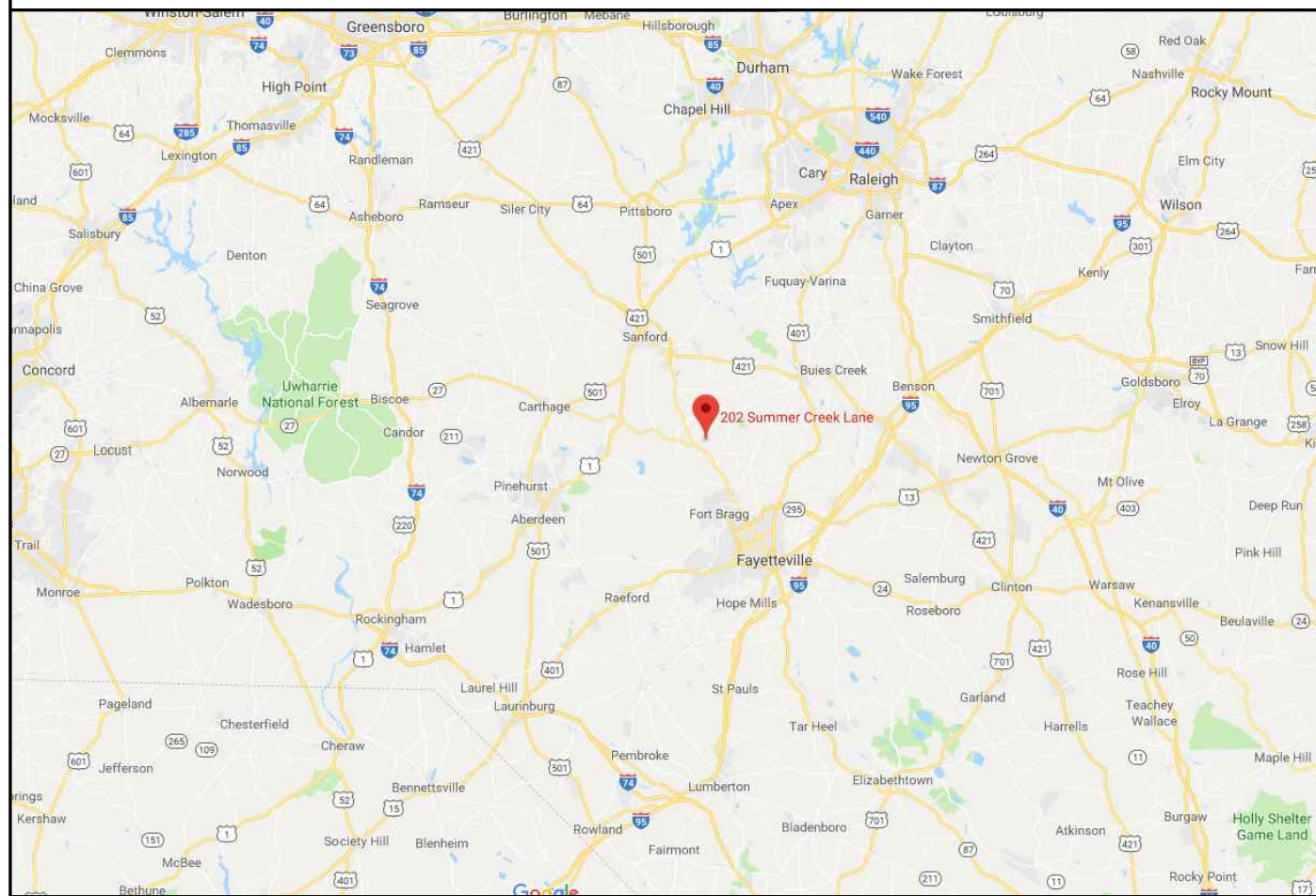
