INSTALLATION OF NEW ROOF MOUNTED/ GROUND MOUNTED 11.96kW PV SYSTEM

194 PIERCE ROAD
WEST BROOKFIELD, MA 01585

VICINITY MAP
SCALE: NTS

SATELLITE VIEW
SCALE: NTS

GENERAL NOTES

IF ISSUED DRAWING IS MARKED WITH A REVISION CHARACTER OTHER THAN "A", PLEASE BE ADVISED THAT FINAL EQUIPMENT AND/OR SYSTEM CHARACTERISTICS ARE SUBJECT TO CHANGE DUE TO AVAILABLITY OF EQUIPMENT.

GENERAL NOTES

1. THE INSTALLATION CONTRACTOR IS RESPONSIBLE FOR INSTALLING ALL EQUIPMENT AND FOLLOWING ALL DIRECTIONS AND INSTRUCTIONS CONTAINED IN THE DRAWING PACKAGE AND INFORMATION RECEIVED FROM TRINITY.
2. THE INSTALLATION CONTRACTOR IS RESPONSIBLE FOR INSTALLING ALL EQUIPMENT AND FOLLOWING ALL DIRECTIONS AND INSTRUCTION CONTAINED IN THE COMPLETE MANUAL.
3. THE INSTALLATION CONTRACTOR IS RESPONSIBLE FOR READING AND UNDERSTANDING ALL DRAWINGS, COMPONENT AND INVERTER MANUALS PRIOR TO INSTALLATION. THE INSTALLATION CONTRACTOR IS ALSO REQUIRED TO HAVE ALL COMPONENT SWITCHES IN THE OFF POSITION AND FUSES REMOVED PRIOR TO THE INSTALLATION OF ALL FUSES BEARING SYSTEM COMPONENTS.
4. ONCE THE PHOTOVOLTAIC MODULES ARE MOUNTED, THE INSTALLATION CONTRACTOR SHOULD HAVE A MINIMUM OF ONE ELECTRICIAN WHO HAS ATTENDED A SOLAR PHOTOVOLTAIC INSTALLATION COURSE ON SITE.
5. FOR SAFETY, IT IS RECOMMENDED BY THE MANUFACTURE THAT THE INSTALLATION CREW ALWAYS HAVE A MINIMUM OF TWO PERSONS WORKING TOGETHER AND THAT EACH OF THE INSTALLATION CREW MEMBERS BE TRAINED IN FIRST AID AND CPR.
6. THIS SOLAR PHOTOVOLTAIC SYSTEM IS TO BE INSTALLED FOLLOWING THE CONVENTIONS OF THE NATIONAL ELECTRIC CODE. ANY LOCAL CODE WHICH MAY SUPERSEDE THE NEC SHALL GOVERN.
7. ALL SYSTEM COMPONENTS TO BE INSTALLED WITH THIS SYSTEM ARE TO BE "UL" LISTED. ALL EQUIPMENT WILL BE NEMA 3R OUTDOOR RATED UNLESS INDOORS.

GENERAL NOTES CONTINUED

8. THE DC VOLTAGE FROM THE PANELS IS ALWAYS PRESENT AT THE DC DISCONNECT ENCLOSURE AND THE DC TERMINALS OF THE INVERTER DURING DAYLIGHT HOURS. ALL PERSONS WORKING ON OR INVOLVED WITH THE PHOTOVOLTAIC SYSTEM ARE WARNED THAT THE SOLAR MODULES ARE ENERGIZED WHENEVER THEY ARE EXPOSED TO LIGHT.
9. ALL PORTIONS OF THIS SOLAR PHOTOVOLTAIC SYSTEM SHALL BE MARKED CLEARLY IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE ARTICLE 690.
10. PRIOR TO THE INSTALLATION OF THIS PHOTOVOLTAIC SYSTEM, THE INSTALLATION CONTRACTOR SHALL ATTEND A PRE-INSTALLTION MEETING FOR THE REVIEW OF THE INSTALLATION PROCEDURES, SCHEDULES, SAFETY AND COORDINATION.
11. PRIOR TO THE SYSTEM START UP THE INSTALLATION CONTRACTOR SHALL ASSIST IN PERFORMING ALL INITIAL HARDWARE CHECKS AND DC WIRING CONDUCTIVITY CHECKS.
12. FOR THE PROPER MAINTENANCE AND ISOLATION OF THE INVERTS REFER TO THE ISOLATION PROCEDURES IN THE OPERATION MANUAL.
13. THE LOCATION OF PROPOSED ELECTRIC AND TELEPHONE UTILITIES ARE SUBJECT TO FINAL APPROVAL OF THE APPROPRIATE UTILITY COMPANIES AND OWNERS.
14. ALL MATERIALS, WORKMANSHIP AND CONSTRUCTION FOR THE SITE IMPROVEMENTS SHOWN HEREIN SHALL BE IN ACCORDANCE WITH:
    A) CURRENT PREVAILING MUNICIPAL AND/OR COUNTY SPECIFICATIONS, STANDARDS AND REQUIREMENTS

