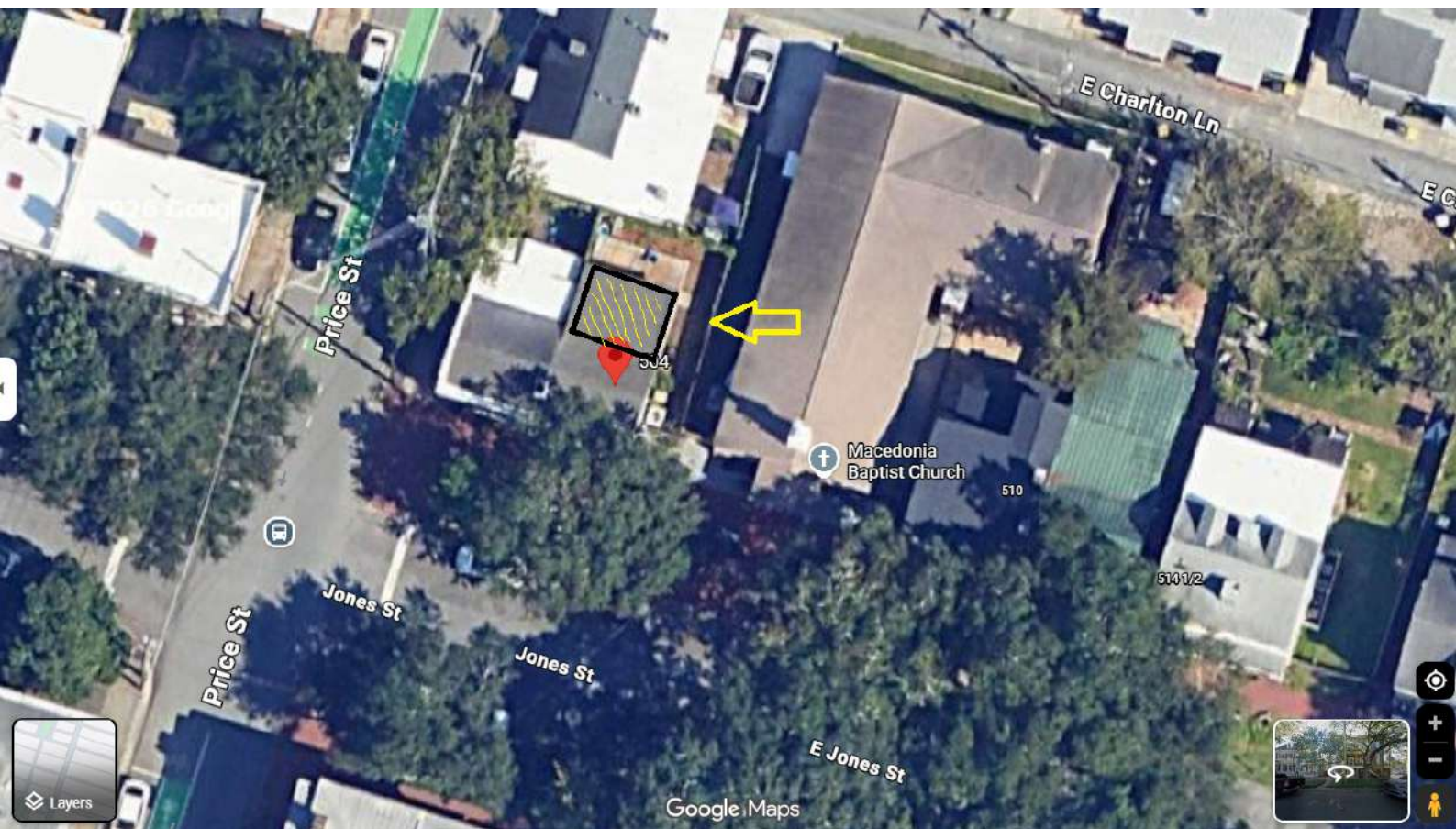
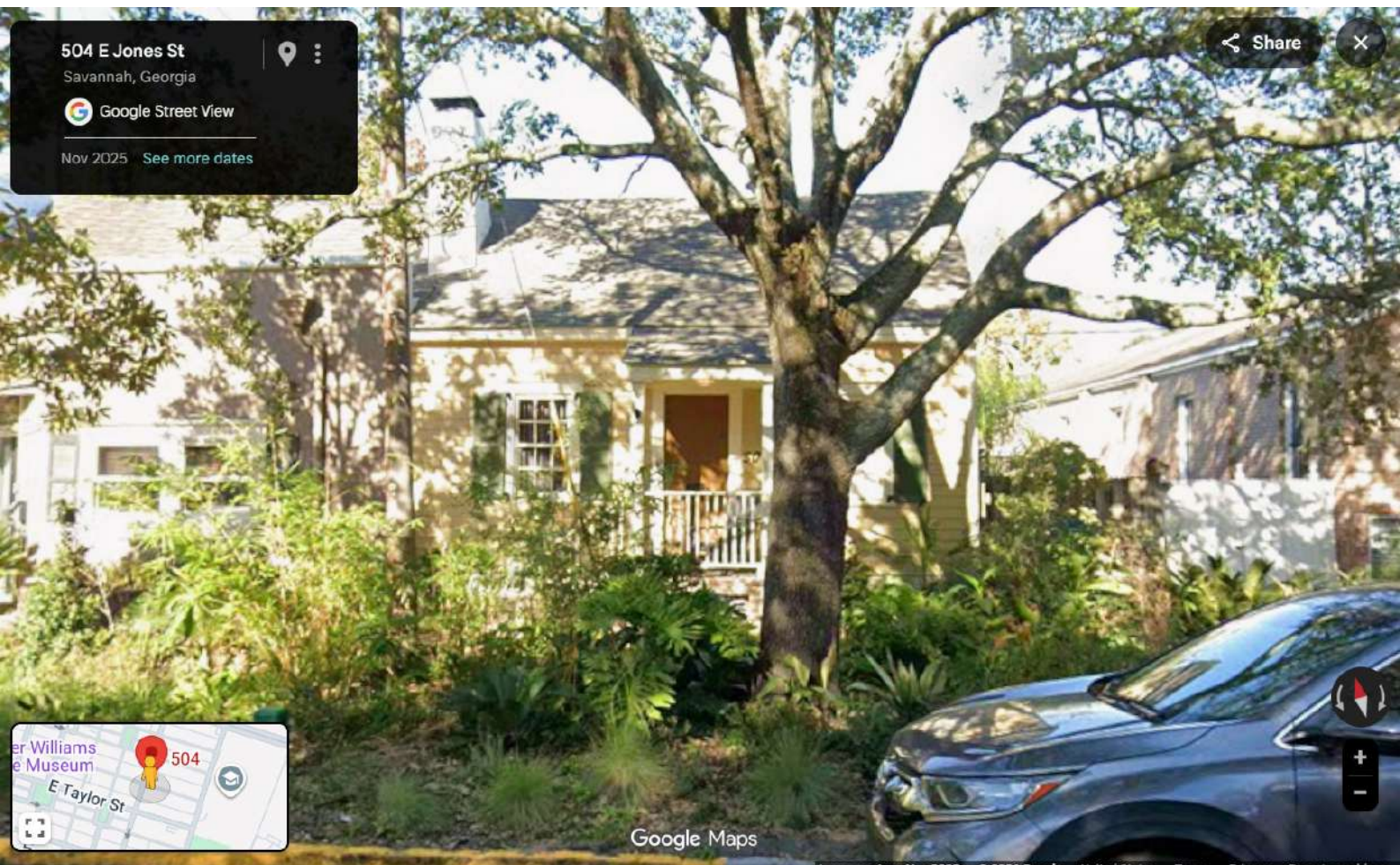






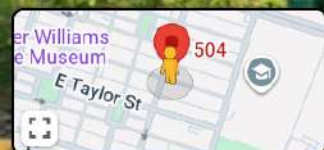
504 E Jones St

Savannah, Georgia

Google Street View

Nov 2025 [See more dates](#)

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Google Maps

346 Price St

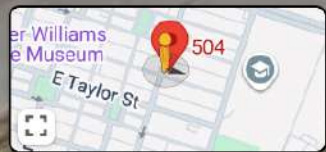
Savannah, Georgia

Google Street View

Oct 2024 [See more dates](#)

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X



Google Maps



SCOPE of WORK	
This set of plans details the installation of a new grid-interactive solar photovoltaic system	
PV SYSTEM DETAILS	
PV Module Type	HD HYUNDAI HIN-T440NF(BK)
PV Module Quantity	14
Solar PV DC System Rating (kWdc)	6.16
Solar PV AC System Rating (kWac)	5.236
Inverter Type	ENPHASE IQ8-60-2-US
Inverter Quantity	14
Battery Type	ENPHASE IQ 5P
Battery Quantity	2
Mounting Location (Roof/Ground/Pergola)	Roof
Mounting Attachments Type	UltraFoot Deck
Racking & Rails Type	SnapNRack UltraFoot Deck

SITE DETAILS	
Property Owner Name	Bob Vaccaro
Site Coordinates	32.071216, -81.088868
Property Address	504 E Jones St, Savannah, GA 31401
Utility Company	SOCO

EXPOSURE NOTES	
Wind Exposure Category	B
Design Wind Speed (mph)	140
Risk Category/Structure Type	II/Enclosed
NAVD Flood Elevation	N/A (Not in a Flood Zone)

GOVERNING CODES	
Structural Codes	2018 IBC/IEBC/IRC
Electrical Codes	2023 NEC
Fire Safety Codes	IFC 2018 (With Local AHJ Amendments, if applicable)

STRUCTURAL & ELECTRICAL AFFIDAVITS/CERTIFICATIONS	
Structural Certification	I, AMJAD MARDI, PE (051450), AN ENGINEER LICENSED CERTIFY THAT THE INSTALLATION OF THE SOLAR MODULES IS IN COMPLIANCE WITH 2018 IBC. BUILDING STRUCTURE WILL SAFELY ACCOMMODATE WIND LATERAL AND UPLIFT FORCES, AND EQUIPMENT DEAD LOADS.
Electrical Certification	I, AMJAD MARDI, PE (051450), AN ENGINEER LICENSED PURSUANT TO CERTIFY THAT THE SOLAR PHOTOVOLTAIC ELECTRICAL SYSTEM AND COMPONENTS ARE DESIGNED AND APPROVED USING THE CODE REQUIREMENTS AND STANDARDS CONTAINED IN THE MOST RECENT VERSION OF THE GEORGIA BUILDING CODE.

