



Town of Lancaster, Massachusetts
Office of Community Development and Planning

TOWN CLERK
JUN 29 2020
LANCASTER, MA 01523

LANCASTER PLANNING BOARD
SPECIAL PERMIT APPLICATION

NOTE: There are several sections to this application. Please read the entire application form before proceeding.

1. REQUIRED SUBMITTALS:

- a) An application fee of \$150.00 plus \$15.00 per unit must accompany the application (check payable to the *Town of Lancaster*)
- b) Advertising fee of \$50.00 (check payable to the *Town of Lancaster*)
- c) A list of parties in interest
- d) Revenue Certification Form
- e) Five copies of completed application with additional submittals, as required, to the Planning Board. One copy of completed application to the Town Clerk.

2. OWNER/PETITIONER: Megan Riendau

Address 31 Runawaybrook Rd Lancaster MA 01523

Telephone (978) 833-2495

E-mail mark.riendau@gmail.com

3. AGENT FOR OWNER (if applicable): Holyoke Applications Team, Trinity Solar

Address 4 Open Square Way, Suite 410, Holyoke, MA 01040

Telephone (413)203-9088 ext. 1522

E-mail applications.westma@trinity-solar.com

4. PREMISES FOR WHICH SPECIAL PERMIT IS SOUGHT:

Street 31 Runawaybrook Rd Lancaster MA 01523

Between _____ Street and _____ Street

Worcester District Registry of Deeds Book _____ Page _____

Lancaster Assessor's Map _____ Parcel(s) 147/044.0-0000-0031.K

5. APPLICATION FOR ENTERPRISE ZONING DISTRICT: *(for other than Enterprise Zoning District, please proceed to Section 6)*

Each application in this category will require:

- a) Narrative of no fewer than 200 words describing the proposed use; and
- b) Six (6) copies of a site plan of the building's layout on the lot as well as the layout of the interior of the facility, relationship to abutting properties with a residential dwelling and setbacks to property lines. Additional required information follow the specific item listed below:

- _____ Living facility for seniors as authorized at Section 220-8.1 (C)
- _____ Boarding, training or veterinary care as authorized at Section 220-8.2 (D)
- _____ Facilities for active outdoor recreation utilizing motorized equipment as authorized at Section 220-8.3 (C)
- _____ Underground or overhead communications, gas, electrical, etc. as authorized at Section 220-8.4 (A)
- _____ Nonprofit community centers, places of public assembly, etc. containing more than 500 square feet for assembly or a use customarily conducted as a business as authorized at Section 220-8.4 (C)
- _____ Long-term care facility as authorized at Section 220-8.4 (D)
- _____ Other customary accessory uses within Public, Health, Educational and Institutional Uses as authorized at Section 220-8.4 (BB)
- _____ Heliports as authorized at Section 220-8.4 (CC), Section 220-8.5 (DD) and Section 220-8.6 (EE)
- _____ Retail stores; craft, consumer, professional or commercial establishments as authorized at Section 220-8.5 (A) *(specific to sub-district EZ-A and sq. ft. requirement)*
- _____ Shopping center as authorized at Section 220-8.5 (B)
- _____ Gasoline service stations, including minor repairs only as authorized at Section 220-8.5 (C)
- _____ Car washing establishments as authorized at Section 220-8.5 (E)
- _____ Dry-cleaning and laundry establishments as authorized at Section 220-8.5 (F)
- _____ Funeral parlor, undertaking establishments as authorized at Section 220-8.5 (G)
- _____ Hotels, motels, inns as authorized at Section 220-8.5 (H)
- _____ Restaurants with drive-on/drive-through facilities as authorized at Section 8.5 (I)
- _____ Medical Clinics as authorized at Section 8.5 (J)
- _____ Printing, publishing and assembly, finishing, or packaging or products as authorized at Section 220-8.6 (A)
- _____ Open storage facilities for lumber, stone, brick, gravel, cement or other bulk materials and contractor's yards as authorized at Section 220-8.6 (E)
- _____ Research and development, engineering, assembly and construction of models, prototypes, samples and experimental products in connection with research, engineering, or development activities as authorized at Section 220-8.6 (H)

- _____ One-family dwelling for personnel required for the safe operation or maintenance of a permitted use as authorized at Section 220-8.6 (AA)
- _____ Outdoor storage accessory to a principal use as authorized at Section 220-8.6 (BB)
- _____ Retail outlets for products of the principal industrial use (*two sets of criteria*) as authorized at Section 220-8.6 (CC)
- _____ Activities accessory to activities permitted in other districts as a matter of right, whether or not on the same parcel as the principal permitted use, which are necessary in connection with scientific research or scientific development or related production as authorized at Section 220-8.6 (DD)

6. APPLICATION FOR ALL OTHER ZONING DISTRICTS:

Each application in this category will require:

- a) Narrative of no fewer than 200 words describing the proposed facility and use; and
- b) Six (6) copies of a site plan of the facility's layout on the lot as well as the layout of the interior of the facility, relationship to abutting properties with a residential dwelling and setbacks to property lines. Those marked with an asterisk (*) require a plan other than a site plan as listed above. Additional required information follow the specific item listed below:

- _____ Health and Fitness Center as authorized at Section 220-8.3 (H)
- _____ Heliports as authorized at Section 220-8.4 (CC), Section 220-8.5 (DD) and Section 220-8.6 (EE)
- _____ Medical Clinic as authorized at Section 220-8.5 (J)
- _____ *Integrated Planning Overlay District as authorized at Section 220-8.7. Integrated Plan as specified in Section 220-8.7 (E) of the Lancaster Zoning Bylaw.
- _____ Setback for soccer field as authorized at Section 220-11 (D)
- _____ *Lot shape as authorized at Section 220-14. Show *gross lot area* and the *lot shape calculation*, including any areas being excluded from the calculation of *lot area*.
- _____ *Flexible Development as authorized at Section 220-15. Include calculations justifying the proposed number of lots in relation to land area as well as six (6) copies of a Definitive Plan as described in Section 301-8 of the Subdivision Regulations.
- _____ *Shared or extended driveway as authorized at Section 220-22 (G) and (H). Plan of the driveway, parking facilities, development being served, and lot boundaries for each serviced lot, and in the case of extended driveways, existing and

proposed centerline profile, at 1"= 40' horizontal and 1"= 4' vertical unless another scale is approved prior to submittal.

_____ *Building design as authorized at Section 220-35 (B) and (C). Reference design elements prompting exemption of this bylaw as well as plan showing layout and dimensions of the building and the lot.

_____ *Disturbance control departure as authorized at Section 220-36.1 (A). Vicinity plan at 1"= 100' or larger, indicating relationship of the disturbance source, zoning district boundaries, and use of adjacent and nearby premises.

_____ *Lighting as authorized at Section 220-36.2 (H). Alternative lighting proposal.

_____ *Water Resource District as authorized at Section 220-39. Include attachments as specified in Section 200-39 (F) (5) of the Lancaster Zoning Bylaw.

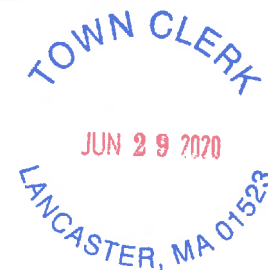
 x _____ *Solar Energy System as authorized by Article XVII of the Lancaster Zoning Bylaw.

6. ADDITIONAL SUBMITTALS – See items marked with asterisk (*) above.

7. SIGNATURE OF OWNER/PETITIONER 
Date 5/7/2020

8. SIGNATURE OF AGENT FOR OWNER (if applicable) 
Date 5/7/2020

9. RECEIVED BY THE LANCASTER TOWN CLERK:
Date _____



Important Contact Information

**Office of Community Development and Planning
Zoning Enforcement Officer/Building Inspector
Fax**

**978-365-3326 Ex. 1311
978-365-3326 Ex. 1309
978-368-4009**

CERTIFIED LIST OF PARTIES IN INTEREST

OWNERS NAME: Megan Riendau

ADDRESS OF PROPERTY: 31 Runawaybrook Rd Lancaster MA 01523

MAP & PARCEL: 147/044.0-0000-0031.K

The following is a list of all parties of interest, as defined by Massachusetts General Laws, Chapter 40A, Section 11.