GENERAL NOTES CONTINUED

14. B) CURRENT PREVAILING UTILITY COMPANY SPECIFICATIONS, STANDARDS, AND REQUIREMENTS
15 THIS SET OF PLANS HAVE BEEN PREPARED FOR THE PURPOSE OF MUNICIPAL AND AGENCY REVIEW AND APPROVAL. THIS SET OF PLANS SHALL NOT BE UTILIZED AS CONSTRUCTION DRAWINGS UNTIL REVISED TO INDICATE "ISSUED FOR CONSTRUCTION".
16 ALL INFORMATION SHOWN MUST BE CERTIFIED PRIOR TO USE FOR CONSTRUCTION ACTIVITIES.

ABBREVIATIONS

AMP	AMPERE
AC	ALTERNATING CURRENT
AL	ALUMINUM
AF	AMP. FRAME
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AWG	AMERICAN WIRE GAUGE
C	CONDUIT (GENERIC TERM OF RACEWAY, PROVIDE AS SPECIFIED)
CB	COMBINER BOX
CKT	CIRCUIT
CT	CURRENT TRANSFORMER
CU	COPPER
DC	DIRECT CURRENT
DISC	DISCONNECT SWITCH
DWG	DRAWING
EC	ELECTRICAL SYSTEM INSTALLER
EMT	ELECTRICAL METALLIC TUBING
FS	FUSIBLE SWITCH
FU	FUSE
GND	GROUND
GFI	GROUND FAULT INTERRUPTER
HZ	FREQUENCY (CYCLES PER SECOND)

ABBREVIATIONS CONTINUED

JB	JUNCTION BOX
kCMIL	THOUSAND CIRCULAR MILS
kVA	KILO-VOLT AMPERE
kW	KILO-WATT
kWH	KILO-WATT HOUR
L	LINE
MCB	MAIN CIRCUIT BREAKER
MDP	MAIN DISTRIBUTION PANEL
MLO	MAIN LUG ONLY
MTD	MOUNTED
MTG	MOUNTING
N	NEUTRAL
NEC	NATIONAL ELECTRICAL CODE
NIC	NOT IN CONTRACT
NO #	NUMBER
NTS	NOT TO SCALE
OCP	OVER CURRENT PROTECTION
P	POLE
PB	PULL BOX
PH ∅	PHASE
PVC	POLY-VINYL CHLORIDE CONDUIT
PWR	POWER
QTY	QUANTITY
RGS	RIGID GALVANIZED STEEL
SN	SOLID NEUTRAL
JSWBD	SWITCHBOARD
TYP	TYPICAL
U.O.I.	UNLESS OTHERWISE INDICATED
WP	WEATHERPROOF
XFMR	TRANSFORMER
+72	MOUNT 72 INCHES TO BOTTOM OF ABOVE FINISHED FLOOR OR GRADE

SHEET INDEX

PV-1 COVER SHEET W/ SITE INFO & NOTES
PV-2 LAYOUT PLAN W/ MODULE LOCATIONS
PV-3 STRUCTURAL DETAILS
PV-4 ELECTRICAL 3 LINE DIAGRAM

*PLANS COMPLY WITH 2010 RCNYS ASCE 7-05, 2001 WFCM AS PER REFERNCED STANDARDS. WIND SPEED DESIGN IS 110 MPH

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NO.	DESCRIPTION	DATE
P1	ISSUED TO TOWNSHIP FOR PERMIT	2/26/2016

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RODEEN, ADAM

TRINITY ACCT #: 2015-74913

Project Address:

194 PIERCE ROAD
WEST BROOKFIELD, MA 01585

Drawing Title:

PROPOSED 11.96kW SOLAR SYSTEM

Drawing Information

DRAWING DATE:	2/26/2016
DRAWN BY:	JC
REVISED BY:	

System Information:

