Rollins Ford rebuild



NOTE: This map is only intended to illustrate the general electrical connectivity of the projects, and should not be relied upon for exact geographical substation locations or line routes.

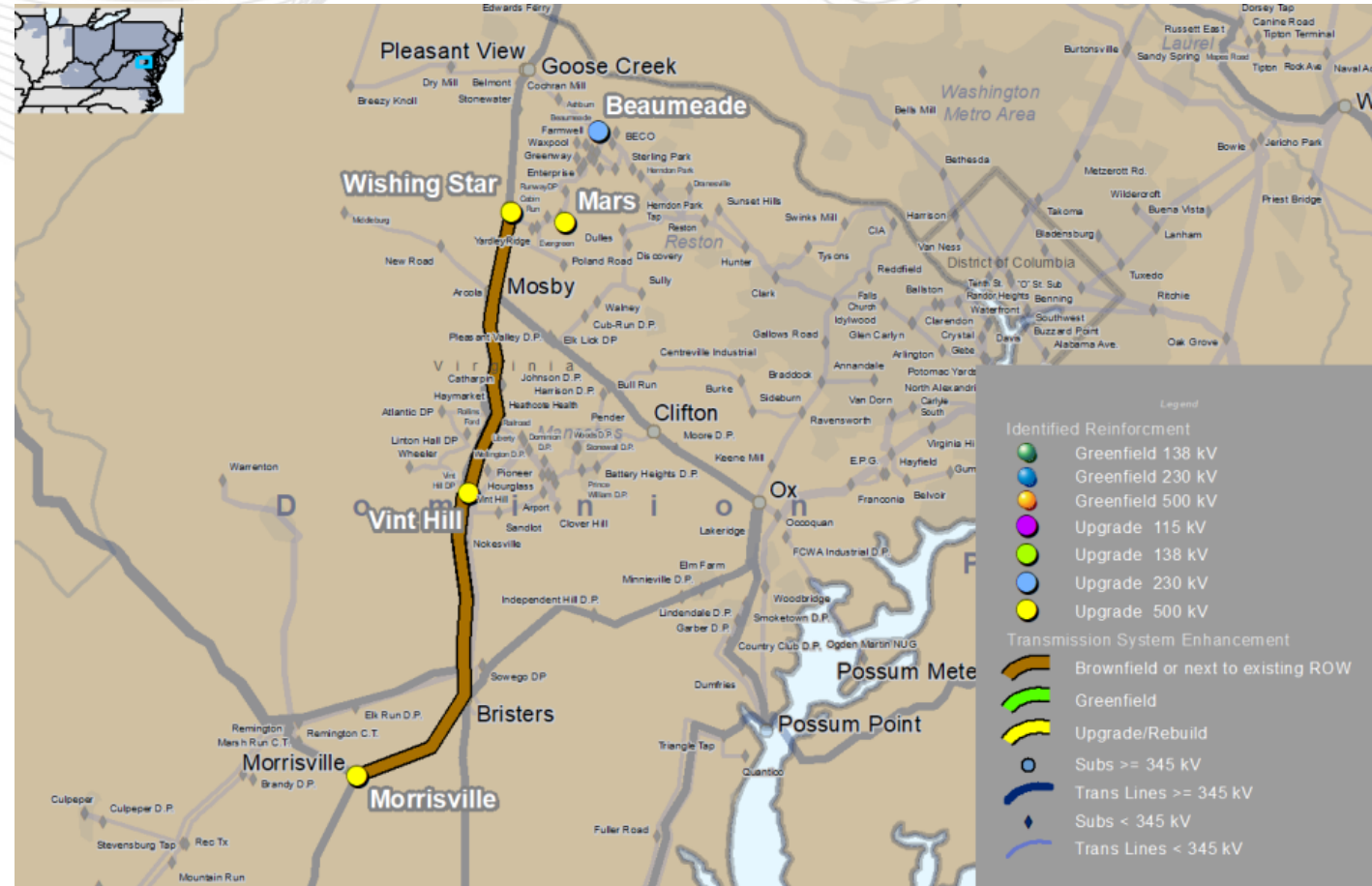
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Recommended Solution: 2022-W3-711 (Partial)

- 230kV Line #2140 Loudoun - Heathcote rebuild
- 230kV Line #2151 Railroad DP - Gainesville rebuild
- 230kV Line #2163 Vint Hill - Liberty rebuild
- 230kV Line #2176 Heathcote - Gainesville rebuild
- 230kV Line #2222 Rollins Ford - Gainesville rebuild
- 115kV Line #183 Bristers - Ox rebuild
- Substation upgrades at:
 - Bristers, Brambleton, Dawkins Branch, Gainesville, Heathcote, Loudoun, Mint Springs, Morrisville, Mosby, North Star, Racefield, Railroad, Vint Hill, Wishing Star, Youngs Branch
- Breaker upgrades at the following substations:
 - Loudoun 230kV, Ox 500kV

Baseline # B3800.311 – B3800.357

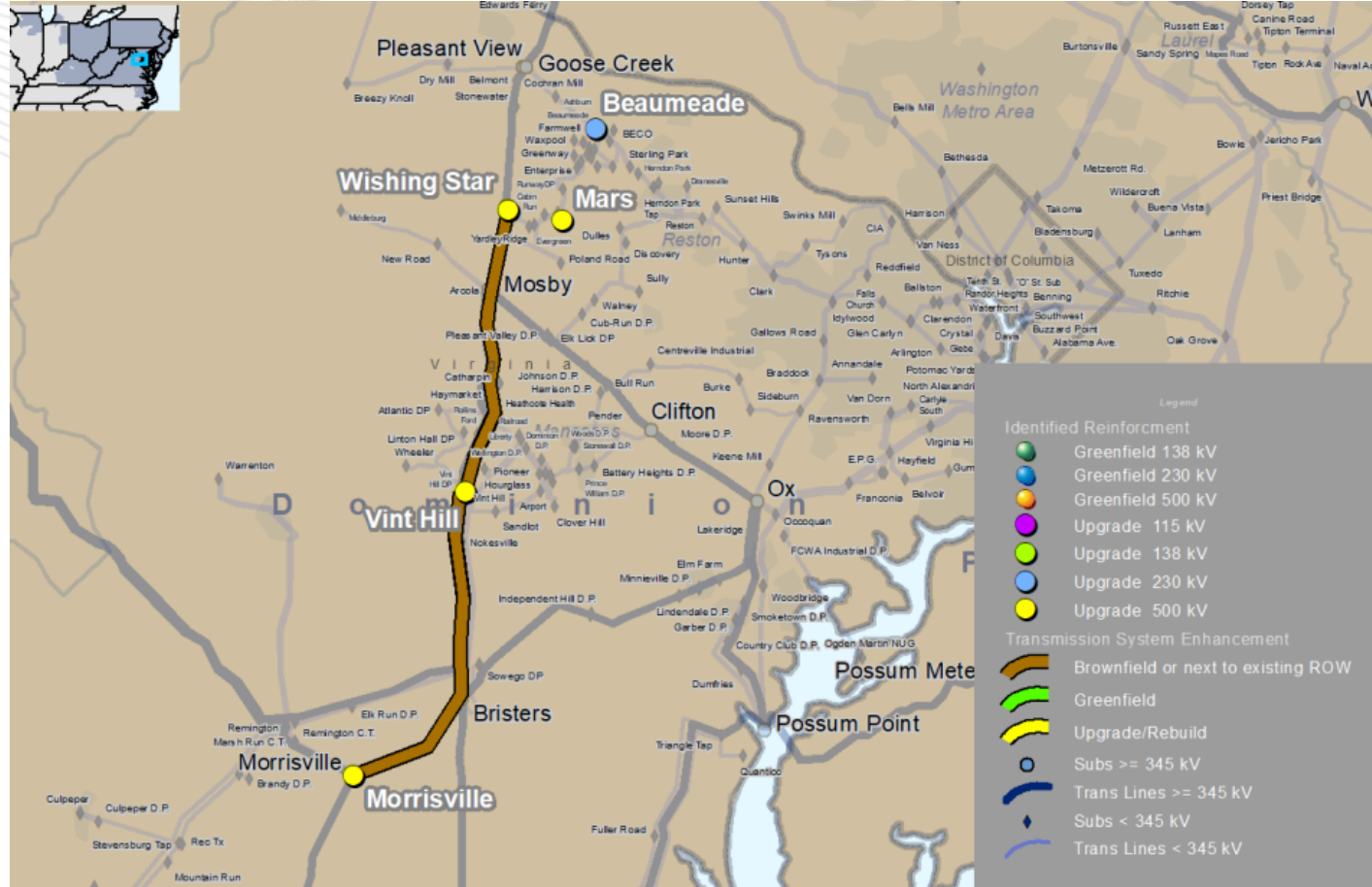
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Existing Facility Ratings:

Branch	SN/SE/WN/WE (MVA)
500kV Line #545 Bristers – Morrisville	3426/3426/4375/4375
500kV Line #569 Loudoun - Morrisville	3426/3426/3464/3464
500kV Line #535 Vint Hill – Loudoun	3572/3622/4560/4599
500kV Line #546 Mosby - Wishing Star	4295/4357/5155/5155
500kV Line #590 Mosby - Wishing Star	3464/3464/3984/4018
230kV Line #2030 Gainesville – Loudoun	1047/1047/1160/1160
230kV Line #2045 Loudoun – Brambleton	1047/1047/1160/1160
230kV Line #2094 & 2227 Brambleton - Racefield - Loudoun	1047/1047/1160/1160
230kV Line #2101 Bristers - Vint Hill	1047/1047/1160/1160
230kV Line #2114 Remington CT - Rollin Ford	1573/1573/1648/1648
230kV Line #2140 Loudoun – Heathcote	1047/1047/1160/1160
230kV Line #2151 Railroad DP – Gainesville	1573/1573/1648/1648
230kV Line #2163 Vint Hill – Liberty	1573/1573/1648/1648
230kV Line #2176 Heathcote – Gainesville	1047/1047/1160/1160
230kV Line #2222 Rollins Ford – Gainesville	1573/1573/1648/1648
115kV Line #183 Bristers – Ox	1573/1573/1648/1648 (@230kV)
500kV Line Vint Hill to Wishing Star	NA
500kV Line Morrisville - Vint Hill	NA



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Preliminary Facility Ratings:

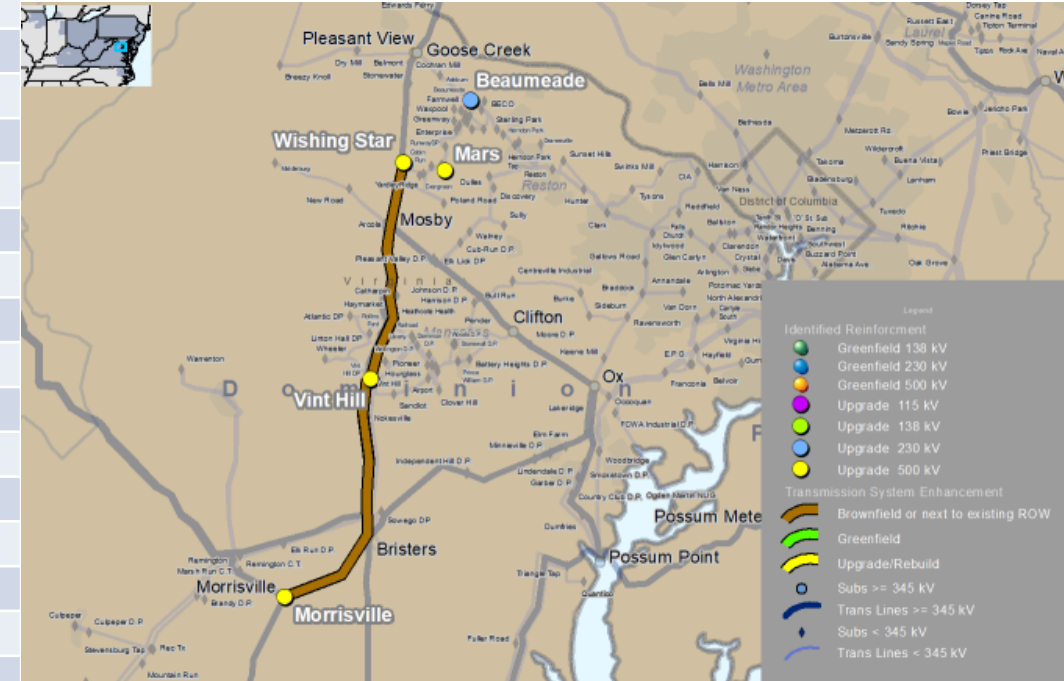
Branch	SN/SE/WN/WE (MVA)
500kV Line #545 Bristers – Morrisville	4357/4357/5155/5155
500kV Line #569 Loudoun - Morrisville	4357/4357/5155/5155
500kV Line #535 Vint Hill – Loudoun	4357/4357/5155/5155
500kV Line #546 Mosby - Wishing Star	4357/4357/5155/5155
500kV Line #590 Mosby - Wishing Star	4357/4357/5155/5155
230kV Line #2030 Gainesville – Loudoun	1573/1573/1648/1648
230kV Line #2045 Loudoun – Brambleton	1573/1573/1648/1648
230kV Line #2094 & 2227 Brambleton - Racefield - Loudoun	1573/1573/1648/1648
230kV Line #2101 Bristers - Vint Hill	1573/1573/1648/1648
230kV Line #2114 Remington CT - Rollin Ford	1573/1573/1648/1648
230kV Line #2140 Loudoun – Heathcote	1573/1573/1648/1648
230kV Line #2151 Railroad DP – Gainesville	1573/1573/1648/1648
230kV Line #2163 Vint Hill – Liberty	1573/1573/1648/1648
230kV Line #2176 Heathcote – Gainesville	1047/1047/1160/1160
230kV Line #2222 Rollins Ford – Gainesville	1573/1573/1648/1648
115kV Line #183 Bristers – Ox	1573/1573/1648/1648 (@230kV)
500kV Line Vint Hill to Wishing Star	4357/4357/5155/5155
500kV Line Morrisville - Vint Hill	4357/4357/5155/5155

Estimated Cost: \$842.19 M

Required IS Date: 6/1/2027

Projected IS Date: 6/1/2028

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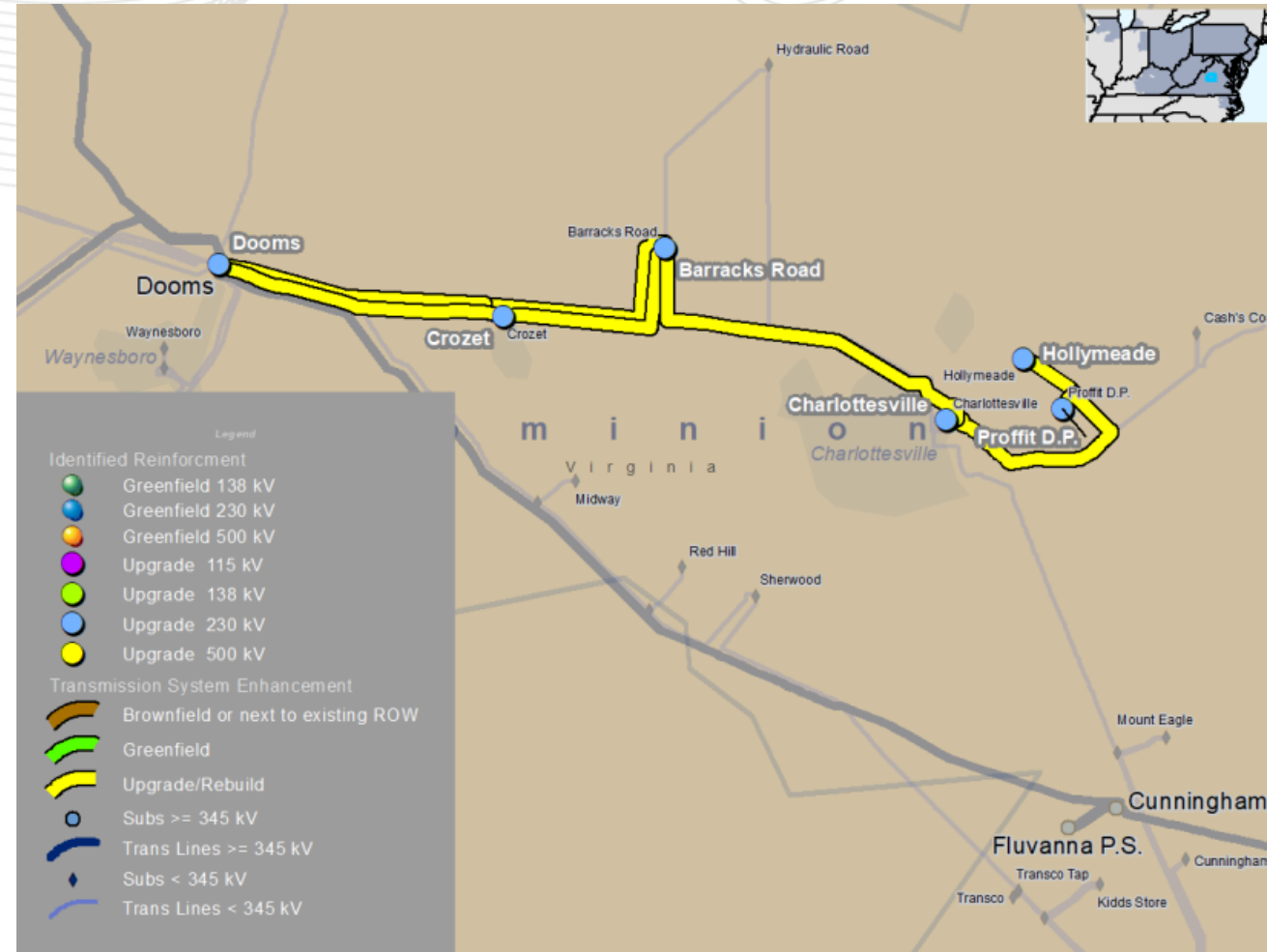
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Recommended Solution: 2022-W3-967

- Rebuild 230kV Line #2054 Charlottesville – Proffit DP using double-circuit capable 500/230 kV poles (the 500kV circuit will not be wired as part of this project).
- Rebuild 230kV Line #233 Charlottesville – Hydraulic Rd – Barracks Road – Crozet – Dooms
- Rebuild 230kV Line #291 Charlottesville – Barracks Road – Crozet – Dooms
- Relay resets/revisions at the following substations:
 - Hollymeade, Proffit, Barracks Road, Crozet
- Terminal equipment upgrades at the following substations:
 - Charlottesville for Lines #2054, #233 & #291 rebuilds
 - Hydraulic Rd for #233 & #291 rebuilds
 - Dooms for #233 & #291 rebuilds

Baseline # B3800.360 – B3800.372

NOTE: This map is only intended to illustrate the general electrical connectivity of the projects, and should not be relied upon for exact geographical substation locations or line routes.