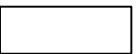
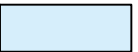
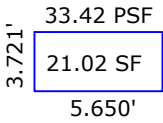
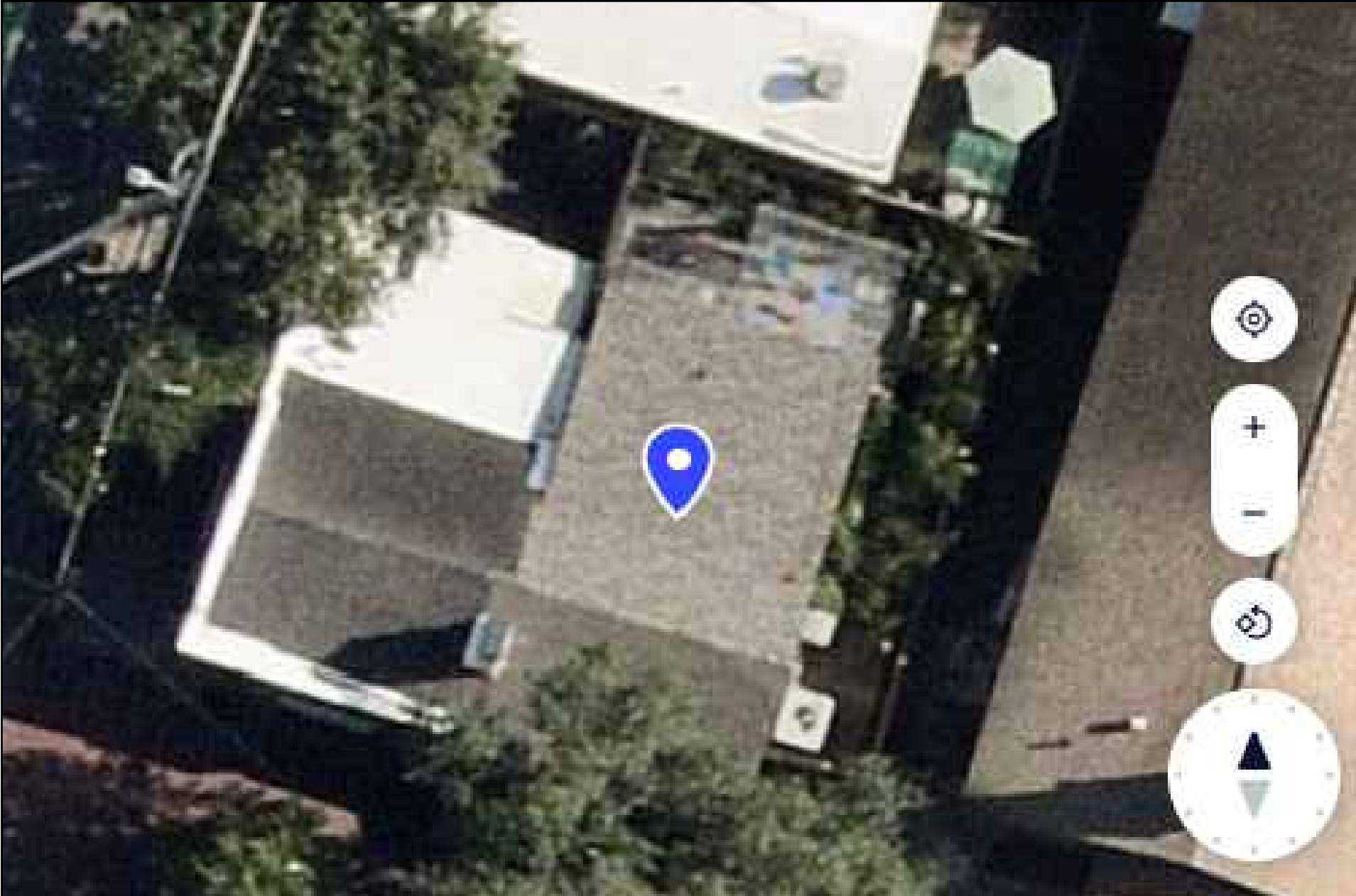
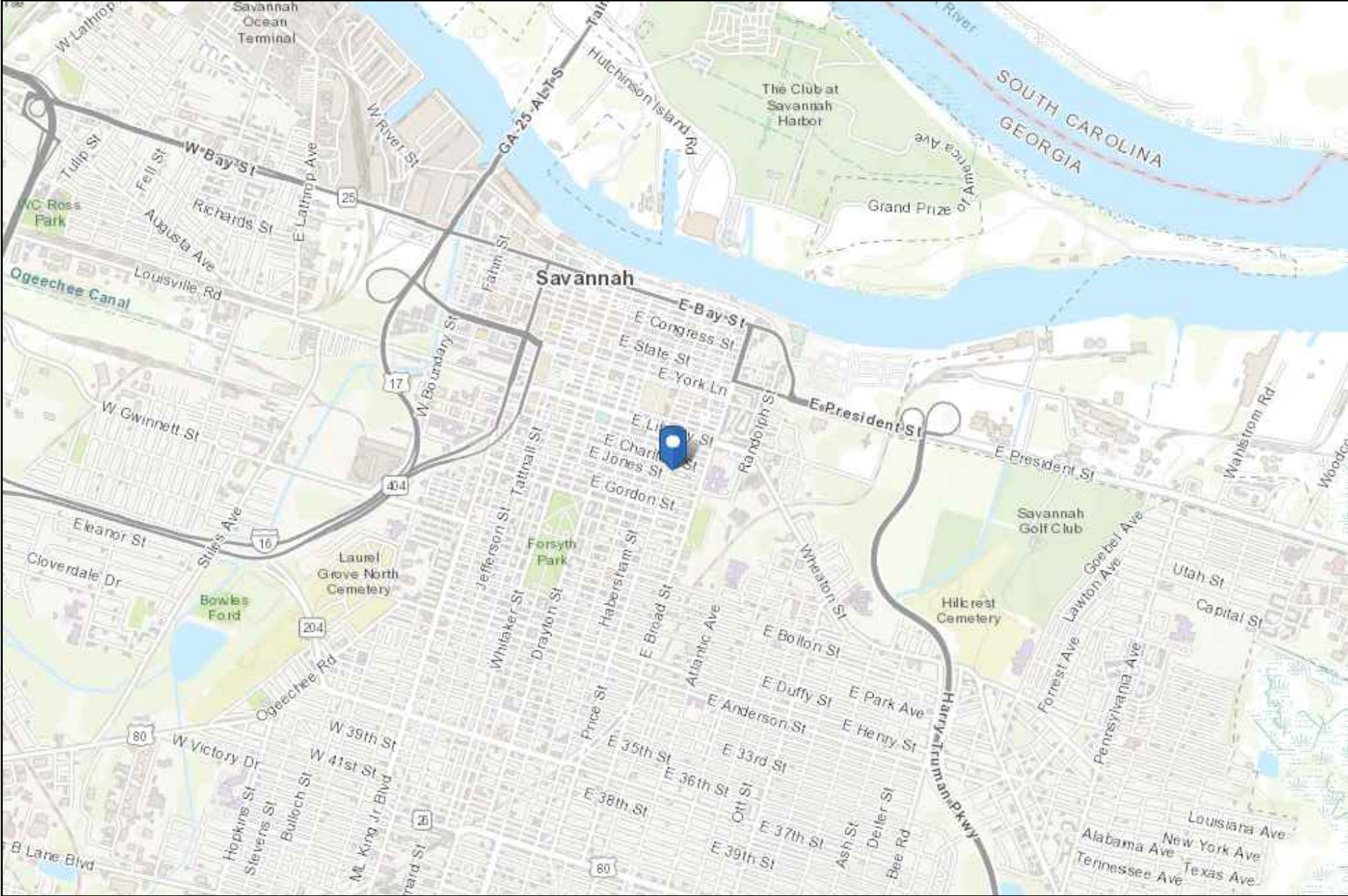
LEGEND			
ACD	AC DISCONNECT		FIRE SETBACK
CP	COMBINER PANEL		ROOF ZONE 1
IQC	ENPHASE IQ CONTROLLER III		ROOF ZONE 2
5P	ENPHASE 5P BATTERY		ROOF ZONE 3
P	PANEL		# OF PLANE
M	METER		RAILS
MBE	MAIN BREAKER ENCLOSURE		TRUSS
			ATTACHMENT
			EXPOSED MODULE
			MODULE

Table Of Contents		
Sheet	Description	REV.
G1	COVER PAGE	0
S1	SITE & ELECTRICAL PLAN	0
S2	WIND CALCULATIONS & ARRAY LAYOUT	0
S3	ATTACHMENT DETAIL & ARRAY LAYOUT	0
S4	MOUNTING & FLASHING DETAILS	0
E1	ELECTRICAL RISER DIAGRAM	0
E2	ELECTRICAL NOTES & EQUIPMENT SPECIFICATIONS	0
E3	SOLAR PV LABELS	0
APP.1-8	APPENDIX - DATA SHEETS, MODULE WIND RATINGS & WIND SIMULATION	0



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PROJECT NAME:

BOB VACCARO
RESIDENCE

PROJECT ADDRESS:

504 E Jones St
Savannah, GA 31401

Date:	SEE P.E. STAMP
Designed By:	RHH
Reviewed by:	AKM
REVISION HISTORY	
02/12/2026	UPDATED SYSTEM DETAILS

DRAWING SCALE:

N.T.S.

SHEET NAME:

COVER PAGE

SHEET NUMBER:

G1

GENERAL NOTES:

1. THE PROJECT IS DESIGNED IN GENERAL ACCORDANCE WITH THE GEORGIA 2018 IBC/ IEBC/IRC BUILDING CODE AND OTHER REFERENCED CODES.
2. ABBREVIATIONS OTHER THAN AS PROVIDED ARE INDUSTRY STANDARD.
3. CONDITION AND CONSTRUCTION OF ROOF ASSEMBLY SHALL BE VERIFIED BY PHYSICAL INSPECTION AND ACCEPTED BY CONTRACTOR PRIOR TO COMMENCEMENT.
4. WORK TO BE COMPLETED SHALL BE VERIFIED BY INSTALLER AND ELECTRICIAN PRIOR TO COMMENCEMENT AND MATERIAL ORDER.
5. ALL CONTRACTORS AND SUB-CONTRACTORS SHALL BE LICENSED BY THE STATE OF GEORGIA AND AS REQUIRED BY PERMITTING AGENCY; NO UNLICENSED CONTRACTORS OR CONSTRUCTION AND TRADE WORKERS SHALL BE ALLOWED ON JOBSITE.
6. ALL CONTRACTORS AND SUB-CONTRACTORS SHALL INSPECT THE SITE AND ALL RESPECTIVE BUILDINGS IMMEDIATELY BEFORE PREPARING ANY BID AND BEFORE ORDERING ANY MATERIALS, AND SHALL PROVIDE CONTRACTOR WRITTEN NOTICE OF ANY DISCREPANCY BETWEEN FIELD CONDITIONS AND THE PLANS. AFTER VERIFICATION, MARDI ENGINEERING SHALL PREPARE ANY NECESSARY PLAN REVISION, GENERALLY WITHIN 72 HOURS OF SUCH NOTICE.
7. REQUIRED PLAN DIMENSIONS NOT PROVIDED SHALL BE CONFIRMED WITH ENGINEER OF RECORD. DIMENSIONS IN PARENTHESES ARE FOR ENGINEERING REFERENCE ONLY.
8. UNPLANNED ALTERATION OF STRUCTURAL ROOF OR WALL FRAMING SHALL REQUIRE WRITTEN APPROVAL BY THE EOR AND OWNER; PLANS SHALL BE SO REVISED.
9. FIRE PROTECTION PROCEDURES SHALL BE FOLLOWED IN ACCORDANCE WITH NEC 2023, Art. 690. 9. WORK SHALL BE INSPECTED PRIOR TO COVER BY BUILDING INSPECTOR, AND EOR UPON REQUEST.
- 10.BEST MANAGEMENT PRACTICES SHALL BE EXERCISED AT ALL TIMES TO MAINTAIN A SAFE AND CLEAN JOBSITE IN COORDINATION WITH PROPERTY OWNER AS APPLIES TO PARKING, TRASH REMOVAL, STORAGE, SOUND, UTILITIES AND TIMES OF WORK.
- 11.NO WORK SHALL BE PERFORMED IN RIGHT-OF-WAY OR EASEMENTS WITHOUT WRITTEN PERMISSION FROM THE APPROPRIATE PERMITTING AGENCY AND OWNER.
- 12.ALL MATERIALS NOT LISTED OR SPECIFIED HEREIN SHALL BE OBTAINED THROUGH CONTRACTOR-APPROVED VENDORS, GENERALLY NECESSARY TO COMPLETE TYPICAL SIMILAR CONSTRUCTION AND SHALL CONFORM TO CODE TABLE, INDUSTRY STANDARDS AND POLICIES OF THE PERMITTING AGENCY.
- 13.DETAILS OR SPECIFICATIONS ARE CALLED OUT BY LOCATION, ARRAY, ELEMENT OR AS OTHERWISE APPLIES.
- 14.IN THE EVENT OF WEATHER AND OTHER CIRCUMSTANCES THAT COULD MATERIALLY AFFECT BUILDING CONDITIONS OR INSTALLATION, CONTRACTOR SHALL PERFORM A RE-INSPECTION ALONG WITH OTHER CONTRACTORS AS REQUIRED THEN ADJUST PROJECT SCHEDULE TO INCLUDE RESPECTIVE PLAN REVISIONS.