TOTAL SYSTEM SIZE:	11.96kW
TOTAL MODULE COUNT:	46
MODULES USED:	TRINA 260
MODULE SPEC #:	TSM-260 PD05.08
UTILITY COMPANY:	NAT'L GRID
UTILITY ACCT #:	63021 50014
UTILITY METER #:	30931144
DEAL TYPE:	MOSAIC

Rev. No. P1

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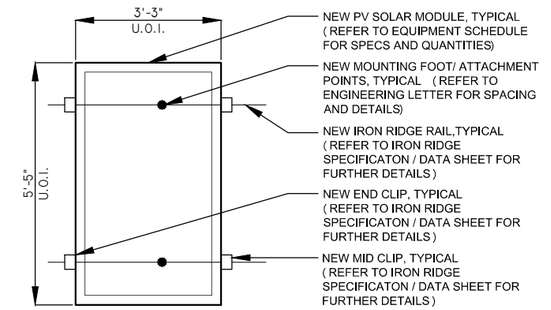
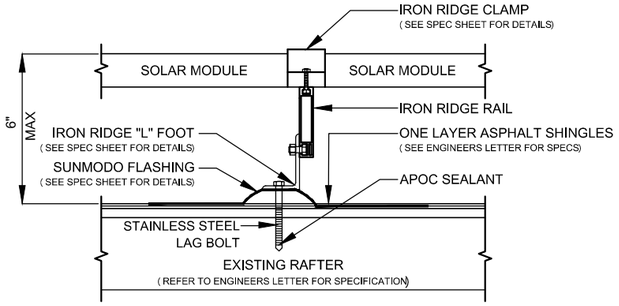
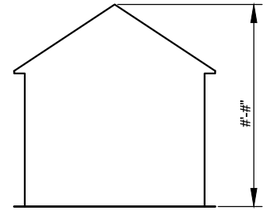


NOTE : REFER TO MODULE SPECS FOR ACTUAL MODULE DIMENSIONS

ATTACHMENT & CLIP DETAIL
SCALE: NOT TO SCALE

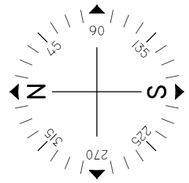


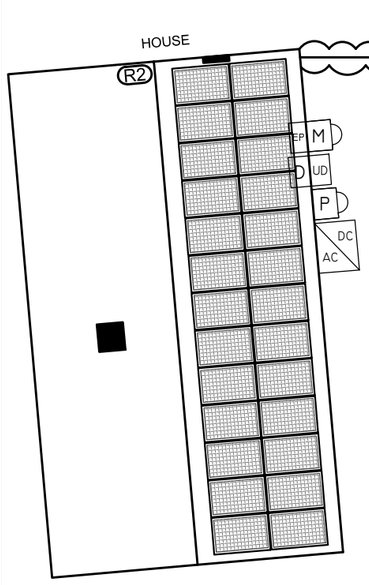
PV MODULE ATTACHMENT ON ASPHALT SHINGLE ROOF
SCALE: NOT TO SCALE



SOLAR MODULES SHALL NOT EXCEED PEAK HEIGHT.

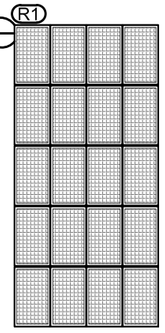
HEIGHT FROM GROUND LEVEL TO PEAK OF ROOF
SCALE: NOT TO SCALE





FRONT

CONDUIT TO BE TRENCHED APPROX. 150'



GROUND MOUNT

BACK

NOTES:
1.) ALL EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
2.) ALL OUTDOOR EQUIPMENT SHALL BE RAIN TIGHT WITH MINIMUM NEMA 3R RATING.
3.) ALL LOCATIONS ARE APPROXIMATE AND REQUIRE FIELD VERIFICATION.
4.) ALL EQUIPMENT INSTALLED OUTDOORS SHALL HAVE A NEMA 3 RATING

ARRAY SCHEDULE
ARRAY 1
ARRAY ORIENTATION = 180° MODULE PITCH = 30°
ARRAY 2
ARRAY ORIENTATION = 173° MODULE PITCH = 23°

SYMBOL LEGEND			
≈	INDICATES 24" DEEP TRENCHED.	UD	INDICATES NEW UTILITY DISCONNECT TO BE INSTALLED OUTSIDE
M	INDICATES EXISTING METER LOCATION		INDICATES NEW PV SOLAR MODULE. RED MODULES INDICATE PANELS THAT USE MICRO INVERTERS. REFER TO EQUIPMENT SCHEDULE FOR SPECS.
EP	INDICATES EXISTING ELECTRICAL PANEL LOCATION: IN BASEMENT	P	INDICATES NEW PRODUCTION METER TO BE INSTALLED OUTSIDE.
D	INDICATES NEW MAIN DISCONNECT TO BE GROUPED WITH MAIN PANEL	DC / AC	INDICATES NEW INVERTER TO BE INSTALLED OUTSIDE. REFER TO EQUIPMENT SCHEDULE FOR SPECS.