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Existing Facility Ratings:

Branch	SN/SE/WN/WE (MVA)
230kV Line #2054 Charlottesville – Proffit D.P.	586/586/741/741
230kV Line #233 Barracks Road – Crozet	608/608/769/769
230kV Line #291 Charlottesville – Barracks Road – Crozet – Dooms	595/595/757/757

Preliminary Facility Ratings:

Branch	SN/SE/WN/WE (MVA)
230kV Line #2054 Charlottesville – Proffit D.P.	1047/1047/1160/1160
230kV Line #233 Charlottesville – Hydraulic Rd – Barracks Road – Crozet – Dooms	1573/1573/1648/1648
230kV Line #291 Charlottesville – Barracks Road – Crozet – Dooms	1573/1573/1648/1648

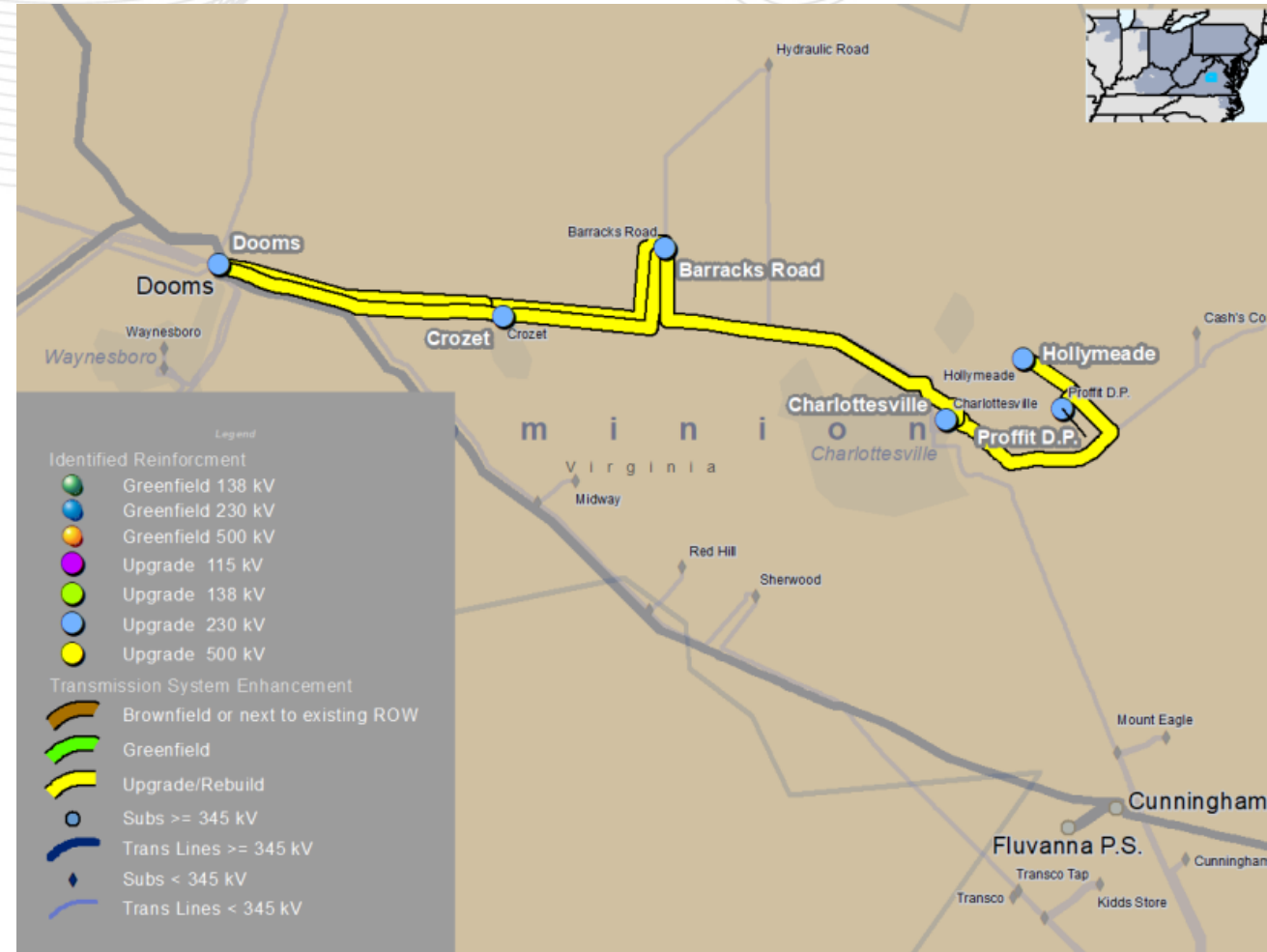
Estimated Cost: \$183.49 M

Required IS Date: 6/1/2027

Projected IS Date: 6/1/2028

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***NOTE:** This map is only intended to illustrate the general electrical connectivity of the projects, and should not be relied upon for exact geographical substation locations or line routes.*



Recommended Solution: 2022-W3-211

- Rebuild 230kV Line #2135 Hollymeade – Gordonsville using double-circuit capable 500/230 kV poles (the 500kV circuit will not be wired as part of this project).
- Terminal equipment upgrades at the following substations:
 - Hollymeade, Gordonsville, Cash’s Corner

Existing Facility Ratings:

Branch	SN/SE/WN/WE (MVA)
230kV Line #2135 Cash’s Corner - Gordonsville	586/586/741/741
230kV Line #2135 Cash’s Corner - Hollymeade	586/586/741/741

Preliminary Facility Ratings:

Branch	SN/SE/WN/WE (MVA)
230kV Line #2135 Cash’s Corner - Gordonsville	1573/1573/1648/1648
230kV Line #2135 Cash’s Corner - Hollymeade	1047/1047/1160/1160

Baseline # B3800.300 – B3800.304

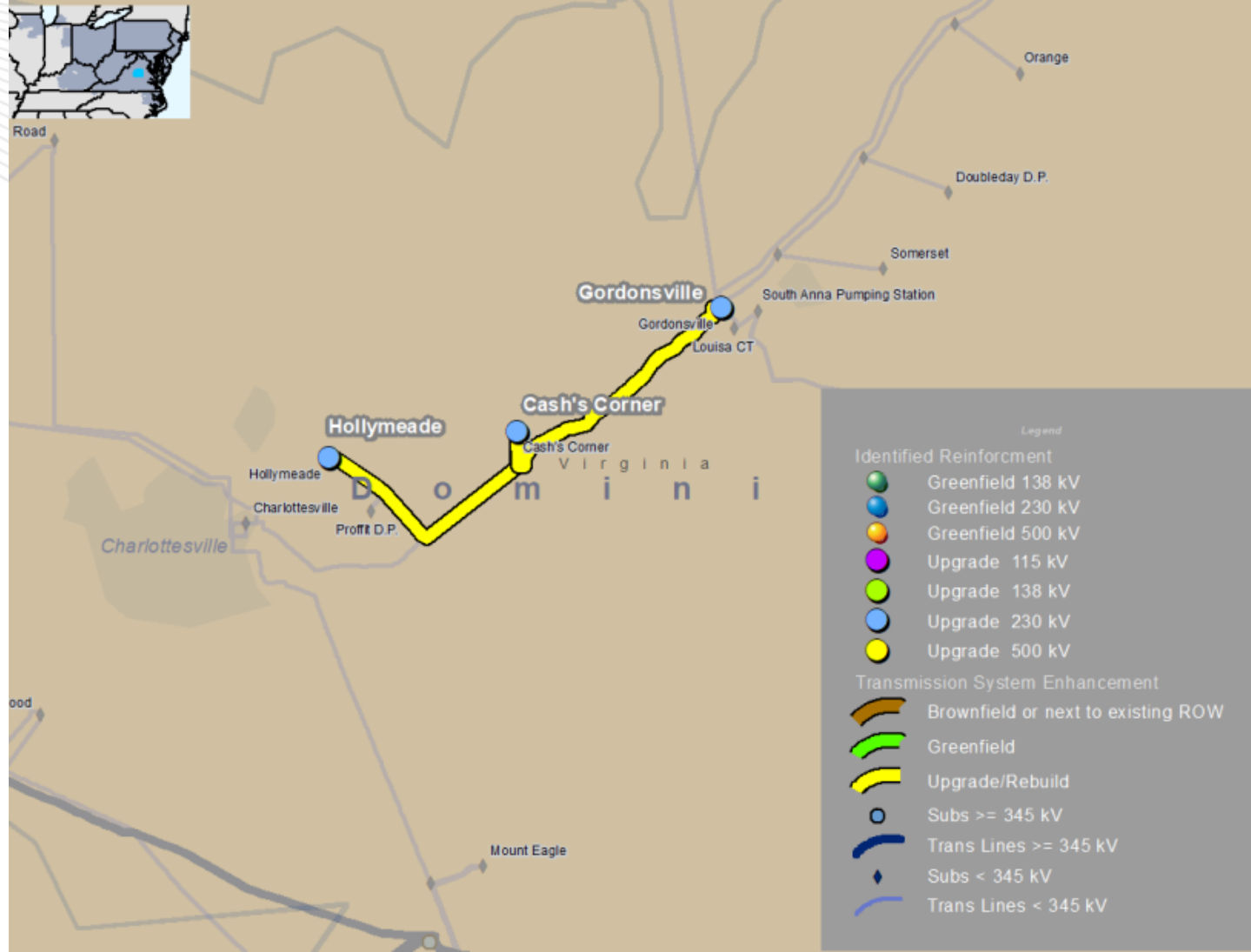
Estimated Cost: \$54.85 M

Required IS Date: 6/1/2027

Projected IS Date: 6/1/2028

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Recommended Solution: 2022-W3-731

- Replace single unit Locks 230/115 kV 168MVA transformer #7 with a new single unit transformer with a rating of 224 MVA.
- Lead lines at the 115 kV level will be upgraded to 2000 A.

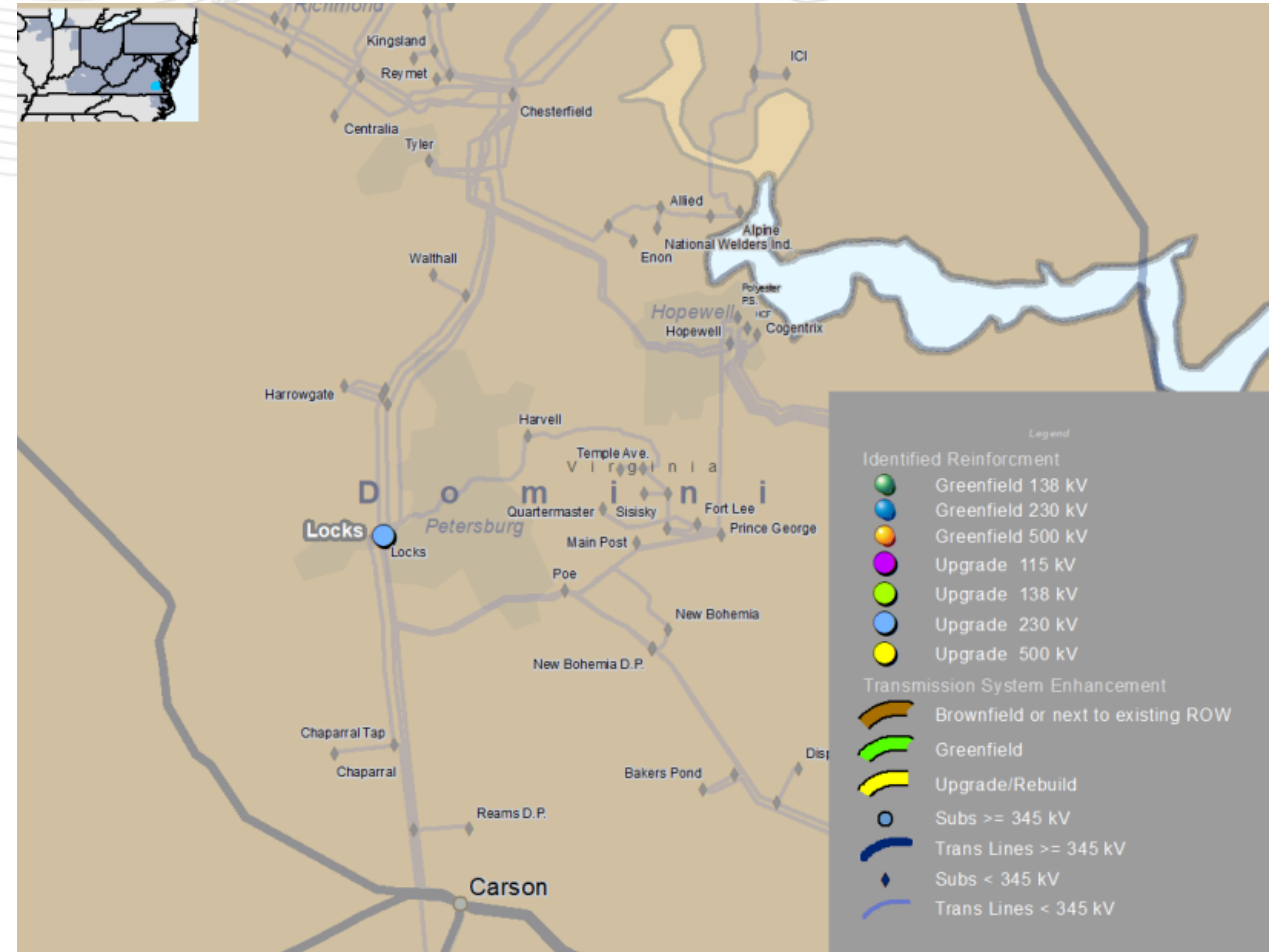
Baseline # B3800.358

Estimated Cost: \$7.14 M

Required IS Date: 6/1/2027

Projected IS Date: 6/1/2028

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Recommended Solution: 2022-W3-74 (Partial)

- Wreck and rebuild Line #2090 Ladysmith CT – Summit D.P. segment as a double circuit 230kV line. Only one circuit will be wired at this stage.
- Upgrade circuit breaker leads, switches and line leads at Ladysmith CT.

Existing Facility Ratings:

Branch	SN/SE/WN/WE (MVA)
230kV Line #2090 Ladysmith CT – Summit D.P.	1225/1225/1358/1358

Preliminary Facility Ratings:

Branch	SN/SE/WN/WE (MVA)
230kV Line #2090 Ladysmith CT – Summit D.P.	1573/1573/1648/1648

Baseline # B3800.359

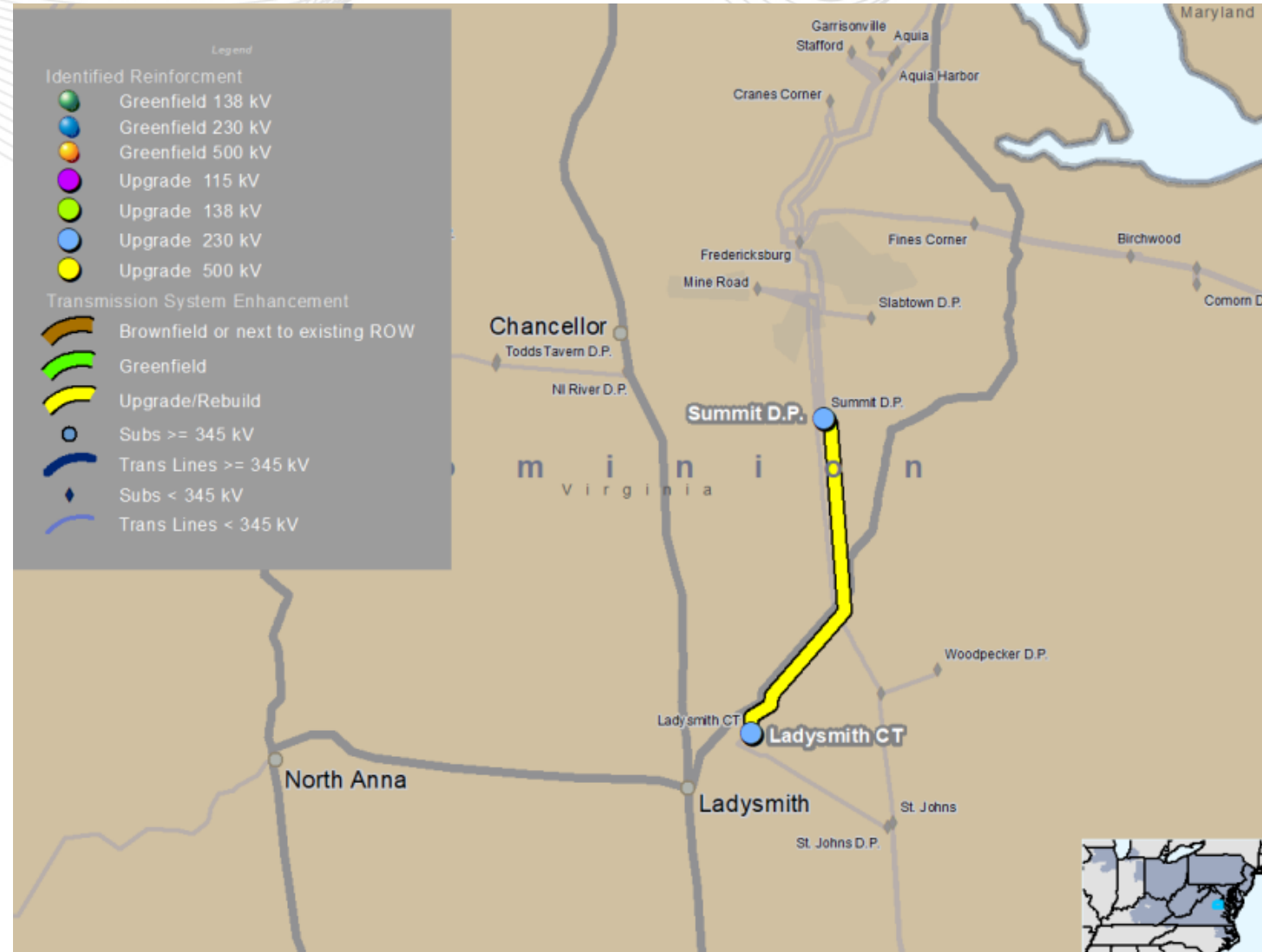
Estimated Cost: \$36.50 M

Required IS Date: 6/1/2027

Projected IS Date: 12/1/2027

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Recommended Solution: 2022-W3-231 (Partial)

- Install 230kV, 500kV shunt capacitor banks and STATCOMs and associated equipment to address the reactive power needs of the system
 - Morrisville Substation
 - (1) 500kV, 150 MVar Shunt Capacitor Bank & associated equipment
 - Wishing Star Substation
 - (1) 230kV, 150 MVar Shunt Capacitor Bank and (1) 500kV, 293.8MVar Shunt Capacitor Bank & associated equipment
 - Mars Substation
 - (1) 500kV, 300 MVar STATCOM and (1) 230kV, 150MVar Shunt Capacitor Bank & associated equipment
 - Beaumeade Substation
 - (1) 230kV, 300 MVar STATCOM & associated equipment

Baseline # B3800.305 – B3800.310

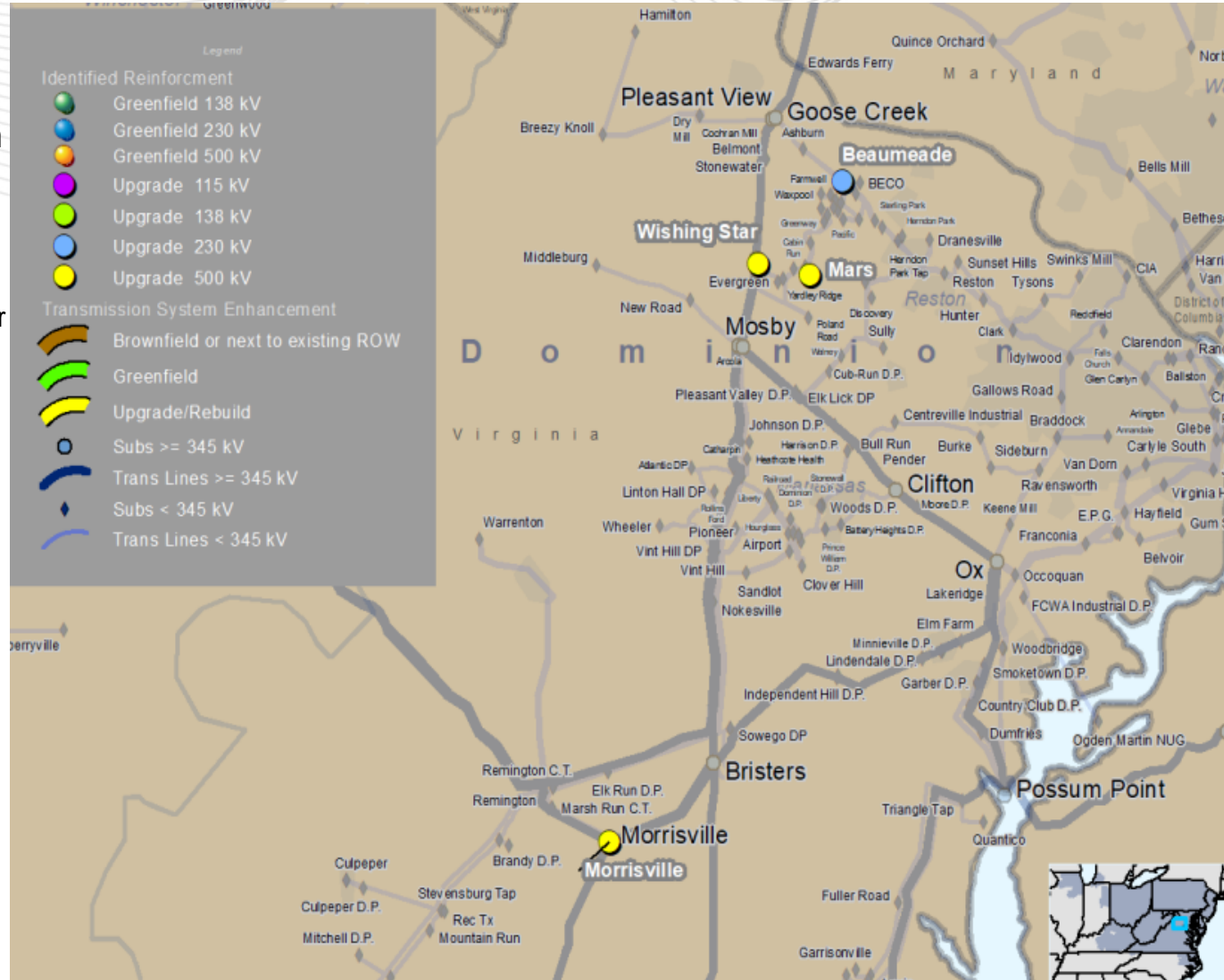
Estimated Cost: \$103.79 M

Required IS Date: 6/1/2027

Projected IS Date: 12/1/2027

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Recommended Solution: Additional 230kV upgrades (Dominion)

- Uprate 12.44 miles of 230kV circuit 256 from St. Johns to Ladysmith CT
 - Approximately 7.14 miles of the line from St Johns Substation to 256/108 will be rebuilt with a mix of light duty steel DOM pole tangent H-frames and engineered steel 3-pole deadend angle structures. The proposed conductor for the rebuilt line will be 2-768 ACSS “Maumee” with dual 48 fiber DNO-11410 for shielding.
 - The remaining 5.30 miles of the line from structure 256/107 to Ladysmith CT will be reconducted with proposed 2-768 ACSS “Maumee” conductor and the existing structures and shield wire will remain.
- Transmission line switch 25666 will be upgraded to 4000A at St. Johns Substation. Terminal equipment at remote end substations will be upgraded to 4000A continuous current rating to support new conductor ratings.

