

# PHOTOVOLTAIC GROUND MOUNT SYSTEM

24 MODULES-GROUND MOUNTED - 11.64 KWDC, 11.50 KWAC  
190 FRED BURNS RD., HOLLY SPRINGS, NC 27540 USA



NC SOLAR ELECTRIC LLC  
THE HIGHEST SOLAR RETURN ON INVESTMENT  
(877) 58-SOLAR  
NC SOLAR ELECTRIC LLC  
105 ROCK ISLAND DR, STATESVILLE, NC, 28625 USA  
PHONE:- (704) 603-7347  
EMAIL: tdesiato@ncsolarelectric.com

## SYSTEM SUMMARY:

- (N) 24 - HANWHA QCELL Q.PEAK DUO XL-10.3 / BFG (485W) MODULES
- (N) 01 - HOYMILES HYS-11.5LV-USG1 INVERTER [240V]
- (E) 225A MAIN SERVICE PANEL WITH (E) 200A MAIN BREAKER
- (N) HOYMILES HYS-11.5LV-USG1 INVERTER [240V]
- (N) 60A NON-FUSED AC DISCONNECT, 240 VAC
- (N) HOYMILES SMART METER
- (N) (6) SOLUNA 10K-PACK-LV (61.20kWh)
- (N) NEMA 4 ENCLOSURE
- (N) 100A ESSENTIAL LOAD CENTER
- (N) 600A 12 STUD BUS BARS RED & BLACK KIT
- (N) 250A 1P, DC BREAKER

## DESIGN CRITERIA:

- SNOW LOAD : - 20 PSF
- WIND SPEED :- 140 MPH
- WIND EXPOSURE:- C
- EXPOSURE CATEGORY:- I
- COORDINATES:- 35.556211, -78.898242

## GOVERNING CODES:

- 2018 INTERNATIONAL BUILDING CODE
- 2018 INTERNATIONAL RESIDENTIAL CODE
- 2018 INTERNATIONAL FIRE CODE
- 2018 INTERNATIONAL PLUMBING CODE
- 2018 INTERNATIONAL MECHANICAL CODE
- 2018 INTERNATIONAL FUEL GAS CODE
- 2018 EDITION, WITH GEORGIA IFGC AMENDMENTS
- 2017 NATIONAL ELECTRICAL CODE
- 2015 INTERNATIONAL ENERGY CONSERVATION CODE
- 2018 INTERNATIONAL SWIMMING POOL AND SPA CODE

## CONSTRUCTION NOTE:

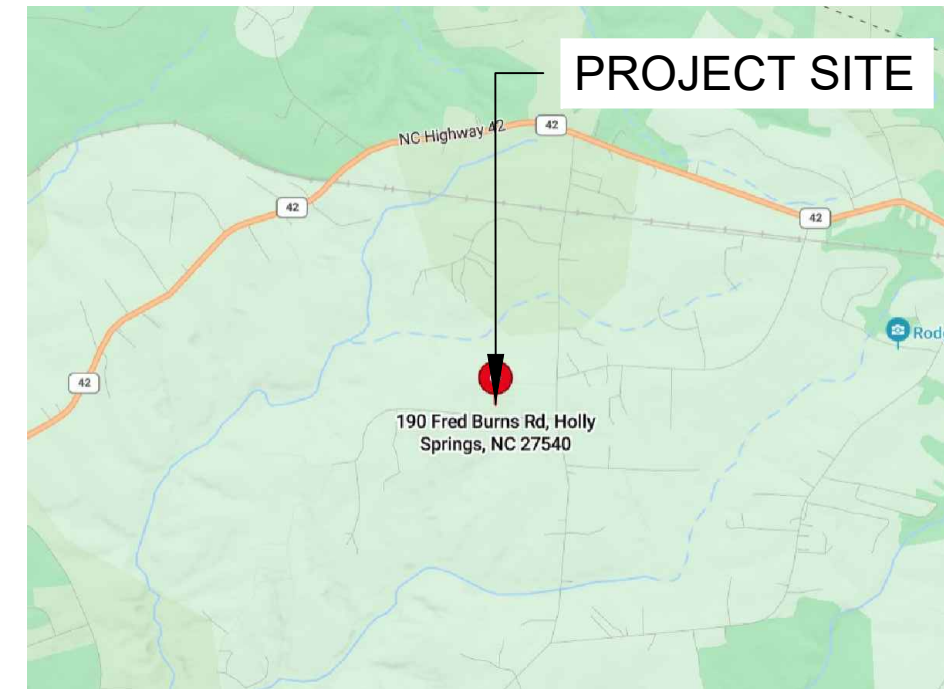
A LADDER SHALL BE IN PLACE FOR INSPECTION  
THE PV MODULES ARE CONSIDERED NON-COMBUSTIBLE AND THIS SYSTEM IS A UTILITY GRID INTERACTIVE SYSTEM  
A GROUNDING ELECTRODE SYSTEM IN ACCORDANCE WITH NEC 690-47 AND 250-50 THROUGH 60 250-166 SHALL BE PROVIDED PER NEC, GROUNDING ELECTRODE SYSTEM OF EXISTING BUILDING MAY BE USED AND BONDED TO AT THE SERVICE ENTRANCE. IF EXISTING SYSTEM IS INACCESSIBLE, OR INADEQUATE, OR IS ONLY METALLIC WATER PIPING, A SUPPLEMENTAL GROUNDING ELECTRODE WILL BE USED AT THE INVERTER LOCATION CONSISTING OF A UL LISTED 8 FT GROUND ROD WITH ACORN CLAMP. GROUNDING ELECTRODE CONDUCTORS SHALL BE NO LESS THAN #8 AWG AND NO GREATER THAN #8 AWG COPPER AND BONDED TO THE EXISTING GROUNDING ELECTRODE TO PROVIDE OR A COMPLETE GROUND. EACH MODULE WILL BE GROUNDED USING THE SUPPLIED GROUNDING POINTS IDENTIFIED BY THE MANUFACTURER.  
EXPOSED NON-CURRENT CARRYING METAL PARTS OF MODULE FRAMES, EQUIPMENT, AND CONDUCTOR ENCLOSURES SHALL BE GROUNDED IN ACCORDANCE WITH 250.134 OR 250.136(A) REGARDLESS OF VOLTAGE. PROPER ACCESS AND WORKING CLEARANCE AROUND EXISTING AND PROPOSED ELECTRICAL EQUIPMENT WILL BE PROVIDED  
ALL SIGNAGE WILL BE INSTALLED AS REQUIRED BY AND 2017 NEC.  
HEIGHT OF INTEGRATED AC/DC DISCONNECT SHALL NOT EXCEED 6' 7" PER NEC 240.24  
THE GROUNDING ELECTRODE CONDUCTOR SHALL BE PROTECTED FROM PHYSICAL DAMAGE BETWEEN THE GROUNDING ELECTRODE AND THE PANEL (OR INVERTER) IF SMALLER THAN #6 AWG COPPER WIRE PER NEC 250-64B. THE GROUNDING ELECTRODE CONDUCTOR WILL BE CONTINUOUS, EXCEPT FOR SPLICES OR JOINTS AT BUSBARS WITHIN LISTED EQUIPMENT PER NEC 250.64C. ALL EXTERIOR CONDUIT SHALL BE PAINTED TO MATCH ADJACENT SURFACES. THE PV CONNECTION IN THE PANEL BOARD SHALL BE POSITIONED AT THE OPPOSITE (LOAD) END FROM THE INPUT FEEDER LOCATION OR MAIN CIRCUIT LOCATION. NEC 690.64(B)(7)  
SITE CONDITIONS SHALL PREVAIL IF NO SCALE IS GIVEN. DRAWINGS ARE NOT NECESSARILY TO SCALE. ALL DIMENSIONS SHALL BE VERIFIED BY SUBCONTRACTOR UPON COMMENCEMENT OF CONSTRUCTION.

## ELECTRICAL NOTES

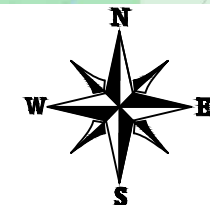
- ALL EQUIPMENT TO BE LISTED BY UL OR OTHER NRTL, AND LABELED FOR ITS APPLICATION.
- ALL CONDUCTORS SHALL BE COPPER, RATED FOR 600 V AND 90 & 75 DEGREE C WET ENVIRONMENT.
- WIRING, CONDUIT, AND RACEWAYS MOUNTED ON ROOFTOPS SHALL BE ROUTED DIRECTLY TO, AND LOCATED AS CLOSE AS POSSIBLE TO THE NEAREST RIDGE, HIP, OR VALLEY.
- WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.26.
- DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS. CONTRACTOR SHALL FURNISH ALL NECESSARY OUTLETS, SUPPORTS, FITTINGS AND ACCESSORIES TO FULFILL APPLICABLE CODES AND STANDARDS.
- WHERE SIZES OF JUNCTION BOXES, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, THE CONTRACTOR SHALL SIZE THEM ACCORDINGLY.
- ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND READILY VISIBLE.
- MODULE GROUNDING CLIPS TO BE INSTALLED BETWEEN MODULE FRAME AND MODULE SUPPORT RAIL, PER THE GROUNDING CLIP MANUFACTURER'S INSTRUCTION.
- MODULE SUPPORT RAIL TO BE BONDED TO CONTINUOUS COPPER E.G.C. VIA WEEB LUG OR ILSCO GBL-4DBT LAY-IN LUG.
- THE POLARITY OF THE GROUNDED CONDUCTORS IS NEGATIVE



1 | AERIAL PHOTO  
PV-0 | SCALE: NTS



2 | VICINITY MAP  
PV-0 | SCALE: NTS



## SHEET INDEX

- PV-0 COVER SHEET
- PV-1 SITE PLAN WITH GROUND MOUNT PLAN
- PV-1.1 ENLARGE VIEW
- PV-2 GROUND MOUNT PLAN WITH MODULES
- PV-3 ARRAY PLAN WITH MODULES
- PV-3.1 TO 3.7 STRUCTURE DETAIL
- PV-3.8 EQUIPMENT ELEVATION
- PV-4 ELECTRICAL LINE DIAGRAM
- PV-4.1 ELECTRICAL CALCULATIONS
- PV-5 WARNING LABELS AND PLACARD
- PV-6+ EQUIPMENT SPEC SHEETS

NOTICE TO CONTRACTOR  
All construction shall comply with the applicable codes and standards.  
APPROVED  
09/10/2024  
Harnett COUNTY  
NORTH CAROLINA

REVISIONS		REV
DESCRIPTION	DATE	
	07-28-2024	

PROJECT NAME  
CHRIS AND SHAUNA WALDON  
190 FRED BURNS RD.,  
HOLLY SPRINGS, NC 27540 USA  
APN# 050635008904  
PHONE NO: (919)-609-7846  
AHJ: CITY OF HOLLY SPRINGS

SHEET NAME  
COVER SHEET

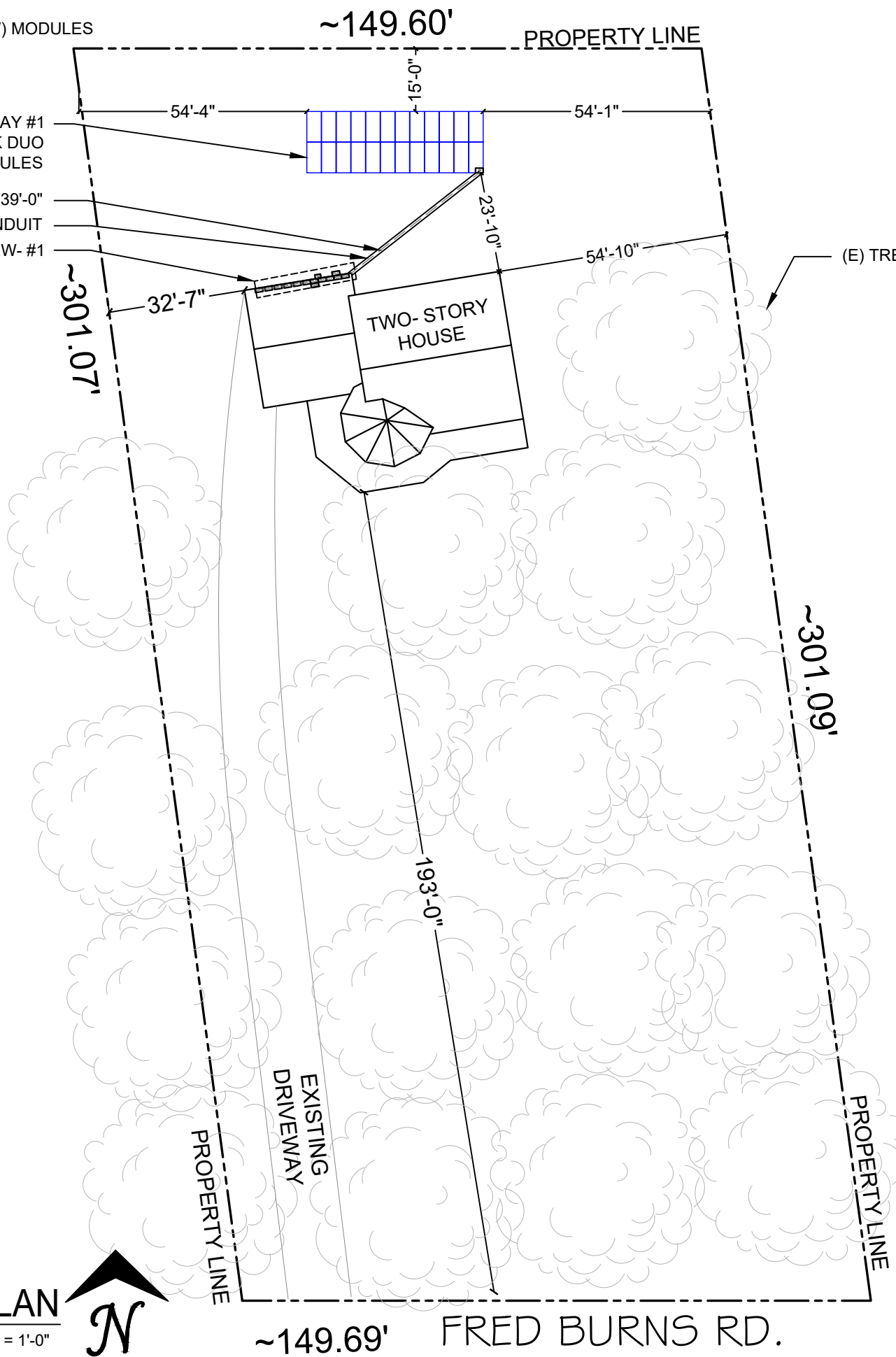
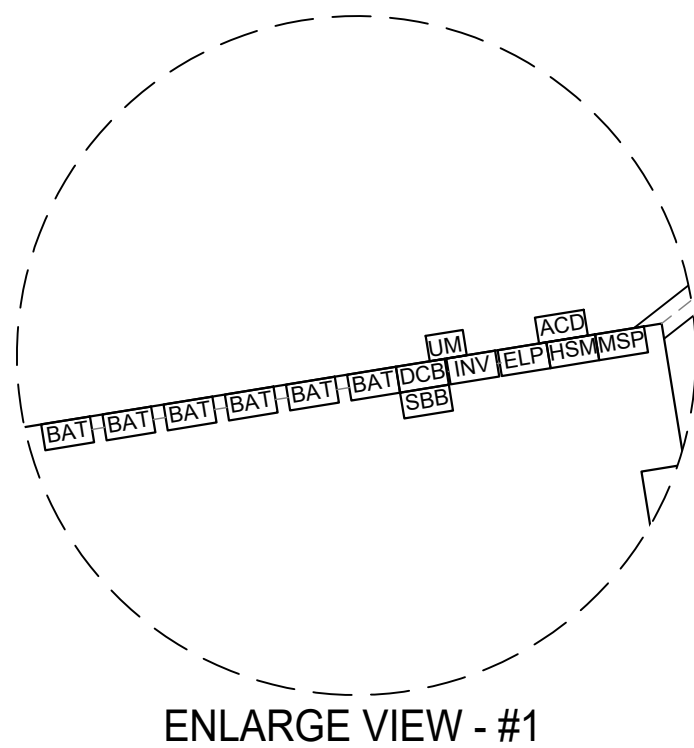
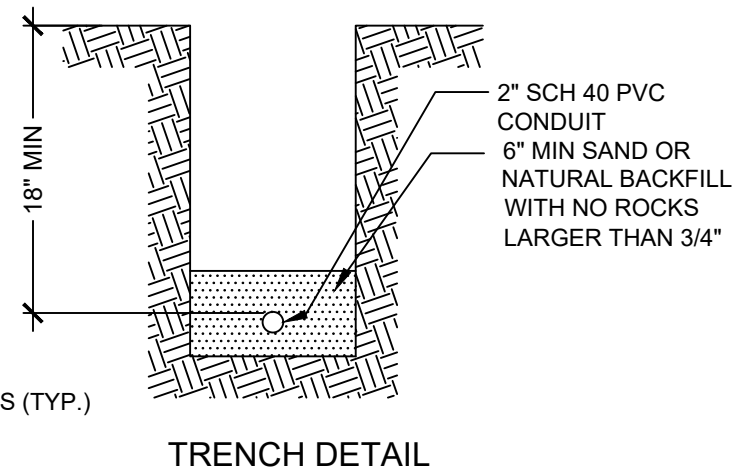
SHEET SIZE  
ANSI B  
11" X 17"

SHEET NUMBER  
PV-0

**MODULE TYPE, DIMENSIONS & WEIGHT**

NUMBER OF MODULES = 24 MODULES  
 MODULE TYPE = HANWHA QCELL Q.PEAK DUO XL-10.3 / BFG (485W) MODULES  
 MODULE WEIGHT = 64.2 LBS / 29.2 KG.  
 MODULE DIMENSIONS = 87.2"X 41.1" = 24.89 SF  
 UNIT WEIGHT OF ARRAY = 2.58 PSF

- (N) GROUND ARRAY #1
- (24) HANWHA QCELL Q.PEAK DUO XL-10.3 / BFG (485W) MODULES
- (N) TRENCH ~39'-0"
- (N) 2" SCH 40/80 PVC CONDUIT
- ENLARGE VIEW- #1



THERE IS NO FENCE OR GATE IN THIS PROPERTY

**1 SITE PLAN WITH GROUND PLAN**  
 SCALE: 1/32" = 1'-0"



LEGEND	
UM	- UTILITY METER
MSP	- MAIN SERVICE PANEL
ELP	- ESSENTIAL LOAD PANEL
DCB	- DC BREAKER
SBB	- STUD BUS BARS
INV	- HOYMILES INVERTER
HSM	- HOYMILES SMART METER
ACD	- AC DISCONNECT
BAT	- BATTERY
JB	- NEMA 4 ENCLOSURE
---	- CONDUIT
---	- TRENCH

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SHEET NAME  
 SITE PLAN WITH GROUND MOUNT PLAN

SHEET SIZE  
 ANSI B  
 11" X 17"

SHEET NUMBER  
 PV-1

**MODULE TYPE, DIMENSIONS & WEIGHT**

NUMBER OF MODULES = 24 MODULES  
 MODULE TYPE = HANWHA QCELL Q.PEAK DUO XL-10.3 / BFG (485W) MODULES  
 MODULE WEIGHT = 64.2 LBS / 29.2 KG.  
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 UNIT WEIGHT OF ARRAY = 2.58 PSF

CIRCUIT LEGENDS	
	CIRCUIT #1
	CIRCUIT #2
	CIRCUIT #3

(24) HANWHA QCELL Q.PEAK DUO XL-10.3 / BFG (485W) MODULES  
 (03) BRANCHES OF 08 MODULES CONNECTED IN PARALLEL

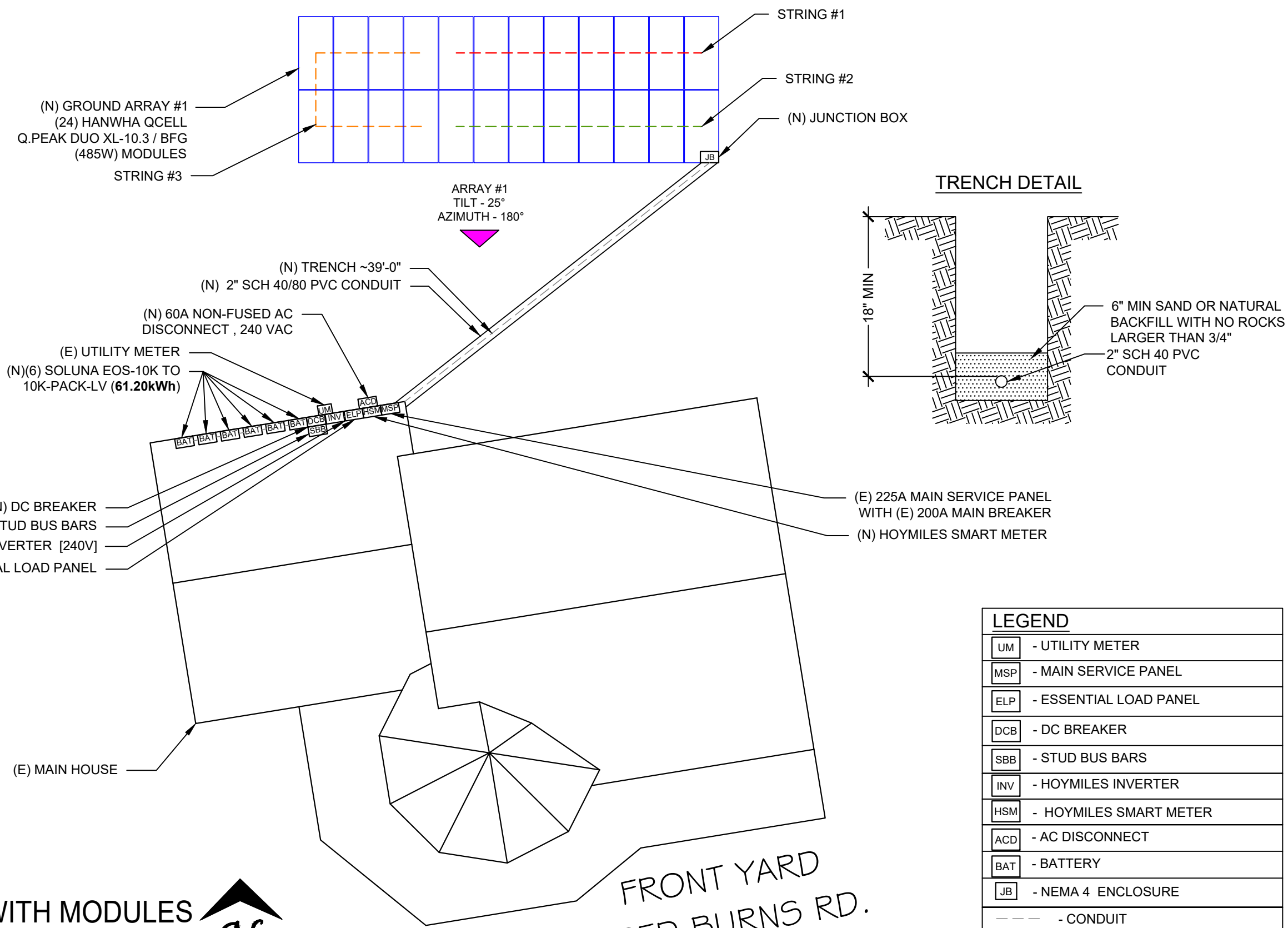
TOTAL GROUND MOUNT ARRAY AREA :- 614.14 SQ.FT.