EQUIPMENT SCHEDULE	
QTY	SPEC #
46	TRINA 260 (TSM-260 PD05.08)
1	SE10000A-US

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DEAL TYPE:	MOSAIC

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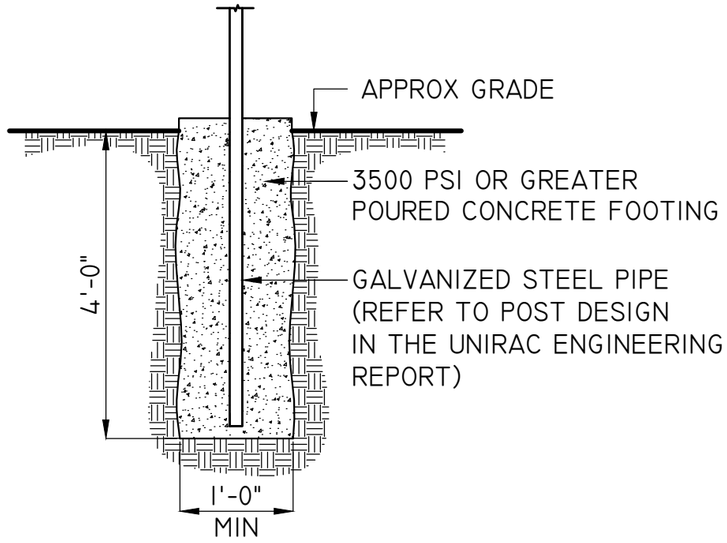
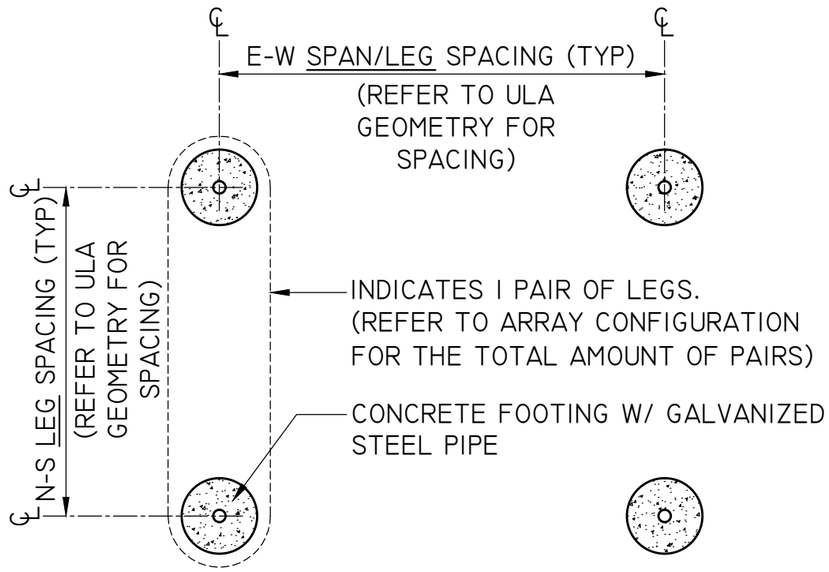