ROOF FIRE SAFETY NOTES: (NFPA 11.12.2.2)

1. FIRE PROTECTION PROCEDURES SHALL BE FOLLOWED IN ACCORDANCE WITH NEC 2023, A. 690.9. WORK SHALL BE INSPECTED PRIOR TO COVER BY BUILDING INSPECTOR, OR EOR UPON REQUEST.
2. ACCESS POINT ARE LOCATED FOR FIRE DEPT. LADDER(S) CLEAR OF OPENINGS/OBSTRUCTIONS.
3. WORK SHALL BE PERFORMED IN ACCORDANCE WITH ROOF SAFETY RATING (CLASS A). (UL 790 / ASTM E108)

NOTE TO INSTALLER:

1. ALL PANELS SHALL BE ATTACHED TO EXISTING ROOF STRUCTURE USING THE REQUIRED NUMBER OF ATTACHMENTS IN THE PROPER CONFIGURATION AS DEFINED IN THIS PLAN SET.
2. ALL PANELS SHALL BE FULLY OUTSIDE OF ANY ROOF AREAS DEFINED AS "FIRE SETBACK" IN THIS SITE PLAN. FIRE SETBACKS ARE DEFINED BY THE DIMENSIONS IN RED AND ARE CONSIDERED ABSOLUTE.
3. ANY DIMENSIONS NOTED AS "MAX" SHALL BE BE UNDERSTOOD TO BE ABSOLUTE REQUIREMENTS WITH A TOLERANCE OF +0.0"
3. ANY DIMENSIONS NOTED AS "MIN" SHALL BE BE UNDERSTOOD TO BE ABSOLUTE REQUIREMENTS WITH A TOLERANCE OF -0.0"
4. STANDARD DIMENSIONS (NOT INCLUDING FIRE SETBACKS) SHALL BE UNDERSTOOD TO BE REQUIREMENTS WITH A TOLERANCE OF ±2.0"
5. ANY DIMENSIONS NOTED AS "APPROX" SHALL BE UNDERSTOOD TO BE APPROXIMATE IN NATURE AND SHOULD BE USED AS A GUIDE. EXACT PLACEMENT OF THE PANELS RELATIVE TO THESE DIMENSIONS ARE LEFT TO THE INSTALLERS DISCRETION ASSUMING THAT ALL OTHER DEFINED REQUIREMENTS ARE MET.
6. ANY DIMENSIONS IN PARENTHESES () ARE FOR ENGINEERING REFERENCE ONLY AND ARE NOT NEEDED FOR INSTALLATION.
7. IT IS THE CONTRACTOR RESPONSIBILITY TO INSTALL THE SYSTEM AND ITS SUPPORTS AS INDICATED IN THESE PLANS. THE CONTRACTOR SHALL CONTACT THE ENGINEER OF RECORD IF SITE CONDITIONS DIFFER FROM WHAT IS DEPICTED ON PLANS.

ATTACHMENT SYSTEM:

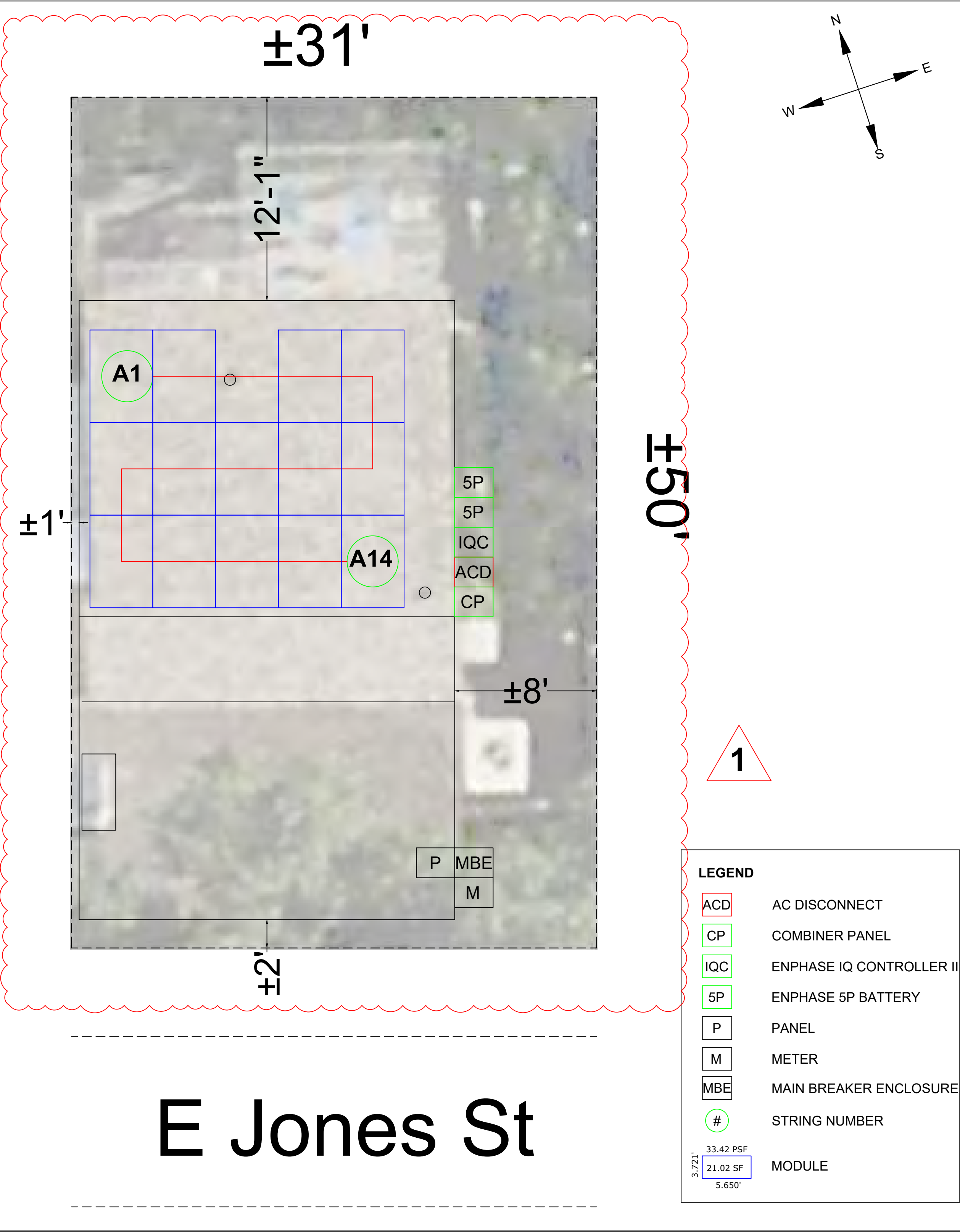
ATTACHMENT SYSTEM AND FLASHING METHOD SHALL BE CONSTRUCTED ACCORDING MANUFACTURER'S INSTALLATION MANUAL AND AS SPECIFIED BY EOR.

NOTE:

ROOF LAYOUT SHOWN MAY BE ADJUSTED IN THE FIELD BY THE INSTALLER TO ACCOUNT FOR ISSUES CAUSED BY ROOF OBSTACLES, TRUSS ALIGNMENT, OR SHADING. SO LONG AS THE MODULES ARE MOUNTED AND SECURED TO THE ROOF. THE LAYOUT MAY BE ALTERED AND ALL ROOF ORIENTATION MAY BE UTILIZED.

SUGGESTED ELECTRICAL EQUIPMENT MOUNTING LOCATION

THE SUGGESTED EQUIPMENT MOUNTING LOCATION MAY BE ADJUSTED AT INSTALLER'S DISCRETION SO LONG AS LOCAL AHJ REQUIREMENTS ARE ADHERED TO



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BOB VACCARO
RESIDENCE

PROJECT ADDRESS:

504 E Jones St
Savannah, GA 31401

Date:	SEE P.E. STAMP
Designed By:	RHH
Reviewed by:	AKM
REVISION HISTORY	
02/12/2026	UPDATED LAYOUT, STRINGING & EQUIPMENT LOCATION

DRAWING SCALE:

N.T.S.

