

# South Carolina Regional Transmission Planning

## Stakeholder Meeting

Hilton Garden Inn Charleston Airport

North Charleston, SC

December 09, 2015

## Purpose and Goals of Today's Meeting

- Review of Key Assumptions and Data for Next Planning Cycle
- Review of Major Transmission Expansion Plans
- Review and Discuss Assessment and Planning Studies
  - CTCA
  - ERAG
  - SERC
  - Other

# Transmission Planning Key Assumptions and Data

**SCE&G**

**Phil Kleckley**

# Modeling Assumptions and Data

## Dispersed Substation Load Forecast

- Summer/Winter Peak, Off-Peak and Seasonal Load Levels
- Resource Planning provides 10 Year system load forecasts
- Transmission Planning creates dispersed substation load forecasts

# Load Forecast Process

## Resource Planning Input

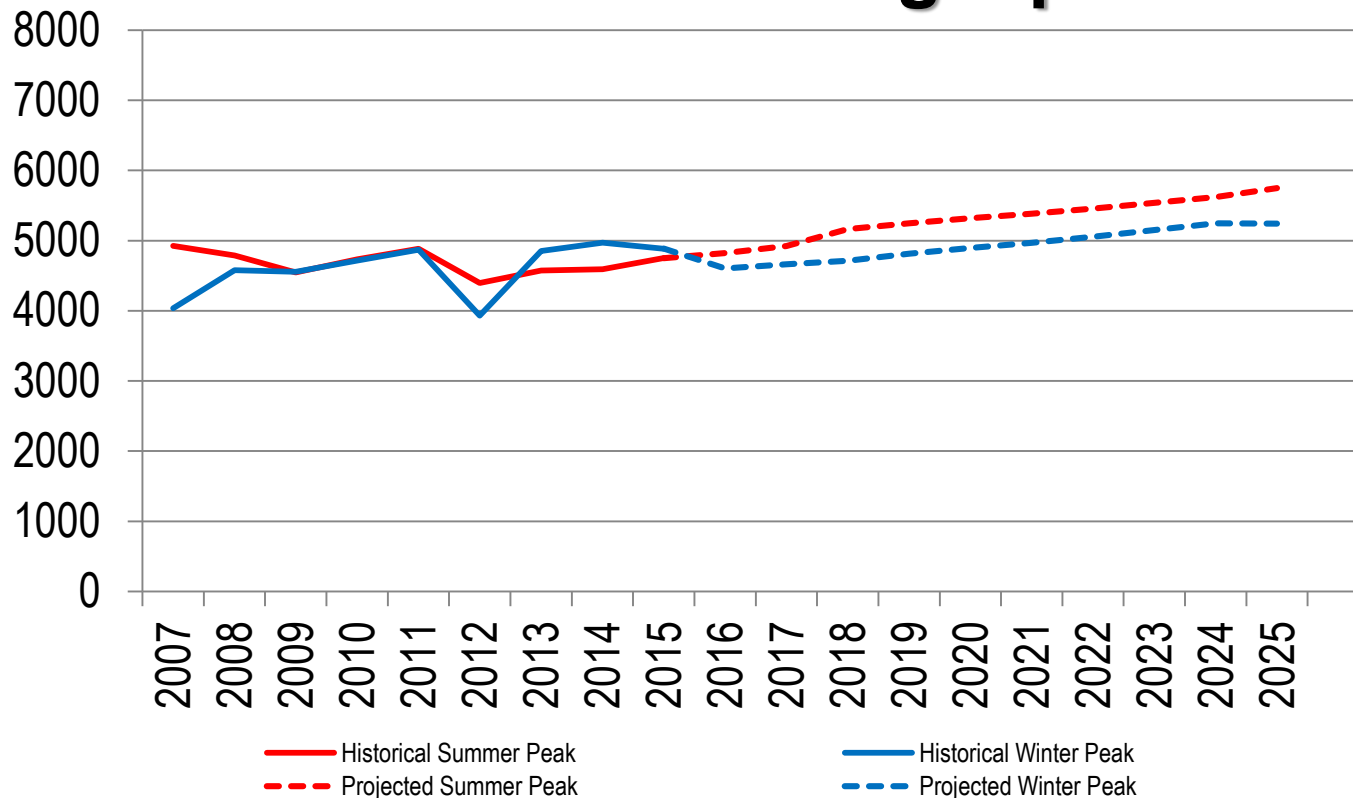
- Develop 10 year projected forecast based on:
  - 10 year historical load summer and winter loads
  - Load factors by customer class
  - Considers weather, personal income, population growth, economic conditions, load management, energy efficiency, etc
  - Applies regression analysis to historical data to develop models
  - Applies forecasted growth rates to develop future projections

# SCE&G 10 Year Load Forecast

	<u>Summer</u>		<u>Winter</u>
2015	4,750 MW	2014/2015	4,970 MW
2016	4,822 MW	2015/2016	4,602 MW
2017	4,925 MW	2016/2017	4,664 MW
2018	5,033 MW	2017/2018	4,744 MW
2019	5,142 MW	2018/2019	4,862 MW
2020	5,256 MW	2019/2020	4,909 MW
2021	5,365 MW	2020/2021	4,978 MW
2022	5,464 MW	2021/2022	4,043 MW
2023	5,566 MW	2023/2024	5,174 MW
2024	5,659 MW	2024/2025	5,241 MW

# Load Forecast Process

## Resource Planning Input



# Load Forecast Process

## Transmission Planning Input

- Obtain summer and winter snapshot meter data from most recent seasons and adjust for load switching
- Develop 10 year projected forecast based on:
  - 10 year historical loading
  - Feedback from Distribution Planning, Local Managers, Large Industrial Group and Transmission Services Manager
- Wholesale loads are modeled as provided by the customer
- Dispersed forecasted load points are integrated into Corporate forecasted load

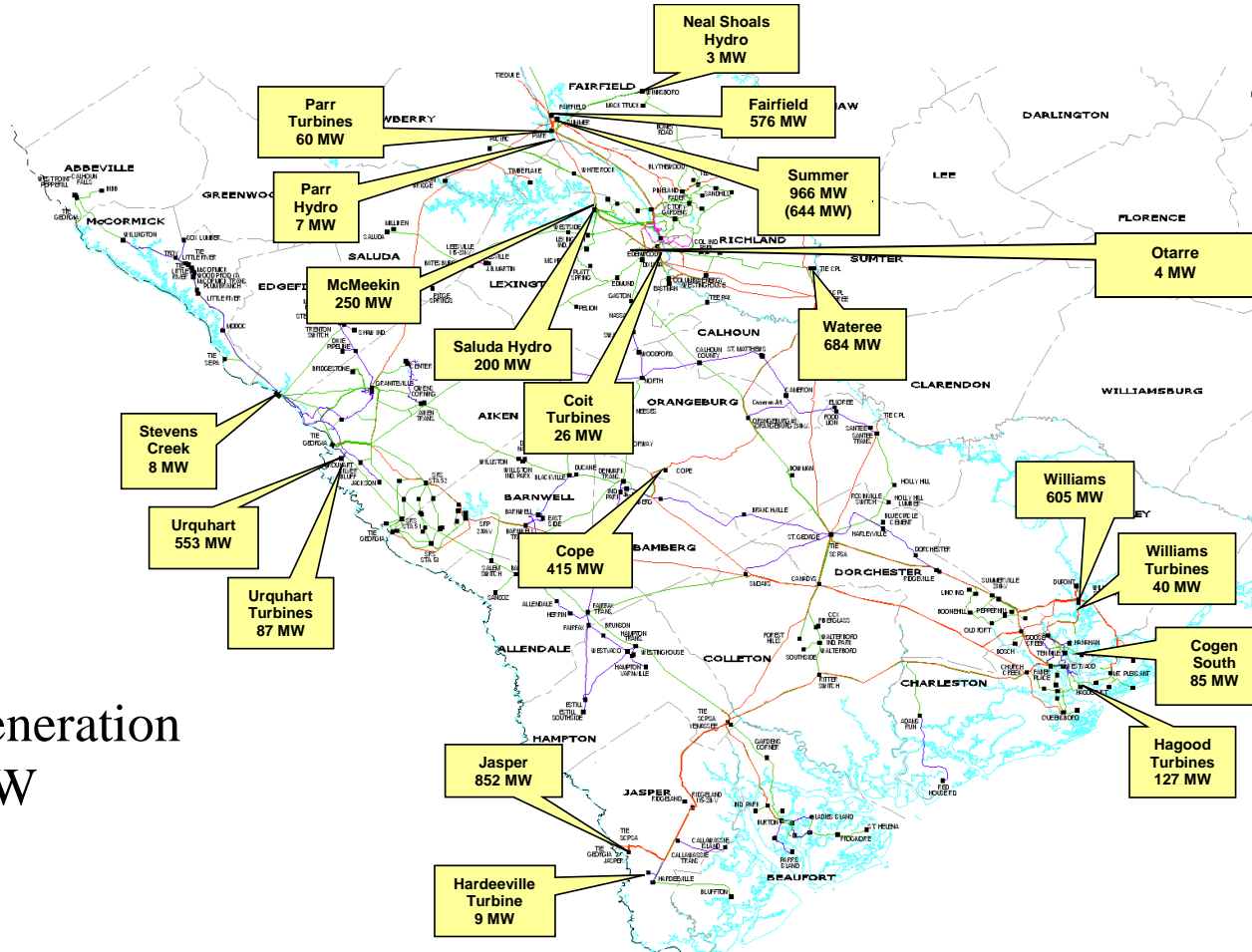


# Modeling Assumptions and Data

## Generation

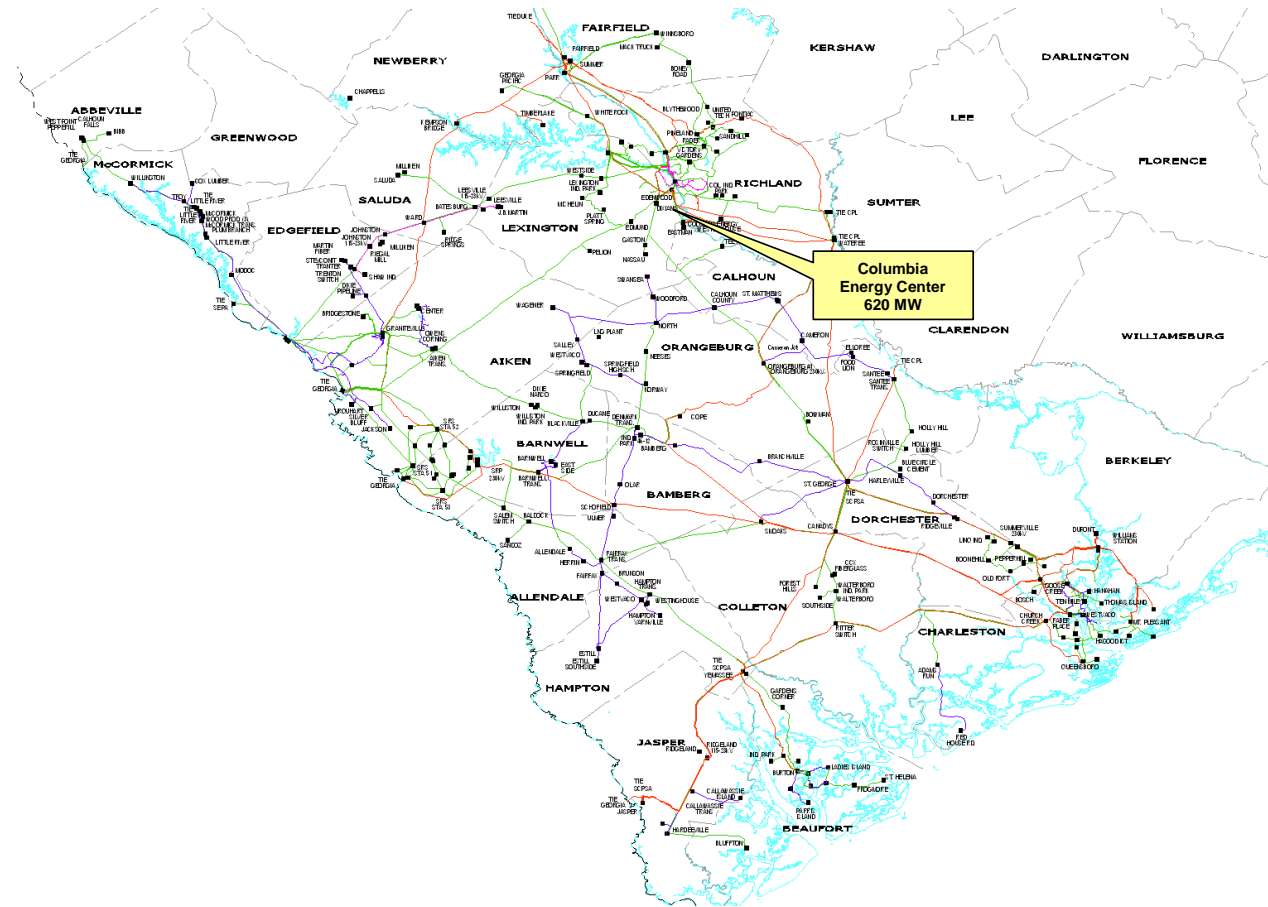
- Annual generator ratings used
- Input from Generation Expansion Plan – Reductions/Additions
- Input from Generation Maintenance Schedule
- Generators dispatched economically
- Merchant Generators included, modeled at contracted output

# Existing Generation



Rated Generation  
5,231 MW

## Merchant Generation



# Generation Plan

## Reductions

- 345 MW Coal 2020

*Tentative, subject to approval of VCS 2&3 revised schedule by SCPSC*

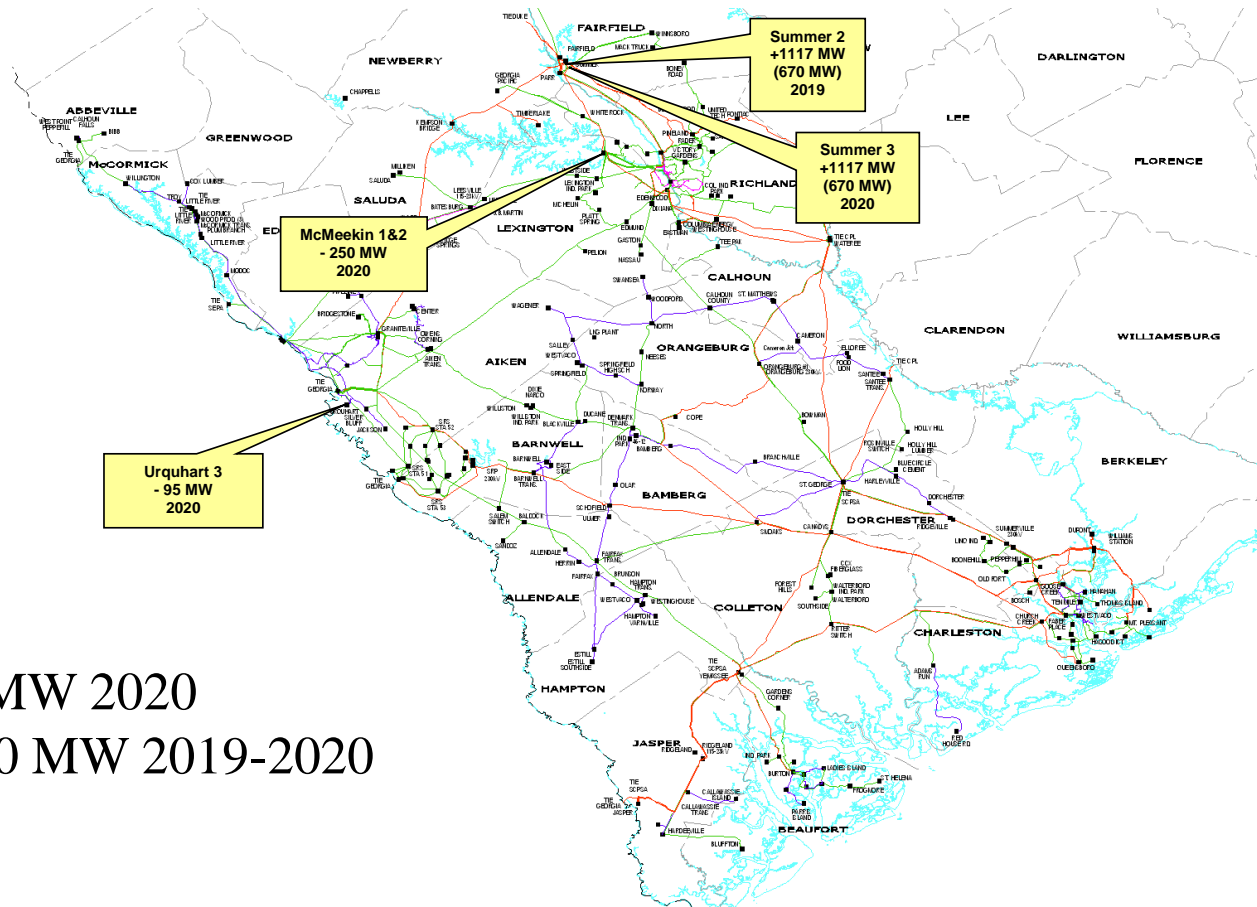
# Generation Plan Additions

- 223 MW solar Interconnection Agreements for 2015-2017 (tentative)
- 1117 MW of SCE&G/Santee Cooper Base Load Nuclear Generation planned for 2019 (V. C. Summer)\*
- 1117 MW of SCE&G/Santee Cooper Base Load Nuclear Generation planned for 2020 (V. C. Summer)\*

\**Date is tentative, subject to approval of VCS 2&3 revised schedule by SCPSC*



# Generation Changes



- 95 MW 2020  
+ 1340 MW 2019-2020

# Modeling Assumptions and Data

## Transmission Network

- Input from Transmission Plan
- Neighboring Transmission Systems Modeled

# Modeling Assumptions and Data

## Planned Transmission Facilities

4/21/2015

### South Carolina Electric & Gas Planned Transmission Facilities

Planned Project	Tentative Completion Date
Bayview - Charlotte St 115 kV U/G #2 Repair/Replace	Dec-15
St. Andrews - Queensboro 115 kV Rebuild	Dec-15
Okatie - Hardeeville 115 kV #2 Line Construct	May-16
Okatie 230/115 kV Sub Construct and Line Upgrades	May-16
Blythewood 115 kV Switching Station	May-16
Church Creek upgrade 230/115 kV transformer & Relocate 224 MVA transformer	May-16
Summerville upgrade 230/115 kV transformer & Relocate 224 MVA transformer	May-16
Queensboro 115 kV Switching Station	Dec-16
Urquhart Replace Switch House	Dec-16
AM Williams - Cainhoy 230 kV #2 and 115 kV #2 Line Construct	May-17
Cainhoy - Hamlin Tap 115 kV Line Section Rebuild to Double Circuit	May-17
Canadys - St George 230 kV Line Upgrade	May-17
Dunbar Rd.-Dixiana 115 kV Upgrade	May-17
Dunbar Road - Orangeburg 115 kV Line Rebuild to Double Circuit	May-17
Orangeburg - St. George 115 kV #1/#2 Lines Rebuild to Double Circuit	May-17



# Modeling Assumptions and Data

## System Interchange

- Firm scheduled transfers included
- Coordinated with Neighbors

# Questions?

# Transmission Planning Key Assumptions and Data

**Santee Cooper**

**Rick Thornton**

## Components

- Demand Forecast
- Transmission Network
- Generation Resources
- Actual System Operations

## Demand Forecast

Load forecast is developed with contributions from:

- Santee Cooper (retail, industrial)
- Central Electric Power Cooperative, Inc. (retail, industrial)
- Cities of Bamberg and Georgetown (municipal)

## Santee Cooper 10 Year Load Forecast

	<u>Summer</u>		<u>Winter</u>
2015	4979 MW (June 16)	2015/2016	5,156 MW
2016	4,626 MW	2016/2017	5,083 MW
2017	4,554 MW	2017/2018	4,992 MW
2018	4,460 MW	2018/2019	4,974 MW
2019	4,430 MW	2019/2020	5,014 MW
2020	4,472 MW	2020/2021	5,064 MW
2021	4,527 MW	2021/2022	5,121 MW
2022	4,582 MW	2022/2023	5,185 MW
2023	4,642 MW	2023/2024	5,249 MW
2024	4,698 MW	2024/2025	5,310 MW

## Transmission Network

Models include:

- Existing transmission system as well as committed Santee Cooper additions (uncommitted facilities are subject to change in scope or date).
- Confirmed firm PTP transmission service reservations
- Neighboring transmission system representations
- All facilities assumed to be available for service
- Normal operating status (in-service or OOS) of facilities is represented.

## Transmission Network

- Uniform rating methodology is applied to transmission facilities.
- Base case models are updated annually.
- Study models may be updated prior to any study effort.



## Planned Transmission Facilities in the Model

- Winyah - Bucksville 230 kV Line 12/31/2015
- Jefferies – Medway #2 115 kV Line 05/31/2016
- Carnes – Medway #2 115 kV Line 05/31/2016
- Richburg-Flat Creek 230 kV Line 06/01/2016
- Bucksville-Garden City 115kV Line 06/01/2016
- Bucksville-Myrtle Beach 115 kV Line 12/31/2016
- Perry Road-Myrtle Beach #3 115 kV Line 06/01/2017
- Sandy Run 230-115 kV Substation 05/31/2018
- Pomaria-Sandy Run 230 kV Line 05/31/2018
- Marion-Red Bluff 230 kV Line 12/31/2018
- Sandy Run-Orangeburg 230 kV Line 06/30/2019

## Generation Resources

### Existing Transmission Connected Generation

Cross 1- 4

J.S. Rainey Power Block 1

Winyah 1- 4

J.S. Rainey 2A, 2B

Hilton Head Turbines 1- 3

J.S. Rainey 3-5

Myrtle Beach Turbines 1-5

Spillway (Hydro)

Jefferies 1, 2, 3, 4, 6 (Hydro)

St. Stephen 1-3 (Hydro)

Allendale (biomass)

V.C. Summer #1

Dorchester (biomass)

Domtar (co-gen)

# Generation Resources

## Projected Capacity in Models

V. C. Summer #2 (2019)

V. C. Summer #3 (2020)

## Actual System Operations

- Network Transmission Lines Operated Split
  - Newberry-Batesburg 69 kV Line
  - Winnsboro-Pomaria 69 kV Line
  - Winnsboro-Richburg 69 kV Line #1

# Transmission Planning Key Assumptions and Data

## Stakeholder Input, Comments and Questions

# SCRTP Regional Planning

Clay Young

# FERC Order 1000 Summary

## Regional Requirements

- Open and transparent procedures by which TPs identify and evaluate solutions that may be more efficient or cost-effective than current plans developed through Local Planning and IRP processes
- Any entity can submit transmission proposals that they believe are more efficient or cost-effective than current planned projects
- TPs will evaluate proposals in consultation with stakeholders to determine whether the proposed project is more efficient or cost-effective for the region.