GROUND ARRAY DESCRIPTION		
GROUND ARRAY	ARRAY TILT	AZIMUTH
#1	25°	180°

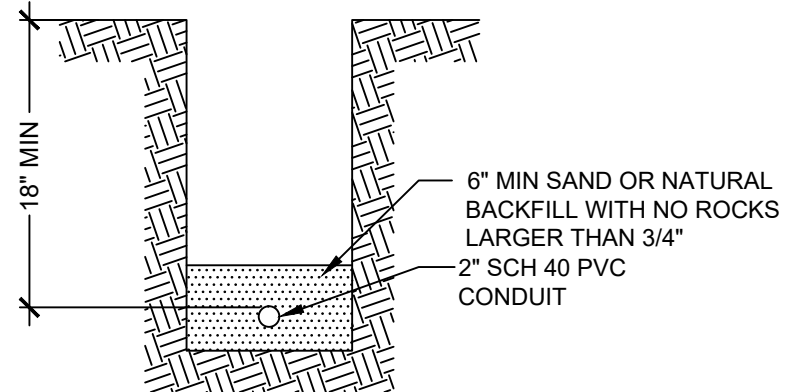


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**REAR YARD**



**TRENCH DETAIL**



REVISIONS		
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DATE	07-28-2024	

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LEGEND	
	- UTILITY METER
	- MAIN SERVICE PANEL
	- ESSENTIAL LOAD PANEL
	- DC BREAKER
	- STUD BUS BARS
	- HOYMILES INVERTER
	- HOYMILES SMART METER
	- AC DISCONNECT
	- BATTERY
	- NEMA 4 ENCLOSURE
	- CONDUIT
	- TRENCH

SHEET NAME  
**GROUND PLAN WITH MODULES**

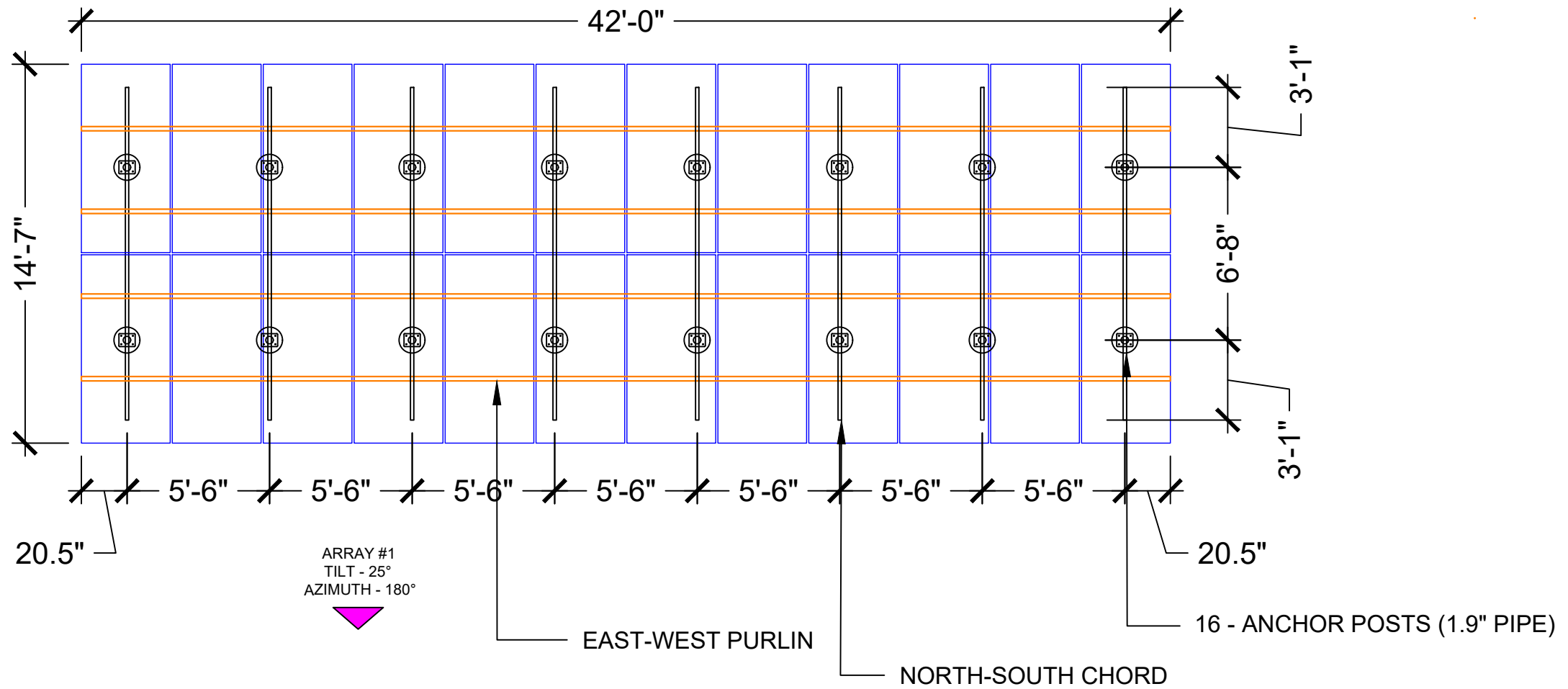
SHEET SIZE  
**ANSI B  
 11" X 17"**

SHEET NUMBER  
**PV-2**

**1 GROUND PLAN WITH MODULES**  
 SCALE: 3/32" = 1'-0"



**FRONT YARD  
 FRED BURNS RD.**



REVISIONS		REV
DESCRIPTION	DATE	
	07-28-2024	

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SHEET NAME  
 ARRAY PLAN WITH  
 MODULES

SHEET SIZE  
 ANSI B  
 11" X 17"

SHEET NUMBER  
 PV-3

**GENERAL NOTES**

1. IN THIS DOCUMENT, THE CONTRACTOR WILL BE REFERRED TO AS THE RESPONSIBLE PARTY IN CHARGE OF THE ARRAY. THIS PARTY MAY BE THE OWNER, BUYER, CUSTOMER, OR INSTALLER. USAGE OF ANY OF THE AFOREMENTIONED TERMS ARE TAKEN TO BE ANY OF THE SAME GROUPS, BUT NONE INCLUDE AP ALTERNATIVES OR THE JDI GROUP.
2. THE CONTRACTOR MUST VERIFY ONSITE CONDITIONS, TO VERIFY CONFORMANCE TO CONTRACT DOCUMENTATION, INCLUDING BUT NOT LIMITED TO: THIS DOCUMENT, THE STATE SEALED LETTER DOCUMENT, APPLICABLE AUXILIARY DRAWINGS, AND THE INSTALLATION MANUAL.
3. THE CONTRACTOR MUST VERIFY ALL FIELD DIMENSIONS AND THE SHAPES AND SIZES OF STRUCTURAL MEMBERS TO ENSURE THE PROPER STRENGTH, FIT, AND LOCATION OF THE STRUCTURAL WORK. CONDITIONS WHICH MAY PREVENT THE PROPER EXECUTION AND COMPLETION OF THE WORK MUST BE REPORTED TO AP ALTERNATIVES, IN WRITING, BEFORE RESUMING WORK.
4. AP ALTERNATIVES AND THE JDI GROUP ARE NOT RESPONSIBLE FOR WORK CONDUCTED BY OTHERS.
5. WORK DONE BY OTHERS INCLUDE BUT NOT BE LIMITED TO, EXCEPT WHERE EXPLICITLY CONTRACTED TO DO SO WITHIN THE CONTRACT DOCUMENTS.
  - 5.1. SITE WORK AND DEVELOPMENT, INCLUDING BUT NOT LIMITED TO GRADING, CONSTRUCTION ROADS, FENCING, SEEDING, EROSION CONTROL.
  - 5.2. ALL ELECTRICAL WORK.
  - 5.3. ALL GROUNDING AND BONDING.
  - 5.4. ALL SHADING AND PRODUCTION ANALYSIS.
6. SEE OTHER MANUFACTURER'S DRAWINGS AND INSTALLATION MANUALS FOR ADDITIONAL INFORMATION ON THEIR PARTS. (IE. FOR PV MODULES, GROUNDING LUGS, DYNOBONDS, ETC.).
7. INSTALLATION CONTRACTOR RESPONSIBLE FOR ALL CONSTRUCTION EQUIPMENT, METHODS, AND SEQUENCES.
8. CUSTOMER IS RESPONSIBLE FOR VERIFYING CORROSION COMPATIBILITY WITH ANCHOR POSTS.
9. DO NOT SCALE OFF OF THESE DRAWINGS. USE GIVEN DIMENSIONS WHEN WRITTEN. DIMENSIONS PORTRAYED WITH A VARIABLE, MAY BE FOUND IN THE APPROPRIATE TABLE, IN THE APPROPRIATE STATE SEALED LETTER.
10. WHERE THERE ARE MULTIPLE DIMENSIONS OR CRITERIA, THE MOST CONSERVATIVE APPROACH SHOULD BE TAKEN AS THE INTENDED.

11. IT IS THE CONTRACTORS RESPONSIBILITY TO DETERMINE THE APPLICABLE DESIGN CRITERIA FOR THE PROJECT. THIS SHALL BE DONE UNDER THE GUIDANCE OF THE AHJ AND A CUSTOMER CONTRACTED ENGINEER, PRIOR TO PURCHASE. AP ALTERNATIVES AND THE JDI GROUP ARE NOT RESPONSIBLE FOR INCORRECTLY BUYING OR BUILDING TO INAPPLICABLE DESIGN CRITERIA.
12. DESIGN CRITERIA NOT CONSIDERED BY THESE DRAWINGS OR THE STATE SEALED LETTER (BUT MAY BE REQUIRED BY THE AHJ) INCLUDE FLOOD LOADS, IMPACT LOADS, DEBRIS LOADS, EROSION, EXPANSIVE SOILS, FROST HEAVE, ACTS OF GOD, DYNAMIC ANALYSIS, AND ANY OTHER LOADING NOT EXPLICITLY STATED AS BEING INCLUDED IN THE DESIGN OF THE RACKING.
13. IT IS THE BUYERS RESPONSIBILITY TO DETERMINE THE APPLICABILITY OF THIS DESIGN PACKET AND THE STATE SEALED LETTER WITH ALL LOCAL AND STATE LAWS, PRIOR TO PURCHASE.

**ADDITIONAL DOCUMENTATION**

ADDITIONAL ENGINEERING DOCUMENTATION DEVELOPED FOR THIS PROJECT & GENERAL DOCUMENTATION INTENDED TO BE USED ON THIS PROJECT, CREATED BY OTHERS:

1. PV MODULE INSTALLATION MANUAL, (PROVIDED BY PV MODULE MANUFACTURER).
2. APA RACKING INSTALLATION MANUAL.
3. PE STATE SEALED LETTER.

**DESIGN RESPONSIBILITY**

1. THE JDI GROUP IS THE STRUCTURAL ENGINEER OF RECORD.
2. AP ALTERNATIVES AND THE JDI GROUP ARE RESPONSIBLE ONLY FOR THE STRUCTURAL DESIGN OF THE RACKING, AS PROVIDED AND LIMITED TO THE DRAWING SET HEREIN AND THE APPROPRIATE STATE SEALED LETTER.
3. AP ALTERNATIVES AND THE JDI GROUP ARE NOT THE ELECTRICAL ENGINEER OF RECORD. AP ALTERNATIVES AND THE JDI GROUP ARE NOT RESPONSIBLE FOR THE ELECTRICAL DESIGN OF THE SITE (INCLUDING BUT NOT LIMITED TO INVERTER SELECTION AND INSTALLATION, PIPING & WIRING, TRENCHING, BONDING, GROUNDING, ETC., OR ANY OTHER ENGINEERING NOT COVERED BY THE STRUCTURAL ENGINEERING OF THE RACKING SYSTEM).
4. AP ALTERNATIVES AND THE JDI GROUP ARE NOT THE CIVIL ENGINEER OF RECORD. AP ALTERNATIVES AND THE JDI GROUP ARE NOT RESPONSIBLE FOR THE CIVIL DESIGN OF THE SITE (INCLUDING BUT NOT LIMITED TO

GRADING, SURVEYING, SITE CLEARING, EROSION, SITE MAINTENANCE, ETC., OR ANY OTHER ENGINEERING NOT COVERED BY THE STRUCTURAL ENGINEERING OF THE RACKING SYSTEM).

5. AP ALTERNATIVES AND THE JDI GROUP ARE NOT THE GEOTECHNICAL ENGINEER OF RECORD. AP ALTERNATIVES AND THE JDI GROUP ARE NOT RESPONSIBLE FOR THE GEOTECHNICAL DESIGN OF THE SITE (INCLUDING BUT NOT LIMITED TO SOIL ANALYSIS, ANALYSIS OF THE SOILS ABILITY TO RESIST FORCES, CORROSION ANALYSIS, ETC., OR ANY OTHER ENGINEERING NOT COVERED BY THE STRUCTURAL ENGINEERING OF THE RACKING SYSTEM).
6. AP ALTERNATIVES AND THE JDI GROUP ARE NOT THE SOLAR DESIGN ENGINEER OF RECORD. AP ALTERNATIVES AND THE JDI GROUP ARE NOT RESPONSIBLE FOR THE SOLAR DESIGN OF THE SITE (INCLUDING BUT NOT LIMITED TO SHADING, EFFICIENCY, ORIENTATION, PART SELECTION, TILT SELECTION, ETC., OR ANY OTHER ENGINEERING NOT COVERED BY THE STRUCTURAL ENGINEERING OF THE RACKING SYSTEM).

**CONSTRUCTION**

1. ALL CONSTRUCTION SHALL CONFORM TO LOCAL CODES, INCLUDING THE INTERNATIONAL BUILDING CODE AND FIRE CODE.
2. LOCATION OF UNDERGROUND UTILITIES SHALL BE VERIFIED PRIOR TO START OF WORK.
3. INSTALLATION CONTRACTORS ARE RESPONSIBLE FOR REVIEWING, UNDERSTANDING, AND FOLLOWING ALL DIRECTIONS, MEASUREMENTS, AND GUIDELINES CONTAINED IN THIS DRAWING PACKET AND IN ANY DOCUMENTATION INTENDED TO BE USED IN CONJUNCTION WITH THIS PACKET.
4. GOOD INDUSTRY PRACTICES ARE EXPECTED TO BE USED IN THE ASSEMBLY OF ALL STRUCTURAL COMPONENTS OF THIS PROJECT.
5. ALL WORK SHALL BE DONE IN A WORKMAN-LIKE MANNER.
6. ALL CONTRACTORS MUST COMPLY WITH ALL APPLICABLE SAFETY REQUIREMENTS WHILE CONSTRUCTING.
7. AP ALTERNATIVES IS NOT LIABLE FOR THE SAFETY OF PERSONNEL, PARTS, MATERIALS, PERSONAL PROPERTY, OR OTHER.
8. CARE SHOULD BE USED WHEN HANDLING PV MODULES. ANY PANELS EXPOSED TO SUNLIGHT SHOULD BE TREATED AS IF IT IS FULLY CHARGED. MOST PANELS ARE CAPABLE OF PRODUCING 600VDC DURING DAYLIGHT HOURS.
9. CHECK MODULE SPECIFIC SPEC SHEET FOR

**ELECTRICAL SPECIFICATIONS.**

**10. ANCHOR POST TOLERANCES**

- 10.1. ± 2" VARIATION IN HEIGHT.
- 10.2. ± 2" VARIATION IN NORTH-SOUTH DIRECTION.
- 10.3. ± 2" VARIATION IN EAST-WEST DIRECTION.
- 10.4. ± 2" VARIATION IN POST PLUMBNESS.

11. ACCURATELY LOCATE AND INSTALL ANCHOR POSTS BY SUCH METHODS AND EQUIPMENT SO AS NOT TO IMPAIR THE ANCHOR STRENGTH OR DAMAGE ANCHORS OR ADJACENT CONSTRUCTION.

12. INSTALLATION CONTRACTOR RESPONSIBLE FOR ALL CONSTRUCTION EQUIPMENT, METHODS, AND SEQUENCES.

13. DISTURBED GALVANIZED SURFACES SHALL BE TOUCHED UP WITH AN APPROVED COLD GALVANIZING COMPOUND OR EQUIVALENT.

14. GOOD INDUSTRY PRACTICE SHALL BE USED IN THE ASSEMBLY OF ALL STRUCTURAL COMPONENTS OF THIS PROJECT.

15. STORE ALL PARTS AND COMPONENTS PROPERLY. PREVENT TRAPPING MOISTURE. PREVENT GROUND CONTACT. PREVENT DEFORMATION OR POTENTIAL DAMAGE.

16. IT IS THE RESPONSIBILITY OF THE CUSTOMER TO VERIFY EASEMENTS, SETBACK, FIRE LANES, AND OTHER DISTANCES REQUIRED BY THE AHJ. FAILURE TO PROPERLY VERIFY AND MARK SUCH DISTANCES MAY RESULT IN PROJECT DELAYS AND ADDITIONAL COSTS TO BE COVERED BY THE CUSTOMER.

17. UNDER SPECIFIC CIRCUMSTANCES, TERRAIN AND SITE PROPERTIES MAY INDICATE THE NEED FOR ADDITIONAL PARTS, WITH COSTS TO BE COVERED BY THE CUSTOMER.

**STEEL**

1. ALL FASTENERS SHALL BE THE TYPE AND SIZE INDICATED ON THE DRAWINGS.
2. ALL BOLTS, WASHERS, AND NUTS SHALL BE STAINLESS STEEL OR CORROSION-RESISTANT EQUIVALENT.
3. STRUCTURAL SHAPES, TUBING, AND COLD-FORMED SHAPES SHALL CONFORM TO THE ASTM GUIDELINES INDICATED WITHIN THE SEALED STRUCTURAL PERMIT PACKAGE.
4. ALL STRUCTURAL MATERIALS SHALL HAVE ADEQUATE CORROSION PROTECTION FOR THE ENVIRONMENT. ABOVE GRADE STRUCTURAL STEEL SHALL BE HOT DIPPED GALVANIZED PER ASTM A123 OR AN APPROVED EQUIVALENT SHALL BE EVALUATED BY THE ENGINEER.

5. IT IS THE CUSTOMERS RESPONSIBILITY TO ENSURE THE PROVIDED CORROSION PROTECTION IS ADEQUATE FOR THE THE SITE CONDITIONS AND LIFE OF THE PROJECT, PRIOR TO PURCHASE AND AT THE CUSTOMERS EXPENSE.
6. SEE CONNECTIONS DRAWING FOR FASTENER TORQUE VALUES.

**ELECTRICAL**

1. UNLESS SPECIFIED BY CONTRACT DOCUMENTS, AP ALTERNATIVES AND THE JDI GROUP ARE NOT RESPONSIBLE FOR ANY WORK CONCERNING THE ELECTRICAL SYSTEMS OR COMPONENTS, INCLUDING BUT NOT LIMITED TO, ELECTRICAL INSTALLATION AS THEY PERTAIN TO THE RACKING HARDWARE, PV MODULES, OR THE SITE.
2. AP ALTERNATIVES AND THE JDI GROUP ARE NOT RESPONSIBLE FOR GROUNDING AND BONDING COMPONENTS, OR THE REQUIREMENTS AND INSTALLATION METHODS.
3. ELECTRICAL COMPONENTS, INCLUDING THOSE FOR BONDING, GROUNDING, AND WIRE MANAGEMENT, PROVIDED BY AP ALTERNATIVES, ARE PROVIDED AS COMPONENTS ONLY. AP ALTERNATIVES AND THE JDI GROUP ARE NOT RESPONSIBLE FOR THEIR USAGE OR INSTALLATION AND PROVIDE NO GUARANTEE TO THEIR LIFE OR ADHERENCE TO APPLICABLE BUILDING CODES.
4. ANY DRAWING, NOTE, OR DOCUMENTATION PROVIDED BY AP ALTERNATIVES, REFERENCING ANY ELECTRICAL GROUNDING, OR BONDING COMPONENT OR INSTALLATION IS PROVIDED AS REFERENCE ONLY, AND SHALL NOT BE TAKEN AS PROOF OF AP ALTERNATIVES RESPONSIBILITIES OR LIABILITY, EXCEPT WHERE EXPLICITLY DEFINED IN THE CONTRACT DOCUMENTS.
5. MOUNTING OF ELECTRICAL EQUIPMENT TO AP ALTERNATIVES RACKING IS FORBIDDEN.

**SPECIAL INSPECTION**

WHERE REQUIRED BY OWNER, CUSTOMER, AND/OR AUTHORITY HAVING JURISDICTION, MINIMUM INSPECTION SHALL INCLUDE THE FOLLOWING NOTES AND TABLE BELOW.

1. ALL SPECIAL INSPECTORS SHALL BE RETAINED BY OWNER/CUSTOMER. THE EXTENT OF THE INSPECTION SHALL COMPLY WITH THE CONTRACT DOCUMENTS, THE BUILDING CODE REQUIREMENTS, AND LOCAL JURISDICTION. IT IS THE OWNER/CUSTOMER'S RESPONSIBILITY TO GIVE PROPER NOTIFICATION TO THE SPECIAL INSPECTOR AND PROCEED WITH THE WORK ONLY AFTER THE SPECIAL INSPECTOR'S APPROVAL.
2. FAILURE TO NOTIFY THE SPECIAL INSPECTOR MAY RESULT IN OWNER/CUSTOMER HAVING TO REMOVE WORK FOR THE PURPOSE OF INSPECTION AT THE OWNER'S/CUSTOMERS EXPENSE.
3. SPECIAL INSPECTORS SHALL KEEP RECORDS OF ALL INSPECTIONS. RECORDS SHALL BE FURNISHED TO THE OWNER, ENGINEER OF RECORD, AND LOCAL JURISDICTION AS REQUIRED.
4. SPECIAL INSPECTIONS DO NOT RELIEVE OWNER FROM ADDITIONAL INSPECTIONS REQUIRED BY THE AHJ.

