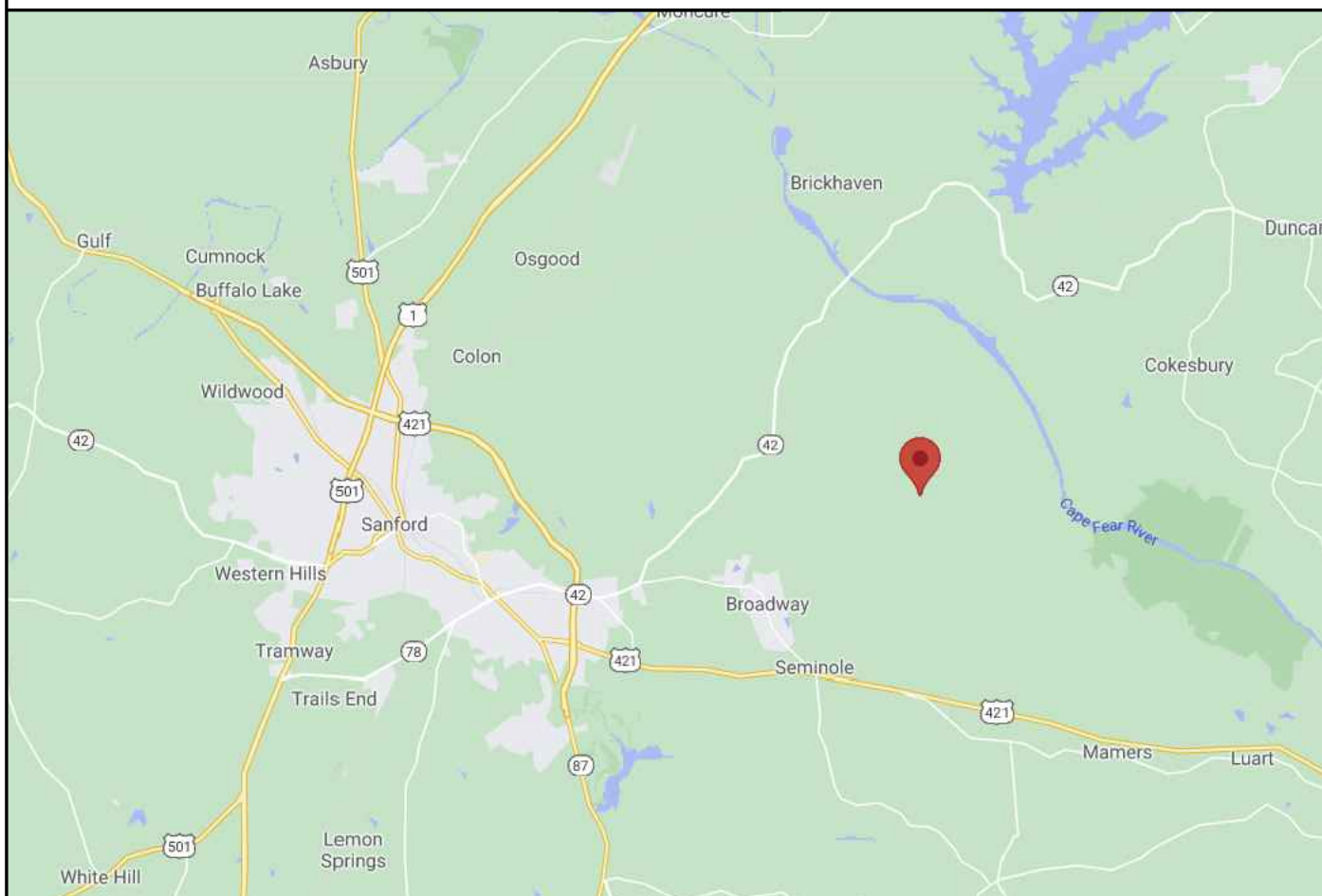
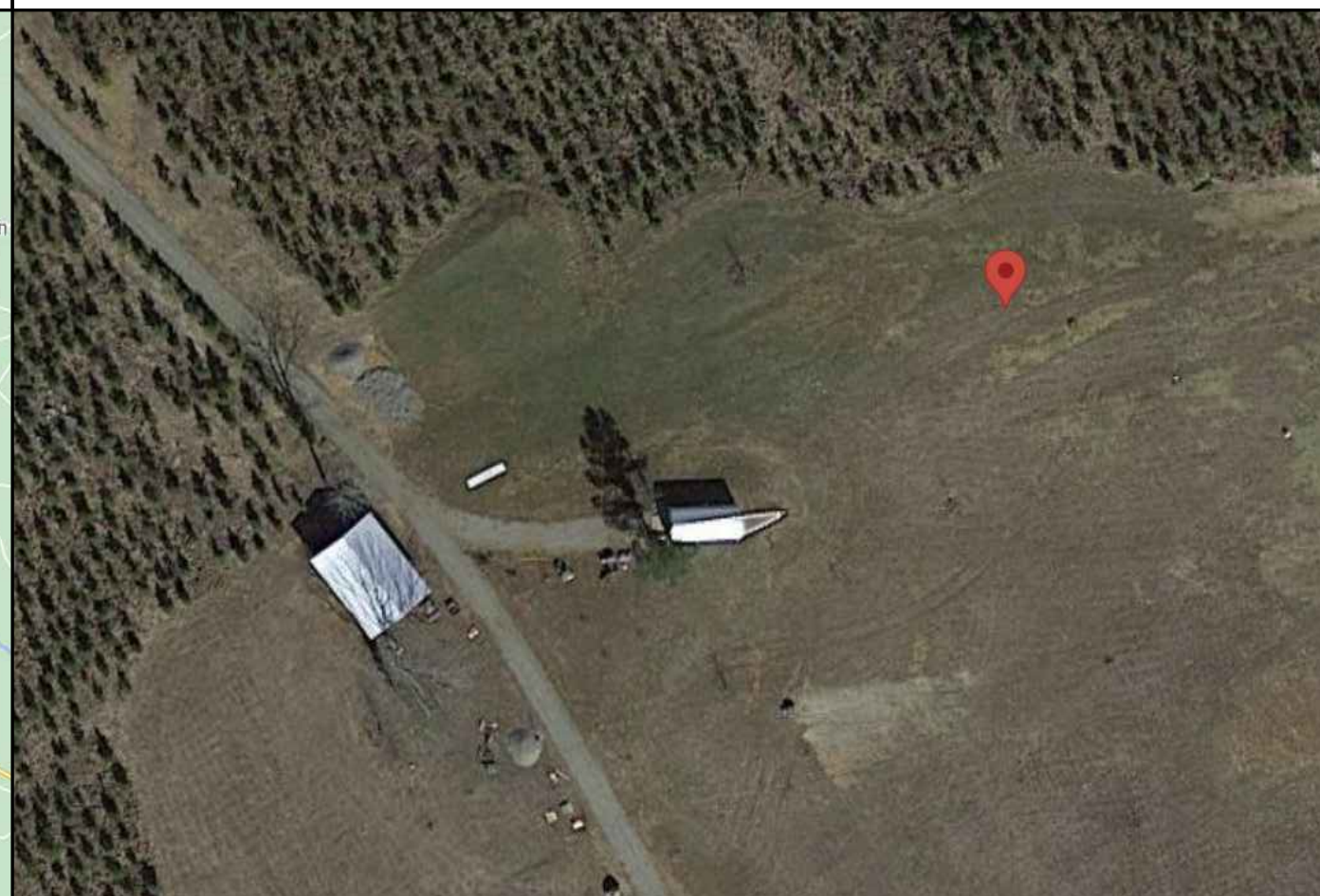