# Major Transmission Expansion Plan

**SCE&G**

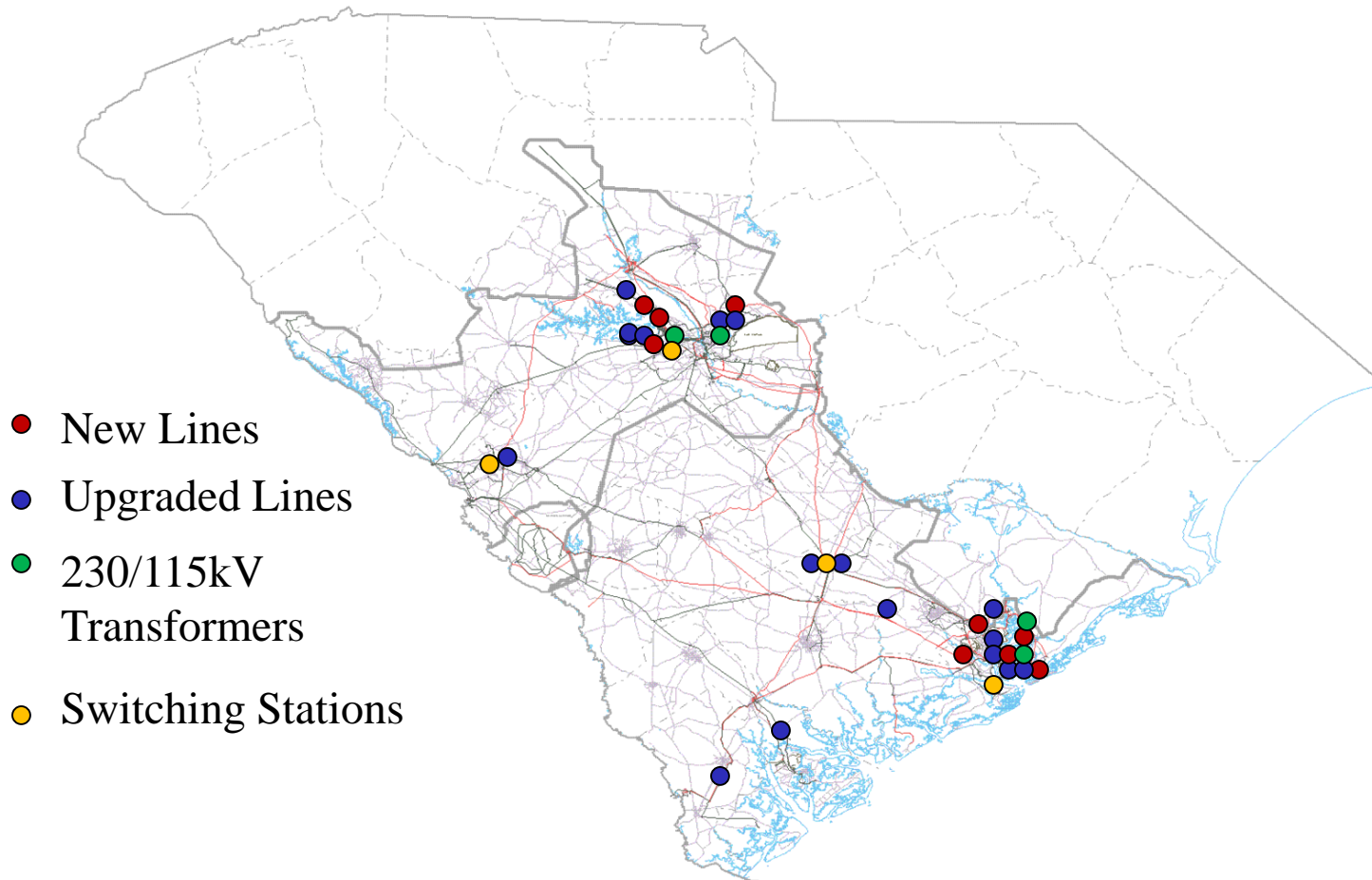
**Jeff Neal**



## Disclaimer

- These projects represent the current transmission plans within the SCRTP footprint
- The expansion plan is continuously reviewed and may change due to changes in key data and assumptions
- This presentation does not represent a commitment to build

# SCE&G Planned Projects



## SCE&G Current Projects

- **Active Projects**

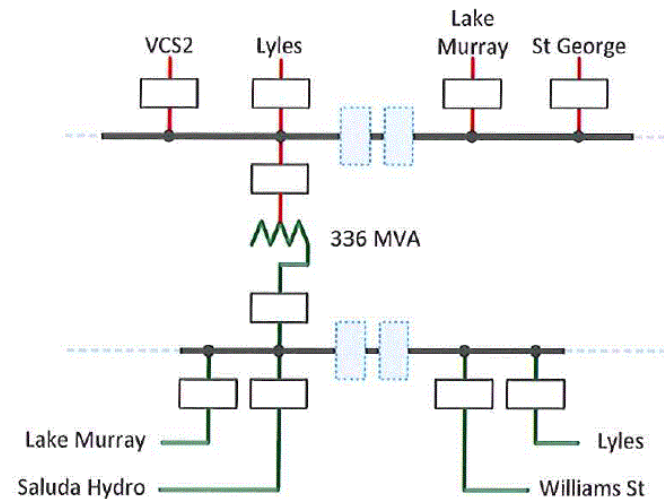
- Saluda River 230/115 kV Substation (New Nuclear Development)
- St. George 230kV Substation (New Nuclear Development)
- Cainhoy 230/115 kV Transmission Substation (System Improvement)
- Lake Murray – SRT – Lyles 230/115kV (System Improvement)

- **Future Projects**

- Orangeburg VCS2 – St. George 230 kV Fold-in (System Improvement)
- St. George – Summerville 230 kV #1&2 (NND/System Improvement)
- Summerville – Pepperhill 230 kV (System Improvement)
- Toolebeck 115 kV Switching Station (System Improvement)
- Burton – Yemassee 115kV #2 Rebuild (System Improvement)
- Canadys – Ritter 115 kV Rebuild SPDC 230/115 kV (System Improvement)

# Active Projects

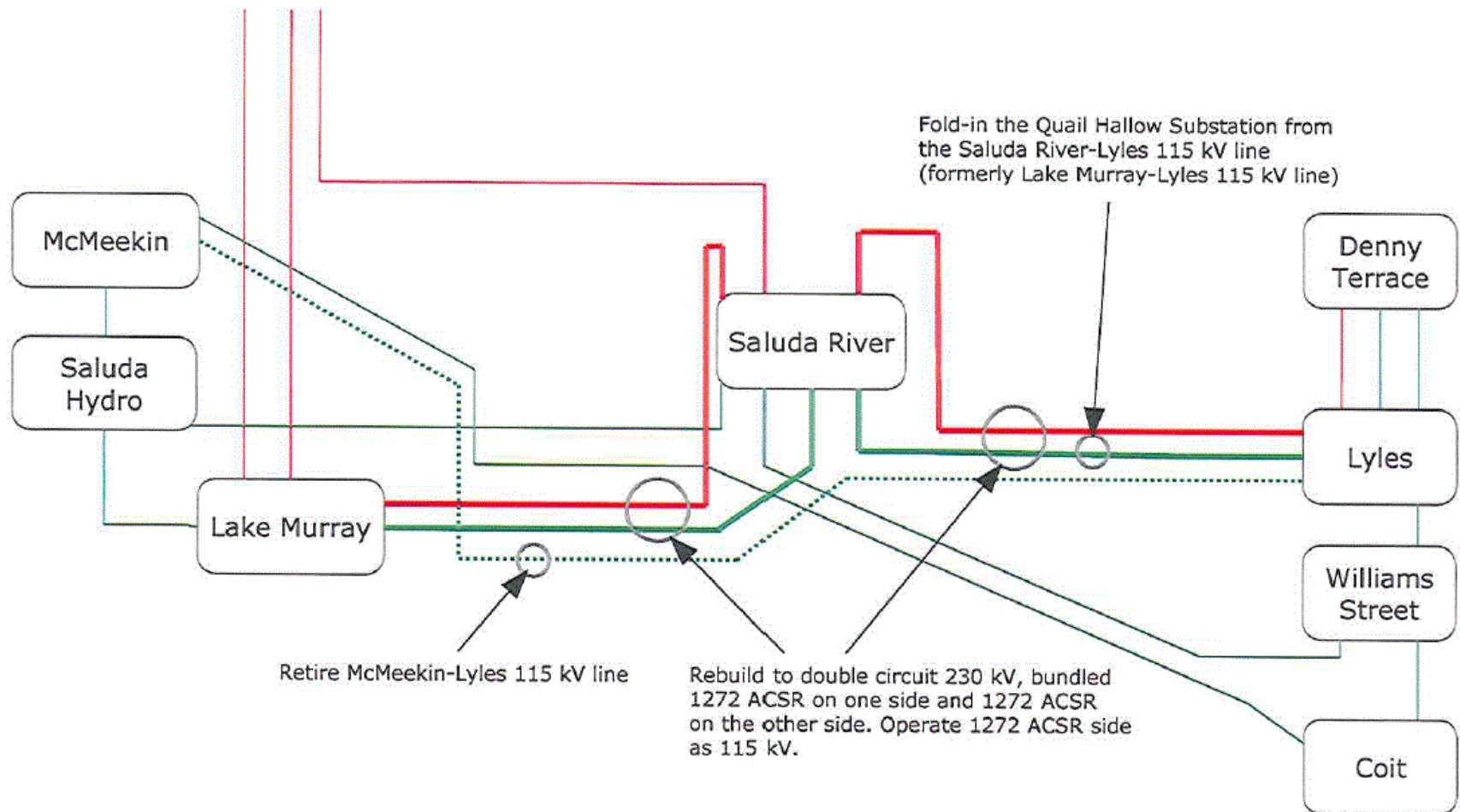
## Saluda River 230/115 kV



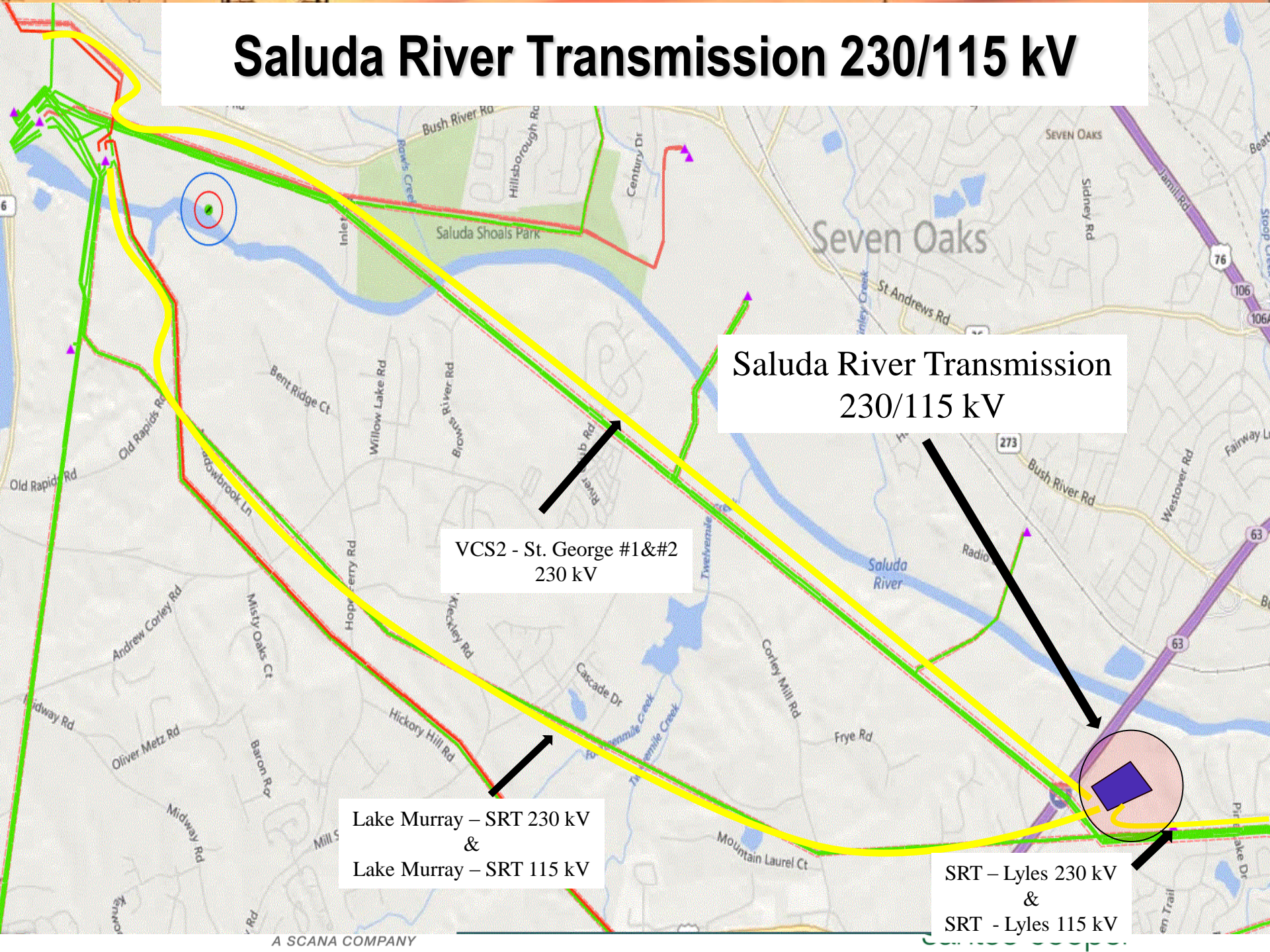
- Substation energized **9/15/15**
- Lyles – SRT 230&115 kV completed 9/15/15, SRT – Lake Murray 230&115 kV completed **10/15/15** (NERC TPL System Improvement)
- VCS2 – Saluda River 230 kV complete by **12/31/15**
- Saluda Hydro – Saluda River 115 kV complete by **12/31/15**
- Remaining 115 kV rebuilds surrounding Saluda River complete by **2/1/15**

# Saluda River Transmission 230/115 kV

V.C. Summer



# Saluda River Transmission 230/115 kV



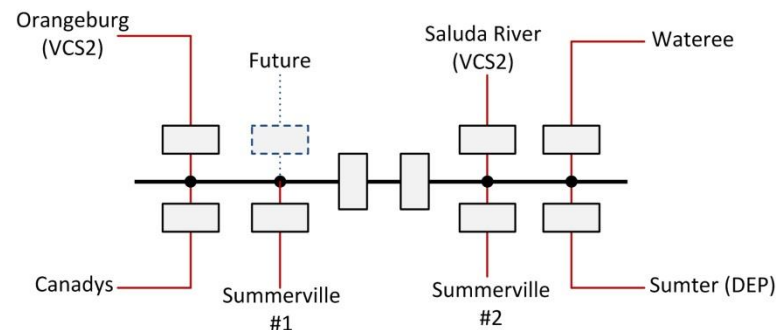
Saluda River Transmission  
230/115 kV

VCS2 - St. George #1&#2  
230 kV

Lake Murray – SRT 230 kV  
&  
Lake Murray – SRT 115 kV

SRT – Lyles 230 kV  
&  
SRT - Lyles 115 kV

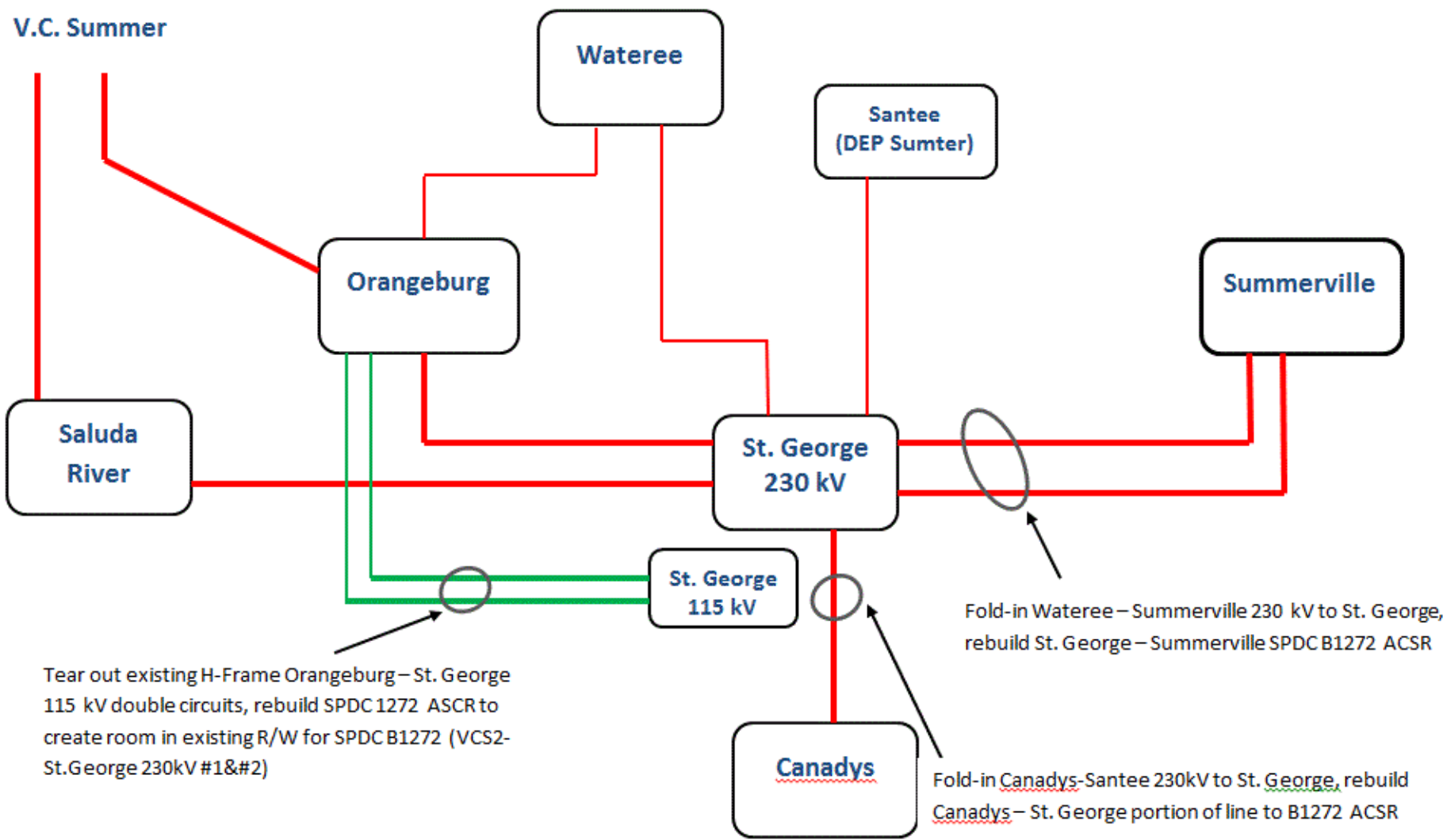
## St. George 230 kV Switching Station



- Scheduled for completion **May 2016**
  - Seven 230 kV line terminals
  - Back to Back bus tie breaker
- Canadys – St. George 230 kV upgrade to B1272 ACSR complete by May 2016
- St. George – Orangeburg completion date delayed to May 2017
- St. George – Summerville 230 kV #1&2 completion date delayed to May 2018



# St. George 230 kV Switching Station



V.C. Summer

Wateree

Santee  
(DEP Sumter)

Orangeburg

Summerville

Saluda  
River

St. George  
230 kV

St. George  
115 kV

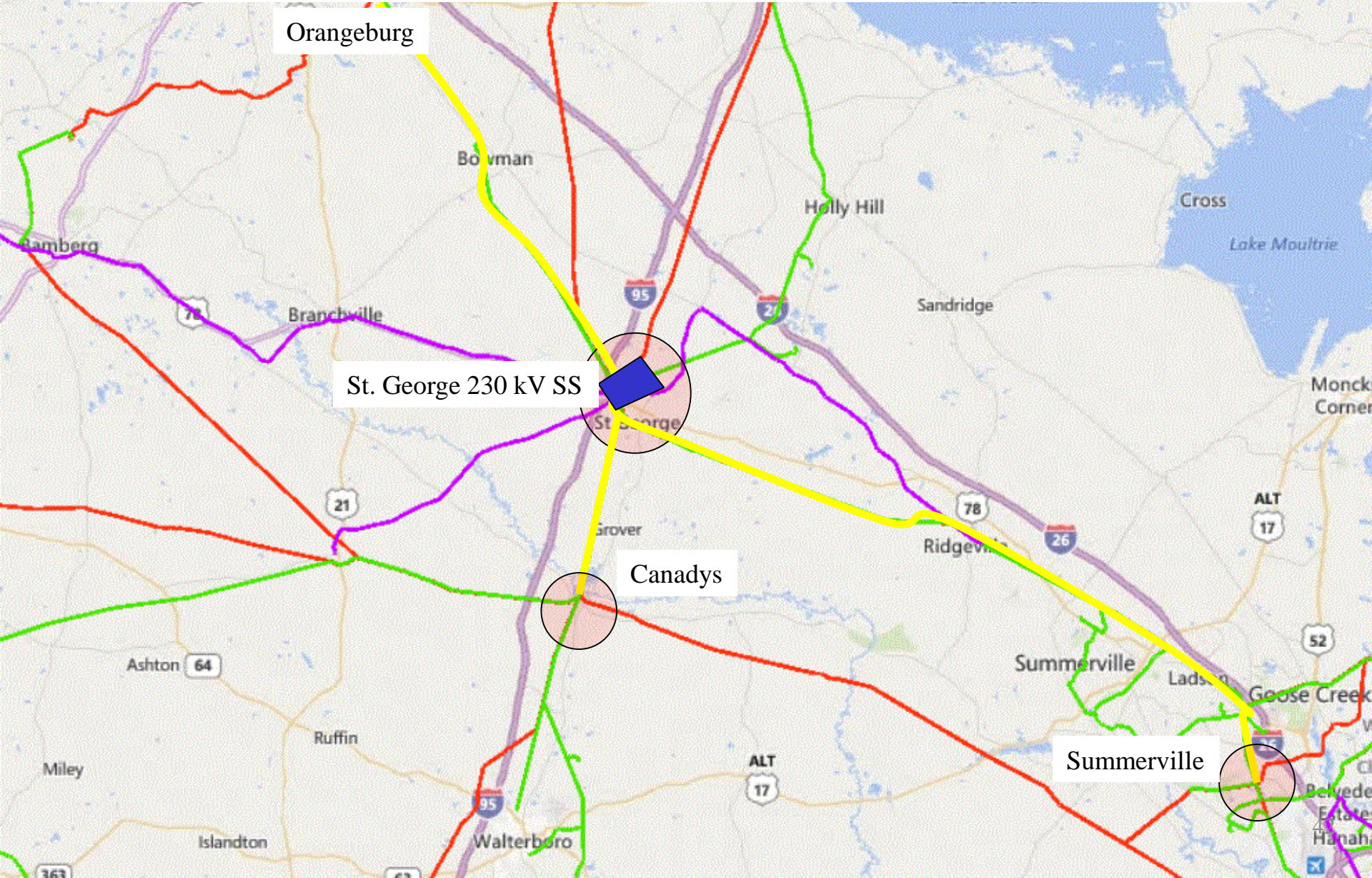
Canadys

Tear out existing H-Frame Orangeburg - St. George 115 kV double circuits, rebuild SPDC 1272 ACSR to create room in existing R/W for SPDC B1272 (VCS2-St. George 230kV #1&#2)