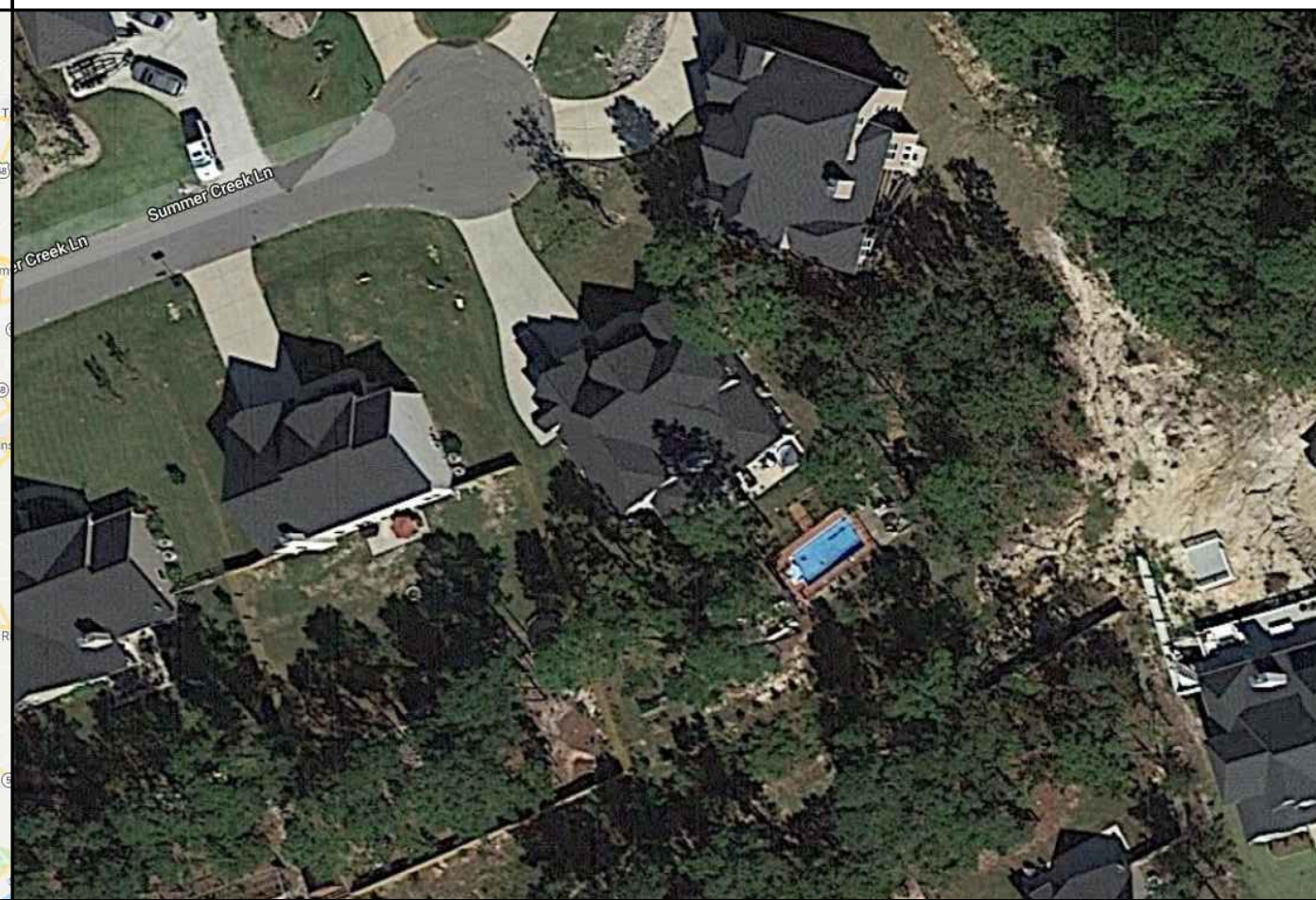