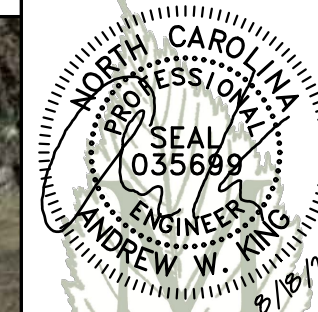
## VICINITY MAP



## PROPERTY MAP



ENGINEER:



**MODEL ENERGY**

300 FAYETTEVILLE ST.  
#1430  
RALEIGH, NC 27602  
919-274-9905  
MODELENERGY.COM  
P-1194

JOB TITLE:

**NEW SOLAR PV SYSTEM**  
11.92 kW DC INPUT  
7.60 kW AC EXPORT  
**David Krakowski**  
2248 Buckhorn Rd.  
Sanford, NC 27730

CLIENT:



ISSUED FOR: **CONSTRUCTION**      DATE: **07/23/21**

PROJECT INFORMATION

# PV1.1

## CONSTRUCTION NOTES

- ALL WORK AND EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST NATIONAL, STATE, AND LOCAL CODES AND ORDINANCES
- FOLLOW MANUFACTURER'S INSTALLATION INSTRUCTIONS, BEST PRACTICES, AND SPECIFICATIONS
- WIRES SHALL BE RATED AND LABELED "SUNLIGHT RESISTANT" WHERE EXPOSED TO AMBIENT CONDITIONS
- THE PHOTOVOLTAIC SYSTEM SHALL NOT EXCEED 600 VOLTS OR 800 AMPS
- EACH ELECTRICAL APPLIANCE SHALL BE PROVIDED WITH A NAMEPLATE GIVING THE IDENTIFYING NAME AND THE RATING IN VOLTS AND AMPERES, OR VOLTS AND WATTS. IF THE APPLIANCE IS TO BE USED ON A SPECIFIC FREQUENCY OR FREQUENCIES, IT SHALL BE SO MARKED. WHERE MOTOR OVERLOAD PROTECTION EXTERNAL TO THE APPLIANCES IS REQUIRED, THE APPLIANCE SHALL BE SO MARKED
- WHERE APPLICABLE, GROUNDING ELECTRODE CONDUCTOR TO BE CONTINUOUS. GROUNDING CRIMPS TO BE IRREVERSIBLE
- GROUNDING DC PHOTOVOLTAIC ARRAYS SHALL BE PROVIDED WITH DC GROUND-FAULT PROTECTION THAT MEETS THE REQUIREMENTS OF NEC SECTION 690.5. UNGROUNDED DC PHOTOVOLTAIC ARRAYS SHALL COMPLY WITH NEC SECTION 690.35
- IN ONE- AND TWO-FAMILY DWELLINGS, LIVE PARTS IN PHOTOVOLTAIC SOURCE CIRCUITS AND PHOTOVOLTAIC OUTPUT CIRCUITS OVER 150 VOLTS TO GROUND, SHALL ONLY BE ACCESSIBLE TO QUALIFIED PERSONS WHILE ENERGIZED.
- PHOTOVOLTAIC SYSTEMS SHALL BE PERMANENTLY MARKED AT VARIOUS EQUIPMENT LOCATIONS TO IDENTIFY THAT A PHOTOVOLTAIC SYSTEM IS INSTALLED AND THAT VARIOUS DANGERS ARE PRESENT.
- EACH PHOTOVOLTAIC SYSTEM DISCONNECTING MEANS SHALL BE PERMANENTLY MARKED TO IDENTIFY IT AS A PHOTOVOLTAIC SYSTEM DISCONNECT
- WHERE ALL TERMINALS OF A DISCONNECTING MEANS MAY BE ENERGIZED IN THE OPEN POSITION, A WARNING SIGN SHALL BE MOUNTED ON OR ADJACENT TO THE DISCONNECT
- A PERMANENT LABEL FOR THE DIRECT-CURRENT PHOTOVOLTAIC POWER SOURCE SHALL BE PROVIDED BY THE INSTALLED AT THE DC DISCONNECT MEANS
- A PERMANENT PLAQUE OR DIRECTORY, DENOTING ALL ELECTRIC POWER SOURCES SERVING THE PREMISES, SHALL BE INSTALLED AT EACH SERVICE EQUIPMENT LOCATION AND AT LOCATIONS OF ALL POWER PRODUCTION SOURCES.
- A PERMANENT PLAQUE OR DIRECTORY SHALL BE PROVIDED DENOTING THE LOCATIONS OF THE SERVICE DISCONNECT MEANS AND THE PHOTOVOLTAIC SYSTEM DISCONNECT MEANS IF THEY ARE NOT LOCATED AT THE SAME LOCATION.
- ALL MODULE GROUND CONNECTIONS SHALL BE MADE IN ACCORDANCE WITH NEC SECTION 690.4 (C)