Fold-in Wateree - Summerville 230 kV to St. George, rebuild St. George - Summerville SPDC B1272 ACSR

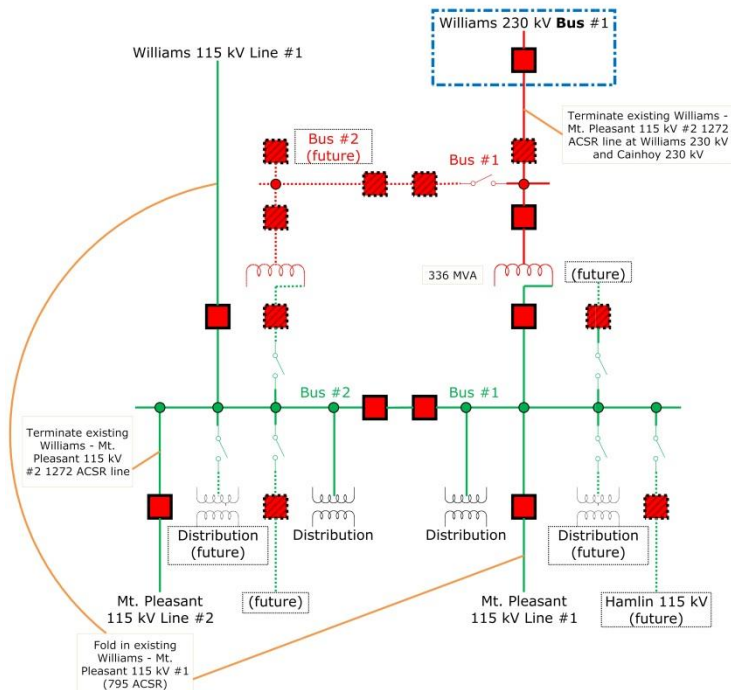
Fold-in Canadys-Santee 230kV to St. George, rebuild Canadys - St. George portion of line to B1272 ACSR

# St. George 230 kV Switching Station



# Cainhoy 230/115 kV Transmission

## Cainhoy 230 kV Substation - Phase 1 Completion by December 2015



## Phase I (Completed by May 2016)

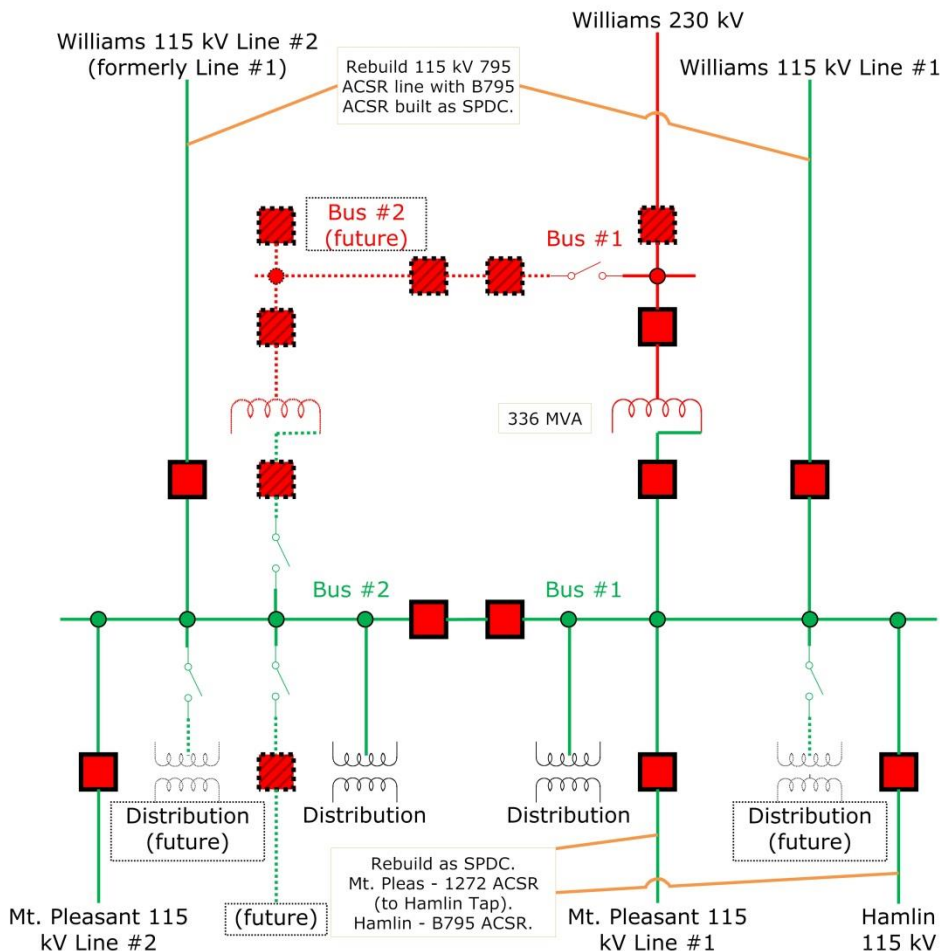
- Construct 230/115 kV transmission substation near existing Cainhoy distribution substation
  - Three 115 kV line terminals
  - Back-to-back bus tie breakers on 115 kV bus
  - One 230/115 kV 336 MVA autotransformer with high side and low side breakers
- Add one 230 kV terminal to #1 AM Williams 230 kV bus
- Fold Williams – Mt. Pleasant 115 kV #2 into Cainhoy 230 kV and 115 kV
  - Creates Williams – Cainhoy 230 kV & Cainhoy – Mt. Pleasant 115 kV #2
- Fold Williams – Mt. Pleasant 115 kV #1 into Cainhoy 115 kV #2 bus
  - Creates Williams – Cainhoy 115 kV and Cainhoy – Mt. Pleasant 115 kV #1

# Cainhoy 230/115 kV Transmission



# Cainhoy 230/115 kV Transmission

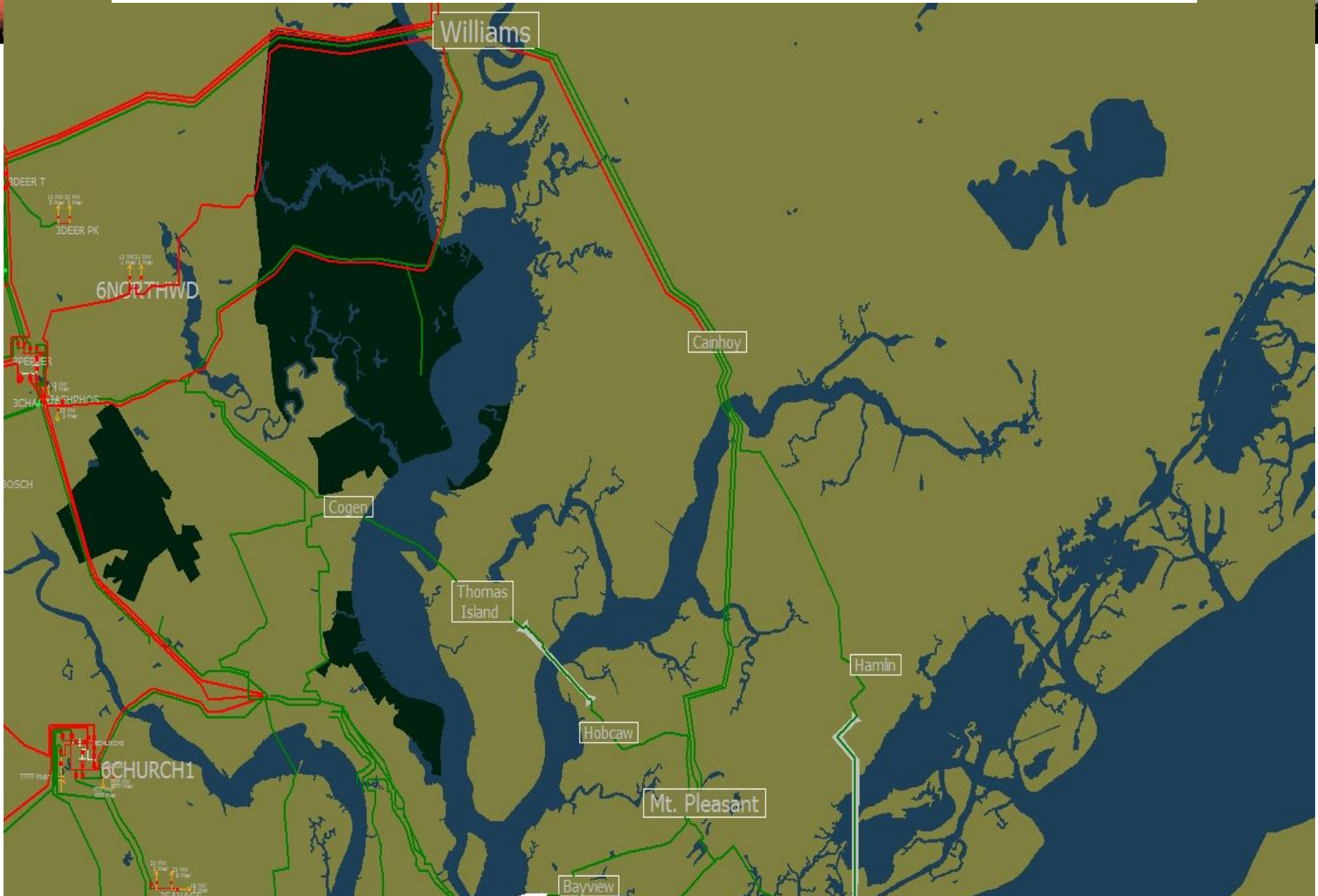
## Cainhoy 230 kV Substation - Phase 2 Completion by December 2016



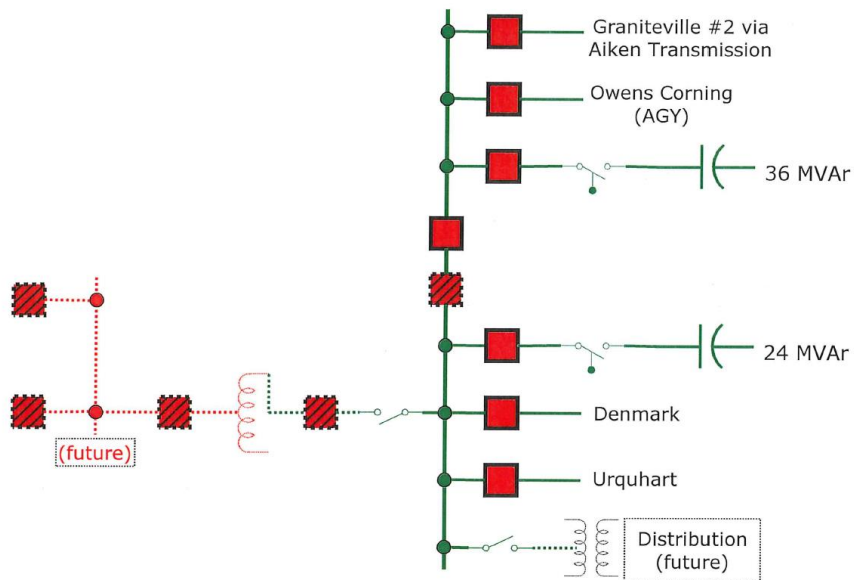
## Phase II (Completed by December 2016)

- Rebuild Cainhoy – Hamlin 115 kV to SPDC
  - Creates Cainhoy – Mt. Pleasant 115 kV partially 1272 ACSR & Cainhoy – Hamlin 115 kV B795 ACSR
- Add 115 kV Hamlin terminal
- Rebuild Williams – Cainhoy 230 kV SPDC
  - Creates Williams – Cainhoy 115 kV #1 & #2 B795 ACSR
- Upgrade terminals at Williams to 2000A for Cainhoy 115 kV circuits

# Cainhoy 230/115 kV Transmission

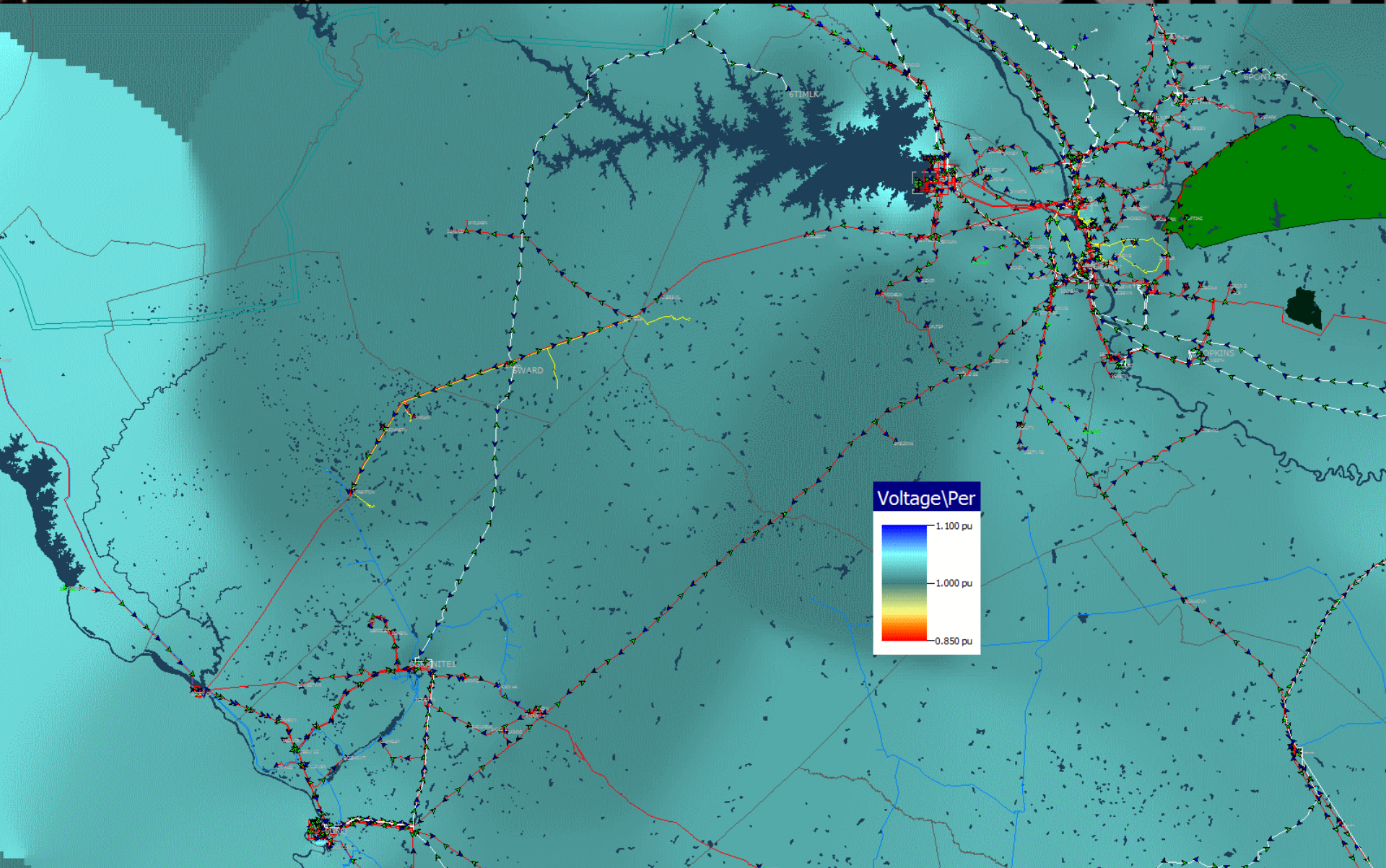


# Toolebeck 115 kV Transmission



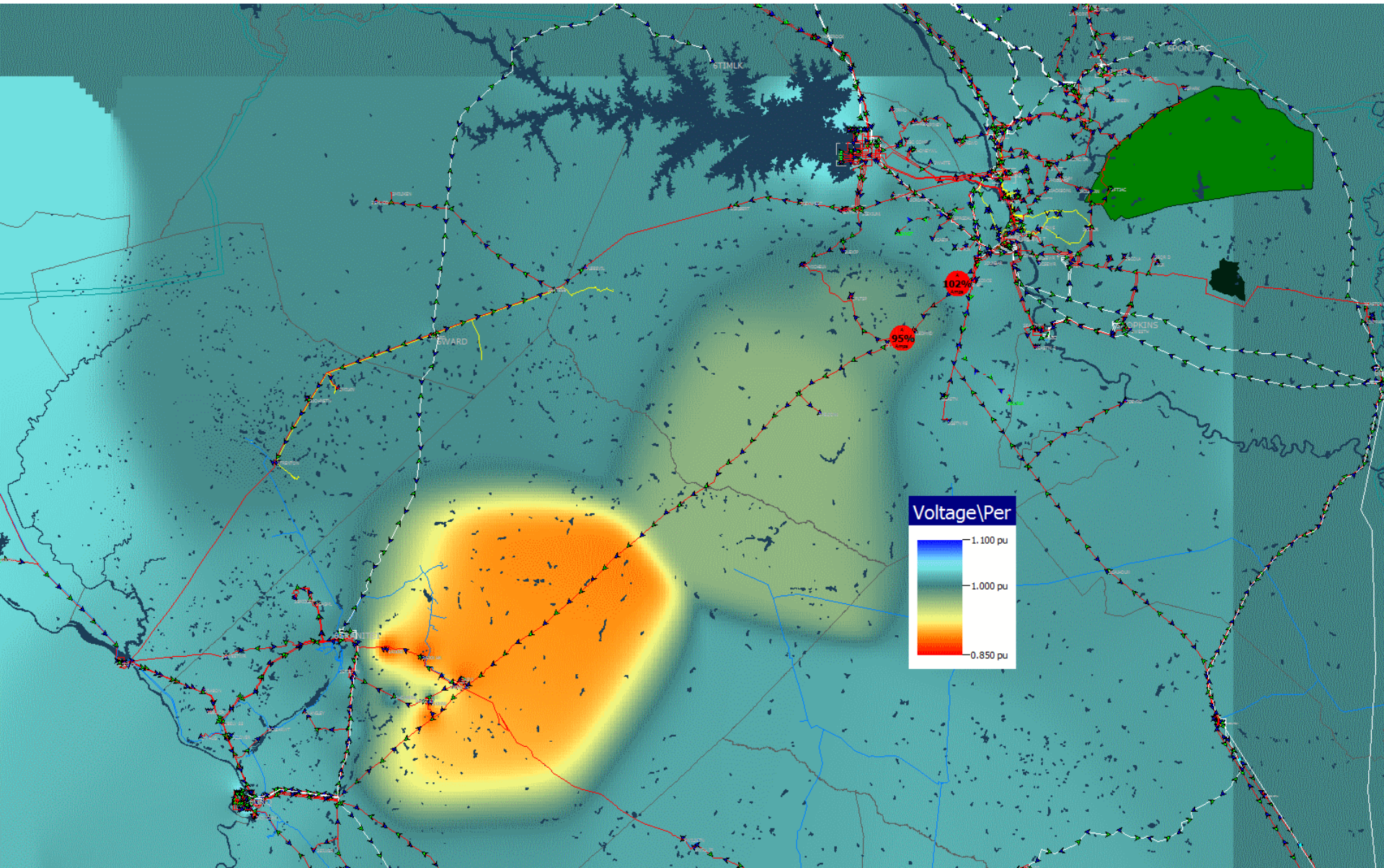
- Completion date delayed to **December 2016**
- Construct 115 kV transmission substation near existing Aiken Transmission and Owens Corning substations
  - Four 115 kV line terminals
  - Bus tie breaker (Future Back-to-Back)
  - One 24 MVAR and one 36 MVAR capacitor
  - Built to accommodate future growth, i.e. 230/115 kV transformation and distribution transformer
- Fold-in of Urquhart – Owens Corning 115 kV line
- Fold-in of Aiken – Denmark 115 kV line
- NERC TPL System Improvement
  - Operating guides in place to alleviate potential branch overloads and voltage concerns