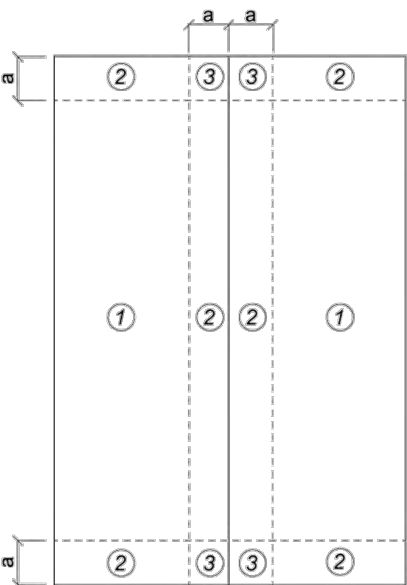
SHEET NAME:

SITE & ELECTRICAL PLAN

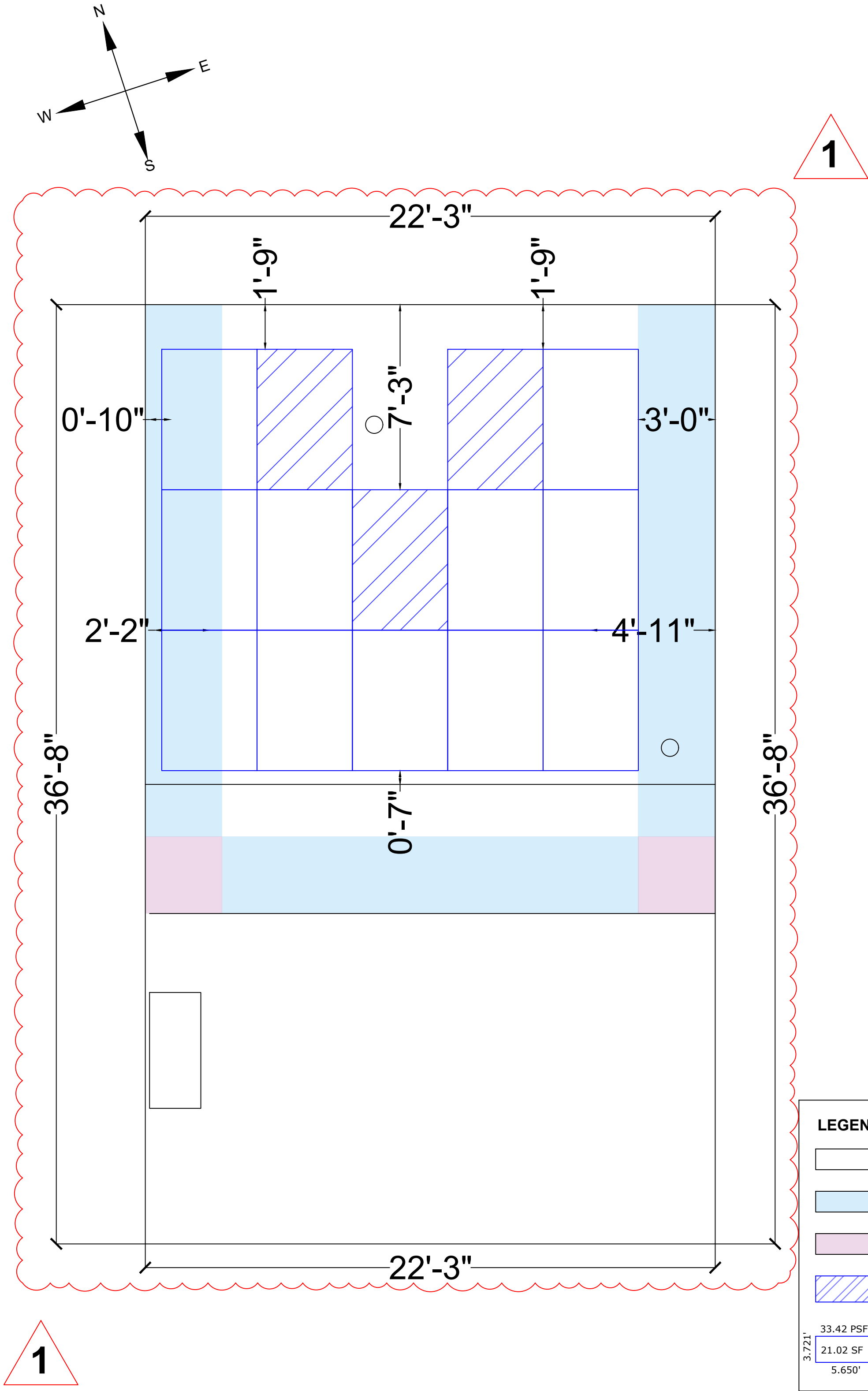
SHEET NUMBER:

S1

Wind Pressures (psf) where Solar Panels are to be installed per ASCE 7-22 Sec 29.4.4 (All wind pressures include a load factor of 0.6)		
	EXPOSED (DOWNWARD/ UPLIFT)	NOT EXPOSED (DOWNWARD/ UPLIFT)
1	4.65/-22.18	4.65/-14.79
2	NONE	4.65/-20.15
3	NONE	NONE
1_OH	NONE	NONE
2_OH	NONE	0.00/-28.49
3_OH	NONE	NONE
Existing Structure & Limiting Factors		
Roof Type	Gable	
Roof Material	Shingle	
Sheathing	Plywood	
Framing	Wood Trusses, 24" O.C.	
Fire Rating	Class A	
Roof Slope	3:12	
Mean Roof Height (h) [ft]	±11.3806	
Overhang (OH) [ft]	1.5	
Dead Load [psf]	19.9	
Live Load [psf]	20	
a = Width for Zone 2 and 3 determination (per C&C figure) [ft]	3	
h/2 = Width used to determine if exposed [ft]	5.69	
h1 = Distance from roof to lower panel edge: Min (hny,hnp) [ft]	0.29	
h2 = Distance from roof to upper panel edge: Max (hny,hnp) [ft]	0.29	
d1 = limit for adjacent panels [ft]	0.58	
Minimum height above roof edge [ft]	0.58	



PV Module Data		
Chord length [ft]	5.650	
Width [ft]	3.721	
Area [sqft]	21.02	
Thickness [ft]	0.100	
Weight [lbs]	50.01	
Module Dead Load	2.38	
Angle to Roof [degrees °]	0	
Environmental Data		
Design Wind Speed (V)	140	
Elevation Factor(Ke)	1.0	
Topographic factor (Kzt)	1.0	
pressure exposure (Kz)	0.9	
Velocity Pressure (qh)	42.65	
PV Module Loads		
	Downward	Uplift
Module Design Pressure [psf]	75.18	-33.42
Worst Case Pressure [psf]	4.65	-28.49
Worst Case Roof Zone	1 (Exposed)	2_OH (Non-Exposed)
Net Load Pressure [psf]	7.03	-26.11
Margin [psf]	68.15	-7.31
Safety Factor (OK IF OVER 1.0)	10.70	1.28
Total Array Calculations		
Minimum Number of Attachments	28	
Number of Fasteners per Attachment	2	
Total Array Weight [lbs]	700.14	
Total Array Area [sqft]	294.32	
Total Roof Area [sqft]	809.31	
Percentage of Total Occupied Roof Area [%]	36.37	
Total Array Uplift [lbs]	-7684.98	
Force per Attachment [lbs]	-274.46	
Force Per Fastener [lbs]	-137.23	
Max Allowed Force Per Fastener [lbs]	313	
Safety Factor (OK if over 1.50)	2.28	



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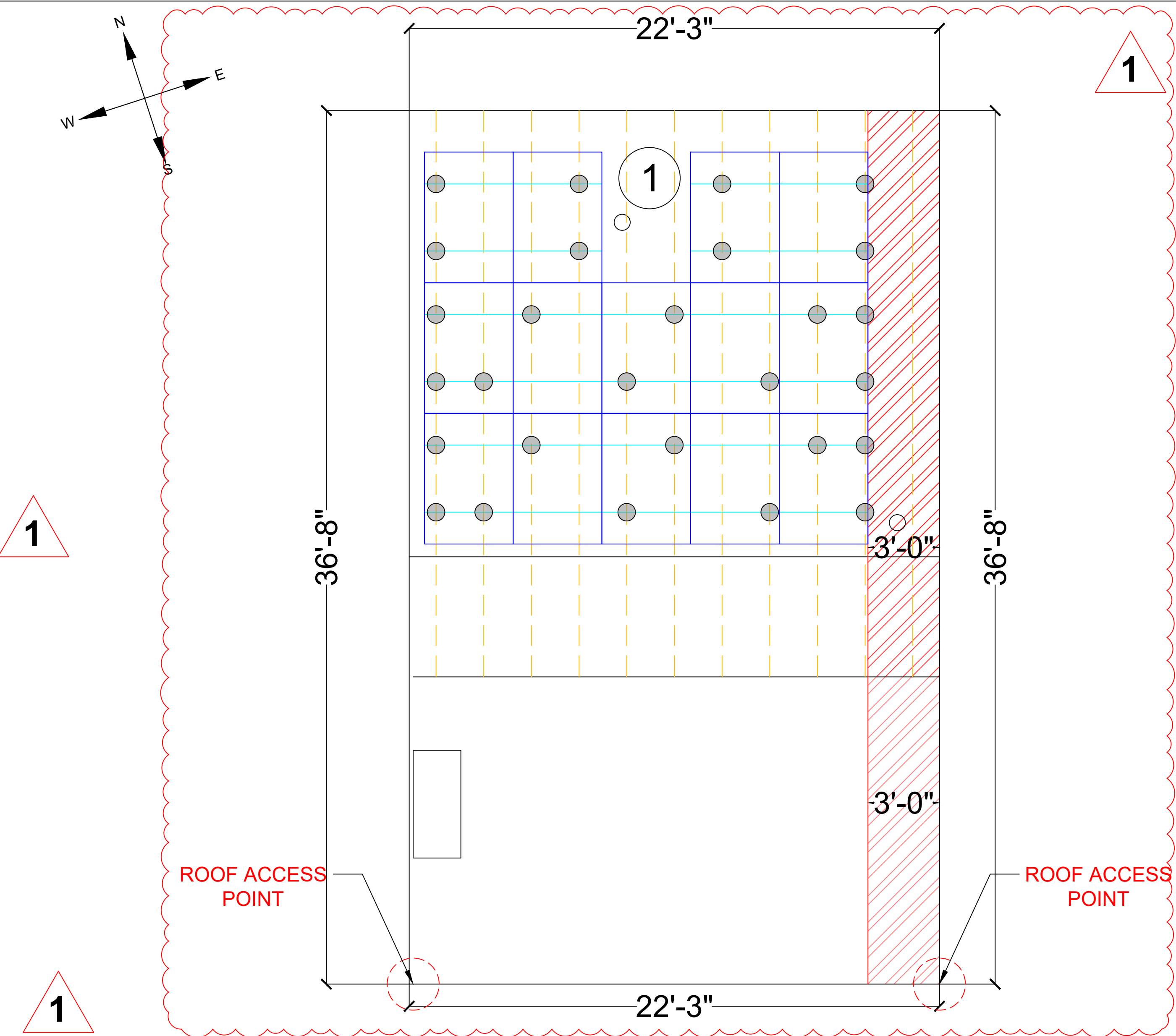
Date:	SEE P.E. STAMP
Designed By:	RHH
Reviewed by:	AKM
REVISION HISTORY	
02/12/2026	UPDATED LAYOUT & TOTAL ARRAY CALCS

DRAWING SCALE:
N.T.S.