SPECIAL INSPECTION & TESTING SCHEDULE		
	CONTINUOUS	PERIODIC
STRUCTURAL STEEL ERECTION		
MATERIAL IDENTIFICATION		X
INSTALLATION OF HIGH STRENGTH BOLTS		X
WELDED CONNECTIONS		X
MEMBER SIZES AND PLACEMENT		X
GENERAL CONFORMANCE WITH DESIGN DOCUMENTS		X
DRIVEN DEEP FOUNDATION ELEMENTS		
VERIFY ELEMENT MATERIALS, SIZE, LENGTHS COMPLY WITH DESIGN DOCUMENTS	X	
DETERMINE CAPACITIES OF TEST ELEMENTS & CONDUCT ADDITIONAL LOAD TESTS, AS REQ.	X	
OBSERVE DRIVING OPERATIONS, MAINTAIN RECORDS	X	
VERIFY PLACEMENT LOCATIONS & PLUMBNESS	X	

**GOVERNING CODES & REFERENCE DOCUMENTS**

1. 2018 INTERNATIONAL BUILDING CODE
2. ASCE 7-16 – MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES
3. AISI S100-16 – NORTH AMERICAN SPECIFICATION FOR THE DESIGN OF COLD-FORMED STEEL STRUCTURAL MEMBERS
4. ANSI/AISC 360-16 – SPECIFICATIONS FOR STRUCTURAL STEEL

**PACKAGE COVERAGE – LOADING & SETUP RANGES & CONSTANTS**

TILT ANGLES: 25°  
 GROUND SNOW LOAD (PSF): 0 – 100  
 WIND SPEEDS (MPH): 100 – 140  
 WIND EXPOSURE CATEGORY: C  
 MAX SEISMIC Ss: 3.211 g  
 MAX SEISMIC S1: 1.285 g

PV MODULE:  
 MAX. PANEL WIDTH: 41.50"  
 MAX. PANEL LENGTH: 84.00"  
 MAX. PANEL HEIGHT: 2.00"  
 MAX. PANEL WEIGHT: 70.00 LBS

RISK CATEGORY: I  
 MAX. FRONT LIP CLEARANCE: 36"

**ABBREVIATIONS**

ADMOD	ADVANCED MODULAR GROUND MOUNT
AHJ	AUTHORITY HAVING JURISDICTION
ALT	ALTERNATE, ALTERNATIVE
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
APA	AP ALTERNATIVES, LLC
APPD	APPROVED
APPROX	APPROXIMATE
ASTM	AMERICAN SECTION OF THE INTERNATIONAL ASSOCIATION FOR TESTING MATERIALS
AZ	AZIMUTH
BLDG	BUILDING
CAD	COMPUTER AIDED DESIGN
CMB	COMBINER BOX
DC	DIRECT CURRENT
DIA	DIAMETER
DWG	DRAWING
(A)	EXISTING
EOR	ENGINEER OF RECORD
EW	EAST TO WEST
G.C.	GENERAL CONTRACTOR
G,GND	GROUND
GALV	GALVANIZED
IBC	INTERNATIONAL BUILDING CODE
ID	INSIDE DIAMETER
KW	KILOWATT
MFG	MANUFACTURER
MIN	MINIMUM
MISC	MISCELLANEOUS
MTD	MOUNTED
MW	MEGAWATT
(N)	NEW
NEC	NATIONAL ELECTRIC CODE
NO	NUMBER
NS	NORTH TO SOUTH
OD	OUTSIDE DIAMETER
PE	PROFESSIONAL ENGINEER
PV	PHOTOVOLTAIC
REV	REVISION
SCH	SCHEDULE
SF	SQUARE FOOT/FEET
SHCS	SOCKET HEAD CAP SCREW
SPEC	SPECIFICATION
SS	STAINLESS STEEL
STD	STANDARD
TBD	TO BE DETERMINED
TYP	TYPICAL
UL	UNDERWRITERS LABORATORIES
VDC	VOLTS DIRECT CURRENT
W	WATT

SHEET INDEX		
S.00	A	STRUCTURAL COVER
S.12	A	RACKING OVERVIEW – 25° TILT
S.20	A	ANCHOR POSTS & HELIXES
S.21	A	SCREW PILE
S.30	A	STRUCTURAL PURLINS
S.40	A	GENERAL CONNECTIONS
S.50	A	ANCHOR BRACING



IMAGE FOR REFERENCE ONLY

**NC SOLAR ELECTRIC LLC**  
THE HIGHEST SOLAR RETURN ON INVESTMENT  
  
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REVISIONS		REV
DESCRIPTION	DATE	
	07-28-2024	

**PROJECT NAME**  
**CHRIS AND SHAUNA WALDON**  
**190 FRED BURNS RD.,**  
**HOLLY SPRINGS, NC 27540 USA**  
**APN# 050635008904**  
**PHONE NO: (919)-609-7846**  
**AHJ: CITY OF HOLLY SPRINGS**

**SHEET NAME**  
**STRUCTURAL DETAIL**

**SHEET SIZE**  
**ANSI B**  
**11" X 17"**

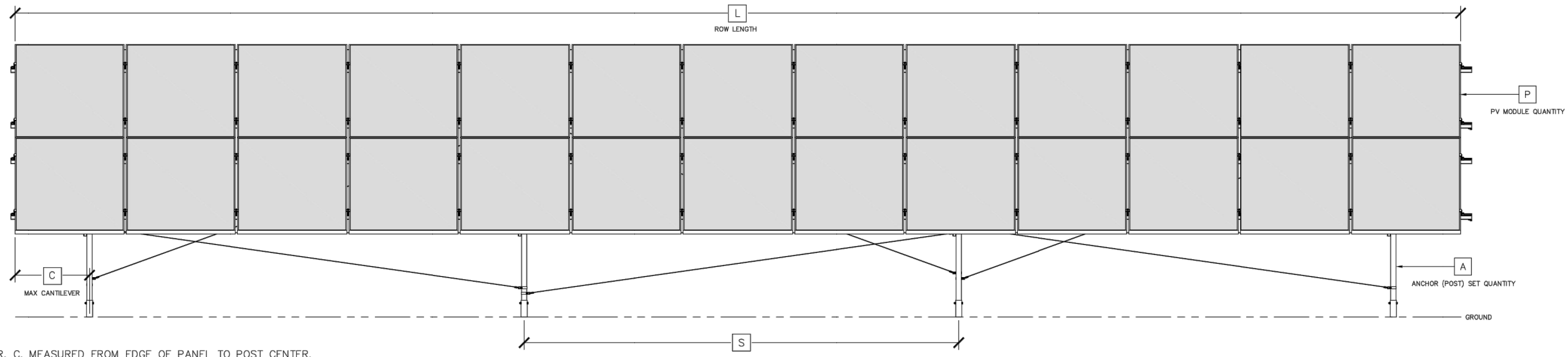
**SHEET NUMBER**  
**PV-3.1**

REVISIONS		REV
DESCRIPTION	DATE	
	07-28-2024	

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**CHRIS AND SHAUNA WALDON**  
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 HOLLY SPRINGS, NC 27540 USA  
 APN# 050635008904  
 PHONE NO: (919)-609-7846  
 AHJ: CITY OF HOLLY SPRINGS

SHEET NAME  
**STRUCTURAL DETAIL**

SHEET SIZE  
**ANSI B**  
**11" X 17"**  
 SHEET NUMBER  
**PV-3.2**

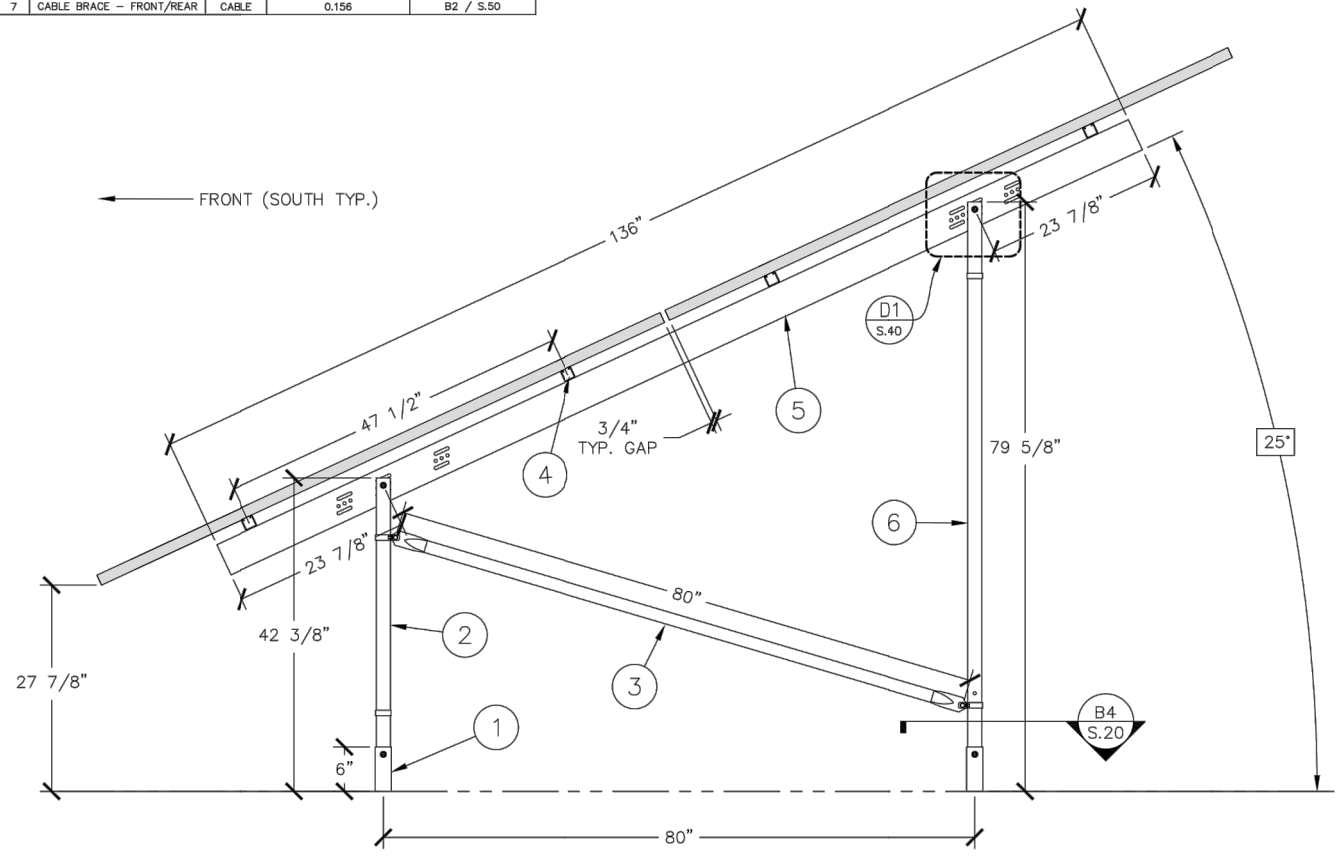


NOTES: MAX CANTILEVER, C, MEASURED FROM EDGE OF PANEL TO POST CENTER.  
 MAX SPAN, S, MEASURED CENTER-TO-CENTER.  
 C & S DIMENSIONS FROM PRESCRIPTIVE DESIGN & STRUCTURAL CALCULATIONS REPORT AND REQUIRED SITE DESIGN CRITERIA.  
 POST QUANTITY, A, AS REQUIRED TO SATISFY DIMENSIONS C & S, ROW LENGTH, L, & PANEL QUANTITY P, PER TABLES IN PRESCRIPTIVE DESIGN & STRUCTURAL CALCULATIONS REPORT.

IMAGE REFERENCE ONLY. NOT INDICATIVE OF REQUIRED QUANTITIES OR DIMENSIONS.

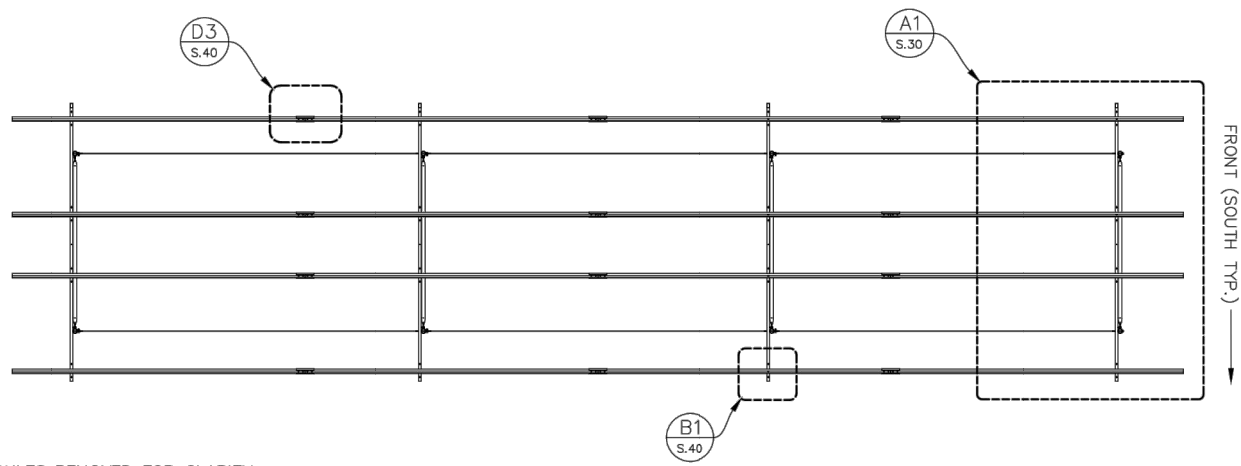
**D1 ELEVATION VIEW (FRONT) - 25°**

PARTS LIST			
ITEM	DESCRIPTION	SHAPE	DIMENSIONS (IN.)
1	FOUNDATION	PIPE	VARIES, SEE SHEETS
2	UPPER ANCHOR - FRONT	PIPE	1.9 x 0.120
3	HARD BRACE	PIPE	1.66 x 0.065
4	EAST/WEST PURLIN	STRUT	1.625 x 1.625 x 0.108
5	NORTH/SOUTH CHORD	CEL	4.5 x 1.188 x 0.070
6	UPPER ANCHOR - REAR	PIPE	1.9 x 0.120
7	CABLE BRACE - FRONT/REAR	CABLE	0.156



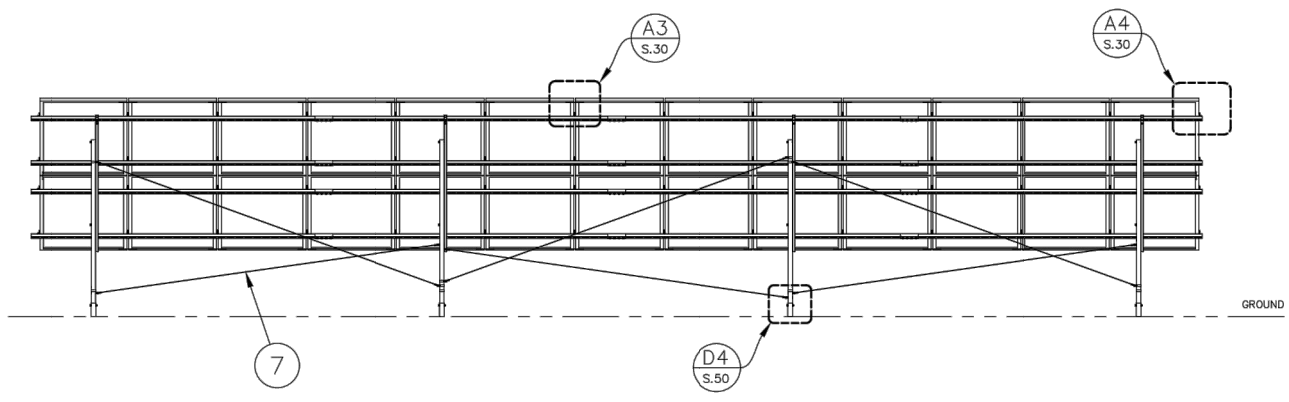
NOTES: PV MODULE & MODULE RELATED DIMENSIONS THIS DETAIL ARE MAX ALLOWABLE. SEE STATE LETTER FOR FURTHER INFORMATION.  
 ADDITIONAL DIMENSIONS ARE NOMINAL FROM LEVEL GROUND. SEE NOTES SHEET FOR TOLERANCES.

**A1 PROFILE VIEW - 25°**

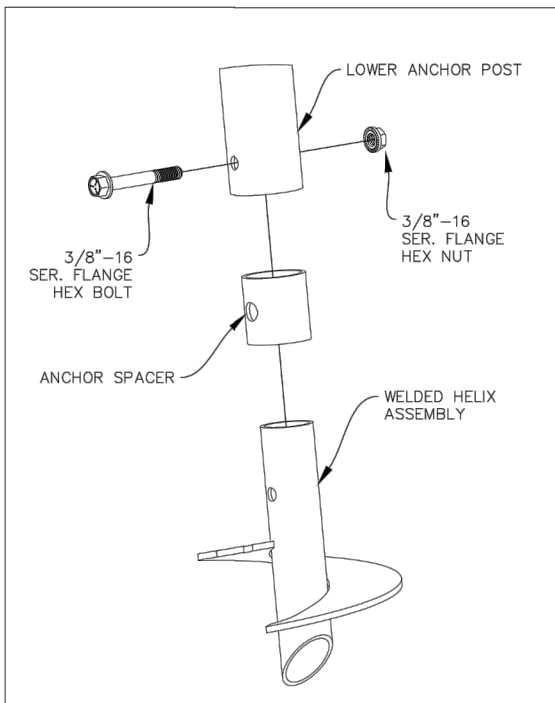


PV MODULES REMOVED FOR CLARITY.

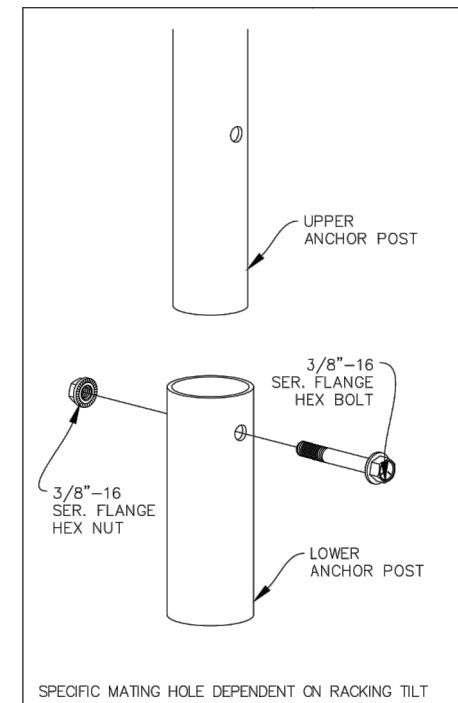
**B4 PLAN VIEW - 25°**



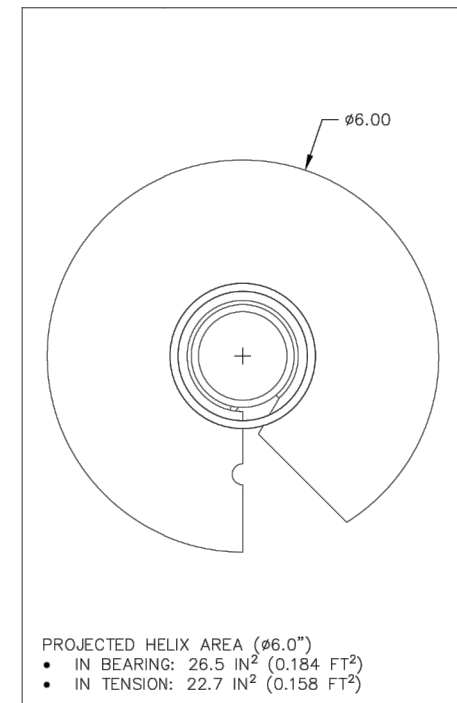
**A4 ELEVATION VIEW (REAR) - 25°**



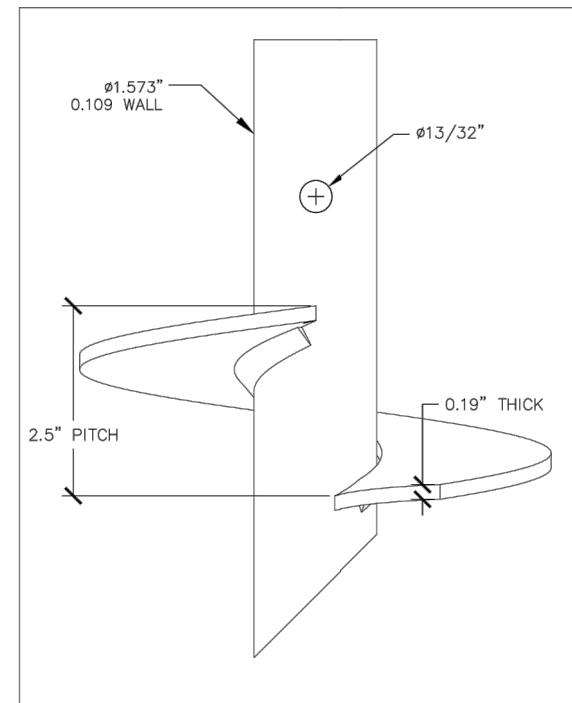
D1 CONNECTION: POST-TO-HELIX



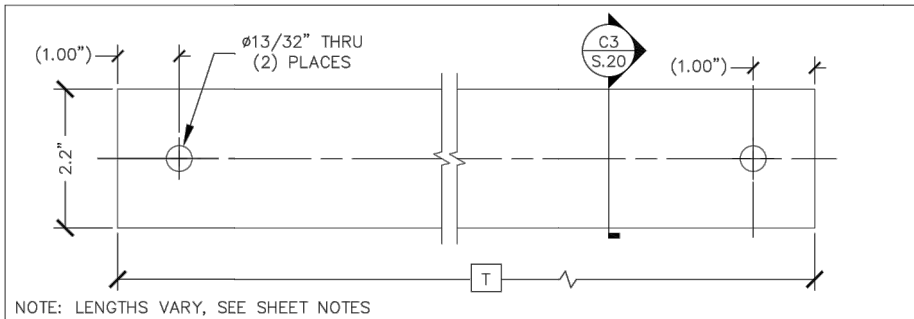
D2 CON.: UPPER-TO-LOWER



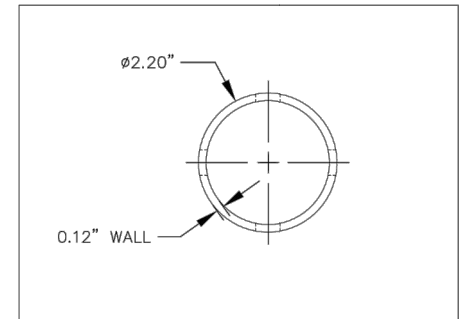
D3 TOP VIEW: 6.0" HELIX ASM.