# Toolebeck 115 kV Transmission

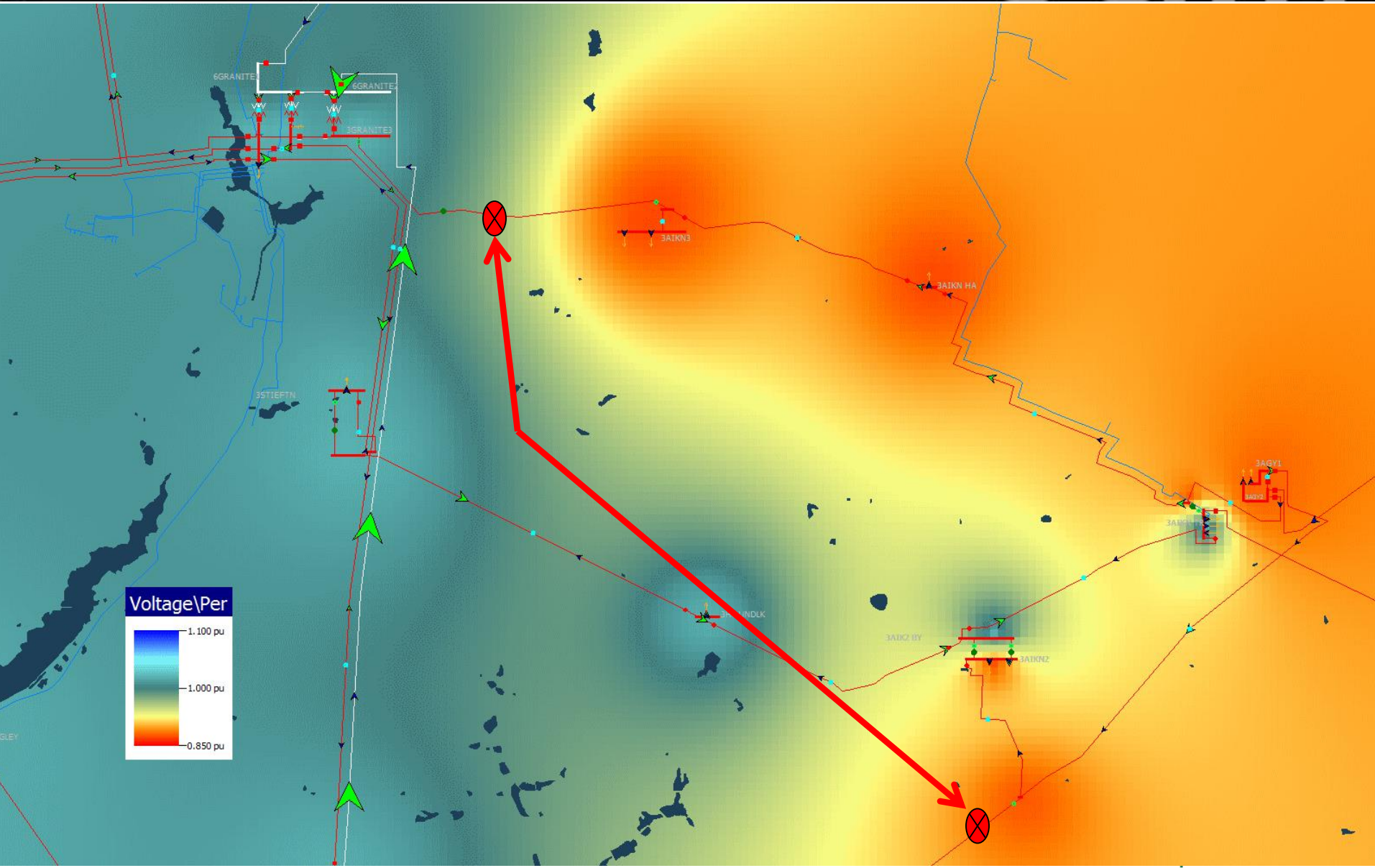




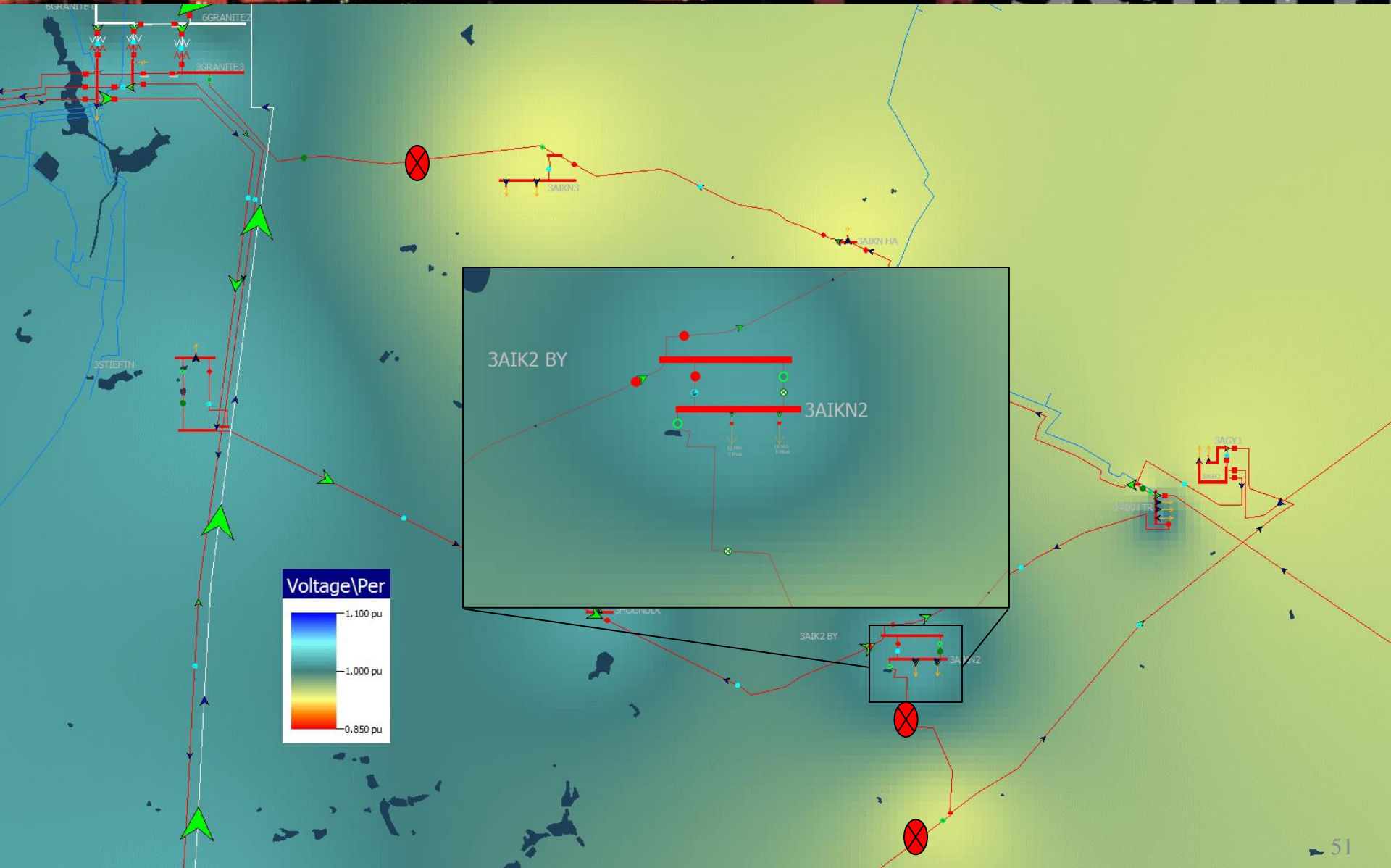
# Toolebeck 115 kV Transmission



# Toolebeck 115 kV Transmission

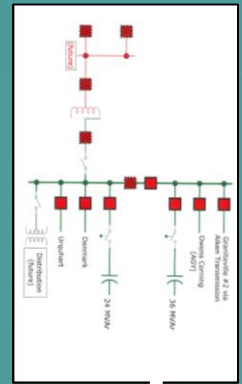
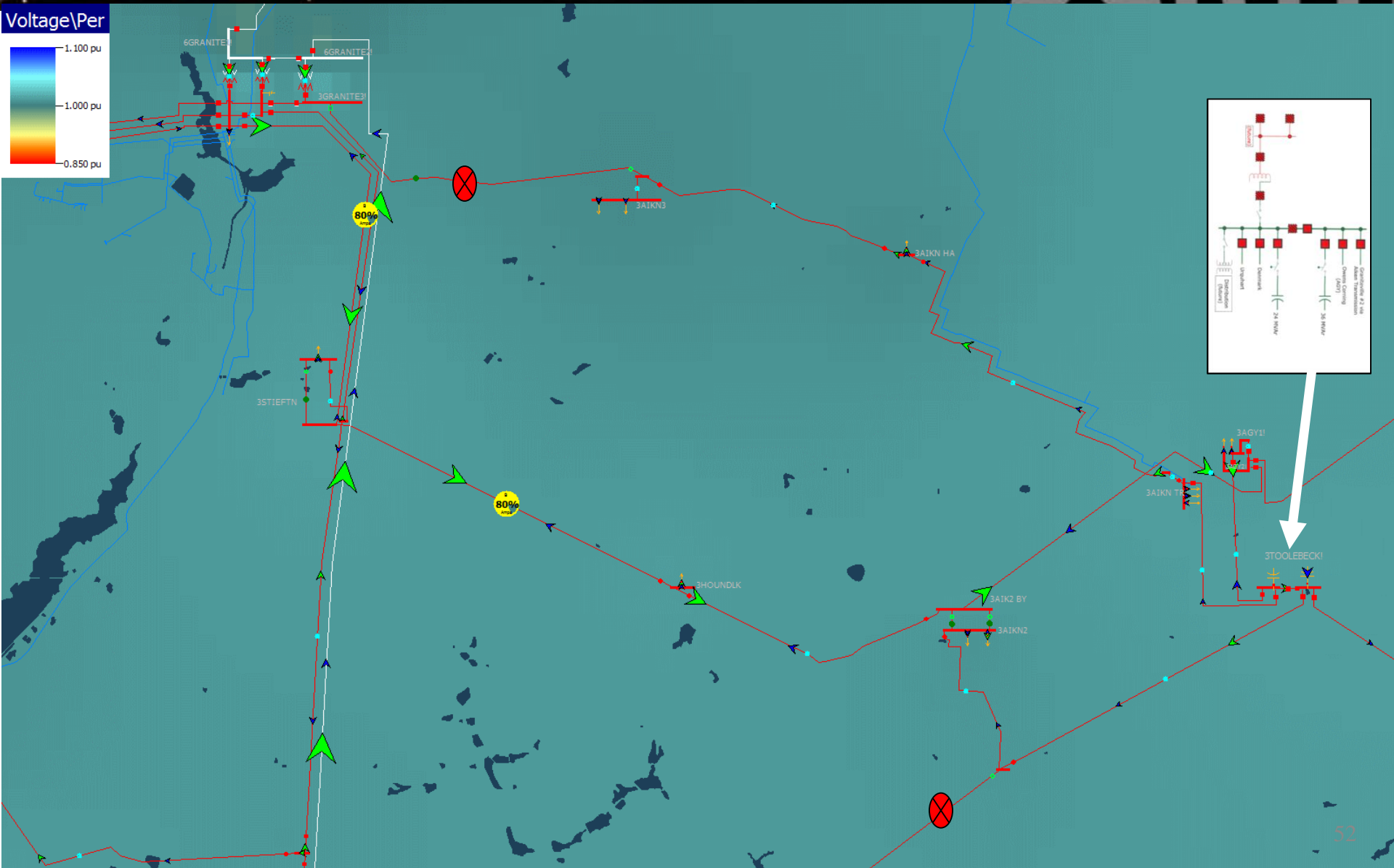
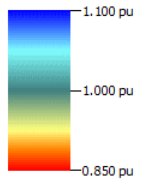


# Toolebeck 115 kV Transmission



# Toolebeck 115 kV Transmission

Voltage\Per

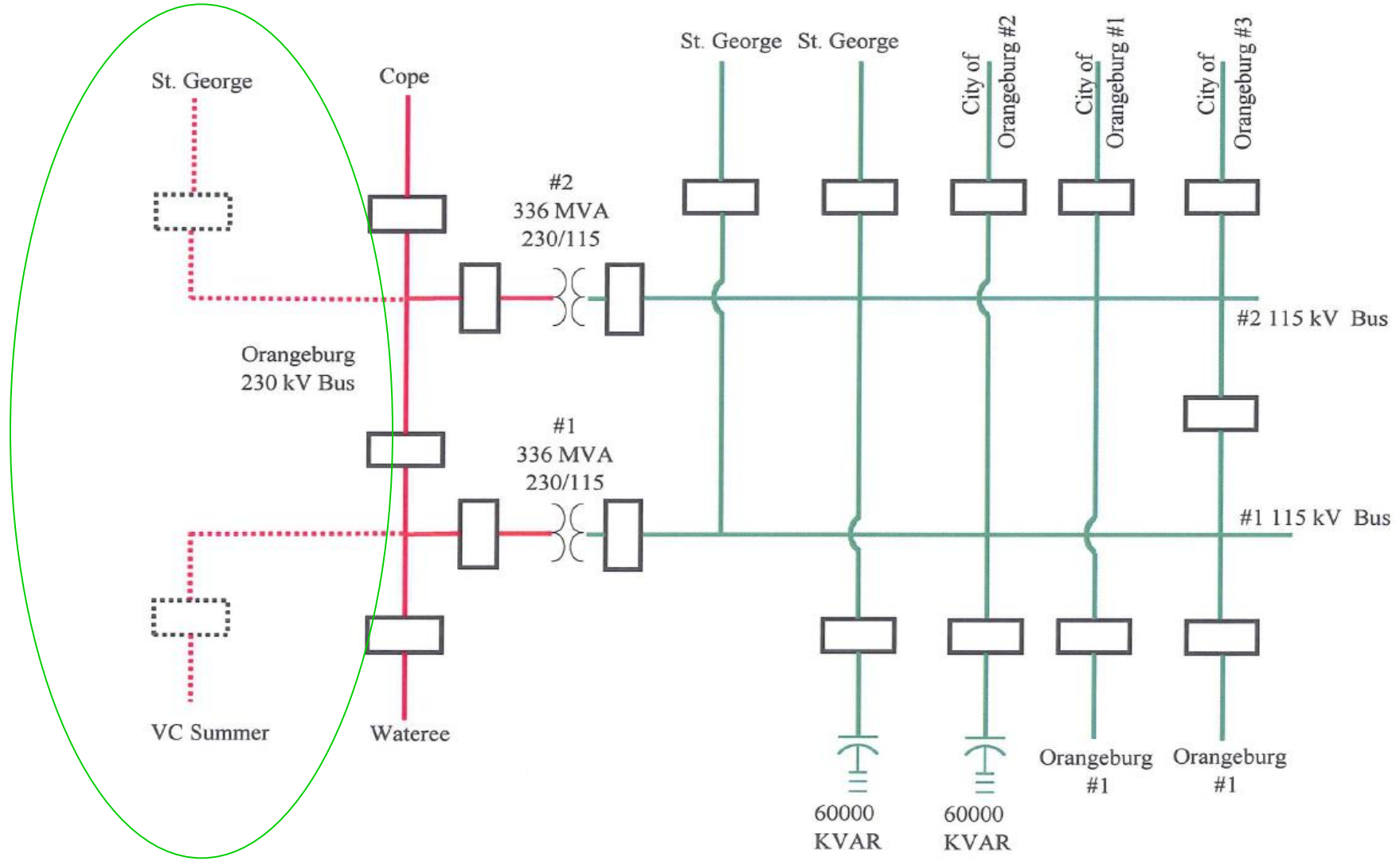


# Future Projects

## Orangeburg VCS2 – St. George 230 kV Fold-In

- Fold in the future VCS2 – St. George 230 kV line at Orangeburg 230/115 kV Transmission substation
- Replace 2000 Amp bus-tie breaker with 3000 Amp breaker
- Project now required to alleviate potential N-2 contingency overload associated with retirement of Canadys Coal fired generators
- Increased support of Orangeburg 230 kV will decrease the burden of the 115 kV system in Orangeburg/St. George areas
- Scheduled for completion by December 2017

# Orangeburg East 230/115 kV Fold-In VCS2 – St. George 230 kV

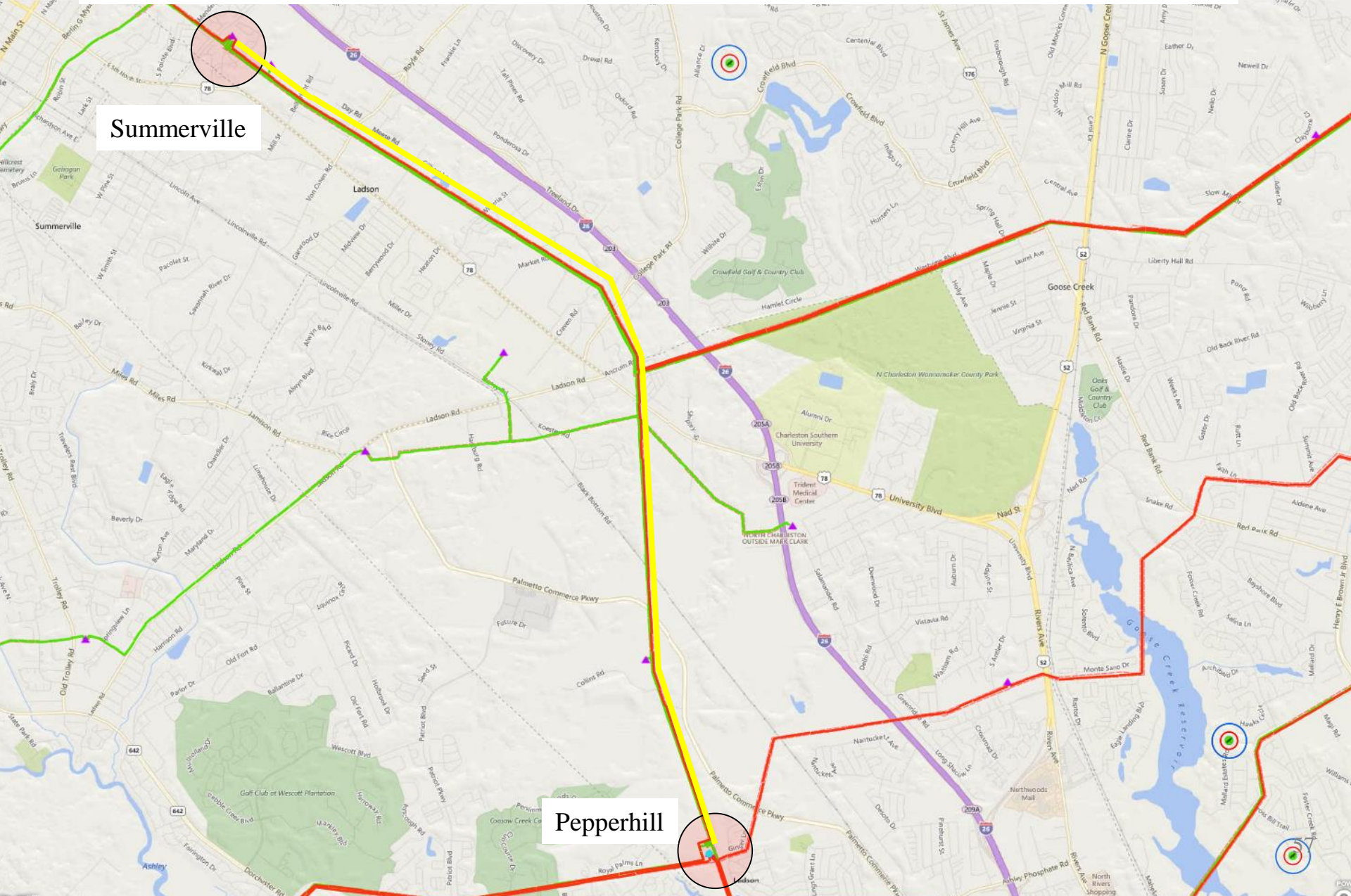


## Pepperhill – Summerville 230 kV

- Rebuild existing portions of Canadys – Williams 230 kV & Williams – Summerville 230 kV lines SPDC between Pepperhill and Summerville, adding new Pepperhill – Summerville 230 kV B1272 ACSR line
- Project originated back in 2005, various delays due to new construction and load projections in Charleston/Pepperhill/Summerville areas
- Project now required to alleviate potential N-2 contingency overload associated with VC Summer Units 2&3 operation and new transmission lines into Summerville
- Scheduled for completion by December 2018



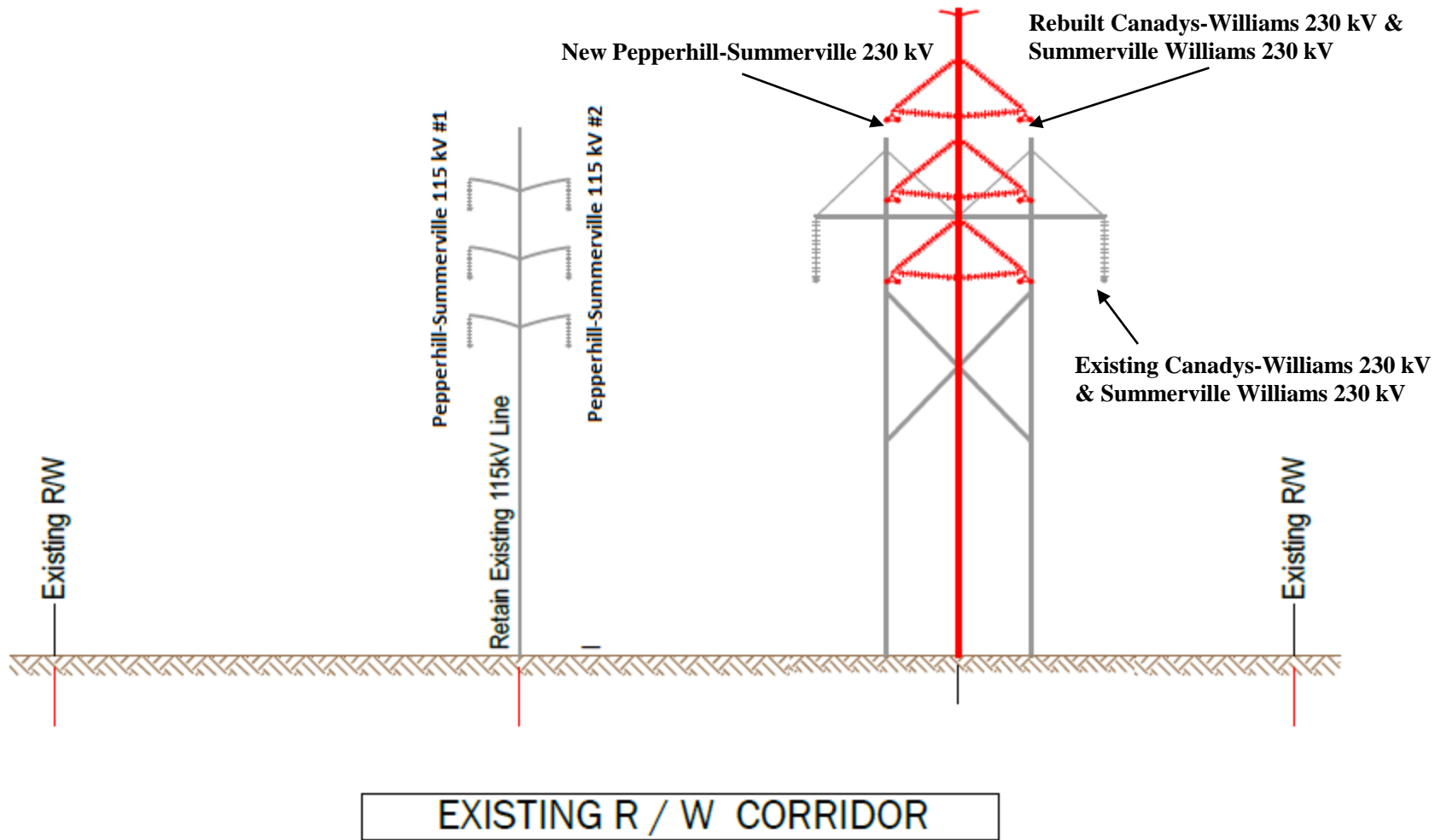
# Pepperhill – Summerville 230 kV



Summerville

Pepperhill

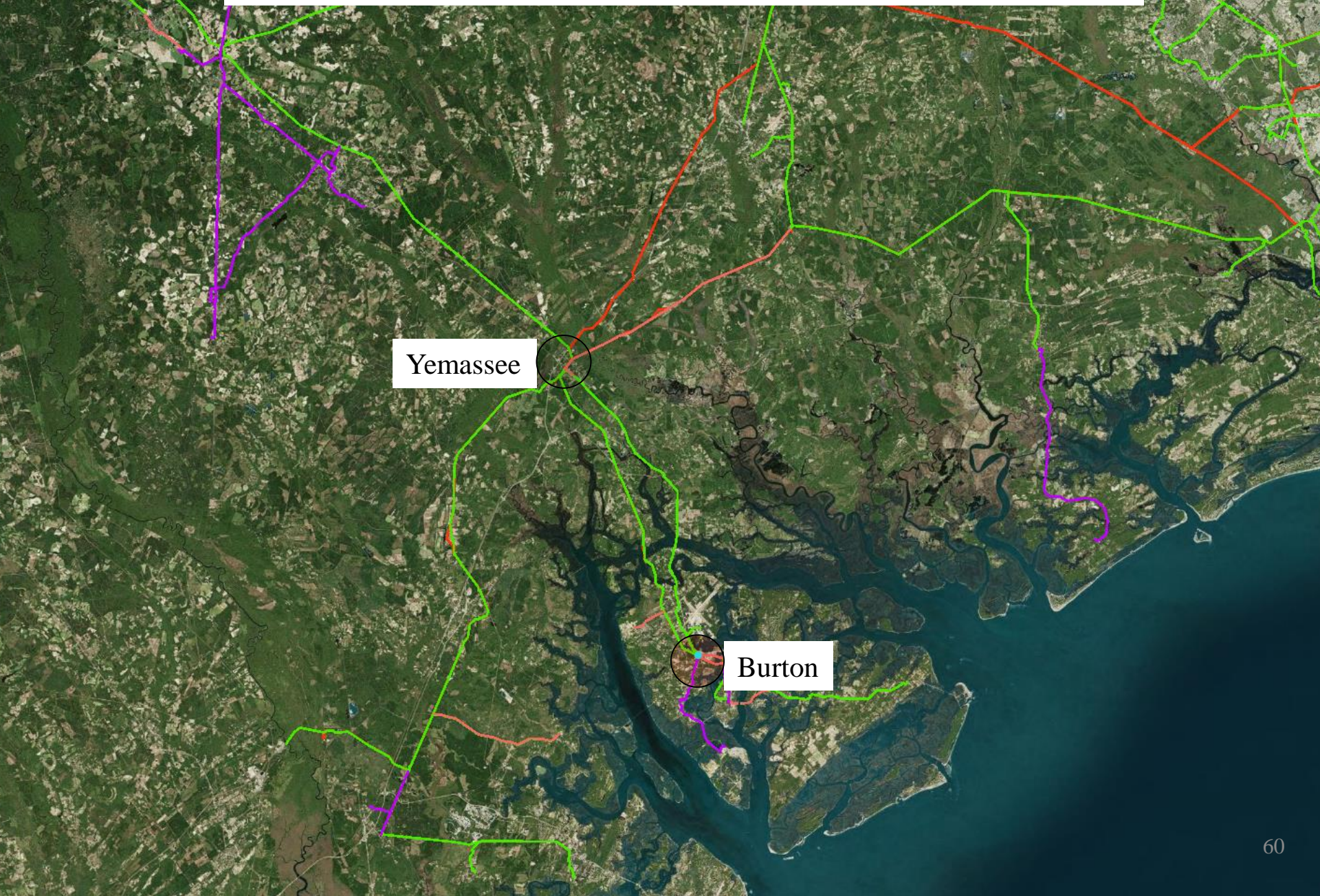
# Pepperhill – Summerville 230 kV



## Burton – Yemassee 115 kV #2 Rebuild

- Remove existing H-Frame 477 ACSR 115 kV line, rebuild approximately 21 miles SPDC B795 ACSR
  - Burton – Yemassee 115 kV #2 upgraded
  - Burton – Yemassee 115 kV #3 created
- Upgrade/Add 115 kV terminals at Yemassee & Burton
- Project required to alleviate potential N-2 contingency overload that requires load shedding under peak conditions
  - Radial load shed only, does not have any adverse effects on BES
- Completion date delayed to December 2017 (Tentative)