## ABBREVIATIONS

A	AMPERE
AC	ALTERNATING CURRENT
DC	DIRECT CURRENT
EGC	EQUIPMENT GROUNDING CONDUCTOR
EMT	ELECTRICAL METAL TUBING
GALV	GALVANIZED
GEC	GROUNDING ELECTRODE CONDUCTOR
GND	GROUND
I	CURRENT
IMP	CURRENT AT MAXIMUM POWER
ISC	SHORT-CIRCUIT CURRENT
KVA	KILOVOLT AMPERE
KW	KILOWATT
MAX	MAXIMUM
MIN	MINIMUM
MCB	MAIN CIRCUIT BREAKER
MLO	MAIN LUG ONLY
NOM	NOMINAL
NTS	NOT TO SCALE
P <sub>NOM</sub>	NOMINAL POWER
PV	PHOTOVOLTAIC
PVC	POLYVINYL CHLORIDE
SN	SOLAR NOON
STC	STANDARD TEST CONDITIONS
TYP	TYPICAL
V	VOLT
V <sub>MP</sub>	VOLTAGE AT MAXIMUM POWER
V <sub>oc</sub>	OPEN-CIRCUIT VOLTAGE
W	WATT

## CODE REFERENCES

2017 NATIONAL ELECTRIC CODE  
2018 NORTH CAROLINA BUILDING CODE  
2018 NORTH CAROLINA RESIDENTIAL CODE  
2018 NORTH CAROLINA FIRE CODE

## SHEET INDEX

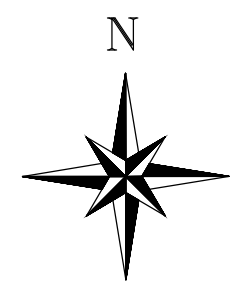
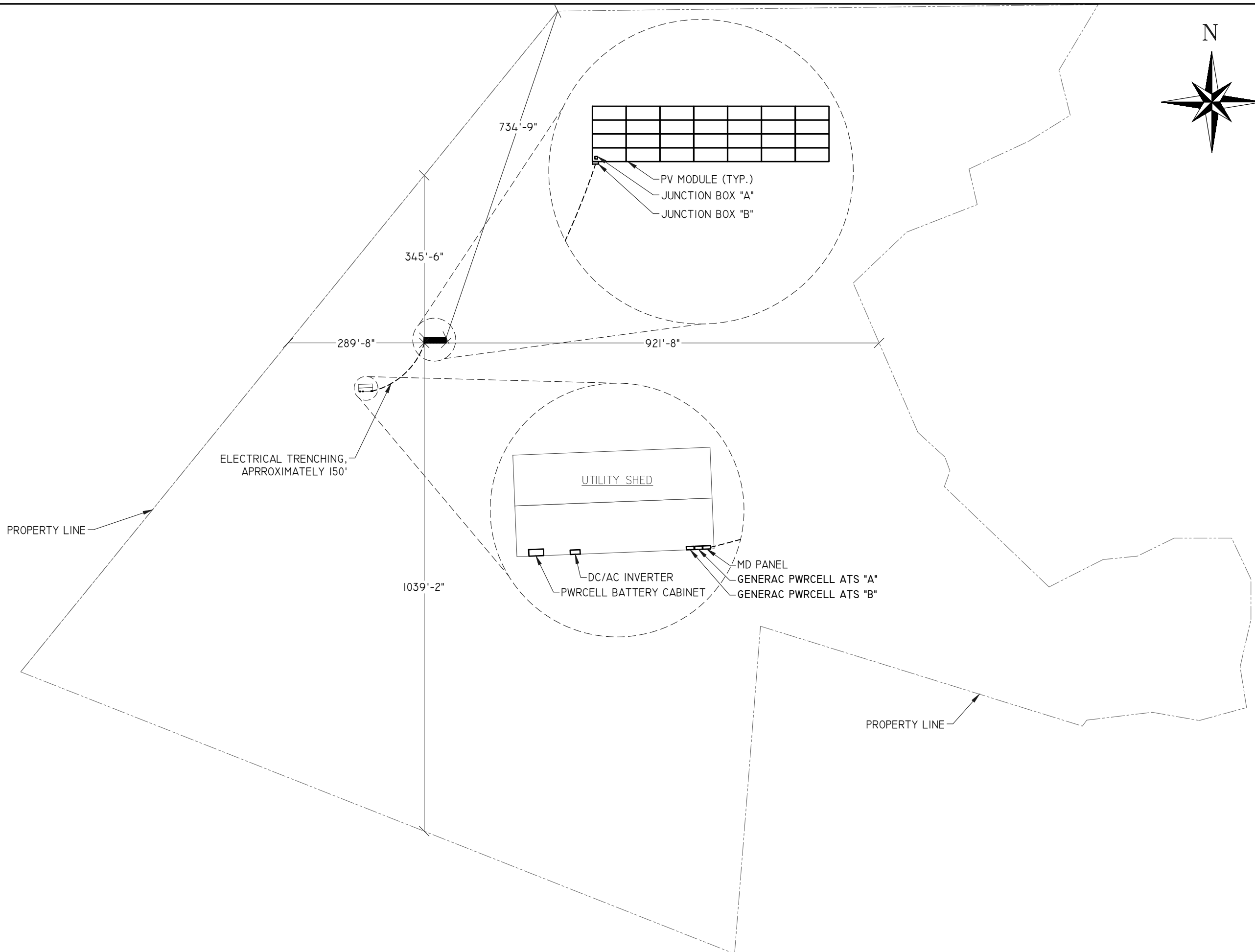
PV1.1 - PROJECT INFORMATION  
PV2.1 - SITE INFORMATION  
PV3.1 - STRUCTURAL INFORMATION  
PV4.1 - PV4.2 - ELECTRICAL INFORMATION  
PV5.1 - EQUIPMENT LABELS