SHEET NAME:
WIND CALCULATIONS &
ARRAY LAYOUT

SHEET NUMBER:
S2

BILL OF MATERIALS	
Structural	
Product	Quantity
SNRAC 232-10095-USA DOMESTIC UR-45 RAIL 172" - MILL (144)	8
SNRAC 242-01213 ULTRA RAIL SPLICE SILVER(20)	4
SNRAC 242-10057 ULTRAFOOT DECK - BLACK	28
SNRAC 242-10066 SEALING WOOD SCRW#14X3" 1/2" HEX SS	56
SNRAC 242-02071 ULTRA RAIL MID CLAMP BLACK	20
SNRAC 242-02073 ULTRA RAIL END CLAMP BLACK	16
SNRAC 232-02452 ULTRA RAIL UR40 END CAP	16
SNRAC 242-10034-USA DOMESTIC OMNILUG	4
MLPE FRAME ATTACHMENT KIT	14
HD HYUNDAI HIN-T440NF(BK) MODULES	14
M-1 SEALANT	4
Electrical	
ENPHASE IQ8-60-2-US MICROINVERTER	14
ENPHASE IQ COMBINER 5/5C	1
TWO-POLE 20A BREAKER	2
TWO-POLE 40A BREAKER	1
60A NON-FUSED AC DISCONNECT	1
ENPHASE IQ CONTROLLER III	1
ENPHASE IQ 5P	2
200A MAIN BREAKER	1



SYSTEM SUMMARY					
ROOF PLANE	NUMBER OF MODULES	ARRAY TILT (DEGREES)	AZIMUTH ANGLE (DEGREES)	ROOF SLOPE	ROOF SLOPE (DEGREES)
1	14	0	18	3:12	14.04

NOTE:

SINCE PHOTOVOLTAIC SYSTEM WILL NOT OCCUPY MORE THAN 33% OF THE ROOF (SEE SHEET S2 FOR CALCULATION), RIDGE SETBACKS SHALL BE PERMITTED TO BE 18" (R324.6.2).

NOTE:

MAX CANTILEVER: 1/3 OF ALLOWABLE SPAN

MAX ALLOWABLE SPAN: 72"

LEGEND

- FIRE SETBACK
- RAILS
- TRUSS
- ATTACHMENT
- ROOF PLANE #
- MODULE

3.721' 33.42 PSF
21.02 SF
5.650'

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BOB VACCARO RESIDENCE

PROJECT ADDRESS:

504 E Jones St
Savannah, GA 31401

Date:	SEE P.E. STAMP
Designed By:	RHH
Reviewed by:	AKM
REVISION HISTORY	
02/12/2026	UPDATED LAYOUT, BOM & SYSTEM SUMMARY

DRAWING SCALE:

N.T.S.

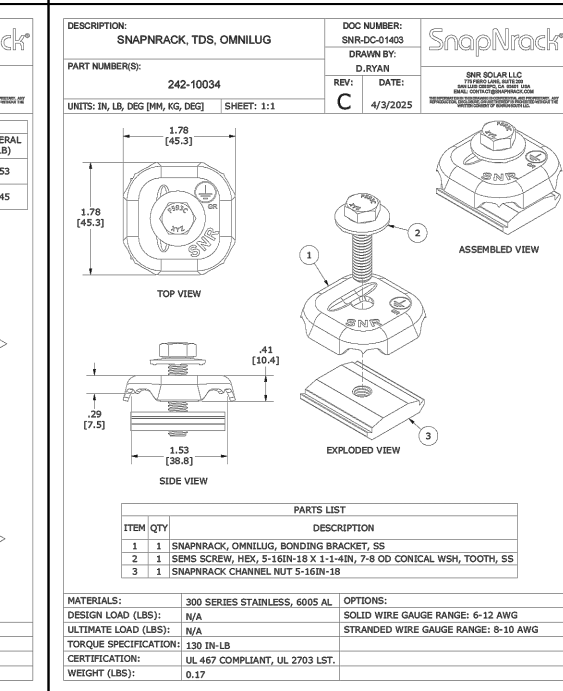
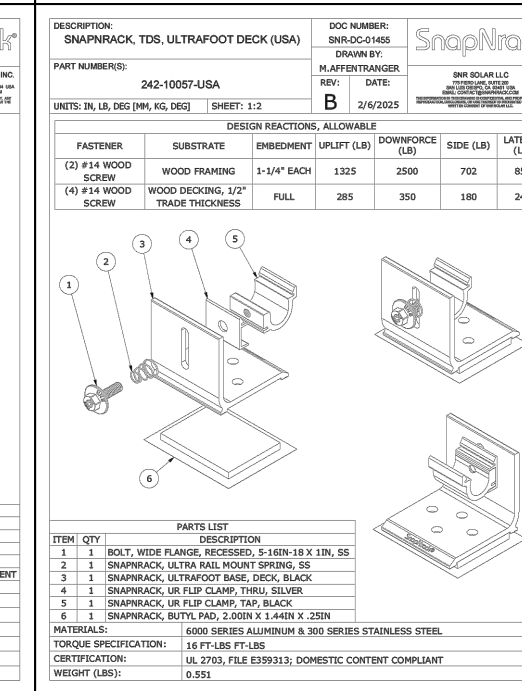
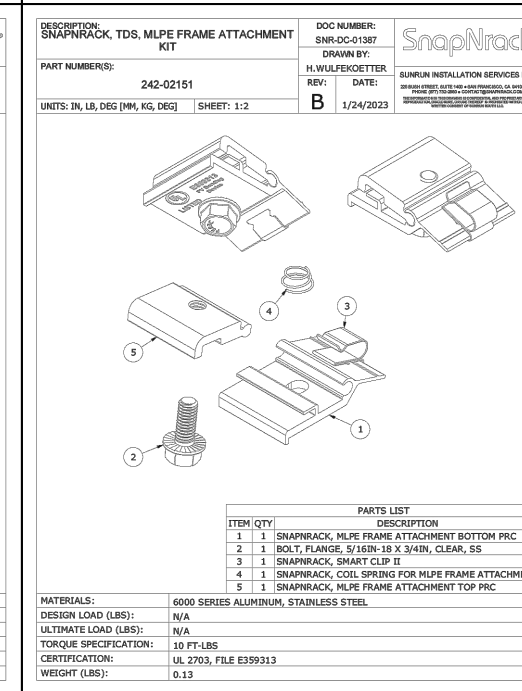
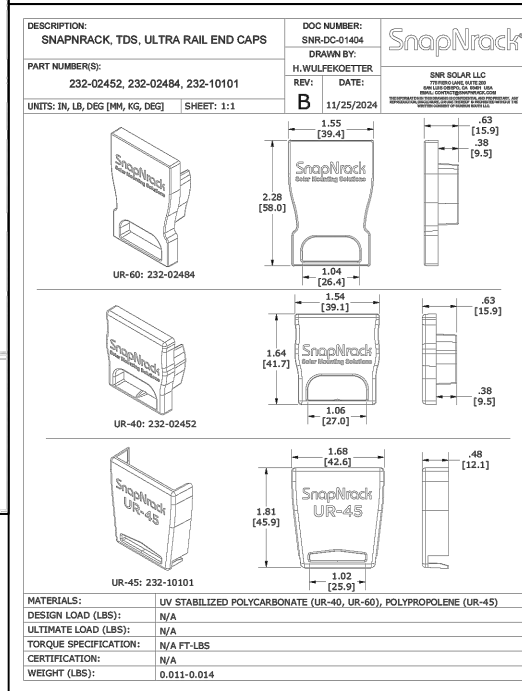
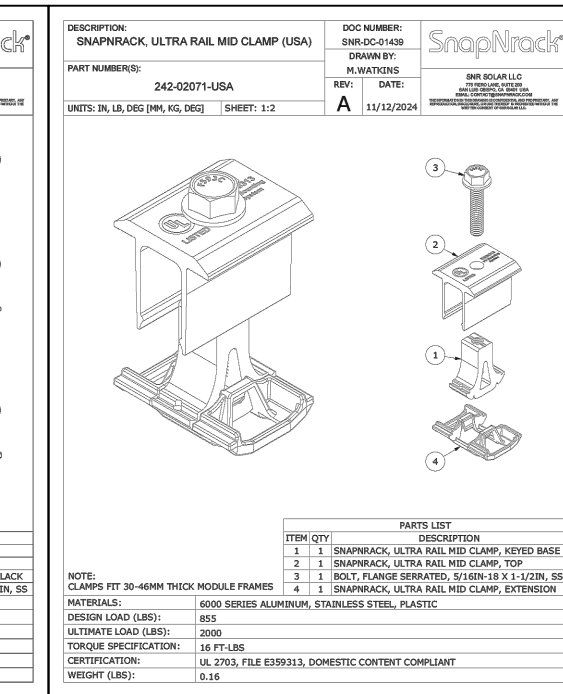
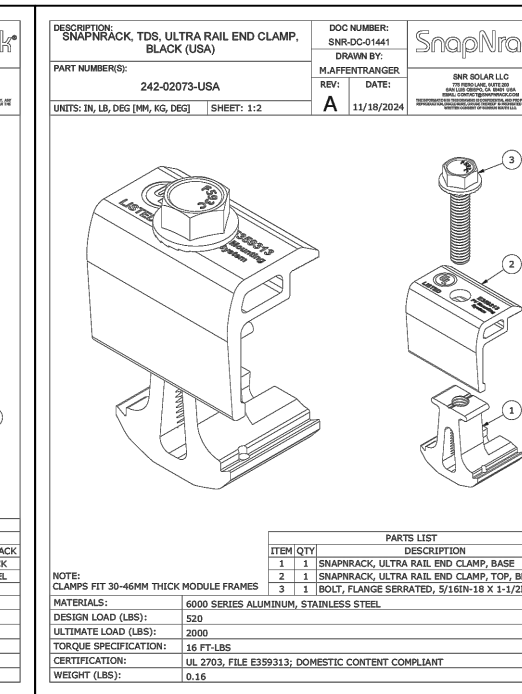
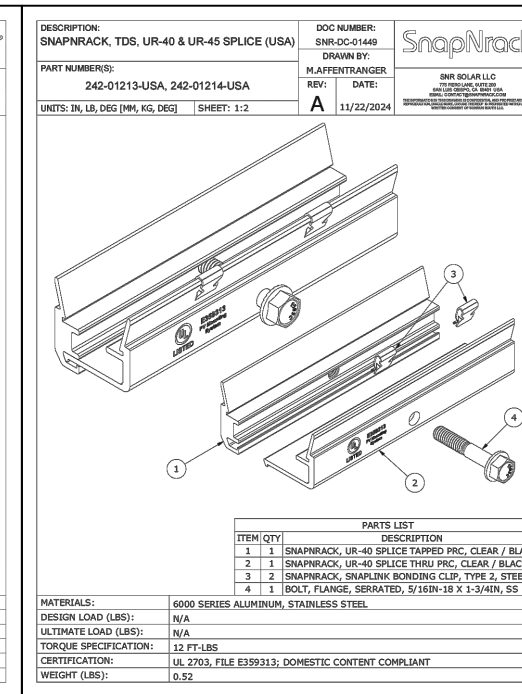
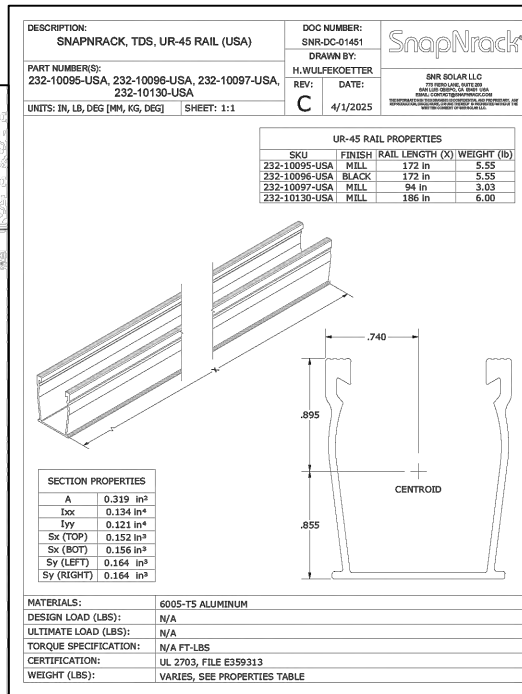
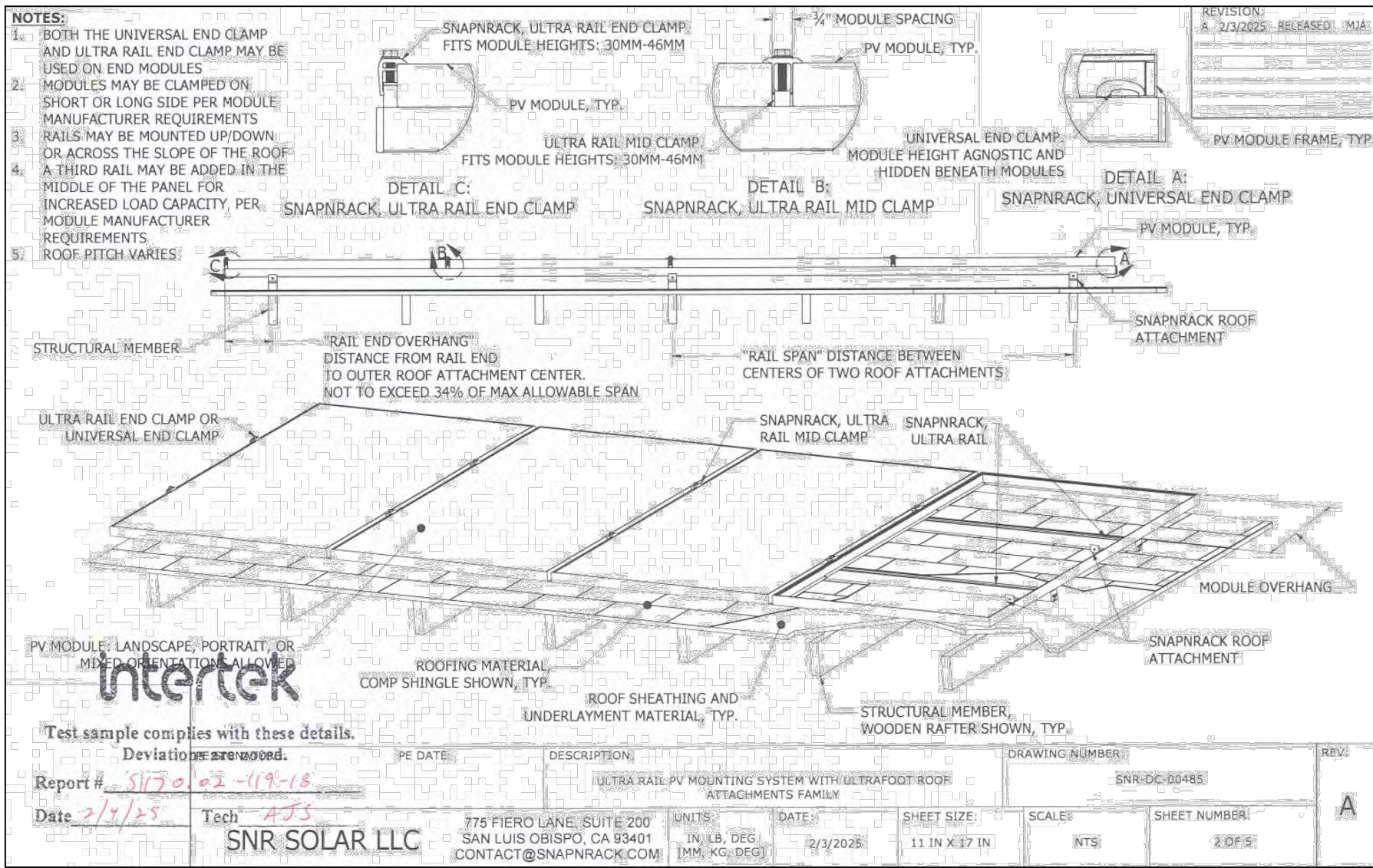
SHEET NAME:

ATTACHMENT DETAIL & ARRAY LAYOUT

SHEET NUMBER:

S3

RACKING & MOUNTING SPECIFICATIONS



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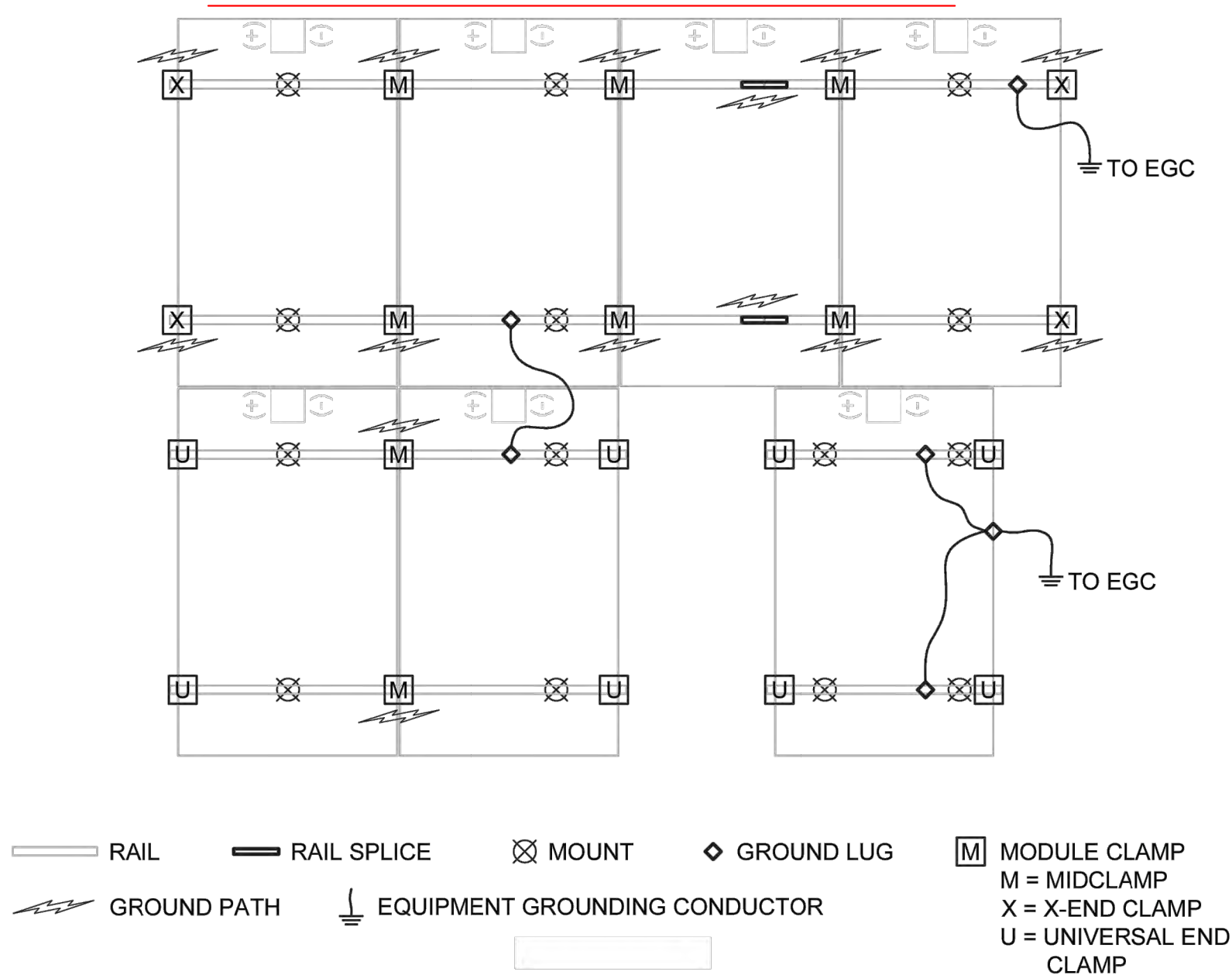
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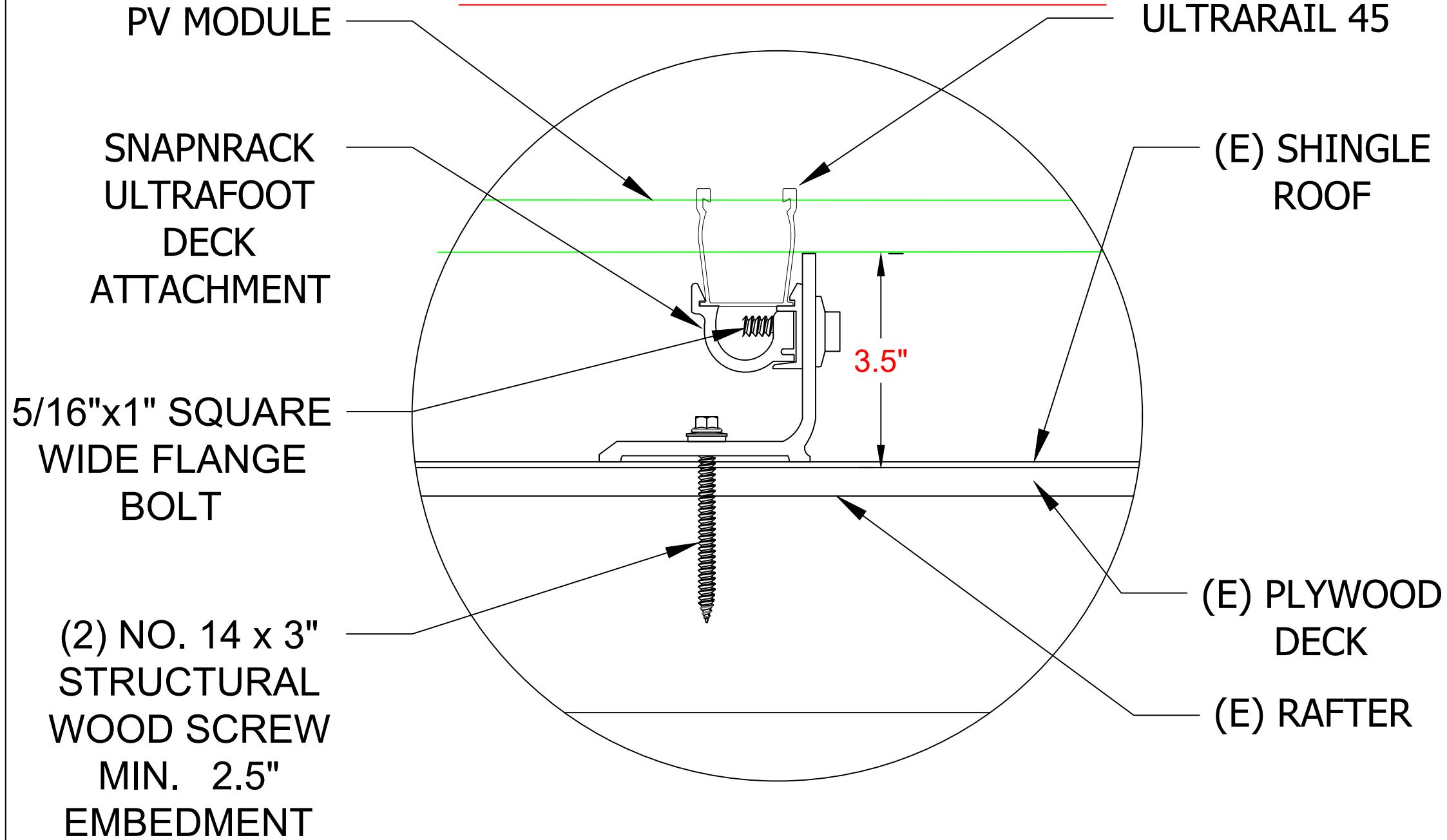
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GROUNDING DETAILS