VICINITY MAP



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
11.97 kW DC INPUT
10.00 kW AC EXPORT

TIM SCHERR
202 SUMMER CREEK LANE
SANFORD, NC 27332

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 _{NOM}	NOMINAL POWER
PV	PHOTOVOLTAIC
PVC	POLYVINYL CHLORIDE
SN	SOLAR NOON
STC	STANDARD TEST CONDITIONS
TYP	TYPICAL
V	VOLT
VMP	VOLTAGE AT MAXIMUM POWER
V _{oc}	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 & STRUCTURAL INFORMATION
PV3.1 - ELECTRICAL INFORMATION
PV4.1 - EQUIPMENT LABELS

SITE CONDITIONS

ASCE 7-10 WIND SPEED - 118 MPH
EXPOSURE CATEGORY - B
RISK CATEGORY - II

LEGEND

	DISCONNECT SWITCH
	FUSE
	CIRCUIT BREAKER
	EQUIP. GROUND

CLIENT:



ISSUED FOR:

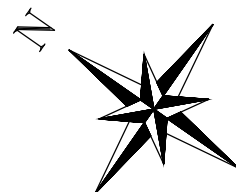
DATE:

CONSTRUCTION

06/14/19

PROJECT INFORMATION

PV1.1



ARRAY "A" SUMMARY	
# MODULES	13
MOD. ATT. MID	20
MOD. ATT. END	12
ROOF MOUNTS	23
RAIL LENGTH	88 FT.
ARRAY AREA	236 sqFT.
ARRAY WEIGHT	535.6 LBS.
AZIMUTH @ SN	143°
TILT ANGLE	37.3°

ARRAY "B" SUMMARY	
# MODULES	25
MOD. ATT. MID	44
MOD. ATT. END	12
ROOF MOUNTS	28
RAIL LENGTH	167 FT.
ARRAY AREA	454 sqFT.
ARRAY WEIGHT	1030 LBS.
AZIMUTH @ SN	233°
TILT ANGLE	43.7°

PV MODULES	
MAKE	HANWHA Q-CELL
MODEL	Q.PEAK DUO BLK-G5 315
WIDTH	39.4"
LENGTH	66.3"
THICKNESS	1.26"
WEIGHT	41.2 LBS

MOUNTING RAILS	
MAKE	UNIRAC
MODEL	SM STANDARD
MATERIAL	ALUMINUM
WEIGHT	1.25 LBS./FT.
SPACING	34 IN.

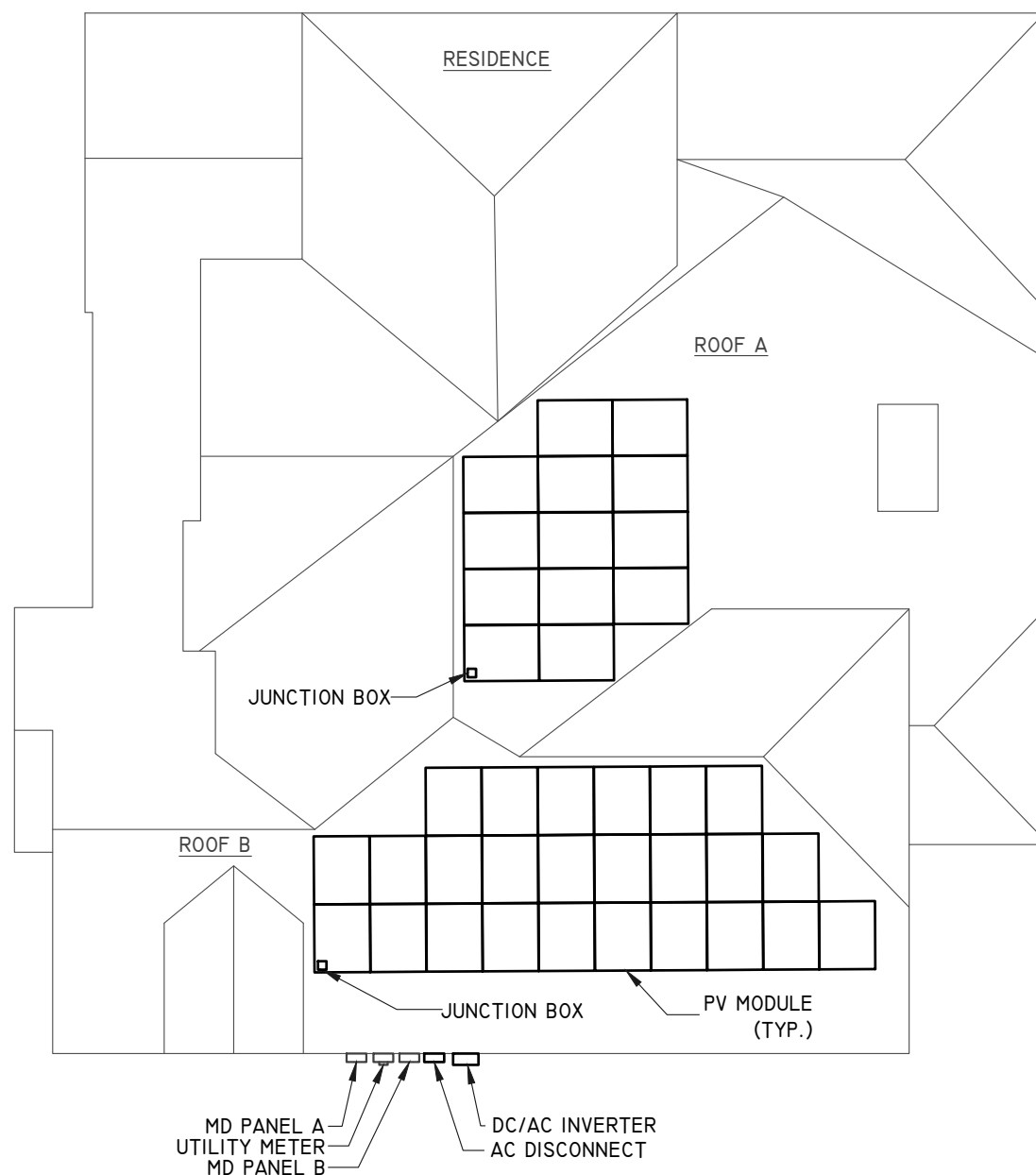
ROOF "A" SUMMARY	
STRUCTURE:	
TYPE	TRUSSES
MATERIAL	SOUTHERN PINE #2
SIZE	2" X 10"
SPACING	16" o.c.
EFF. SPAN	35'-0"
PITCH	9 / 12
DENSITY	30 LBS./CU.FT.
DECKING:	
TYPE	OSB
MATERIAL	WOOD COMPOSITE
THICKNESS	7/16"
WEIGHT	1.6 LBS./SQFT.
ROOFING:	
TYPE	ARCH SHINGLE
MATERIAL	ASPHALT
WEIGHT	2.3 LBS./SQFT.