## SITE CONDITIONS

ASCE 7-10 WIND SPEED - 115 MPH  
EXPOSURE CATEGORY - B  
RISK CATEGORY - II

## LEGEND

	DISCONNECT SWITCH
	FUSE
	CIRCUIT BREAKER
	EQUIP. GROUND



ENGINEER:

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7.60 kW AC EXPORT

**David Krakowski**  
2248 Buckhorn Rd.  
Sanford, NC 27730

CLIENT:

**SOUTHERN ENERGY MANAGEMENT**  
ENERGY EFFICIENCY & SOLAR POWER

ISSUED FOR:	DATE:
CONSTRUCTION	07/23/21

SITE INFORMATION

**PV2.1**

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**Series 200 Configuration Tool Report**



Company Name: Krakowski, David  
Project Name: Create Date: 2021-07-12T15:02:17-0400  
Bill of Materials #175272

PV Module Data:			
Module brand:	Custom...	Length:	79.45 inches
Model:	Custom...	Width:	39.45 inches
Rated power @ STC:	415 W	Depth:	1.38 inches
		Weight:	49.83 pounds

Environmental Requirements:			
Wind Speed Standard:	IBC 2015	Tilt:	35 degrees
Snow Load:	1-10 psf	Existing Terrain N-S Slope:	0 degrees
Wind Speed:	120 mph	End Clamp Preference:	Universal
Topographic Condition:	Standard		

Array Information:			
Number of rows per array:	4 High (Landscape)	Grounding Method:	UL 2703 Listed
Number of columns per array:	7 columns	Foundation Option:	Standard Pier
Number of arrays:	1 arrays	Bracing:	Braced
Minimum Height of Leading Edge:	23 inches	1.5" Pipe:	Sch.40
Module Overhang:	1 inches	Microinverter Attachment Kits:	No

**Proposed Bill of Materials:**

Part Number	Description	Qty
232-01072	SNAPNRACK, GROUND RAIL, 162IN, SILVER	14
242-02070	SNAPNRACK, ULTRA RAIL, MID CLAMP, SILVER	42
242-02215	SNAPNRACK, UNIVERSAL END CLAMP	28
242-09004	SNAPNRACK, BONDING PIPE CLAMP ASSEMBLY FOR 1-1/2IN	28
232-01043	SNAPNRACK, GROUND RAIL END CAP, BLACK	28
242-02101	SNAPNRACK, GROUND LUG ASSEMBLY, 6-12 AWG	1
172-05818	HOLLAENDER, SEKT-8, SINGLE SOCKET TEE, 1-1/2IN, AL-MG	8
172-05803	HOLLAENDER, 17-8, SINGLE ADJUSTABLE SOCKET TEE, 1-1/2IN, AL-MG	24
172-05804	HOLLAENDER, 19E-8, DOUBLE ADJUSTABLE SOCKET TEE, 1-1/2IN, AL-MG	8
172-05808	HOLLAENDER, 62-8, PLUG END, 1-1/2IN, AL	12

Links to Relevant Information can be found on our website

[www.snapnrack.com/resources/](http://www.snapnrack.com/resources/)

SnapNrack PV Mounting System ? [www.snapnrack.com/](http://www.snapnrack.com/) ? +877732-2860 ? 775 Fiero Ln, Suite 200, San Luis Obispo, CA 93401

1 of 2

(1.9.6) 2021-07-12T15:02:17-0400

**BRACED OPTIONS:**

Maximum E-W post spacing:	149 inches
Adjusted E-W post spacing:	149 inches
N-S post spacing:	78.64 inches
Rails per Column:	2
Total Array Length:	46.4 feet
E-W exterior post distance:	37.3 feet
E-W exterior rail distance:	46.2 feet
Rail Span (RS):	96 inches
Rail Overhang (RO):	32 inches
Total Number of Modules:	28
Pier Diameter:	12 inches
Front Pier Depth:	30 inches
Back Pier Depth:	65.82 inches

Front Post:		Back Post:	
Per Array:	4 posts	Per Array:	4 posts
Above grade:	47.35 inches	Above grade:	102.41 inches
Total length:	77.35 inches	Total length:	168.23 inches
Total quantity:	4 posts	Total quantity:	4 posts
Total feet of pipe:	25.78 feet	Total feet of pipe:	56.08 feet

Horizontal:	Brace A:	Brace E:	Brace F:
Per Array:	2	Per Array:	4
Length:	47 feet	Length:	91 inches
Total quantity:	2	Total quantity:	8
Total feet:	95	Total feet:	46

**NOTE:** All pipe lengths are estimated to be slightly long. Pipe fittings will slightly reduce length of cross braces, and terrain variations may effect lengths as well. Pipe is typically purchased from a plumbing supply in 21 foot sections. It is important to make sure the pipe is threaded on both ends and includes a coupler. Use this coupler to connect pipe sections together for the Horizontal Pipe.

Total:	Concrete Estimate:
Total Posts: 8	Cubic Yards: 1.2
Total Pipe: 336 feet	60 lb Bags of Concrete: 60

SnapNrack PV Mounting System ? [www.snapnrack.com/](http://www.snapnrack.com/) ? +877732-2860 ? 775 Fiero Ln, Suite 200, San Luis Obispo, CA 93401

2 of 2

**NOTE:**

THE STRUCTURAL INFORMATION CONTAINED ON THIS PAGE WAS NOT PRODUCED OR VALIDATED BY MODEL ENERGY, PLLC. IT IS SHOWN AS PART OF THESE CONSTRUCTION DOCUMENTS FOR PERMITTING PURPOSES ONLY.

