Request for CMR
Qualification Submittals

NCSU Electrical Distribution Upgrade Project

NC STATE UNIVERSITY

North Carolina State University

State Construction ID 19-21163

Code: 41924

Item: 303

NCSU Project No. 201920030

Facility ID 199Z

North Carolina State University
Electrical Distribution Upgrade

Construction Manager at Risk
Project Summary

2/25/20

Project Description
This project will install a new underground 15 kV medium voltage distribution system. Six new feeder loops, twelve circuits, will replace the existing electrical distribution system serving NC State's main campus in its entirety. New construction will include metal clad switchgear feeder breaker up fit, distribution feeder ductbank & manhole, cable, pad mounted switchgear and SCADA control scope. Project involves significant underground utilities, civil/sitework and transportation (vehicle and pedestrian) coordination.

Project Funding
The total project budget of $58,800,000 includes design, construction and associated construction costs.

Project Scope
The University seeks the professional services of a Construction Manager at Risk (CMR) to join the team in the advanced planning design phase to provide services for the project through design, construction and post acceptance.

Project Schedule
Designer Selection Complete – April 2020
CMR Selection Complete – May 2020
Design Start – June 2020
Early packages

- Equipment Pre-purchase
- Early site package
- Early SCADA design build package.

Design Complete – April 2021
Construction Complete – October 2024

Critical Selection Factors

Interested firms can participate in the process by submitting a proposal that addresses all the information requested by the Qualifications Questionnaire for CM at Risk. The Questionnaire will be available on March 2nd through the Project Manager or at the website: http://www.ncsu.edu/facilities/advertisements/index.htm . Please note that two (2) copies of the proposal are required; the length of the proposal should be limited to 20 pages both sides. This limitation does not include the Cover Sheet, Tabs or Financial Statements. Firms are requested to assure receipt of proposals at address listed below by **3:00 PM on March 27th.**

Critical selection factors include the following:

1. Workload that is fully able to accommodate the timely execution of this project. List projects for which the company is currently committed including name and location of each project, time frame to complete, and dollar volume of each project.
2. Record of successfully completed projects of similar scope without major legal or technical problems. List three projects of similar size, scope and complexity, including details on the scope of preconstruction and construction phase services.
   Provide annual workload for each of the last five years; number of projects and total dollar value. Provide complete information regarding past litigations and claims.
3. Record of Financial viability. Attach latest balance sheet and income statement if available, based on company type. Audited statements preferred. If not available, attach a copy of the latest annual renewal submission to the relevant licensing board. Indicate Dunn and Bradstreet rating if one exists. Attach letter from Surety Company or its agent licensed to do business in North Carolina verifying proposer's capability of providing adequate performance and payment bonds for this project.
4. Previous experiences with the Owner, a good working relationship with Owner representatives, have completed projects in a timely manner and have performed an acceptable quality of work. For the three projects requested in item 2 above, provide owner references including contact information for the project owner representative. Additionally, list all construction projects performed by the proposer for agencies and institutions of the State of North Carolina during the past 10 years.
5. Key personnel that have appropriate experience and qualifications. Attach sworn statement that key personnel will be exclusively assigned to this project for its duration. For each person, detail what aspects of pre-construction or construction the person will handle, as well as his experience in the firm, other prior and relevant experience with projects of similar size and scope, and there person's location. Include resumes and references for each individual.

6. Relevant and easily understood graphic or tabular presentations.
7. Completion of CM at Risk projects in which there was little differences between the GMP and final cost. For the three projects requested in item 2 above, list the GMP and the total cost of the project at completion.
8. Projects that were completed on or ahead of schedule. For the three projects requested in item 2 above, compare the number of days in the original schedule with the number of days taken for actual completion.
9. Construction administration capabilities.
10. Proximity to and familiarity with the area where the project is located and the dynamics of the local market.
11. Approach to design phase services, including constructability reviews and cost estimating. Appropriate level of commitment to each phase of service, staffed with appropriate personnel. Provide a brief description of how the project will be organized and managed and how the services will be performed in both pre-construction and construction phases. Project planning that offers the same project manager for pre-construction and construction phases will be given preference. Include information regarding value engineering, constructability issues, cost modeling and estimate, project tracking and reporting, reques for information and shop drawings, quality control, schedule and staffing plan.
12. Quality of compliance plan for minority business participation as required by G.S.143-128.2. History of successful implementation of similar HUB efforts. Describe the program that your company has developed to encourage participation by minority and other HUB firms to meet or exceed the goals set by the statute. Attach a copy of that plan to the proposal. Provide documentation of the minority and other HUB participation that you have achieved over the past two years on both public and private construction projects. Outline specific efforts that your company takes to notify minority and other HUB firms of opportunities for participation. Indicate the minority participation goal that you expect to achieve on this project.
13. Other factors that may be appropriate for the project.
14. Proximity to and familiarity with NCSU campus.