ROOF "A" AND "B" LOADING	
GROUND SNOW LOAD:	15 LBS./SQFT.
LIVE LOAD:	20 LBS./SQFT.
DEAD LOAD:	
ROOFING	3.9 LBS./SQFT.
PV ARRAY	2.5 LBS./SQFT.
TOTAL	6.4 LBS./SQFT.
WIND LOAD:	
UPLIFT ZONE 1	-24.6 LBS./SQFT.
UPLIFT ZONE 2	-29.0 LBS./SQFT.
UPLIFT ZONE 3	-29.0 LBS./SQFT.
DOWNWARD	23.0 LBS./SQFT.
FASTENER LOAD:	
UPLIFT ZONE 1	-362 LBS.
UPLIFT ZONE 2	-320 LBS.
UPLIFT ZONE 3	-107 LBS.
DOWNWARD	339 LBS.

ROOF "B" SUMMARY	
STRUCTURE:	
TYPE	TRUSSES
MATERIAL	SOUTHERN PINE #2
SIZE	2" X 10"
SPACING	16" o.c.
EFF. SPAN	17'-6"
PITCH	11 / 12
DENSITY	30 LBS./CU.FT.
DECKING:	
TYPE	OSB
MATERIAL	WOOD COMPOSITE
THICKNESS	7/16"
WEIGHT	1.6 LBS./SQFT.
ROOFING:	
TYPE	ARCH SHINGLE
MATERIAL	ASPHALT
WEIGHT	2.3 LBS./SQFT.


ROOF MOUNT & FASTENER	
ROOF MOUNT:	
MAKE	SOLAR ROOF HOOK
MODEL	L-FOOT
MATERIAL	ALUMINUM
FASTENER	
MAKE	SOLAR ROOF HOOK
MODEL	QUICKBOLT
MATERIAL	304 SS
SIZE	5/16-18 X 5.25"
GENERAL	
WEIGHT	1 LBS
FASTENERS PER MOUNT	1
MAX. PULL-OUT FORCE	960 LBS. / MOUNT
SAFETY FACTOR	2.0
DESIGN PULL-OUT FORCE	480 LBS. / MOUNT

ROOF "A" AND "B" ZONES:	
ALL ZONES	MAX. OVERHANG = 12"
ZONE 1	MAX. FASTENER SPAN ZONE 1 = 64"
ZONE 2	MAX. FASTENER SPAN ZONE 2 = 48"
ZONE 3	MAX. FASTENER SPAN ZONE 3 = 16"



STATEMENT OF STRUCTURAL COMPLIANCE


THE EXISTING ROOF STRUCTURE HAS BEEN DESIGNED TO SUPPORT THE ADDITIONAL LOADS OF THE PURPOSED PV SYSTEM. IN ADDITION, THE RACKING AND FASTENING SYSTEM SHALL BE CAPABLE OF SECURING THE SYSTEM TO THE STRUCTURE UNDER DESIGN CONDITIONS WHEN INSTALLED PROPERLY AND IN ACCORDANCE WITH THE RACKING AND FASTENING ARRANGEMENT DETAILED WITHIN THESE DRAWINGS.