INSTALLATION DETAIL



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Savannah, GA 31401

Date:	SEE P.E. STAMP
Designed By:	RHH
Reviewed by:	AKM
REVISION HISTORY	

DRAWING SCALE:

N.T.S.

SHEET NAME:

MOUNTING & FLASHING
DETAIL

SHEET NUMBER:

S4

LEGEND	
N	NEW
E	EXISTING
—	CT WIRE

NOTE:

LARGEST SINGLE BACKUP LOAD MUST NOT EXCEED THE POWER AND/OR SURGE CAPACITY OF THE ESS PER NEC 710.15(A)

SYSTEM DETAILS

PV Module Type	HD HYUNDAI HIN-T440NF(BK)
PV Module Quantity	14
Solar PV DC System Rating (kWdc)	6.16
Solar PV AC System Rating (kWac)	5.236
Inverter Type	ENPHASE IQ8-60-2-US
Inverter Quantity	14
Battery Type	ENPHASE IQ 5P
Battery Quantity	2

ELECTRICAL SERVICE UPGRADE NOTES:

- NEW ENPHASE IQ CONTROLLER WITH 200A MAIN BREAKER SHALL BE ADDED TO THE EXTERIOR WALL AND SHALL SERVE AS NEW MAIN SERVICE ENTRANCE
- SERVICE GROUND TO BE RELOCATED TO NEW 200A ENPHASE IQ CONTROLLER
- EXISTING NEUTRAL & GROUND BONDING TO BE REMOVED FROM EXISTING 225A EXTERIOR MAIN BREAKER ENCLOSURE AND ALL GROUNDS AND NEUTRALS SHALL BE SEPARATED IN THIS ENPHASE IQ CONTROLLER
- SURGE PROTECTION DEVICE SHALL BE INSTALLED IN ACCORDANCE WITH NEC 230.67 & 242.12



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Reviewed by:	AKM
REVISION HISTORY	
02/12/2026	UPDATED SYSTEM SUMMARY & WIRE TAGS

DRAWING SCALE:

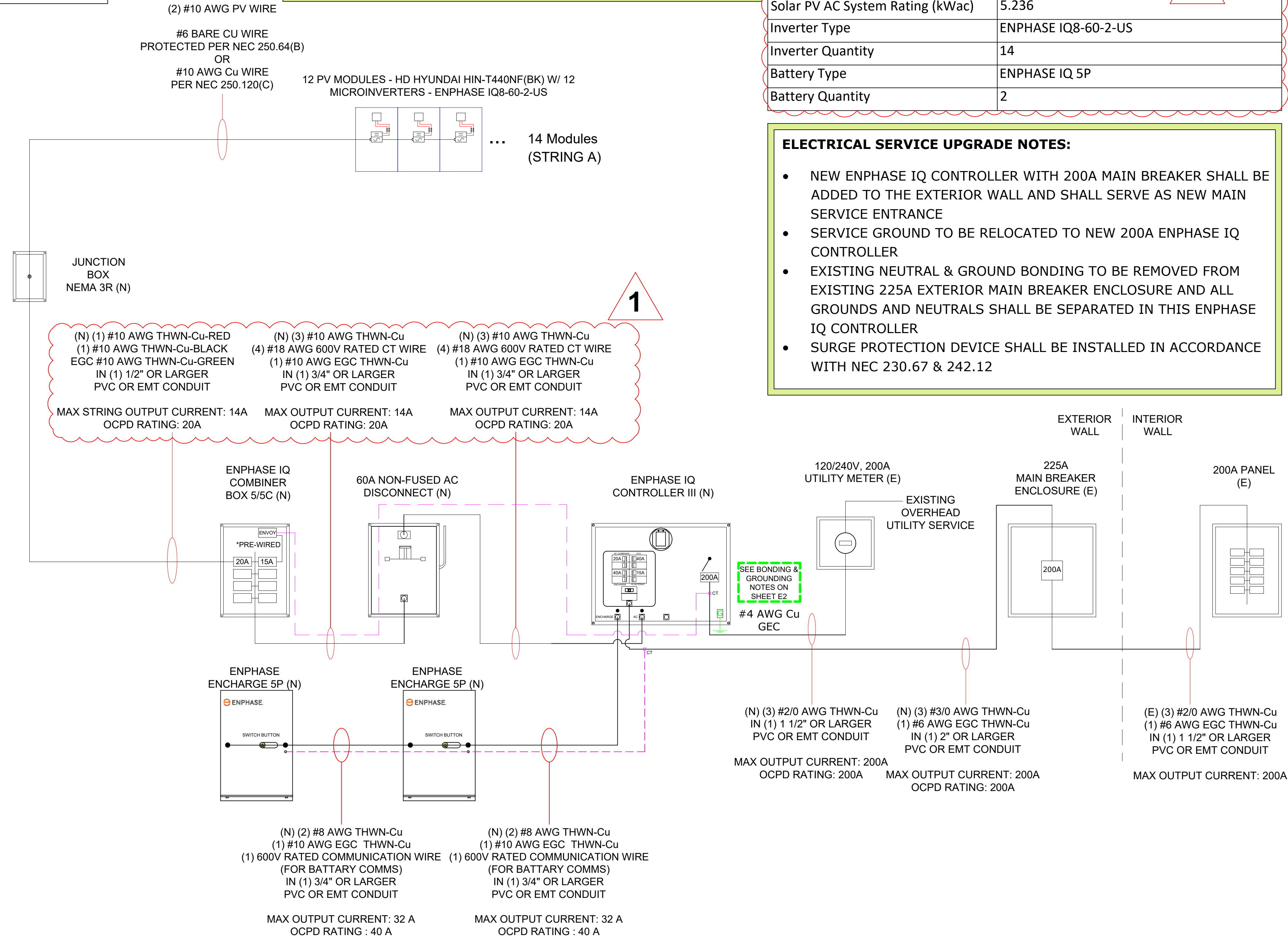
N.T.S.

SHEET NAME:

ELECTRICAL RISER
DIAGRAM

SHEET NUMBER:

E1



EQUIPMENT NOTES:

1. NEW EQUIPMENT CLEARANCES: 36" (FRONT), 30" (WORK AROUND), 6 FT (OH) (NEC 110.26)

2. NEW EQUIPMENT AND COMPONENTS SHALL BE CERTIFIED BY A NATIONAL LABORATORY.

3. LABEL READING, "WARNING: THIS EQUIPMENT FED BY MULTIPLE SOURCES" SHALL BE PROPERLY AFFIXED.

4. EQUIPMENT SHALL BE INSTALLED AND USED ACCORDING TO INSTALLATION MANUAL OR SPECIFICATIONS (NEC 110.3(B)), AND SHALL BE RATED FOR OUTDOOR USE IF INSTALLED OUTSIDE (NEMA 3-6P, TABLE 110.28)

GENERAL NOTES:

1. INSTALLER SHALL FURNISH ALL LABOR, MATERIALS AND EQUIPMENT NECESSARY FOR THE INSTALLATION OF A COMPLETE ELECTRICAL SYSTEM PURSUANT TO THE PLANS IN ACCORDANCE WITH THE FBC, NEC, FHPA, OSHA AND ALL OTHER APPLICABLE CODES AND ORDINANCES.

2. ELECTRICAL WORK AND RESPECTIVE PREPARATION WORK SHALL BE PERFORMED BY PROPERLY LICENSED SUBCONTRACTORS.

3. MATERIALS SHALL BE INCLUDED IN THE PLANS AND ANY NECESSARY EQUIVALENT SUBSTITUTIONS SHALL BE APPROVED BY THE EOR.

4. CONDUCTORS SHALL BE COPPER OF 98% CONDUCTIVITY. CABLES SHALL BE 600V-RATED, SINGLE-CONDUCTOR IN THERMOPLASTIC INSULATION SUITABLE FOR CONTINUOUS OPERATION AT 75° C. CONDUCTORS AND CABLE SHALL BE NEC-CLASS TYPE THW OR THWN, EXCEPT AWG SIZE #10 AND SMALLER MAY BE TW. INSULATION SHALL BE COLOR-CODED #6 AND SMALLER. COLOR-CODED TAPE SHALL BE USED ON #4 AND LARGER.

5. CONDUCTORS SHALL BE RUN IN CONDUIT WHEN NOT BENEATH MODULES. EXPOSED CONDUIT IS PERMITTED IN GARAGES OR OTHER AREAS ACCEPTABLE TO OWNER AND AS APPROVED BY EOR. CONDUIT SHALL BE PAINTED TO MATCH SURFACE AS REQUIRED BY OWNER.

6. FLEXIBLE CONDUIT SHALL BE USED FOR VIBRATING EQUIPMENT AND RECESSED, MOUNTED FIXTURES AND SHALL BE SEALED WITH LIQUID TIGHT IF EXPOSED TO WEATHER WITH GREEN BOND CONDUCTOR INSTALLED TOGETHER AT CIRCUIT CONDUCTORS. GALVANIZED EMT WITH SET-SCREW MAY BE USED FOR INTERIOR LOCATIONS. PVC WITH GREEN BOND CONDUCTOR (NEC 250) MAY BE USED IN UG LOCATIONS.

7. EXISTING AND CONNECTED ELECTRICAL PANELS, CIRCUIT BREAKERS AND SAFETY SWITCH SHALL BE SQUARE D OR EQUIV. LOAD SIDE SOLAR PV-SYSTEM CIRCUIT BREAKERS SHALL BE INSTALLED AT OPPOSITE END OF BUSBAR.

8.