PARTIES IN INTEREST shall mean the Petitioner, abutters, owners of land directly opposite on any Public or Private Street or way and abutters to the abutters within 300' of the property line, even though said land is in another city and/or town, and the Planning Boards of Lancaster and contiguous towns.

NAME		LEGAL MAILING ADDRESS (ZIP)
APPLICANT:	Holyoke Applications Team, Trinity Solar	4 Open Square Way, Suite 410, Holyoke, MA 01040
OWNER:	Megan Riendau	31 Runawaybrook Rd Lancaster MA 01523
AGENT/ATTORNEY:		
	LANCASTER PLANNING BOARD	
	HARVARD PLANNING BOARD	
	BOLTON PLANNING BOARD	
	CLINTON PLANNING BOARD	
	LEOMINSTER PLANNING BOARD	
	SHIRLEY PLANNING BOARD	
	LUNENBURG PLANNING BOARD	

REVENUE CERTIFICATION

Application/Petition/Appeal of:

1. **Applicant:** Holyoke Applications Team, Trinity Solar
2. **Owner:** Megan Riendau
3. **Property:** 31 Runawaybrook Rd Lancaster MA 01523
Assessors Map _____ **Parcel** 147/044.0-0000-0031.K

Pursuant to M.G.L. c. 40D, Section 57, and the General By-Laws of the Town of Lancaster, the undersigned applicant hereby certifies as follows:

- 1) The following named persons, firms or corporations constitute the complete list of all parties having an ownership or proprietary interest in the property or use subject to the above-entitled application.
- 2) Each of the below listed parties have complied with the laws of the Commonwealth of Massachusetts and the Town of Lancaster in that they have not neglected or refused to pay any local taxes, fees, assessments, betterments or other municipal charges for not less than a twelve month period.

OWNER:

Megan Riendau

APPLICANT:

Holyoke Applications Team, Trinity Solar

OTHER:

Signed under the pains and penalties of perjury,



Signature of Applicant

DATED: 5/7/2020

CERTIFIED BY TOWN OF LANCASTER TOWN COLLECTOR



DATED: 6-29-20

ABUTTERS CERTIFICATION

[illegible]

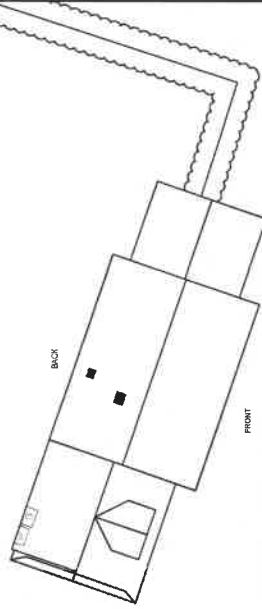
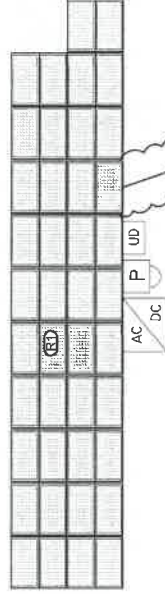
CERTIFIED BY BOARD OF ASSESSORS: _____ **DATE:** _____

Trinity[®]
SOLAR



ARRAY SCHEDULE

PEDESTAL MOUNTED UTILITY METER
PLACARD TO BE INSTALLED INDICATING
PV SYSTEM DISCONNECT LOCATION



- NOTES:
- 1) ALL EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
 - 2) ARRAY SIZING TO COMPLY WITH MANUFACTURER SPECIFICATION.
 - 3) ALL LOCATIONS ARE APPROXIMATE AND REQUIRE FIELD VERIFICATION.
 - 4) AN AC DISCONNECT SHALL BE GROUPED WITH INVERTER (S) NEC 680.13 (E).
 - 5) ALL EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
 - 6) ROOF-OF-SOLAR INSTALLATION ONLY PV ARRAY SHALL NOT EXTEND BEYOND THE EXISTING ROOF EDGE.

SYMBOL LEGEND

(RD)	INDICATES ROOF DESIGNATION. REFER TO ARRAY SCHEDULE FOR NOTE INFORMATION	UD	INDICATES NEW UNUSED PV DISCONNECT TO BE INSTALLED OUTSIDE (UTILITY ACCESSIBLE)	SP	INDICATES NEW PV ONLY SUBPANEL TO BE INSTALLED
M	INDICATES EXISTING METER LOCATION	DC	INDICATES NEW PV SOLAR MODULE (DC) MODULES INDICATE PANELS THAT USE MICRO INVERTERS. REFER TO EQUIPMENT SCHEDULE FOR SPECS.	DC	INDICATES NEW DC DISCONNECT
EP	INDICATES EXISTING ELECTRICAL PANEL LOCATION. OUTSIDE	P	INDICATES NEW PRODUCTION METER TO BE INSTALLED OUTSIDE		
D	INDICATES NEW FIRED PV DISCONNECT TO BE INSTALLED OUTSIDE (UTILITY ACCESSIBLE)	AC	INDICATES NEW INVERTER TO BE INSTALLED OUTSIDE. REFER TO EQUIPMENT SCHEDULE FOR SPECS.		