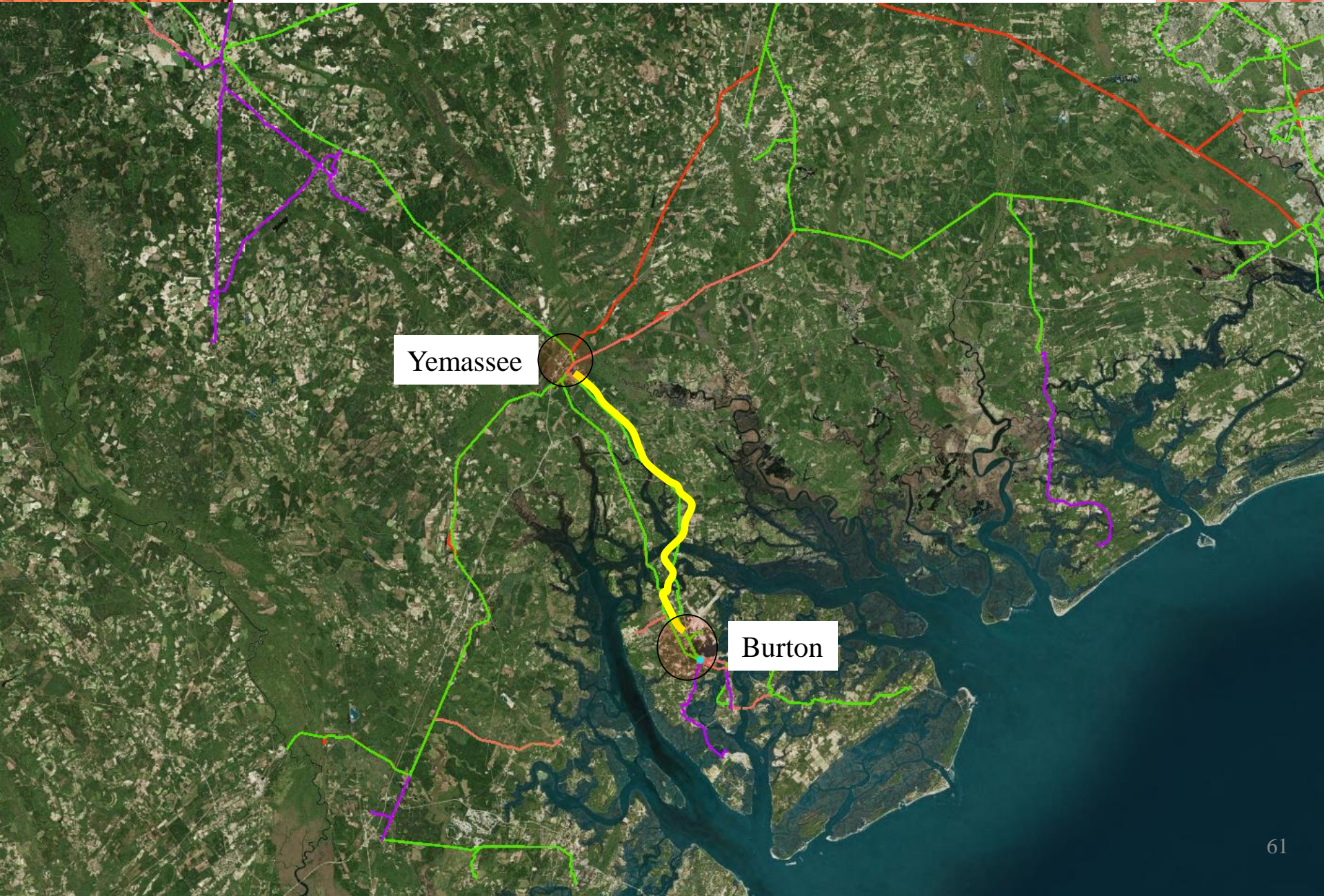
# Burton – Yemassee 115 kV #2 Rebuild



Yemassee

Burton

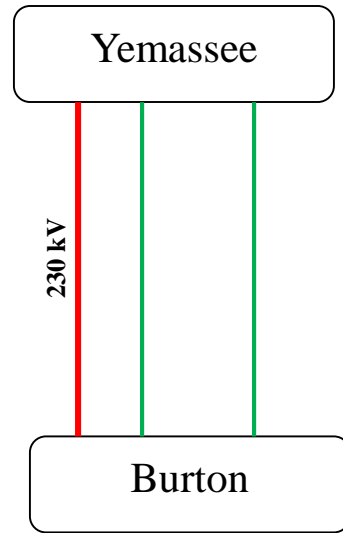
# Burton – Yemassee 115 kV #2 Rebuild



Yemassee

Burton

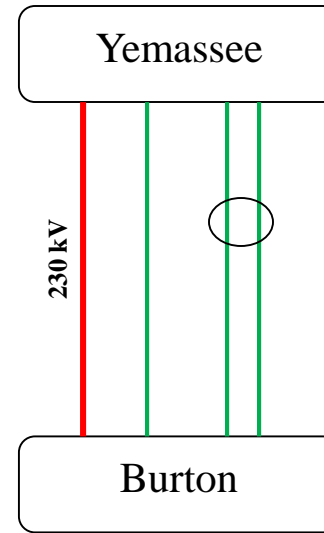
# Burton – Yemassee 115 kV #2 Rebuild



Current Configuration:

- 1-230 kV 1272 ACSR
- 2-115 kV 477 ACSR

Total Capacity: **500 MVA**



Future Configuration:

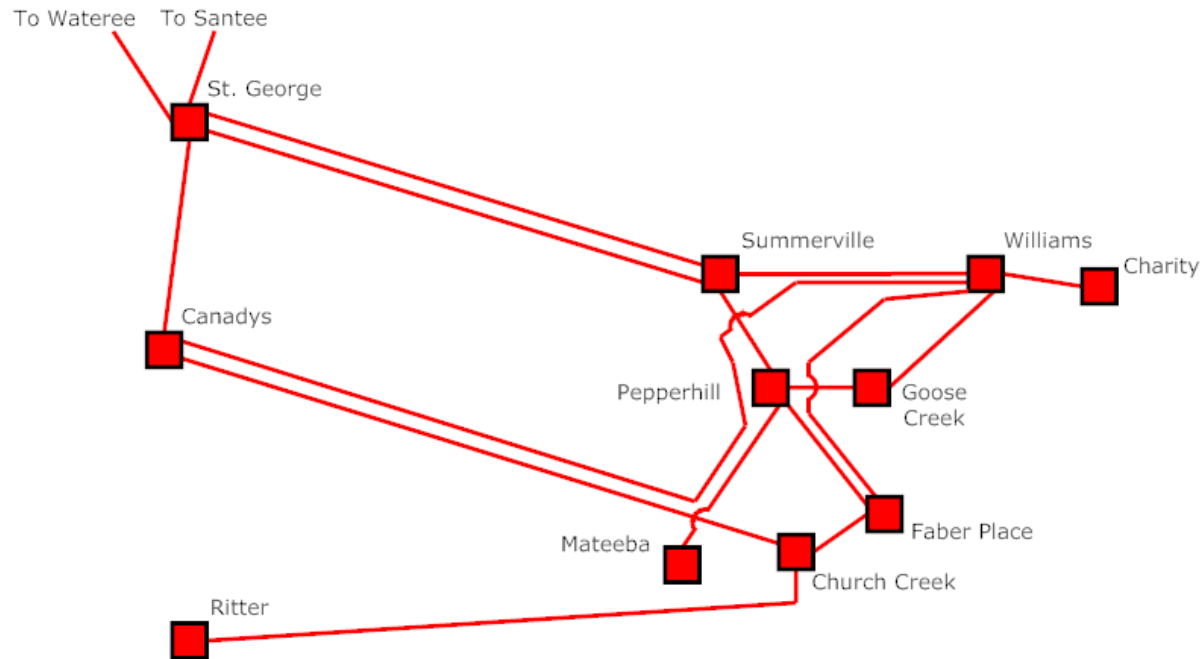
- 1-230 kV 1272 ACSR
- 1-115 kV 477 ACSR
- 2-115 kV B795 ACSR

Total Capacity: **1,074 MVA**

## Canadys – Ritter 115 kV Rebuild as SPDC 230/115 kV

- Most recent addition to “Post Nuclear” planning horizon
- Project required to alleviate several potential NERC TPL-001-4 contingencies that will cause the loading/overload of transmission system facilities in SCE&G’s southern region
- Two phase project:
  - 1.) Fold the Williams – Canadys 230 kV line into Pepperhill (2020)
  - 2.) Rebuild approximately 18 miles Canadys – Ritter 115 kV line as SPDC with Canadys – Ritter 230 kV B1272 ACSR and Canadys – Ritter 115 kV 1272 ACSR (2022)

# Canadys – Ritter 115 kV Rebuild as SPDC 230/115 kV



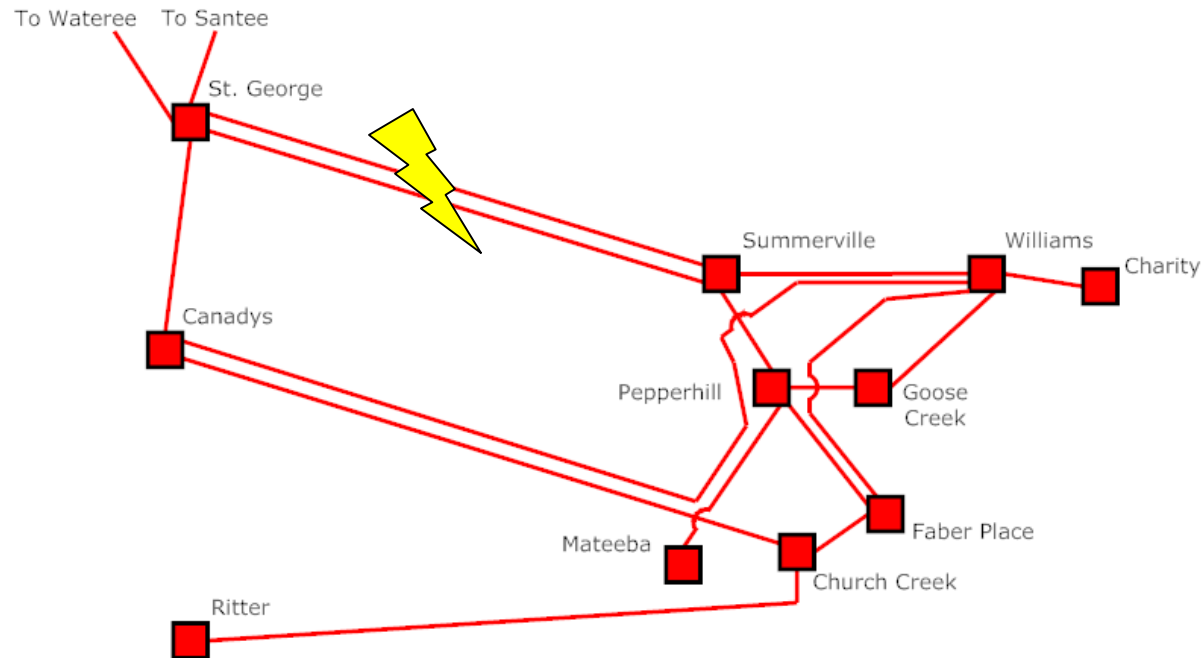
**Charleston Region 230 kV Transmission (>2018)**



# Canadys – Ritter 115 kV Rebuild as SPDC 230/115 kV

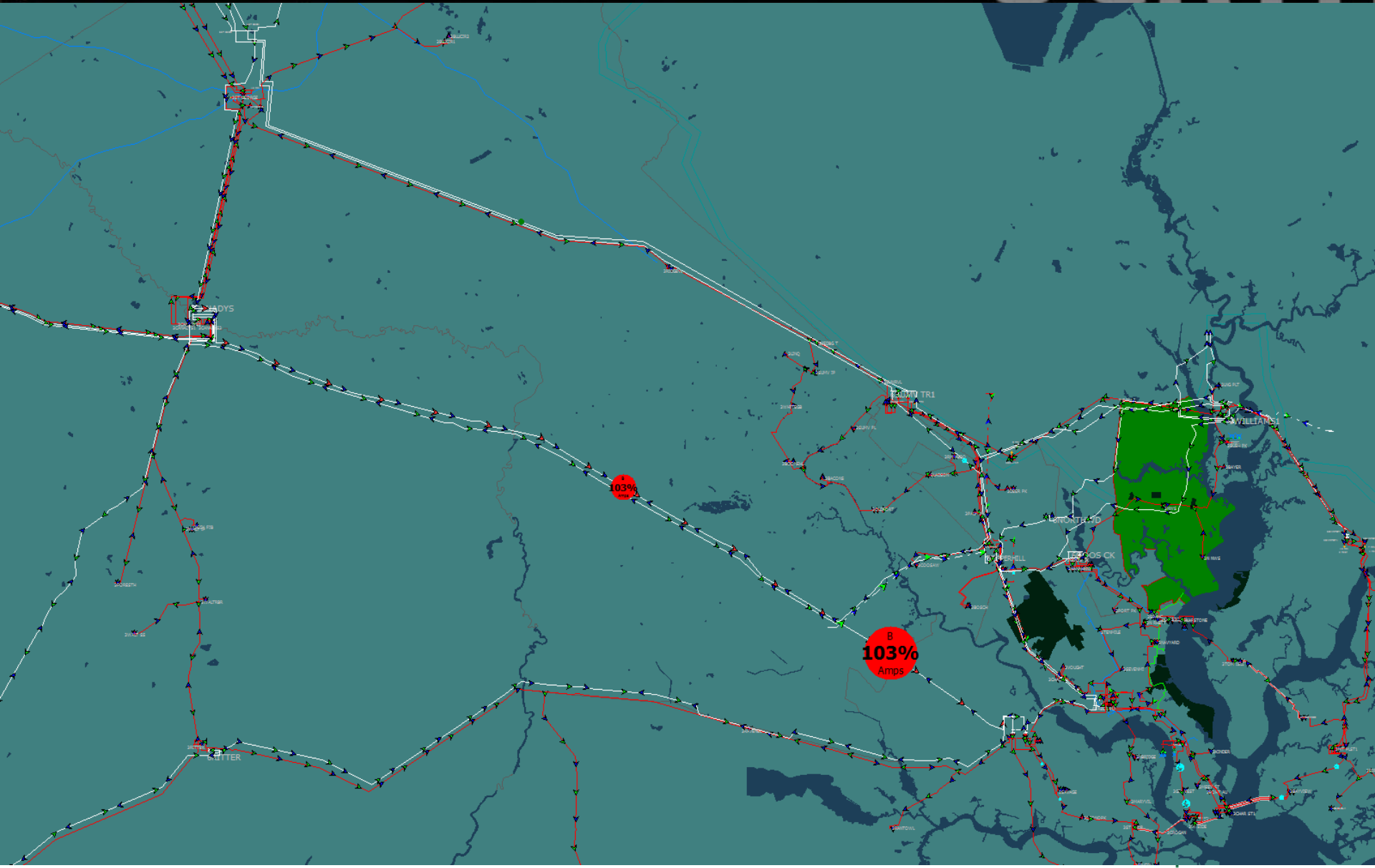
Year/Season	Contingency	Monitored Element	Flow (Rating)
2019S	<b>C5:</b> St. George – Summerville 230 kV #1 and St. George – Summerville 230 kV #2 SPDC	<u>Canadys</u> – Church Creek 230 kV	94% (376.3 MVA)
2019S	<b>C3:</b> <u>Pepperhill</u> – Summerville 230 kV and Summerville 230/115 kV Transformer 1/2	Summerville 230/115 kV Transformer 2/1	94% (336 MVA)
2019S	<b>C3:</b> Church Creek – Faber Place 230 kV and Church Creek 230/115 kV Transformer 1/2	Church Creek 230/115 kV Transformer 2/1	95% (336 MVA)
2020S	<b>C5:</b> St. George – Summerville 230 kV #1 and St. George – Summerville 230 kV #2 (SPDC)	<u>Canadys</u> – Church Creek 230 kV	103% (376.3 MVA)
2020S	<b>C3:</b> <u>Pepperhill</u> – Summerville 230 kV and Summerville 230/115 kV Transformer 1/2	Summerville 230/115 kV Transformer 2/1	99% (336 MVA)
2020S	<b>C3:</b> Church Creek – Faber Place 230 kV and Church Creek 230/115 kV Transformer 1/2	Church Creek 230/115 kV Transformer 2/1	100% (336 MVA)

# Canadys – Ritter 115 kV Rebuild as SPDC 230/115 kV



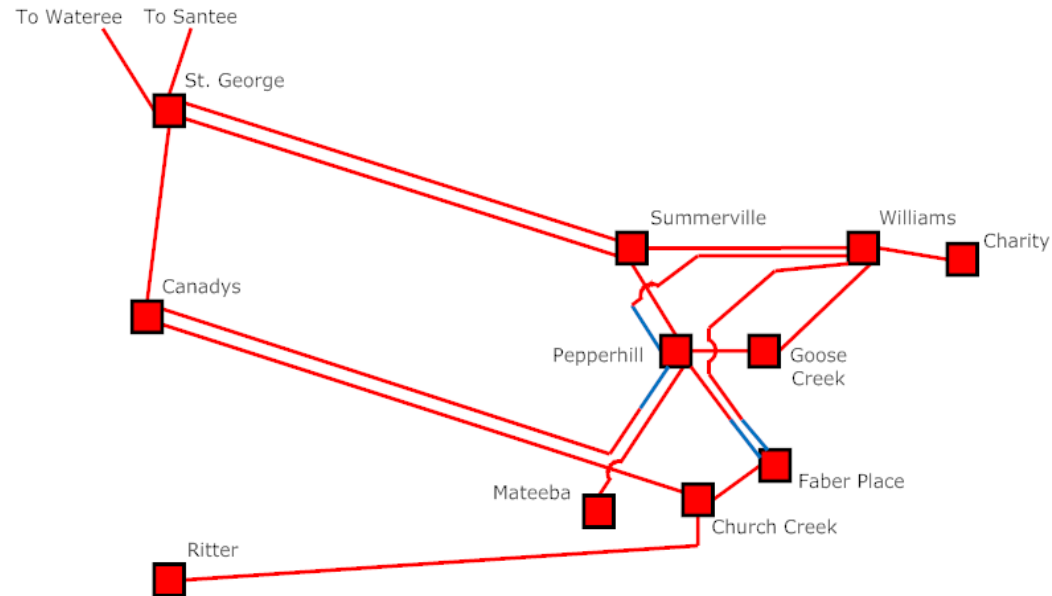
**C5 Contingency: Loss of St. George – Summerville 230 kV #1&2**

# Canadys – Ritter 115 kV Rebuild as SPDC 230/115 kV



# Canadys – Ritter 115 kV Rebuild as SPDC 230/115 kV

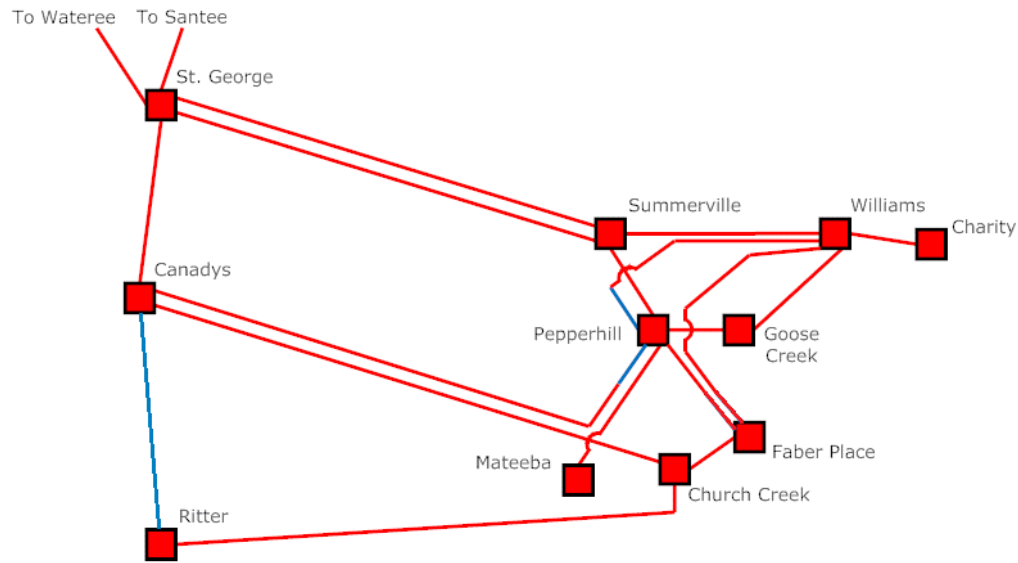
## Phase I: Fold Canadys – Williams 230 kV line into Pepperhill



- Causes flow to be more evenly split from Canadys to Church Creek and Williams
- Breaks 49 mile line into two segments of 30 and 19 miles
- Allows for 2 year delay of Canadys – Ritter 230 kV construction