Existing Facility Ratings:

Branch	SN/SE/WN/WE (MVA)
230kV Line #256 Ladysmith CT – St. Johns	876/956/876/956

Preliminary Facility Ratings:

Branch	SN/SE/WN/WE (MVA)
230kV Line #256 Ladysmith CT – St. Johns	1573/1573/1648/1648

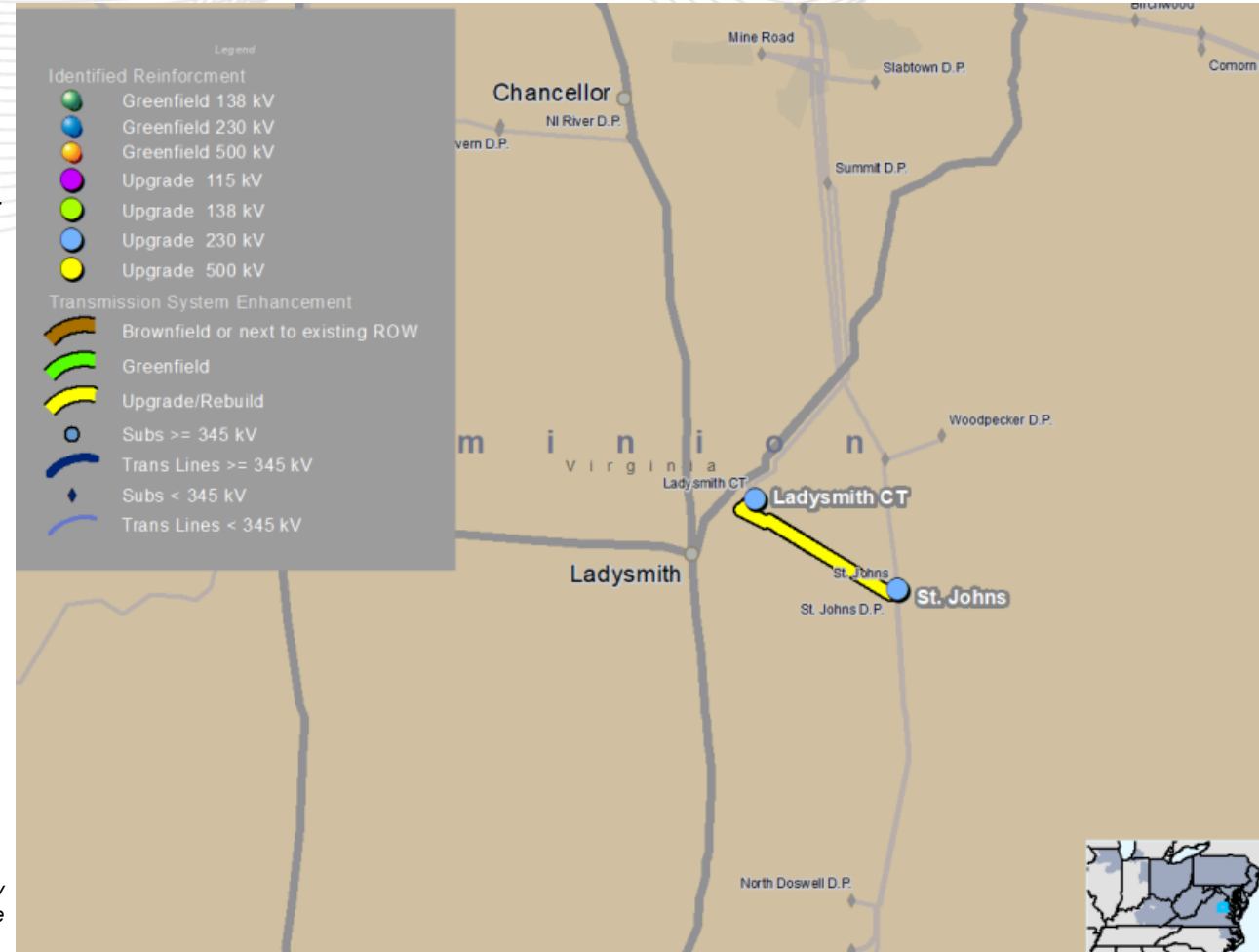
Baseline # B3800.373 – B3800.374

Estimated Cost: \$37.89 M

Required IS Date: 6/1/2028

Projected IS Date: 6/1/2028

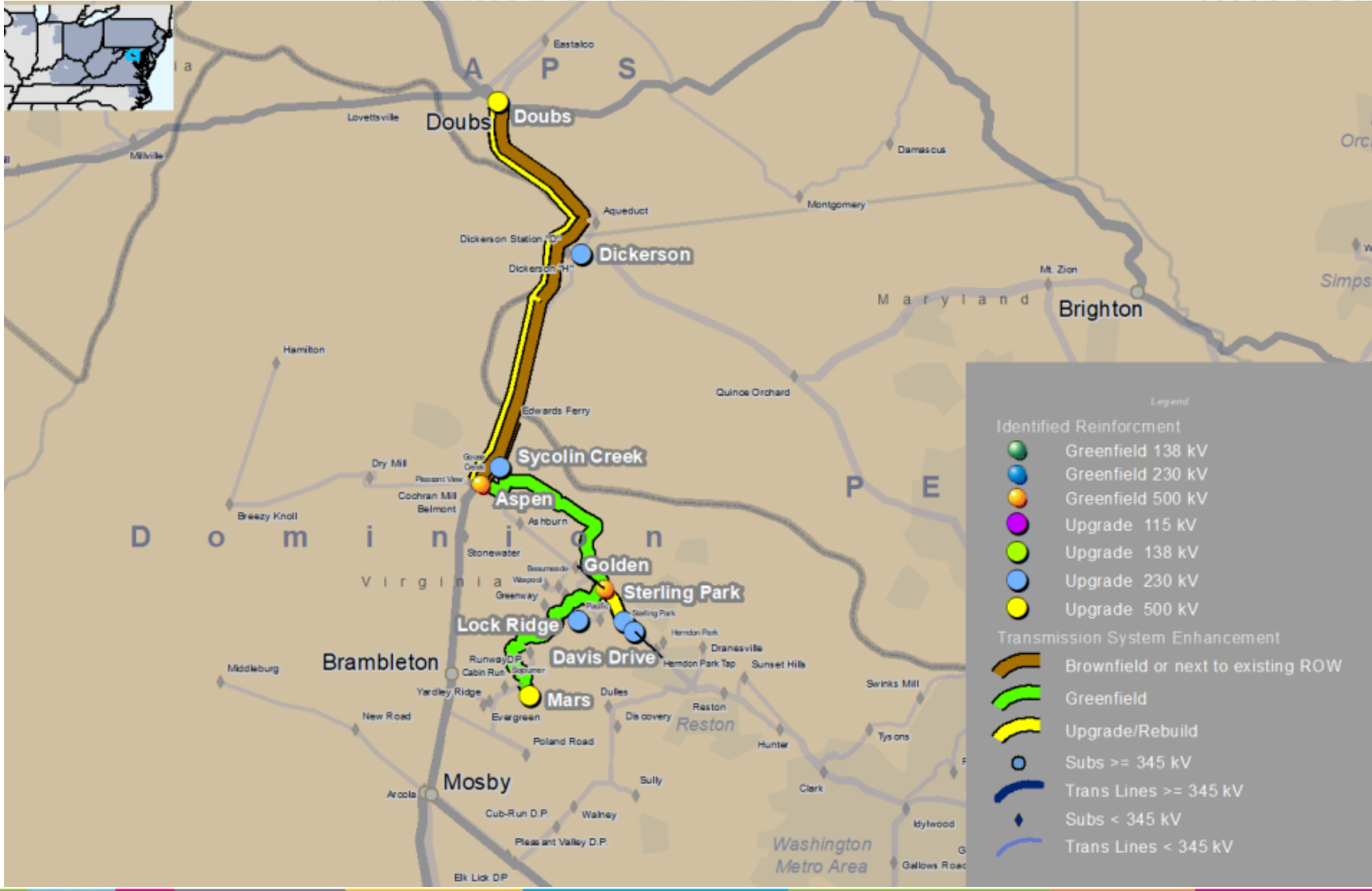
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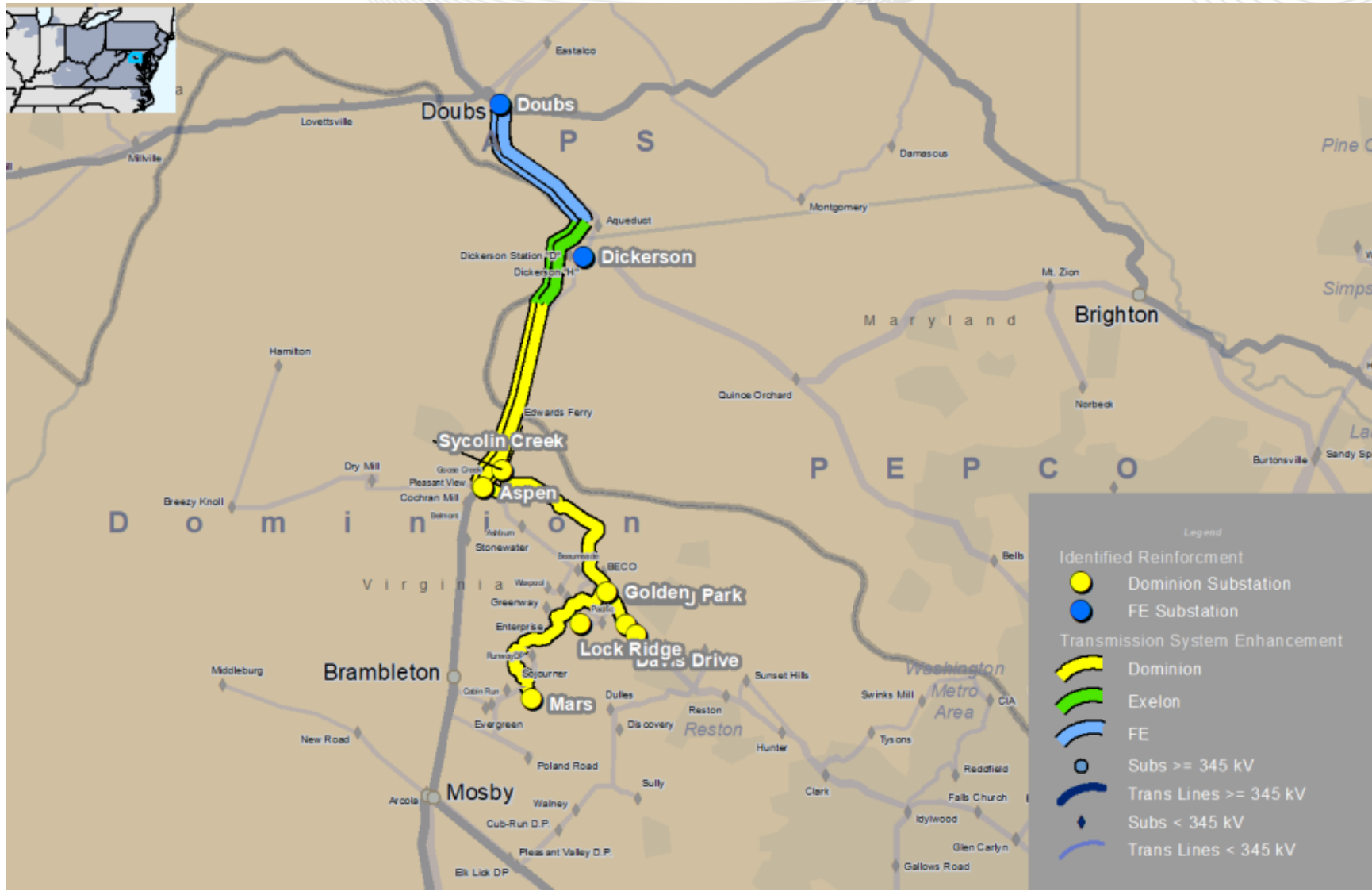
NOTE: This map is only intended to illustrate the general electrical connectivity of the projects, and should not be relied upon for exact geographical substation locations or line routes.

Northern Virginia/Doubs- Selected Proposals

Baseline Reliability Projects



NOTE: This map is only intended to illustrate the general electrical connectivity of the projects, and should not be relied upon for exact geographical substation locations or line routes.

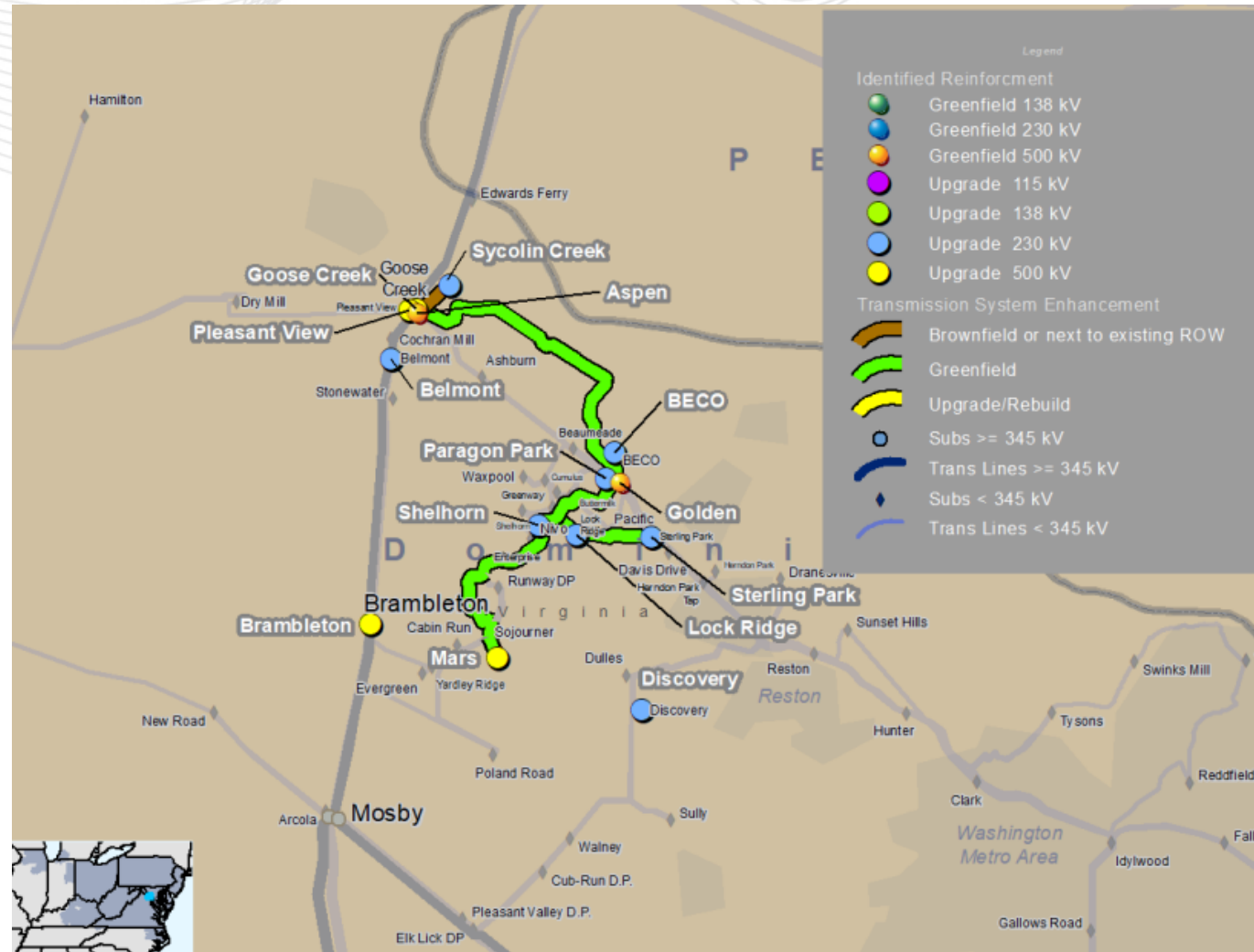


NOTE: This map is only intended to illustrate the general electrical connectivity of the projects, and should not be relied upon for exact geographical substation locations or line routes.

Recommended Solution: 2022-W3-692

- Construct new double-circuit 500/230 kV lines from Aspen substation to Golden substation
 - 230kV Line will connect Aspen – Sycolin Creek – Golden
- Construct new double-circuit 500/230 kV lines from Golden substation to Mars substation
 - 230kV Line will connect Golden – Lockridge – Mars
- Construct a new 500kV Line from Aspen to Goose Creek
- Install the 2nd 500-230 kV 1440 MVA transformer at Mars Substation
- Construct a new Aspen 500/230kV substation by tapping 500kV Line #558
- Construct a new Golden 500/230kV substation
- Upgrade existing double-circuit 230 kV lines from Golden substation to Paragon Park substation (Lines # 2150 & 2081)
- Upgrade existing single circuit 230 kV line from Paragon Park substation to BECO Substation (Line # 2207) to a minimum normal summer rating of 1573 MVA. Equipment at each substation will be upgraded to support the new conductor rating of 4000A
- Equipment upgrades at the following substations:
 - Paragon Park, BECO
- Golden relay setting reset
- Replace overdutied breakers at Belmont, BECO, Beaumeade, Pleasant View, Shellhorn, and Discovery.

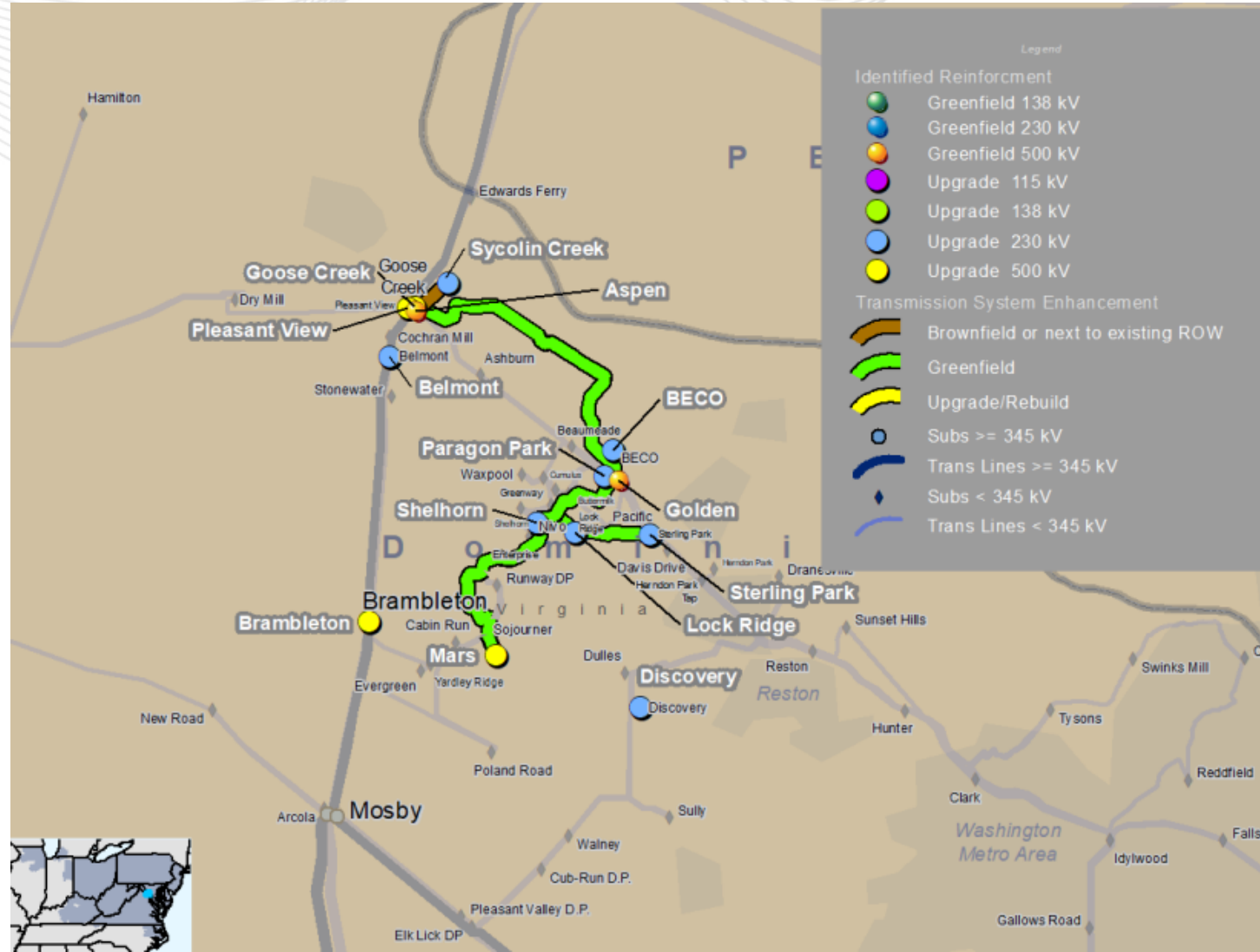
NOTE: This map is only intended to illustrate the general electrical connectivity of the projects, and should *not* be relied upon for exact geographical substation locations or line routes.