CMR Selection Process
Following the receipt of proposals, a University Interview Committee, appointed by the Secretary to the University Board of Trustees' Building and Property Committee, will shortlist three (3) firms, interview and make a recommendation of selection to the University Board of Trustees' Buildings and Property Committee. The selected firm will contract with the State of North Carolina through the University and coordinate services with Capital Project Management.

CMR Contract
The contract will be negotiated with the CMR in two parts. Part one of the contract is pre-construction services.
The second part of the contract is for bidding, construction, and close-out services.

CMR Pre-Proposal Meeting
A Pre-Proposal Meeting will be held **March 13th at 2:00 p.m.** in room 124A/B of the Admin III Building at 2701 Sullivan Drive on the NC State University campus. Obtain parking permits from NCSU Transportation, located in Administrative Services I, at 2721 Sullivan Drive.

In order to offer Construction Manager at Risk services in the response to this solicitation, the proposer must be licensed as a general contractor in the state of North Carolina.

Questions/Proposal Submittal
In order that the selection process be as objective as possible, do not contact members of the Board of Trustees, or any university officials other than the project manager. All questions and project submittals are to be directed to:

Damian Lallathin, Project Manager
NC State University, Capital Project Management
Box 7520, 2701 Sullivan Drive
Raleigh, North Carolina 27695-7520
Phone 919-513-0373
dllallat@ncsu.edu

RFP DATA SHEET	
Item	**Datum**
Short Description of Project	This project will install a new underground 15 kV medium voltage distribution system. Six new feeder loops, twelve circuits, will replace the existing electrical distribution system serving NC State's main campus in its entirety. New construction will include metal clad switchgear feeder breaker up fit, distribution feeder ductbank & manhole, cable, pad mounted switchgear and SCADA control scope. Project involves significant underground utilities, civil/sitework and transportation (vehicle and pedestrian) coordination.
Issuing Office	Capital Project Management
Department, Agency/Institution, Location where the Project will be constructed	NC State University, North & Central Campus Precincts.
Project Overview	Designer Selection Complete – April 2020 CMR Selection Complete – May 2020 Design Start – June 2020 Early packages ● Equipment Pre-purchase ● Early site package ● Early SCADA design build package. Design Complete – April 2021 Construction Complete – October 2024
Website address (URL) for posting of notices regarding this project	https://facilities.ofa.ncsu.edu/category/ads/
Expected Date of Completion of Design	April 2021
Project Designer & Consultants	TBD
Construction Manager at Risk Selection Schedule	Advertisement – 3/1/20 Pre-Submittal Meeting – 3/13/20 Submittal Due Date – 3/27/20 Shortlist – 4/10/20 Pre-Interview Meeting – 4/15/20 Interviews – 5/5/20
Construction Management Fee (Section II Paragraph E.2)	The Construction Management Fee will be a fixed number based on a percentage of the Cost of Work.

Project Construction Cost	Total Project Budget: $58,800,000 Less: Owner Pre-Construction Costs Owner Design/Consultant Costs • Designer • CMR • Special Inspections/Geotech/CMT • Subsurface Utility Engineering • Survey • Commissioning Owner Associated Construction Costs • OFCI Equipment • Telecommunications • Misc Work Orders • Transportation displaced parking Owner's Contingencies

APPENDIX

BASIS OF DESIGN INFORMATION

System Overview:

Existing Substation Defined

NC State's North & Central campus precincts receive electrical power from Duke Energy Progress (DEP) at the 115kV – 12.47kV Sullivan Substation located on Central campus and is owned and operated by the University. Two overhead transmission service taps enter the substation from the existing DEP 115kV transmission line between Method and Raleigh substations. Sectionalizing of the DEP transmission system is configured such that service can be maintained to the University from either DEP substation point of delivery in the event of a failure and or scheduled maintenance outage.