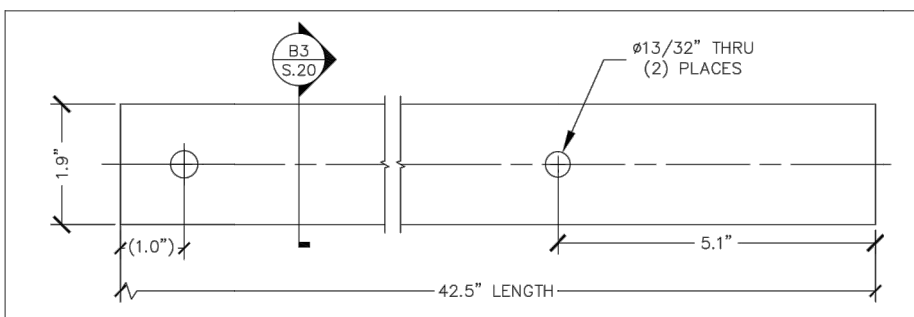
D4 SIDE VIEW: 6.0" HELIX



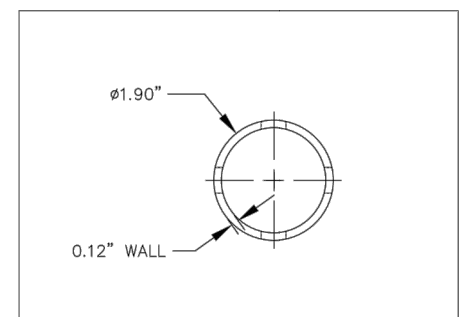
C1 PART: LOWER ANCHOR POST



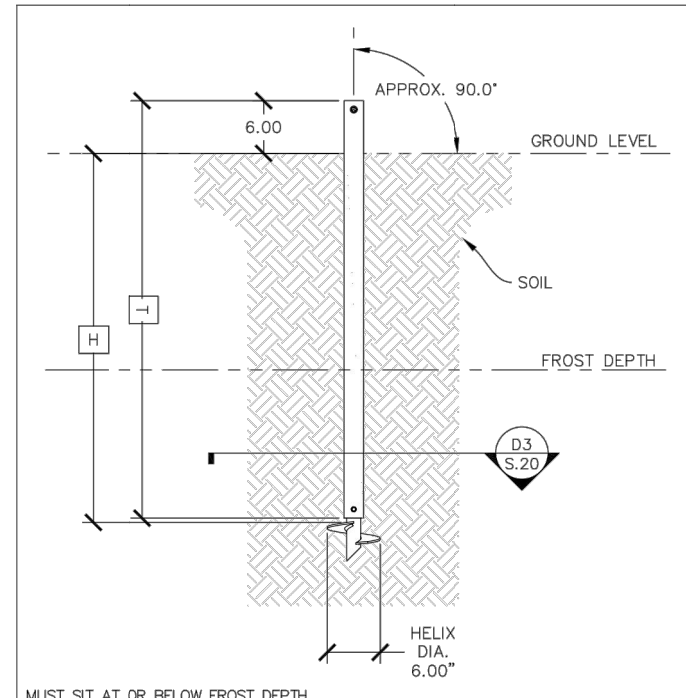
C3 SEC.: LOWER POST



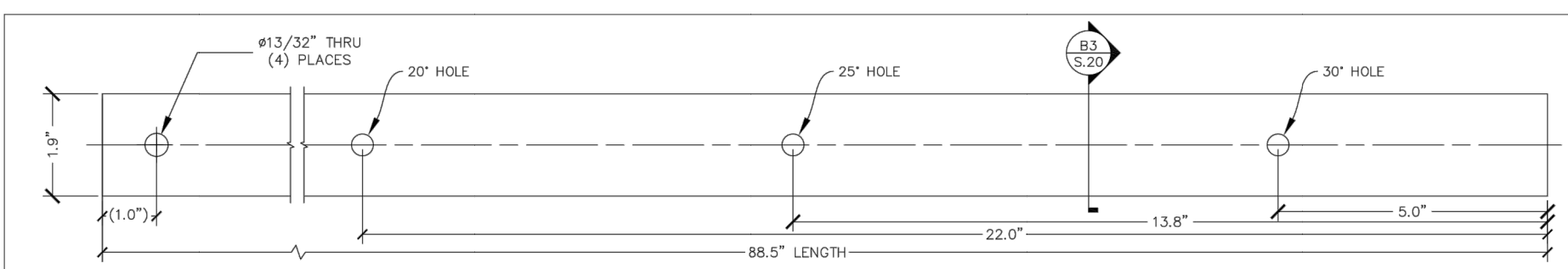
B1 PART: UPPER ANCHOR POST - FRONT



B3 SEC.: UPPER POST



B4 VIEW: POST EMBEDMENT



A1 PART: UPPER ANCHOR POST - REAR

EMBEDMENT TABLE		
DESIGN FROST DEPTH (PER AHJ)	MIN. EMBEDMENT	TUBE LENGTH
≤30"	30"	(35.5")
≤36"	36"	(41.5")
≤42"	42"	(47.5")
≤48"	48"	(53.5")
≤60"	60"	(65.5")

- NOTES:
- TUBE MATERIAL, SPACER, AND WELDED HELIX ASSEMBLY: 50 KSI MIN YIELD STRENGTH, 1010 STEEL.
  - TUBE AND ANCHOR SYSTEM TO BE HOT DIPPED GALVANIZED TO ASTM A123 OR IN LINE GALVANIZED TO ASTM A1057.
  - ALL HARDWARE IS 300 SERIES STAINLESS STEEL.
  - RECOMMENDED TORQUE VALUES FOR STAINLESS STEEL HARDWARE: 3/8-16 HARDWARE TO 19.6 FT-LBS
  - MIN/MAX TORQUE VALUES FOR STAINLESS STEEL HARDWARE) 3/8-16: 17.5 - 21.5 FT-LBS
  - ANCHOR HELIX SHALL PENETRATE THE SOIL TO A DEPTH PAST THE FROST LINE AND TO THE DEPTH INDICATED AS MINIMUM TO ACHIEVE MINIMUM RESISTANCE TO TENSION AND COMPRESSION LOADS, PER THE STATE SEALED LETTER, WHICHEVER IS DEEPER.
  - INSTALLERS SHALL REFER TO STRUT AND POST SETUP SHEETS FOR LENGTH AND PLACEMENT DETAILS.
  - LISTED EMBEDMENT DEPTHS, ARE ONLY TO EXCEED SPECIFIC FROST DEPTHS, AS INDICATED IN THE TABLE. IT'S THE CUSTOMERS RESPONSIBILITY TO CONFIRM THE PROJECT FROST DEPTH, AND REQUIRED MINIMUM DESIGN DEPTH WITH THE LOCAL AHJ AND CUSTOMER CONTRACTED LICENSED GEOTECHNICAL ENGINEER, BEFORE PURCHASING MATERIALS.
  - DEEPER EMBEDMENT, THAN LISTED HERE, MAY BE REQUIRED TO RESIST ANTICIPATED MAXIMUM LOAD VALUES, PER THE STATE SEALED STRUCTURAL LETTER. IT IS THE CUSTOMERS RESPONSIBILITY TO CONFIRM THAT THE ONSITE SOIL CONDITIONS ARE COMPATIBLE WITH THE PURCHASED HELIX SIZE, EMBEDMENT, AND REACTION VALUES (FROM THE STATE SEALED LETTER).
  - PILES MUST BE DRIVEN TO FULL DEPTH AS DIRECTED BY LICENSED GEOTECHNICAL ENGINEER, OR THEY ARE CONSIDERED A FAILURE AND AN ADDITIONAL ANCHOR OR ALTERNATE ANCHORING METHOD MAY BE REQUIRED.
  - SHALLOWER PILE EMBEDMENTS MAY ONLY BE USED IF APPROVED BY A CUSTOMER CONTRACTED LICENSED GEOTECHNICAL ENGINEER. INSTALLING FOUNDATIONS IN ANY METHOD OR DEPTH LESS THAN THOSE LISTED HERE, IN THE STATE SEALED LETTER, OR COMPANION DOCUMENTATION, MAY VOID THE WARRANTY OF THE FOUNDATION, THE RACKING SYSTEM, OR ANY OTHER PART.
  - ANCHOR POST INSTALLATION
    - ACCURATELY LOCATE AND INSTALL ANCHOR POSTS BY SUCH METHODS AND EQUIPMENT SO AS NOT TO IMPAIR THE ANCHOR STRENGTH OR DAMAGE ANCHORS OR ADJACENT CONSTRUCTION.
    - INSTALLATION CONTRACTOR RESPONSIBLE FOR ALL CONSTRUCTION EQUIPMENT, METHODS, AND SEQUENCES.
    - DISTURBED GALVANIZED SURFACES SHALL BE TOUCHED UP WITH AN APPROVED COLD GALVANIZING COMPOUND.
    - INSTALL ANCHORS TO MINIMUM DEPTH AS REQUIRED, MINIMUM VALUE OF THIS SHEET, THE STATE SEALED LETTER, OR THE LOCAL AHJ.
  - HELICAL ANCHOR POSTS SHALL BE INSTALLED SO THAT POST TOLERANCES ARE MET, AND THE POST DOES NOT DEFORM, SO THAT THE RACKING CANNOT CONNECT TO THE POST.
  - ANCHORS DRIVEN TOO SHALLOW OR TOO DEEP WILL NEED TO BE REMEDIED (AT THE CONTRACTOR'S EXPENSE).
  - IT IS THE CONTRACTORS RESPONSIBILITY TO DETERMINE THE LOCAL DESIGN FROST DEPTH, AND DETERMINE THE LOAD CAPACITIES OF THE SOIL.
  - THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO THE PILE AFTER DELIVERY, INCLUDING HITTING UNDERGROUND OBSTRUCTIONS, INCORRECTLY INSTALLING RESULTING IN DAMAGE, OR OTHER.
  - PILES ARE DESIGNED TO SOIL CONDITIONS STATED IN IBC 2018. THE CUSTOMER SHALL VERIFY SITE CONDITIONS MEET MINIMUM REQUIREMENTS. AP ALTERNATIVES AND THE JDI GROUP ARE NOT RESPONSIBLE FOR IMPROPER PILE CHOICE OR INSTALLATION.

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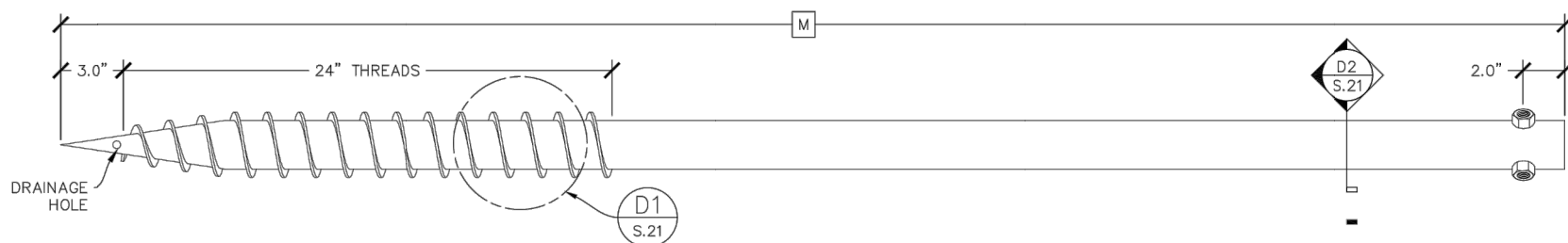
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SHEET NAME	
STRUCTURAL DETAIL	

SHEET SIZE	
ANSI B	
11" X 17"	

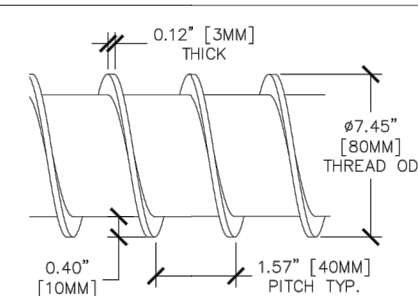
  

SHEET NUMBER	
PV-3.3	

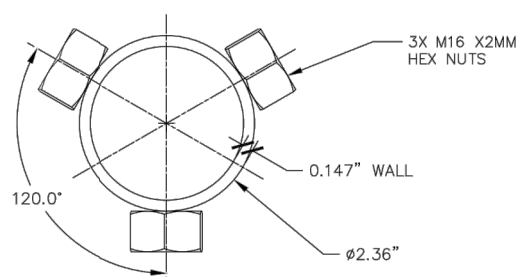


NOTES:  
1. VIEW NOT REPRESENTATIVE OF REQUIRED OVERALL OR THREAD LENGTH.

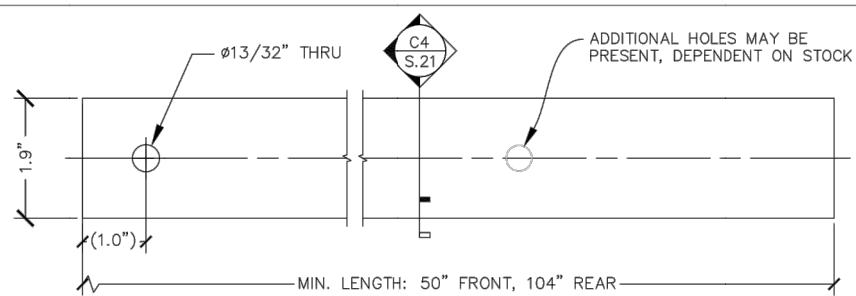
E1 PART: SCREW PILE



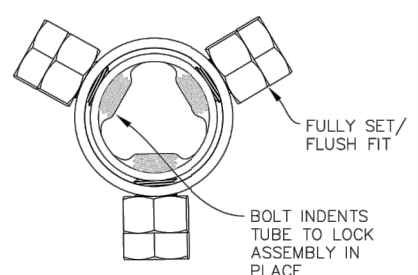
D1 DETAIL: SCREW PILE



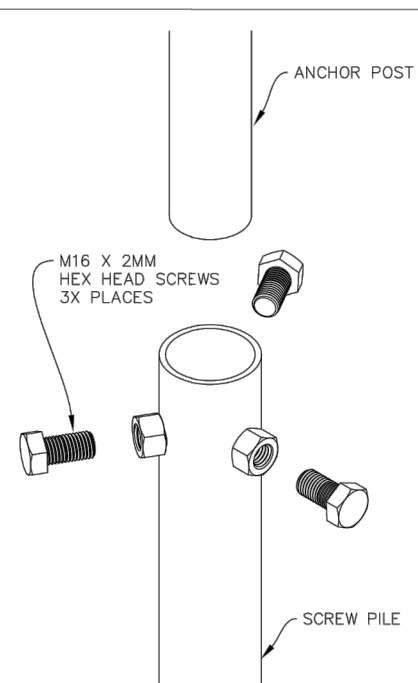
D2 SECTION: SCREW PILE



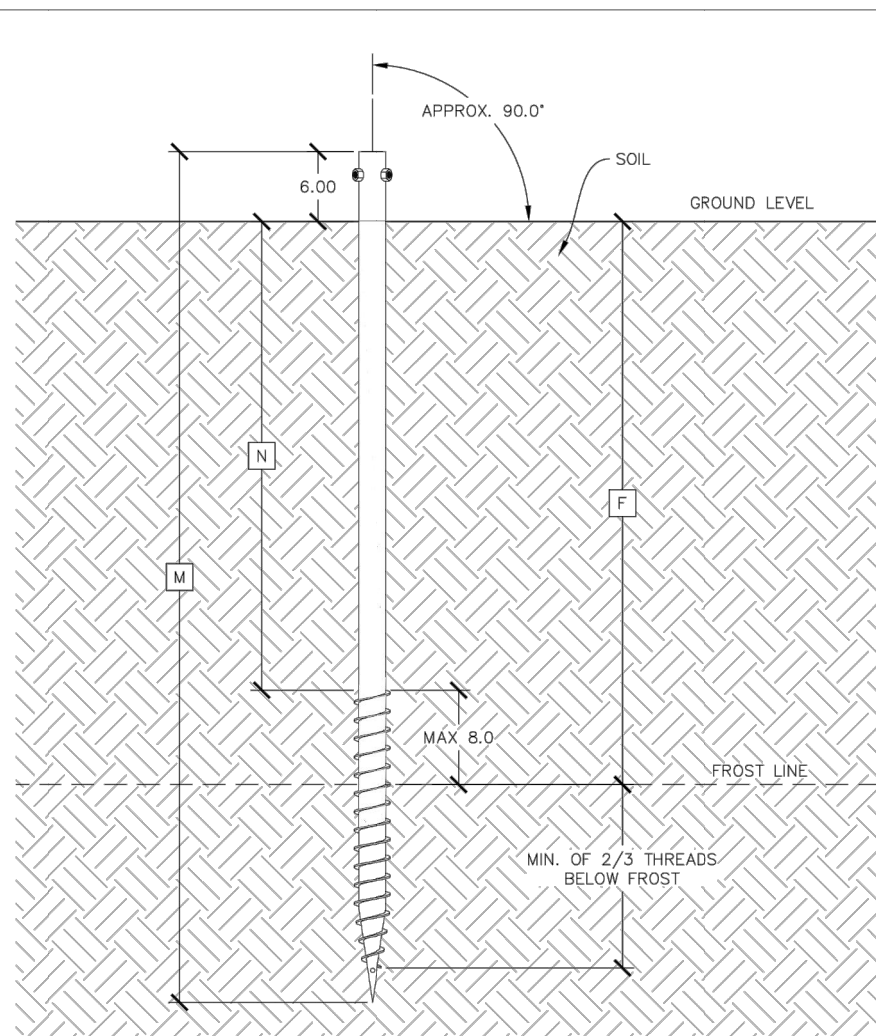
D4 PART: UPPER ANCHOR POST - FRONT



C1 DETAIL: PILE ASSEMBLY

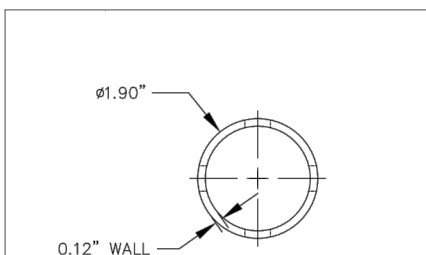


A1 CONNECTION: POST-TO-PILE



NOTES:  
1. LENGTH & THREADS MAY VARY, SEE SHEET NOTES

A2 VIEW: POST EMBEDMENT



C4 SEC.: UPPER POST

EMBEDMENT TABLE		
F FROST DEPTH (PER AHJ)	N DEPTH TO TOP OF SCREW PORTION	M OVERALL LENGTH OF SCREW PILE
≤15"	(7")	40"
≤22"	(14")	47"
≤36"	(28")	61"
≤48"	(40")	73"
≤60"	(52")	85"

NOTES:

- TUBE MATERIAL: 50 KSI MIN YIELD STRENGTH, 1010 STEEL.
- UPPER TUBE TO BE HOT DIPPED GALVANIZED TO ASTM A123 OR INLINE GALVANIZED TO ASTM A1057.
- SCREW PILE TUBE MATERIAL: 30 KSI MIN YIELD STRENGTH STEEL.
- SCREW PILE THREAD MATERIAL: 28 KSI MIN YIELD STRENGTH STEEL.
- SCREW PILE TO BE HOT DIPPED GALVANIZED TO ASTM A123 OR INLINE GALVANIZED TO ASTM A1057.
- ALL HARDWARE IS 300 SERIES STAINLESS STEEL, A574 ALLOY STEEL, OR MINIMUM 8.8 CLASS METRIC.
- BOLTS MUST BE FULLY SET INTO WELDED NUTS.
- BOLTS SHALL BE 25 TO 30 MM LONG.
- SCREW PILE SHALL PENETRATE THE SOIL TO A DEPTH PAST THE FROST LINE, SUCH WHICH LESS THAN 1/3 OF THE TOTAL LENGTH OF THREADS ARE ABOVE THE FROST LINE AND TO THE DEPTH INDICATED AS MINIMUM TO ACHIEVE MINIMUM RESISTANCE TO TENSION AND COMPRESSION LOADS, PER THE STATE SEALED LETTER, WHICHEVER IS DEEPER.
- ANCHOR POST SHALL EXTEND ABOVE GROUND LEVEL AT MINIMUM OF INDICATED FRONT LIP CLEARANCE, PLUS THE ADDITIONAL LENGTH REQUIRED TO ACHIEVE THE INDICATED TILT ANGLE.
- MINIMUM ENGAGEMENT BETWEEN SCREW PILE AND ANCHOR POST SHALL BE 4".
- INSTALLERS SHALL REFER TO STRUT AND POST SETUP SHEETS FOR LENGTH AND PLACEMENT DETAILS.
- LISTED EMBEDMENT DEPTHS, ARE ONLY TO EXCEED SPECIFIC FROST DEPTHS, AS INDICATED IN THE TABLE. IT'S THE CUSTOMERS RESPONSIBILITY TO CONFIRM THE PROJECT FROST DEPTH, OR REQUIRED MINIMUM DESIGN DEPTH WITH THE LOCAL AHJ, BEFORE PURCHASING MATERIALS.
- DEEPER EMBEDMENT, THAN LISTED HERE, MAY BE REQUIRED TO RESIST ANTICIPATED MAXIMUM LOAD VALUES, PER THE STATE SEALED STRUCTURAL LETTER. IT IS THE CUSTOMERS RESPONSIBILITY TO CONFIRM THAT THE ONSITE SOIL CONDITIONS ARE COMPATIBLE WITH THE PURCHASED EMBEDMENT, AND REACTION VALUES (FROM THE STATE SEALED LETTER).
- PILES MUST BE DRIVEN TO FULL DEPTH, OR THEY ARE CONSIDERED A FAILURE AND AN ADDITIONAL ANCHOR OR ALTERNATE ANCHORING METHOD MAY BE REQUIRED.
- SHALLOWER PILE EMBEDMENTS MAY ONLY BE USED IF APPROVED BY A CUSTOMER CONTRACTED LICENSED GEOTECHNICAL ENGINEER. INSTALLING FOUNDATIONS IN ANY METHOD OR DEPTH LESS THAN THOSE LISTED HERE, IN THE STATE SEALED LETTER, AND COMPANION DOCUMENTATION, MAY VOID THE WARRANTY OF THE FOUNDATION, THE RACKING SYSTEM, OR ANY OTHER PART.
- PILES SHALL BE INSTALLED SO THAT POST TOLERANCES ARE MET, AND THE POST DOES NOT DEFORM EXCESSIVELY, SO THAT THE RACKING CANNOT CONNECT TO THE POST.
- ANCHORS DRIVEN TOO SHALLOW OR TOO DEEP WILL NEED TO BE REMEDIED (AT THE CONTRACTOR'S EXPENSE).
- IT IS THE CONTRACTORS RESPONSIBILITY TO DETERMINE THE LOCAL DESIGN FROST DEPTH, AND DETERMINE THE LOAD CAPACITIES OF THE SOIL.
- THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO THE PILE AFTER DELIVERY, INCLUDING HITTING UNDERGROUND OBSTRUCTIONS, INCORRECTLY INSTALLING RESULTING IN DAMAGE, OR OTHER.
- PILES ARE DESIGNED TO SOIL CONDITIONS STATED IN IBC 2018. THE CUSTOMER SHALL VERIFY SITE CONDITIONS AND MEET MINIMUM REQUIREMENTS. AP ALTERNATIVES AND THE JDI GROUP ARE NOT RESPONSIBLE FOR IMPROPER PILE CHOICE OR INSTALLATION.
- ANCHOR POST INSTALLATION
  - ACCURATELY LOCATE AND INSTALL SCREW PILES BY SUCH METHODS AND EQUIPMENT SO AS NOT TO IMPAIR THE PILE STRENGTH OR DAMAGE ANCHORS OR ADJACENT CONSTRUCTION.
  - INSTALLATION CONTRACTOR RESPONSIBLE FOR ALL CONSTRUCTION EQUIPMENT, METHODS, AND SEQUENCES.
  - DISTURBED GALVANIZED SURFACES SHALL BE TOUCHED UP WITH AN APPROVED COLD GALVANIZING COMPOUND.
  - INSTALL ANCHORS TO MINIMUM DEPTH AS REQUIRED, MINIMUM VALUE OF THIS SHEET, THE STATE SEALED LETTER, OR THE LOCAL AHJ.