SEE ENGINEERING TABLES FOR PIER DEPTHS AND SPAN LIMITATIONS.

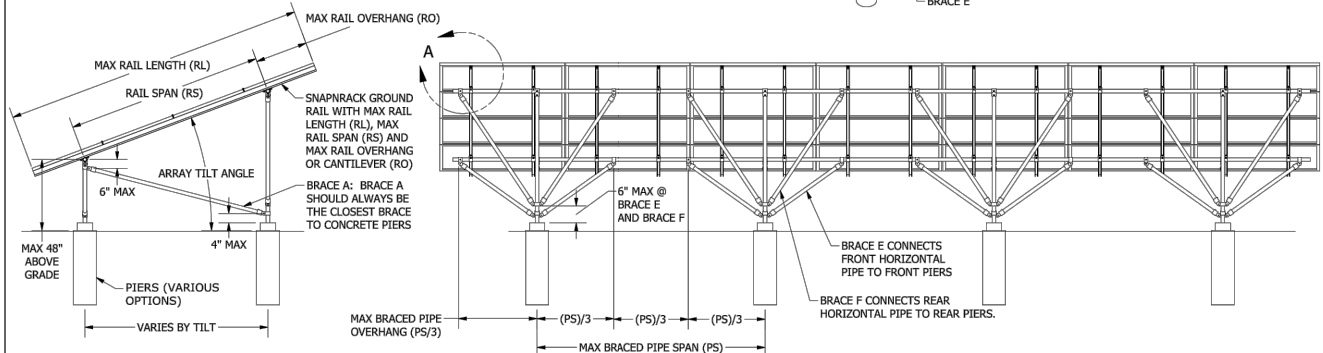
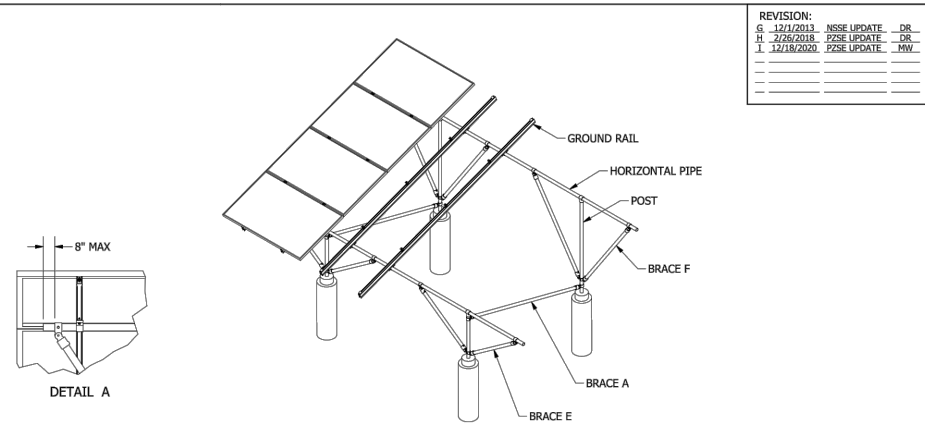
COMPATIBLE WITH ALL PIER OPTIONS INCLUDING STANDARD PIERS AND GRADE BEAMS.

UNLESS OTHERWISE SPECIFIED IN ENGINEERING DOCS, THE FOLLOWING VALUES APPLY.

WHEN RAIL LENGTH (RL) IS 162":  
RAIL SPAN (RS) = 96"  
MAX RAIL OVERHANG (RO) = 32"

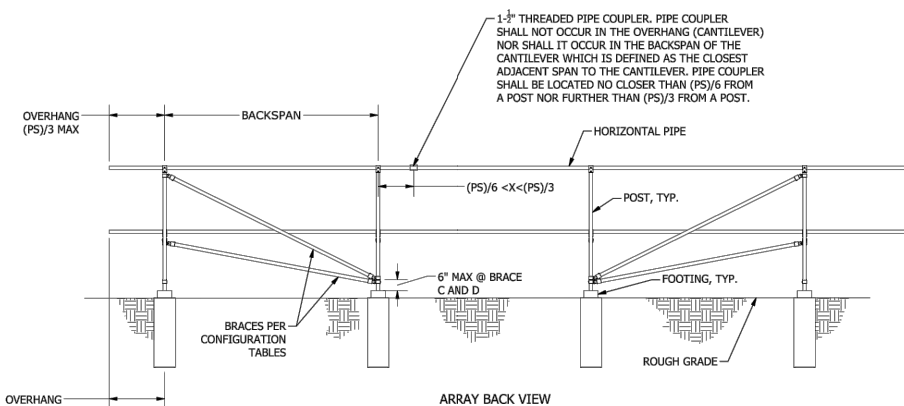
WHEN RAIL LENGTH (RL) IS 172":  
RAIL SPAN (RS) = 105"  
MAX RAIL OVERHANG (RO) = 35"

