

--- = EQUIP. GROUNDING CONDUCTOR    --- = CIRCUIT CONDUCTOR    --- = FUSE    --- = CIRCUIT BREAKER    (N) = NEW EQUIP.    (E) = EXISTING EQUIP.    L1 = LINE 1 (BLACK)    L2 = LINE 2 (RED)    N = NEUTRAL (WHITE)    G = GROUND (GREEN)    + = POSITIVE (RED)    - = NEGATIVE (BLACK)

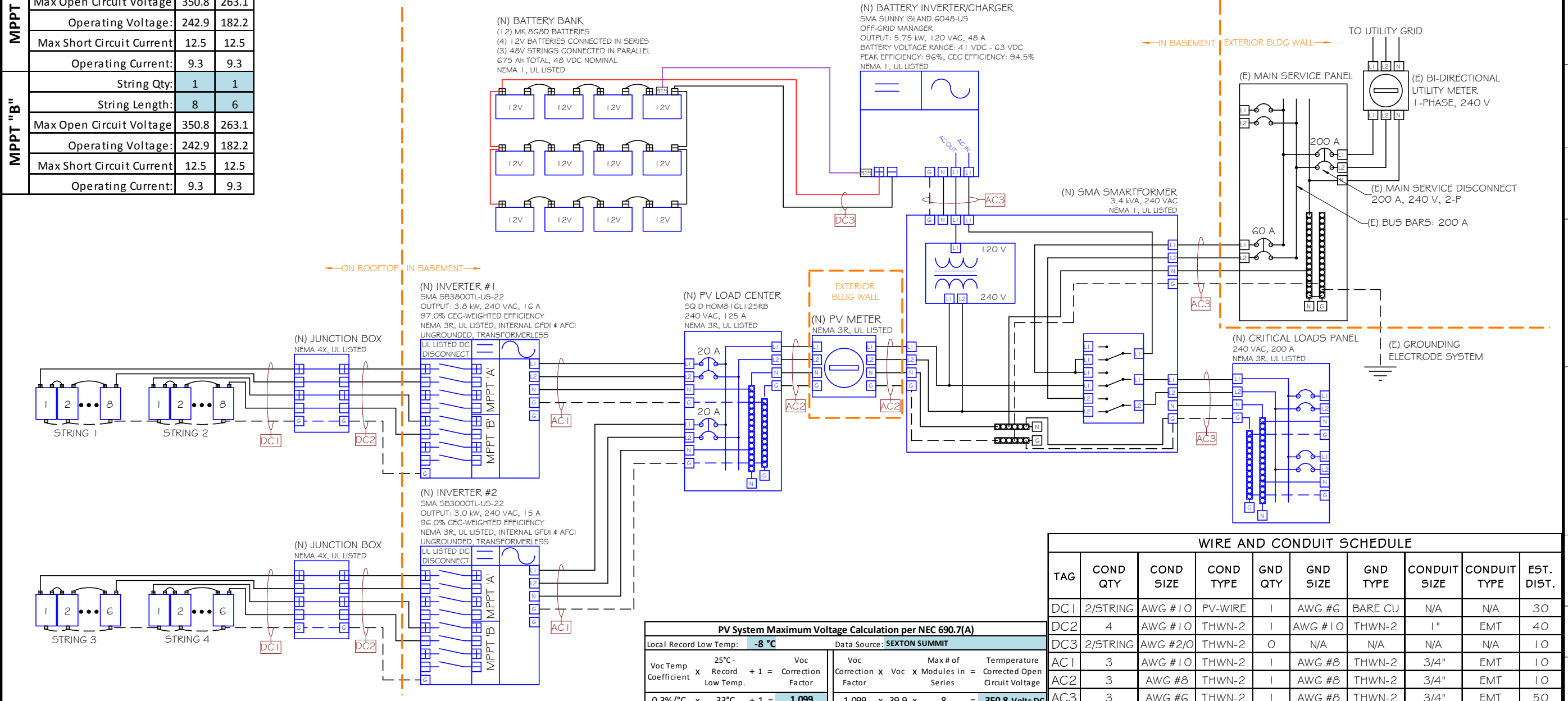
Array Configuration		
<b>System Power: 8.12 kWstc, 6.8 kW AC</b>		
<b>Total PV Module Qty: 28</b>		
Inverter I.D. #	Inv #1	Inv #2
Inverter AC Power (kW):	3.84	3.00
PV Power (kWstc):	4.64	3.48
Inverter DC:AC Ratio	1.21	1.16
Module Total Qty:	16	12
String Qty:	1	1
String Length:	8	6
Max Open Circuit Voltage	350.8	263.1
Operating Voltage:	242.9	182.2
Max Short Circuit Current	12.5	12.5
Operating Current:	9.3	9.3
String Qty:	1	1
String Length:	8	6
Max Open Circuit Voltage	350.8	263.1
Operating Voltage:	242.9	182.2
Max Short Circuit Current	12.5	12.5
Operating Current:	9.3	9.3