  
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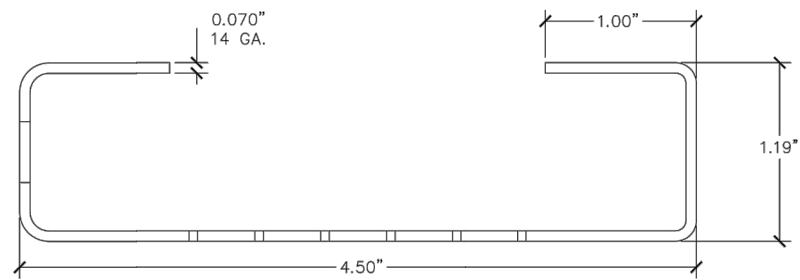
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 APN# 050635008904  
 PHONE NO: (919)-609-7846  
 AHJ: CITY OF HOLLY SPRINGS

SHEET NAME  
**STRUCTURAL DETAIL**

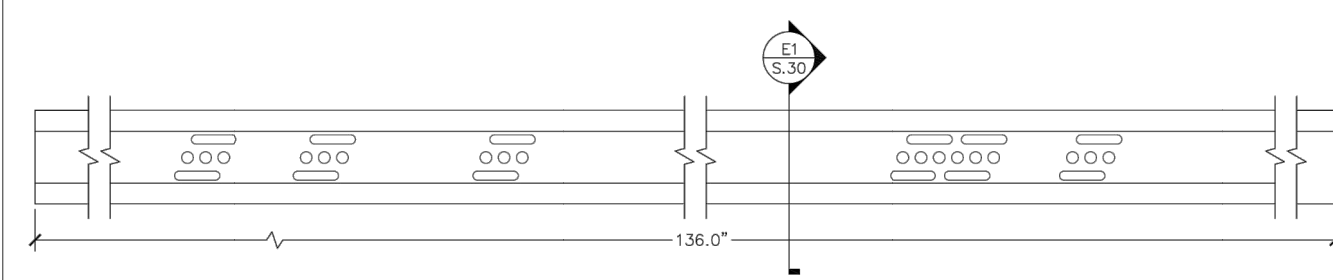
SHEET SIZE  
**ANSI B  
 11" X 17"**

SHEET NUMBER  
**PV-3.4**

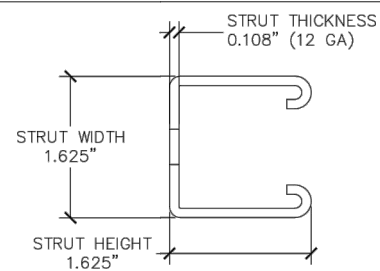




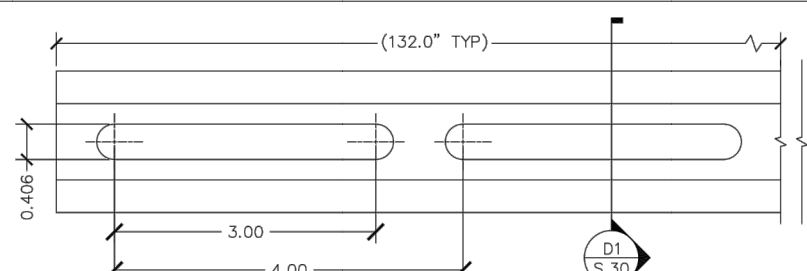
E1 SECTION: NS (VERTICAL) CEE PURLIN



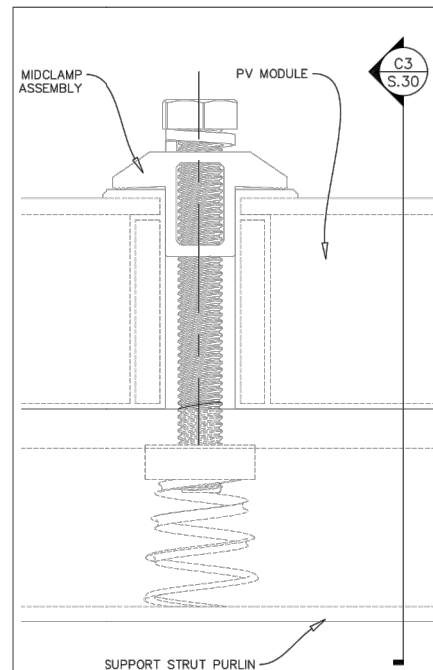
E3 PART: NS CEE PURLINS



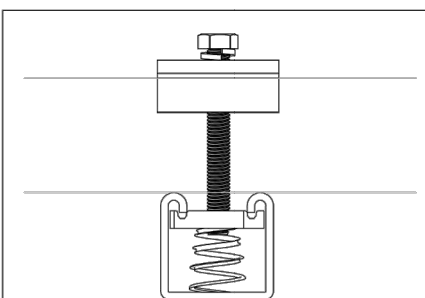
D1 SECTION: EW STRUT



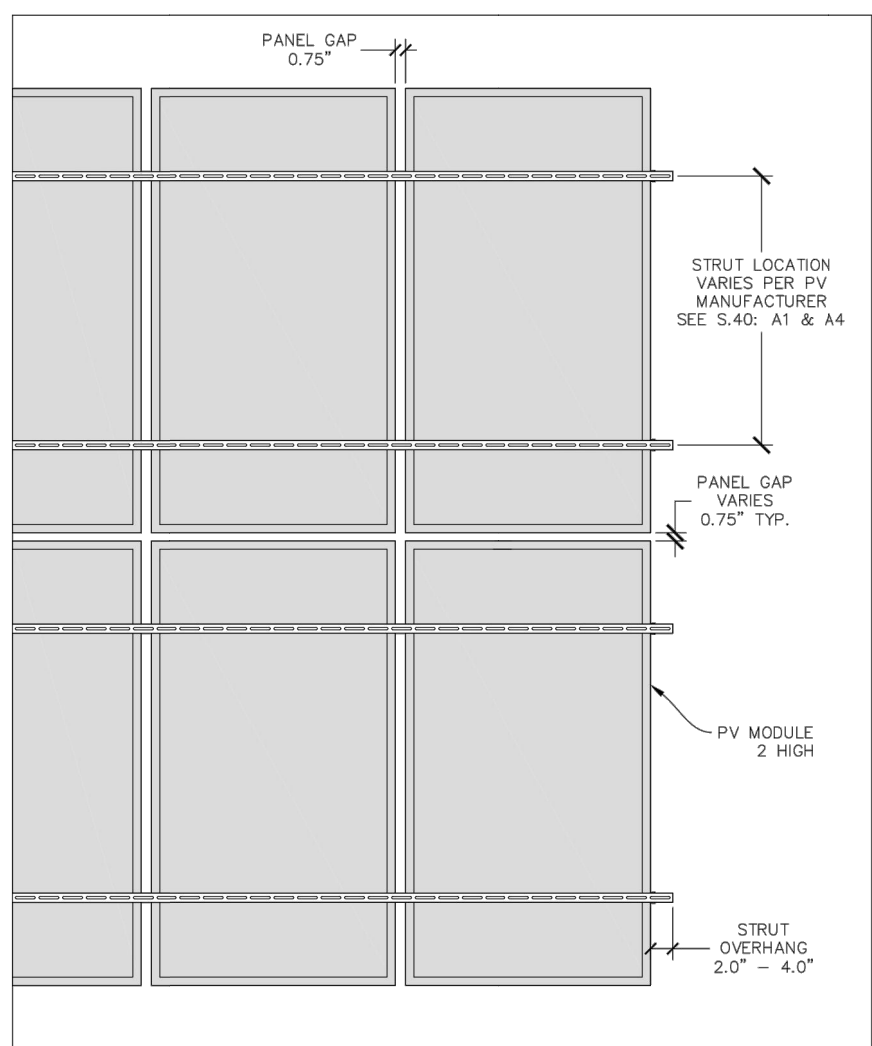
NOTE: OVERALL LENGTH MAY BE SHORTER, AS REQUIRED PER PROJECT  
D2 PART: STRUT CHANNEL WITH LONG SLOTS



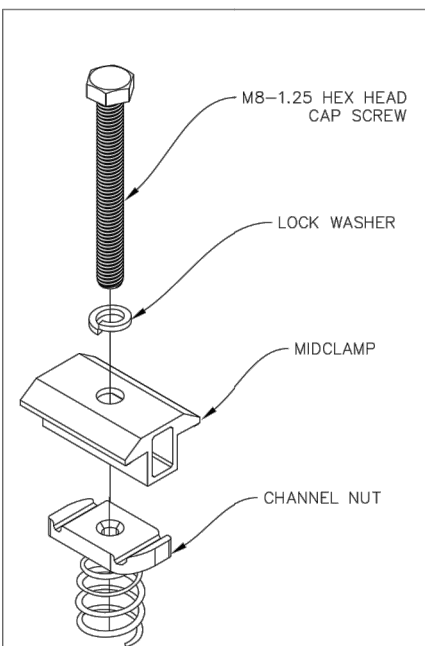
C3 CONNECTION: PV-TO-STRUT



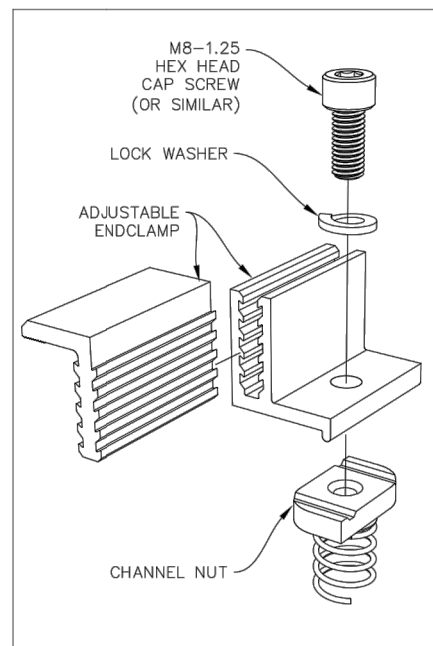
C5 CONNECTION: PV-TO-STRUT



A1 ASSEMBLY: PANELS TO EW STRUTS - BOTTOM VIEW



A3 CONNECTION: MIDCLAMP



NOTE: MAY NOT BE REPRESENTATIVE OF INSTALLED ENDCLAMPS

A4 CONNECTION: ENDCLAMP

NOTES

1. STRUT PURLIN MATERIAL AND FINISH ARE MANUFACTURED TO SPECIFICATIONS THAT EXCEED OUR STANDARD PRODUCT WARRANTY.
2. ALL PURLINS GALVANIZED TO CONFORM TO A MINIMUM THICKNESS DESIGNATION EQUAL TO G90 OR INLINE GALVANIZED TO COMPARABLE THICKNESS AS PER ASTM A1057.
3. ALL PURLINS MANUFACTURED USING ASTM A1011/A1011M STRUCTURAL STEEL.
4. MINIMUM STEEL F<sub>y</sub> YIELD STRENGTH OF STRUT PURLINS TO BE 50 KSI.
5. MINIMUM STEEL F<sub>y</sub> YIELD STRENGTH OF CEE CHANNEL TO BE 50 KSI.
6. LENGTH OF CUT STRUT PURLINS VARIES BY PROJECT AND LOCATION WITHIN ARRAY.
7. PANEL DIMENSIONS VARY. REFER TO MANUFACTURER'S SPEC SHEET.
8. STRUT PLACEMENT IN RELATIONSHIP TO PANEL DICTATED BY MANUFACTURER, SEE MANUFACTURER'S INSTALL MANUAL.
9. CLAMP PLACEMENT DETERMINED BY STRUT PLACEMENT.
10. ENDCLAMPS MUST BE INSTALLED AT BOTH ENDS OF THE ROW, AT THE EAST AND WEST END (TYP.) OF EACH STRUT.
11. STAINLESS STEEL HARDWARE)
  - NOMINAL TORQUE VALUE
  - M8-1.25: 15.6 FT-LBS
  - MIN/MAX TORQUE VALUES
  - M8-1.25: 14.0 - 17.5 FT-LBS
12. KEEP ENDS OF TRIMMED STRUT PURLINS UNTIL END OF PROJECT FOR USE ON REMAINING ROWS.
13. STRUTS SHALL EXTEND APPROXIMATELY 4" PAST PANEL EDGES TO ACCOMMODATE END CLAMPS.
14. ENSURE ALL STRUTS SPAN A MINIMUM OF AT LEAST ONE (1) SET OF ANCHORS.
15. INSTALL FOUR (4) ROWS OF STRUT PURLINS PER RACK
16. STRUT ENDS MUST BE AT LEAST 4" FROM ANCHOR CENTERS (TO PREVENT INTERFERENCE BETWEEN SPLICE AND BRACKET)
17. SPLICES SHALL NOT OCCUR IN THE CANTILEVERED PORTION.

  
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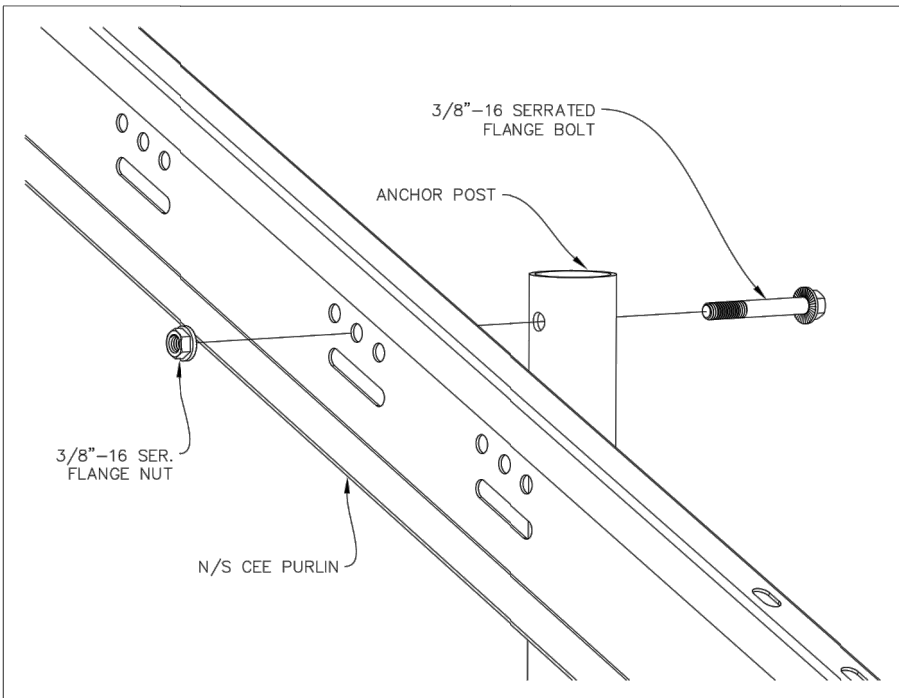
REVISIONS		REV
DESCRIPTION	DATE	
	07-28-2024	

PROJECT NAME  
**CHRIS AND SHAUNA WALDON**  
 190 FRED BURNS RD.,  
 HOLLY SPRINGS, NC 27540 USA  
 APN# 050635008904  
 PHONE NO: (919)-609-7846  
 AHJ: CITY OF HOLLY SPRINGS

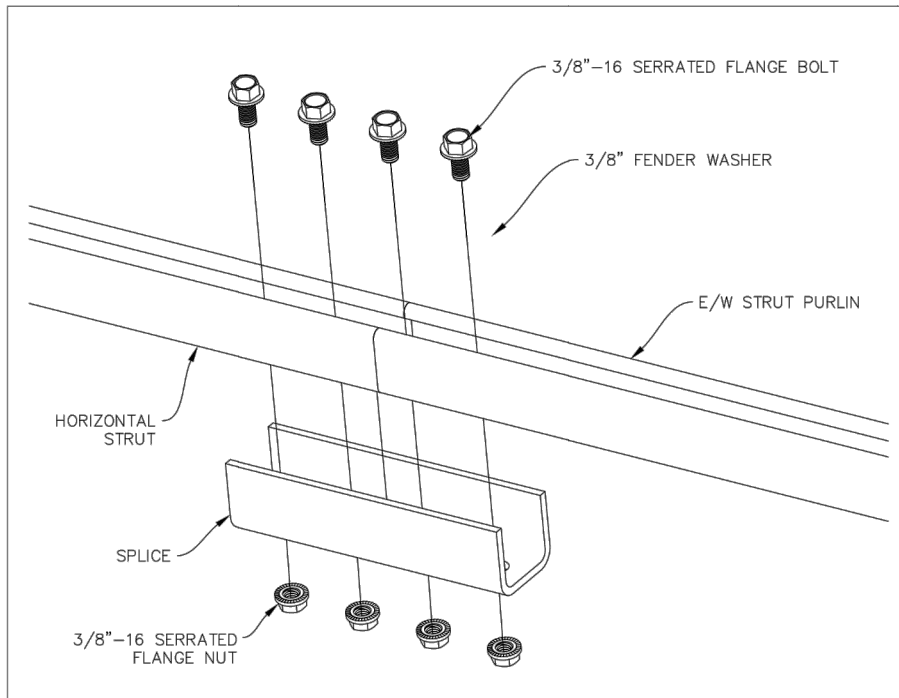
SHEET NAME  
**STRUCTURAL DETAIL**

SHEET SIZE  
**ANSI B**  
**11" X 17"**

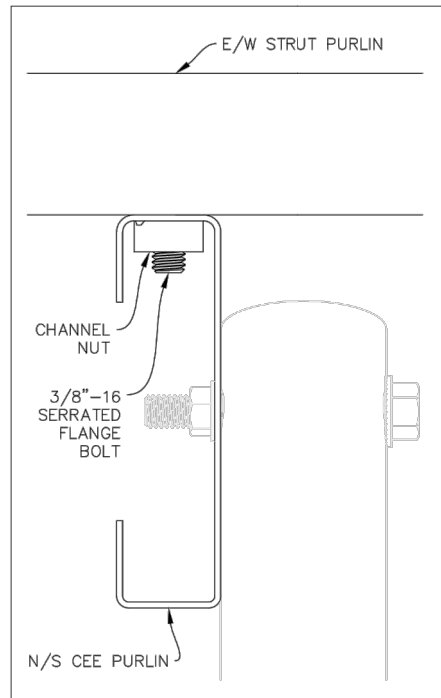
SHEET NUMBER  
**PV-3.5**



D1 CONNECTION: CEE-TO-POST



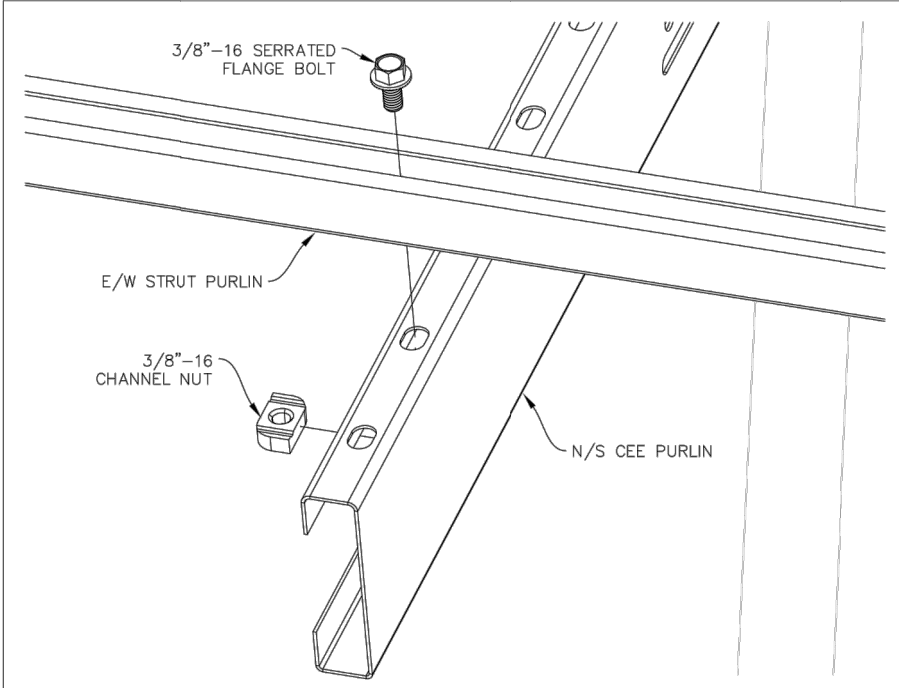
D3 CONNECTION: STRUT-TO-STRUT SPLICE



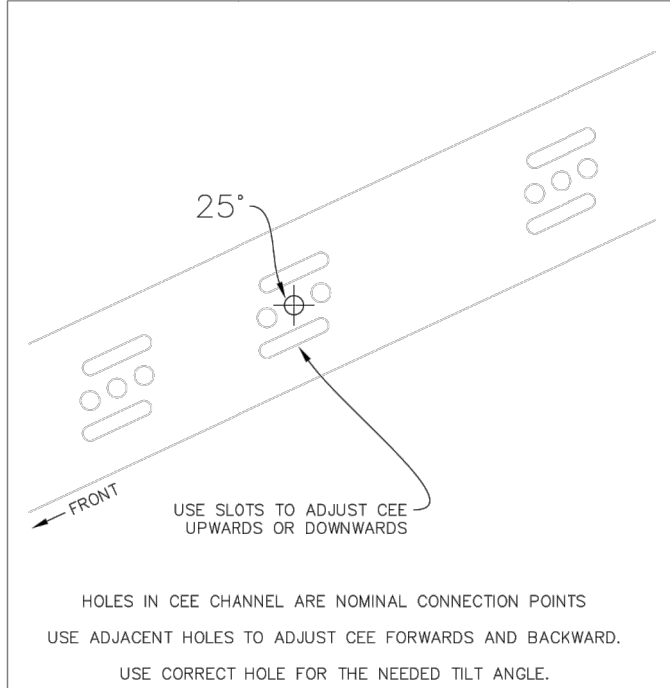
D5 DETAIL B1 FRONT VIEW

NOTES

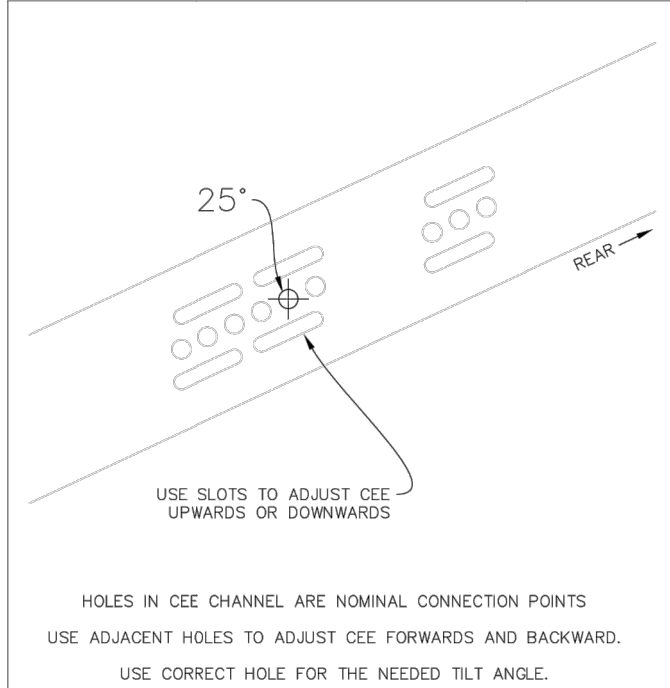
- RECOMMENDED TORQUE VALUES (FOR STAINLESS STEEL HARDWARE)
  - 3/8-16: 19.6 FT-LBS
- MIN/MAX TORQUE VALUES (FOR STAINLESS STEEL HARDWARE)
  - 3/8-16: 17.5 - 21.5 FT-LBS
- DEPICTED HARDWARE AND PART PLACEMENT NOT INDICATIVE OF PREFERRED OR REQUIRED POSITIONS.
- TILT ANGLE IS SETUP BY ANCHOR POST HEIGHTS.
- CEE CHANNEL PURLIN ALLOWS FOR HEIGHT ADJUSTMENT, FORWARD/REAR ADJUSTMENT, AND MULTIPLE TILT ANGLES.
- OTHER SPECIFIC CONNECTIONS ELSEWHERE IN DRAWING SET.
- STRUT PURLINS MUST CONNECT TO THE CORRECT HOLES IN CEE CHANNEL (INNER, MIDDLE, OR OUTER TYPICALLY), AS DETERMINED BY PV MODULE MANUFACTURERS ALLOWABLE CLAMPING ZONE.
- USE CORRECT NOMINAL HOLES IN CEE TO CONNECT TO ANCHOR POST, AS INDICATED. ADJACENT HOLES AND SLOTS FOR FIELD ADJUSTMENTS.
- SERRATED HARDWARE MAY BE REPLACED WITH EQUIVALENT HARDWARE WITH WASHERS IF NECESSARY.