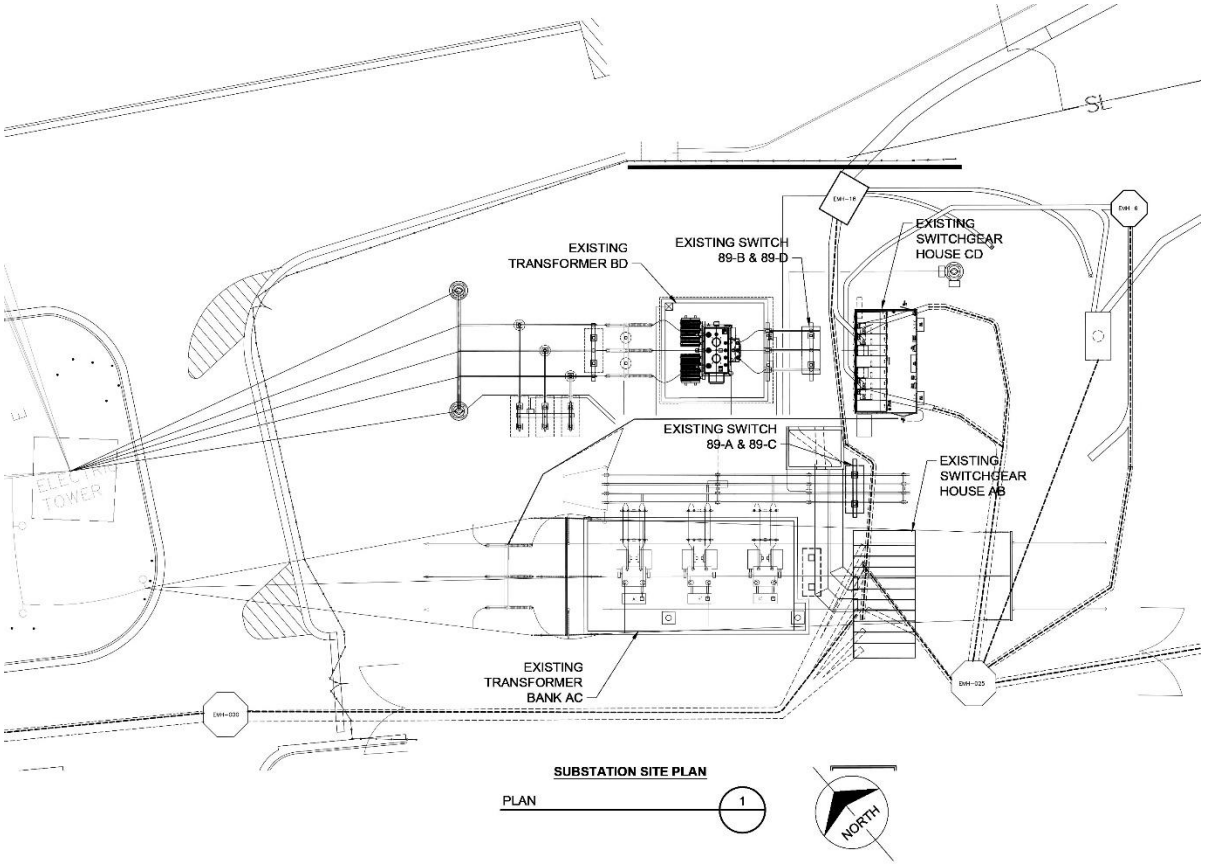
Within the substation two delta-wye ground transformer banks are installed and connected to the Duke Energy Progress 115kV transmission system via separate circuit switchers. Transformer bank 1 was installed when the Sullivan Substation was originally constructed and consists of three 10/13/16MVA 115 – 7.2kV single phase units connected with delta primary and wye ground secondary. Transformer bank 2 consists of a single three phase unit rated 30/40/50MVA 115 – 12.47Y/7.2kV with delta primary and wye ground secondary. Transformer bank 2 is equipped with an auto load tap changer (LTC) to maintain auto voltage control while transformer bank 2 is managed with a manual LTC. Each transformer bank is