CONCRETE FOOTING DETAIL

SCALE: NTS REFER TO UNIRAC ENGINEER REPORT FOR SPECIFICATIONS



CONCRETE FOOTING LAYOUT

SCALE: NTS REFER TO UNIRAC ULA QUOTATIONS FOR SPECIFICATIONS

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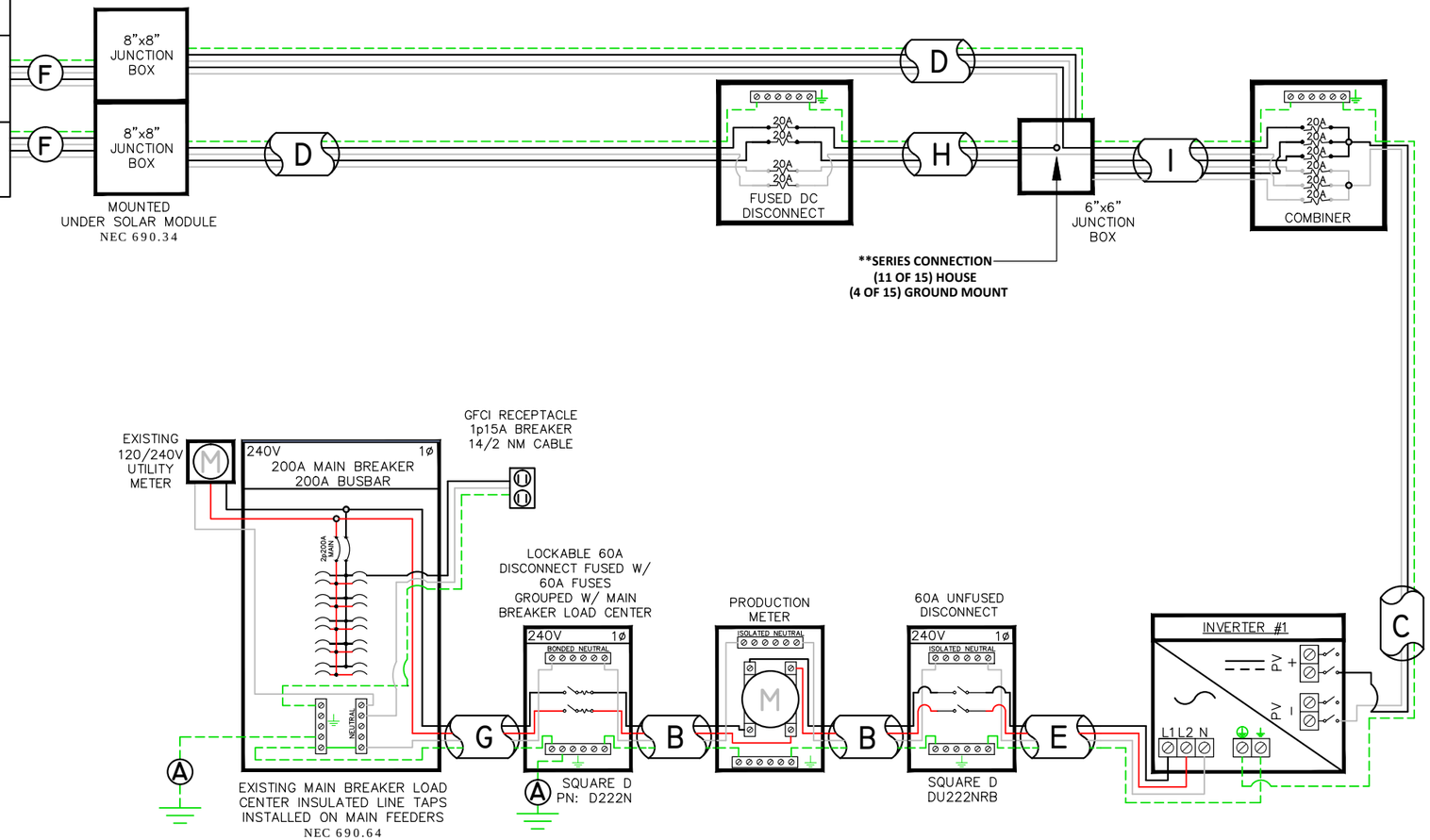
SOLAR MODULES GROUND MOUNTED ON 2 ARRAYS 46 - 260W MODULES W/ 1 SOLAR EDGE P300 PER MODULE 18.75 ADC MAX PER STRING
(TOTAL) 2 STRINGS OF 15 MODULES IN SERIES - 350 Vmax 1 STRING OF 16 MODULES IN SERIES - 350 Vmax *3 STRINGS TO BE TERMINATED IN PARALLEL INSIDE COMBINER BOX
(HOUSE) 1 STRING OF 15 MODULES IN SERIES - 350 Vmax 1 STRING (11 OF 15) MODULES IN SERIES - 350 Vmax *STRING (11 OF 15) TO BE TERMINATED IN SERIES WITH (4 OF 15) FROM GROUND MOUNT
(GROUND MOUNT) 1 STRING OF 16 MODULES IN SERIES - 350 Vmax 1 STRING (4 OF 15) MODULES IN SERIES - 350 Vmax *STRING (4 OF 15) TO BE TERMINATED IN SERIES WITH (11 OF 15) FROM HOUSE