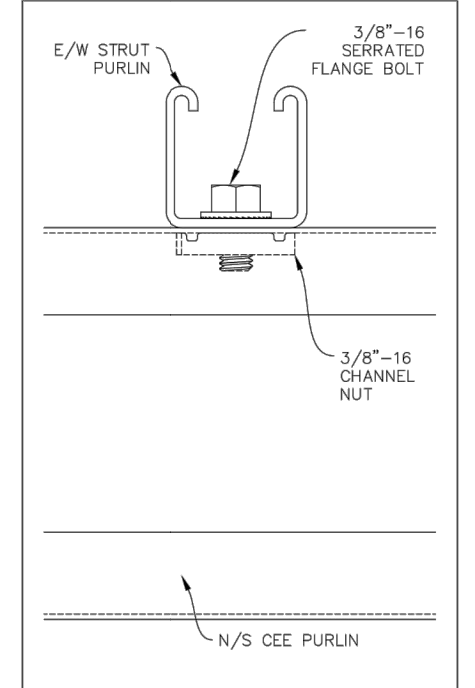
B1 CONNECTION: STRUT-TO-CEE



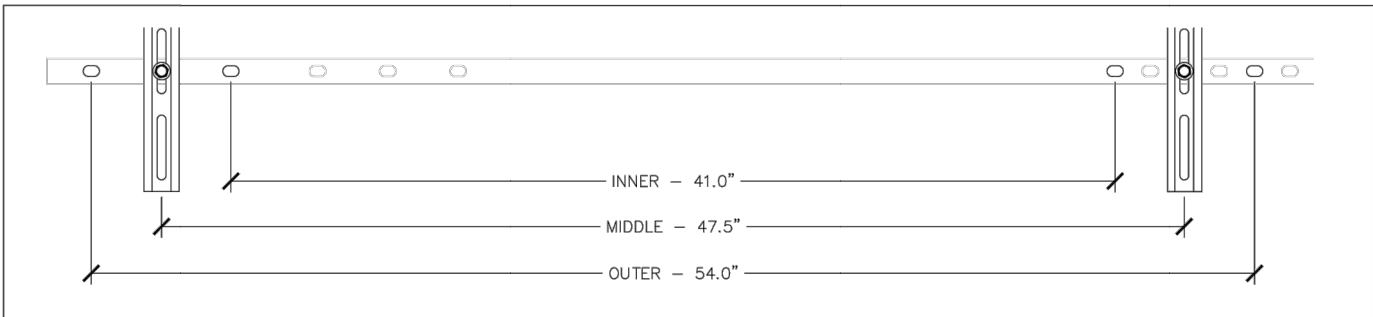
B3 DETAIL: CEE-TO-POST ADJUSTMENT



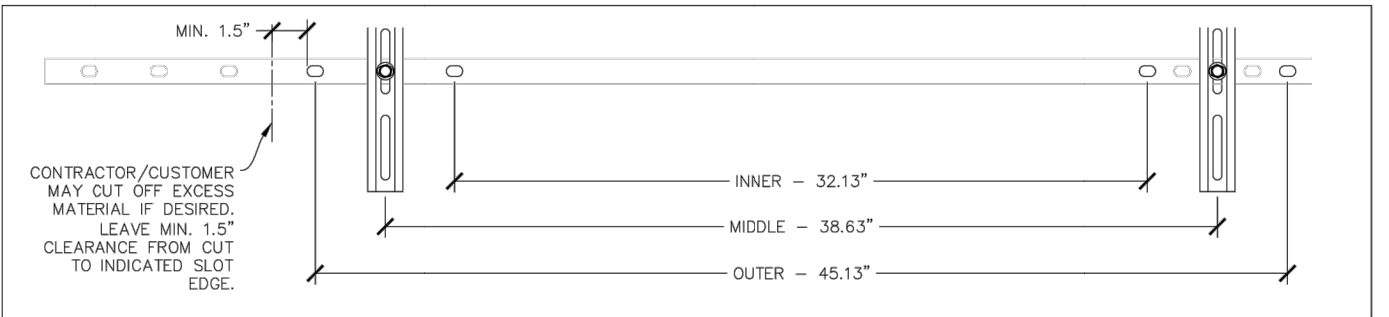
B4 DETAIL: CEE-TO-POST ADJUSTMENT



B6 DETAIL B1 SIDE VIEW



A1 DETAIL: STRUT-TO-CEE MODULE CLAMP ZONES - 72 CELL



A4 DETAIL: STRUT-TO-CEE MODULE CLAMP ZONES - 60 CELL

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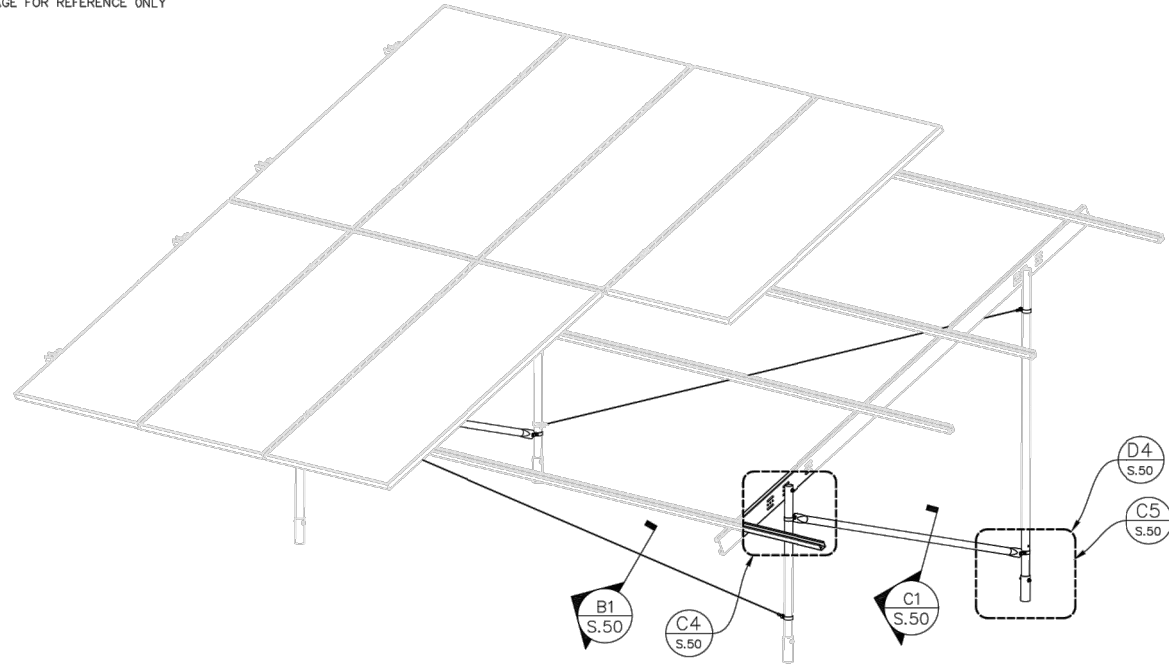
PROJECT NAME  
**CHRIS AND SHAUNA WALDON**  
190 FRED BURNS RD.,  
HOLLY SPRINGS, NC 27540 USA  
APN# 050635008904  
PHONE NO: (919)-609-7846  
AHJ: CITY OF HOLLY SPRINGS

SHEET NAME  
**STRUCTURAL DETAIL**

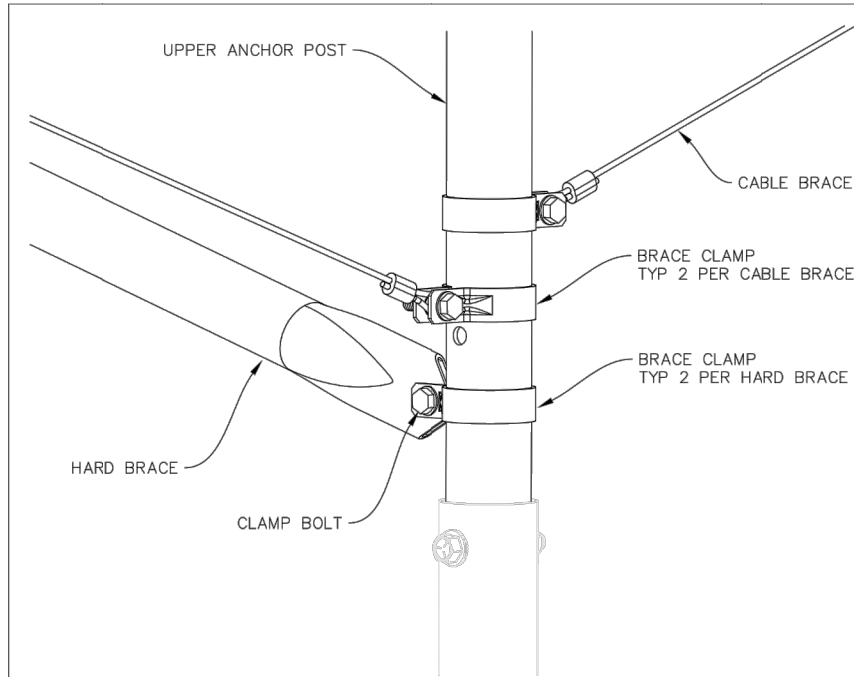
SHEET SIZE  
**ANSI B  
11" X 17"**

SHEET NUMBER  
**PV-3.6**

IMAGE FOR REFERENCE ONLY



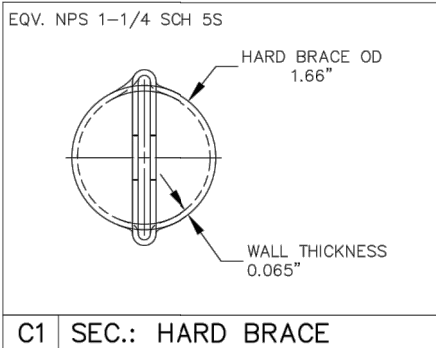
D1 VIEW: TYPICAL END OF ROW BRACING



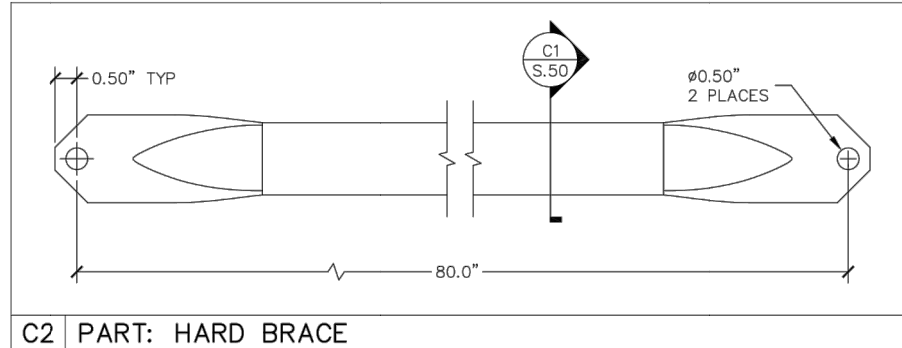
D4 DETAIL: BRACING CONNECTIONS

NOTES:

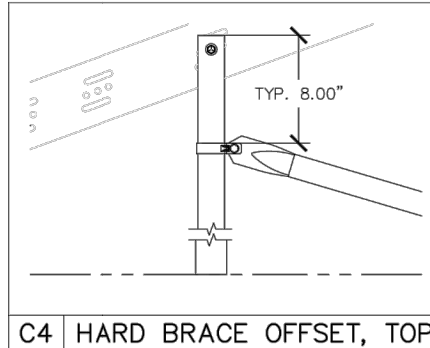
- HARD BRACING TO BE INSTALLED BETWEEN EVERY NORTH AND SOUTH ANCHOR SET. (100%)
- EAST/WEST CABLE BRACING (VEE BRACES) TO BE INSTALLED IN THE SPACE BETWEEN ANCHOR SETS (BAY), AT THE FRONT AND REAR.
- CABLE BRACING SHALL BE INSTALLED TAUT. IT DOES NOT KEEP MEMBERS IN TENSION, BUT IT IS A MOTION LIMITING ELEMENT.
- BRACE CLAMPS TO BE LOCATED AS SHOWN IN OFFSET DETAILS, THIS PAGE.
- CABLE TO BE STAINLESS STEEL AIRCRAFT CABLE.
- CABLE MAY BE OF EITHER 7X7 OR 7X19 CONFIGURATION.
- HARD BRACE MATERIAL: 40 KSI MIN YIELD STRENGTH, 1010 STEEL
- HARD BRACE TO BE HOT DIPPED GALVANIZED TO ASTM A123 OR INLINE GALVANIZED TO ASTM A1057
- LENGTH OF CABLE BRACES WILL VARY DEPENDENT ON ARRAY TILT, TERRAIN, POST SPANS, AND OTHER FACTORS.
- CABLE BRACES WILL TYPICALLY BE RECEIVED WITH ONE END MANUFACTURED WITH A LOOP AND THE OTHER END FREE. THESE SHOULD BE FIELD FIT WITH A WIRE SPLICE AND ADJUSTED TO THE CORRECT LENGTH AND TENSION, BY THE CONTRACTOR UPON INSTALLATION.
- FOLLOW ALL MANUFACTURERS GUIDELINES WHEN BUILDING FIELD MADE END OF CABLES.
- ENSURE CABLE IS CLEANLY CUT TO ENSURE PROPER ASSEMBLY.
- ENSURE CABLE ENTERS CORRECT APERTURE OF WIRE SPLICE. THE FINAL LOOP SHOULD ONLY BE ABLE TO GET TIGHTER UNDER LOAD, NOT LOOSER.
- DEAD END OF FIELD MADE CABLE MUST EXTEND MIN. 4" FROM THE END OF THE SWAGED SLEEVE.
- LOOPED END RECOMMENDED TO EXTEND 3" FROM WIRE SPLICE TO CLAMP BOLT.
- WHEN PROPERLY INSTALLED, FIELD MADE CABLE LOOPS USING THE PROVIDED WIRE SPLICES AND METHOD PRESENTED HERE, ARE CAPABLE OF ACHIEVING ADEQUATE BREAKING STRENGTH.
- IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THE CABLES ARE PREPARED TO THE CORRECT LENGTH.



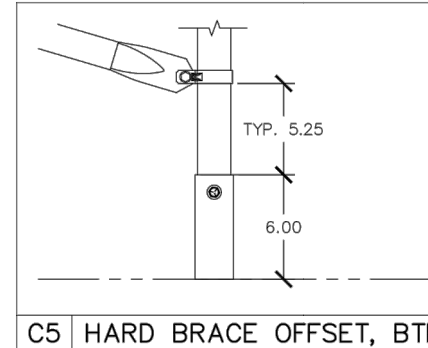
C1 SEC.: HARD BRACE



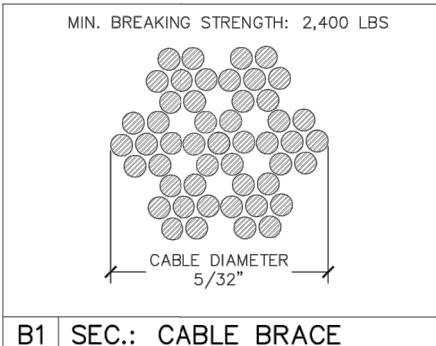
C2 PART: HARD BRACE



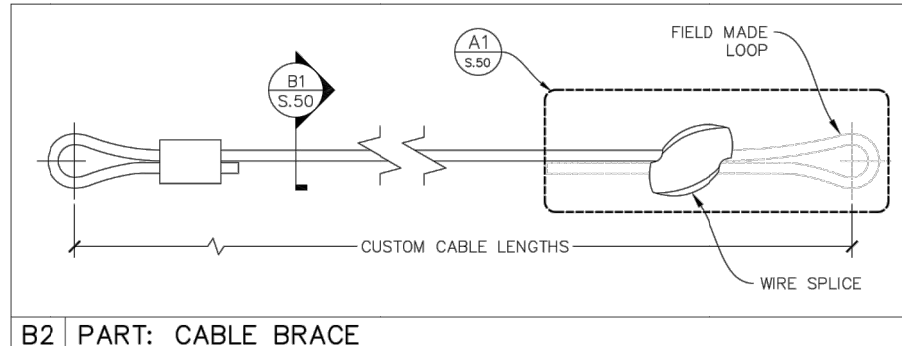
C4 HARD BRACE OFFSET, TOP



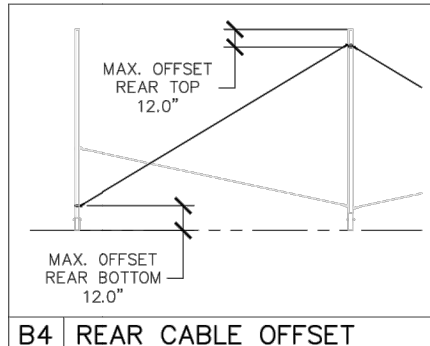
C5 HARD BRACE OFFSET, BTM.



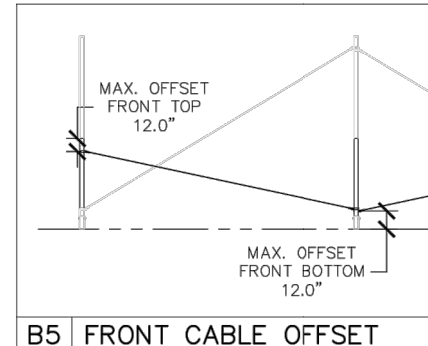
B1 SEC.: CABLE BRACE



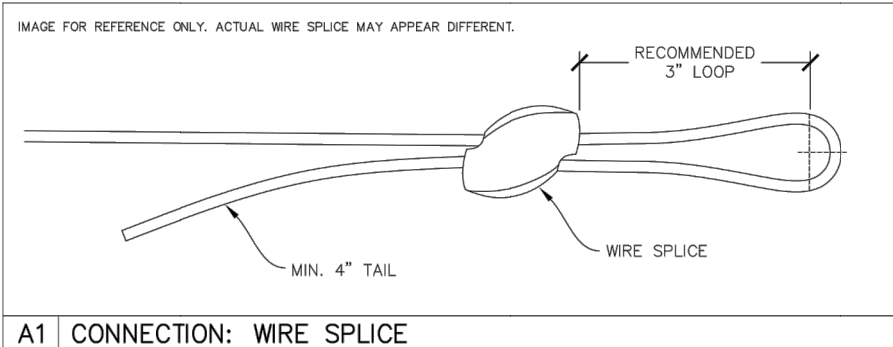
B2 PART: CABLE BRACE



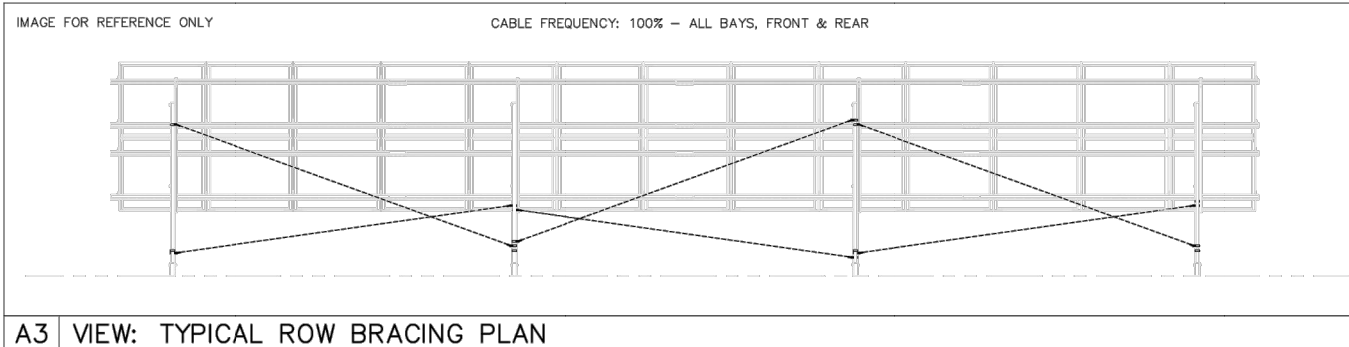
B4 REAR CABLE OFFSET



B5 FRONT CABLE OFFSET



A1 CONNECTION: WIRE SPLICE



A3 VIEW: TYPICAL ROW BRACING PLAN

  
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REVISIONS		REV
DESCRIPTION	DATE	
	07-28-2024	

PROJECT NAME  
**CHRIS AND SHAUNA WALDON**  
**190 FRED BURNS RD.,**  
**HOLLY SPRINGS, NC 27540 USA**  
**APN# 050635008904**  
**PHONE NO: (919)-609-7846**  
**AHJ: CITY OF HOLLY SPRINGS**

SHEET NAME  
**STRUCTURAL DETAIL**

SHEET SIZE  
**ANSI B**  
**11" X 17"**

SHEET NUMBER  
**PV-3.7**



(24) HANWHA QCELL Q.PEAK DUO XL-10.3 / BFG (485W) MODULES  
 (03) BRANCHES OF 08 MODULES CONNECTED IN PARALLEL

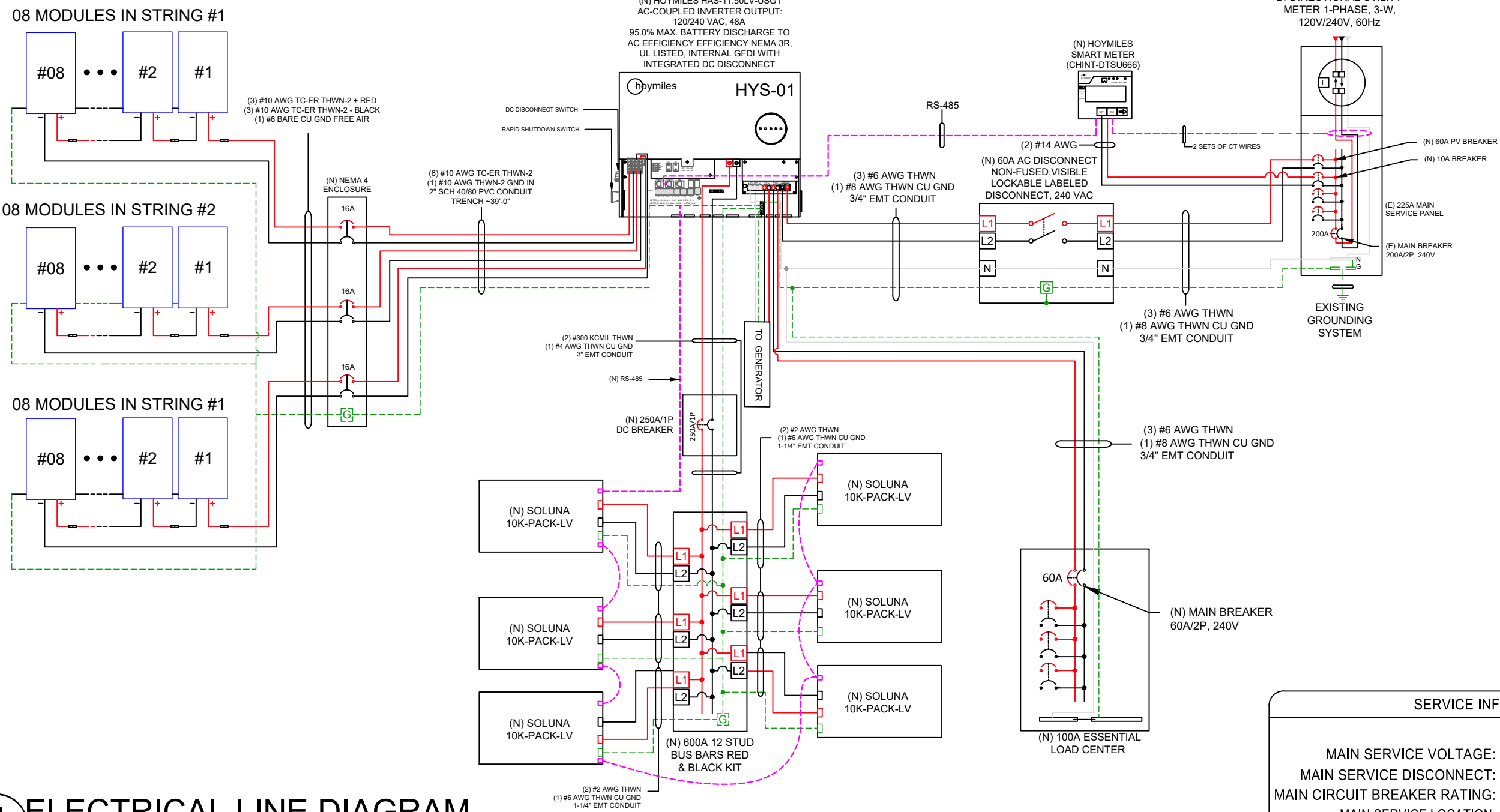
SYSTEM SIZE:- 24 x 485W = 11.64 kWDC  
 SYSTEM SIZE:- (01 x = 11.50 kWAC)