SIGNED: 

NAME: ANDREW W. KING, PE

TITLE: PROFESSIONAL ENGINEER

ENGINEER:




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

JOB TITLE:

NEW SOLAR PV SYSTEM
 11.97 kW DC INPUT
 10.00 kW AC EXPORT

TIM SCHERR
 202 SUMMER CREEK LANE
 SANFORD, NC 27332

CLIENT:



ISSUED FOR:	DATE:
CONSTRUCTION	06/14/19

SITE & STRUCTURAL INFORMATION

PV2.1

PV MODULES	
MAKE	HANWHA Q-CELL
MODEL	Q.PEAK DUO BLK-G5 315
TECHNOLOGY	MONO-CRYST.
NOM. POWER (P _{NOM})	315 WATTS
NOM. VOLT. (V _{MP})	33.46 VOLTS
O.C. VOLT. (V _{OC})	40.29 VOLTS
MAX. SYS. VOLT.	1000 V (UL)
TEMP. COEF. (V _{Tc})	-0.28 %/°C
NOM. CURR. (I _{MP})	9.41 AMPS
S.C. CURR. (I _{SC})	9.89 AMPS
MAX. SERIES FUSE	20 AMPS

MODULE OPTIMIZER	
MAKE	SOLAREEDGE
MODEL	P320
DC INPUT:	
NOM. POWER	320 WATTS
VOLT. RANGE	8-48
MAX. CURR.	11.0 AMPS
DC OUTPUT:	
NOM. POWER	320 WATTS
MAX. VOLT.	60 VOLTS
MAX. CURR.	15 AMPS
MIN. STRING	8 OPTIMIZERS
MAX. STRING	25 OPTIMIZERS
MAX. POWER	5700 WATTS

JUNCTION BOX	
MAKE	SOLADECK
MODEL	0783-3R
PRO. RATING	NEMA 3R
VOLT. RATING	600 VOLTS
AMP RATING	120 AMPS
UL LISTING	UL 50

TAG	CURRENT CARRYING CONDUCTORS				GROUNDING CONDUCTORS				CONDUIT/RACEWAY				NOTES
	QTY.	SIZE	MATERIAL	INSULATION	QTY.	SIZE	MATERIAL	INSULATION	QTY.	SIZE	MATERIAL	LOCATION	
C1.1	2	10 AWG	COPPER	PV WIRE	1	6 AWG	COPPER	PV WIRE	-	-	-	FREE AIR	1
C1.2	4	10 AWG	COPPER	THWN-2	1	10 AWG	COPPER	THWN-2	1	3/4"	EMT	EXT	2,4
C2.1	2	10 AWG	COPPER	THWN-2	1	10 AWG	COPPER	THWN-2	1	1/2"	EMT/FMC	EXT/INT	2,4
C2.2	4	10 AWG	COPPER	THWN-2	1	10 AWG	COPPER	THWN-2	1	3/4"	EMT/FMC	EXT/INT	2,4
C3	3	6 AWG	COPPER	THWN	1	10 AWG	COPPER	THWN	1	3/4"	EMT	EXT	2,4
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

DC/AC INVERTER	
MAKE	SOLAREEDGE
MODEL	SEI0000H-US
TECHNOLOGY	TRANS-LESS
DC INPUT:	
MAX. POWER	15500 WATTS
MAX. VOLT.	480 VOLTS
NOM. VOLT.	380 VOLTS
MAX. CURRENT	27 AMPS
MAX. SCC	45 AMPS
STRINGS INPUTS	3 STRINGS
AC OUTPUT:	
RATED POWER	10000 WATTS
MAX. POWER	10000 WATTS
NOM. VOLT.	240 VOLTS
MAX. CURR.	42 AMPS
GFP (Y/N)	YES
RPP (Y/N)	YES
GFCI (Y/N)	YES
AFCI (Y/N)	YES
DC DISC. (Y/N)	YES
RAPID SHUTDOWN	AUTOMATIC
FUSE RATING	15 AMPS
PROTECT. RATING	NEMA 4X