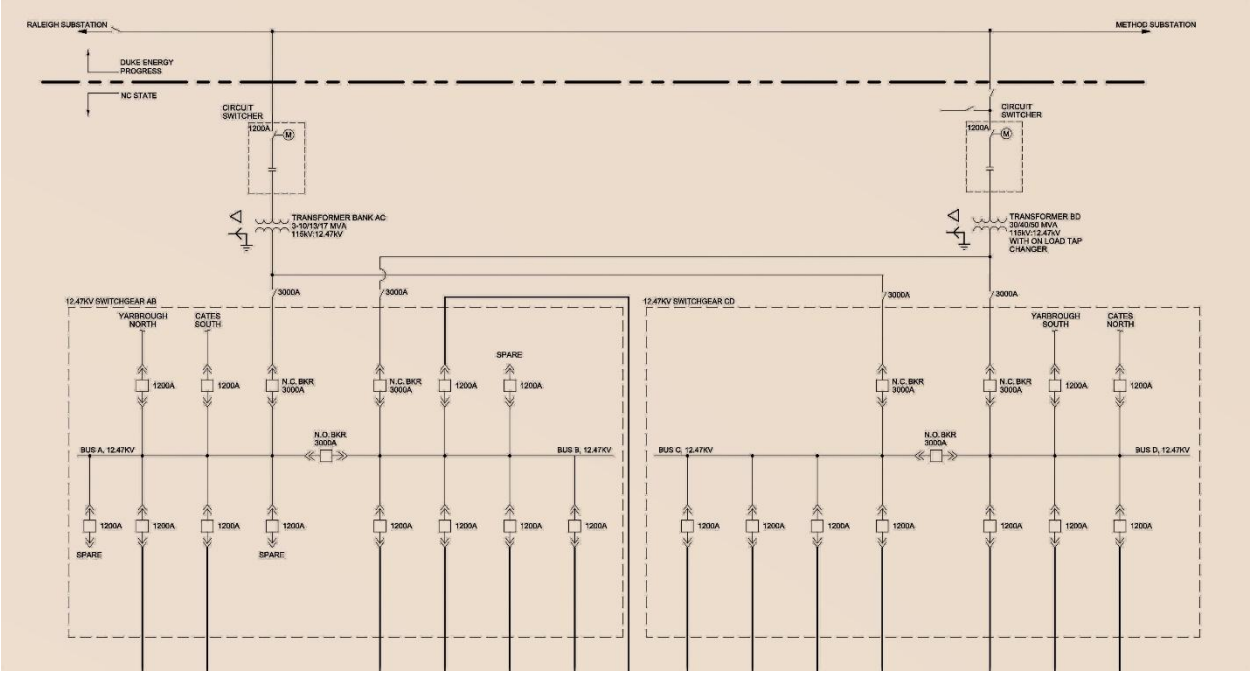
interconnected to two 15 kV arc resistant metal clad switchgear with a main tie main bus arrangement. To maximize reliability and facilitate maintenance activities without impact or outages to Campus a double circuit breaker scheme is used to serve the distribution system. The double breaker-double bus configuration in this application consists of two main buses per switchgear, each normally energized. Two circuit breakers exist for each circuit. Each circuit is configured as a primary loop with an open point at the midpoint. Each ½ of the loop is served from both SWGR maximizing flexibility and reliability.

The current operating configuration is set up that transformer bank 2 is primary and transformer bank 1 is on standby. The substation SCADA system provides remote operation and monitoring of the metal clad switchgear main, tie and feeder breakers as well as automated bus transfer and overcurrent lockout to automatically restore loop power in the event of loss of one substation source. In the future it is planned to replace transformer bank 1 with a matching 30/40/50MVA 115 – 12.47Y/7.2kV transformer with auto LTC and operate the two transformations sources in parallel, thus the matching metal clad SWGR. Until replacement each SWGR tie operates closed forming bus A/B & C/D.

The main advantages of this scheme include:

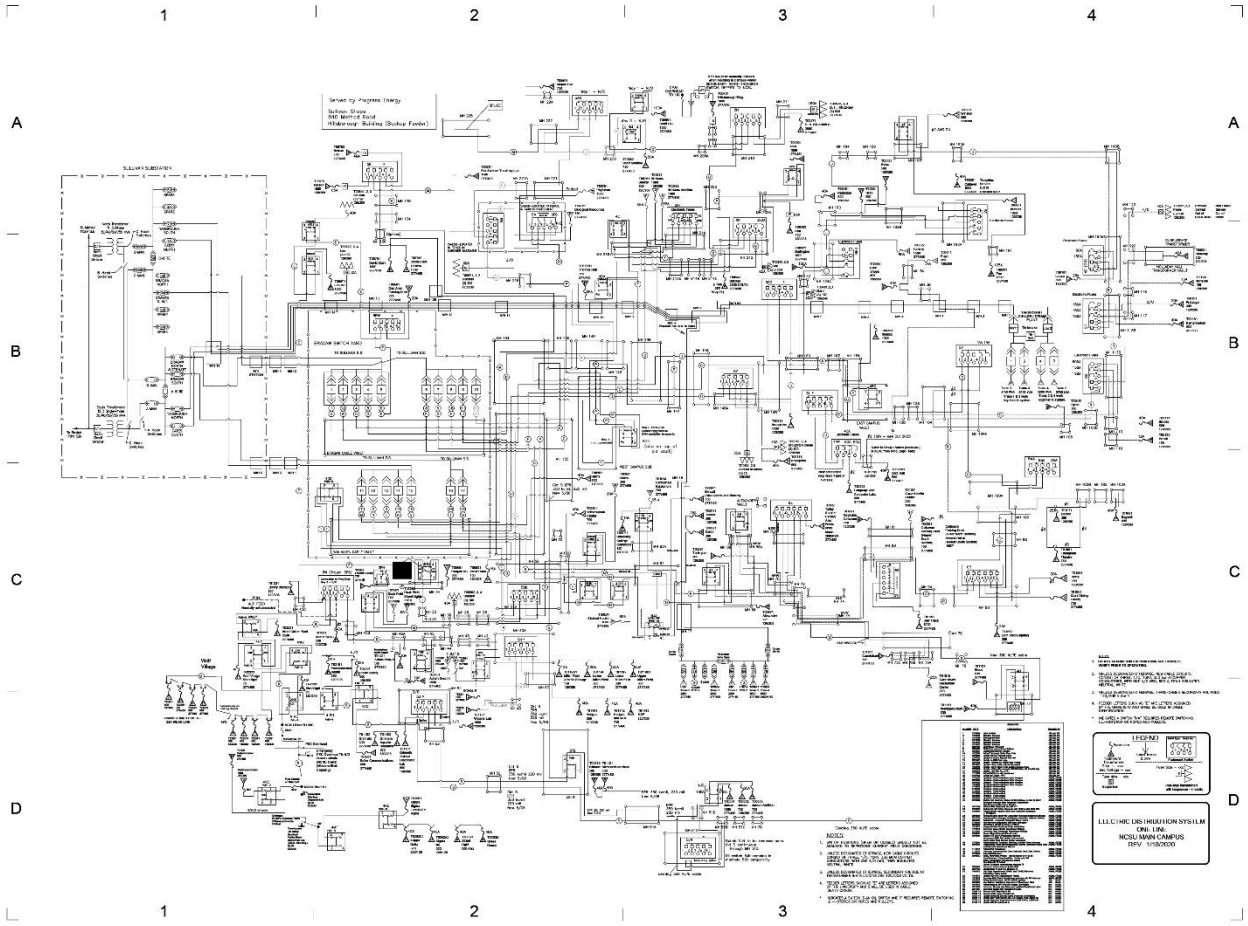
- Flexible operation,
- Very high reliability,
- Isolation of either main bus for maintenance without disrupting service,
- Isolation of any circuit breaker for maintenance without disrupting service,
- Double feed to each circuit,
- No interruption of service to any circuits from bus fault,
- Loss of only one circuit for breaker failure, and
- All switching with circuit breakers.


EXISTING TRANSFORMER BD
EXISTING SWITCH 89-B & 89-D
EXISTING SWITCHGEAR HOUSE CD
EXISTING SWITCH 89-A & 89-C
EXISTING SWITCHGEAR HOUSE AB
EXISTING TRANSFORMER BANK AC
ELECTRIC TOWER
EXH-030
EXH-025
SUBSTATION SITE PLAN
PLAN 1
NORTH


RALEIGH SUBSTATION
METHOD SUBSTATION
DUKE ENERGY PROGRESS
NC STATE
CIRCUIT SWITCHER
1200A
TRANSFORMER BANK AC
9-10/13/17 MVA
115KV:12.47KV
TRANSFORMER BD
30/40/50 MVA
115KV:12.47KV
WITH ON LOAD TAP CHANGER
12.47KV SWITCHGEAR AB
12.47KV SWITCHGEAR CD
3000A
YARDROUGH NORTH
CATES SOUTH
YARDROUGH SOUTH
CATES NORTH
SPARE
N.C. BKR 3000A
N.O. BKR 3000A
BUS A, 12.47KV
BUS B, 12.47KV
BUS C, 12.47KV
BUS D, 12.47KV