INTERCONNECTION  
 120% RULE - NEC 705.12(B)(2)(3)(b)

UTILITY FEED + SOLAR CURRENT  
 200A + 60.00A = 260.00A  
 BUSS RATING x 120%  
 225A x 120% = 270A

BILL OF MATERIALS		
EQUIPMENT	QTY	DESCRIPTION
SOLAR PV MODULES	24	HANWHA QCELL Q.PEAK DUO XL-10.3 / BFG (485W) MODULES
INVERTER	1	HOYMILES HYS-11.5LV-USG1 INVERTER [240V]
JUNCTION BOX	1	NEMA 4 ENCLOSURE
SMART METER	1	HOYMILES SMART METER (CHINT-DTSU666)
AC DISCONNECT	1	60A NON-FUSED AC DISCONNECT, 240VAC
BATTERY	6	SOLUNA 10K-PACK-LV
DC BREAKER	1	250A/1P DC BREAKER
ESSENTIAL LOAD CENTER	1	100A ESSENTIAL LOAD CENTER
STUD BUS BARS RED & BLACK KIT	1	600A 12 STUD BUS BARS RED & BLACK KIT

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 APN# 050635008904  
 PHONE NO: (919)-609-7846  
 AHJ: CITY OF HOLLY SPRINGS

SHEET NAME  
 ELECTRICAL LINE DIAGRAM  
 SHEET SIZE  
 ANSI B  
 11" X 17"  
 SHEET NUMBER  
 PV-4

SERVICE INFO  
 MAIN SERVICE VOLTAGE: 240V  
 MAIN SERVICE DISCONNECT: (E) 225A  
 MAIN CIRCUIT BREAKER RATING: (E) 200A  
 MAIN SERVICE LOCATION: NORTH  
 SERVICE FEED SOURCE: OVERHEAD

SOLAR MODULE SPECIFICATIONS	
MANUFACTURER / MODEL #	HANWHA QCELL Q.PEAK DUO XL-10.3 / BFG (485W)MODULES
VMP	45.63
IMP	10.63
VOC	53.63
ISC	11.16
MODULE DIMENSION	87.2"L x 41.1"W x 1.37"D (In Inch)

INVERTER SPECIFICATIONS	
MANUFACTURER / MODEL #	HOYMILES HYS-11.5LV-USG1 INVERTER [240V]
NOMINAL OUTPUT VOLTAGE	240 VAC
NOMINAL OUTPUT CURRENT	48.0A

AMBIENT TEMPERATURE SPECS	
WEATHER STATION: RALEIGH DURHAM INTERNATIONAL	
RECORD LOW TEMP	-12°
AMBIENT TEMP (HIGH TEMP 2%)	36°
CONDUIT HEIGHT	0.9"
ROOF TOP TEMP	36°
CONDUCTOR TEMPERATURE RATE(ON ROOF)	90°
CONDUCTOR TEMPERATURE RATE(OFF ROOF)	75°
MODULE TEMPERATURE COEFFICIENT OF Voc	-0.26%/°C

PERCENT OF VALUES	NUMBER OF CURRENT CARRYING CONDUCTORS IN EMT
.80	4-6
.70	7-9
.50	10-20

**ELECTRICAL NOTES**

- ALL EQUIPMENT TO BE LISTED BY UL OR OTHER NRTL, AND LABELED FOR ITS APPLICATION.
- ALL CONDUCTORS SHALL BE COPPER, RATED FOR 600 V AND 90 DEGREE C WET ENVIRONMENT.
- WIRING, CONDUIT, AND RACEWAYS MOUNTED ON ROOFTOPS SHALL BE ROUTED DIRECTLY TO, AND LOCATED AS CLOSE AS POSSIBLE TO THE NEAREST RIDGE, HIP, OR VALLEY.
- WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH CEC 110.26.
- DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS. CONTRACTOR SHALL FURNISH ALL NECESSARY OUTLETS, SUPPORTS, FITTINGS AND ACCESSORIES TO FULFILL APPLICABLE CODES AND STANDARDS.
- WHERE SIZES OF SOLADECK, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, THE CONTRACTOR SHALL SIZE THEM ACCORDINGLY.
- ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND READILY VISIBLE.
- MODULE GROUNDING CLIPS TO BE INSTALLED BETWEEN MODULE FRAME AND MODULE SUPPORT RAIL, PER THE GROUNDING CLIP MANUFACTURER'S INSTRUCTION.
- MODULE SUPPORT RAIL TO BE BONDED TO CONTINUOUS COPPER G.E.C. VIA WEEB LUG OR ILSCO GBL-4DBT LAY-IN LUG.
- TEMPERATURE RATINGS OF ALL CONDUCTORS, TERMINATIONS, BREAKERS, OR OTHER DEVICES ASSOCIATED WITH THE SOLAR PV SYSTEM SHALL BE RATED FOR AT LEAST 75 DEGREE C.

DC CONDUCTOR AMPACITY CALCULATIONS: ARRAY TO NEMA 4 ENCLOSURE :	
EXPECTED WIRE TEMP (In Celsius)	36°
TEMP. CORRECTION PER TABLE 310.15(B)(2)(a)	0.91
NO. OF CURRENT CARRYING CONDUCTORS	6
CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a)	0.80
CIRCUIT CONDUCTOR SIZE	10 AWG
CIRCUIT CONDUCTOR AMPACITY	40A
REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(A&B)	20.00A
1.25 X MAX. DC OUTPUT CURRENT	
DERATED AMPACITY OF CIRCUIT CONDUCTOR PER NEC 310.15(B)(2)(a)	29.12A
TEMP. CORRECTION PER TABLE 310.15(B)(2)(a) X CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a) X CIRCUIT CONDUCTOR AMPACITY	
RESULT SHOULD BE GREATER THAN (20.00A) OTHERWISE LESS THE ENTRY FOR CIRCUIT CONDUCTOR SIZE AND AMPACITY	

DC CONDUCTOR AMPACITY CALCULATIONS: NEMA 4 ENCLOSURE TO INVERTER :	
AMBIENT TEMPERATURE ADJUSTMENT FOR EXPOSED CONDUIT PER NEC 310.15(B)(2)(c)	36°
TEMP. CORRECTION PER TABLE 310.15(B)(2)(a)	0.91
NO. OF CURRENT CARRYING CONDUCTORS	6
CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a)	0.80
CIRCUIT CONDUCTOR SIZE	10 AWG
CIRCUIT CONDUCTOR AMPACITY	40A
REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(A&B)	20.00A
1.25 X MAX. DC OUTPUT CURRENT	
DERATED AMPACITY OF CIRCUIT CONDUCTOR PER NEC 310.15(B)(2)(a)	29.12A
TEMP. CORRECTION PER TABLE 310.15(B)(2)(a) X CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a) X CIRCUIT CONDUCTOR AMPACITY	
RESULT SHOULD BE GREATER THAN (20.00A) OTHERWISE LESS THE ENTRY FOR CIRCUIT CONDUCTOR SIZE AND AMPACITY	

VOLTAGE DROP CALCULATOR							
MODULES IN STRING		VOLTAGE	AMPS	DISTANCE (ft.)	VOT.DROP	WIRE SIZE	CONDUIT SIZE
STRING #1 (MODULE) TO NEMA 4 ENCLOSURE	08	240	16.00	40 FEET	0.53%	10 AWG	FREE AIR
STRING #2 (MODULE) TO NEMA 4 ENCLOSURE	08	240	16.00	40 FEET	0.53%	10 AWG	FREE AIR
STRING #3 (MODULE) TO NEMA 4 ENCLOSURE	08	240	16.00	40 FEET	0.53%	10 AWG	FREE AIR
NEMA 4 ENCLOSURE TO INVERTER (MAX BRANCH)	08	240	16.00	39 FEET	0.52%	10 AWG	2" PVC
INVERTER TO INTERCONNECTION	20	240	48.00	10 FEET	0.16%	6 AWG	3/4" EMT
					MAX VOLTAGE DROP: 1.21%		

AC CONDUCTOR AMPACITY CALCULATIONS: INVERTER TO INTERCONNECTION	
AMBIENT TEMPERATURE ADJUSTMENT FOR EXPOSED CONDUIT PER NEC 310.15(B)(2)(c)	36°
TEMP. CORRECTION PER TABLE 310.15(B)(2)(a)	0.88
NO. OF CURRENT CARRYING CONDUCTORS	3
CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a)	1.00
CIRCUIT CONDUCTOR SIZE	6 AWG
CIRCUIT CONDUCTOR AMPACITY	65A
REQUIRED CIRCUIT CONDUCTOR AMPACITY PER NEC 690.8(A&B)	48.00A
1.25 X MAX. AC OUTPUT CURRENT	
DERATED AMPACITY OF CIRCUIT CONDUCTOR PER NEC 310.15(B)(2)(a)	57.20A
TEMP. CORRECTION PER TABLE 310.15(B)(2)(a) X CONDUIT FILL CORRECTION PER NEC 310.15(B)(3)(a) X CIRCUIT CONDUCTOR AMPACITY	
RESULT SHOULD BE GREATER THAN (48.00A) OTHERWISE LESS THE ENTRY FOR CIRCUIT CONDUCTOR SIZE AND AMPACITY	



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APN# 050635008904  
PHONE NO: (919)-609-7846  
AHJ: CITY OF HOLLY SPRINGS

SHEET NAME

**ELECTRICAL LINE DIAGRAM**

SHEET SIZE

**ANSI B  
11" X 17"**

SHEET NUMBER

**PV-5**

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

LABEL LOCATION:  
 AC & DC DISCONNECT AND SUB PANEL  
 (PER CODE: NEC 690.13(B))

**⚠ WARNING**  
**ELECTRIC SHOCK HAZARD**  
 TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION  
 DC VOLTAGE IS ALWAYS PRESENT WHEN SOLAR MODULES ARE EXPOSED TO SUNLIGHT

LABEL LOCATION:  
 DC DISCONNECT, POINT OF INTERCONNECTION  
 (PER CODE: NEC 690.13(B))

**WARNING**  
**ELECTRIC SHOCK HAZARD**  
 IF GROUND FAULT IS INDICATED ALL NORMALLY GROUNDED CONDUCTORS MAY BE UNGROUNDED AND ENERGIZED

LABEL LOCATION:  
 AC & DC DISCONNECT AND SUB PANEL  
 (PER CODE: NEC 690.41(B))

**⚠ WARNING DUAL POWER SOURCE**  
 SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

LABEL LOCATION:  
 MAIN SERVICE PANEL & NET METER  
 (PER CODE: NEC 705.12(D)(3), NEC 705.12(B)(3-4) & NEC 690.59)

**⚠ WARNING**  
 THE DISCONNECTION OF THE GROUNDED CONDUCTOR(S) MAY RESULT IN OVERVOLTAGE ON THE EQUIPMENT

LABEL LOCATION:  
 INVERTER  
 (PER CODE: NEC 690.31(I))

**⚠ CAUTION**  
 PHOTOVOLTAIC SYSTEM CIRCUIT IS BACKFED

LABEL LOCATION:  
 MSP  
 (PER CODE: NEC 690.13 (F), NEC 705.12(B)(3-4) & NEC 690.59)

**PHOTOVOLTAIC SYSTEM AC DISCONNECT**  
 RATED AC OPERATING CURRENT 48.0 AMPS  
 AC NOMINAL OPERATING VOLTAGE 240 VOLTS

LABEL LOCATION:  
 AC DISCONNECT & INVERTER  
 (PER CODE: NEC690.54)

**⚠ WARNING**  
 POWER SOURCE OUTPUT CONNECTION  
 DO NOT RELOCATE THIS OVERCURRENT DEVICE

LABEL LOCATION:  
 SERVICE PANEL IF SUM OF BREAKERS EXCEEDS PANEL RATING  
 (PER CODE: NEC 705.12 (B)(2)(3)(B))

**WARNING:PHOTOVOLTAIC POWER SOURCE**

LABEL LOCATION:  
 CONDUIT, INVERTER  
 (PER CODE: NEC 690.31(G)(3))

**PHOTOVOLTAIC AC DISCONNECT**

LABEL LOCATION:  
 DC DISCONNECT  
 NEC 690.13(B)

**RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM**

LABEL LOCATION:  
 RAPID SHUTDOWN  
 (PER CODE: NEC 690.56(C)(3))

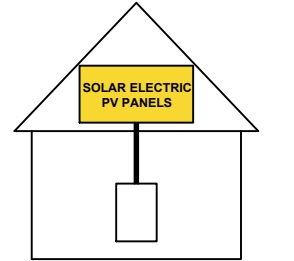
**MAIN PHOTOVOLTAIC SYSTEM DISCONNECT**

LABEL LOCATION:  
 MAIN SERVICE DISCONNECT / UTILITY METER  
 (PER CODE: NEC 690.13(B))

- NOTES AND SPECIFICATIONS:
- SIGNS AND LABELS SHALL MEET THE REQUIREMENTS OF THE 2017 ARTICLE 110.21(B), UNLESS SPECIFIC INSTRUCTIONS ARE REQUIRED BY SECTION 690, OR IF REQUESTED BY THE LOCAL AHJ.
  - SIGNS AND LABELS SHALL ADEQUATELY WARN OF HAZARDS USING EFFECTIVE WORDS, COLORS AND SYMBOLS.
  - LABELS SHALL BE PERMANENTLY AFFIXED TO THE EQUIPMENT OR WIRING METHOD AND SHALL NOT BE HAND WRITTEN.
  - LABEL SHALL BE OF SUFFICIENT DURABILITY TO WITHSTAND THE ENVIRONMENT INVOLVED.
  - SIGNS AND LABELS SHALL COMPLY WITH ANSI Z535.4-2011, PRODUCT SAFETY SIGNS AND LABELS, UNLESS OTHERWISE SPECIFIED.
  - DO NOT COVER EXISTING MANUFACTURER LABELS.

**SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN**

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



LABEL LOCATION:  
 AC DISCONNECT, DC DISCONNECT, POINT OF INTERCONNECTION  
 (PER CODE: 605.11.3.1(1) & 690.56(C)(1)(a))

**ENERGY STORAGE SYSTEM DISCONNECT**  
 NOMINAL VOLTAGE: 240 VAC  
 MAX AVAILABLE ISC: 48 AAC  
 ISC CLEAR TIME: 67 MS  
 DATE: \_\_\_\_\_

REQ'D BY NEC 706.7(D)  
 APPLY TO: BATTERY

**CAUTION TRI POWER SOURCE**  
 FIRST SOURCE IS UTILITY ELECTRICAL GRID  
 SECOND SOURCE IS AC BATTERY  
 THIRD SOURCE IS PV INVERTER

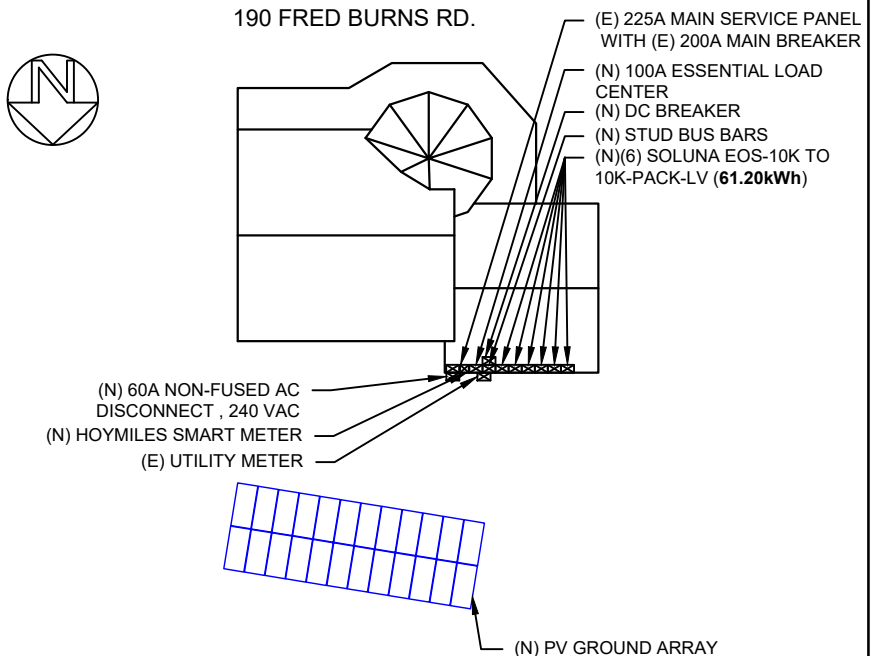
**BATTERY SHUTDOWN PROCEDURE**

1. TURN OFF BATTERY SWITCH ON THE RIGHT SIDE OF ALL UNITS
2. TURN OFF "BATTERY INVERTER A.C. ISOLATOR"(S) ADJACENT TO ALL UNITS
3. TURN OFF ALL "MAIN SWITCH (BATTERY INVERTER SUPPLY)" CIRCUIT BREAKER(S) IN ALL SWITCH BOARD(S) WAIT ONE MINUTE BEFORE COMMENCING START-UP, START-UP IS THE REVERSE OF SHUTDOWN

LOCATION: BATTERY

**CAUTION ! MULTIPLE SOURCES OF POWER**

POWER TO THIS BUILDING IS ALSO SUPPLIED FROM THE FOLLOWING SOURCES WITH DISCONNECTS LOCATED AS SHOWN



**NC SOLAR ELECTRIC LLC**  
 THE HIGHEST SOLAR RETURN ON INVESTMENT  
 (877) 58-SOLAR  
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 105 ROCK ISLAND DR, STATESVILLE, NC, 28625 USA  
 PHONE:- (704) 603-7347  
 EMAIL: tdesiato@ncsolarelectric.com

REVISIONS		REV
DESCRIPTION	DATE	
DATE	07-28-2024	
REVISION DATE	14-01-2024	▲

PROJECT NAME  
 CHRIS AND SHAUNA WALDON  
 190 FRED BURNS RD.,  
 HOLLY SPRINGS, NC 27540 USA  
 APN# 050635008904  
 PHONE NO: (919)-609-7846  
 AHJ: CITY OF HOLLY SPRINGS

SHEET NAME  
 WARNING LABELS & PLACARD

SHEET SIZE  
 ANSI B  
 11" X 17"

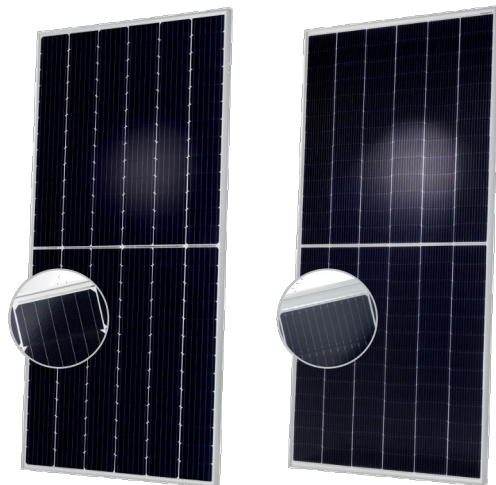
SHEET NUMBER  
 PV-6

# Q.PEAK DUO XL-G10 SERIES



475-490Wp | 156 Cells  
21.2% Maximum Module Efficiency

MODEL Q.PEAK DUO XL-10.3/BFG



6 busbar cell technology

12 busbar cell technology



### Bifacial energy yield gain of up to 20%

Bifacial Q.ANTUM solar cells with zero gap cell layout make efficient use of light shining on the module rear-side for radically improved LCOE.



### Low electricity generation costs

Q.ANTUM DUO Z combines cutting edge cell separation and innovative wiring with Q.ANTUM Technology for higher yield per surface area, lower BOS costs, higher power classes, and an efficiency rate of up to 21.2%.



### A reliable investment

Double glass module design enables extended lifetime with 12-year product warranty and improved 30-year performance warranty<sup>1</sup>.



### Enduring high performance

Long-term yield security with Anti LeTID Technology, Anti PID Technology<sup>2</sup>, Hot-Spot Protect.



### Frame for versatile mounting options

High-tech aluminum alloy frame protects from damage, enables use of a wide range of mounting structures and is certified regarding IEC for high snow (5400 Pa) and wind loads (2400 Pa).



### Innovative all-weather technology

Optimal yields, whatever the weather with excellent low-light and temperature behavior.

<sup>1</sup> See data sheet on rear for further information.

<sup>2</sup> APT test conditions according to IEC/TS 62804-1:2015 method B (-1500V, 168h) including post treatment according to IEC 61215-1 Ed. 2.0 (CD)

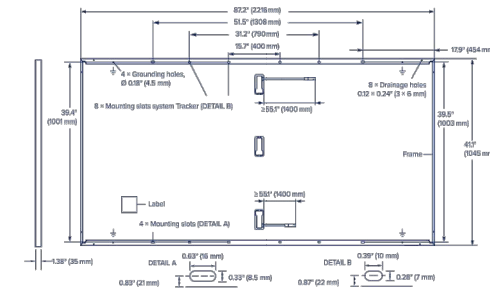
The ideal solution for:



## Q.PEAK DUO XL-G10 SERIES

### Mechanical Specification

Format	87.2 in × 41.1 in × 1.38 in (including frame) (2216 mm × 1045 mm × 35 mm)
Weight	64.2 lbs (29.1 kg)
Front Cover	0.08 in (2.0 mm) thermally pre-stressed glass with anti-reflection technology
Back Cover	0.08 in (2.0 mm) semi-tempered glass
Frame	Anodized aluminum
Cell	6 × 26 monocrystalline Q.ANTUM solar half cells
Junction box	2.09-3.98 in × 1.26-2.36 in × 0.59-0.71 in (53-101 mm × 32-60 mm × 15-18 mm), IP67, with bypass diodes
Cable	4 mm <sup>2</sup> Solar cable; (+) ≥ 55.1 in (1400 mm), (-) ≥ 55.1 in (1400 mm)
Connector	Stäubli MC4, Stäubli MC4-Evo2, Hanwha Q CELLS HQC4, IP68



### Electrical Characteristics

POWER CLASS	475	480	485	490
-------------	-----	-----	-----	-----

		BSTC*		BSTC*		BSTC*		BSTC*	
Power at MPP <sup>1</sup>	P <sub>MPP</sub> [W]	475	519.6	480	525.0	485	530.5	490	536.0
Short Circuit Current <sup>1</sup>	I <sub>SC</sub> [A]	11.08	12.12	11.12	12.17	11.16	12.21	11.20	12.26
Open Circuit Voltage <sup>1</sup>	V <sub>OC</sub> [V]	53.15	53.34	53.39	53.58	53.63	53.82	53.86	54.06
Current at MPP	I <sub>MPP</sub> [A]	10.55	11.54	10.59	11.58	10.63	11.63	10.67	11.67
Voltage at MPP	V <sub>MPP</sub> [V]	45.03	45.02	45.33	45.32	45.63	45.62	45.93	45.92
Efficiency <sup>1</sup>	η [%]	≥ 20.5		≥ 20.7		≥ 20.9		≥ 21.2	

Bifaciality of P<sub>MPP</sub> and I<sub>SC</sub>: 70% ± 5% • Bifaciality given for rear side irradiation on top of STC (front side) • According to IEC 60904-1-2

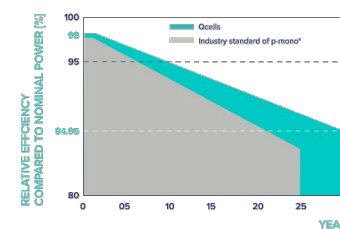
<sup>1</sup> Measurement tolerances P<sub>MPP</sub> ± 3%; I<sub>SC</sub> V<sub>OC</sub> ± 5% at STC: 1000 W/m<sup>2</sup>; \*at BSTC: 1000 W/m<sup>2</sup> + φ × 135 W/m<sup>2</sup>, φ = 70% ± 5%, 25 ± 2 °C, AM 1.5 according to IEC 60904-3

MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT<sup>2</sup>

		357.6	361.4	365.1	368.9
Power at MPP	P <sub>MPP</sub> [W]	357.6	361.4	365.1	368.9
Short Circuit Current	I <sub>SC</sub> [A]	8.92	8.96	8.99	9.02
Open Circuit Voltage	V <sub>OC</sub> [V]	50.27	50.49	50.72	50.95
Current at MPP	I <sub>MPP</sub> [A]	8.30	8.34	8.37	8.40
Voltage at MPP	V <sub>MPP</sub> [V]	43.06	43.35	43.63	43.92

<sup>2</sup> 800 W/m<sup>2</sup>, NMOT, spectrum AM 1.5

### Qcells PERFORMANCE WARRANTY

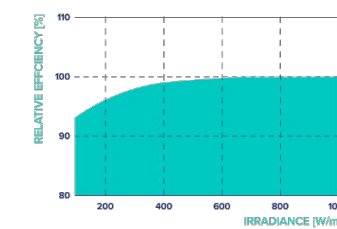


At least 98% of nominal power during first year. Thereafter max. 0.45% degradation per year. At least 93.95% of nominal power up to 10 years. At least 84.95% of nominal power up to 30 years.