EQUIPMENT SCHEDULE

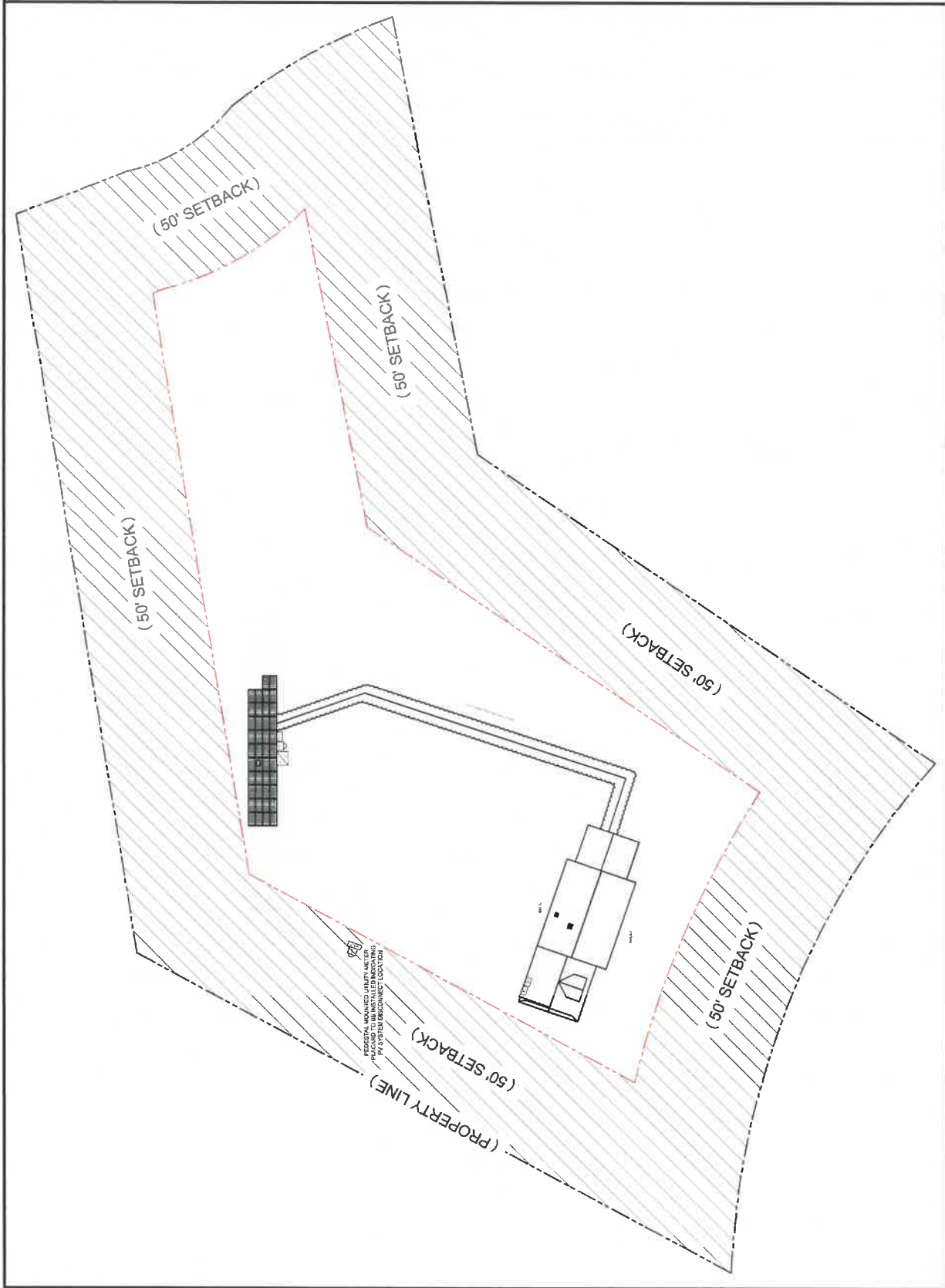
QTY	SPEC #
42	REC 315 (REC315NP BLACK)
1	SE11000H-US500NCL4
OTHER OBSTRUCTIONS	

Issued / Revisions	
NO.	DESCRIPTION
1	PROJECT: 10319-10-388974
2	PROJECT: 10319-10-388974
3	PROJECT: 10319-10-388974
4	PROJECT: 10319-10-388974
5	PROJECT: 10319-10-388974
6	PROJECT: 10319-10-388974
7	PROJECT: 10319-10-388974
8	PROJECT: 10319-10-388974
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98	PROJECT: 10319-10-388974
99	PROJECT: 10319-10-388974
100	PROJECT: 10319-10-388974

Rev. No.	Sheet
R2	PV - 2



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Issued / Revisions			
NO.	DESCRIPTION	DATE	
01	ISSUED FOR PERMIT	07/10/2020	
02	REVISED FOR PERMIT	07/10/2020	

Project Title:
RIENDAU, MEGAN-
TRINITY ACCT #: 2019-10-385874

Project Address:
31 RUNAWAY BROOK ROAD
LANCASTER, MA 01523
42.423052,-71.716004

Drawing Title:
PROPOSED PV SOLAR SYSTEM

Drawing Information	
DRAWING DATE:	9/10/2020
DRAWN BY:	K9
REVIEWED BY:	DMR

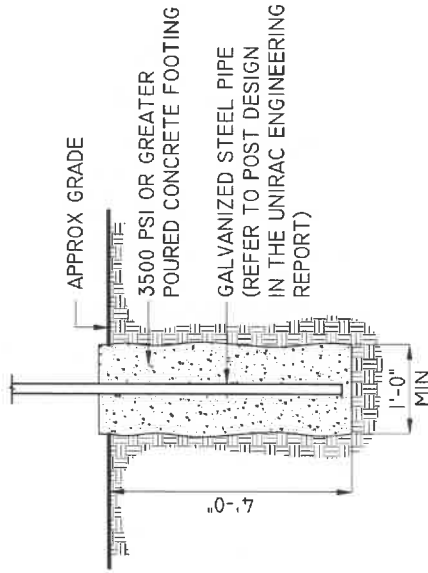
System Information:	
DC SYSTEM SIZE:	13.23KW
AC SYSTEM SIZE:	10KW
TOTAL MODULE COUNT:	42
MODULE USED:	REC15NP BLACK
MODULE SPEC #:	REC15NP
UTILITY COMPANY:	NAIL GRID
UTILITY ACCT #:	03879-40010
UTILITY METER #:	5733M05
DEAL TYPE:	SUNNOVA

Rev. No.	Sheet
R2	PV - 3



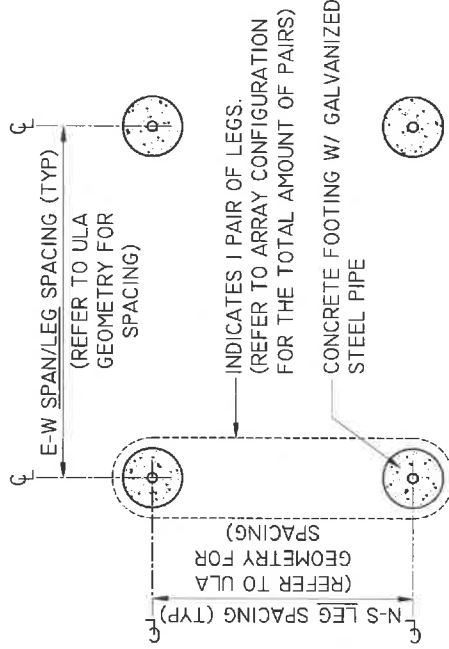
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CONCRETE FOOTING DETAIL

SCALE: NTS REFER TO UNIRAC ENGINEER REPORT
FOR SPECIFICATIONS



CONCRETE FOOTING LAYOUT

SCALE: NTS REFER TO UNIRAC ULA QUOTATIONS
FOR SPECIFICATIONS

Issued / Revisions	
R2 PROJECT ULA SYSTEMS 4/24/2020	R1 PROJECT ULA SYSTEMS 4/24/2020
R3 PROJECT ULA SYSTEMS 4/24/2020	R4 PROJECT ULA SYSTEMS 4/24/2020
NO. DESCRIPTION DATE	NO. DESCRIPTION DATE
Project Title: RIENDAU, MEGAN- TRINITY ACT # 2019-10-385874	
Project Address: 31 RUNAWAY BROOK ROAD LANCASTER, MA 01523 42.423052, -71.716004	
Drawing Title: PROPOSED PV SOLAR SYSTEM	
Drawing Information	
DRAWING DATE: 3/12/2020	DRAWN BY: KB
REVISED BY: DMR	DATE: 3/12/2020
System Information:	
DC SYSTEM SIZE: 13.23KW	AC SYSTEM SIZE: 10KW
TOTAL MODULE COUNT: 42	MODULES USED: REC-315
MODULE SPEC #: REC-315HP BLACK	UTILITY COMPANY: NATL GRID
UTILITY ACT #: 08879-40000	DEALER TYPE: 25500005
DEALER NAME: SUNNOVA	DEALER TYPE: 25500005
Rev. No. R2	Sheet PV - 4



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ARRAY CIRCUIT WIRING NOTES

1.) LICENSED ELECTRICIAN ASSUMES ALL RESPONSIBILITY FOR DETERMINING ON-SITE CONDITIONS AND PROVIDING NECESSARY INFORMATION IN ACCORDANCE WITH NEC 2020

2.) LOWEST EXPECTED AMBIENT TEMPERATURE BASED ON ASHRAE MINIMUM MEAN EXTREME DRY BULB TEMPERATURE FOR THE LOCATION MOST SIMILAR TO INSTALLATION LOCATION. LOWEST EXPECTED AMBIENT TEMP = -18°C

3.) HIGHEST CONTINUOUS AMBIENT TEMPERATURE BASED ON ASHRAE HIGHEST MONTHLY 2% DRY BULB TEMPERATURE FOR THE LOCATION MOST SIMILAR TO INSTALLATION LOCATION. HIGHEST CONTINUOUS TEMP = 34°C

4.) 2005 ASHRAE FUNDAMENTALS 2% DESIGN TEMPERATURES: 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 1/2" CONDUIT, TEMPERATURE OF 47°C ON LEB (ALL OF UNITED STATES)

5.) PV SYSTEM CIRCUITS INSTALLED ON OR IN BUILDINGS SHALL INCLUDE A RAPID SHUTDOWN FUNCTION THAT CONTROLS SPECIFIC CONDUCTORS IN ACCORDANCE WITH NEC 690.12(A) THROUGH (D)

6.) PHOTOVOLTAIC POWER SYSTEMS SHALL BE PERMITTED TO OPERATE WITH UNGROUNDED PHOTOVOLTAIC SOURCE AND OUTPUT CIRCUIT AS PER NEC 690.41 (A)(4)

7.) UNGROUNDED DC CIRCUIT CONDUCTORS SHALL BE IDENTIFIED WITH THE FOLLOWING OUTER FINISH: POSITIVE CONDUCTORS - RED NEGATIVE CONDUCTORS - BLACK

8.) ARRAY AND SUB-ARRAY CONDUCTORS SHALL BE #10 PV WIRE TYPE RW90 OR EQUIVALENT AND SHALL BE PROTECTED BY CONDUIT WHERE EXPOSED TO DIRECT SUNLIGHT. SUB-ARRAY CONDUIT LONGER THAN 24" SHALL BE PROTECTED BY CONDUIT. SUNLIGHT SHALL CONTAIN 5-9 CURRENT CARRYING CONDUCTORS.

