









LEGEND

| | | | |
|---|--------------------------------|---|------------------------|
|  | METER PROVISION & ENCLOSURE |  | EMERGENCY POWER OFF |
|  | SURGE PROTECTIVE DEVICE |  | TRANSFORMER |
|  | UNFUSED DISCONNECT SWITCH |  | CIRCUIT BREAKER |
|  | FUSED DISCONNECT SWITCH | | |


KEYNOTES

- ① ALL CONNECTIONS FROM FUEL CELLS TO INVERTER ARE FACTORY WIRED. ALL MAINTENANCE CABINETS ARE ACTIVELY PRESSURIZED; THEREFORE, NO CLASS 1 - DIVISION 2 WIRING IS REQUIRED.
- ② MANUFACTURER WILL FURNISH ENERGY SERVER, TELEMETRY CABINET, PDS, WDM, PRIVATE METERING EQUIPMENT.
- ③ MANUFACTURER INSTALLED PRE-WIRED EPO BUTTON, EPO LOCATED IN READILY ACCESSIBLE LOCATION AT ENERGY SERVER PLATFORM AND CONNECTED TO TELEMETRY TERMINAL STRIP.
- ④ PROVIDE TWO TO COPPER CLAD GROUND RODS SPACED A MINIMUM OF 6' APART. TERMINATIONS SHALL BE EXOTHERMICALLY WELDED.
- ⑤ PROVIDE CONDUCTORS AND CONDUIT TO ENERGY SERVER AS CALLED OUT. STUB UP CONDUIT IN BOTTOM OF PDS AND AT ENERGY SERVER STUB UP LOCATION.
- ⑥ PROVIDE 2#10 + 1#10G (CU) IN A 3/4" CONDUIT FROM PDS TO TELEMETRY CABINET.
- ⑦ PROVIDE 2#12 + 1#12G IN A 3/4" CONDUIT FROM BREAKER IN PDS TO ELECTRICAL PANEL IN WDM WATER DECONTAMINATION WHEEL ENCLOSURE. ENTER ELECTRICAL PANEL THROUGH THE LEFT PREPARED HOLE IN THE BOTTOM OF THE ELECTRICAL PANEL. SECURE WITH GROMMETS. CONNECT CONDUCTORS TO FURNISHED POWER TERMINAL STRIP PER MANUFACTURER'S RECOMMENDATION.
- ⑧ PROVIDE 2#12 + 1#12G CIRCUIT IN 3/4" CONDUIT TO WDM WATER INLET/OUTLET FOR HEAT TRACE POWER. SUBMERG FROM CIRCUIT INSIDE WDM ELECTRICAL PANEL.
- ⑨ PROVIDE 2#12 + 1#12G CIRCUIT IN 3/4" CONDUIT TO WATER INLET AT FUEL CELL FOR HEAT TRACE POWER.
- ⑩ CONTRACTOR TO PROVIDE A LOAD SIDE INTERCONNECTION AT SECTION B87 OF SUBSTATION B8. CONTRACTOR SHALL COORDINATE ALL NECESSARY BUS MODIFICATIONS AND PROVIDE ALL NECESSARY HARDWARE FOR INSTALLATION OF RE-MANUFACTURED GTYPE-31005 SWITCH. CONTRACTOR SHALL PROVIDE NEW 15.9KV MV FUSE COMPLY WITH EXISTING SWITCHGEAR.
- ⑪ CONTRACTOR TO PROVIDE AND INSTALL REVENUE GRADE CURRENT TRANSFORMERS AND POTENTIAL TRANSFORMERS WITH AN ACCURACY OF 0.3% CURRENT TRANSFORMERS TO BE 2005:RFA. CONTRACTOR TO PROVIDE AND MOUNT FLOWMETER BACING FANDED BLACK IN NEW CT CABINET.
- ⑫ TORQUE CT STUDS AS PER MANUFACTURER'S VIEWS. REFER TO STUD SIZE TORQUE VOLTAGE VOLTAGE CHART. DAMAGE TO CT COMPONENTS SHALL BE CORRECTED AT CONTRACTORS EXPENSE.
- ⑬ PROVIDE 2#12 + 1#12G (CU) IN A 3/4" CONDUIT BETWEEN LPC WATER AND A 150V 120V, 2A - 1 POLE CIRCUIT BREAKER. CONTRACTOR SHALL COORDINATE CONDUIT ROUTING AND CONNECTION TO PANEL. CONTRACTOR TO INSTALL 20A DUPE RECTIFIER IN CT CABINET.




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PROJECT INFORMATION

REVISIONS

REVISIONS

PROJECT INFORMATION

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MODEL

MODEL

SHEET TITLE

SHEET TITLE

ONE-LINE DIAGRAM

ONE-LINE DIAGRAM

SHEET NUMBER

SHEET NUMBER

6.1

6.1

ELECTRICAL ONE-LINE DIAGRAM

SCALE
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SHORT-CIRCUIT CALCULATIONS EDM (MSE)

Distances are for calculation purposes only and shall not be used for contractor takeoffs nor bidding

The following calculations are based on the "Point-by-Point" method where:

$ISC(2)=ISC(1) \times M(1)$

$ISC(1)$ = Short circuit current at fault point 1

$ISC(2)$ = Short circuit current at fault point 2

$FEEDER(3PH):$

$I(3PH) = 1.732 \times L \times ISC$

$C \times E$

$FEEDER(1PH):$

$I(3PH) = 2 \times L \times ISC$

$C \times E$

L = Length of circuit

$C = 1$ / Impedance per linear foot

E = Line to line voltage

IS = Secondary short circuit current

VS = Secondary voltage

Feeder Type =

NM – Non Magnetic Conduit, M – Magnetic Conduit, FB – Feeder Busway, PB – Plug-In Busway, TX – Transformer

| FAULT POINT | PANEL OR TRANSFORMER | PHASE | SOURCE (FAULT POINT) | ISC (AMPS) | FEEDER CONDUIT TYPE | # | WIRE/BUS SIZE | FEEDER MATERIAL CU or AL | C VALUE | L-1 VOLTS E | CIRCUIT LENGTH L | LOAD POWER FACTOR (pf) | CIRCUIT LOAD A | CONDUCTOR RESISTANCE R | CONDUCTOR REACTANCE X | f | M | FAULTY CURRENT SC | FAULT POINT | | | | | | | | | | | |
|--------------------------|---|-------|----------------------|------------|---------------------|---|---------------------|--------------------------|----------|-------------|------------------|------------------------|----------------|------------------------|-----------------------|----------|--------|-------------------|-------------|-----|--|--|--|--|--|--|--|--|--|--|
| 0 | at the secondary of the utility transformer | | | | | | | | | | | | | | | | | | | 503 | 0 | | | | | | | | | |
| Motor Contribution (T/A) | | | | | | | | | | | | | | | | | | | | 84 | Use 4x the connected full load motor amps (includes compressors) | | | | | | | | | |
| 1 | J11 XFMR TO SUBST.BB | 3 | 0 | 503 | M | 1 | Set(s) of 2 | CU | 3908.93 | 13800 | 220 | 0.8 | 17 | 0.000200 | 0.000200 | 0.00235 | 0.9977 | 502 | 1 | | | | | | | | | | | |
| 2 | SUBST.BB TO XFMR.1 | 3 | 1 | 502 | M | 1 | Set(s) of 2 | CU | 5926.93 | 13800 | 300 | 0.8 | 62 | 0.000200 | 0.000357 | 0.000350 | 0.9968 | 500 | 2 | | | | | | | | | | | |
| 3 | DISC.1 TO DISC.1 | 3 | 2 | 500 | M | 6 | Set(s) of 500 kcmil | CU | 22185.17 | 480 | 20 | 0.8 | 1770 | 0.000029 | 0.000048 | 0.000071 | 0.9997 | 200 | 3 | | | | | | | | | | | |
| 4 | DISC.1 TO PDS | 3 | 3 | 500 | M | 6 | Set(s) of 500 kcmil | CU | 22185.17 | 480 | 25 | 0.8 | 1770 | 0.000029 | 0.000048 | 0.000074 | 0.9997 | 200 | 4 | | | | | | | | | | | |
| 5 | PDS TO ES-5 | 3 | 4 | 500 | M | 2 | Set(s) of 3/0 | CU | 12843.50 | 480 | 165 | 0.8 | 316 | 0.000079 | 0.000052 | 0.01159 | 0.9885 | 494 | 5 | | | | | | | | | | | |

VOLTAGE DROP CALCULATIONS

Distances are for calculation purposes only and shall not be used for contractor takeoffs nor bidding

VOLTAGE DROP (3PH):

$V_{VD} = (((R \times (L/\#) \times \cos(\arccos(pf))) + (X \times (L/\#) \times \sin(\arccos(pf))) \times 1.732) / E$

VOLTAGE DROP (1PH):

$V_{VD} = (((R \times (L/\#) \times \cos(\arccos(pf))) + (X \times (L/\#) \times \sin(\arccos(pf))) / E$

V_{VD} CUM = Cumulative Voltage Drop from Fault Point 1 to Fault Point #

R = Resistance in ohms per linear foot

X = Reactance in ohms per linear foot

Feeder Type =

NM – Non Magnetic Conduit, M – Magnetic Conduit, FB – Feeder Busway, PB – Plug-In Busway, TX – Transformer

| VD POINT | PANEL OR TRANSFORMER | PHASE | SOURCE (FAULT POINT) | FEEDER CONDUIT TYPE | # | WIRE/BUS SIZE | FEEDER MATERIAL CU or AL | L-1 VOLTS E(LV) | CIRCUIT LENGTH L | LOAD POWER FACTOR (pf) | CIRCUIT LOAD A | CONDUCTOR RESISTANCE R | VOLTAGE DROP V _{VD} | TOTAL V.D. V _{VD} CUM |
|----------|----------------------|-------|----------------------|---------------------|---|---------------------|--------------------------|-----------------|------------------|------------------------|----------------|------------------------|------------------------------|--------------------------------|
| 1 | ES-5 TO PDS | 3 | 0 | M | 2 | Set(s) of 3/0 | CU | 480 | 165 | 0.8 | 316 | 0.000079 | 0.04% | 0.04% |
| 2 | PDS TO DISC.1 | 3 | 1 | M | 6 | Set(s) of 500 kcmil | CU | 480 | 20 | 0.8 | 1770 | 0.000029 | 0.14% | 0.18% |
| 3 | DISC.1 TO XFMR | 3 | 2 | M | 6 | Set(s) of 500 kcmil | CU | 480 | 25 | 0.8 | 1770 | 0.000029 | 0.11% | 0.29% |
| 4 | XFMR TO SUBST. BB | 3 | 3 | M | 1 | Set(s) of 2 | CU | 13800 | 300 | 0.8 | 62 | 0.000200 | 0.05% | 0.33% |

VOLTAGE DROP AND SHORT CIRCUIT CALCULATIONS

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