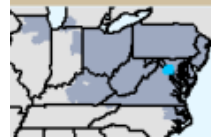
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Existing Facility Ratings:

Branch	SN/SE/WN/WE (MVA)
500kV Line Aspen – Goose Creek 2	NA
500kV Line Golden – Mars	NA
230kV Line Aspen – Sycolin Creek – Golden	NA
230kV Line Golden – Lockridge – Mars	NA
230kV Line #2150 Golden – Paragon Park 1	762/762/849/849
230kV Line #2081 Golden – Paragon Park 2	765/765/852/852
230kV Line #2207 Paragon Park – BECO	762/762/849/849



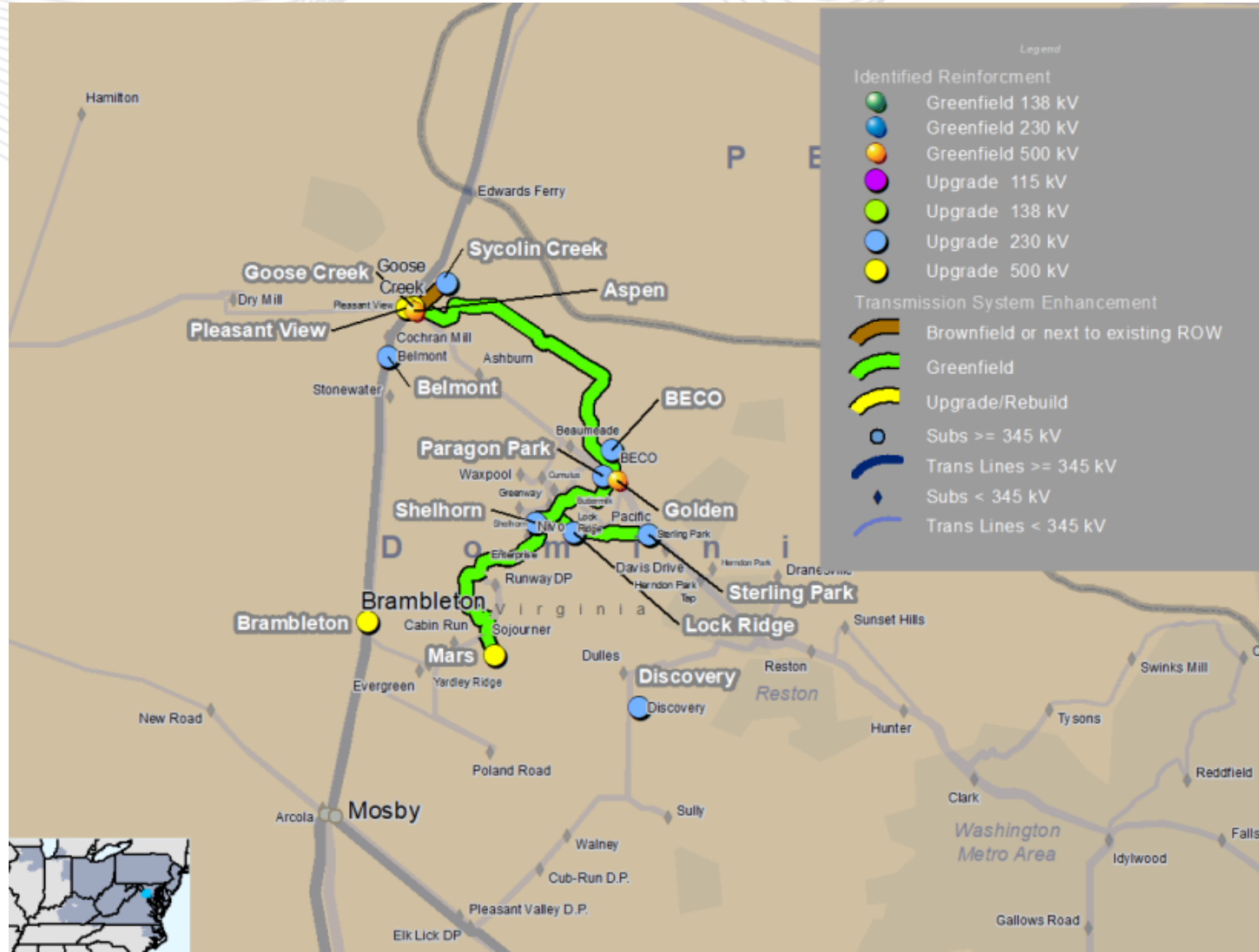
NOTE: This map is only intended to illustrate the general electrical connectivity of the projects, and should *not* be relied upon for exact geographical substation locations or line routes.



Continued on next slide...

Preliminary Facility Ratings:

Branch	SN/SE/WN/WE (MVA)
500kV Line Aspen – Goose Creek	4357/4357/5155/5155
500kV Line Golden – Mars	4357/4357/5155/5155
230kV Line Aspen – Sycolin Creek – Golden	1573/1573/1648/1648
230kV Line Golden – Lockridge – Mars	1573/1573/1648/1648
230kV Line #2150 Golden – Paragon Park 1	1573/1573/1648/1648
230kV Line #2081 Golden – Paragon Park 2	1573/1573/1648/1648
230kV Line #2207 Paragon Park – BECO	1573/1573/1648/1648



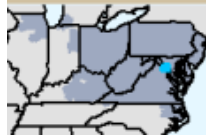
Baseline # B3800.200 – B3800.227

Estimated Cost: \$1025.06 M

Required IS Date: 6/1/2027

Projected IS Date: 6/1/2028

NOTE: This map is only intended to illustrate the general electrical connectivity of the projects, and should not be relied upon for exact geographical substation locations or line routes.



Continued on next slide...

Recommended Solution: Additional upgrades (Dominion)

- Reconductor 1.47 miles of 230kV circuits 2081 and 2150 from Sterling Park to Golden substation
- Reconductor 0.67 miles of 230kV circuits 2194 and 9231 from Davis Drive to Sterling Park substation

Existing Facility Ratings:

Branch	SN/SE/WN/WE (MVA)
230kV Line #2150 Golden – Sterling A	762/762/849/849
230kV Line #2081 Golden – Sterling B	765/765/852/852
230kV Line #2194 Davis Drive – Sterling A	762/762/849/849
230kV Line #9231 Davis Drive – Sterling B	629/629/721/721

Preliminary Facility Ratings:

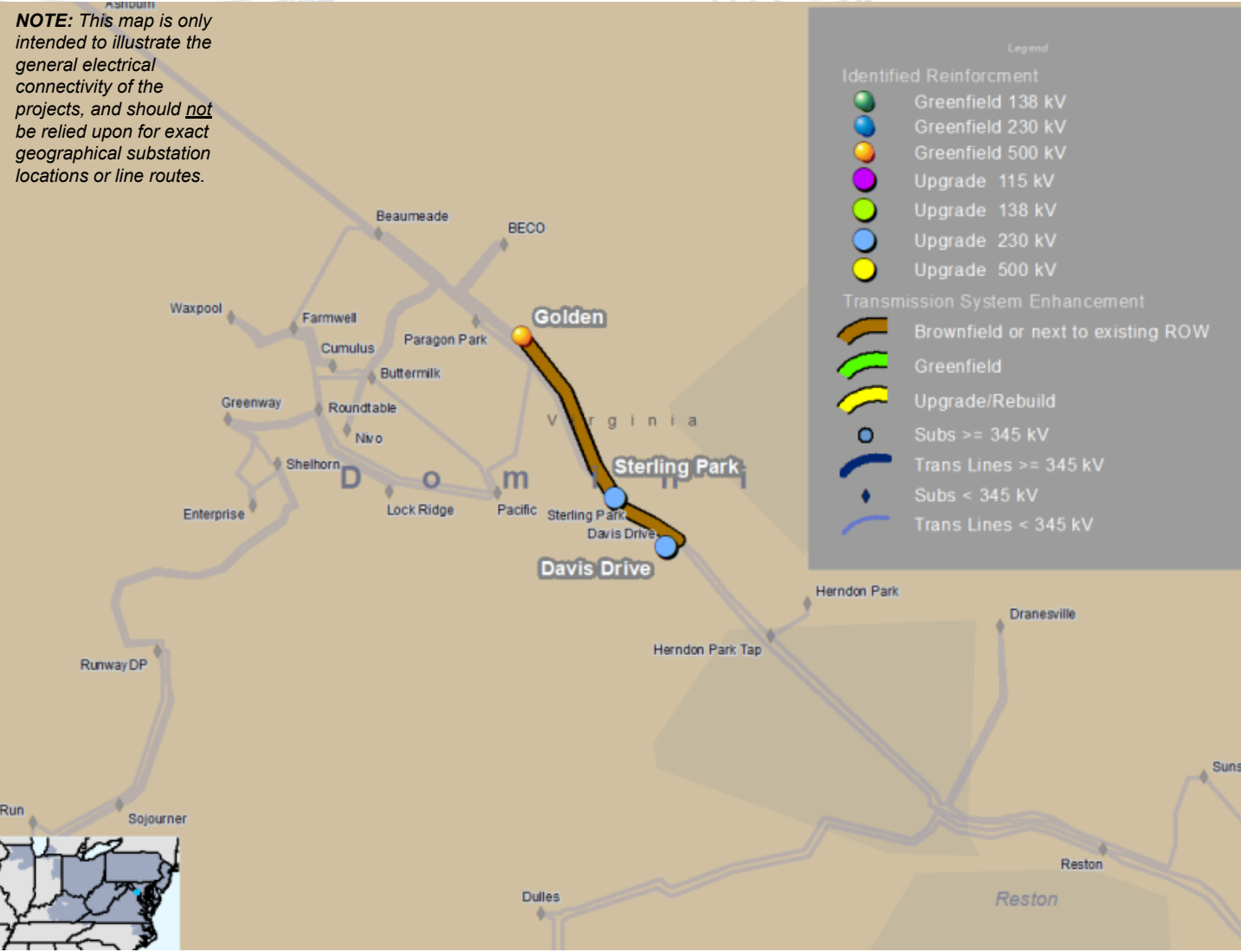
Branch	SN/SE/WN/WE (MVA)
230kV Line #2150 Golden – Sterling A	1573/1573/1648/1648
230kV Line #2081 Golden – Sterling B	1573/1573/1648/1648
230kV Line #2194 Davis Drive – Sterling A	1573/1573/1648/1648
230kV Line #9231 Davis Drive – Sterling B	1573/1573/1648/1648

Baseline # B3800.228 – B3800.229

Estimated Cost: \$13.50 M

Required IS Date: 6/1/2027

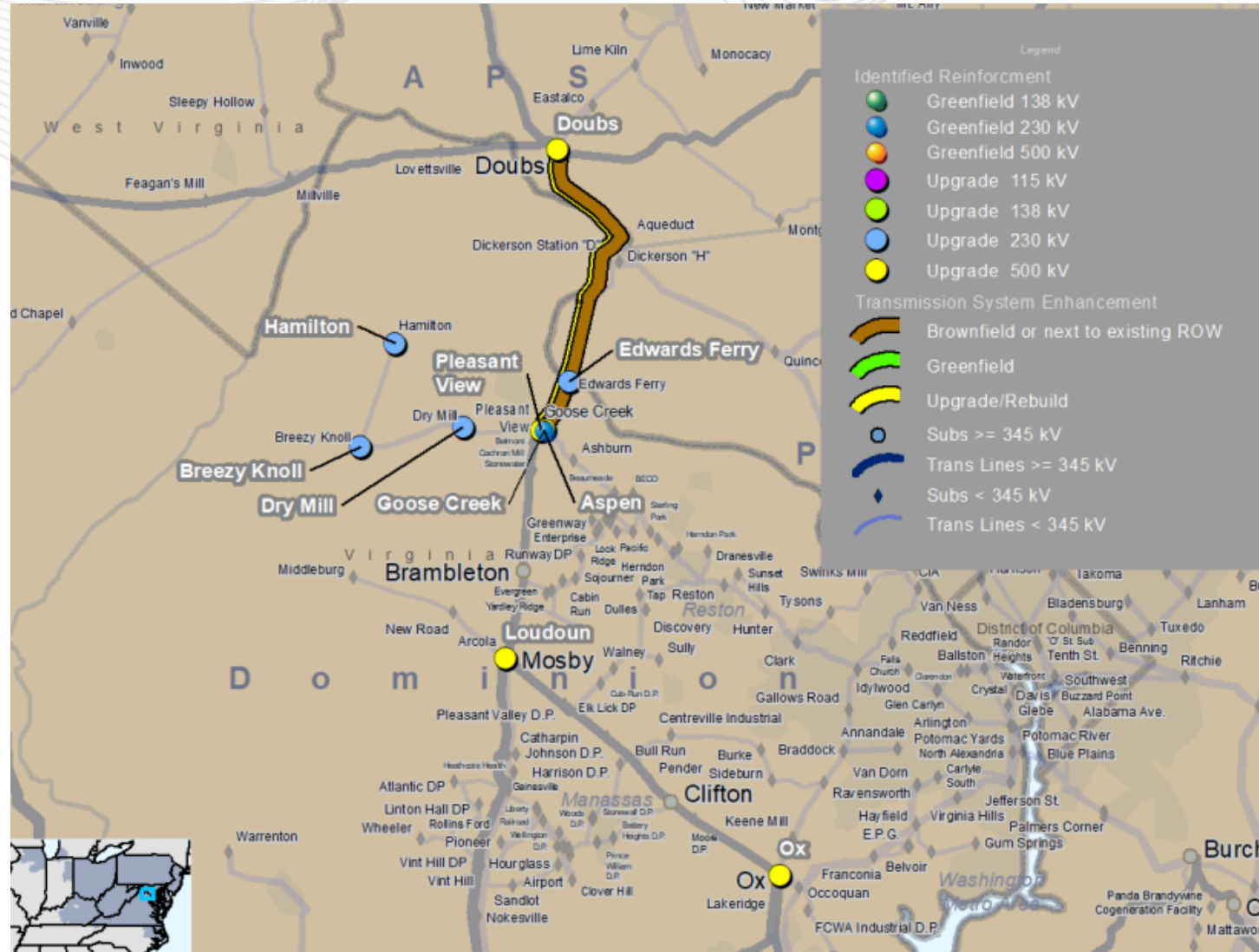
Projected IS Date: 6/1/2028



Recommended Solution: 2022-W3-516 (Dominion)

- Rebuild 500kV Line #514 Doubs – Goose Creek using double circuit 500kV/230kV towers on foundations. Scope covers line construction between Goose Creek and the Doubs Interconnection point, which is south of the Potomac River.
- Construct a new 500kV Line between Doubs and a new substation called Aspen. Scope covers line construction between Aspen and the Doubs Interconnection point, which is south of the Potomac River.
- Rebuild 230kV Line #203 Pleasant View – Dickerson (from Pleasant View substation and structure 203/15 within the existing ROW using double circuit 500kV/230kV towers on foundations.
- Wreck and rebuild approximately 1 mile of 230kV Line #2098 between Pleasant View and Structure 2098/9, where Line 2098 turn towards Hamilton Substation. The 1 mile portion will share the new double circuit 500/230kV towers with Line 514, which is being rebuilt as part of this project.
- Relay resets/revisions at the following substations:
 - Breezy Knoll, Dry Mill, Hamilton
- Terminal equipment upgrades at the following substations:
 - Goose Creek, Pleasant View, Edwards Ferry
- Replace overdutied breakers at Loudoun, Ox, Pleasant View.
- Earlier approved EOL baseline B3247 (DOM) and supplemental S2386 (FE) will be cancelled

NOTE: This map is only intended to illustrate the general electrical connectivity of the projects, and should *not* be relied upon for exact geographical substation locations or line routes.



Continued on next slide...

Existing Facility Ratings:

Branch	SN/SE/WN/WE (MVA)
500kV Line #514 Doubs – Goose Creek	4224/4357/5155/5155
500kV Line #5XX Doubs – Aspen	NA
230kV Line #203 Pleasant View – Twin Creeks	1315/1412/1564/1564
230kV Line #9303 Twin Creeks – Edwards Ferry	1315/1412/1564/1564

Preliminary Facility Ratings:

Branch	SN/SE/WN/WE (MVA)
500kV Line #514 Doubs – Goose Creek	4357/4357/5155/5155
500kV Line #5XX Doubs – Aspen	4357/4357/5155/5155
230kV Line #203 Pleasant View – Twin Creeks	1573/1573/1648/1648
230kV Line #9303 Twin Creeks – Edwards Ferry	1573/1573/1648/1648

Baseline # B3800.230 – B3800.242

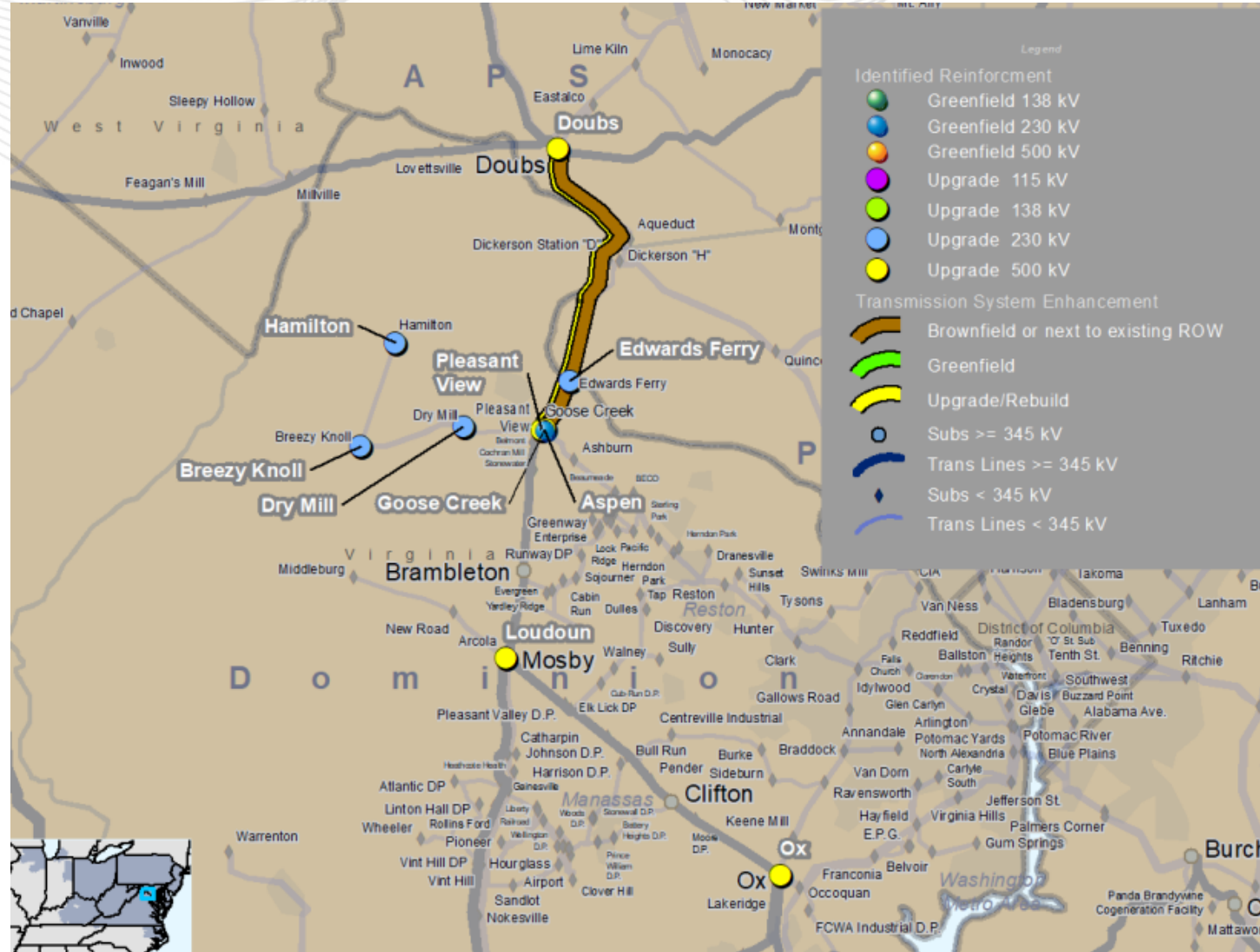
Estimated Cost: \$78.4 M

Required IS Date: 6/1/2027

Projected IS Date: 12/1/2027

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NOTE: This map is only intended to illustrate the general electrical connectivity of the projects, and should not be relied upon for exact geographical substation locations or line routes.



Recommended Solution: 2022-W3-344/660 (Exelon)

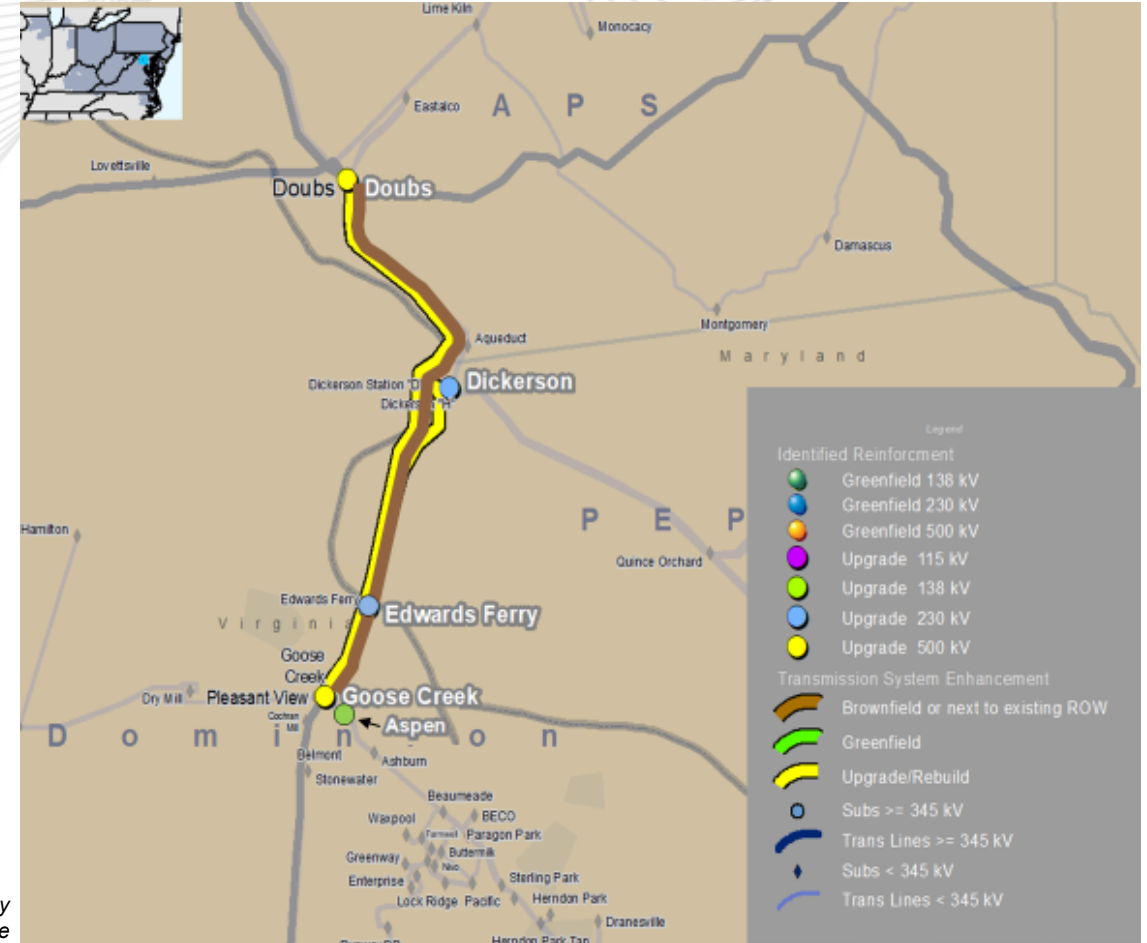
- Exelon portion of the New 500 kV Doubs to Goose Creek utilizing Existing Exelon ROW
 - Rebuild 7.26 miles of existing 230 kV circuit from Dickerson Station H to Ed's Ferry area to accommodate the new 500 kV circuit between Doubs and Goose Creek. The new structure will carry both 500 kV and the 230 kV from Dickerson Station H to Ed's Ferry circuits. **(Exelon)**
 - 500 kV New Rating 4357SN/4357SE/WN5155/5155WE MVA
 - 230 kV New Rating 1618SN/1867SE/WN1702/1951WE MVA
 - Reconfigure Dickerson H 230 kV Substation and upgrade terminal equipment. **(Exelon)**