9.) ALL WIRE LENGTHS SHALL BE LESS THAN 100' UNLESS OTHERWISE NOTED

10.) FLEXIBLE CONDUIT SHALL NOT BE INSTALLED ON ROOFTOP AND SHALL BE LIMITED TO 12" IF USED OUTDOORS

11.) OVERCURRENT PROTECTION FOR CONDUCTORS CONNECTED TO THE SUPPLY SIDE OF A SERVICE SHALL BE LOCATED WITHIN 10' OF THE POINT OF CONNECTION NEC 690.9(A)(3)(2)

12.) WHERE TWO SOURCES FEED A BUSBAR, ONE A UTILITY AND THE OTHER AN INVERTER, PV BACKFEED DISCONNECT SHALL BE LOCATED OPPOSITE FROM UTILITY NEC 705.21(B)(2)(4)

13.) ALL SOLAR SYSTEM LOAD CENTERS TO CONTAIN ONLY OVERCURRENT DEVICES AND NO UNUSED POSITIONS ON LOADS

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

CALCULATIONS FOR CURRENT CARRYING CONDUCTORS REQUIRED CONDUIT TO BE 1/2" RIGID PVC PER STRING [NEC 690.41(B), (1500V) 1.251 * 81.75A

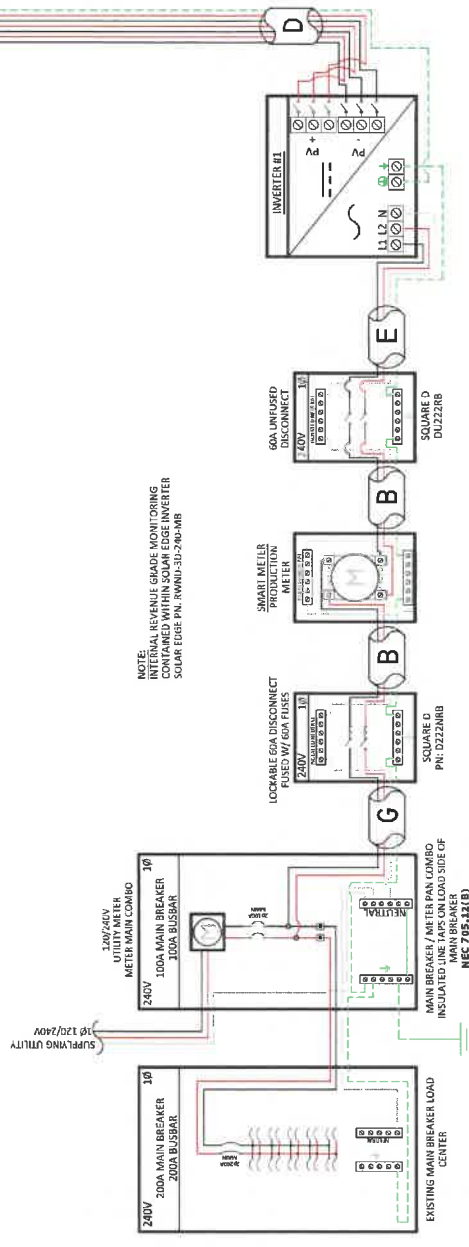
ANG #10 DERATED AMPACITY [NEC 310.15(B)(16)] 55A
NEC 705.13(B)(2) DIVERSITY FACTOR: .95
[400' 550A/80 = 30.72A
30.72A * 1.875A, THEREFORE WIRE SIZE IS VALID
TOTAL AC REQUIRED CONDUCTOR AMPACITY
42.00A * 1.25 = 52.50A

ANG #8 DERATED AMPACITY
AMBIENT TEMP: 30°C, TEMP DEGRATING: 1.0
[NEC 310.15(B)(16)] 42A
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
---> 50A OVERCURRENT PROTECTION IS VALID

SOLAR MODULES MOUNTED TO ROOF ON 1 ARRAY
42.315W MODULES W/ 1 SOLAR EDGE P320 PER MODULE
3 STRINGS OF 14 MODULES IN SERIES - 480 Vmax
*3 STRINGS TO BE TERMINATED IN PARALLEL INSIDE INVERTER 1

F

8" x 8" JUNCTION BOX



NOTE:
INTERNAL REVENUE GRADE MONITORING
CONTAINED WITHIN SQUARE EDGE INVERTER
SQUARE EDGE P/N: 1XW00-30-2-ND-MB

SMART METER
PANEL METER

60A UNGROUNDED
DISCONNECT

INVERTER #1

PV MODULE SPECIFICATIONS	
Imp	9.31
Vmp	38.9
Voc	40
Isc	10.17

INVERTER #1 - SET1000H-US200R3CA	
DC	AC
Imp	27
Vmp	400
Voc	480
Isc	45

NOTE: CONDUIT TYPE SHALL BE CHOSEN BY THE INSTALLATION CONTRACTOR
TO MEET OR EXCEED NEC AND LOCAL AID REQUIREMENTS

A	#6 THWN-2 GEC TO EXISTING GROUND RUD	G	3/4" CONDUIT W/ 2-#6 THWN-2, 1-#6 THWN-2 GROUND
B	3/4" CONDUIT W/ 2-#6 THWN-2, 1-#10 THWN-2 GROUND	H	1" PVC W/ 2-#3 THWN-2, 1-#8 THWN-2 GROUND (TRENCHED APPROX. 170')
C	3/4" CONDUIT W/ 6-#10 THWN-2, 1-#10 THWN-2 GROUND		
D	3/4" CONDUIT W/ 6-#10 THWN-2, 1-#10 THWN-2 GROUND		
E	3/4" CONDUIT W/ 2-#6 THWN-2, 1-#10 THWN-2 GROUND		
F	#10 PV WIRE (FREE AIR) W/ #6 BARE COPPER BOND TO ARRAY		

Issued / Revisions	
NO.	DESCRIPTION
1	PROJECT APPROVAL
2	PROJECT APPROVAL
3	PROJECT APPROVAL
4	PROJECT APPROVAL
5	PROJECT APPROVAL

Project Title:
RIENDAU, MEGAN-
TRINITY ACCT # 2019-10-385874

Project Address:
31 RUNAWAY BROOK ROAD
LANCASTER, MA 01523
42.423052,-71.716004

Drawing Title:
PROPOSED PV SOLAR SYSTEM

Drawn By:
3/18/2020
REVISED BY:
DWB

System Information:
DC SYSTEM SIZE: 13.23kW
AC SYSTEM SIZE: 10kW
TOTAL MODULE COUNT: 42
MODULES USED: REC 315
MODULE SPEC #:
UTILITY COMPANY: N.E.T. GRID
UTILITY ACCT #: 09479-00010
UTILITY METER #: 5250805
DEAL TYPE: SUNNOVA

Rev. No.
R2

Sheet
PV - 5



2313 Main Street
Wah, New Jersey 07075
877-365-7283
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Project Description:

Trinity solar and their client, Megan Riendau, propose that a 13.23 kilowatt DC solar system with a SolarEdge SE10000H-US000BNC4 (10 kw AC) inverter be installed at 31 Runawaybrook Rd, Lancaster, MA 01523. A conduit must be run underground approximately 170 feet long, which will require excavation work. The resulting trench will be 2 feet deep. The concrete footings that will hold the racking must be dug 4 feet deep and require the excavation of 4 holes. The system will extend approximately 700 square feet consisting of panels that are 5.5' by 3'. The system will contain a total of 42 panels. Using OLIVER, we have determined that the nearest wetlands are approximately 200' from the system and will have 50 foot setbacks from the front, sides, and back of the property lines. The lowest point of the system will be approximately 2 feet from the ground and the highest will extend up to roughly 8 feet tall. This system will be for residential use with the interest of applying for net metering with the utility. Trinity has yet to submit any building or electrical permitting applications to perform the work to the Lancaster Building Department.