MAXIMUM MODULE WEIGHT IS 65 LBS

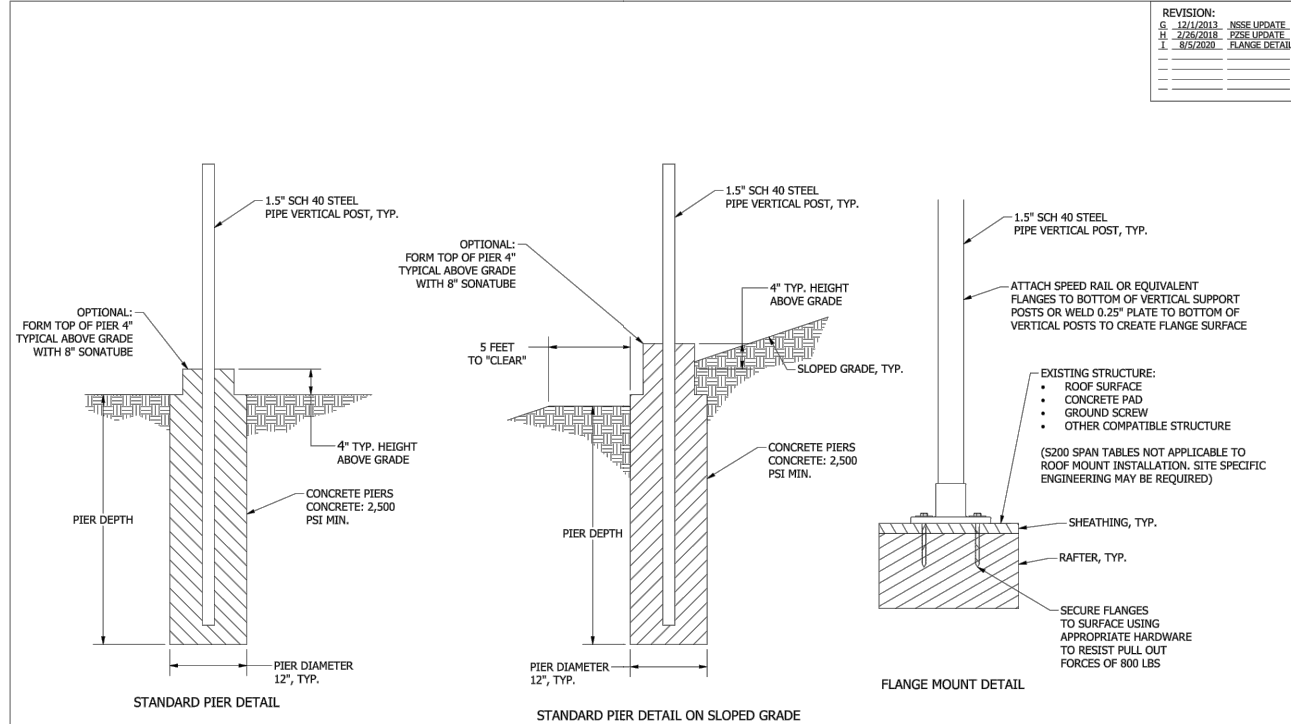


SnapNrack Solar Mounting Solutions	Sunrun South LLC 888 MARKET STREET, 3RD FLOOR, SAN FRANCISCO, CA 94103 USA PHONE: (415) 588-8888 • FAX: (415) 588-8882	DESIGNER: G.McPheeters DRAFTER: D.Ryan APPROVED BY: G.McPheeters	SCALE: DNS DATE: 12/18/2020	PART NUMBER: S200 D03	DESCRIPTION: SERIES 200 BRACED INSTALLATION OPTION, HIGH LOAD OR LONGER SPANS	REV: I
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REVISION:	NEW SHEET	DR
A	4/4/2018	



SnapNrack Solar Mounting Solutions	Sunrun South LLC 888 MARKET STREET, 3RD FLOOR, SAN FRANCISCO, CA 94103 USA PHONE: (415) 588-8888 • FAX: (415) 588-8882	DESIGNER: G.McPheeters DRAFTER: D.Ryan APPROVED BY: G.McPheeters	SCALE: DNS DATE: 4/4/2018	PART NUMBER: S200 D10	DESCRIPTION: SERIES 200 PIPE SPLICE DETAIL	REV: A
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SnapNrack Solar Mounting Solutions	Sunrun South LLC 888 MARKET STREET, 3RD FLOOR, SAN FRANCISCO, CA 94103 USA PHONE: (415) 588-8888 • FAX: (415) 588-8882	DESIGNER: G.McPheeters DRAFTER: D.Ryan APPROVED BY: B.Peterson	SCALE: DNS DATE: 8/5/2020	PART NUMBER: S200 D06	DESCRIPTION: SERIES 200 PIER DETAILS	REV: I
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ENGINEER:



MODEL ENERGY

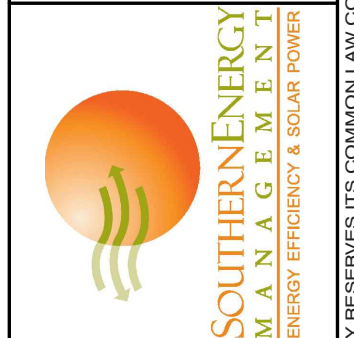
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919-274-9905  
MODELENERGY.COM