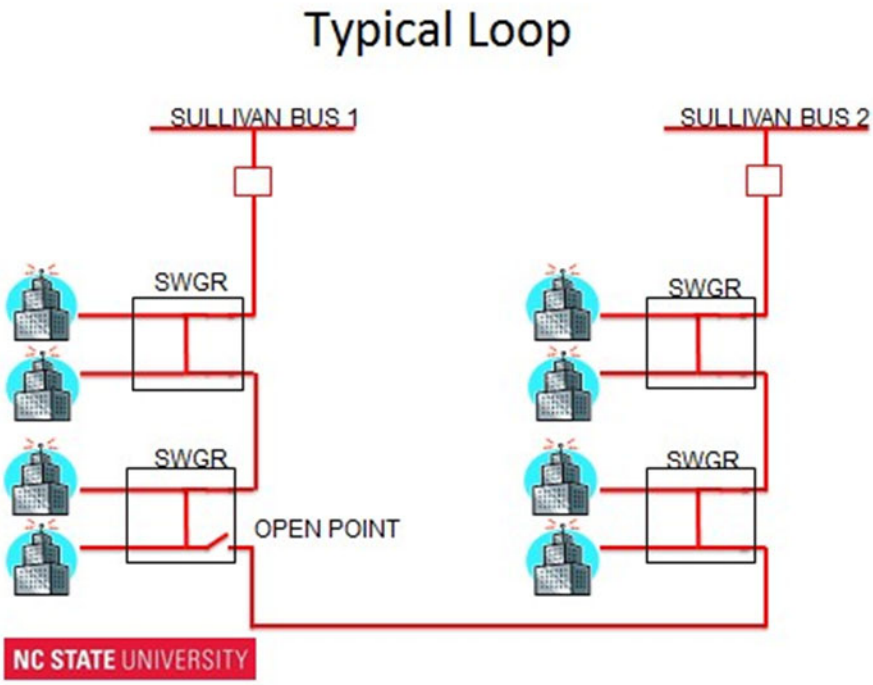
Existing Distribution System Defined

The North & Central Campus distribution is a 12,470Y/7200V 3-phase 4-wire multipoint grounded wye system. Seventeen distribution feeders currently provide power through underground concrete encased duct banks to serve building loads and 4 express feeders serve two steam & chilled water central utility plants. The existing NCSU system configuration serving the building load is a nested loop system. Distribution switches are fed downstream radially from other distribution switches and form loops that are downstream from other loops. Due to existing conditions sectionalizing for maintenance and or failure isolation is difficult to attain without disruption to many buildings. Some distribution switches in the existing nested loop configuration do not have ties to other power sources, which makes sectionalizing loads not an option. This is not an effective or reliable solution. Many feeder cables are installed in common ductbanks such that failure of one feeder cable could result in the failure of other cables serving unrelated equipment resulting in extended outages to major portions of the Campus. The age and condition of many switches, both in manholes and above grade, indicate the switches have exceeded their useful life and should be replaced. Many ductbanks were installed over 40 years ago and are not deemed reliable for reuse. These ductbanks feature fiber type conduit that tends to collapse with age rendering it unusable to remove old cable or install new cable.



