

Metro West Working Group Report

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Background

In May 2024, the Metro West Working Group was established to find an area solution for the Lithia Springs and Villa Rica area loads.

Purpose

The purpose of this study is to analyze and mitigate all N-1-G area thermal and voltage issues associated with new loads in the Metro West area. With the addition of many customers (mainly data centers) being served in the Metro West area, there are many overloads caused by multiple contingencies that need to be addressed. Thus, we believe a strategic project would better serve the area than brute force rebuilds. The scenarios in the next section are the strategic projects looked at in this study.

Scenarios

Scenario 1 (Base): GPC's solution with work at Villa Rica

- 2027-2028
 - Rebuild the three lines going East from Villa Rica to the new East Villa Rica Switching station with bundled 200C 1351 ACSS
 - Villa Rica Work
 - Add a new 500/230kV auto bank at Villa Rica
 - Turn the 230kV side into a 5 rung breaker and a half configuration
 - Loop in and out the Bowen – Union City 500kV line

Scenario 2: GTC's Cavender Drive solution and build a line from Cavender Drive to Buzzard Roost

- 2027-2028
 - Rebuild the three lines going East from Villa Rica to the new East Villa Rica Switching station with bundled 200C 1351 ACSS (2.5 miles)
 - Villa Rica Work
 - Add a new 500/230kV auto bank at Villa Rica
 - Turn the 230kV side into a 5 rung breaker and a half configuration
 - Loop in and out the Bowen – Union City 500kV line
- 2030:
 - Convert Cavender Drive into a 500/230 kV station looping in Union City - Villa Rica 500kV transmission line
 - Build a new 7-mile 230kV line from Cavender Drive to Buzzard Roost using 200C 1351 ACSS conductor

Scenario 3: GTC's Cavender Drive solution and build a line from Cavender Drive to a new substation (Marietta 25)

- 2027-2028
 - Rebuild the three lines going East from Villa Rica to the new East Villa Rica Switching station with bundled 200C 1351 ACSS
 - Villa Rica Work
 - Add a new 500/230kV auto bank at Villa Rica
 - Turn the 230kV side into a 5 rung breaker and a half configuration

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- Loop in and out the Bowen – Union City 500kV line
- 2030:
 - Convert Cavender Drive into a 500/230 kV station looping in Union City - Villa Rica 500 kV transmission line
 - New 4-mile 230kV line from Cavender Drive to Marietta 25 using 200C 1351 ACSS Martin
 - Loop in and out Adamsville – Buzzard Roost 230kV line to Marietta 25

Results**Scenario 1 (Base) Thermal Loadings**

Table 1 - Base Loading Percentages				
Monitored Facility	Buzzard Roost – Douglasville 230kV (2.2 miles)	Douglasville – East Villa Rica SS 230kV (8.2 miles)	Summer Lake – East Villa Rica SS 230kV (14.4 miles)	Villa Rica 500/230kV autos (Banks A and B)
<i>Year</i>				
2028				
2029				
2030				
2031				
2032				
2033				
2034				
Worst Contingency				

Scenario 2 Thermal Loadings

Table 2 - Loading Percentages								
Monitored Facility	Buzzard Roost – Douglasville 230kV (2.2 miles)		Douglasville – East Villa Rica SS 230kV (8.2 miles)		Summer Lake – East Villa Rica SS 230kV (14.4 miles)		Villa Rica 500/230kV autos (Banks A and B)	
<i>Year</i>		Delta		Delta		Delta		Delta
2028								
2029								
2030								
2031								
2032								
2033								
2034								
Worst Contingency								

*For facilities where the worst contingency is REDACTED, please refer to Table 1 on what the worst contingency is in 2028 and 2029.

** Delta represents the difference from the worst event in scenario 1. See Table 1.

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Table 3 - New Overloads Loading Percentages		
Monitored Facility	East Point – Tributary 230kV (Cavender – Tributary) (4.6 miles)	Thornton Rd – Tributary 230kV (2.8 miles)
<i>Year</i>		
2028	REDACTED	REDACTED
2029	REDACTED	REDACTED
2030	REDACTED	REDACTED
2031	REDACTED	REDACTED
2032	REDACTED	REDACTED
2033	REDACTED	REDACTED
2034	REDACTED	REDACTED
Worst Contingency	REDACTED	REDACTED

Scenario 3 Thermal Loadings

Table 4 - Loading Percentages								
Monitored Facility	Buzzard Roost – Douglasville 230kV (2.2 miles)		Douglasville – East Villa Rica SS 230kV (8.2 miles)		Summer Lake – East Villa Rica SS 230kV (14.4 miles)		Villa Rica 500/230kV autos (Banks A and B)	
<i>Year</i>		Delta		Delta		Delta		Delta
2028								
2029								
2030								
2031								
2032								
2033								
2034								
Worst Contingency								

*For facilities where the worst contingency is REDACTED please refer to Table 1 on what the worst contingency is in 2028 and 2029

** Delta represents the difference from the worst event in scenario 1. See Table 1.

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Table 5 - New Overloads Loading Percentages		
Monitored Facility	East Point – Tributary 230kV (Cavender – Tributary) (4.6 miles)	Thornton Rd – Tributary 230kV (2.8 miles)
<i>Year</i>		
2028	REDACTED	REDACTED
2029	REDACTED	REDACTED
2030	REDACTED	REDACTED
2031	REDACTED	REDACTED
2032	REDACTED	REDACTED
2033	REDACTED	REDACTED
2034	REDACTED	REDACTED
Worst Contingency	REDACTED	REDACTED

Important Note: The new line from Cavender Drive to Marietta 25 would have to be bundled ACSS conductor as the 200C 1351 ACSS conductor would become overloaded.