All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Qcells sales organization of your respective country.

\*Standard terms of guarantee for the 5 PV companies with the highest production capacity in 2021 (February 2021)

### PERFORMANCE AT LOW IRRADIANCE



Typical module performance under low irradiance conditions in comparison to STC conditions (25 °C, 1000 W/m<sup>2</sup>).

### TEMPERATURE COEFFICIENTS

Temperature Coefficient of I <sub>SC</sub>	α [%/K]	+0.04	Temperature Coefficient of V <sub>OC</sub>	β [%/K]	-0.27
Temperature Coefficient of P <sub>MPP</sub>	γ [%/K]	-0.34	Nominal Module Operating Temperature	NMOT [°F]	109 ± 5.4 (43 ± 3 °C)

### Properties for System Design

Maximum System Voltage	V <sub>sys</sub> [V]	1500	PV module classification	Class II
Maximum Series Fuse Rating	[A DC]	20	Fire Rating based on ANSI/UL 61730	TYPE 29 <sup>1</sup>
Max. Design Load, Push/Pull <sup>2</sup>	[lbs/ft <sup>2</sup> ]	75 (3600 Pa)/33 (1600 Pa)	Permitted Module Temperature on Continuous Duty	-40 °F up to +185 °F (-40 °C up to +85 °C)
Max. Test Load, Push/Pull <sup>3</sup>	[lbs/ft <sup>2</sup> ]	113 (5400 Pa)/50 (2400 Pa)		

<sup>3</sup> See Installation Manual

<sup>4</sup> New Type is similar to Type 3 but with metallic frame

### Qualifications and Certificates

Quality Controlled PV - TÜV Rheinland; UL 61730, CE-compliant, IEC 61215:2016, IEC 61730:2016, U.S. Patent No. 9,893,215 (solar cells)



Qcells pursues minimizing paper output in consideration of the global environment.

Note: Installation instructions must be followed. Contact our technical service for further information on approved installation of this product. Hanwha Q CELLS America Inc. 400 Spectrum Center Drive, Suite 1400, Irvine, CA 92618, USA | TEL: +1 949 748 59 96 | EMAIL: hq-inquiry@qcells.com | WEB: www.qcells.com



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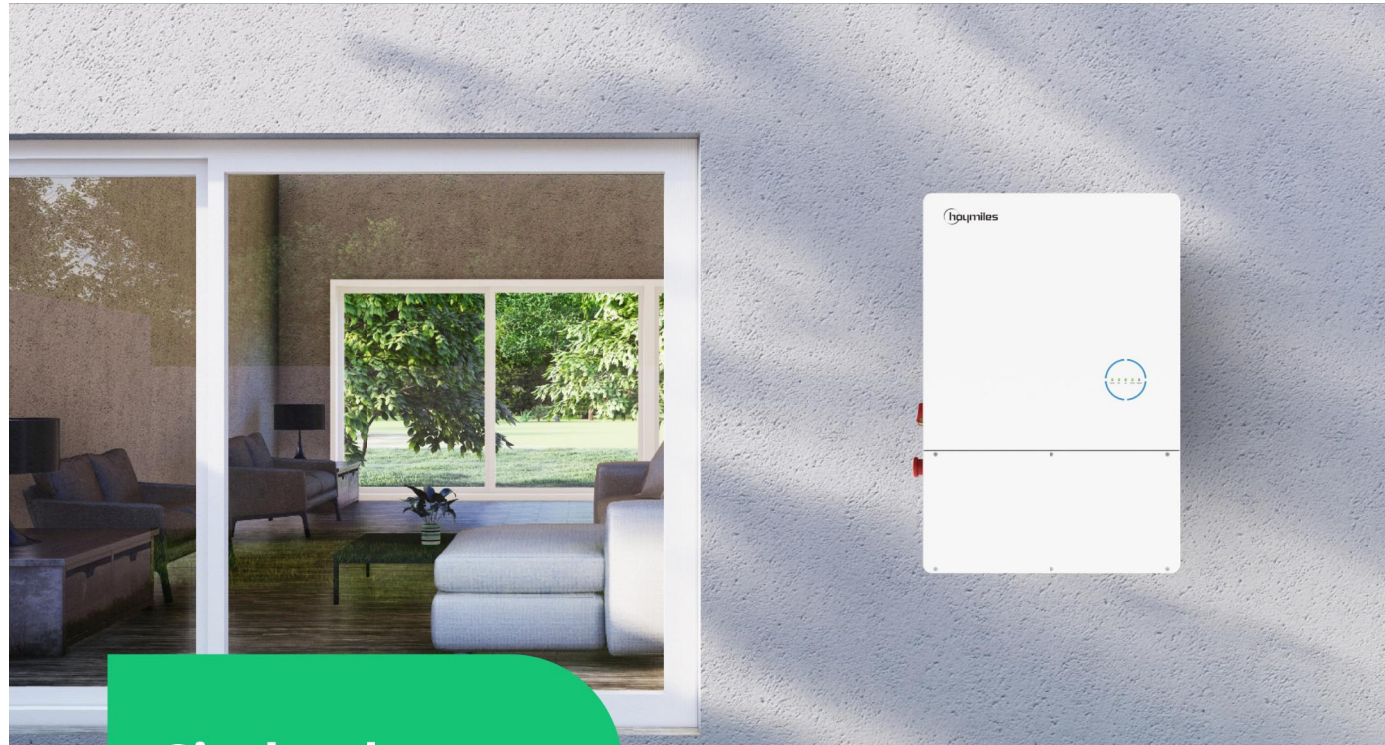
SHEET NUMBER  
PV-8

Specifications subject to technical changes © Qcells Q.PEAK DUO XL-G10.3-BFG\_series\_475-490\_2023-01\_Rev02\_NA





Open Energy For All



# Single-phase Hybrid Inverter Datasheet

- HYS-3.8LV-USG1
- HYS-4.8LV-USG1
- HYS-6.0LV-USG1
- HYS-7.6LV-USG1
- HYS-9.6LV-USG1
- HYS-11.5LV-USG1

## Description

The HYS-LV-USG1 Series is a high-performance single-phase hybrid inverter with excellent reliability, including power classes ranging from 3.8 kW to 11.5 kW.

The intelligent EMS function supports self-consumption mode, economical mode, and backup mode for multi-scenario applications.

Monitoring management through S-Miles Cloud allows users to remotely diagnose and track individual system's performance over time, maximizing the total solar power production and battery utilization.

## Features

- 01 Max. efficiency 97.6%, CEC efficiency 97.0%
- 02 Double MPPT tracker, up to 32 A MPPT current
- 03 DC/AC ratio up to 150%
- 04 Ultralight for easy installation and space-saving
- 05 Support 120 V/240 V backup power without external autotransformer
- 06 Seamless backup power for whole home or critical loads
- 07 Built-in dry contact flexibly set to earth fault alarm, load control, or generator control
- 08 Integrated arc fault protection and rapid shutdown function

## Technical Specifications

Model	HYS-3.8LV-USG1	HYS-4.8LV-USG1	HYS-6.0LV-USG1	HYS-7.6LV-USG1	HYS-9.6LV-USG1	HYS-11.5LV-USG1
<b>Battery</b>						
Battery type	Li-ion/Lead-acid <sup>(1)</sup>					
Battery voltage range (V)	40-60					
Max. charge/discharge current (A)	80/80	100/100	100/100	160/160	200/200	200/200
Max. charge/discharge power (W)	3840/3840	4800/4800	4800/4800	7600/7600	9600/9600	9600/9600
Charging strategy for Li-ion battery	Self-adaption to BMS					
Charging curve	3 Stages/Equalization					
External temperature sensor	Optional					
Communication	CAN					
<b>PV Input</b>						
Recommended max. PV power (W)	5760	7200	9000	11520	14400	14400
Max. input voltage (V)	550					
Rated voltage (V)	380					
Start-up voltage (V)	150					
MPPT voltage range (V)	125-500					
Max. input current (A)	16/16	16/16	16/16	32/32	32/32	32/32
Max. short circuit current (A)	20/20	20/20	20/20	40/40	40/40	40/40
MPPT number/Max. input strings number	2/2	2/2	2/2	2/4	2/4	2/4
<b>AC Input and Output (On-grid)</b>						
Rated output power (W)	3840	4800	6000	7680	9600	11520
Max. output apparent power (VA)	3840	4800	6000	7680	9600	11520
Max. input power (W)	7680	9600	9600	15360	19200	19200
Rated AC output voltage/Range (V)	240, 211-264					
Rated grid frequency (Hz)	60					
Max. output current (A)	16	20	25	32	40	48
Max. input current (A)	32	40	40	64	80	80
Power factor	>0.99 (0.8 leading ... 0.8 lagging)					
THDi (@rated output)	<3%					
<b>AC Output (Off-grid)</b>						
Rated output power (W)	3840	4800	4800	7680	9600	9600
Max. output apparent power (VA) <sup>(2)</sup>	7680, 10s	9600, 10s	9600, 10s	15360, 10s	19200, 10s	19200, 10s
Back-up switch time (ms)	<40					
Rated output voltage (V)	120/240 (split phase)					
Rated output frequency (Hz)	60					
Max. continuous output current (A)	16	20	20	32	40	40
THDv (@linear load)	<3%					
<b>Efficiency</b>						
MPPT efficiency	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%
Max. efficiency	97.6%	97.6%	97.6%	97.6%	97.6%	97.6%
CEC efficiency	97.0%	97.0%	97.0%	97.0%	97.0%	97.0%
Max. battery discharge to AC efficiency	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
<b>Protection</b>						
Anti-islanding protection	Integrated					
PV arc fault detection	Integrated					
PV string input reverse polarity protection	Integrated					
Compliant MLRSD products	Integrated					
Insulation resistor detection	Integrated					
Residual current monitoring unit	Integrated					
AC over current protection	Integrated					
AC short current protection	Integrated					
AC overvoltage and undervoltage protection	Integrated					
Surge protection	DC Type II/AC Type III					
<b>General</b>						
Dimensions (W × H × D)	19.8 × 24.2 × 7.95 inch (502 × 615 × 202 mm)			19.8 × 29.1 × 7.95 inch (502 × 740 × 202 mm)		
Weight	68.3 lbs (31 kg)			90.4 lbs (41 kg)		
Mounting	Wall mounting					
Operating temperature	-13°F to +149°F (>113°F, derating)/-25°C to +65°C (>45°C, derating)					
Relative humidity	0-95%, no condensing					
Cooling	Natural convection					
Topology (Solar/Battery)	Transformerless/High-frequency isolation					
Altitude	≤6562 ft (2000 m)					
Protection degree	Type 4X					
Noise (dB)	<40					
User interface	LED, App					
Digital input/output	1 × DI, 2 × DO					
Max. parallel	10 <sup>(3)</sup>			10 <sup>(4)</sup>		
Communication	RS485, optional: Wi-Fi/Ethernet/4G <sup>(5)</sup>					
Warranty	10 Years					
<b>Certifications and Standards</b>						
Grid connection standard	IEEE 1547-2018, IEEE 1547.1-2020, SRD2.0					
Safety/EMC standard	UL 1741, CSA C22.2 No.107.1, UL 1741 CRD, UL 1741 SB, FCC Part 15 Class B					
AFCI	UL 1699B					
Software approval	UL 1998					

(1) Lead-acid batteries will be supported soon.  
 (2) Can be achieved only if PV and battery power are sufficient.  
 (3) On-grid and off-grid parallel solutions will be coming soon.  
 (4) Off-grid parallel solution will be coming soon.  
 (5) The DTS-4G solution will be coming soon.



(877) 58-SOLAR

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 EMAIL: tdesiato@ncsolarelectric.com

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 AHJ: CITY OF HOLLY SPRINGS

SHEET NAME  
 SPEC SHEETS

SHEET SIZE  
 ANSI B  
 11" X 17"

SHEET NUMBER  
 PV-9

**SOLUNA™**  
POWER DESIGNED FOR NIGHT AND DAY

**SOLUNA™**  
POWER DESIGNED FOR NIGHT AND DAY



  
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THE HIGHEST SOLAR RETURN ON INVESTMENT  
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**SPEC SHEETS**

SHEET SIZE  
**ANSI B  
 11" X 17"**

SHEET NUMBER  
**PV-10**

**Soluna 10K PACK LV** is a battery solution ideal for residential and small commercial energy storage applications.

The model is adopted by the latest **LiFePO4** technology with an intelligent BMS integrated in the fault protection for energy security, offering a capacity of 10kwh which can be installed in parallel up to 12 batteries allowing 120kwh of total storage.

With a **10-year** warranty and 6000 cycle life, the Soluna 10K pack LV is a flexible, reliable and high performance battery storage solution.

## TECHNICAL SPECIFICATIONS

### PHYSICAL CHARACTERISTICS

Height (mm)	760
Width (mm)	500
Depth (mm)	215
Weight (kg)	100
Installation	Indoor / Outdoor

### ELECTRICAL CHARACTERISTICS

Battery type	Lithium LEP
Nominal capacity (Ah)	200
Nominal voltage (V)	51.2
Voltage range (usable) (V)	48 to 57.6
Max. charge/ discharge current(A)	100 / 200
Depth of discharge (DoD) (%)	90
Internal resistance (mΩ)	≤60
Cycle life	≥6000
Battery pack round-trip efficiency (%)	>95
DC disconnect	Contactors / fuse

### BMS

Power consumption	<3W (work) <100 mW (sleep)
Monitoring parameters	System voltage System current Cell voltage Cell temperature CAN
Communication	CAN

### OPERATING CONDITIONS

Operating temperature (°C)	-10 to 50
Operating temperature(recommended) (°C)	15 to 30
Storage temperature (recommended)(°C)	15 to 30
Humidity conditions(%)	5 to 95
Altitude(m)	Max. 2,000
Cooling strategy	Natural convection

### RELIABILITY AND CERTIFICATION

Certification	Cell: UL1642 Module: UN38.3 . UL1973. UL9540A IEC62619 . CE RoHS
Transportation	UN38.3
Ingress protection rating	IP 55
System configuration	1 to 12 parallel

### WARRANTY

Product and performance	10-year standard warranty
-------------------------	---------------------------

**Low Voltage**



**Scalable to 120kWh**



**Safest LiFePO4 battery**



**Long lifespan**



**Easy Installation**



**Floor,Wall mounting**





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SHEET NAME

**SPEC SHEETS**

SHEET SIZE

**ANSI B  
11" X 17"**

SHEET NUMBER

**PV-11**

Product specifications

# Eaton DG222URB-CSA

Catalog Number: DG222URB-CSA

Eaton General duty non-fusible safety switch, single-throw, 60 A, NEMA 3R, Painted galvanized steel, Rainproof, Two-pole, Two-wire, 240 V

General specifications

**Product Name** Eaton general duty non-fusible safety switch  
**Catalog Number** DG222URB-CSA  
**UPC** 786685223131

**Product Length/Depth** 7.38 in  
**Product Height** 14.38 in

**Product Width** 8.69 in  
**Product Weight** 9 lb

**Warranty** Eaton Selling Policy 25-000, one (1) year NEC 230.62 (C) Compliant Barrier from the date of installation of the Product or eighteen (18) months from the date of shipment of the Product, whichever occurs first.  
**Certifications** CSA Certified



Physical Attributes

**Enclosure**  
NEMA 3R  
  
**Enclosure material**  
Painted galvanized steel  
  
**Fuse configuration**  
Non-fusible  
  
**Number Of Poles**  
Two-pole  
  
**Number of wires**  
2  
  
**Type**  
Non-fusible, single-throw

Performance Ratings

**Amperage Rating**  
60A  
  
**Voltage rating**  
240V

Miscellaneous

**Product Category**  
General duty safety switch  
  
**Special features**  
CSA Certified

Resources

**Multimedia**  
Switching Devices Flex Center  
Double Up on Safety  
  
**Specifications and datasheets**  
Eaton Specification Sheet - DG222URB-CSA



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 30 Pembroke Road  
 Dublin 4, Ireland  
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SHEET NUMBER

PV-12

# READY RACK

A DIVISION OF **APA** SOLAR RACKING

READYRACKSOLAR.COM  
FAST. FLEXIBLE. ENGINEERED. READY.



## WHY USE THE READY RACK KIT™?

### PRE-ENGINEERED

The racking is provided with PE stamped engineering documents and is manufactured with hole patterns for 20°, 25°, 30° and 35° tilt angles.

### CUSTOMIZABLE ROW LENGTHS

The racking is capable of accommodating any row length. Solar modules can be added in increments of two modules, allowing you to match the system size to your projects needs.

### INSTALLER FRIENDLY

Sleek and strong, the cee channel accommodates varying post heights, spans, tilts, and allows for adjustments in the field.

### READILY AVAILABLE EQUIPMENT

Foundations are installed with the most common piece of construction equipment, a skid loader.

### GEOBALLAST FOUNDATION

Geoballast is ideal for sites with non-penetrable soils and utilizes quarry rock as fill.

### SIMPLE ADAPTERS

Our standard helical and ground screw adapters mount directly to the 2" hex shaft of the auger attachment.

## PRE-ENGINEERED KIT

The **Ready Rack Kit™** is specifically designed for small scale solar installations. All required components are included with the system, as well as approved engineering documentation. Just pick your site's parameters and go. The hardware design is a simple configuration that allows contractors to install the system lightning fast. The Ready Rack Kit is customizable in two module increments and adapts to virtually any module size. No need to go out and source additional materials, such as schedule 40 pipe - our racking includes all hardware needed, from foundations to module clamps, and everything in-between.

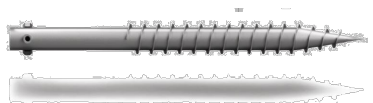
*Ready Rack is a division of APA Solar, a leading provider of large commercial and utility scale solar racking systems.*

## STANDARD SPECIFICATIONS

- Engineering:** APA Drawings can be PE stamped for all 50 States and territories
- Grounding:** Materials included
- Foundation:** Helical, Ground Screw or Geoballast
- Tilt Angles:** 20°, 25°, 30° or 35°
- Racking Coating:** Galvanized; G90
- Foundation Coating:** Varies
- Wind Loading:** Up to 140mph
- Snow Loading:** Up to 100psf
- Mounting Orientation:** 2-High in Portrait
- Warranty:** 25 Years

## CONCRETE FREE FOUNDATIONS

Our proprietary shallow helical, ground screw, and geoballast foundations allow us to be extremely versatile, managing all soil conditions while providing a stable foundation at a cost effective price. The helical and ground screw foundations can be installed using a skid loader and auger attachment, eliminating the need for specialized equipment. All of our foundations eliminate the need for concrete and allow installers to begin building the racking as soon as the foundation is installed, which drastically reduces installation times.



**READY RACK**  
A DIVISION OF **APA** SOLAR RACKING

**NC SOLAR ELECTRIC LLC**  
THE HIGHEST SOLAR RETURN ON INVESTMENT

(877) 58-SOLAR

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REVISIONS		REV
DESCRIPTION	DATE	
	07-28-2024	

PROJECT NAME  
**CHRIS AND SHAUNA WALDON**  
190 FRED BURNS RD.,  
HOLLY SPRINGS, NC 27540 USA  
APN# 050635008904  
PHONE NO: (919)-609-7846  
AHJ: CITY OF HOLLY SPRINGS

SHEET NAME

SPEC SHEETS

SHEET SIZE  
ANSI B  
11" X 17"

SHEET NUMBER  
PV-13



## ROCKY SOIL CONDITIONS

Our ground screws are designed for sites with rock. The forged tip helps lead the screw straight and plumb. The threads of the screw bite and hold firmly into the soil without getting caught on rocks and cobble. The heavy walled tube and welded connections allow massive amounts of torque and downward pressure to be applied, helping the screw to advance in even the toughest soils.



## SIMPLE INSTALL

Several types of equipment can be used to install ground screws. Skid loaders or mini excavators with an auger attachment are among the most common installation equipment. Many drilling contractors can use a simple adapter to drive ground screws without buying new equipment. Most pile driving rigs can be converted to rotary heads with little effort.

## GROUND SCREW FOUNDATION

Our ground screws are manufactured for even the most challenging solar sites. We use heavy walled tubing for the main shaft of the screw. The tips of the screw are forged, making them extremely hard, helping them to penetrate into or pass by underground obstructions. The threads are welded with a patented automated welding process to provide a consistent and strong weld along the entire length of the thread. Ground screws come with a durable hot dipped galvanized coating that will protect them from long term corrosion.

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## WHY USE A GROUND SCREW FOUNDATION?

### HARD SOILS

Hard soils are why ground screws were designed. The forged tip and heavy duty steel tube allow for thousands of pounds of downforce and turning torque to be applied to the screw. This amount of torque and downforce allows rocks and cobbles to be pushed out of the way during installation.

### SOLID ROCK

Ground screws can be installed into solid rock by utilizing the method of drilling a pilot hole and adding some gravel backfill. The ground screws are securely installed into the pilot hole using the threads of the screw and the gravel backfill then locks them into the solid rock.

### SANDY SOILS

The granular structure of sand has poor friction value making it hard for driven piles to perform well. However, the shape and threads of a ground screw displace and compact the sand around it when installed. This helps interlock the sand together and provides excellent holding power of the screw threads.

### HEIGHT ADJUSTMENT

Posts can be adjusted to the perfect height by simply raising or lowering the top post in or out of the screw. To secure the post, simply tighten the three set screws.

### SHALLOW INSTALL

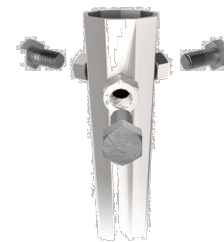
The ground screws can be installed as shallow as 30" depending on the soil. This lessens the chance of hitting underground obstructions.

### FROST HEAVE RESISTANCE

The threads of the screw allow the foundation to easily overcome frost jacking forces.

### SET SCREW CONNECTION

Using set screws allows the upper post to easily telescope to the correct height on sites with high degrees of topography.



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SHEET NAME

**SPEC SHEETS**

SHEET SIZE  
**ANSI B**  
**11" X 17"**

SHEET NUMBER  
**PV-14**



REVISIONS		REV
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**SPEC SHEETS**

SHEET SIZE

**ANSI B  
11" X 17"**

SHEET NUMBER

**PV-15**