# Canadys – Ritter 115 kV Rebuild as SPDC 230/115 kV

## Phase II: Rebuild Canadys – Ritter 115 kV to SPDC 230/115 kV



Contingency	Monitored Element	Pre-Flow (Rating)	Post-Flow (Rating)
<b>C5:</b> St. George – Summerville 230 kV #1 and St. George – Summerville 230 kV #2 SPDC	<u>Canadys</u> – Church Creek 230 kV	103% (376.3 MVA)	91% (376.3 MVA)
<b>C3:</b> <u>Pepperhill</u> – Summerville 230 kV and Summerville 230/115 kV Transformer 1/2	Summerville 230/115 kV Transformer 2/1	99% (336 MVA)	92% (336 MVA)
<b>C3:</b> Church Creek – Faber Place 230 kV and Church Creek 230/115 kV Transformer 1/2	Church Creek 230/115 kV Transformer 2/1	100% (336 MVA)	107% (336 MVA)

# Questions?

# Proposed Transmission Expansion Plan

**Santee Cooper**

**Rick Thornton**

# Transmission Network Completed Projects

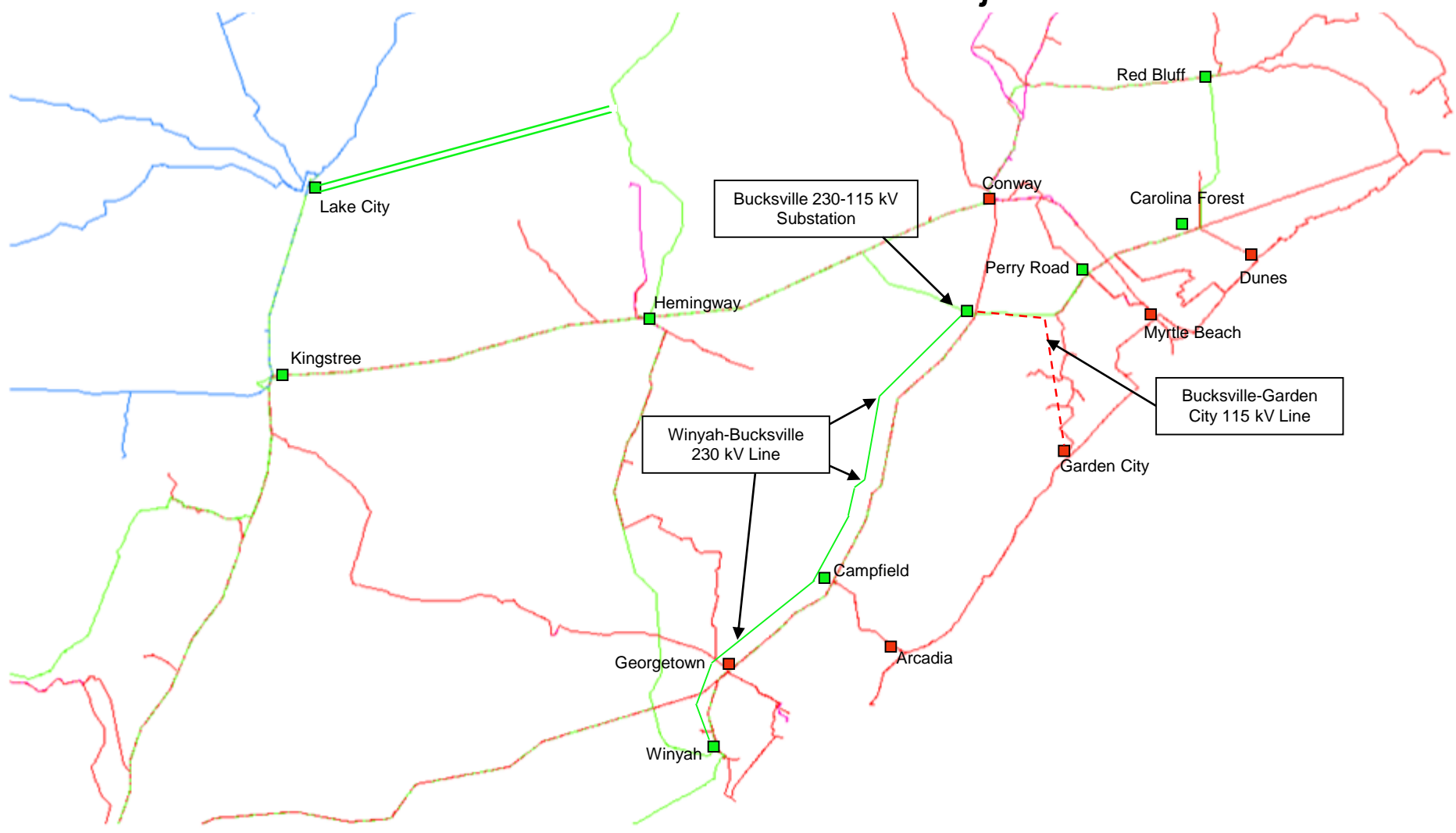
- Purrysburg-McIntosh 230 kV Line #2 04/2015
- Richburg 230-69 kV Substation 05/2015
- Winnsboro-Richburg 230 kV Line 05/2015

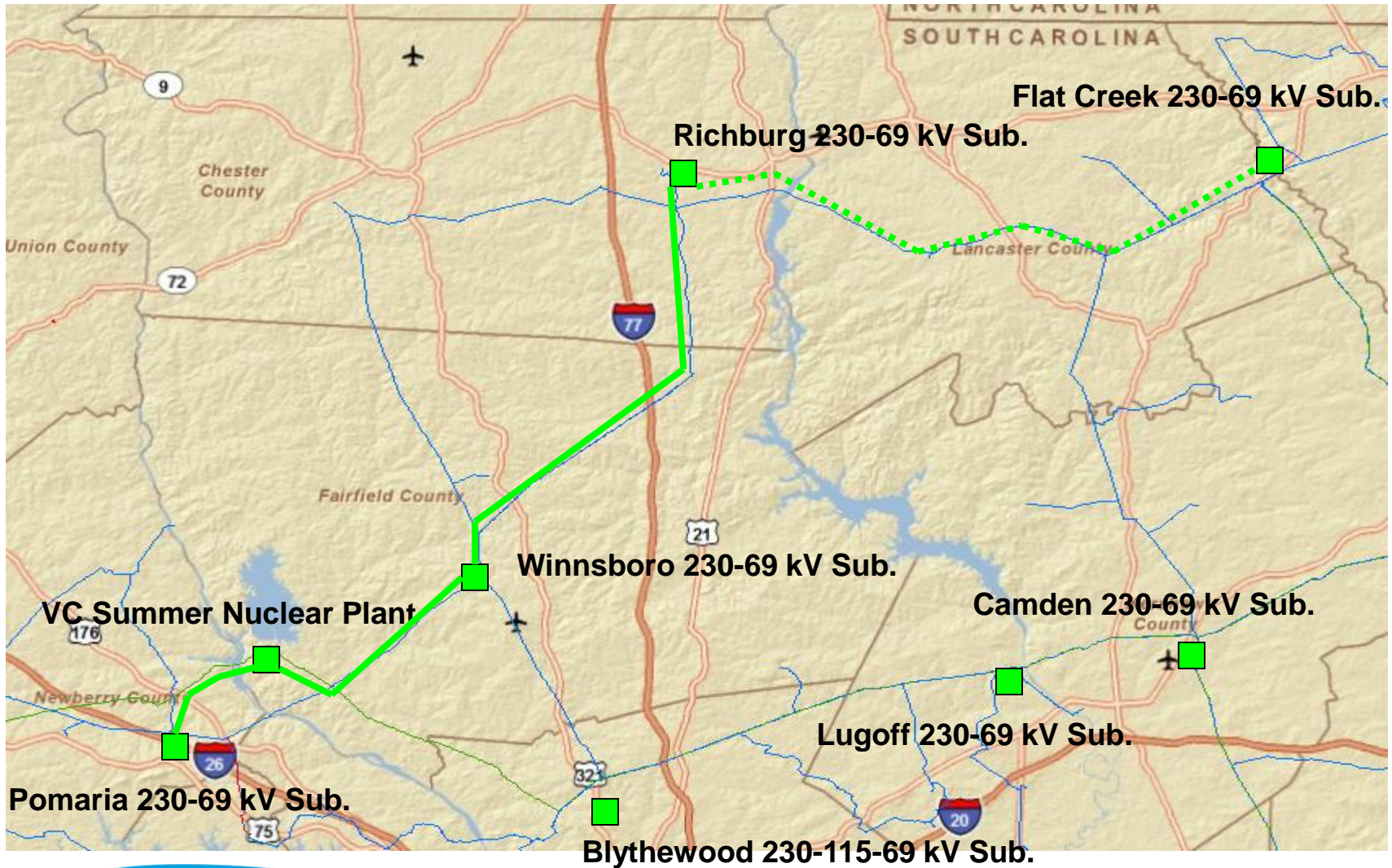


## Transmission Network Active Projects

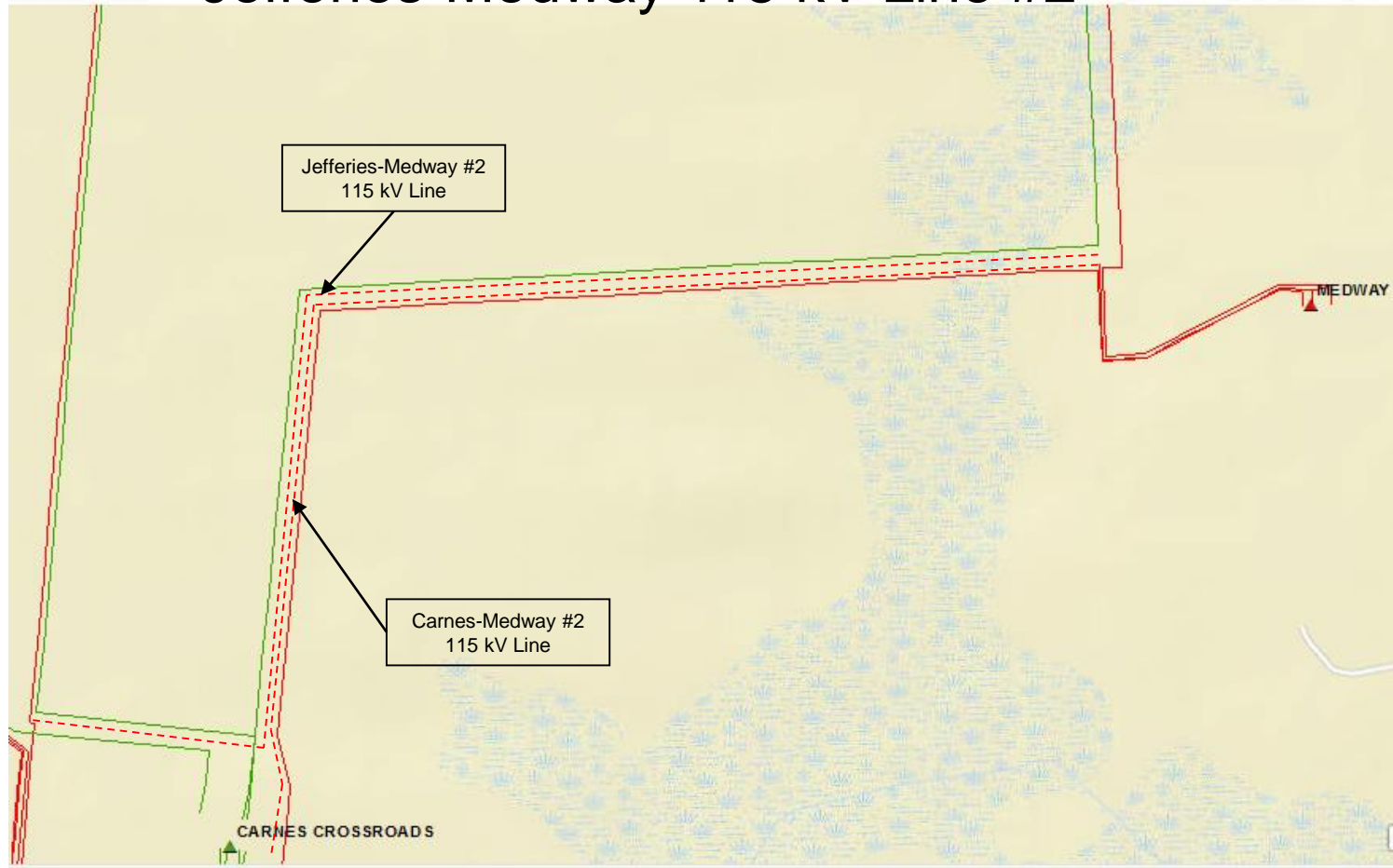
- Winyah-Bucksville 230 kV Line 12/2015
- Richburg-Flat Creek 230 kV Line 06/2016
- Bucksville-Garden City 115 kV Line 06/2016
- Carnes Crossroads-Medway 115 kV Line #2 06/2016
- Jefferies-Medway 115 kV Line #2 06/2016
- Bucksville-Myrtle Beach 115 kV Line 12/2016
- Pringletown 115 kV Switching Station 12/2016
- Perry Road-Myrtle Beach #3 06/2017
- Pine Level-Allen #2 115 kV Line 06/2017
- New Harleys Bridge 115-69 kV Substation 12/2017
- Sandy Run 230-115 kV Substation 05/2018
- Pomaria-Sandy Run 230 kV Line 05/2018
- Marion-Red Bluff 230 kV Line 12/2018
- Sandy Run-Orangeburg 230 kV Line 06/2019

## Bucksville Transmission Projects

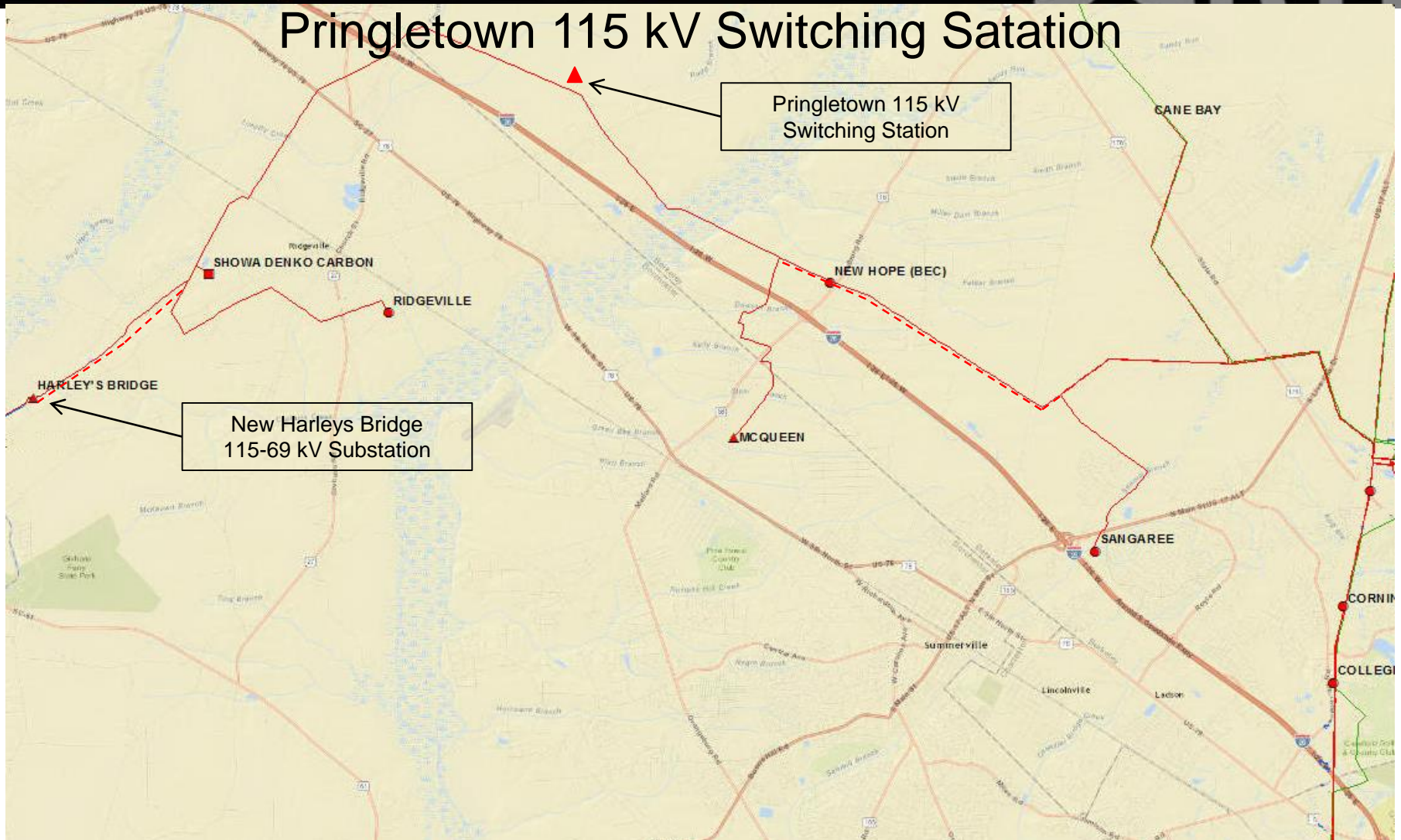




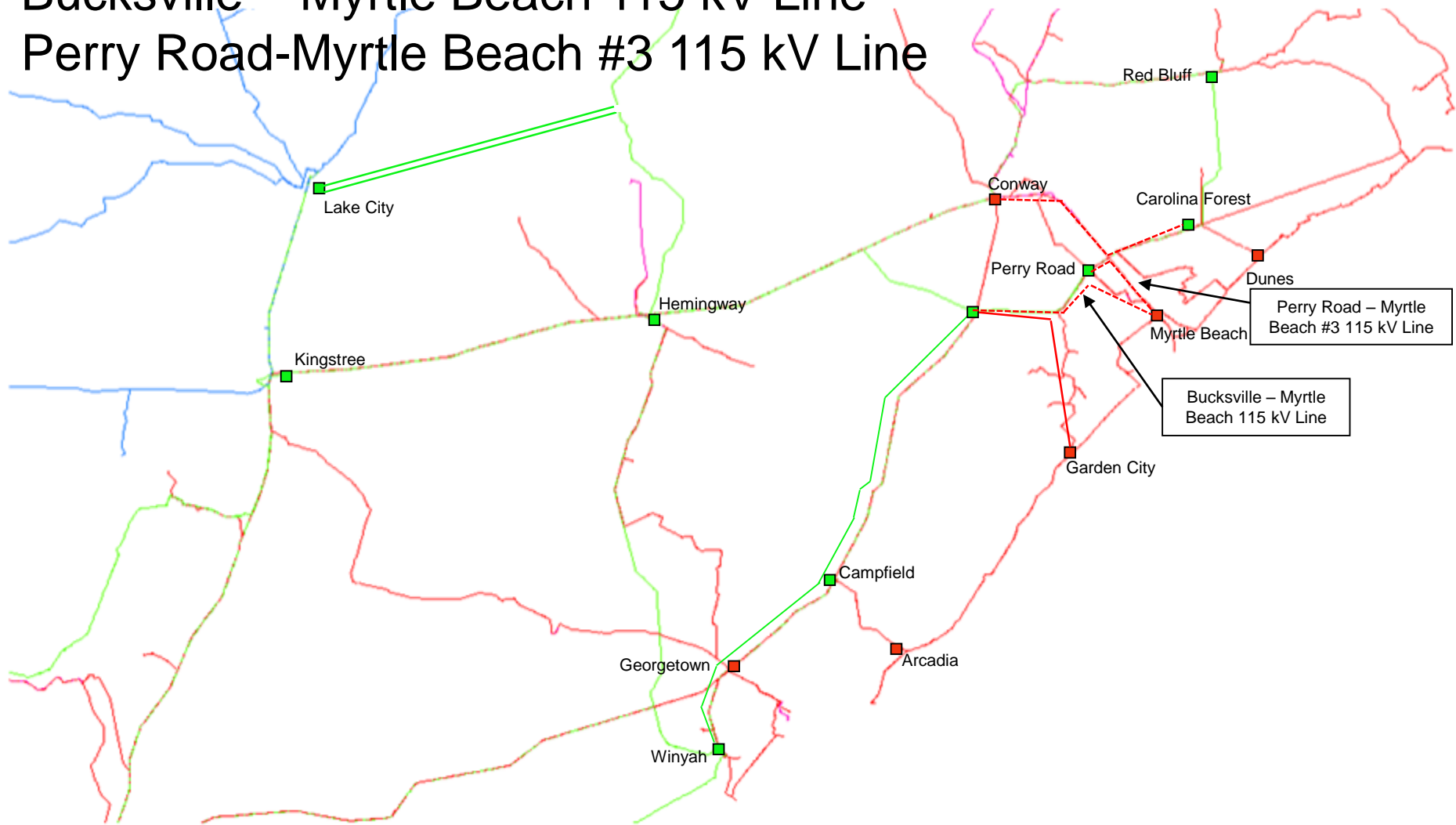
## Carnes-Medway 115 kV Line #2 Jefferies-Medway 115 kV Line #2