Baseline # B3800.243 – B3800.245

Proposed Cost Estimate: \$66.38 M

Required In-Service Date : 6/1/2027

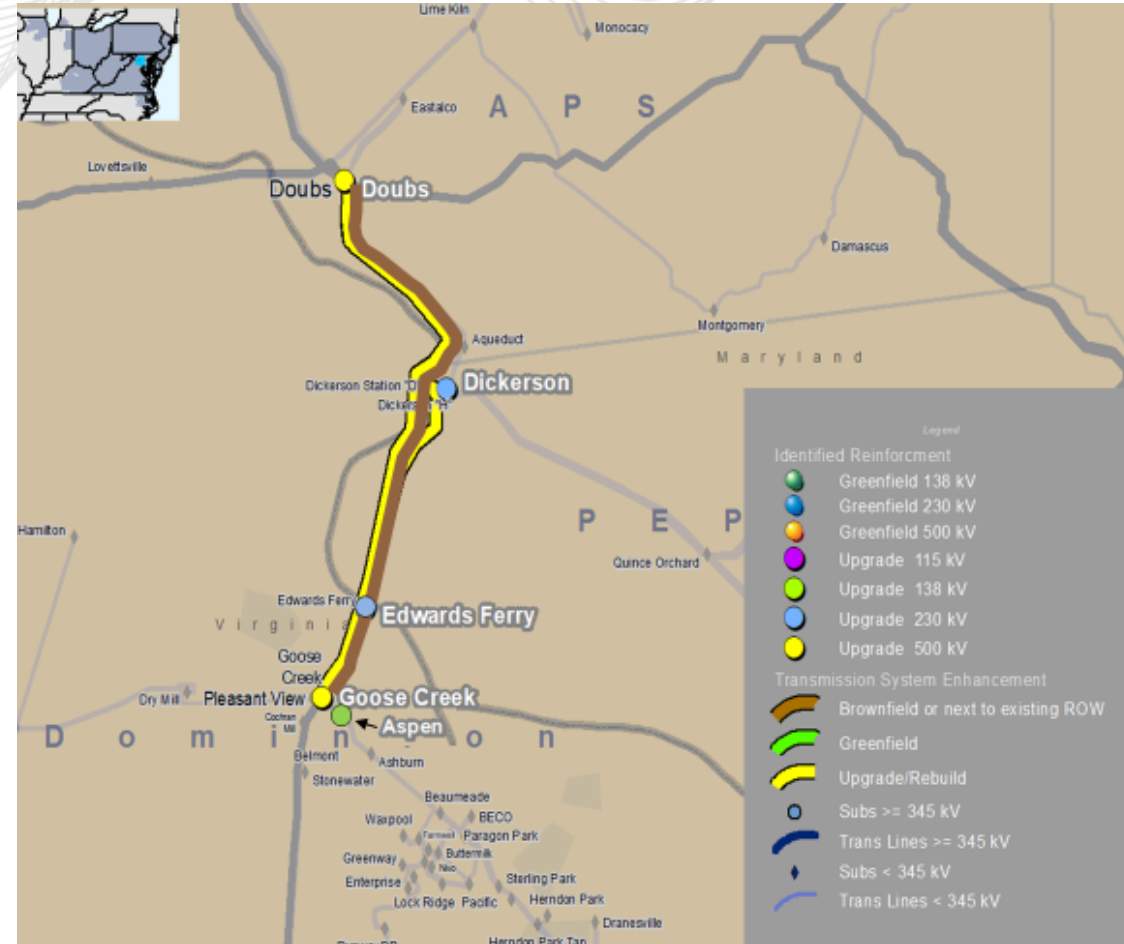
Projected In-Service Date : 2028-2030



NOTE: This map is only intended to illustrate the general electrical connectivity of the projects, and should not be relied upon for exact geographical substation locations or line routes.

Recommended Solution: 2022-W3-837 (FirstEnergy)

- Existing Doubs to Goose Creek 500 kV rebuild and New Doubs to Aspen 500 kV line
 - **Rebuild 500kV Line #514 from Doubs – Goose Creek 500 kV line.** The Doubs – Goose Creek 500 kV Line will be rebuilt and the Doubs - Dickerson 230 kV will be relocated and underbuilt on the same structure - **(FE Cost Estimate: \$103.27M)**
 - **New Doubs to Aspen 500 kV line** - Aspen Substation is not yet constructed but is a component in Dominion's proposal 2022-W3-692. - **(FE Cost Estimate: \$68.8M)**
 - **Doubs Substation work** - Re-terminate the rebuilt Doubs – Goose Creek 500 kV line in its existing bay, Terminate the new Doubs – Aspen 500 kV line in the open bay at Doubs, Replace three 500 kV breakers, Replace 500 kV terminal equipment including disconnect switches, CTs and substation conductor & Replace relaying - **(FE Cost Estimate: \$31.7M)**
 - Rebuild the Doubs - Dickerson 230 kV Line, Rebuild the Doubs - Aqueduct 230 kV Line and Rebuild the Dickerson - Aqueduct 230 kV Line. This will be underbuilt on the new Doubs - Aspen 500 kV Line - **(FE Cost Estimate: \$31.19M)**



NOTE: This map is only intended to illustrate the general electrical connectivity of the projects, and should not be relied upon for exact geographical substation locations or line routes.

Existing Facility Ratings:

Branch	SN/SE/WN/WE (MVA)
Doubs – Goose Creek 500 kV Rebuild	4224/4357/5155/5155
Doubs - Aqueduct 230 kV	1106/1290/1121/1357
Aqueduct - Dickerson H 230 kV	1104/1195/1121/1195
Doubs - Dickerson H 230 kV	1104/1195/1121/1195

Preliminary Facility Ratings:

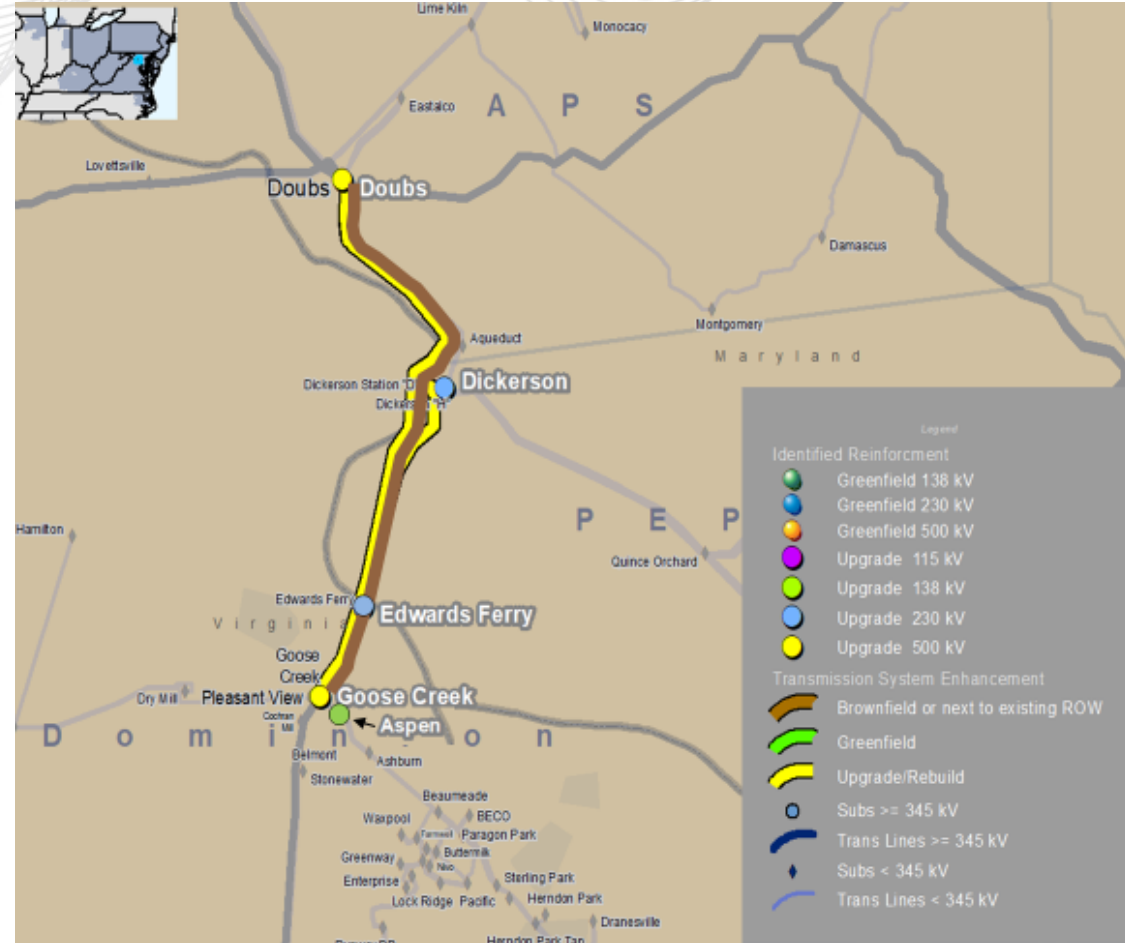
Branch	SN/SE/WN/WE (MVA)
Doubs – Goose Creek 500 kV Rebuild	4357/4357/5155/5155
Doubs – ASPEN 500 kV (New)	
Doubs - Aqueduct 230 kV	1106/1323/1360/1512
Aqueduct - Dickerson H 230 kV	1104/1195/1195/1195
Doubs - Dickerson H 230 kV	1104/1195/1195/1195

Estimated Cost: \$234.96M

Baseline ID's: b3800.122 – b3800.127

Required IS Date: 6/1/2027

Projected IS Date: 6/1/2030



NOTE: This map is only intended to illustrate the general electrical connectivity of the projects, and should not be relied upon for exact geographical substation locations or line routes.

Eastern Cluster - Selected Proposals

Baseline Reliability Projects

Transource – North Delta substation Expansion

Recommended Solution:

- Expand North Delta 500 kV substation
 - Expand the North Delta 500 substation to include four bay breaker and half configuration
 - Expansion will allow termination of six 500 kV lines and one 500/230 kV transformer

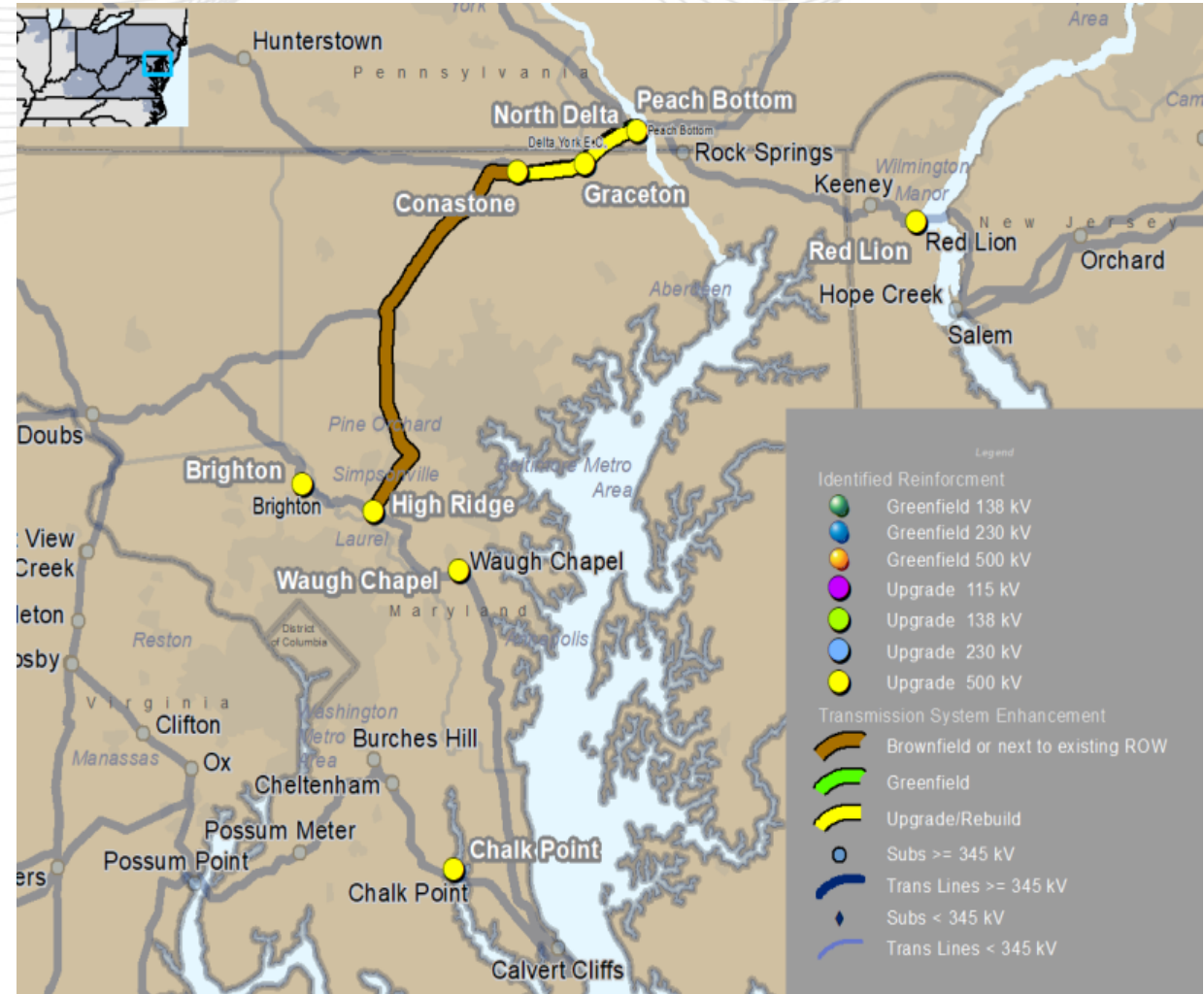
Baseline # B3737.47 (NJOSW – SAA 1.0)

Proposed Cost Estimate: \$104.1 M

Required In-Service Date : 6/1/2027

Projected In-Service Date : 12/31/2027

NOTE: This map is only intended to illustrate the general electrical connectivity of the projects, and should not be relied upon for exact geographical substation locations or line routes.



Exelon:2022-W3-344/660

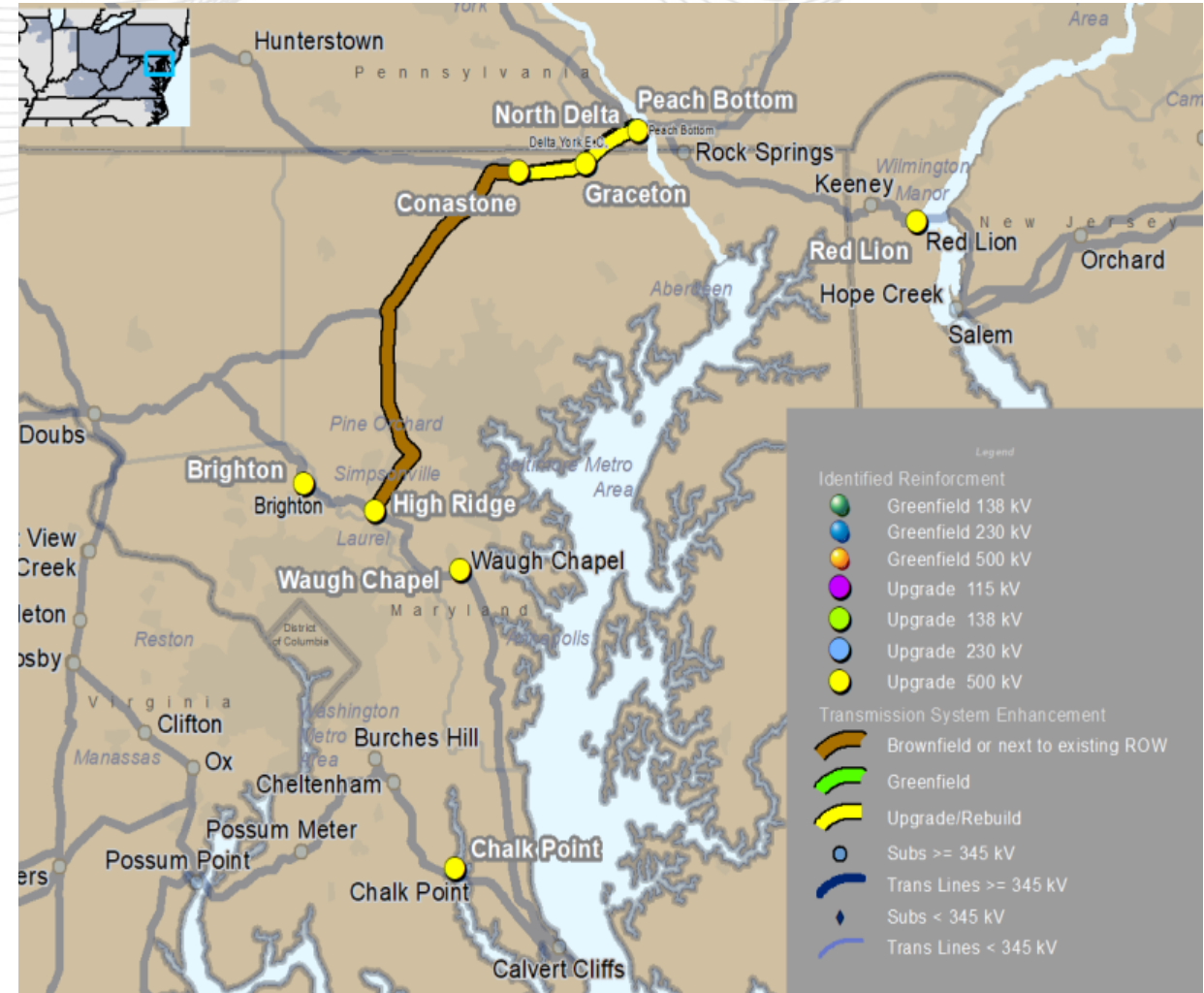
Recommended Solution:

- Build new Peach Bottom South - North Delta 500kV line – cut in to Peach Bottom tie #1 and extending line to North Delta (~1.25 miles new ROW)
 - New Rating - 4503SN/5022SE/5206WN/5802WE MVA
- North Delta termination for the North Delta - High Ridge 500 line
- North Delta 500 kV termination for the Rock Springs 500 kV line (5034/5014 line)
- North Delta 500 kV termination for the new Peach Bottom - North Delta 500 kV line
- North Delta 500 kV termination for the Calpine generator

Baseline # B3800.44 –B3800.51

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NOTE: This map is only intended to illustrate the general electrical connectivity of the projects, and should not be relied upon for exact geographical substation locations or line routes.



