

# Demo: Progression of Work

115kV/34.5kV Solar Power Plant and Substation Design

# Work Completed

## **60 MW Solar Plant**





- Part Selection
- Array Parameters
- Voltage Drop Calculations
- Solar Farm Layout - CAD
- Wiring
- Racking
- Cost Estimate

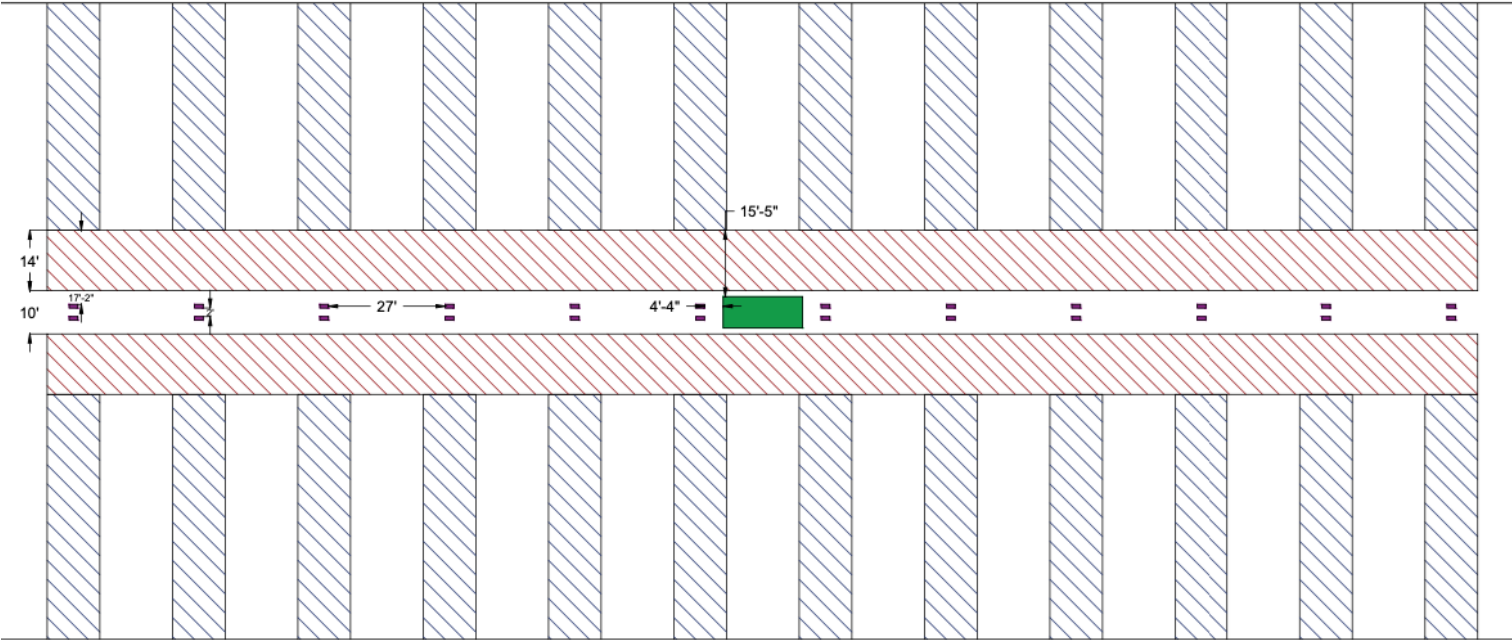
## **115kV/34.5kV Substation**

- One Line
- Three Line
- Key Plan
- Conduit Plan
- Trench Plan
- Grounding Grid
- DC Battery Calculations
- Lightning Protection
- Bus Calculations
- AC Load Calculations
- Cost Estimate
- ETAP Simulation Studies