# Pringletown 115 kV Switching Satation



## Bucksville – Myrtle Beach 115 kV Line Perry Road-Myrtle Beach #3 115 kV Line



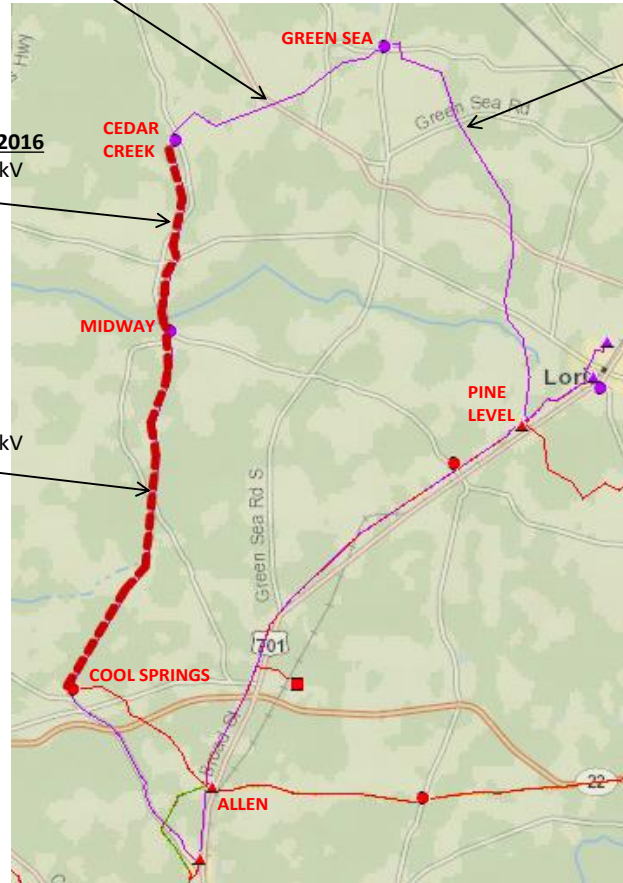
# Allen – Pine Level #2 115 kV Line

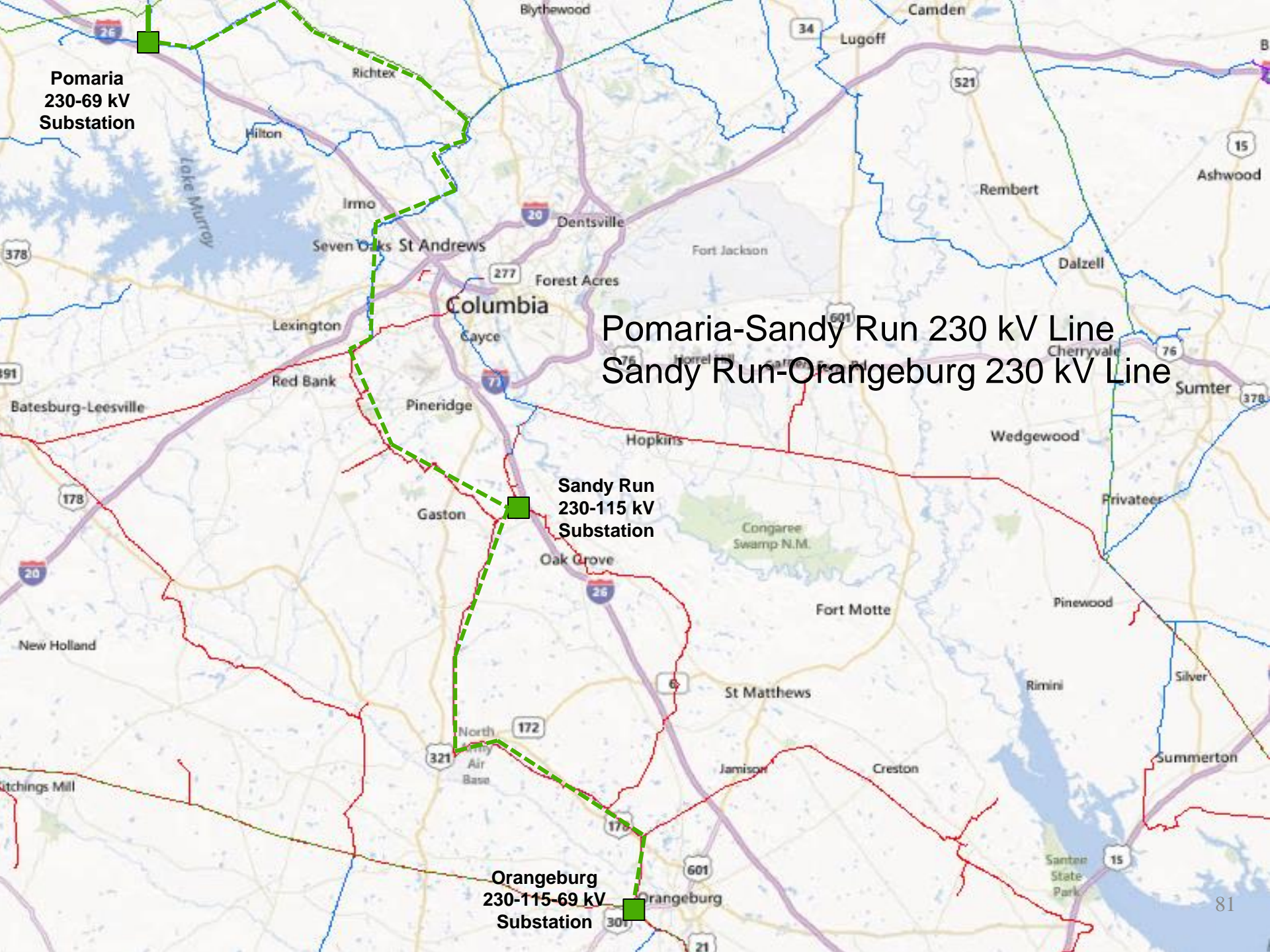
Changed to **3/1/2017**  
**OPERATE AT 115kV**  
 (ALREADY 477 ACSR  
 BUILT FOR 115kV)

Changed to **5/1/2016**  
**REBUILD FOR 115kV**  
 795 ACSR

**BY 11/30/2015**  
**REBUILD FOR 115kV**  
 795 ACSR

Changed to **3/1/2017**  
**OPERATE AT 115kV**  
 (ALREADY 477 ACSR  
 BUILT FOR 115kV)





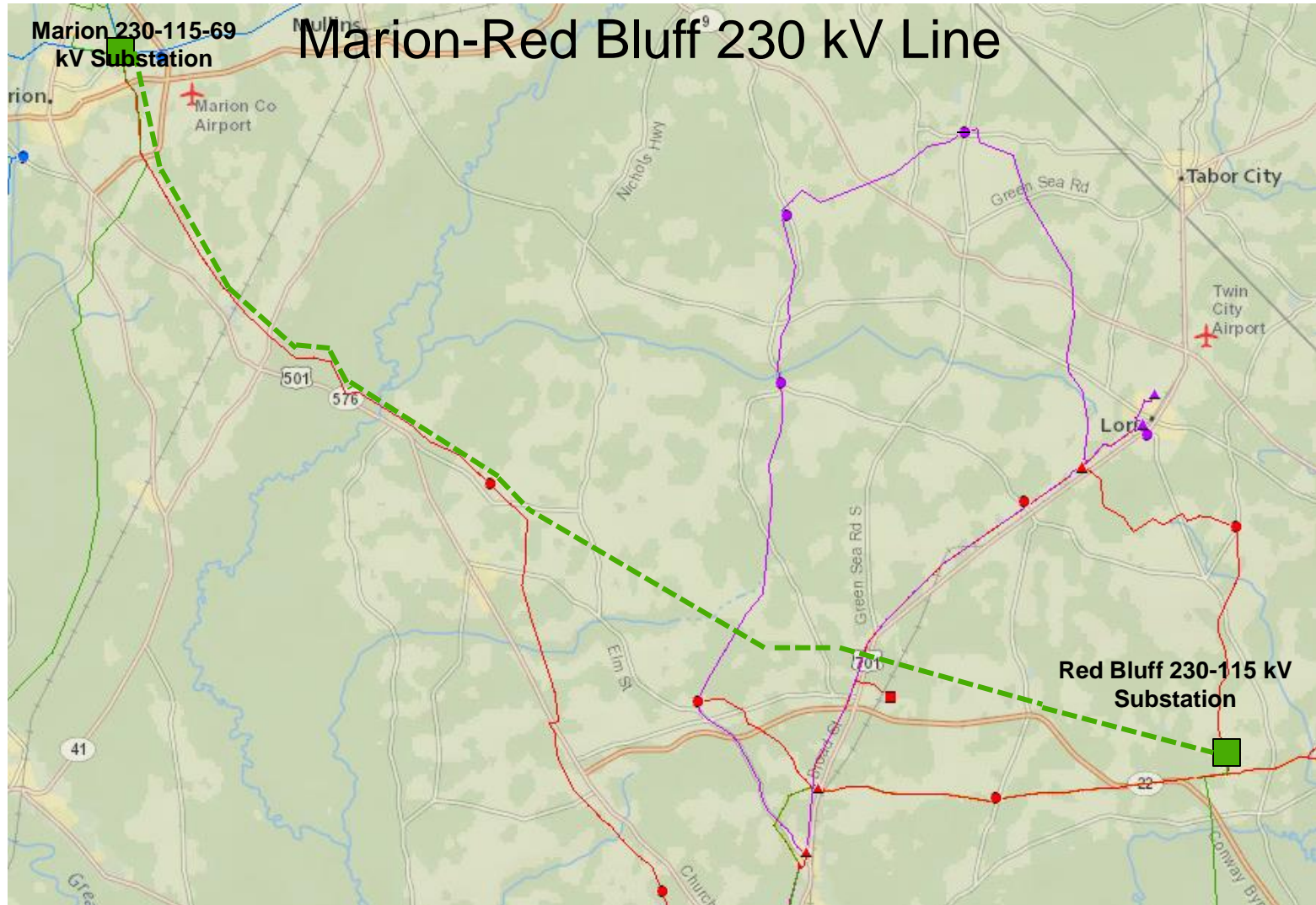
**Pomaria  
230-69 kV  
Substation**

**Pomaria-Sandy Run 230 kV Line  
Sandy Run-Orangeburg 230 kV Line**

**Sandy Run  
230-115 kV  
Substation**

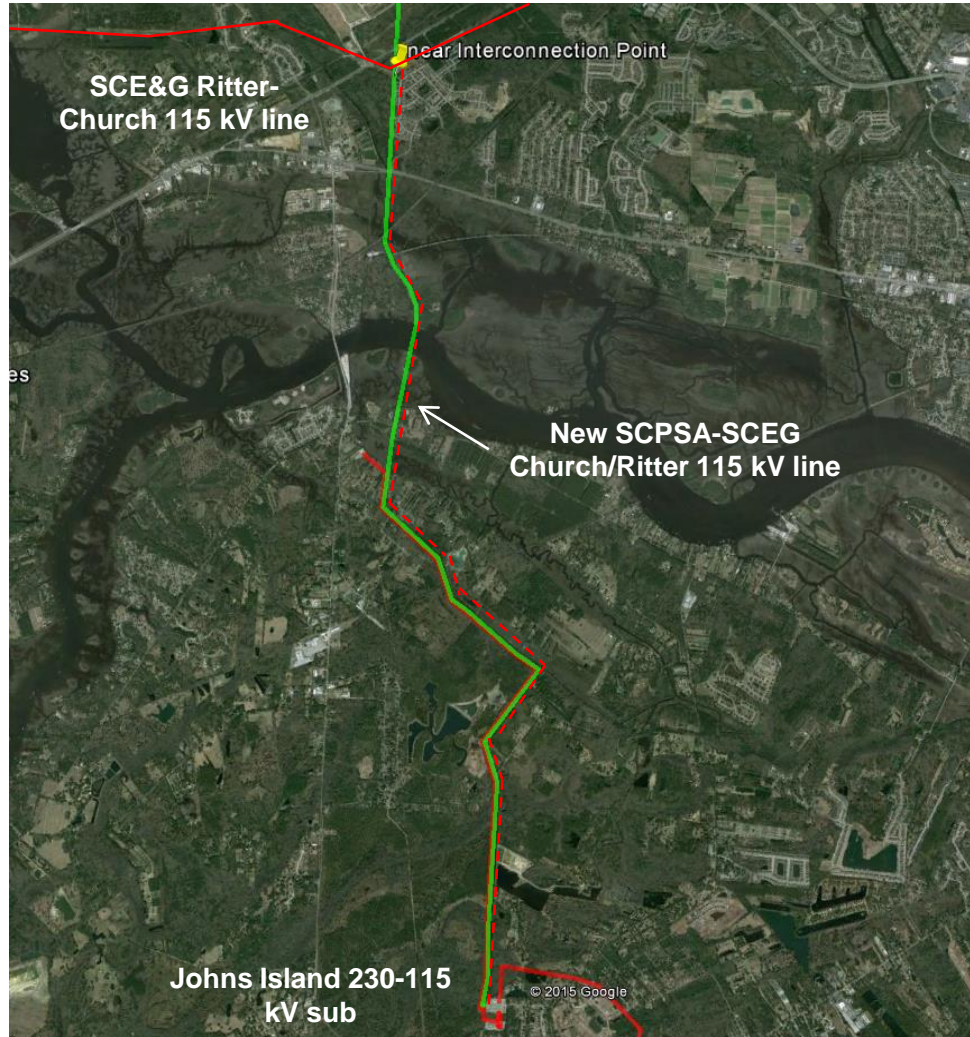
**Orangeburg  
230-115-69 kV  
Substation**



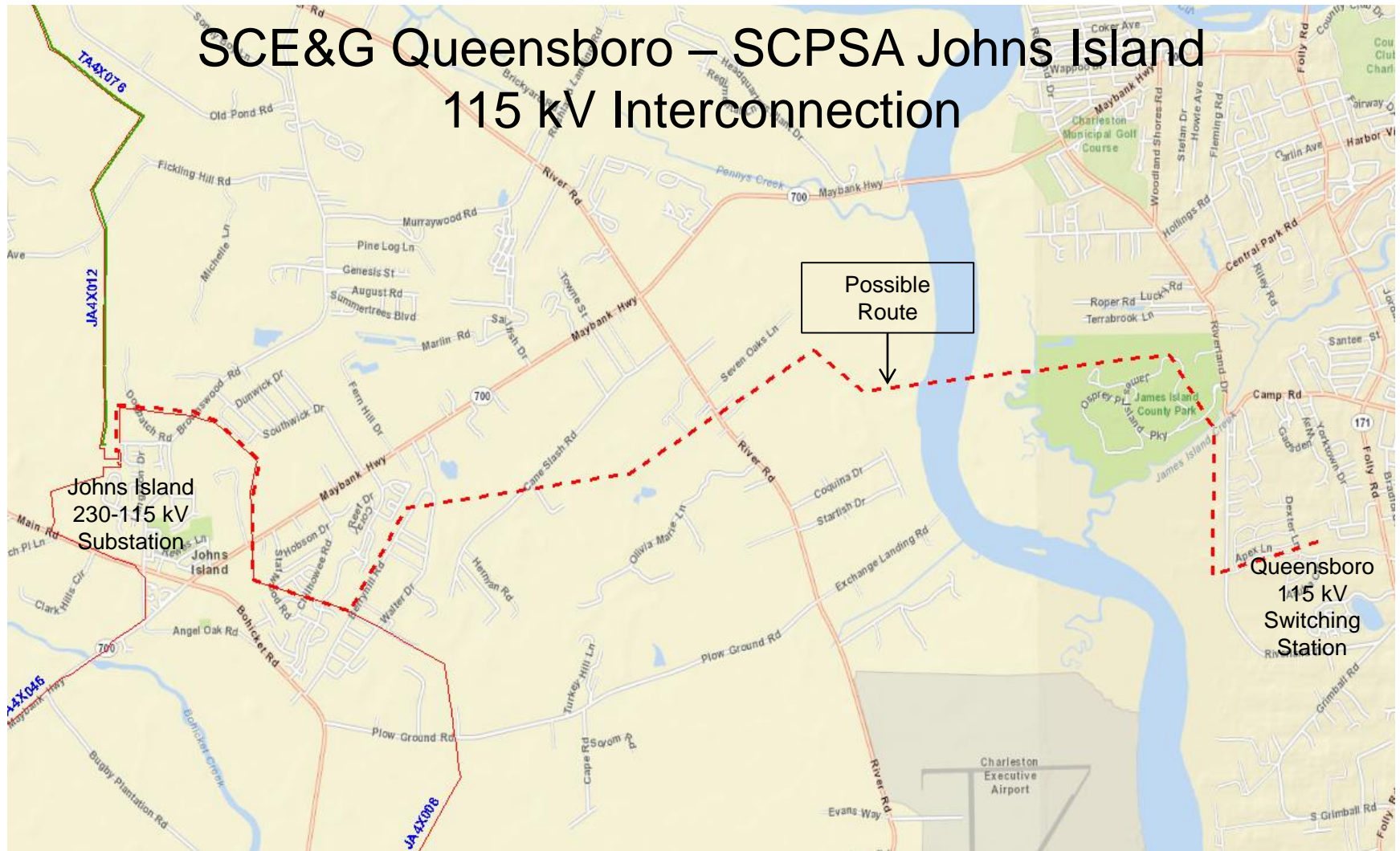


# Transmission Network Planned Projects

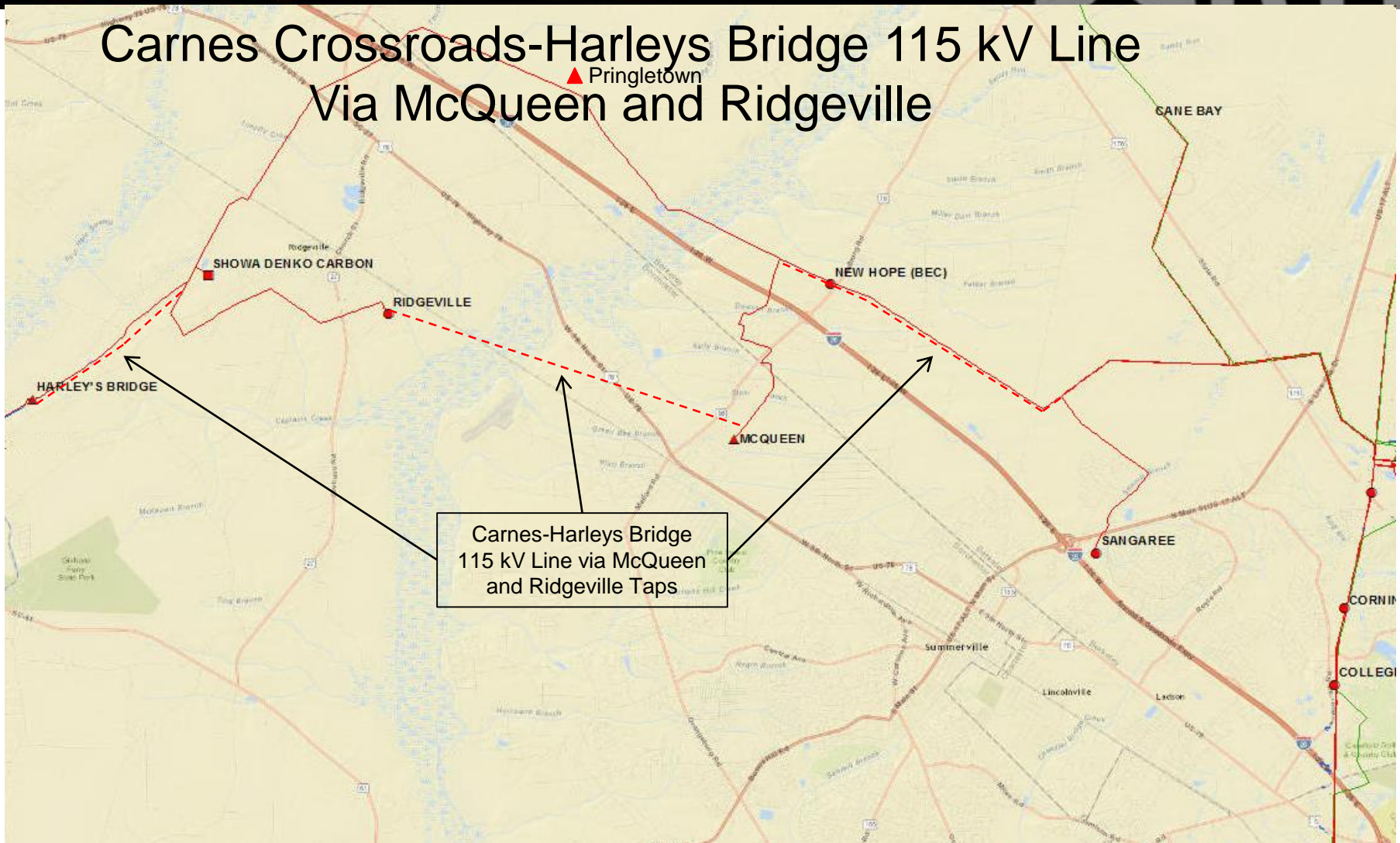
- New Harleys Bridge 115-69 kV Substation 12/2017
- SCE&G Church Creek / Ritter-SCPSA Johns Island 12/2017
- SCE&G Queensboro-SCPSA Johns Island  
115 kV Interconnection 06/2018
- Carnes-Harleys Bridge 115 kV Line via McQueen 12/2020
- Dalzell-Lake City 230 kV Line 04/2020
- Sandy Run-Pinewood 230 kV Line 12/2021



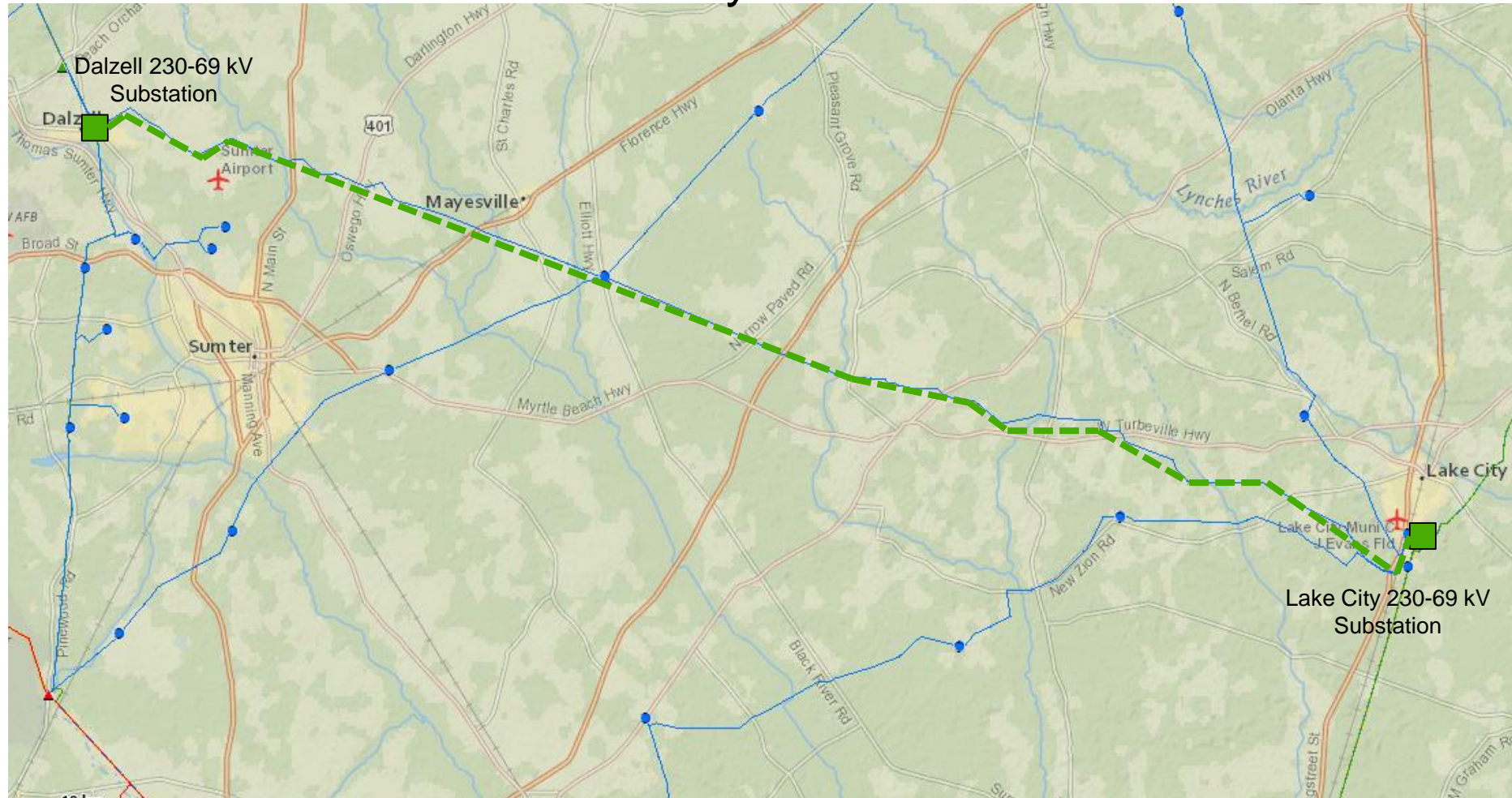
## SCE&G Queensboro – SCPSA Johns Island 115 kV Interconnection