Please feel free to reach out for any additional information and thank you so much,

Holyoke Applications Team, Trinity Solar

Applications.westma@trinity-solar.com

(413)203-9088 ext. 1522

INSTALLATION OF NEW
GROUND MOUNTED PV SOLAR SYSTEM
31 RUNAWAY BROOK ROAD
LANCASTER, MA 01523
42.423052,-71.716004

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 AVAILABILITY 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 FUSE 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 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 ELECTRICAL 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 ELECTRICAL CODE ARTICLE 690 & 705.
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 INVERTERS 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. ONCE APPROVED, THE INSTALLATION CONTRACTOR IS RESPONSIBLE FOR INSTALLING ALL SYSTEM COMPONENTS AS DESCRIBED IN THE DRAWING PACKAGE.
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 PROPERTY LINES & SETBACKS
PV-4 STRUCTURAL DETAILS
PV-5 ELECTRICAL 3 LINE DIAGRAM
APP APPENDIX

RUNAWAY BROOK ROAD ●



VICINITY MAP
SCALE: NTS

SITE



SATELLITE VIEW
SCALE: NTS

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NO.	DESCRIPTION	DATE
R2	PROPERTY LINES & SETBACKS	4/24/2020
R1	PANEL SWAP	4/16/2020
P1	ISSUED TO TOWNSHIP FOR PERMIT	3/18/2020

Project Title:

RIENDAU, MEGAN-
TRINITY ACCT #: 2019-10-385874

Project Address:

31 RUNAWAY BROOK ROAD
LANCASTER, MA 01523
42.423052,-71.716004

Drawing Title:

PROPOSED PV SOLAR SYSTEM

Drawing Information

DRAWING DATE:	3/18/2020
DRAWN BY:	KB
REVISED BY:	DMR

System Information:

DC SYSTEM SIZE:	13.23kW
AC SYSTEM SIZE:	10kW
TOTAL MODULE COUNT:	42
MODULES USED:	REC 315
MODULE SPEC #:	REC315NP BLACK
UTILITY COMPANY:	NAT'L GRID
UTILITY ACCT #:	05879-40010
UTILITY METER #:	52503005
DEAL TYPE:	SUNNOVA

Rev. No.

R2

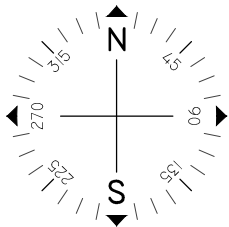
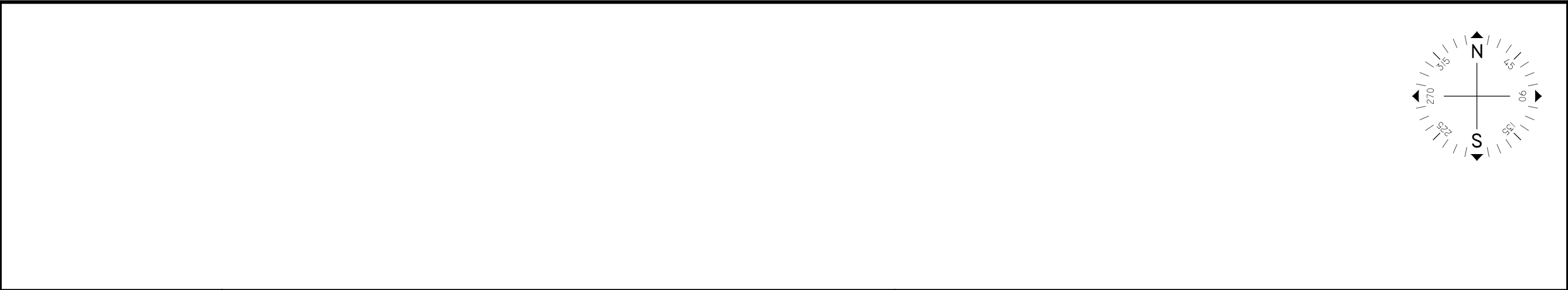
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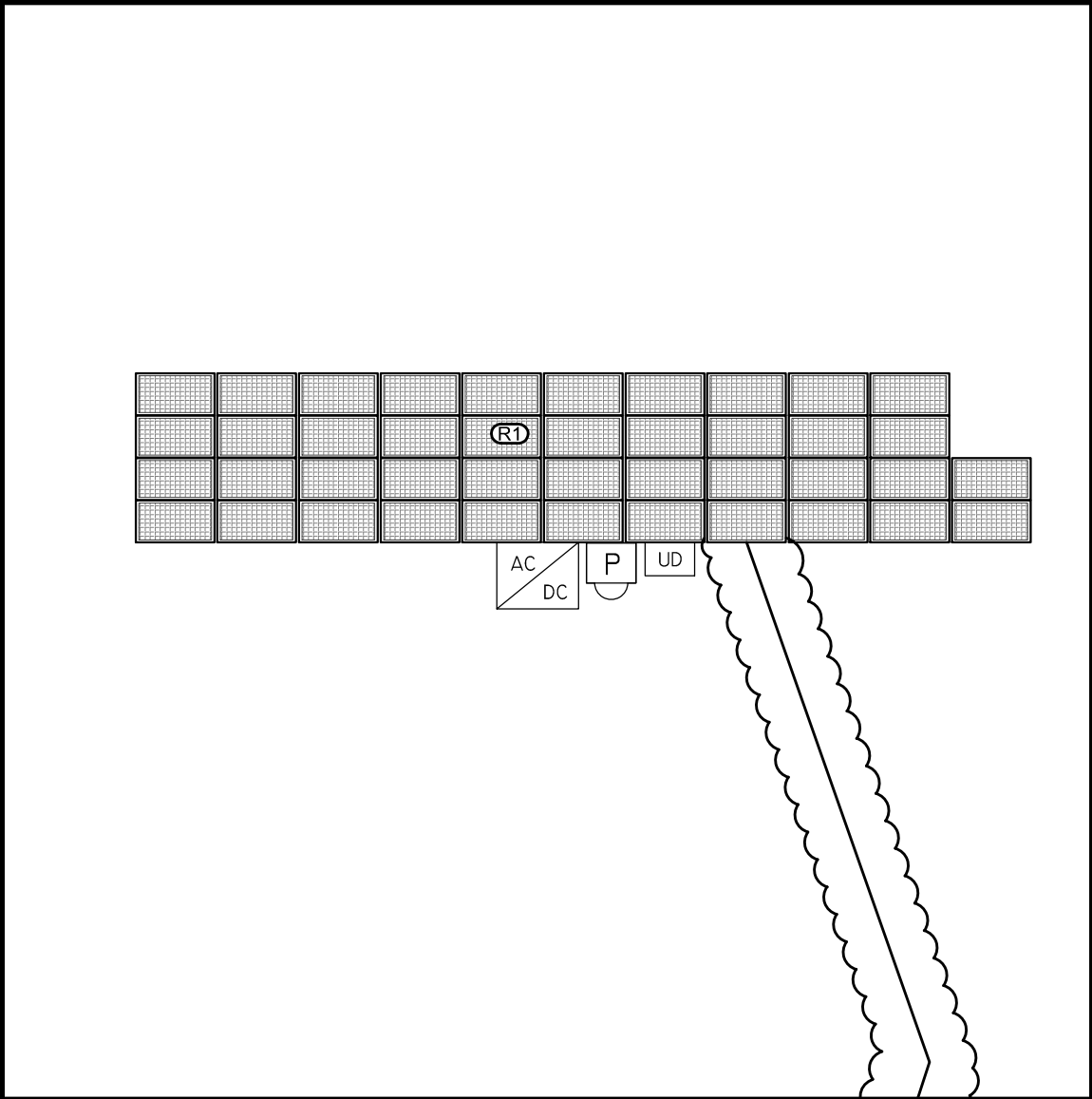
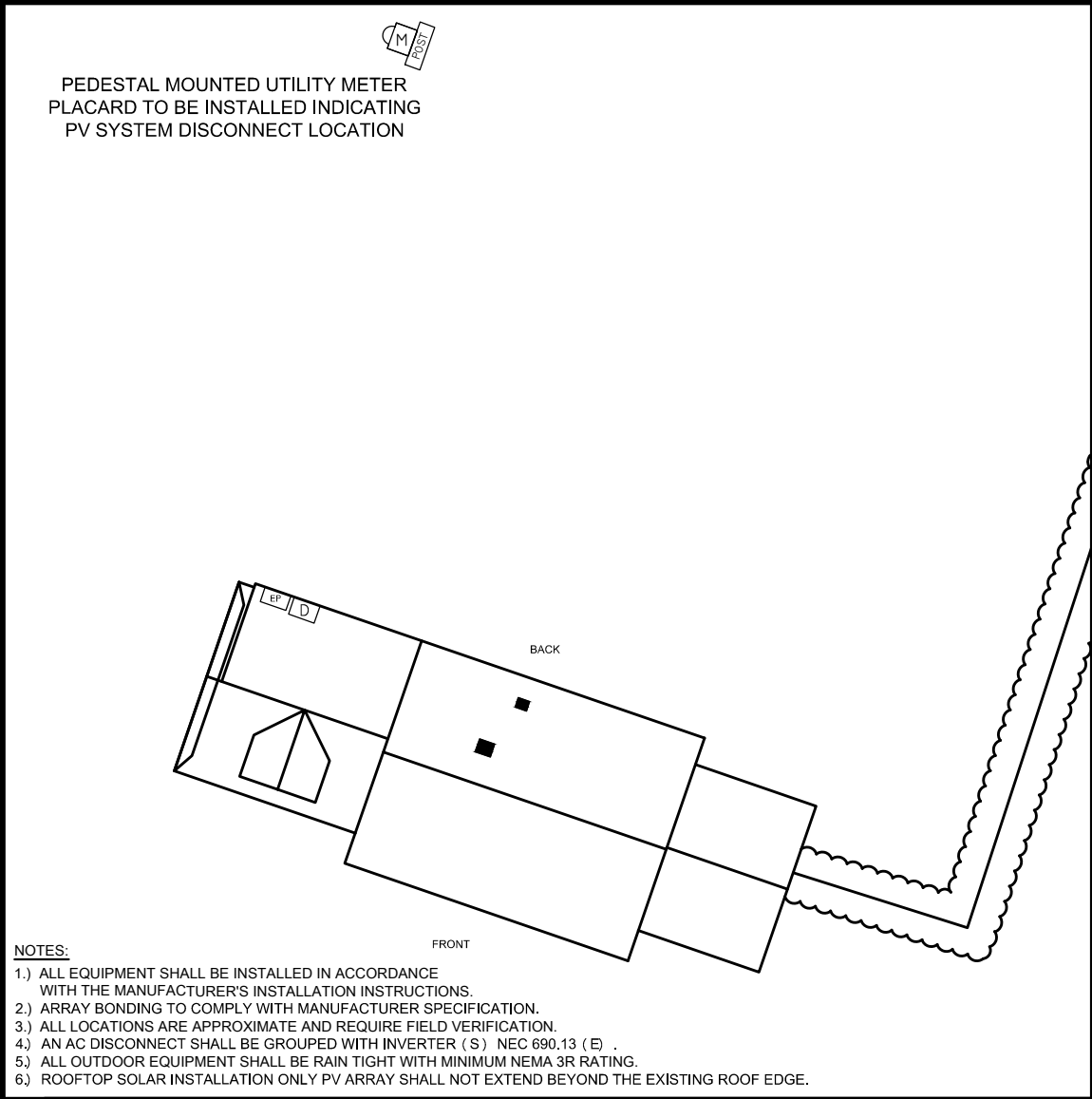