# Solar Farm Equipment Layout - V1

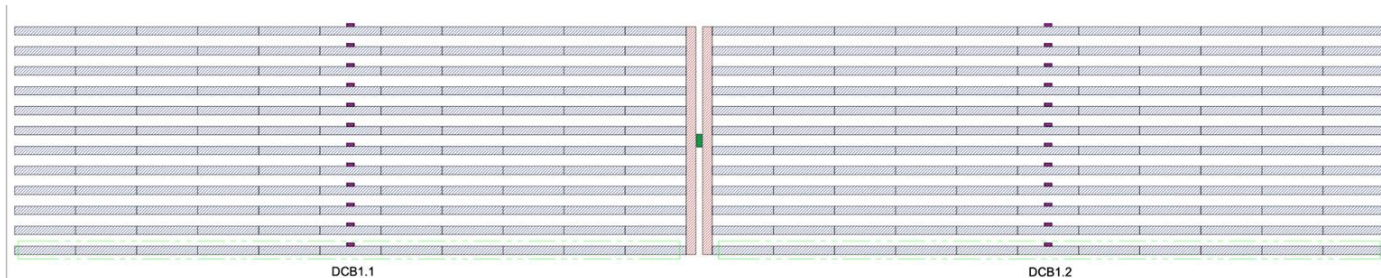
Voltage Drop with Original Design = 10%

-  SOLAR MODULE
-  ACCESS PATHWAY
-  DC/JAC INVERTER
-  COMBINER BOX



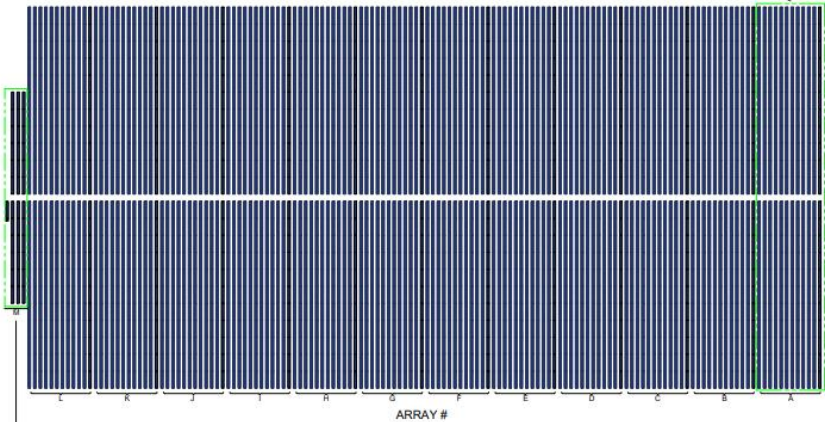
# Why We Made Changes to Solar Design - Voltage Drop

- Max Allowable Voltage Drop = 5%
- With old design the jumper length was causing the high voltage drop
- Decreased the jumper length by moving the combiner boxes in the center of the rows
  - Primary initial concern with the movement was maintenance but the spacing between rows is large enough to comfortably fit a maintenance vehicle
- Lower voltage drop along feeder due to increased wire size
- Final Voltage Drop = 4.05%

