

# 2023-2024 FFA/GEMC Speech/Demonstration Topic

## **PROBLEM:**

The contestant will be expected to thoroughly explain the calculations and installation of a Pole Mounted Main Farm Service. This installation will consist of a Self-Contained Pole Mounted Meter with a pole-mounted 200-amp Main Breaker Load Center serving as the site disconnect. Power will be supplied to the following locations. A farm residence located 120 feet from the Pole, a farm shop located 110 feet from the pole, and a beef show barn located 85 feet from the pole. Voltage drop should not exceed 3%. All connections and calculations will be made in accordance with the National Electric Code and Agriculture Wiring Handbook.

## **Load Calculations:**

Determine diversified demand in accordance with Section 20 of the Agriculture Wiring Handbook. The loads used to calculate demand for size service equipment and over current protection are:

Residence	–	90 amps, 240V
Farm Shop	–	45 amps, 240V
Beef Barn	–	25 amps, 240V

## **Materials List:**

The following list of materials will either be attached to the demo frame or laid out for the contestants to use as they explain the installation of the circuits.

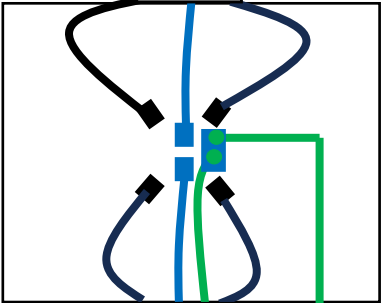
- 1 - 200 Amp Meter Base
- 1 - Eaton Type BR 200-Amp 8 Spaces Main Breaker Load Center
- 1 - #6 Soft Drawn Bare Copper Conductor installed
- 2 - 5/8" Grounding Rod attached to display board
- 2 - 5/8" Grounding Clamps
- 1 - 100 Amp Double Pole Breaker
- 1 - 50 Amp Double Pole Breaker
- 1 - 30 Amp Double Pole Breaker
- 6 - 4/0 AL Type USE-2 or RHH or RHW-2 Cable Service Entrance Cable
- 1 - #2 AL Type USE-2 or RHH or RHW-2 Multiwire Cable Serving Residence
- 1 - # 6 CU UF Multiwire Cable Serving Farm Shop
- 1 - # 10 CU UF Multiwire Cable Serving Livestock Barn
- 1 - 2 1/2" Service Entrance Cap
- 3 - 2 1/2" Ridge PVC Schedule 40 Conduit (Length Varies)
- 4 - 2 1/2" Male Conduit Fitting
- 2 - 2 1/2" Rain Tight Hub (One for Meter Base, One for Load Center)

## **References:**

2023 National Electrical Code  
Agricultural Wiring Handbook, 17<sup>th</sup> Edition  
Poster Display Board

2 1/2" Schedule 40 PVC Conduit

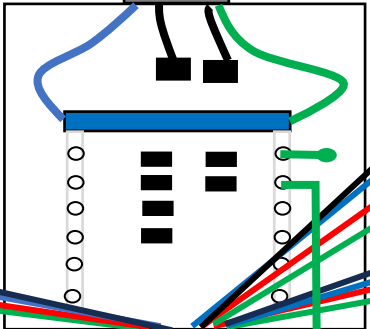
4/0 AL USE-2/RHH



The grounding conductor, grounded conductor, and meter base enclosure are bonded.

The meter base grounding conductor is bonded to an assumed driven ground

2 1/2" Schedule 40 PVC Conduit less than 24"



#2-2-2-4 AL USE RHH/RHW-2 cable to Farm Residence 120ft From Pole  
Cable Area = .944 in<sup>2</sup>

2 1/2" Schedule 40 PVC Conduit

#10/3 w Ground Copper UF cable to Ag Shop 85 ft From Pole  
Cable Dimension .727" Width x .215" Thickness = Cable Area .1563in<sup>2</sup>

#6/3 w Ground Stranded Copper UF cable to Ag Shop 110 ft From Pole  
Cable Dimension 1.223" Width x .361" Thickness = Cable Area .4415 in<sup>2</sup>