AC DISCONNECT	
MAKE	GENERIC
MODEL	N/A
ENCL. RATING	NEMA 3R
VOLT. RATING	240 VOLTS
AMP RATING	60 AMPS
UL LIST. (Y/N)	YES
FUSED (Y/N)	YES
FUSE RATING	60 AMPS

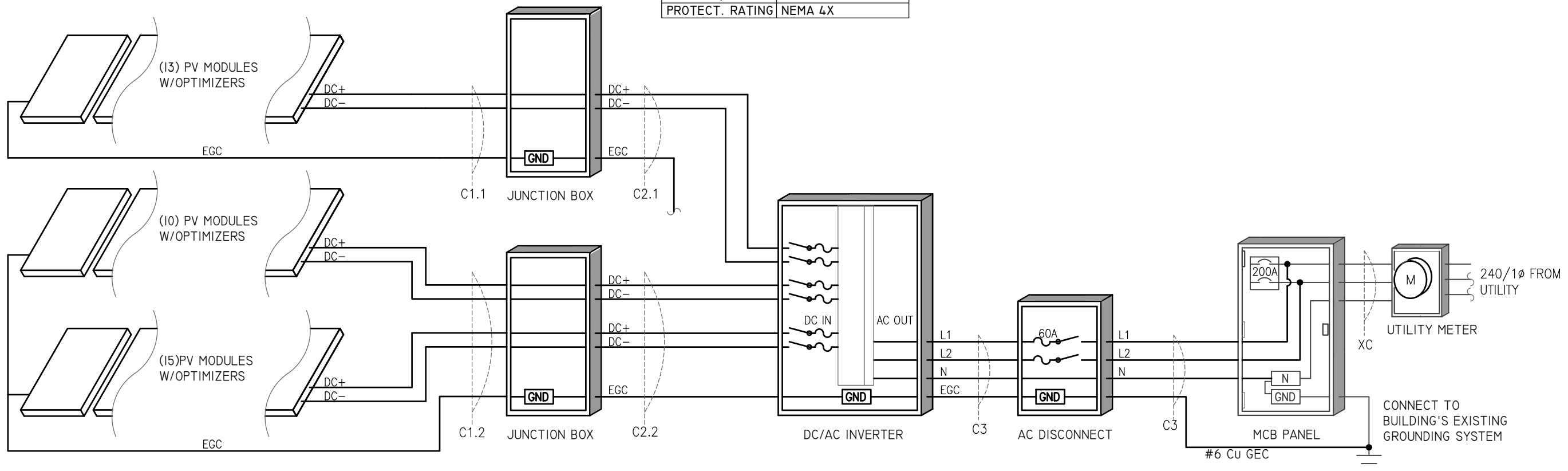
NOTES:

- LOAD-BREAK RATED
- VISIBLE OPEN
- LOCKABLE IN OPEN POSITION
- INSTALL ADJACENT TO METER
- DISCONNECT TO BE READILY ACCESSIBLE TO UTILITY COMPANY PERSONNEL AT ALL TIMES
- SERVICE RATED
- PROVIDE NEUTRAL/GROUND BONDING JUMPER

MD PANEL (EXISTING)	
MAKE	EATON
MODEL	N/A
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:

- BACK-FEED SOLAR OUTPUT VIA SUPPLY SIDE TAP INSIDE MAIN BREAKER.
- MAIN BREAKER SERVES AS SERVICE DISCONNECT SWITCH.



ENGINEER:

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

JOB TITLE:

NEW SOLAR PV SYSTEM
11.97 kW DC INPUT
10.00 kW AC EXPORT

TIM SCHERR
202 SUMMER CREEK LANE
SANFORD, NC 27332

CLIENT:



ISSUED FOR: CONSTRUCTION
DATE: 06/14/19

ELECTRICAL INFORMATION

PV3.1

© 2019 MODEL ENERGY, PLLC EXPRESSLY RESERVES ITS COMMON LAW COPYRIGHT AND OTHER PROPERTY RIGHTS IN THESE PLANS. THESE PLANS ARE NOT TO BE REPRODUCED, CHANGED OR COPIED IN ANY FORM OR MANNER WHATSOEVER, NOR ARE THEY TO BE ASSIGNED TO ANY THIRD PARTY WITHOUT FIRST OBTAINING THE EXPRESSED WRITTEN PERMISSION AND CONSENT OF MODEL ENERGY, PLLC.