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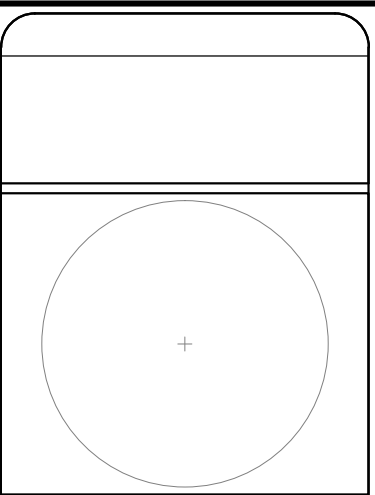
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ARRAY SCHEDULE



SYMBOL LEGEND				PLUMBING SCHEDULE	EQUIPMENT SCHEDULE	
	INDICATES ROOF DESIGNATION . REFER TO ARRAY SCHEDULE FOR MORE INFORMATION		INDICATES NEW UNFUSED PV DISCONNECT TO BE INSTALLED OUTSIDE (UTILITY ACCESSIBLE)		INDICATES NEW PV ONLY SUBPANEL TO BE INSTALLED	QTY
	INDICATES EXISTING METER LOCATION		INDICATES NEW PV SOLAR MODULE. RED MODULES INDICATE PANELS THAT USE MICRO INVERTERS. REFER TO EQUIPMENT SCHEDULE FOR SPECS.		INDICATES NEW DC DISCONNECT	SPEC #
	INDICATES EXISTING ELECTRICAL PANEL LOCATION: OUTSIDE		INDICATES NEW PRODUCTION METER TO BE INSTALLED OUTSIDE.			42
	INDICATES NEW FUSED PV DISCONNECT TO BE INSTALLED OUTSIDE (UTILITY ACCESSIBLE)		INDICATES NEW INVERTER TO BE INSTALLED OUTSIDE. REFER TO EQUIPMENT SCHEDULE FOR SPECS.			1
				OTHER OBSTRUCTIONS		



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REVISED BY:	DMR

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MODULE SPEC #:	REC315NP BLACK
UTILITY COMPANY:	NAT'L GRID
UTILITY ACCT #:	05879-40010
UTILITY METER #:	52503005
DEAL TYPE:	SUNNOVA

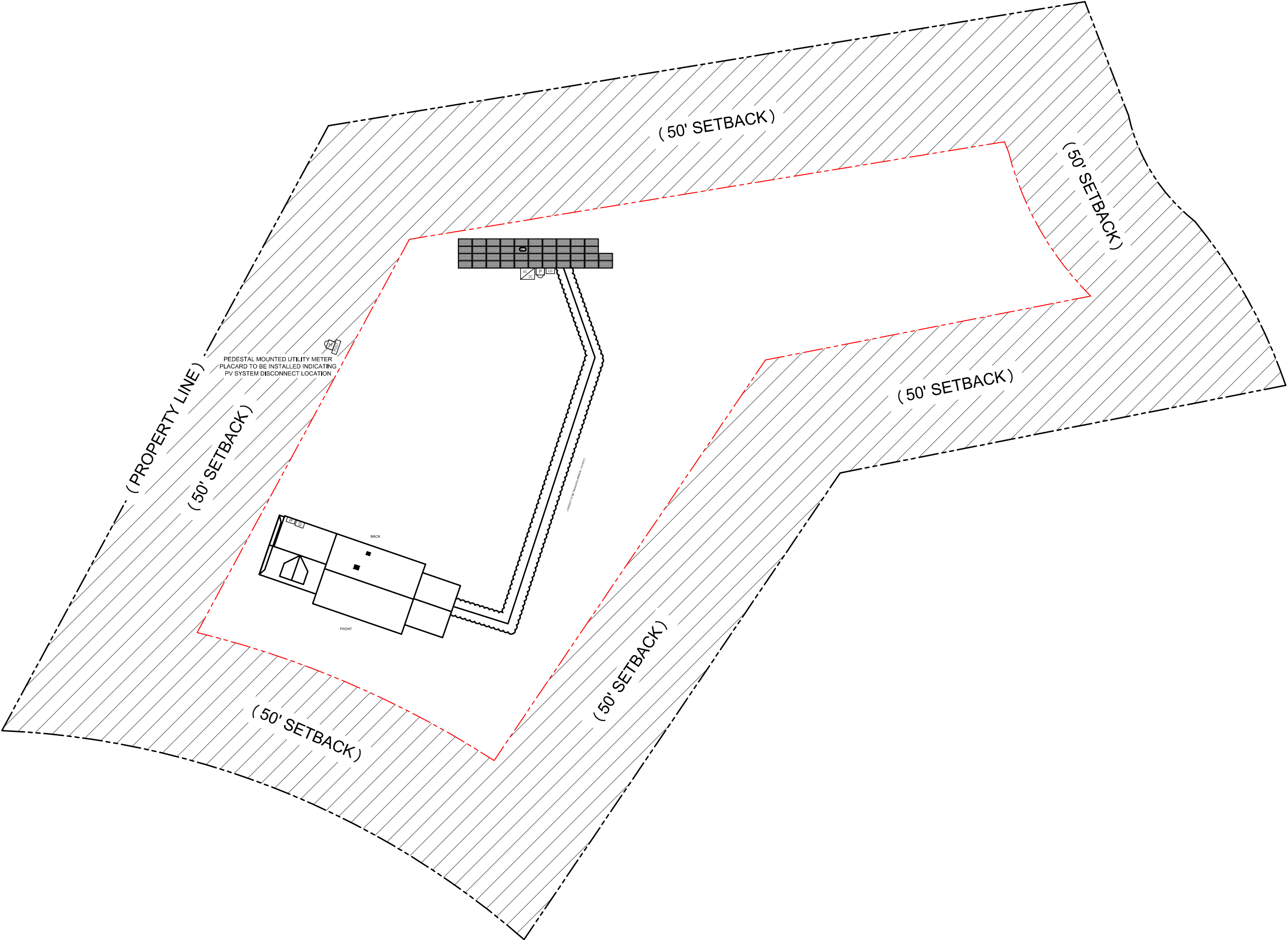
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R2	PV - 2