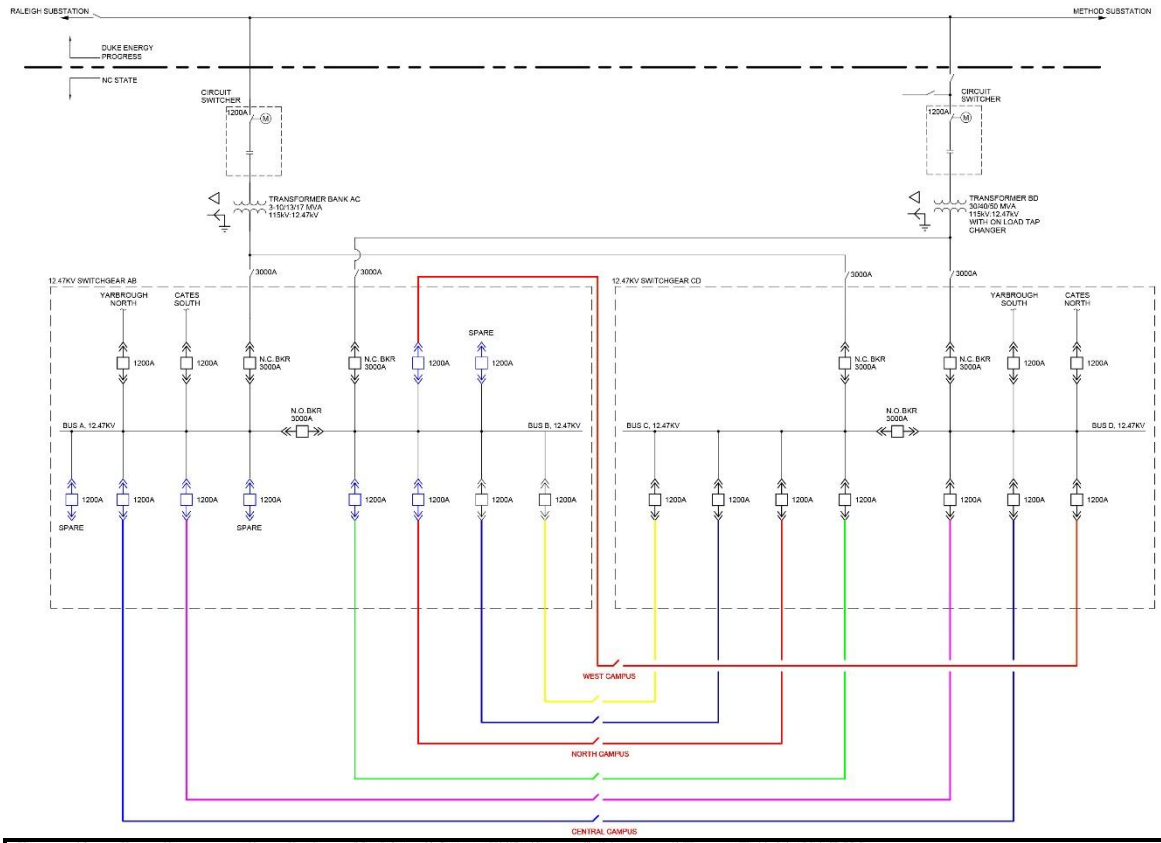
New Distribution System Basis of Design:

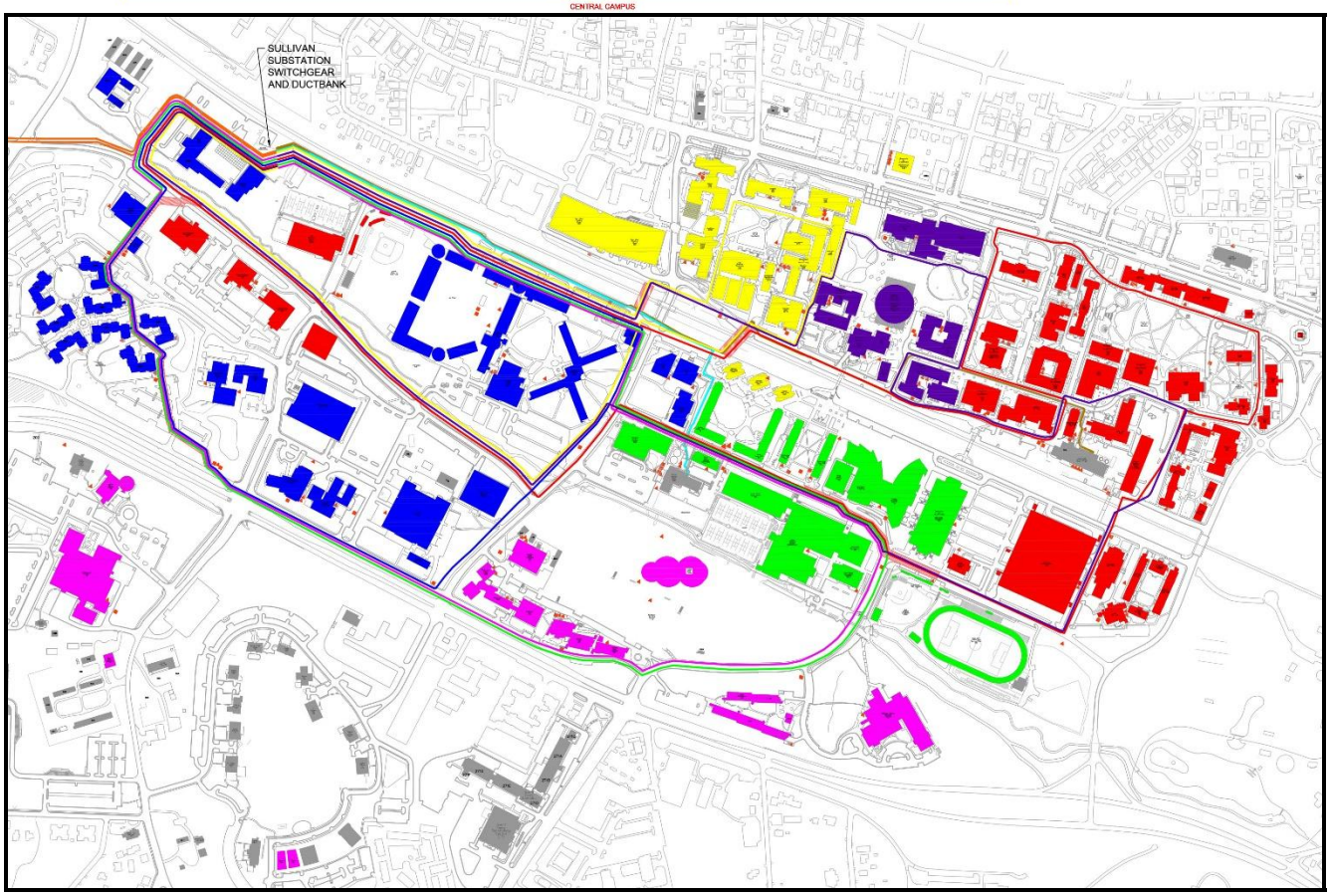
A mainline loop configuration includes distribution switches that form one loop via loop feeders and tie back to the substation. Radial load feeders from each of these switches serve the loads. This mainline loop configuration is crucial to effectively sectionalize loads and resume power in case of a feeder failure.