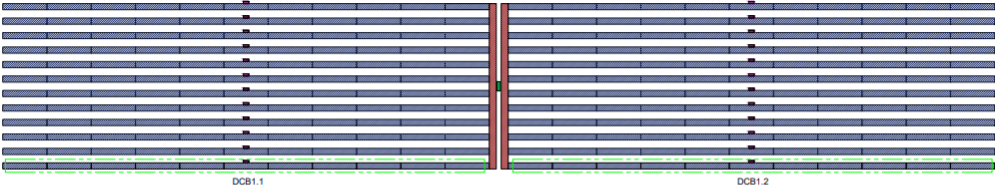


# Solar Farm Final Version

ARRAY (A - L) DIMENSIONS (TYP) 1 PV-3

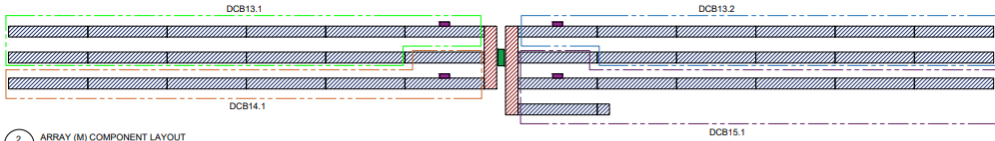


2 PV-3 ARRAY (M) DIMENSIONS



1 PV-4 ARRAY (A) COMPONENT LAYOUT (TYPICAL)  
NOT TO SCALE

NOTE 1: ELECTRICAL DETAIL FOR ARRAY (A) IS SHOWN IN E-1 & E-2. EACH COMBINER BOX IS LABELED DCBX.X



2 PV-4 ARRAY (M) COMPONENT LAYOUT  
NOT TO SCALE

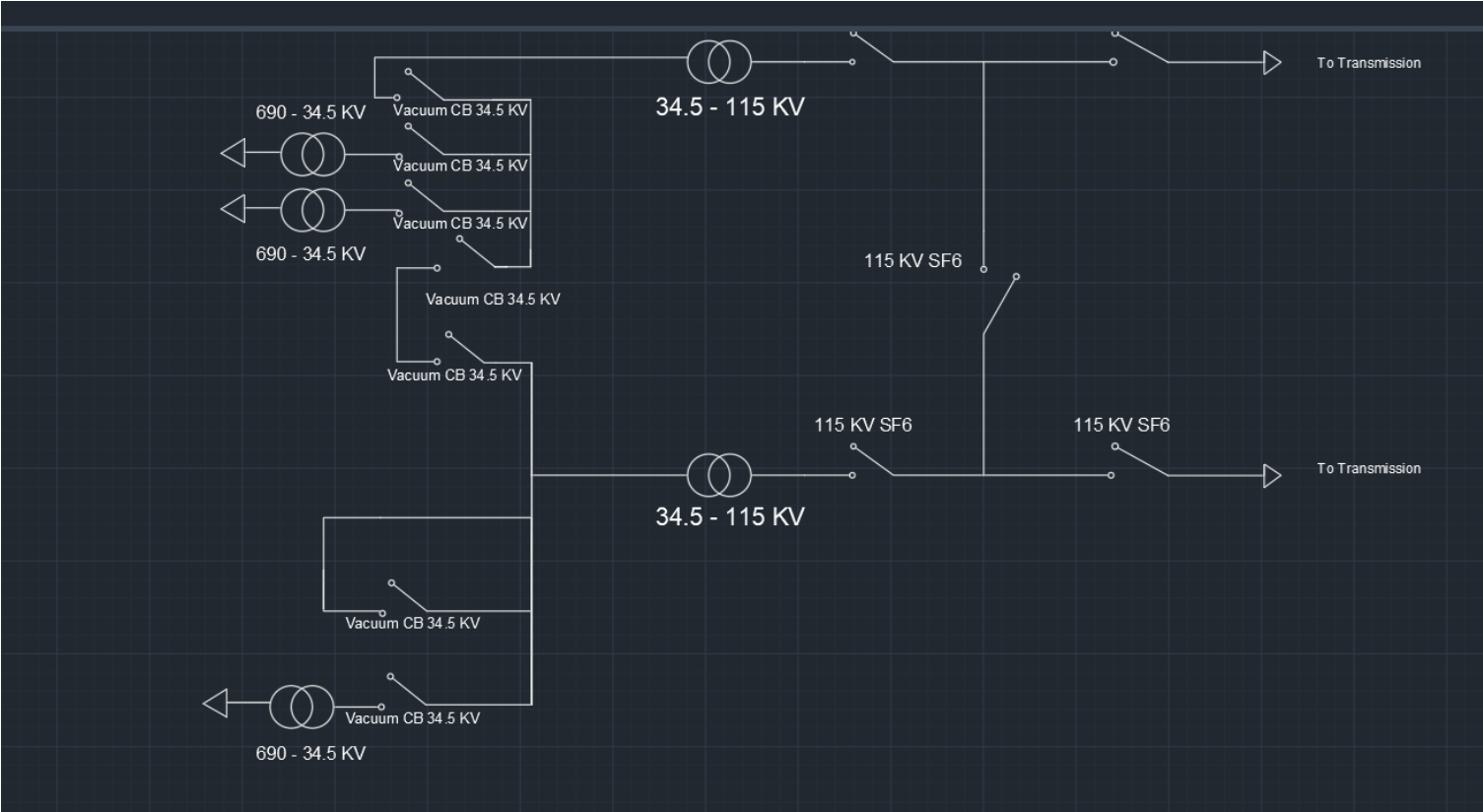
NOTE 2: ELECTRICAL DETAIL FOR ARRAY (M) IS SHOWN IN E-3. EACH COMBINER BOX IS LABELED DCBX.X

NOTE 3: CAB SYSTEM IS NOT SHOWN. REFER TO PAGE PV-2 FOR DETAILS.

- SOLAR MODULE
- ACCESS PATHWAY
- DC/AC INVERTER
- COMBINER BOX



# Substation One Line V1 – Sectionalized Bus



# Substation One Line Final