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ROOF 1
MODULES: 42
PITCH: 30
ORIENTATION: 196



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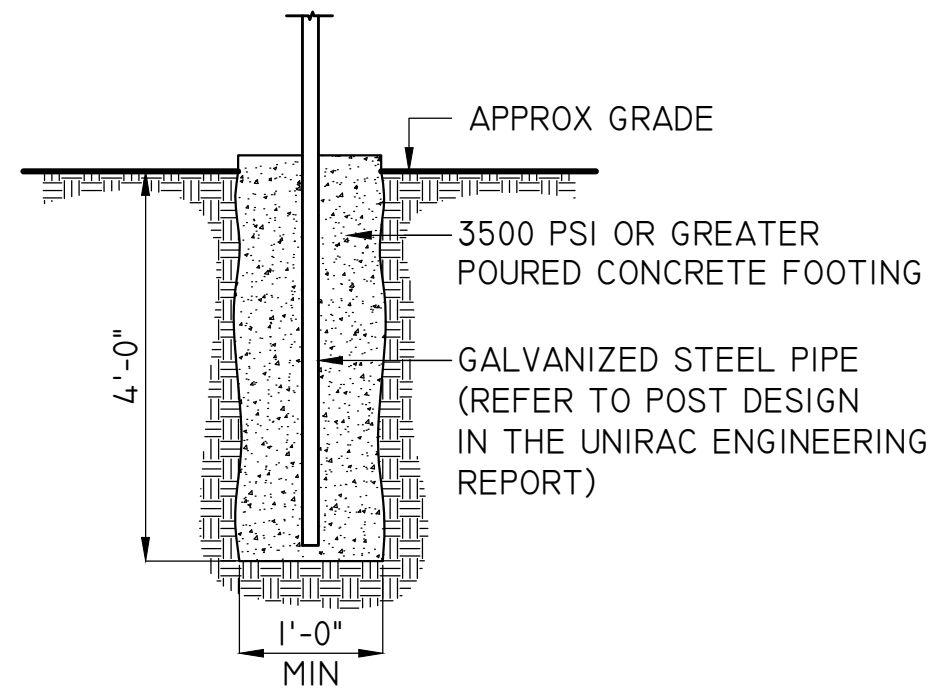
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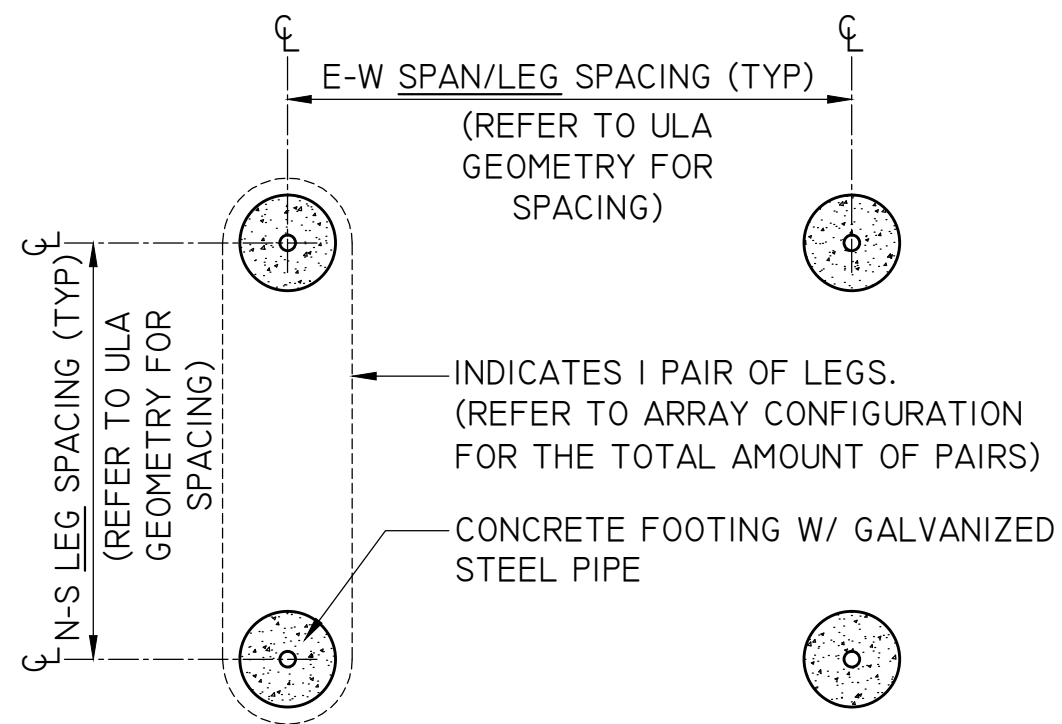
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UTILITY METER #:	52503005
DEAL TYPE:	SUNNOVA

Rev. No.	Sheet
R2	PV - 3

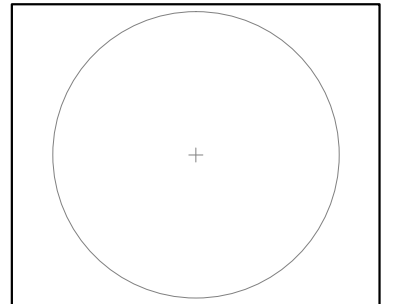
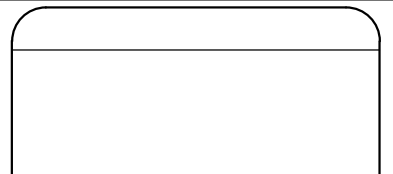




CONCRETE FOOTING DETAIL
 SCALE: NTS REFER TO UNIRAC ENGINEER REPORT FOR SPECIFICATIONS



CONCRETE FOOTING LAYOUT
 SCALE: NTS REFER TO UNIRAC ULA QUOTATIONS FOR SPECIFICATIONS



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UTILITY METER #:	52503005
DEAL TYPE:	SUNNOVA

Rev. No.	Sheet
R2	PV - 4



ARRAY CIRCUIT WIRING NOTES
1.) LICENSED ELECTRICIAN ASSUMES ALL RESPONSIBILITY
FOR DETERMINING ONSITE CONDITIONS AND
EXECUTING INSTALLATION IN ACCORDANCE WITH
NEC 2020