New Distribution System Scope of Work:

The new substation feeder configuration will maintain the two express feeders to both the Cates and Yarbrough Central Utility Plants. The existing Bragaw Switchgear will be eliminated. Campus building distribution configuration will feature loop with normal open point with load normally, evenly split between loop sections. Nested sub-loops will be eliminated. The new North and Central Campus feeder loops will originate from feeder breakers at the Sullivan Substation and route to their respective campus loads in concrete encased ductbanks. The North Campus will feature three feeder loops originating from six feeder breakers at the substation. The Central Campus will feature three feeder loops originating from six feeder breakers at the substation.


RALEIGH SUBSTATION
METHOD SUBSTATION
DUKE ENERGY PROGRESS
NC STATE
CIRCUIT SWITCHER
1200A
TRANSFORMER BANK AC
3-10/13/17 MVA
115kV-12.47kV
TRANSFORMER BD
30/40/50 MVA
115kV-12.47kV
WITH ON LOAD TAP CHANGER
3000A
12.47KV SWITCHGEAR AB
12.47KV SWITCHGEAR CD
YARBROUGH NORTH
CATES SOUTH
YARBROUGH SOUTH
CATES NORTH
SPARE
N.C. BKR 3000A
N.O. BKR 3000A
BUS A, 12.47KV
BUS B, 12.47KV
BUS C, 12.47KV
BUS D, 12.47KV
WEST CAMPUS
NORTH CAMPUS
CENTRAL CAMPUS


SULLIVAN SUBSTATION SWITCHGEAR AND DUCTBANK

Distribution System SCADA

Distribution automation will consist of remote supervisory switch motor operators for mainline switch operation and switch position indication. Tap ways will be equipped with fault indicators with remote contact monitoring. Mainline ways will utilize PT's and CT's installed on each phase of each way to facilitate remote fault location and aid in sectionalizing for faulted circuits. An SEL 451 Protection, Automation and Control System relay will be provided in each pad mounted switchgear with inputs and outputs wired to support remote monitoring and control. All 451's will communicate with the campus RTAC to coordinate self-healing in the event of a fault.

Mainline feeder faults will be cleared by the feeder breaker at the substation switchgear. This will result in an outage to all customers connected to the faulted half of the feeder loop. The 451's at each switch will communicate to the RTAC if they experienced the fault passing through their switch. The RTAC will then instruct the switches to operate, isolating the fault and enabling the restoration in a matter of seconds.

Sequence of Events:

- Main line fault occurs
- Substation breaker clears fault
- Switches report status to the RTAC so that fault location can be identified.
- RTAC IDs fault and open both switch ways on faulted circuit.
- N.O. switch from opposite feeder closes to re-energize all circuits except faulted circuit.
- Open feeder breaker closes back-in.
- Personnel clear fault. System is placed back in normal operating scenario.