Exelon:2022-W3-344/660

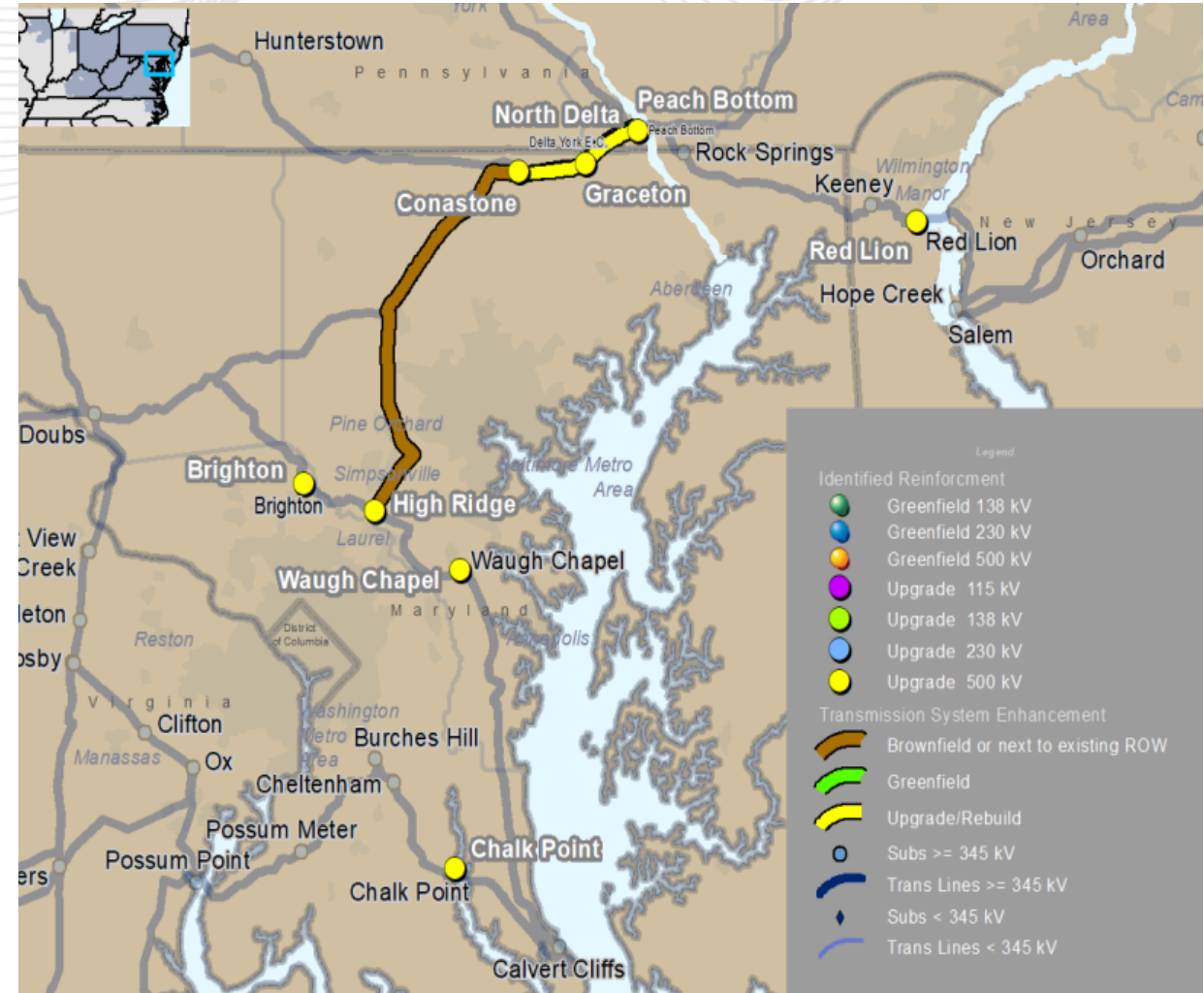
Recommended Solution:

- Build High Ridge 500 kV substation (cut into Brighton – Waugh Chapel 500 kV line)
 - Three bay breaker and half configuration
 - Two 500/230 kV transformers
 - Replace terminal equipment at both Brighton and Waugh Chapel

Baseline # B3800.26 –B3800.30

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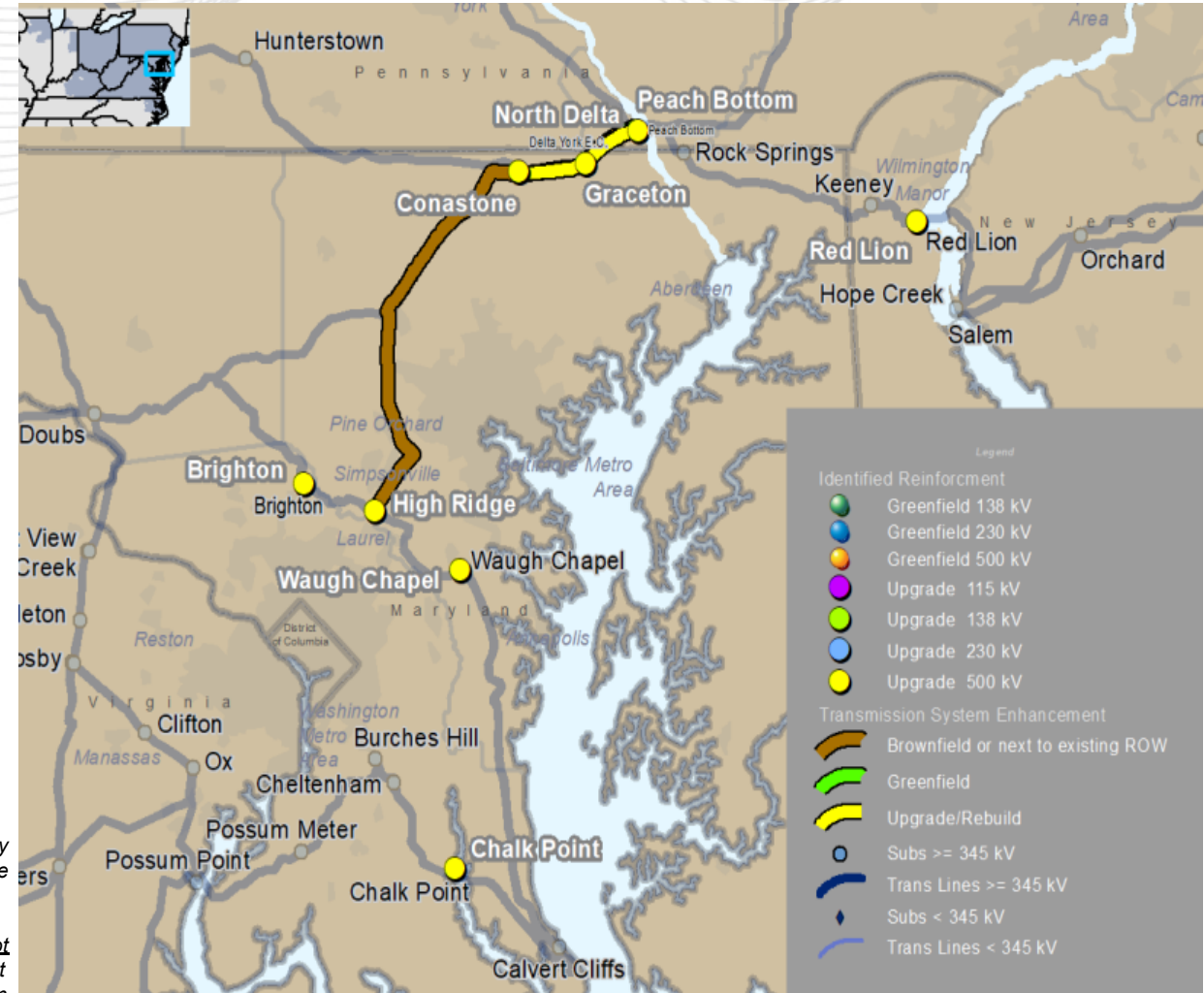
NOTE: This map is only intended to illustrate the general electrical connectivity of the projects, and should not be relied upon for exact geographical substation locations or line routes.



Exelon:2022-W3-344/660

Recommended Solution:

- Rebuild 5012 (existing Peach Bottom – Conastone) 500 kV line on single circuit structures within existing ROW and cut into North Delta 500 kV and Gracetone 500 kV stations. (B3800.34- B3800.36)
 - New Rating - 4503SN/5022SE/5206WN/5802WE MVA
- Build new North Delta – High Ridge 500 kV line. (~65 miles). (B3800.31&B3800.32)
 - New Rating - 4503SN/5022SE/5206WN/5802WE MVA



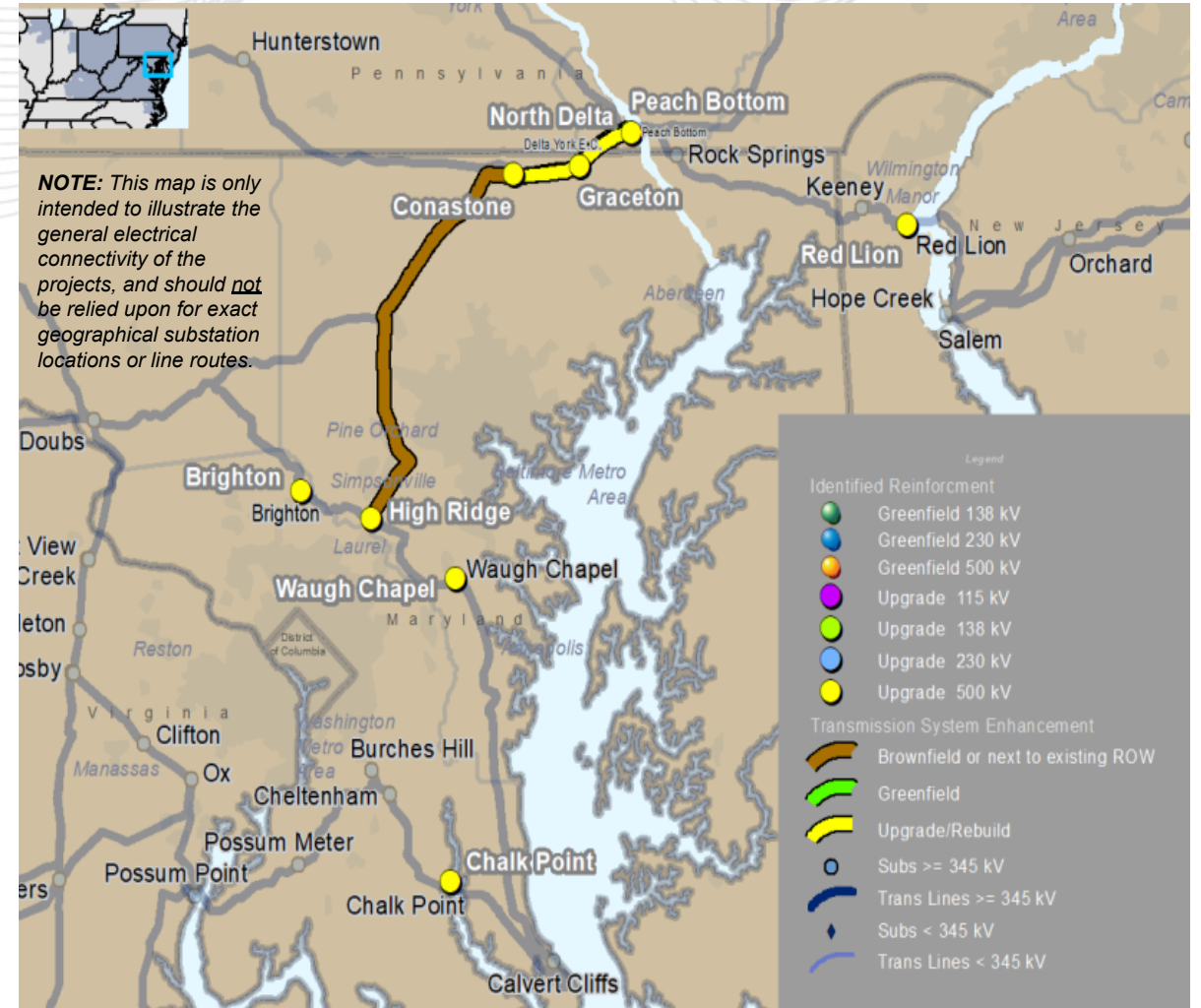
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NOTE: This map is only intended to illustrate the general electrical connectivity of the projects, and should *not* be relied upon for exact geographical substation locations or line routes.

Exelon:2022-W3-344/660

Recommended Solution:

- Conastone - Brighton 500 kV (5011 circuit) - Replace terminal equipment limitations at both Conastone and Brighton 500 kV **(B3800.40& B3800.41)**
 - (New Rating 2920SN/3598SE/3594WN/4264WE)
- Brighton - Waugh Chapel 500kV (5053) - Replace terminal equipment limitations at Brighton 500kV **(B3800.33)**
 - (New Rating 3498SN/4070SE/4014WN/4010WE MVA)
- Chalk Point - Cheltenham 500 kV (5073) - Replace relay at Chalk Point 500 kV **(B3800.38)**
 - (New Rating – 2670SN/3099SE/3064WN/3567WE MVA)
- Conastone - Peach Bottom 500 kV (5012 circuit)- Upgrade (2) existing 500 kV breakers at Conastone from 4000A to 5000A. **(B3800.37)**
 - (New Rating - 4503SN/5022SE/5206WN/5802WE MVA)



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Exelon:2022-W3-344/660

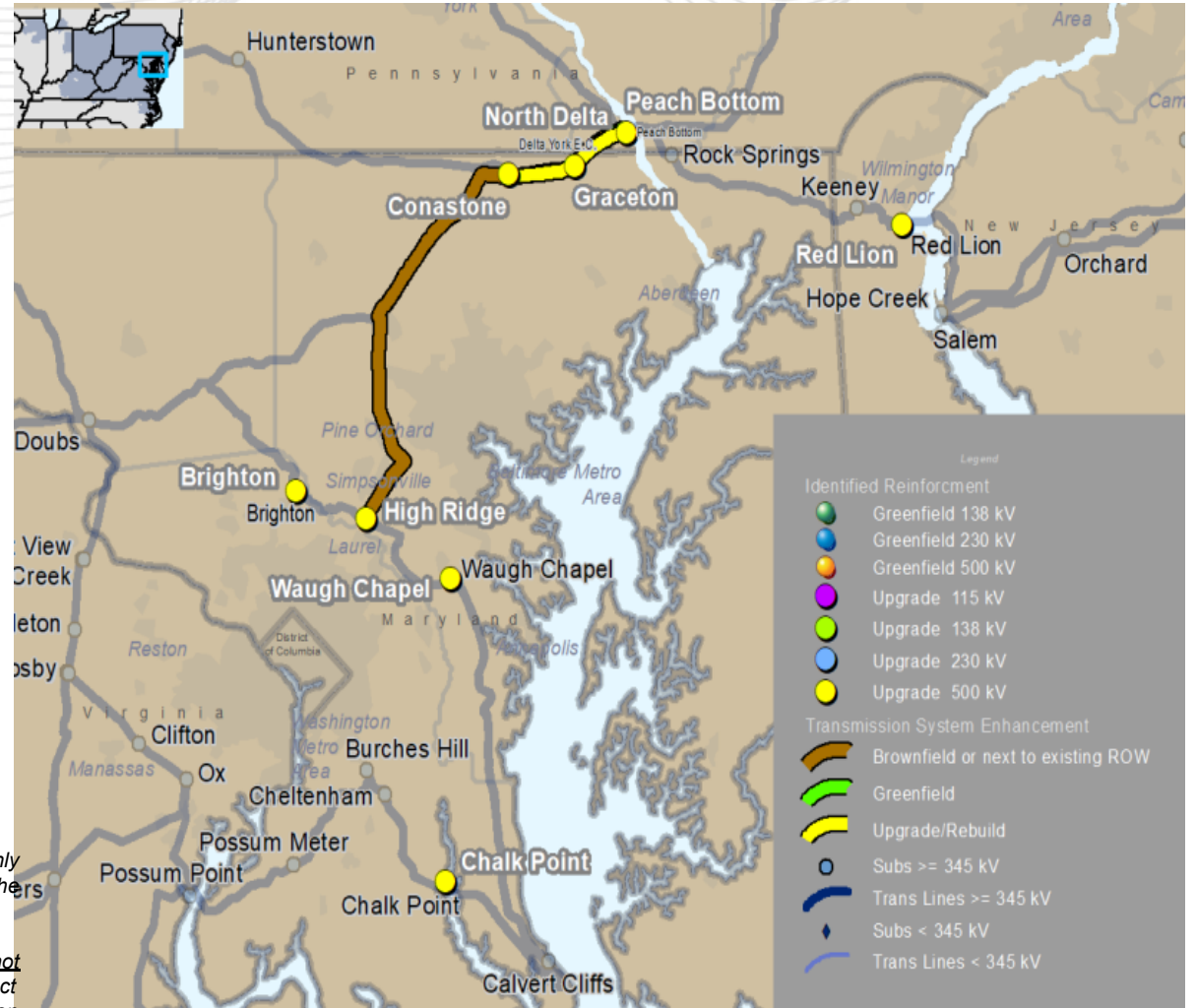
Recommended Solution:

- Peach Bottom 500 kV – Reconfigure and upgrade several terminal/substation equipment at both North and South Peach Bottom 500 kV substations (B3800.42)
- Red Lion - Hope Creek 500 kV - Replace terminal equipment at Red Lion (B3800.39)
 - (New Rating – 2598SWN/2598SWE MVA)

Proposed Cost Estimate: \$708.77 M

Required In-Service Date : 6/1/2027

Projected In-Service Date : 2028-2030



NOTE: This map is only intended to illustrate the general electrical connectivity of the projects, and should not be relied upon for exact geographical substation locations or line routes.

PPL:2022-W3-374

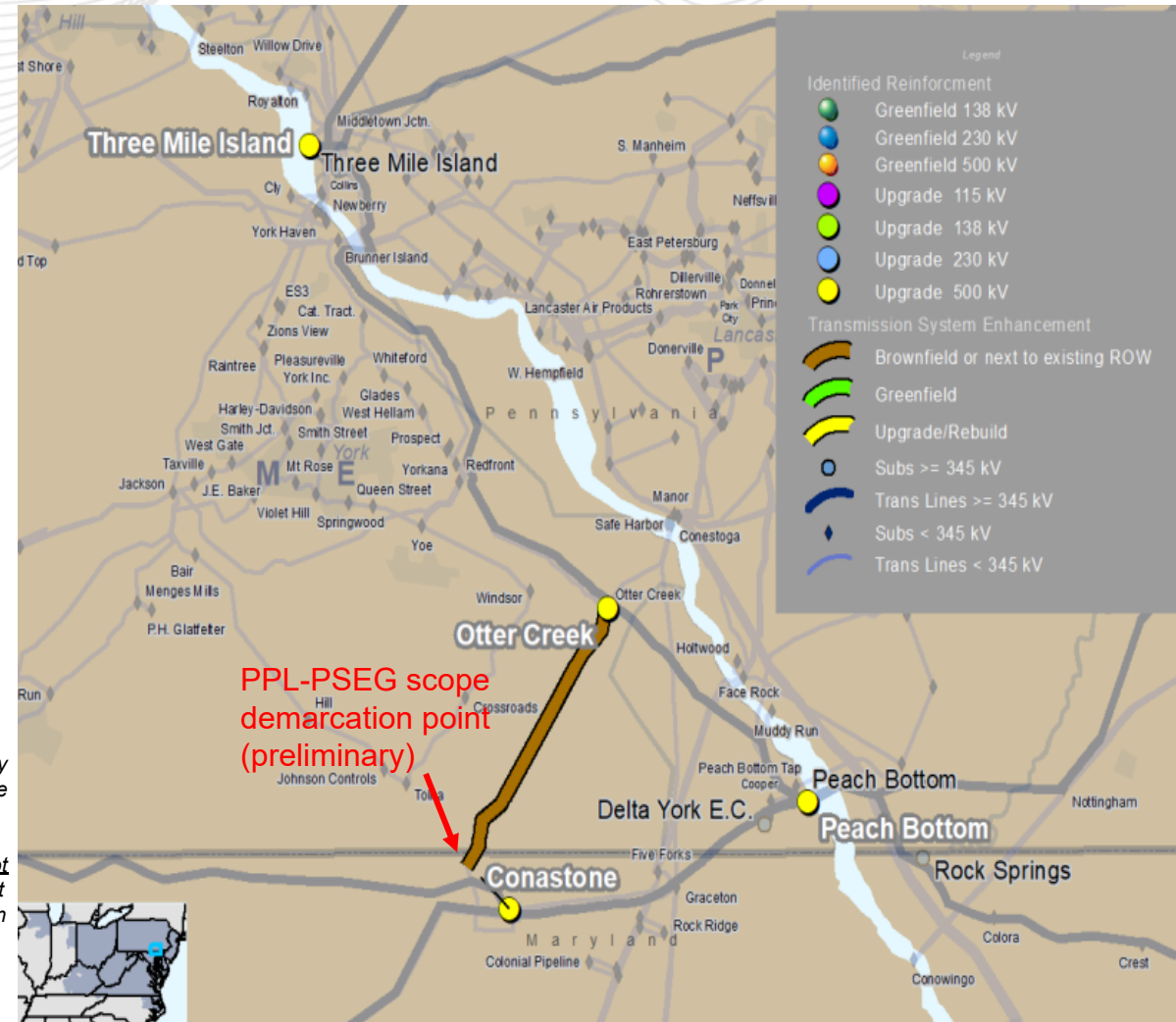
Recommended Solution:

- Build New Otter Creek 500 kV switching station – cut into Peach Bottom – TMI 500 kV line
 - Two bay three breaker configuration
- Build New 500kV AC line from the new Otter Creek substation – towards Conastone station fence – Conastone demarcation point (~17 miles)
 - Rebuild the existing Otter Creek - Conastone 230 kV line to become a double-circuit 500 and 230 kV line. The existing line is owned by PPL and BGE, and both will share responsibility.
 - New Rating - 4398SN/5237SE/4762WN/5609WE MVA
- Upgrade relay/terminal equipment at Peach Bottom and TMI substations
 - New Rating - 2644SN/3016SE/2917WN/3250WE MVA

Baseline # B3800.1 –B3800.6

Proposed Cost Estimate: \$134.2 M
Required In-Service Date : 6/1/2027
Projected In-Service Date : 6/1/2027

NOTE: This map is only intended to illustrate the general electrical connectivity of the projects, and should not be relied upon for exact geographical substation locations or line routes.