INVERTER #1 SPECIFICATIONS		
Model Number:	<b>SMA SB3800TL-US-22</b>	
Power Rating:	<b>3.84</b> kW AC	
Nominal Voltage:	<b>240</b> Volts AC	
Max Output Current:	<b>16.0</b> Amps	
CEC Weighted Efficiency:	<b>97.0%</b>	
Max Current per MPPT:	<b>15.0</b>	
Maximum DC Voltage:	<b>600</b>	
DC Start Voltage:	<b>150</b>	Max. MPPT Voltage: <b>480</b>
MPPT Quantity:	<b>2</b>	
Inverter Quantity:	<b>1</b>	

INVERTER #2 SPECIFICATIONS		
Model Number:	<b>SMA SB3000TL-US-22</b>	
Power Rating:	<b>3.00</b> kW AC	
Nominal Voltage:	<b>240</b> Volts AC	
Max Output Current:	<b>15.0</b> Amps	
CEC Weighted Efficiency:	<b>96.5%</b>	
Max Current per MPPT:	<b>15.0</b>	
Maximum DC Voltage:	<b>600</b>	
DC Start Voltage:	<b>150</b>	Max. MPPT Voltage: <b>480</b>
MPPT Quantity:	<b>2</b>	
Inverter Quantity:	<b>1</b>	

PV Module Specifications		
Model Number:	<b>SOLARWORLD SW290 MONO</b>	
Weight:	<b>46.7</b> lbs	
Dimensions:	<b>65.94 x 39.41 x 1.22</b> (in)	
Module Power @ STC:	<b>290</b> Watts	
Voc (open-circuit Voltage):	<b>39.9</b> Volts DC	
Vmp (max-power Voltage):	<b>31.4</b> Volts DC	
Isc (short-circuit current):	<b>9.97</b> Amps	
Imp (max-power current):	<b>9.33</b> Amps	
Mfr Voc Temp Coefficient:	<b>-0.30</b> %/°C	

AC System Summary	
NOMINAL SYSTEM VOLTAGE:	<b>240 Volts AC</b>
MAX CURRENT PER 690.8(A):	<b>31 Amps</b>
MAX CURRENT PER 690.8(B):	<b>39 Amps</b>



PV System Maximum Voltage Calculation per NEC 690.7(A)			
Local Record Low Temp:	<b>-8 °C</b>	Data Source:	<b>SEXTON SUMMIT</b>
Voc Temp Coefficient	25°C - Record Low Temp.	Voc Correction Factor	1.099
Max # of Series	39.9	Temperature Correction	1.00
Corrected Open Circuit Voltage	350.8	Temperature Correction	1.00
<b>350.8 Volts DC</b>			

WIRE AND CONDUIT SCHEDULE									
TAG	COND QTY	COND SIZE	COND TYPE	GND QTY	GND SIZE	GND TYPE	CONDUIT SIZE	CONDUIT TYPE	EST. DIST.
DC1	2/STRING	AWG #10	PV-WIRE	1	AWG #6	BARE CU	N/A	N/A	30
DC2	4	AWG #10	THWN-2	1	AWG #10	THWN-2	1"	EMT	40
DC3	2/STRING	AWG #2/0	THWN-2	0	N/A	N/A	N/A	N/A	10
AC1	3	AWG #10	THWN-2	1	AWG #8	THWN-2	3/4"	EMT	10
AC2	3	AWG #8	THWN-2	1	AWG #8	THWN-2	3/4"	EMT	10
AC3	3	AWG #6	THWN-2	1	AWG #8	THWN-2	3/4"	EMT	50