! WARNING

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

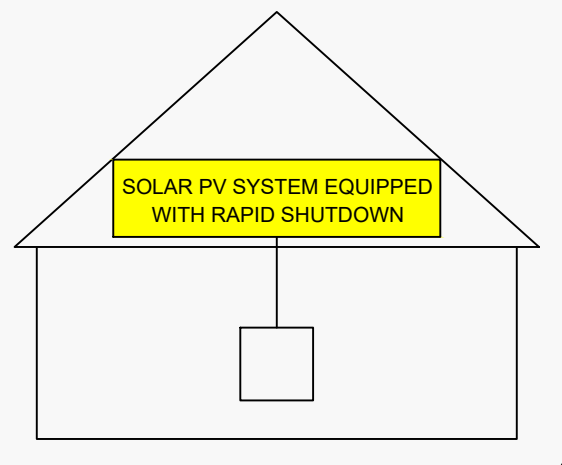
NEC 690.13 (B)
PLACE ON PV SYSTEM DISCONNECTING MEANS.

**RAPID SHUTDOWN
SWITCH FOR
SOLAR PV SYSTEM**

NEC 690.56 (C)(3)
PLACE ON RAPID SHUTDOWN SWITCH OR EQUIPMENT
WITH INTEGRATED RAPID SHUTDOWN *REFLECTIVE*

**SOLAR PV SYSTEM EQUIPPED
WITH RAPID SHUTDOWN**

TURN RAPID SHUTDOWN
SWITCH TO THE
"OFF" POSITION TO
SHUT DOWN PV SYSTEM
AND REDUCE
SHOCK HAZARD
IN THE ARRAY



NEC 690.56 (C)(1)(a)
PLACE WITHIN 3FT OF SERVICE DISCONNECTING MEANS TO
WHICH THE PV SYSTEMS ARE CONNECTED AND SHALL
INDICATE THE LOCATIONS OF RAPID SHUTDOWN SWITCHES

! WARNING

POWER SOURCE
OUTPUT CONNECTION
DO NOT RELOCATE THIS
OVERCURRENT DEVICE

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

PHOTOVOLTAIC POWER SOURCE

OPERATING AC VOLTAGE 240 V

MAXIMUM OPERATING
AC OUTPUT CURRENT 42 A

NEC 690.54
PLACE ON INTERCONNECTION
DISCONNECTING MEANS

**WARNING: PHOTOVOLTAIC
POWER SOURCE**

NEC 690.31 (G)(3)&(4)
PLACE ON ALL JUNCTION BOXES EXPOSED RACEWAYS
EVERY 10' AND 1' FROM BENDS AND PENATRATIONS,
ADJACENT TO THE MAIN SERVICE DISCONNECT *REFLECTIVE*

**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

**DIRECT CURRENT
PHOTOVOLTAIC POWER SOURCE**

MAXIMUM VOLTAGE 600 VDC
MAX CIRCUIT CURRENT 45.0 AMPS

NEC 690.53
PLACE ON ALL DC DISCONNECTING MEANS

EQUIPMENT LABEL NOTES	
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.

ENGINEER:

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

JOB TITLE:

NEW SOLAR PV SYSTEM
11.97 kW DC INPUT
10.00 kW AC EXPORT

TIM SCHERR
202 SUMMER CREEK LANE
SANFORD, NC 27332

CLIENT:

ISSUED FOR:	DATE:
CONSTRUCTION	06/14/19

EQUIPMENT
LABELS

PV4.1

© 2019 MODEL ENERGY, PLLC EXPRESSLY RESERVES ITS COMMON LAW COPYRIGHT AND OTHER PROPERTY RIGHTS IN THESE PLANS. THESE PLANS ARE NOT TO BE REPRODUCED, CHANGED OR COPIED IN ANY FORM OR MANNER WHATSOEVER, NOR ARE THEY TO BE ASSIGNED TO ANY THIRD PARTY WITHOUT FIRST OBTAINING THE EXPRESSED WRITTEN PERMISSION AND CONSENT OF MODEL ENERGY, PLLC.