PSEG: 2022-W3-637

Recommended Solution:

- Build new 500kV AC line from the Conastone demarcation point with PPL Otter Creek line to – Doubs station (~70 miles)
 - Construct a 500kV overhead AC line between the Conastone demarcation point and the Doubs Substations
 - New Rating - 3341SN/4156SE/3759WN/4595WE MVA
 - The 500 kV line will tie into the PPL proposed Otter Creek – Conastone, bypassing the Conastone station
 - Reconfigure Doubs 500 kV station and upgrade terminal equipment to terminate new Otter Creek – Doubs 500 kV line

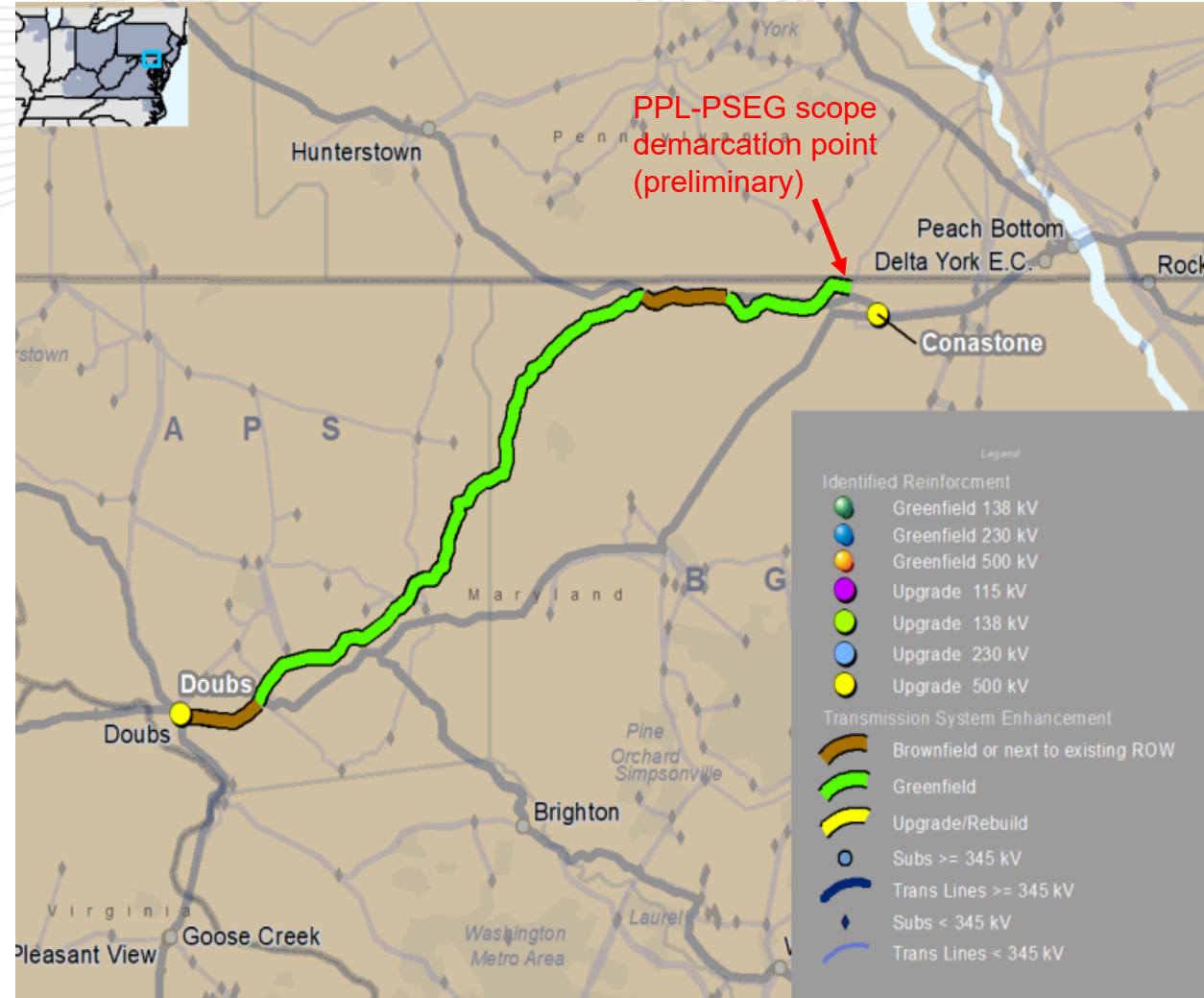
Baseline # B3800.7 –B3800.8 and B3800.43

Proposed Cost Estimate: \$447.5 M

Required In-Service Date : 6/1/2027

Projected In-Service Date : 6/1/2027

NOTE: This map is only intended to illustrate the general electrical connectivity of the projects, and should not be relied upon for exact geographical substation locations or line routes.



Recommended Solution:

FE: 2022-W3-837

Build new 230 kV AC circuit from Hunterstown - Carroll

- Rebuild the existing Hunterstown – Carroll 115/138 kV Corridor as Double Circuit using 230kV construction standards
 - 230kV New Rating – 726SN/890SE/824WN/1056WE MVA
 - 115kV New Rating – 363SN/445SE/412WN/528WE MVA

PJM Identified upgrades:

- Reconductor Lincoln – Orrtanna 115 kV Line
 - New Rating- 232SN/282SE/263WN/334WE MVA
- Fayetteville – Grand Point 138 kV - Replace line trap at Grand Point 138 kV
 - New Rating – 195SN/258SE/280WN/368WE MVA
- Reid - Ringgold 138 kV - Replace line trap, substation conductor, breaker at Ringgold, relaying and CTs
 - New Rating – 308SN/376SE/349WN/445WE MVA
- Cancel b3768 (Rebuild/Reconductor the Germantown - Lincoln 115 kV Line.) (Cost: \$17.36M)

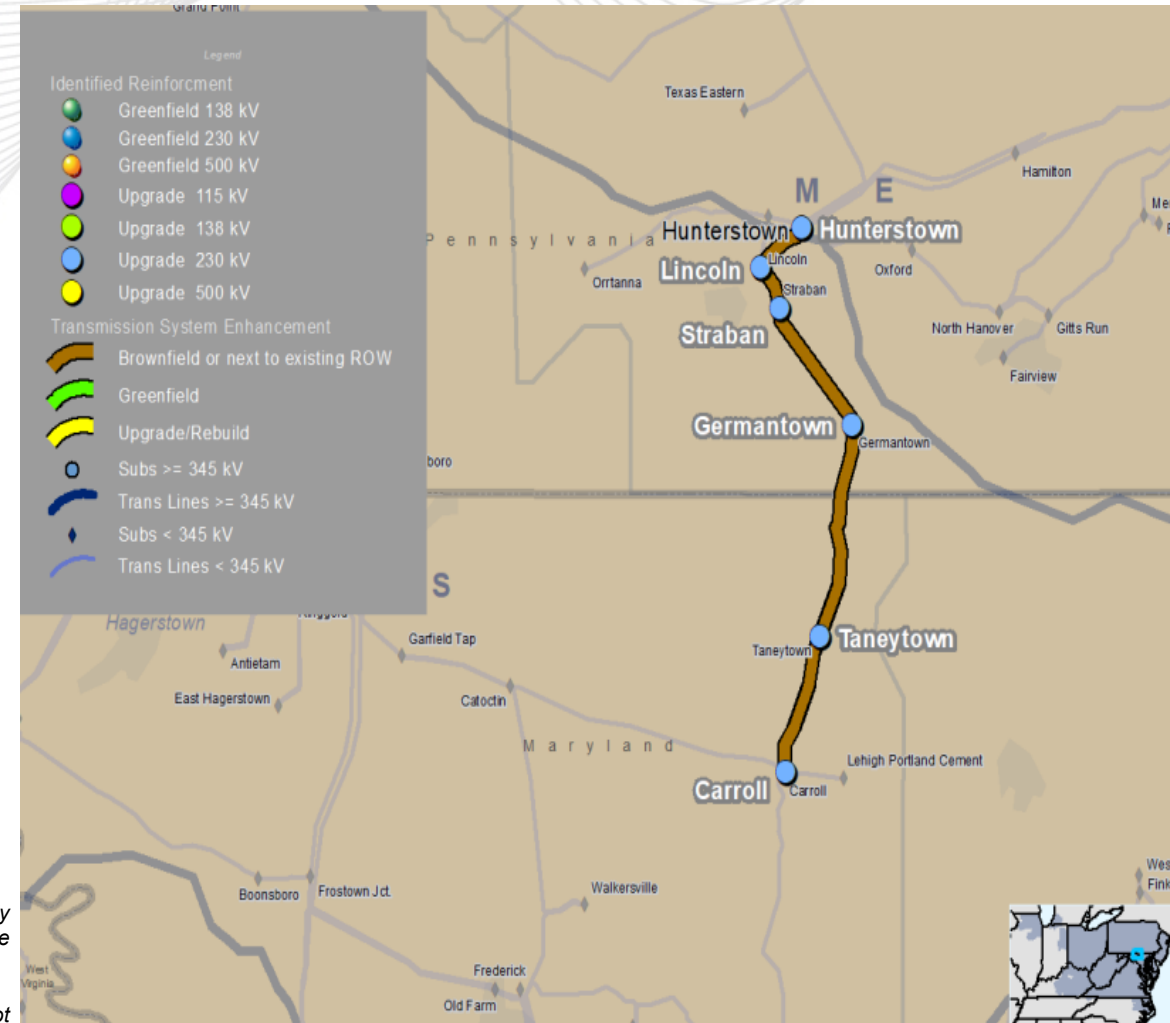
Baseline # B3800.9 –B3800.25

Proposed Cost Estimate: \$152.65 M – \$17.36 M = \$135.3 M

Required In-Service Date : 6/1/2027

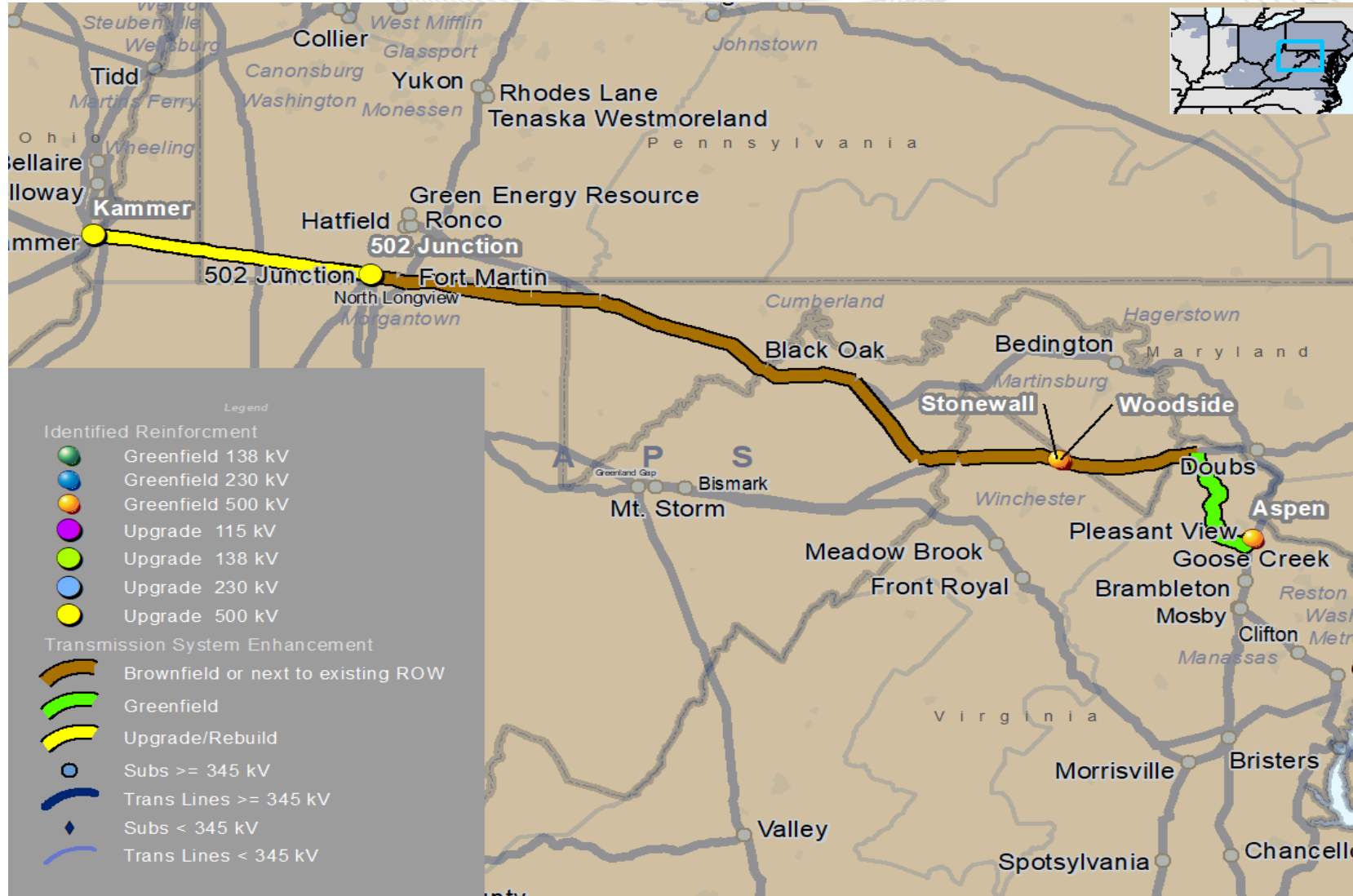
Projected In-Service Date : 6/1/2028

NOTE: This map is only intended to illustrate the general electrical connectivity of the projects, and should not be relied upon for exact geographical substation locations or line routes.



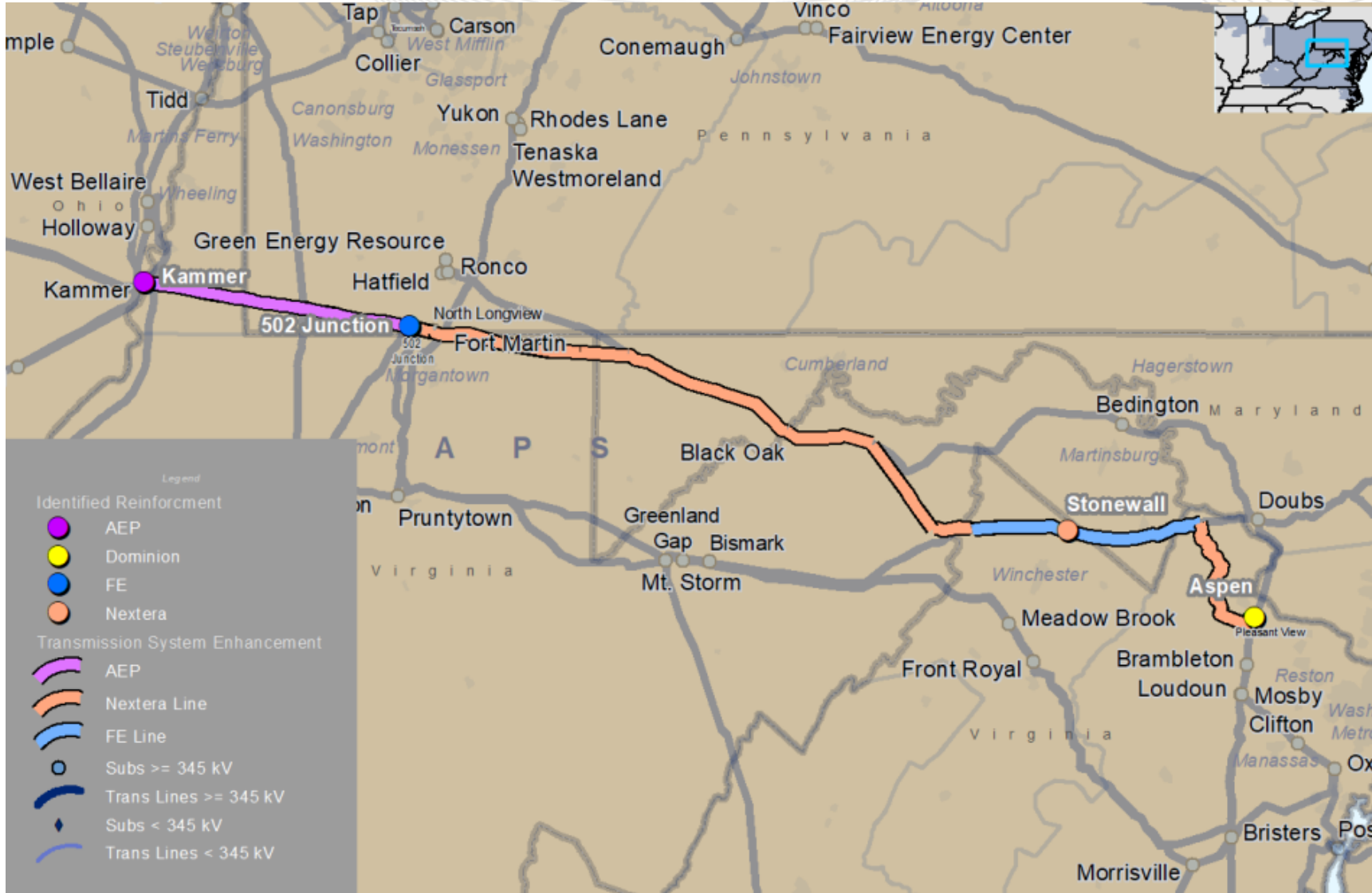
Western Cluster - Selected Proposals

Baseline Reliability Projects



NOTE: This map is only intended to illustrate the general electrical connectivity of the projects, and should not be relied upon for exact geographical substation locations or line routes.

2022W3 – Preferred Solutions: West Cluster By Designated Entity



NOTE: This map is only intended to illustrate the general electrical connectivity of the projects, and should not be relied upon for exact geographical substation locations or line routes.

Preferred Proposals to Address Clusters - West

- **NextEra:2022-W3-853** (bypass Black Oak, terminate at Aspen instead of Gant) – **NextEra Scope**
 - New 500kV line from existing 502 Junction substation to New Stonewall/Woodside substation (**bypass Black Oak**) (**NextEra**) - (**Cost Estimate: \$315.64M**)
 - Woodside substation adjacent to existing Stonewall 138 kV substation. (**NextEra**) (**Cost Estimate: \$125.25M**)
 - Loop in Bismark to Doubs 500 kV line.
 - Two 500/138 kV transformers
 - Two 150 MVAR Cap banks and one +500/-300 MVAR STATCOM
 - Line termination scope for Doubs to Bismark 500 kV line
 - New 500kV transmission line from new Woodside substation to Aspen substation – (**NextEra**)(**Cost Estimate: \$71.72M**)

Preliminary Facility Ratings:

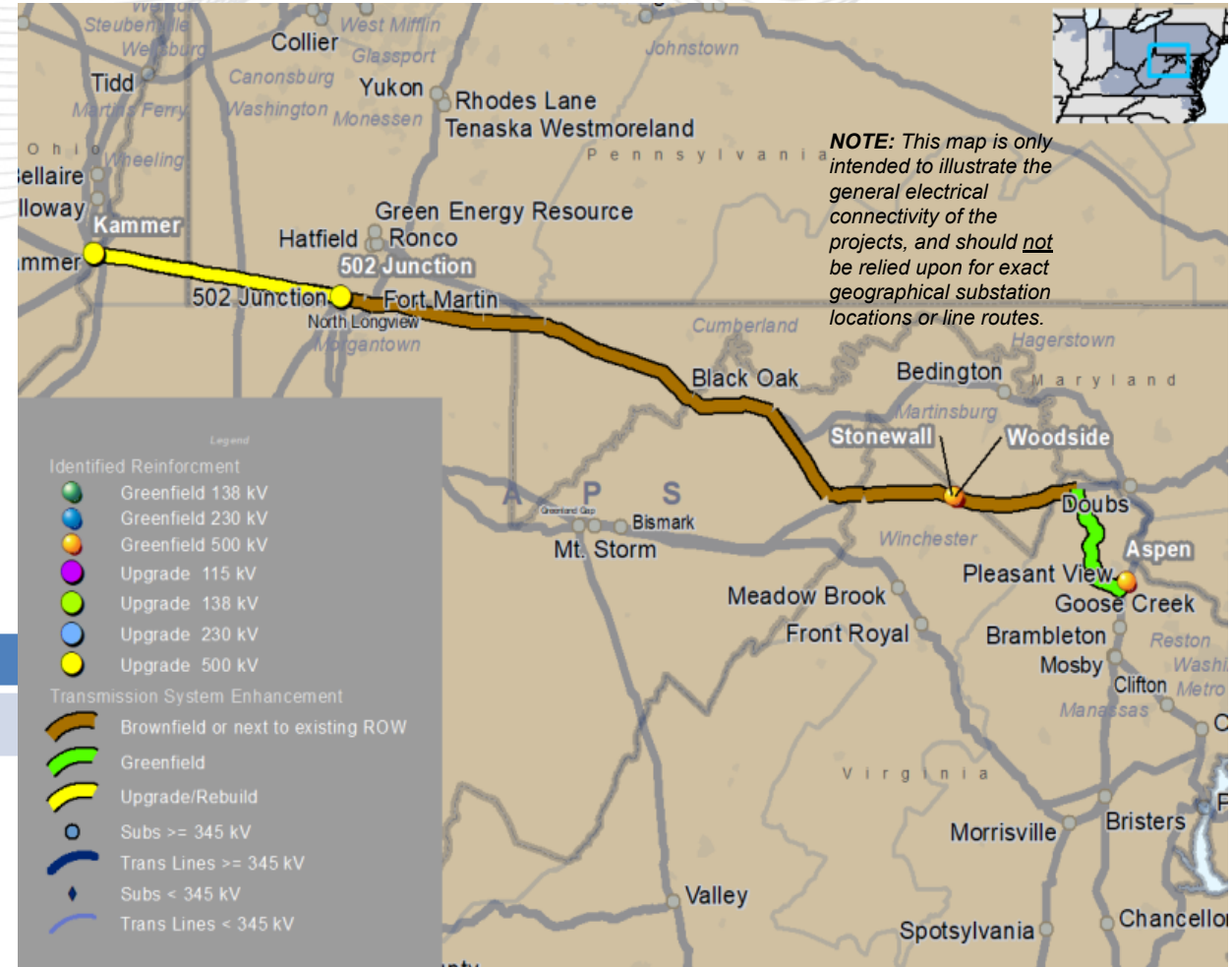
Branch	SN/SE/WN/WE (MVA)
502 Jct – Woodside –ASPEN 500 kV	4295/4357/5066/5196

Estimated Cost: \$512.61M

Baseline numbers: b3800.102, b3800.106 - b3800.110, b3800.113, b3800.115, b3800.117 & b3800.119

Required IS Date: 6/1/2027

Projected IS Date: 6/1/2027



Preferred Projects to Address Clusters - West

- **NextEra:2022-W3-853 (FE Scope)**
 - Rebuild ~16 miles of the Gore - Stonewall 138 kV Line with 500 kV overbuild, rebuild ~15 miles of the Stonewall - Millville 138 kV Line with 500 kV overbuild & rebuild ~6 miles of the Millville - Doubs 138 kV Line with 500 kV overbuild - **(FE Cost Estimate: \$341M) (Incumbent)**
 - Stonewall 138 kV substation two 138kV breaker expansion - **(FE Cost Estimate: \$8.3M) (Incumbent)**
 - 502 Junction substation two 500 kV circuit breaker expansion - **(FE Cost Estimate: \$30.6M) (Incumbent)**
 - Line termination scope associated with terminating Doubs to Bismark line for Doubs end into the Woodside 500 kV substation - **(FE Cost Estimate: \$0.06M) (Incumbent)**
 - Line scope associated with two 138 kV line from Woodside 500 kV substation to FE Stonewall 138 kV substation - **(FE Cost Estimate: \$12.59M) (Incumbent)**