TAG	CIRCUIT ORIGIN	CIRCUIT DESTINATION	CONDUCTOR SPECIFICATIONS			
DC1	PV STRING	JUNCTION BOX	COPPER	90°C	AWG #10	40 Amps
DC2	JUNCTION BOX	INVERTER	COPPER	75°C	AWG #10	35 Amps
DC3	BATTERY BANK	BATTERY INVERTER	COPPER	75°C	AWG #2/0	175 Amps

TAG	CIRCUIT ORIGIN	CIRCUIT DESTINATION	CONDUCTOR SPECIFICATIONS			
AC1	INVERTER	PV LOAD CENTER	COPPER	75°C	AWG #10	35 Amps
AC2	PV LOAD CENTER	SMARTFORMER	COPPER	75°C	AWG #8	50 Amps
AC3	SMARTFORMER	MAIN PANEL	COPPER	75°C	AWG #6	65 Amps

TAG	CIRCUIT ORIGIN	CIRCUIT DESTINATION	CONDUCTOR SPECIFICATIONS			
AC1	INVERTER	PV LOAD CENTER	COPPER	75°C	AWG #10	35 Amps
AC2	PV LOAD CENTER	SMARTFORMER	COPPER	75°C	AWG #8	50 Amps
AC3	SMARTFORMER	MAIN PANEL	COPPER	75°C	AWG #6	65 Amps

TAG	CIRCUIT ORIGIN	CIRCUIT DESTINATION	CONDUCTOR SPECIFICATIONS			
AC1	INVERTER	PV LOAD CENTER	COPPER	75°C	AWG #10	35 Amps
AC2	PV LOAD CENTER	SMARTFORMER	COPPER	75°C	AWG #8	50 Amps
AC3	SMARTFORMER	MAIN PANEL	COPPER	75°C	AWG #6	65 Amps

Project: \_\_\_\_\_

Project Details: \_\_\_\_\_

Engineering Approval: \_\_\_\_\_

REVISIONS		
DESCRIPTION	DATE	REV
ORIGINAL	11/16/2015	A
SUNNY ISLAND	12/2/2015	B
COMBINER BOX	12/9/2015	C

Sheet Title: **ELECTRICAL DIAGRAM**

Sheet Number: **E1.0**

Sheet Size: **ANSI B - 17" x 11"**

DESIGN & DRAFTING BY: **RICHARD DOBBINS**



Reviewed & Approved by: **JH**

**WARNING**  
ELECTRIC SHOCK HAZARD.  
DO NOT TOUCH  
TERMINALS. TERMINALS ON  
BOTH THE LINE AND LOAD  
SIDES MAY BE ENERGIZED  
IN THE OPEN POSITION.

**PHOTOVOLTAIC POWER SOURCE**

**THIS ELECTRIC SERVICE IS  
ALSO SERVED BY A  
PHOTOVOLTAIC SYSTEM**

**WARNING**  
INVERTER OUTPUT  
CONNECTION. DO NOT  
RELOCATE THIS  
OVERCURRENT DEVICE

**SOLAR AC DISCONNECT**

REQ'D BY: NEC 690.17

1

APPLY TO:  
DISCONNECTS  
PV LOAD CENTERS  
COMBINER BOXES

REQ'D BY: NEC 690.31(E)(3)

2

APPLY TO:  
EXPOSED RACEWAYS, CABLE TRAYS  
COVERS OR ENCLOSURES OF JUNCTION BOXES  
CONDUIT BODY W/ AVAILABLE CONDUIT OPENING

REQ'D BY: NEC 705.12(D)(4)

3

APPLY TO:  
MAIN SERVICE PANEL

REQ'D BY: NEC 705.12(D)(7)

4

APPLY TO:  
PV SYSTEM BREAKER

REQ'D BY: NEC 690.14(C)(2)