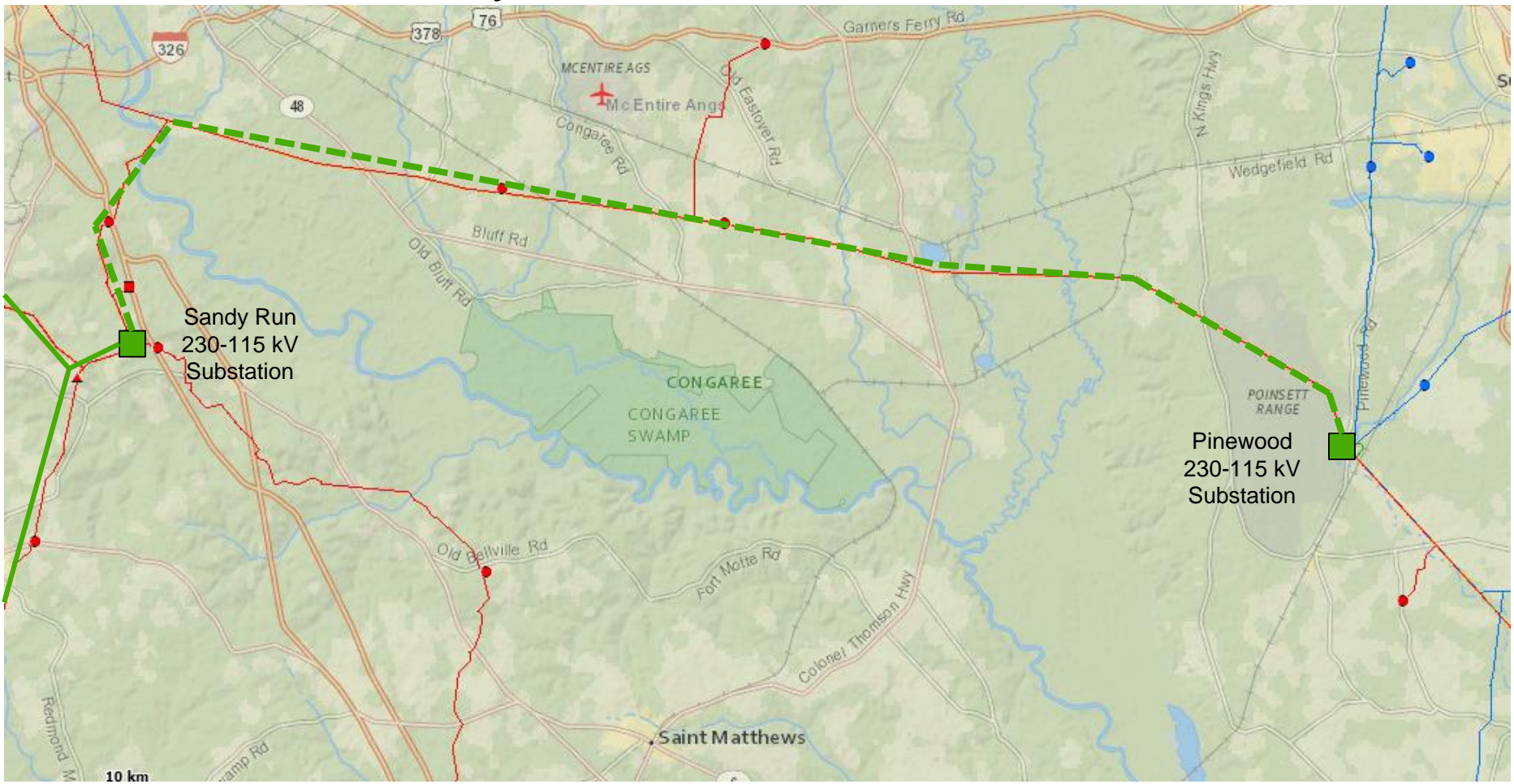
## Carnes Crossroads-Harleys Bridge 115 kV Line Via McQueen and Ridgeville



## Dalzell-Lake City 230 kV Line



## Sandy Run-Pinewood 230 kV Line



# Proposed Transmission Expansion Plan

## Stakeholder Input, Comments and Questions



# Reliability Transmission Planning Studies Schedule

## Clay Young

## 2016

- **Jan – Feb**                      **Models Updated**
- **March – April**                **TPL Analysis**
- **May – June 2016**            **TPL Reports Developed**
- **3<sup>rd</sup> Quarter 2016 SCRTP Meeting – Results Reported**

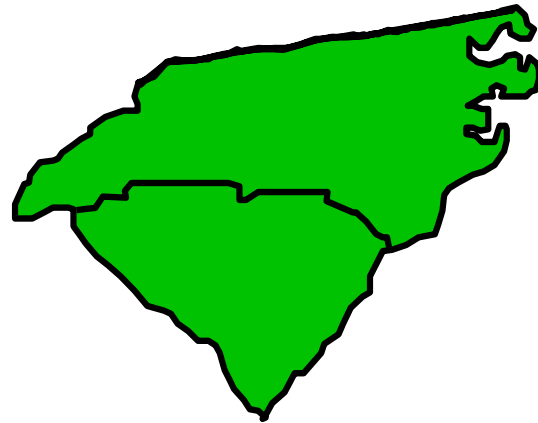
# Reliability Assessment Studies

Rick Thornton and Jeff Neal

## Multi-Party Assessments

- **Carolina Transmission Coordination Arrangement (CTCA) Assessments**
- **Southeastern Electric Reliability Corporation (SERC) Assessments**
- **Eastern Interconnection Planning Collaboration (EIPC)**

# CTCA Future Year Assessments



## CTCA Purpose

- **Collection of agreements developed concurrently by the Principals, Planning Representatives, and Operating Representatives of multiple two-party Interchange Agreements**
- **Establishes a forum for coordinating certain transmission planning and assessment and operating activities among the specific parties associated with the CTCA**

# CTCA Purpose

## Interchange Agreements associated with the CTCA

Duke Energy Carolinas (“Duke”) and Duke Energy Progress (“Progress”)

Duke Energy Carolinas (“Duke”) and South Carolina Electric & Gas Company (“SCE&G”)

Duke Energy Carolinas (“Duke”) and South Carolina Public Service Authority (“SCPSA”)

Duke Energy Progress (“Progress”) and South Carolina Electric & Gas Company (“SCE&G”)

Duke Energy Progress (“Progress”) and South Carolina Public Service Authority (“SCPSA”)

South Carolina Electric & Gas Company (“SCE&G”) and South Carolina Public Service Authority (“SCPSA”)

# CTCA Power Flow Study Group

- Duke Energy Carolinas (“Duke”)
- Duke Energy Progress (“Progress”)
- South Carolina Electric & Gas (“SCEG”)
- South Carolina Public Service Authority (“SCPSA”)



# CTCA Studies

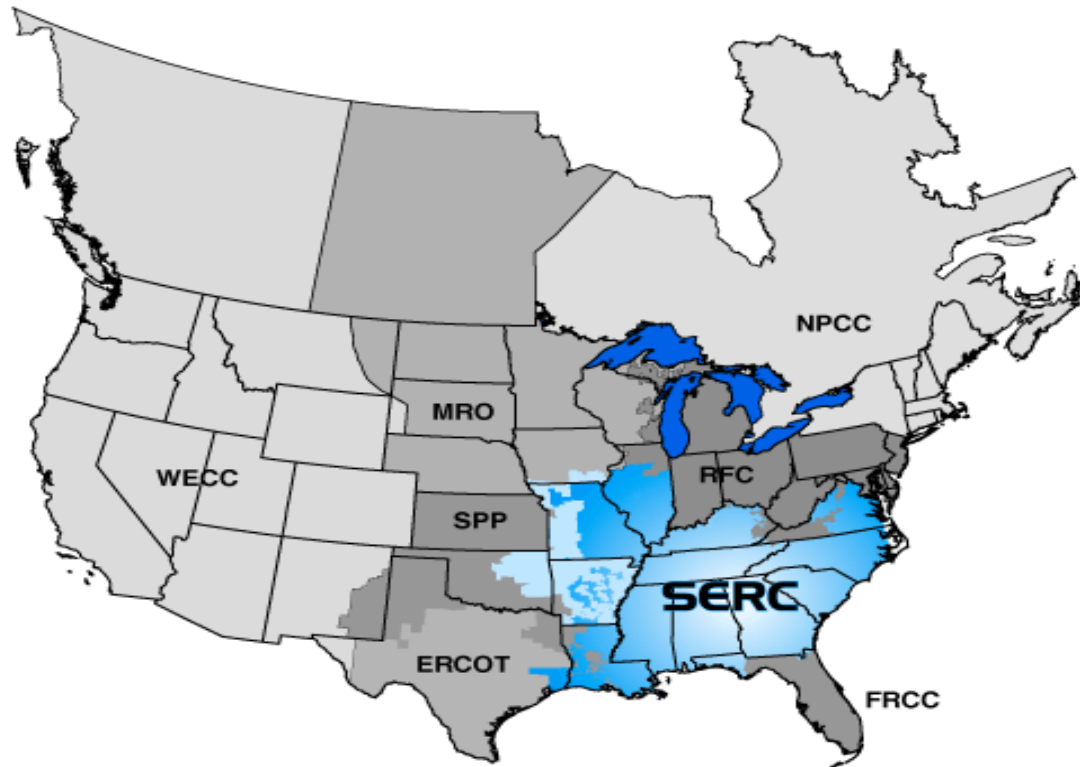
- Assess the existing transmission expansion plans of Duke, Progress, SCEG, and SCPSA to ensure that the plans are simultaneously feasible.
- Identify any potential joint solutions that are more efficient or cost-effective than individual company plans, which also improve the simultaneous feasibility of the Participant companies' transmission expansion plans.
- The Power Flow Study Group ("PFSG") will perform the technical analysis outlined in this study scope under the guidance and direction of the Planning Committee ("PC").

# CTCA Studies 2015 Study

- 2020 Summer (Near-Term)
- 2026 Summer (Long-Term)
- Final report is completed and approved (October)
- Study results indicated the Participants' current transmission expansion plans are simultaneously feasible for the studied years' conditions
- No potential joint alternatives were identified or needed

# SERC LTSG Assessments

## SERC Future Year Assessments Long Term Study Group (LTSG)



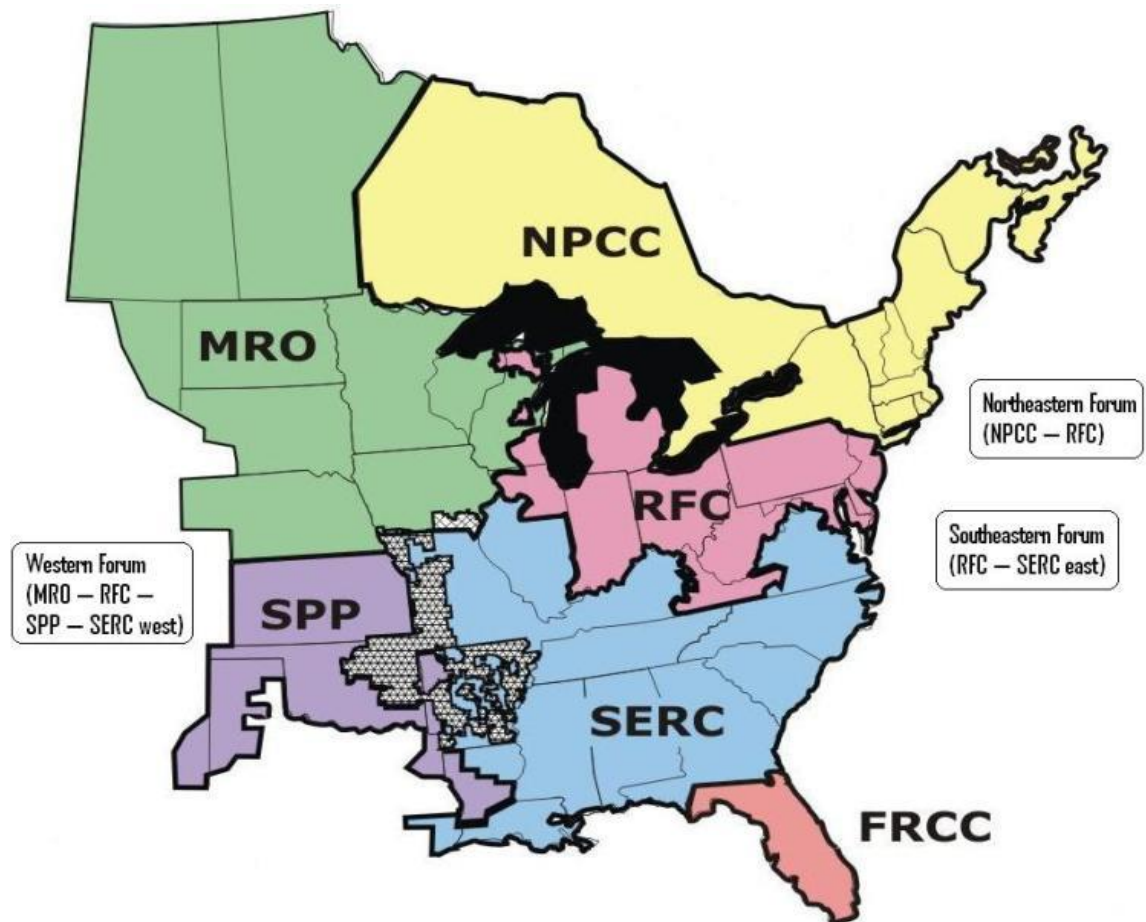
# SERC LTSG Study Purpose

- Analyze the performance of the members' transmission systems and identify limits to power transfers occurring non-simultaneously among the SERC members.
- Evaluate the performance of bulk power supply facilities under both normal and contingency conditions for future years.
- Focus on the evaluation of sub-regional and company-to-company transfer capability.

# SERC Long Term Study Group 2015 Work Schedule

- LTSG Data Bank Update –May 12-14 Hosted by Southern
- Study Case: 2020 Summer Peak Load
- Study has been completed.
- Final Report will be approved in December

# Eastern Interconnection Reliability Assessment Group (ERAG) Assessments





# ERAG Assessments

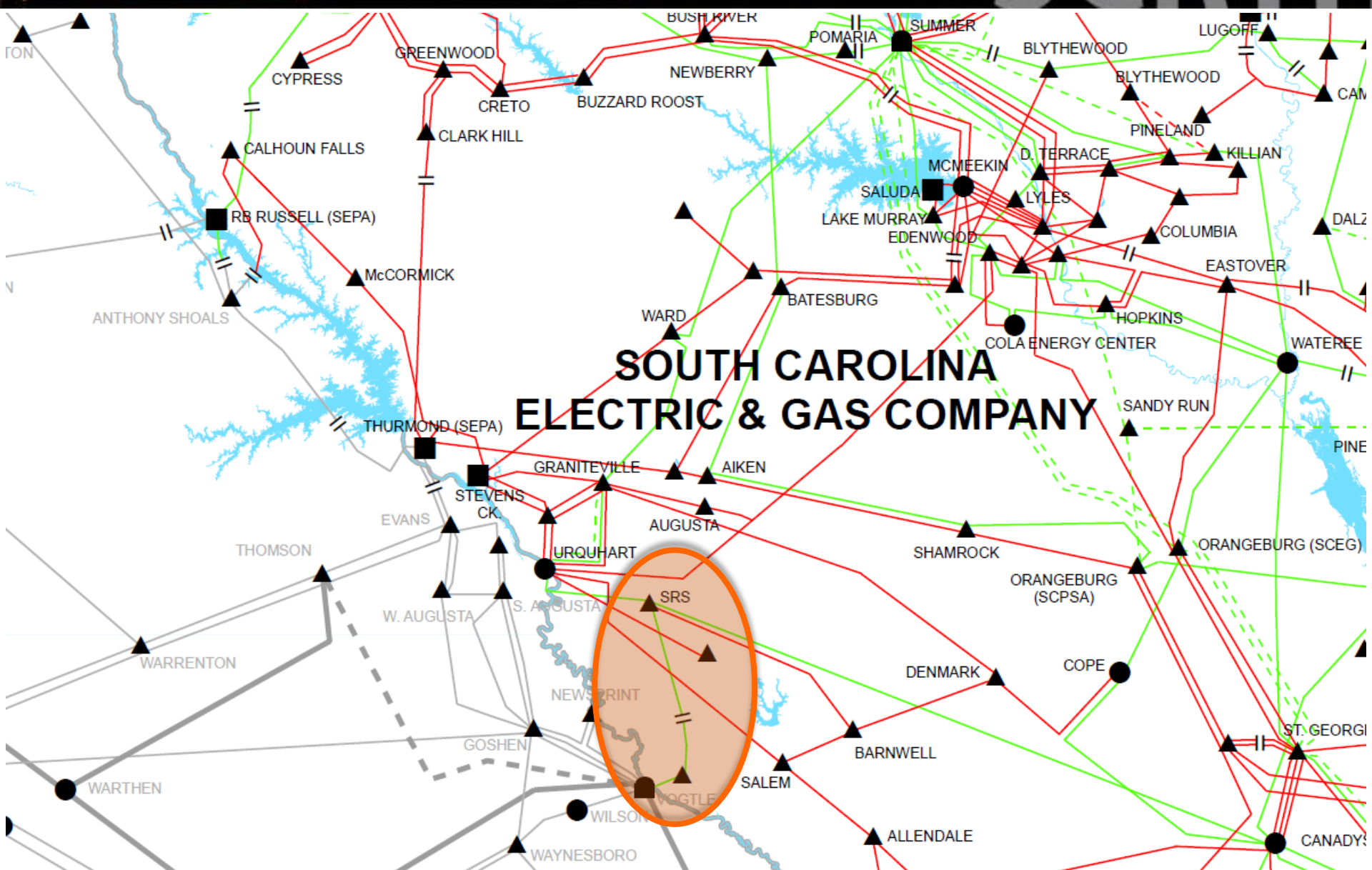
- **No Long Term Study Performed**

# Multi-Party Assessment Studies

# SCE&G-Southern Company Joint Study

- Purpose
  - Conduct a joint study with SCE&G and Southern Company (and all of its affiliated members) to determine the most feasible and economic solution to address constraints identified on the Savannah River Services – Vogtle 230 kV SCE&G/SOCO tie line
- Case Assumptions
  - 2014 Series Transmission Planning Power Flow cases (Version 2A)
    - Study Years: 2018, 2019, 2020, and 2024
    - Load Levels include Summer Peak and Shoulder Peak conditions
- Analysis to be performed
  - Power Flow/Bus Configuration
  - Stability
  - Short Circuit

# SCE&G-Southern Company Joint Study



# Reliability Assessment Studies

## Questions?

# Eastern Interconnection Planning Collaborative (EIPC)

## Activities Update

Phil Kleckley

## About the EIPC

- 20 Planning Authority (Planning Coordinator) members including ISOs/RTOs, non-ISO regions, municipals, cooperatives, ...
- Members are from the U.S. and Canada
- Approximately 95% of the Eastern Interconnection customers covered

## EIPC Supporting Activities

- CEII: Continue to make EIPC models available to those who have completed the EIPC CEII process (based on regional clearance)
- Website: [www.eipconline.com](http://www.eipconline.com)
  - Continue to host the EIPC website
  - Post material from both grant and non-grant EIPC activities



## EIPC Stakeholder Process

- Existing stakeholder groups previously created for other purposes such as compliance with FERC Order 890 will be used to facilitate stakeholder input
- Ensure a regional focus:
  - Present roll-up models and results
  - Receive stakeholder feedback, input, comments and suggestions on specific scenarios to be studied
  - Present the results of scenario studies
  - Seek stakeholder feedback on reports that are created

## EIPC 2016 Study

- Webinar conducted November 17, 2015
- Presented 2025 Summer Peak and 2025 Winter Peak Roll-up cases development
- Presented sample scenarios options to stakeholders for 2016 study

# 2025 Summer/Winter Peak Roll-up Cases

## Transmission Gap Analysis

- Consistent with NERC TPL Standards
  - No transmission elements loaded beyond capacity
  - No voltages above or below PCs planning criteria
- Contingencies
  - N-0 contingency: All facilities in-service
  - N-1 contingency: Event resulting in loss of a single element (230kV and above + selected 161kV, all transformers with high side of 230kV and above)

# 2025 Summer/Winter Peak Roll-up Cases Transmission Gap Analysis

- Numerous high and low voltage issues were identified for N-0 contingency and N-1 contingency cases
- Conceptual solutions identified and under review

# 2025 Summer/Winter Roll-up Cases

## Linear Transfer Analysis

- Analyzed 5,000 MW transfers between selected areas
  - Additional cases with high base transfers from/to NPCC
- Monitored 100kV and above
  - N-0 branch overloads
  - N-1 branch overloads (including NYISO specific regional contingencies)
- Conceptual solutions provided by PCs

# 2025 Summer/Winter Roll-up Cases

## Linear Transfer Analysis

- Currently planned transmission is capable of transferring power between areas
  - NPCC/MISO and NPCC/PJM exceptions
- Incremental transfer capabilities ranged from 335 MW to over 5,000 MW
- Limits should be further analyzed and validated by limiting PCs

## EIPC Study Stakeholder Input

- Principles and Guidelines for Scenarios document posted on EIPC website
- Describes the types of scenarios to be analyzed in the 2016 study
- Provides a sample format for providing ideas on possible scenarios to be studied

## EIPC Study Stakeholder Input

- All scenarios will be run as changes to the Roll-up cases
- Scenarios should not duplicate other local/regional planning efforts or transmission requests subject to analysis under the OATT provisions of any party
- Provides a sample format for providing ideas on possible scenarios to be studied
- EIPC to select up to 3 scenarios per biennial cycle



# Schedule for Stakeholder Input

15	EIPC Webinar on Status of Roll-up Case Development and Possible Scenarios for 2016	November 17, 2015 11:00am Eastern start	
16	Post Draft Roll-up Report	December 11, 2015	
17	<b>Regional Meetings:</b>	December - February	
	a. Present 2025S and 2025W roll-up base cases		
	a. Present results of roll-up case contingency and transfer testing		
	a. Additional discussion on possible scenarios		
	a. Stakeholder feedback on possible scenarios and which scenarios to select		
18	Stakeholder Written Input on Possible Scenarios <b>and the Draft Roll-up Report</b> Due	January 29, 2016	
19	EIPC Webinar to discuss stakeholder feedback on scenario options and prioritize scenarios to be studied in 2016	February 26, 2016	
20	Stakeholder final comments on the scenarios due to regional process or to EIPC@tva.gov	March 2, 2016	
21	EIPC Consideration of comments on scenario selection and final determination of scenarios	March, 2016	
22	Final scenario descriptions & 2016 Schedule posted	March 21, 2016	
23	SSMLFWG Begins Work on Scenarios	March 31, 2016	

**Questions?**

**Contact Phil Kleckley**

**[pkleckley@scana.com](mailto:pkleckley@scana.com)**

## Next SCRTP Meeting

- Stakeholder Group will select up to 5 Economic Power Transfer Sensitivities for study
- Review of near-term Major Transmission Expansion Plans
- Assessment and Planning Study Update
- EIPC Update
- SCRTP Email Distribution List will be notified
- Register online

# South Carolina Regional Transmission Planning

## Stakeholder Meeting

Hilton Garden Inn Charleston Airport

North Charleston, SC

December 09, 2015