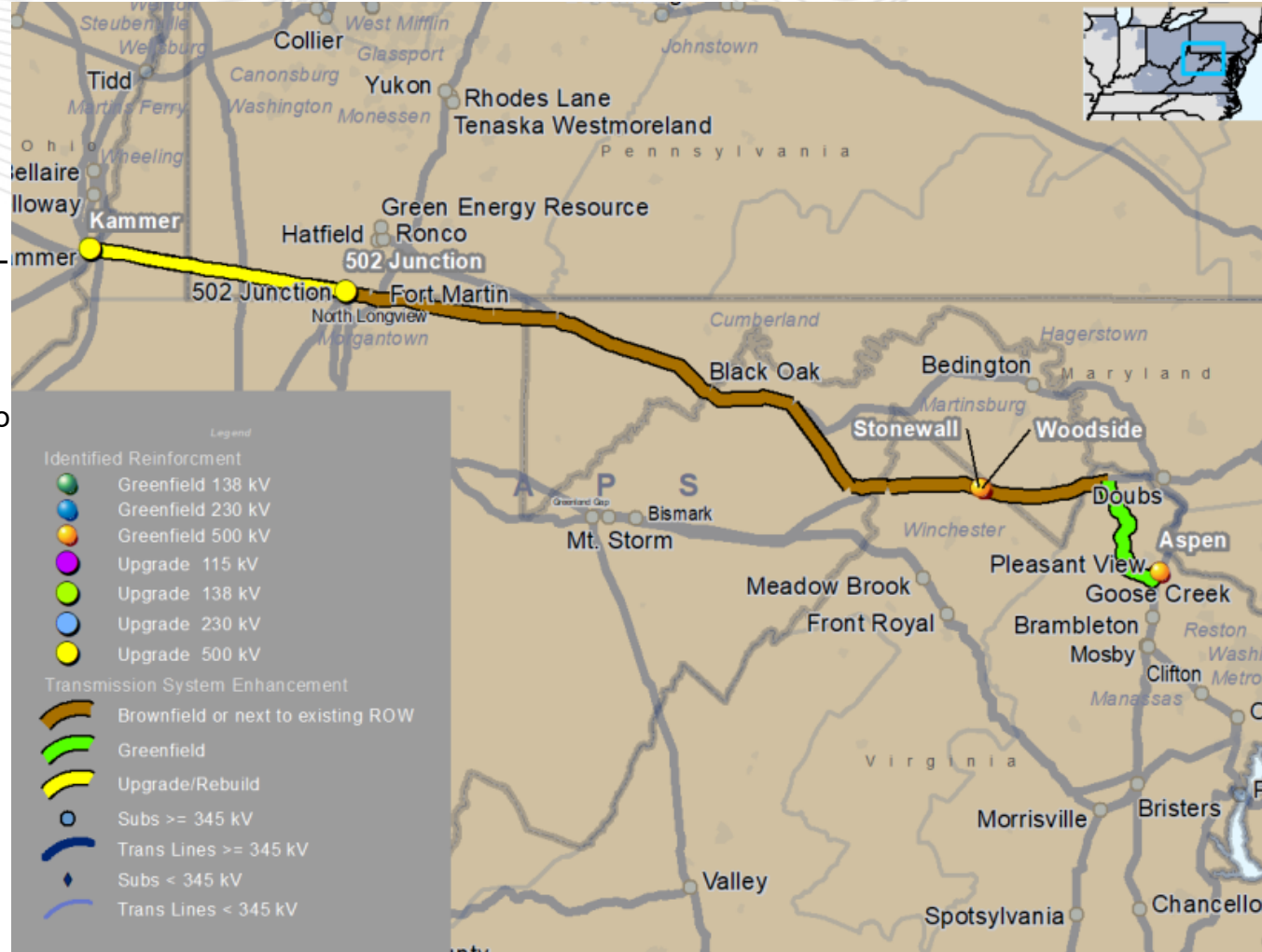
Estimated Cost: \$392.55M

Baseline ID's: b3800.101, b3800.103 – b3200.105, b3800.111, b3800.112, b3800.114 & b3800.116

Required IS Date: 6/1/2027

Projected IS Date: 6/1/2027 – 6/1/2030

NOTE: This map is only intended to illustrate the general electrical connectivity of the projects, and should not be relied upon for exact geographical substation locations or line routes.



Preferred Projects to Address Clusters - West

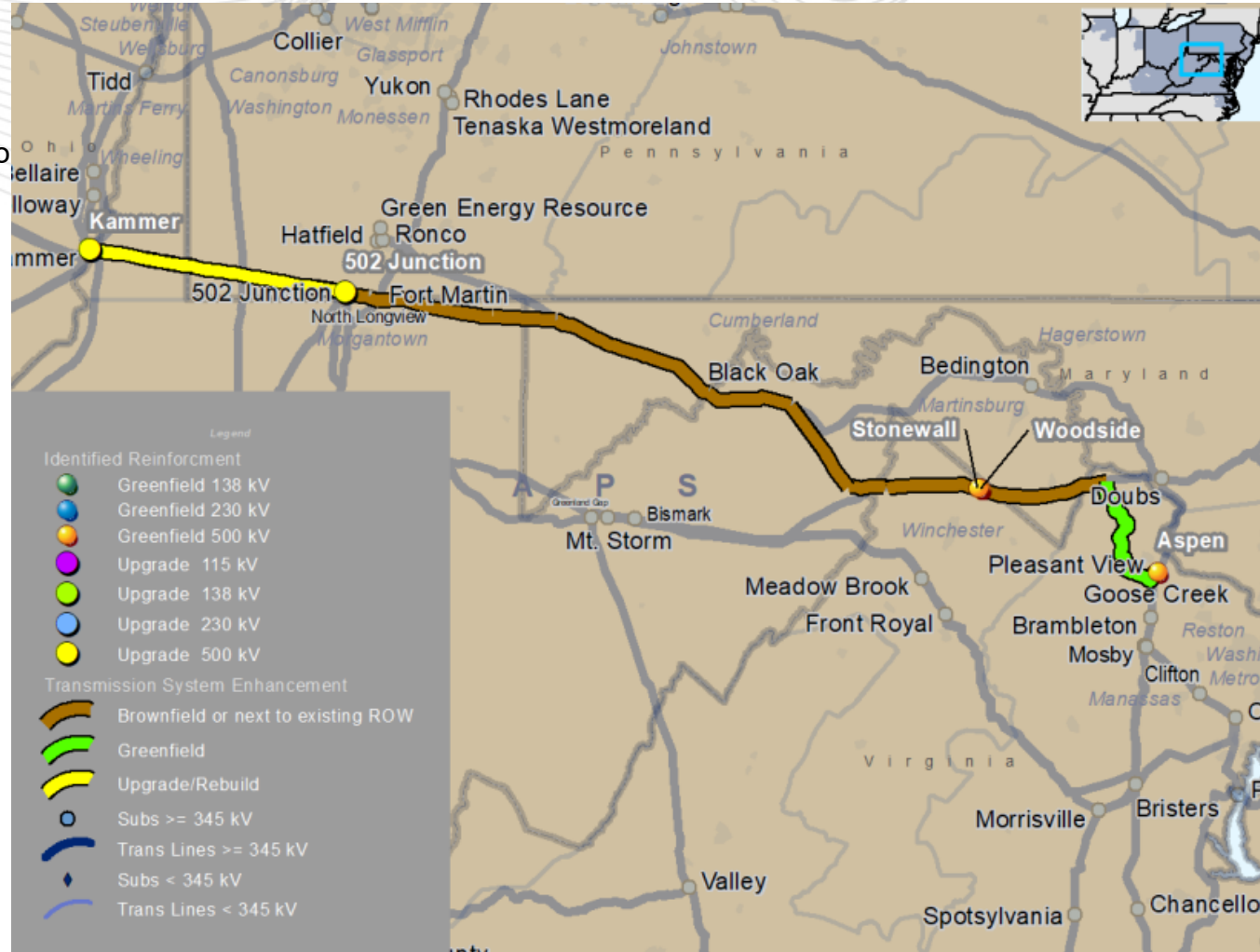
- **NextEra:2022-W3-853 (Dominion Scope)**
 - Aspen substation work to terminate new NextEra 500 kV line (**Dominion**) (**Cost Estimate : \$30.49M**) (**Incumbent**)
 - Line termination scope associated with terminating Doubs to Bismark line into the Woodside 500 kV substation - (**Dominion**) (**Cost Estimate: \$5.1M**) (**Incumbent**)

Estimated Cost: \$35.59M

Baseline ID's: b3800.118 & b3800.120

Required IS Date: 6/1/2027

Projected IS Date: 6/1/2027



NOTE: This map is only intended to illustrate the general electrical connectivity of the projects, and should not be relied upon for exact geographical substation locations or line routes.

- NextEra:2022-W3-853 (AEP Scope)
 - Kammer to 502 Junction 500kV line: Conduct LIDAR Sag Study to assess SE rating and needed upgrades (AEP Scope) (Cost Estimate: \$0.1M)

Existing Facility Ratings:

Branch	SN/SE/WN/WE (MVA)
502 Jct – Kammer	3173/3173/3928/4030

Preliminary Facility Ratings:

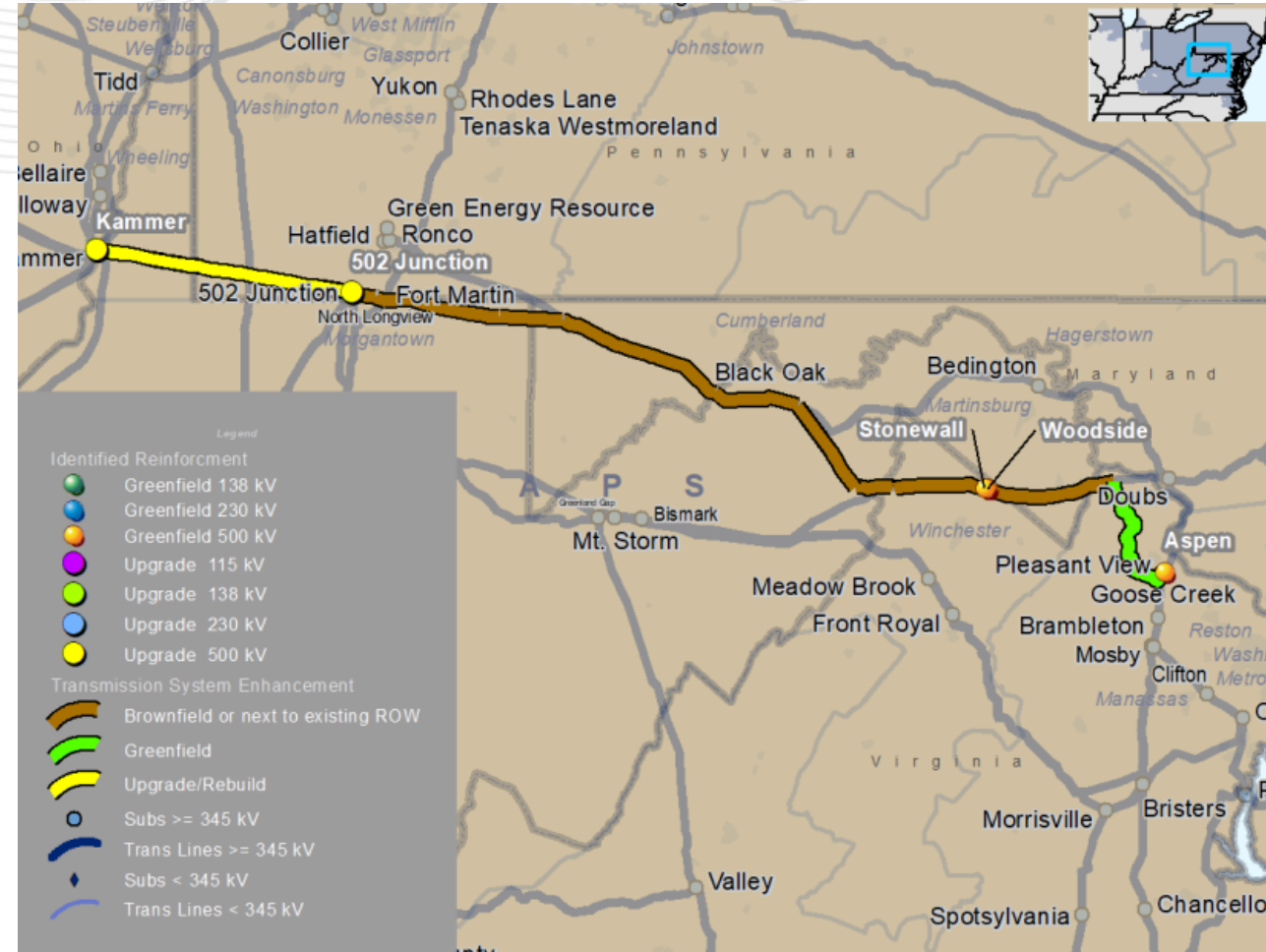
Branch	SN/SE/WN/WE (MVA)
502 Jct – Kammer	3204/3729/3928/4140

Estimated Cost: \$0.1M

Baseline ID's: b3800.121

Required IS Date: 6/1/2027

Projected IS Date: 6/1/2027



NOTE: This map is only intended to illustrate the general electrical connectivity of the projects, and should not be relied upon for exact geographical substation locations or line routes.



Short Circuit Evaluation and Associated Upgrades

2022 Window 3

- Posted window case based on 2027 topology
- Considered impacts to existing breakers in 11 TO areas

Scenario Description	Over Duty Bus (Qty)						Over Duty CBs	Maximum Fault Duty (kA)						Comment
	115 kV	138 kV	230 kV	345 kV	500 kV	765 kV	Total	765 kV	500 kV	345 kV	230 kV	138 kV	115 kV	
2022 Window 3 Recommended Solution	1	1	14	0	5	0	80	38.3	61.9	59.7	76.1	74.4	59.1	Conastone 500kV bus operating below the 52kA rated capability Peachbottom 500kV bus operating below the 63kA rated capability



APS Area and Dominion Area - Short Circuit Upgrades

RTEP ID	Cost	TO Area	Substation	kV	BREAKER (Qty)	BREAKER NAME						
B3800.401	\$0.79M	DOM	ASHBURN	230	1	SC432						
B3800.402	\$2.31M	DOM	BEAUMEADE	230	1	227T2152						
B3800.403	\$4.21M	DOM	BECO	230	2	215012	H12T2150					
B3800.404	\$2.24M	DOM	BELMONT	230	1	227T2180						
B3800.405	\$9.38M	DOM	BRAMBLETON	230	6	20102	20602	204502	209402	201T2045	206T2094	
B3800.406	\$3.11M	DOM	GAINESVILLE	230	1	216192						
B3800.407	\$5.57M	DOM	LOUDON	230	2	204552	217352					
B3800.408	\$9.02M	DOM	OX	230	7	22042	24342	24842	220T2063	243T2097	248T2013	H342
B3800.409	\$4.96M	DOM	PARAGON PARK	230	4	208132	215032	2081T2206	2150T2207			
B3800.410	\$0.79M	DOM	RESTON	230	1	264T2015						
B3800.411	\$4.95M	DOM	STONEWATER	230	4	20662-1	20662-2	217862-1	217862-2			
B3800.412	\$2.93M	DOM	WAXPOOL	230	4	214922-5	214922-6	216622-5	216622-6			
B3800.413	\$3.00M	APS	DOUBLE TOLL GATE	138	1	MDT 138 OCB						
B3800.414	\$10.01M	APS	DOUBS	500	1	DL-55 522LIN						
TOTAL	\$63.27M				36							



2022 Window 3 Recommended Solution

See link for Detail upgrade components:

<https://www.pjm.com/-/media/committees-groups/committees/ta-c/2023/20231205/20231205-informational-only---2022-window-3-baseline-project-b3800-components.ashx>

Project Area	Proposal ID	RTEP Upgrade IDs	Key Facilities Included	Designated Entity	Current Year (2023) Estimated Cost (\$M)	Required In-Service Date	Projected In-Service Date
East	344	b3800.31, 35, 39, 42, 44-51	New Peach Bottom South - North Delta 500 kV & North Delta - High Ridge 500 kV (PECO scope) Rebuild 5012: North Delta - Graceton 500 kV (PECO scope) Red Lion terminal upgrade North Delta 500 kV Terminations (Transource scope)	PECO DPL Transource	77.41	6/1/2027	12/1/2030
	660	b3800.26-30, 32-34, 36-38, 40, 41	High Ridge 500 kV station expansion New North Delta - Highridge 500 kV (BGE scope) Rebuild 5012: North Delta - Gracetone - Conastone (BGE scope)	BGE PEPCO	631.36	6/1/2027	12/1/2030
	374	b3800.1-6	New Otter Creek 500 kV station (tie-in to TMI - Peach Bottom 500 kV) New Otter Creek - Doubs 500/230 kV DCT (PPL and BGE scope) Peach Bottom and TMI Terminal upgrades	PPL BGE ME/PECO	134.20	6/1/2027	6/1/2027
	637	b3800.7, 8, 43	New Otter Creek - Doubs 500 kV (PSEG scope) Doubs 500 kV Termination (APS scope)	PSEG APS	447.50	6/1/2027	6/1/2027
	837	b3800.9-18, 22-25	New Carroll - Hunterstown 230 kV line	APS ME	137.47	6/1/2027	6/1/2028
	PJM Identified Upgrades	b3800.19-21	Reconductor Lincoln-Ortanna 115 kV Grand Point 138 kV line trap replacement Reid-Ringgold 138 kV upgrades	APS ME	15.18	6/1/2027	6/1/2028
West	853	b3800.101-121	New Woodside 500 kV substation (tie-in to Stonewall 138 kV station & loop in Doubs-Bismark 500 kV) New 502 Junction - Woodside - Aspen 500 kV line (NEET and APS scope) Aspen 500 kV line Termination (Dominion) Kammer - 502 Jct 500 kV Sag Study	NEET APS Dominion AEP	940.85	6/1/2027	6/1/2027 thru 6/1/2030
South	711	b3800.311-357	New Morrisville - Vint Hill - Wishing Star 500 kV Rebuild both 500 /230 kV lines in the existing Morrisville-Loudoun-Brambleton corridor	Dominion	842.19	6/1/2027	6/1/2028
	231	b3800.305-310	Morrisville, Wishing Star, Mars and Beaumeade Substation Reactive Upgrades	Dominion	103.79	6/1/2027	12/1/2027
	74, 211, 731, 967	b3800.300-304, 358-372	Proposed Dominion 230 kV Upgrades	Dominion	281.98	6/1/2027	12/1/2027 thru 6/1/2028
	PJM Identified Upgrades	b3800.373, 374	Line #256 Rebuild St. Johns - Ladysmith CT 230 kV	Dominion	37.89	6/1/2027	6/1/2028
Northern VA Data Center and Doubs Area	692	b3800.200-227	New Aspen and Golden 500/230 kV Substation & Mars Station Upgrade New Aspen - Golden - Mars 500 kV and 230 kV lines	Dominion	1025.06	6/1/2027	6/1/2028
	837, 516, 660	b3800.122-127, 230-245	Doubs - Goose Creek '514' 500 kV Rebuild (APS and Dominion scope) New Doubs - Aspen 500/230 kV DCT (APS, PEPCO, Dominion scope)	APS Dominion PEPCO	379.74	6/1/2027	12/1/2027 thru 6/1/2030
	PJM Identified Upgrades	b3800.228, 229,	Sterling Park – Golden 230 kV Reconductor Davis Drive – Sterling Park 230 kV Reconductor	Dominion	13.50	6/1/2027	6/1/2028
Local AEP	410	b3800.100	Cloverdale Breaker Reconfiguration	AEP	11.59	6/1/2027	10/1/2026
Short Circuit	PJM Identified Upgrades	b3800.401-414	Short Circuit Upgrades	Dominion APS	63.27	6/1/2027	6/1/2027
TOTAL					5142.98		



Summary of Scope Change and Cancellations

Scope Change							
RTEP Upgrade ID	Original Project Description	New Project Description	Designated Entity	Original Cost (\$M)	Updated Cost (\$M)	Original In-Service Date	New In-Service Date
b3737.47	Build a new greenfield North Delta station with two 500/230 kV 1500 MVA transformers and nine 63 kA breakers (four high side and five low side breakers in ring bus configuration).	Build New North Delta 500 kV substation (four bay breaker and half configuration) - the substation will include 12 - 500kV breakers and one 500/230 kV transformer, will allow the termination of six - 500 kV lines	Transource	76.27	104.11	6/1/2029	12/31/2027

Cancellations			
RTEP Upgrade ID	Project Description	Designated Entity	Project Cost (\$M)
b3780.3	West Cooper substation (3 breaker ring + transformer, control house + substation build, reconfigure Cooper distribution station feed)New transformer rating: 1559 MVA SN/ 1940 MVA SE	PECO	60.00
b3768	Rebuild/Reconductor the Germantown - Lincoln 115 kV Line. Approximately 7.6 miles. Upgrade limiting terminal equipment at Lincoln, Germantown and Straban	ME	17.36
b3247	Replace 13 towers with galvanized steel towers on Doubs - Goose Creek 500 kV. Reconductor 3 mile section with 3-1351.5 ACSR 45/7. Upgrade line terminal equipment at Goose Creek substation to support the 500 kV line rebuild.	Dominion	7.60
		TOTAL	84.96

Facilitator:
Dave Souder,
Dave.Souder@pjm.com

Secretary:
Tarik Bensala,
Tarik.Bensala@pjm.com

SME/Presenter:
Sami Abdulsalam,
Sami.Abdulsalam@pjm.com

Reliability Analysis Update



Member Hotline

(610) 666 – 8980

(866) 400 – 8980

custsvc@pjm.com

Version No.	Date	Description
1	Nov 30 th 2023	<ul style="list-style-type: none"> Original slides posted
2	Dec 1 st 2023	<ul style="list-style-type: none"> Added slide # 71 and updated slide #70
3	Dec 6 th 2023	<ul style="list-style-type: none"> Updated tables in slide #70 and #6 Updated slide #59 Updated slide #2 to correct year

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