P-1194

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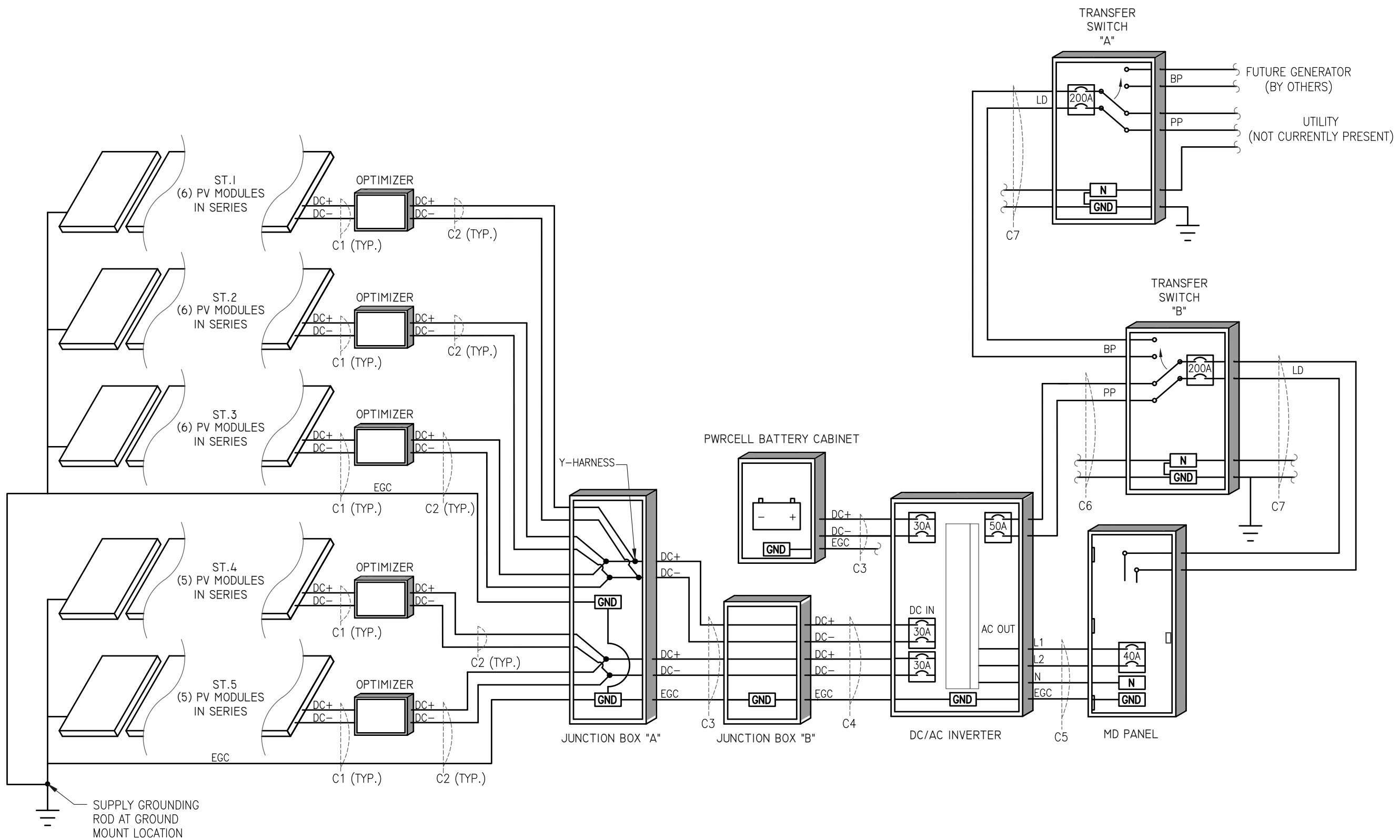
ISSUED FOR: CONSTRUCTION  
DATE: 07/23/21


STRUCTURAL INFORMATION

**PV3.1**


SCALE: 1/8" = 1'-0"

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ENGINEER:  
  
**MODEL ENERGY**  
 300 FAYETTEVILLE ST.  
 #1430  
 RALEIGH, NC 27602  
 919-274-9905  
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 P-1194

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**David Krakowski**  
 2248 Buckhorn Rd.  
 Sanford, NC 27730

CLIENT:  
  
**SOUTHERN ENERGY MANAGEMENT**  
 ENERGY EFFICIENCY & SOLAR POWER

ISSUED FOR:	DATE:
CONSTRUCTION	07/23/21

ELECTRICAL INFORMATION

**PV4.1**

1 PV SYSTEM ELECTRICAL WIRING SCHEMATIC

SCALE : NTS

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CONDUCTOR SCHEDULE													
TAG	CURRENT CARRYING CONDUCTORS				GROUNDING CONDUCTORS				CONDUIT/RACEWAY				NOTES
	QTY.	SIZE	MATERIAL	INSULATION	QTY.	SIZE	MATERIAL	INSULATION	QTY.	SIZE	MATERIAL	LOCATION	
C1	2	10 AWG	COPPER	PV WIRE	1	6 AWG	COPPER	BARE WIRE	-	-	-	FREE AIR	1
C2	2	10 AWG	COPPER	THWN-2	1	10 AWG	COPPER	THWN-2	1	1/2"	FMC/EMT/MC	EXTERIOR	2,4
C3	4	10 AWG	COPPER	THWN	1	10 AWG	COPPER	THWN	1	3/4"	NOTE 5	EXTERIOR	2,4
C4	4	10 AWG	COPPER	THWN	1	10 AWG	COPPER	THWN	1	3/4"	80 PVC	BURIED	2,4
C5	3	8 AWG	COPPER	THWN	1	10 AWG	COPPER	THWN	1	3/4"	NOTE 5	INTERIOR	2,4,5
C6	3	6 AWG	COPPER	THWN	1	10 AWG	COPPER	THWN	1	3/4"	NOTE 5	INTERIOR	2,4,5
C7	3	3/0 AWG	COPPER	THWN	1	6 AWG	COPPER	THWN	1	2"	NOTE 5	INTERIOR	2,4,5
XC	-	-	-	-	-	-	-	-	-	-	-	-	3

- NOTES:
1. MANUFACTURER PROVIDED, UL LISTED WIRING HARNESS FOR USE ON EXPOSED ROOFS
  2. CONDUIT SIZE SHOWN IS CODE MINIMUM. LARGER SIZES ARE ALLOWED.
  3. EXISTING CONDUCTORS, FIELD VERIFY
  4. EQUIPMENT TERMINAL RATING SHALL BE A MINIMUM OF 75°C AT BOTH END OF CONDUCTOR
  5. PVC, EMT, ROMEX, LFNMC & FMC ARE ACCEPTABLE WHEN USED IN ACCORDANCE WITH ARTICLES 330, 334, 348, 350, 352, 356, & 358 OF THE 2017 NEC

JUNCTION BOX "A" & "B"	
MAKE	GENERIC
MODEL	N/A
PRO. RATING	NEMA 3R
VOLT. RATING	600 VOLTS
AMP RATING	120 AMPS
UL LISTING	UL 50

PV MODULES	
MAKE	ASTRENERGY
MODEL	CHSM72M-HC 415
TECHNOLOGY	MONO-CRYST.
NOM. POWER (P <sub>nom</sub> )	415 WATTS
NOM. VOLT. (V <sub>mp</sub> )	42.11 VOLTS
O.C. VOLT. (V <sub>oc</sub> )	50.6 VOLTS
MAX. SYS. VOLT.	1500 V (UL)
TEMP. COEF. (V <sub>tc</sub> )	-0.28 %/°C
NOM. CURR. (I <sub>mp</sub> )	9.86 AMPS
S.C. CURR. (I <sub>sc</sub> )	10.45 AMPS
MAX. SERIES FUSE	20 AMPS