5

APPLY TO:  
PV SYSTEM AC DISCONNECTS

**SOLAR DC DISCONNECT**

**WARNING**  
IF A GROUND FAULT IS  
INDICATED, THE NORMALLY  
GROUNDED CONDUCTORS  
MAY BE ENERGIZED AND  
UNGROUNDED.

**PHOTOVOLTAIC SYSTEM  
DISCONNECT  
AC CURRENT: 39 A  
VOLTAGE: 240 VAC**

REQ'D BY: NEC 690.13(B)

6

APPLY TO:  
PV SYSTEM DC DISCONNECTS

REQ'D BY: NEC 690.5(C)

7

APPLY TO:  
INVERTER

REQ'D BY: NEC 690.54

8

APPLY TO:  
PV SYSTEM DISCONNECT

**GRID TIED PHOTOVOLTAIC  
POWER SOURCE  
MPPT 'A' SPECIFICATIONS:  
OPERATING CURRENT: 9.3 A  
OPERATING VOLTAGE: 243 V  
MAX SYSTEM VOLTAGE: 351 V  
MAX SYSTEM CURRENT: 12.5 A**

**GRID TIED PHOTOVOLTAIC  
POWER SOURCE  
MPPT 'A' SPECIFICATIONS:  
OPERATING CURRENT: 9.3 A  
OPERATING VOLTAGE: 182 V  
MAX SYSTEM VOLTAGE: 263 V  
MAX SYSTEM CURRENT: 12.5 A**

**MPPT 'B' SPECIFICATIONS:  
OPERATING CURRENT: 9.3 A  
OPERATING VOLTAGE: 243 V  
MAX SYSTEM VOLTAGE: 351 V  
MAX SYSTEM CURRENT: 12.5 A**

**MPPT 'B' SPECIFICATIONS:  
OPERATING CURRENT: 9.3 A  
OPERATING VOLTAGE: 182 V  
MAX SYSTEM VOLTAGE: 263 V  
MAX SYSTEM CURRENT: 12.5 A**

**MAX INVERTER OUTPUT:  
3.8 kW, 16 A, 240 VAC**

**MAX INVERTER OUTPUT:  
3 kW, 15 A, 240 VAC**

**WARNING**  
ELECTRIC SHOCK HAZARD.  
THE DC CONDUCTORS OF  
THE PV SYSTEM ARE  
UNGROUNDED AND MAY BE  
ENERGIZED.

REQ'D BY: NEC 690.53

9

APPLY TO:  
INVERTER

REQ'D BY: NEC 690.53

10

APPLY TO:  
INVERTER

REQ'D BY: NEC 690.35(F)

11

APPLY TO:  
JUNCTION BOXES, COMBINER BOXES  
DC DISCONNECTS, INVERTERS

**WARNING**  
ENERGY STORAGE SYSTEM  
MAX OPERATING VOLTAGE: 64 VDC  
EQUALIZATION VOLTAGE: 48 VDC  
POLARITY OF GROUNDED  
CONDUCTOR: NEGATIVE

REQ'D BY: NEC 690.55

12

APPLY TO:  
BATTERY BANK  
BATTERY INVERTER  
BATTERY DISCONNECT(S)

**SIGNAGE REQUIREMENTS**

- 1.) RED BACKGROUND
- 2.) WHITE LETTERING
- 3.) MIN. 3/8" LETTER HEIGHT
- 4.) ALL CAPITAL LETTERS
- 5.) ARIAL OR SIMILAR FONT
- 6.) WEATHER RESISTANT MATERIAL, PER UL 969

Project:

Project Details:

Engineering Approval:

REVISIONS		
DESCRIPTION	DATE	REV
ORIGINAL	11/16/2015	A
SUNNY ISLAND	12/2/2015	B
COMBINER BOX	12/9/2015	C

Sheet Title:  
**SAFETY  
PLACARDS**

Sheet Number:  
**E2.0**

Sheet Size:  
**ANSI B - 17" x 11"**

DESIGN & DRAFTING BY:  
RICHARD DOBBINS



Reviewed & Approved by:  
JH