

# Project Plan

Derek Elkins, Patrick Musoy, Mackenzie Ray,  
Nathan Tegeler, Matthew Wells

Client: Burns and McDonnell  
Advisor: Hugo Villegas  
Team: SDDec-24-02





# What is a substation?

A substation acts as a middleman in the electricity supply chain.

It takes voltage from one level to another.

- Step up - low to high
- Step down - high to low

A Bus is system of uninsulated conductors that carry electricity from one point to another



# Project Overview-Ames Substation

- Our main goal is to tap in a 69kV, 2 MW solar farm into an existing substation
- This station already has 3 input lines, the solar farm would make four
- Each lines requires a different pilot/relaying (communication of system) scheme based on its specific needs and standards
- Must design a bus configuration system that will implement the new line with a high level of reliability and a relatively low level of complexity to make both designing and maintenance easier
- End goal is to have a dynamic simulation with an event analysis report



# Project Management

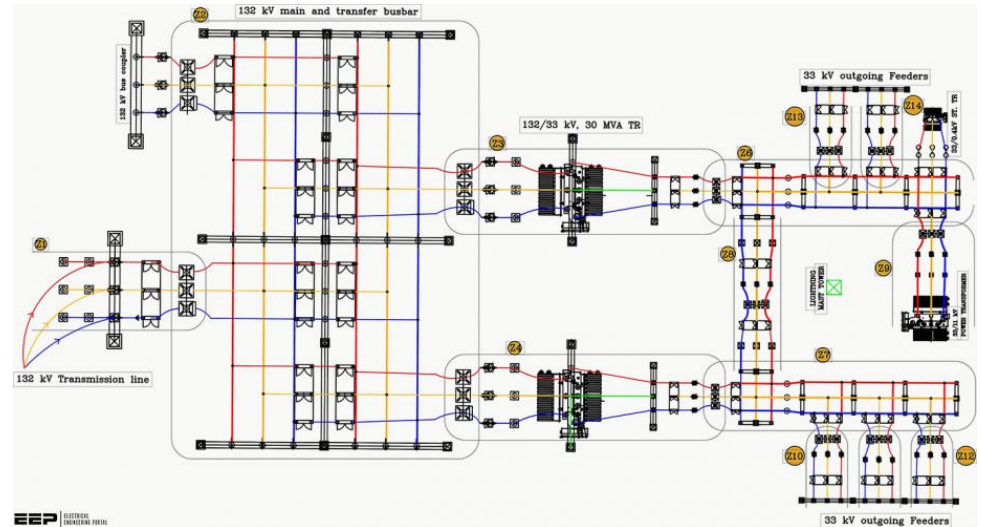
Our project management style closely resembles agile

- Still figuring out what our final deliverables are going to be
  - Due to new deliverables we need to adjust our timeline frequently
- Many of us have not worked in AutoCad
  - may take more time to finish things than we anticipated
- Each subteam relies on the other
  - May have to wait for the relaying team to complete research before CAD for one line can begin



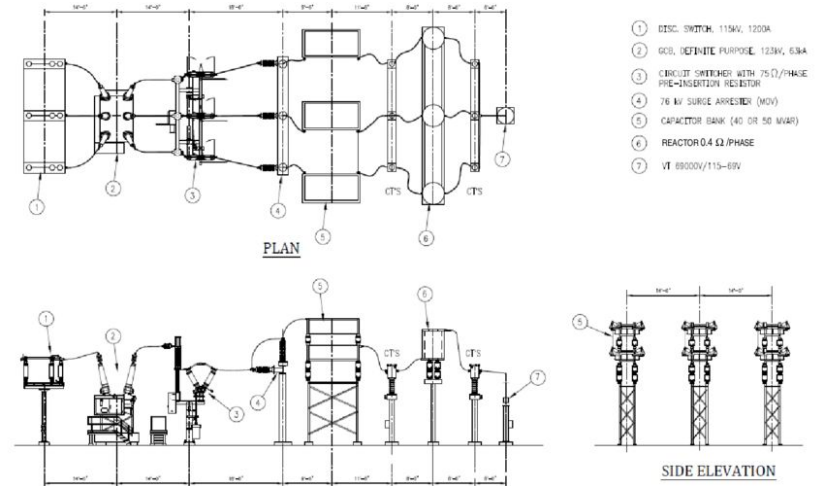
# Task Decomposition (this semester)

- Choose bus configurations
  - Design report
- Choose relaying schemes
  - Design report
- I/O assignments
- Site Layout
- Overview
- Elevation Plans
  - IEEE specifications given by voltage of lines



# Key Milestones, Metrics, and Evaluation Criteria

- Finalized Designs
  - 03-22-2024
  - Chosen bus configurations and relaying schemes and finished design documents
- I/O Assignment
  - 04-23-2024
  - Detail out I/O assignments for relaying schemes
- Site Layout
  - 04-23-2024
  - Drawing showing layout of site with dimensions and specifics with IEEE specifications
- Elevation Plan
  - 04-23-2024
  - Specific elevations of equipment and lines/bus, also follows IEEE specifications





# Key Risks and Mitigation Techniques

- It is possible to delete the files we are working on
  - To mitigate this we will make sure to either make a copy or backup every file
- Rating Electrical Components
  - Choose components that are rated appropriately for their normal operating conditions
- Choose the wrong relay and have to start over
  - To mitigate this we will triple check relay specifications to ensure the ones we chose will work with our substation.
- Miss labeled I/O
  - Have peer reviews to check connections between drawings.
- Miscalculations
  - We will mitigate it by double checking calculations and having peer reviews



# Conclusion

- For developing our substation design we will use the agile project management style to update and revise our documentation.
- We will have a large amount of peer review to review our documents and ensure accuracy
- We will continue to communicate with client to make sure deliverables are completed at the level of quality desired and in a timely manner.