AUTOMATIC TRANSFER SWITCH "A" & "B"	
MAKE	GENERAC
MODEL	RXSC200A3
ENCL. RATING	NEMA 3R
VOLT. RATING	240 VOLTS
BUS RATING	200 AMPS
UL LIST. (Y/N)	YES
MAIN BREAKER (Y/N)	YES
BREAKER RATING	200 AMPS

- NOTES:
- PROVIDE SERVICE DISCONNECT LABEL
  - PROVIDE N/G BOND
  - PROVIDE GEC
  - SERVICE RATED
  - PROVIDED GROUNDING ROD IF NOT PRESENT IN BUILDING

MODULE OPTIMIZER	
MAKE	GENERAC
MODEL	S2502
DC INPUT:	
MAX. CURRENT	18 AMPS
VOLT. RANGE	60-360 VOLTS
MAX. VOLT.	420 VOLTS
DC OUTPUT:	
MAX. CURRENT	8 AMPS
MAX. VOLT.	420 VOLTS
NOM. VOLT.	380 VOLTS
MIN. STRING	2 MODULES
MAX. STRING	8 MODULES
RATED POWER	2500 WATTS
MAX OPTIMIZER STRING SIZE	3 OPTIMIZERS

PWRCELL BATTERY CABINET	
MAKE	GENERAC
MODEL	PWRCELL IR M6 EX
TOTAL ENERGY (kWh)	18 kWh
BATTERY MODULES	6
VOLTAGE RANGE	360-420 VOLTS
MAX CONT. DC CURRENT	27.5 AMPS
MAX CONT. AC POWER	9 kW
PEAK MOTOR START AMPS	50 AMPS

MD PANEL	
MAKE	N/A
MODEL	N/A
ENCL. RATING	NEMA 3R
VOLT. RATING	240 VOLTS
BUS RATING	200 AMPS
UL LIST. (Y/N)	YES
MAIN BREAKER (Y/N)	NO
BREAKER RATING	-

- NOTES:
- BACK-FEED SOLAR OUTPUT VIA 40A BREAKER AT THE OPPOSITE END OF THE BUS BAR FROM MAIN BREAKER.

DC/AC INVERTER	
MAKE	GENERAC
MODEL	X7602
TECHNOLOGY	TRANSF-LESS
DC INPUT:	
MAX. POWER	10000 WATTS
VOLT. RANGE	360-420 VOLTS
NOM. VOLT.	380 VOLTS
MAX. CURRENT/INPUT	30 AMPS
STRINGS INPUTS	4 STRINGS
AC OUTPUT/GRID TIE:	
NOM. POWER	7600 WATTS
MAX. POWER:	11000 WATTS
NOM. VOLT.	240 VOLTS
MAX. CURR.	32.0 AMPS
GFP (Y/N)	YES
GFCI (Y/N)	YES
AFCI (Y/N)	YES
DC DISC. (Y/N)	YES
RAPID SHUTDOWN	NO
FUSE RATING	15 AMPS
PROTECT. RATING	NEMA 3R
DC INPUT BATTERY	
DC FUSES	30 AMPS

ENGINEER:

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CLIENT:

ISSUED FOR:	DATE:
CONSTRUCTION	07/23/21

ELECTRICAL INFORMATION

# PV4.2

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# PV SYSTEM DISCONNECT

NEC 690.13 (B)  
PLACE ON PV SYSTEM DISCONNECTING MEANS.

# WARNING DUAL POWER SUPPLY SOURCES: UTILITY GRID AND PV SOLAR ELECTRIC SYSTEM

NEC 705.12 (B)(3)  
PLACE ON ALL EQUIPMENT THAT IS SUPPLIED  
BY BOTH POWER SOURCES

# WARNING: PHOTOVOLTAIC POWER SOURCE

NEC 690.31 (G)(3)&(4)  
PLACE ON ALL JUNCTION BOXES, EXPOSED RACEWAYS, AND OTHER  
WIRING METHODS EVERY 10' AND ON EVERY SECTION SEPARATED BY  
ENCLOSURES, WALLS, PARTITIONS, CEILINGS, OR FLOORS.

<i>EQUIPMENT LABEL NOTES</i>	
1.	LABELS SHOWN ARE THEIR ACTUAL REQUIRED SIZE.
2.	LABEL MATERIAL SHALL BE SUITABLE FOR THE EQUIPMENT ENVIRONMENT.
3.	CONDUIT SHALL BE MARKED WITH REQUIRED LABEL EVERY 10 FEET.

# WARNING ELECTRIC SHOCK HAZARD TERMINALS ON THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

NEC 690.13 (B)  
PLACE ON PV SYSTEM DISCONNECTING MEANS.

# WARNING POWER SOURCE OUTPUT CONNECTION DO NOT RELOCATE THIS OVERCURRENT DEVICE

NEC 705.12 (B)(2)(3)(b)  
PLACE ADJACENT TO BACK-FED BREAKER

## DIRECT CURRENT PHOTOVOLTAIC POWER SOURCE

MAXIMUM VOLTAGE	420	VDC
MAX CIR. CURRENT	24.0	AMPS


NEC 690.53  
PLACE ON ALL DC DISCONNECTING MEANS

## PHOTOVOLTAIC POWER SOURCE

OPERATING AC VOLT.	240	VAC
MAXIMUM OPERATING AC OUTPUT CURRENT	32.0	AMPS

NEC 690.54  
PLACE ON INTERCONNECTION  
DISCONNECTING MEANS

ENGINEER:




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MANAGEMENT**  
ENERGY EFFICIENCY & SOLAR POWER

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EQUIPMENT  
LABELS

# PV5.1