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.) PV SYSTEM CIRCUITS INSTALLED ON OR IN BUILDINGS
SHALL INCLUDE A RAPID SHUTDOWN FUNCTION THAT
CONTROLS SPECIFIC CONDUCTORS IN ACCORDANCE WITH
NEC 690.12(A) THROUGH (D)

6.) PHOTOVOLTAIC POWER SYSTEMS SHALL BE PERMITTED
TO OPERATE WITH UNGROUNDED PHOTOVOLTAIC
SOURCE AND OUTPUT CIRCUIT AS PER **NEC 690.41 (A)(4)**

7.) UNGROUNDED DC CIRCUIT CONDUCTORS SHALL BE
IDENTIFIED WITH THE FOLLOWING OUTER FINISH:
POSITIVE CONDUCTORS = RED
NEGATIVE CONDUCTORS = BLACK
NEC 210.5(C)(2)

8.) ARRAY AND SUB ARRAY CONDUCTORS SHALL BE #10 PV
WIRE TYPE RHW-2 OR EQUIVELANT AND SHALL BE
PROTECTED BY CONDUIT WHERE EXPOSED TO DIRECT
SUNLIGHT. SUB ARRAY CONDUIT LONGER THAN 24" SHALL
CONTAIN ≤ 20 CURRENT CARRYING CONDUCTORS AND
WHERE EXPOSED TO DIRECT SUNLIGHT SHALL CONTAIN
≤ 9 CURRENT CARRYING CONDUCTORS.

9.) ALL WIRE LENGTHS SHALL BE LESS THAN 100' UNLESS
OTHERWISE NOTED

10.) FLEXIBLE CONDUIT SHALL NOT BE INSTALLED ON
ROOFTOP AND SHALL BE LIMITED TO 12" IF USED
OUTDOORS

11.) OVERCURRENT PROTECTION FOR CONDUCTORS
CONNECTED TO THE SUPPLY SIDE OF A SERVICE SHALL BE
LOCATED WITHIN 10' OF THE POINT OF CONNECTION NEC
690.9(A)(3)(2)

12.) WHERE TWO SOURCES FEED A BUSSBAR, ONE A
UTILITY AND THE OTHER AN INVERTER, PV BACKFEED
BREAKER(S) SHALL BE LOCATED OPPOSITE FROM UTILITY
NEC 705.12(B)(3)(2)

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

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

CALCULATIONS FOR CURRENT CARRYING CONDUCTORS
REQUIRED CONDUCTOR AMPACITY PER STRING
[**NEC 690.8(B)(1)**]: (15.00*1.25)1 = 18.75A

AWG #10, DERATED AMPACITY
AMBIENT TEMP: 33°C, TEMP DERATING FACTOR: .96
RACEWAY DERATING = 6 CCC: 0.80
(40*.96)0.80 = 30.72A

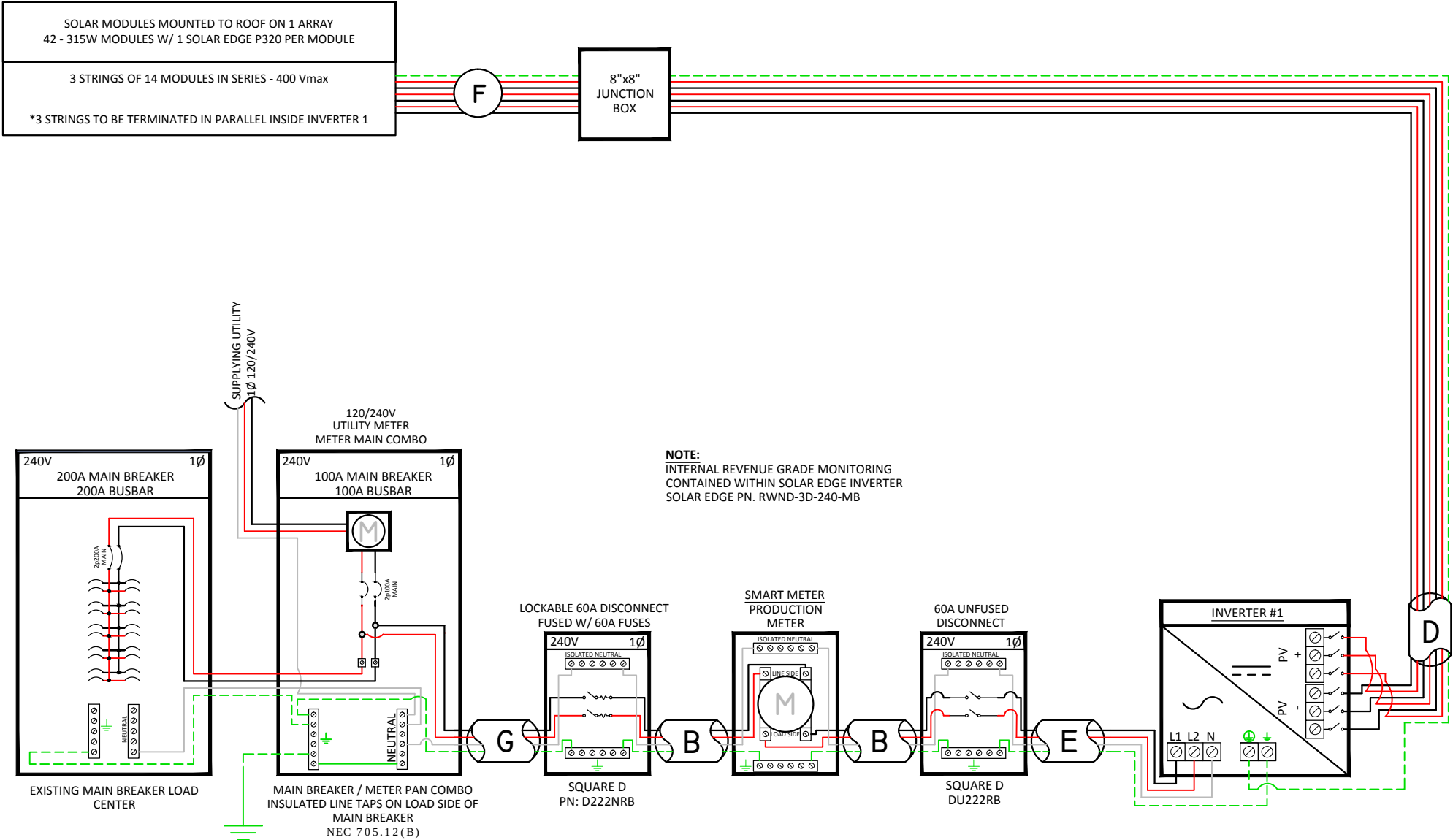
30.72A ≥ 18.75A, THEREFORE WIRE SIZE IS VALID

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	
REC 315 (REC315NP BLACK)	
Imp	9.31
Vmp	33.9
Voc	40
Isc	10.17

INVERTER #1 - SE10000H-US000BNC4			
DC		AC	
Imp	27	Pout	10000
Vmp	400	Imax	42
Voc	480	OCpDmin	52.5
Isc	45	Vnom	240

**NOTE: CONDUIT TYPE SHALL BE CHOSEN BY THE INSTALLATION CONTRACTOR
TO MEET OR EXCEED NEC AND LOCAL AHJD REQUIREMENTS**

A	#6 THWN-2 GEC TO EXISTING GROUND ROD	G	3/4" CONDUIT W/ 2-#6 THWN-2, 1-#6 THWN-2, 1-#8 THWN-2 GROUND
B	3/4" CONDUIT W/ 2-#6 THWN-2, 1-#10 THWN-2, 1-#10 THWN-2 GROUND	H	1" PVC W/ 2-#3 THWN-2, 1-#8 THWN-2, 1-#8 THWN-2 GROUND (TRENCHED APPROX. 170')
C	3/4" CONDUIT W/ 6-#10 THWN-2, 1-#10 THWN-2 GROUND		
D	3/4" CONDUIT W/ 6-#10 THWN-2, 1-#10 THWN-2 GROUND		
E	3/4" CONDUIT W/ 2-#6 THWN-2, 1-#10 THWN-2, 1-#10 THWN-2 GROUND		
F	#10 PV WIRE (FREE AIR) W/ #6 BARE COPPER BOND TO ARRAY		

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