Summary of Results:

There are three lines that are shown as overload in the base case. They are the Douglasville – Villa Rica 230kV line, the Summer Lake – Villa Rica 230kV line, and the Buzzard Roost – Douglasville 230kV line. The length of all these lines nearly total 25 miles and cost ~REDACTED to rebuild them. Moreover, many other 230kV lines are at risk of overloading, inhibiting future growth in the area. Both scenarios studied lead to new overloads. However, these new overloads are much more manageable. They total 7.2 miles of rebuild (~REDACTED) and require 7 miles of new lines (~REDACTED) and give additional capacity to nearly all 230kV lines in Metro West (See Appendix). Finally, with the layered study happening concurrently to this leading to a lot of changes on the 500kV system potentially put the Villa Rica auto banks at risk of overloading. This leads us to the recommendation presented below.

Recommendation:

The recommendation of the working group is to go with scenario 2 with the following caveats:

- **2028-2029 Interim Measures:** Until the new auto bank is installed at Cavender Drive, GPC will use smart valves at the new East Villa Rica Switching Station to mitigate overloads on the Summer Lake – East Villa Rica Switching Station 230kV, Douglasville – East Villa Rica Switching Station 230kV, and Buzzard Roost – Douglasville 230kV lines during 2028 and 2029.
- **Cavender Drive – Tributary Rebuild:** GPC will rebuild the Cavender Drive – Tributary 230kV segment on the East Point – Tributary 230kV line with bundled 200C 1351 ACSS conductor by 2030, or when GTC completes the work at Cavender Drive, whichever is sooner.

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- **Thornton Rd – Tributary Rebuild:** GPC will rebuild the Thornton Rd – Tributary 230kV line with bundled 200C 1351 ACSS conductor by 2030, or when GTC completes the work at Cavender Drive, whichever is sooner.
- **New Line from Line Creek to Cliftondale:** GTC will proceed with plans to construct a new 230kV line from Line Creek to Cliftondale, scheduled to be in service by 2030, using 200C 1351 ACSS Martin conductor.
- **Modification for new Buzzard Roost – Cavender Drive line:** GTC will build the new Buzzard Roost – Cavender Drive 230kV line with bundled 200C 1351 ACSS conductor.

The recommended solution has been implemented into the layered cases for 2024 except for the Smart Valves at East Villa Rica Switching Station in 2028 and 2029.

Study Assumptions

Years: 2025 through 2034

Load levels: Daylight Shoulder, Off Peak, Shoulder, Summer

Base case originations: 2024 Series, Version 2B

Generation Dispatch Scenarios:



Monitored Areas: GA-ITS (ZONES 201, 202, 206, 208, 211, 212)
115 kV and above. All lines and ties in these zones were monitored.

Contingencies: N-1 Contingencies GA-ITS (ZONES 201, 202, 206, 208, 211, 212)
115 kV and above.

Study Criteria

1. Transmission line and transformer bank loadings are not to exceed normal rating (Rate A) under non-contingency conditions.

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2. Transmission line and transformer bank loadings are not to exceed normal rating (Rate B) under single contingency conditions.
3. Voltages on 115 kV and 230 kV buses are to be maintained within normal (95-105%) limits under non-contingency conditions.
4. Voltages on 115 kV and 230 kV buses are to be maintained within normal (92-105%) limits under single contingency conditions.
5. Voltages on 115 kV and 230 kV buses are to be maintained within normal (90-105%) limits under multiple contingency conditions.
6. Voltages on 500 kV buses are to be maintained within normal (98-107.5%) limits under normal conditions.
7. Voltages on 500 kV buses are to be maintained within normal (97-107.5%) limits under single contingency conditions.
8. Future planned projects are included in the cases.

Study Methodology

- Analysis was performed in accordance with the planning events and system performance criteria in TPL-001-5.1 Table 1.
- Normal and contingency conditions were examined for each case with the generation dispatch unchanged from the base cases.
- Unit out/alternate dispatch analysis was performed for the critical generating units in or near the study region. The criteria for selection of unit out scenarios is as follows:
 - Geographical area. When outages of different units impact the same facilities or geographical area, the units with the most significant negative impact are fully evaluated. Units are selected to provide diversity across the area of study.
 - Amount of potential generation lost. All units at a multi-unit plant are excluded except for the largest unit at each voltage level.
 - Previously identified system constraints.
 - Critical units identified in System Operating Study for the current year

The list of the units, voltage levels, and power outputs is detailed in preceding *Study Assumptions section*. For each unit taken out of service, GA-ITS and/or other SBAA generation was economically re-dispatched to account for lost generation.

Customer Load Ramps:

	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034

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***Numbers are MW amounts**

Appendix

Monitored Facility	Scenario 1 (Do Nothing)	Scenario 2 (Cavender Drive 500/230kV solution and new line to Buzzard Roost)	Scenario 3 (Cavender Drive 500/230kV solution and new line to Marietta 25)
Big Shanty – West Marietta 230kV	REDACTED	REDACTED	REDACTED
Buzzard Roost – Thornton Rd 230kV	REDACTED	REDACTED	REDACTED
Jack McDonough – Northwest 230kV (White)	REDACTED	REDACTED	REDACTED
Jack McDonough – Adamsville 230kV	REDACTED	REDACTED	REDACTED

Table 1: Changes in worst loading for lines in Metro West (> 5% change between scenarios)

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Figure 1: Metro West Study Area