ARRAY CIRCUIT WIRING NOTES
1.) LICENSED ELECTRICIAN ASSUMES ALL RESPONSIBILITY FOR DETERMINING ONSITE CONDITIONS AND EXECUTING INSTALLATION IN ACCORDANCE WITH NEC 2014

2.) LOWEST EXPECTED AMBIENT TEMPERATURE BASED ON ASHRAE MINIMUM MEAN EXTREME DRY BULB TEMPERATURE FOR ASHRAE LOCATION MOST SIMILAR TO INSTALLATION LOCATION. LOWEST EXPECTED AMBIENT TEMP = **-16°C**

3.) HIGHEST CONTINUOUS AMBIENT TEMPERATURE BASED ON ASHRAE HIGHEST MONTH 2% DRY BULB TEMPERATURE FOR ASHRAE LOCATION MOST SIMILAR TO INSTALLATION LOCATION. HIGHEST CONTINUOUS TEMP = **33°C**

4.) 2005 ASHRAE FUNDAMENTALS 2% DESIGN TEMPERATURES DO NOT EXCEED 47°C IN THE UNITED STATES (PALM SPRINGS, CA IS 44.1°C). FOR LESS THAN 9 CURRENT-CARRYING CONDUCTORS IN A ROOF-MOUNTED SUNLIT CONDUIT AT LEAST 0.5" ABOVE ROOF AND USING THE OUTDOOR DESIGN TEMPERATURE OF 47°C OR LESS (ALL OF UNITED STATES)

5.) PHOTOVOLTAIC POWER SYSTEMS SHALL BE PERMITTED TO OPERATE WITH UNGROUNDED PHOTOVOLTAIC SOURCE AND OUTPUT CIRCUIT AS PER **NEC 690.35**

6.) ALL EQUIPMENT INSTALLED OUTDOORS SHALL HAVE A **NEMA 3R** RATING.

7.) ALL SOLAR SYSTEM LOAD CENTERS TO CONTAIN ONLY GENERATION CIRCUITS AND NO UNUSED POSITIONS OR LOADS

CALCULATIONS FOR CURRENT CARRYING CONDUCTORS
REQUIRED CONDUCTOR AMPACITY PER STRING
[NEC 690.8(B)(1)]: (15.00*1.25)3 = 56.25A

AWG #6, DERATED AMPACITY
AMBIENT TEMP: 55°C, TEMP DERATING FACTOR: .76
RACEWAY DERATING = 2 CCC: 1.00
(75*.76)1.00 = 57.00A

57.00A ≥ 56.25A, THEREFORE WIRE SIZE IS VALID

TOTAL AC REQUIRED CONDUCTOR AMPACITY
42.00A*1.25 = 52.50A

AWG #6, DERATED AMPACITY
AMBIENT TEMP: 30°C, TEMP DERATING: 1.0
RACEWAY DERATING ≤ 3 CCC: N/A
75A*1.0 = 75A

75A ≥ 52.50A, THEREFORE AC WIRE SIZE IS VALID

CALCULATION FOR PV OVERCURRENT PROTECTION
TOTAL INVERTER CURRENT: 42.00A
42.00A*1.25 = 52.50A
--> 60A OVERCURRENT PROTECTION IS VALID

PV MODULE SPECIFICATIONS	
TRINA 260 (TSM-260 PD05.08)	
Imp	8.5
Vmp	30.6
Voc	38.2
Isc	9

INVERTER #1 - SE10000A-US			
DC		AC	
Imp	30.5	Pout	10000
Vmp	350	Iout	42
Voc	500	Imax	52.5
Isc	45	Vnom	240

A	#6 THWN-2 GEC TO EXISTING GROUND ROD	G	3/4" FMC W/ 3-#6 THWN-2, 1-#8 THWN-2 GROUND
B	3/4" EMT W/ 2-#6 THWN-2, 1-#10 THWN-2, 1-#10 THWN-2 GROUND	H	1" PVC W/ 4-#10 THWN-2, 1-#10 THWN-2 GROUND (TRENCHED APPROX. 150')
C	3/4" EMT W/ 2-#6 THWN-2, 1-#10 THWN-2 GROUND	I	3/4" EMT W/ 6-#10 THWN-2, 1-#10 THWN-2 GROUND
D	3/4" EMT W/ 4-#10 THWN-2, 1-#10 THWN-2 GROUND		
E	3/4" EMT W/ 2-#6 THWN-2, 1-#10 THWN-2, 1-#10 THWN-2 GROUND		
F	#12 PV WIRE W/ #6 BARE COPPER BOND TO ARRAY		

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