8.1. FOR PIERCING TAPS, THE TOTAL AREA OF ALL CONDUCTORS, SPLICES, AND TAPS INSTALLED AT ANY CROSS SECTION OF THE WIRING SPACE SHALL NOT EXCEED 75 PERCENT OF THE CROSS-SECTIONAL AREA OF THAT SPACE (NEC 312.8.A).

8.2. SERVICE-ENTRANCE CONDUCTORS SHALL BE PERMITTED TO BE SPLICED OR TAPPED IN ACCORDANCE WITH NEC 110.14, 300.5(E), 300.13, AND 300.15 (NEC 230.46).

8.3. TAPPED ENCLOSURE SHALL BE LOCATED IN A READILY ACCESSIBLE LOCATION IN COMPLIANCE WITH NEC 230.70(A)(1).

8.4. AC DISCONNECT SHALL BE READILY ACESIBLE, OUTSIDE AND NO MORE THAN 10 FT FROM TAPPED CONDUCTORS.

8.5. PV AC DISCONNECT SHALL BE SERVICE ENTRANCE RATED (NEC 230.66), LOCKABLE (NEC 110.25) AND SHALL COMPLY WITH NEC 690.13(A-E).

8.6. ALL FUSES SHALL BE (R) RATED AND SHALL HAVE APPROPRIATE REJECTION CLIPS

9. CIRCUIT BREAKER DIRECTORY SHALL BE AFFIXED TO PANEL.

10. HVAC CONDUCTORS, CIRCUIT BREAKERS AD FUSES SHALL BE REPLACED AS NECESSARY TO COMPLY WITH MANUFACTURER'S RECOMMENDED OVER-CURRENT PROTECTION AT NO UP-CHARGE. CONDUIT AND BREAKERS SHALL BE COORDINATED WITH THE EQPT. NAMEPLATE. OTHER CIRCUITS PULLING 208-240V SHALL BE INSPECTED FOR COMPLIANCE WITH CONDUCTOR AND OVER-CURRENT PROTECTION REQUIREMENTS. REPLACEMENT SHALL BE THE RESPONSIBILITY OF THE OWNER AND PERFORMED BEFORE CONTRACTOR PERFORMS INITIAL SYSTEM TESTING.

CONDUIT NOTES:

PVC SCH 40 OR SCH 80 MAY BE USED AS REQUIRED FOR ADDITIONAL SAFETY OR FOR RUNS ≤ 3 FT WITH UPSIZE ACCORDING TO FILL TABLE.

ELECTRICAL METALLIC TUBING (EMT) NEC Art. 358:

1. EMT SHALL BE FASTENED EVERY 10 FT & FROM BOX, FITTING, TERMINAL POINT.

2. BENDS BETWEEN PULL POINTS SHALL COMBINE ≤ 360°.

3. CONNECTORS SHALL BE CORROSION RESISTANT.

4. GASKETS SHALL BE WATERTIGHT.

5. COUPLINGS AND CONNECTORS SHALL BE RAIN-TIGHT OR RAIN-TIGHT/INSULATED.

NEC FILL TABLES

RIGID PVC CONDUIT TABLE: SCHEDULE 80 - C10 / 40 - C11

FLEXIBLE METALLIC CONDUIT - TABLE C3

LIQUIDTIGHT FLEXIBLE CONDUIT TABLE- METALLIC C7 / NON-METALLIC (FNMC-B) - C5

ELECTRICIAN NOTES:

1. CONFIRM GROUND CONDUCTOR TO ELECTRODE

2. CONFIRM BUSBAR RATINGS & FEEDERS. IF ACTUAL CONDITIONS DIFFER, NOTIFY EOR.

3. CONDUCTORS MAY BE COMBINED USING RATED JUNCTIONS BOXES/CONDUIT UP-SIZE.

EXPANSION NOTE: FITTINGS SHALL BE INSTALLED BETWEEN SECURELY-MOUNTED ELBOWS AND TERMINATION POINTS (NOT INCL. WYES). IF JOINT IS VERTICAL, OPEN-END SHALL BE SECURELY FASTENED IN DOWN POSITION W/ COUPLING INSTALLED CLOSE TO TOP OF RUN W/ BARREL ALSO DOWN AND LOWER END SECURED AT BOTTOM TO ALLOW UPWARD MOVEMENT. (SEC. 352.44 NEC)

BONDING & GROUNDING NOTE:

1. MODULES SHALL BE BONDED BY BONDING MID-CLAMPS ACCORDING TO INSTALLATION MANUAL. MODULES WHICH CAN NOT BE FULLY BONDED SHALL BE PROPERLY GROUND USING GROUNDING LUG WIRED DIRECTLY TO SYSTEM GROUND WIRE. ALTERNATIVES REQUIRE A CUSTOMIZED PLAN FROM EOR.

2. (2) ROD AND PIPE ELECTRODES REQUIRED. ROD AND PIPE ELECTRODES SHALL NOT BE LESS THAN 2.44 M (8 FT) IN LENGTH AND SHALL CONSIST OF THE FOLLOWING MATERIALS: COPPER, GALVANIZED STEEL, STAINLESS STEEL.

3. GROUNDING ELECTRODES OF PIPE OR CONDUIT SHALL NOT BE SMALLER THAN METRIC DESIGNATOR 21 (TRADE SIZE 3/4) AND, WHERE OF STEEL, SHALL HAVE THE OUTER SURFACE GALVANIZED OR OTHERWISE METAL-COATED FOR CORROSION PROTECTION.

4. ROD-TYPE GROUNDING ELECTRODES OF STAINLESS STEEL AND COPPER OR ZINC-COATED STEEL SHALL BE AT LEAST 15.87 MM (5/8 IN.) IN DIAMETER, UNLESS LISTED. (2023 NEC)

5. THE METAL WATER PIPING SYSTEM SHALL BE BONDED AS REQUIRED PER NEC 250.104

6. INTERSYSTEM BONDING REQUIRED PER NEC 250.94

SMOKE ALARM NOTES:

INTERCONNECTED SMOKE ALARMS SHALL BE INSTALLED THROUGHOUT THE DWELLING, INCLUDING IN ROOMS, ATTACHED GARAGES, AND AREAS IN WHICH ESS ARE INSTALLED IN COMPLIANCE WITH LOCAL BUILDING CODE. WHERE ESS ARE INSTALLED IN AN ATTACHED GARAGE OR AREA IN WHICH SMOKE ALARMS CANNOT BE INSTALLED IN ACCORDANCE WITH THEIR LISTING, AN INTERCONNECTED LISTED HEAT ALARM SHALL BE INSTALLED AND BE CONNECTED TO THE SMOKE ALARM SYSTEM REQUIRED BY THE LOCAL BUILDING CODE PER NFPA 855 EDITION 2020 15.9.2.

ESS NOTES:

ESS SHALL BE PROTECTED FROM IMPACT FROM VEHICLE DAMAGE PER NFPA 855 EDITION 2020 15.10.

Surge Protection Notes:

WHERE SERVICE EQUIPMENT IS REPLACED, A SURGE PROTECTION DEVICE SHALL BE INSTALLED IN ACCORDANCE WITH NEC 230.67 & 242.12

Temperature Adjusted Conductor Ampacity - Assuming 45 °C						
Conductor Size (AWG)	Ampacity at 75 °C	Temp. Adjusted Ampacity (0.82 Adjustment Factor at 45 °C)	Temp. Adjusted Ampacity (4-6 Current-Carrying Conductors - 0.80 Adjustment Factor)	Ampacity at 90 °C	Temp. Adjusted Ampacity (0.87 Adjustment Factor at 45 °C)	Temp. Adjusted Ampacity (4-6 Current-Carrying Conductors - 0.80 Adjustment Factor)
14	20	16.4	13.12	25	21.75	17.4
12	25	20.5	16.4	30	26.1	20.88
10	35	28.7	22.96	40	34.8	27.90
8	50	41	32.8	55	47.9	38.3
6	65	53.3	42.64	75	65.3	52.2
4	85	69.7	55.76	95	82.7	66.2
3	100	82	65.6	110	95.7	76.6
2	115	94.3	75.44	130	113.1	90.5
1	130	106.6	85.28	150	130.5	104.4
1/0	150	123	98.4	170	147.9	118.3
2/0	175	143.5	114.8	195	169.7	135.8
3/0	200	164	131.2	225	195.8	156.6
4/0	230	188.6	150.88	260	226.2	181.0
Site Condition Assumptions						
Interconnection Frequency			60 Hz			
Voltage - Line 1 to Neutral			120 V			
Voltage - Line 2 to Neutral			120 V			
Voltage Line 1 to Line 2			240 V			
Environmental Assumptions						
Minimum Annual Temperature			10 °C			
Maximum Annual Temperature			45 °C			
PV Module Specifications						
Manufacturer			#N/A			
Model Number			HIN-T440NF(BK)			
Temperature Coefficient - Voltage			-0.25% / oC			
Temperature Coefficient - Current			0.046 / Oc			
Temperature Coefficient - Power			-0.3% / oC			
Specifications at STC						
Maximum Power - Pmp			440W			
Maximum Power Voltage - Vmp			32.3 V			
Maximum Power Current - Imp			13.63 A			
Open Circuit Voltage - Voc			38.8 V			
Short Circuit Current - Isc			14.39 A			
Temperature Adjusted						
Vmp Min			26.97			
Voc Max			40.25 V			
Inverter Specifications						
Manufacturer			ENPHASE			
Model Number			IQ8-60-2-US			
MPPT Voltage Range			27-37 V			
Operating Voltage Range			25-48 V			
Maximum Input Voltage			50 V			
Max Continuous AC Output Power			240 VA			
Max Continuous AC Output Current			1 A			
Conduit Fill Calculations for Raceways Containing More than 3 Current-Carrying Conductors						
Current-Carrying Conductor Sizes (AWG)			#10			
Conductor Cross Sectional Area (in2)			0.02036			
Number of Current-Carrying Conductors			2			
Total Cross Sectional Area of Conductors (in2)			0.040716612			
Total Conduit Size (in)			0.5			
Total Cross Area of Conduit (in2)			0.285			
Conduit Fill Percentage (%)			14.29			
Max Voltage Drop Percentage Calculation (%)						
From Rooftop Junction Box to Combiner Conductor Size (AWG)			#10			
Max String OCPD Rating (Amps)			20			
From Combiner Box to ACD & ACD to Point of Interconnection (AWG)			#10			
Max PV OCPD Rating (Amps)			20			
Max Circuit Distance (ft)			30			
Voltage Drop Percentage From Rooftop Junction Box to Combiner Box (%)			0.54			
Voltage Drop Percentage From Combiner Box to ACD & ACD to Point of Interconnection (%)			0.54			



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PROJECT NAME:

BOB VACCARO RESIDENCE

PROJECT ADDRESS:

504 E Jones St
Savannah, GA 31401

Date:	SEE P.E. STAMP
Designed By:	RHH
Reviewed by:	AKM
REVISION HISTORY	

DRAWING SCALE:

N.T.S.

SHEET NAME:

ELECTRICAL NOTES & EQUIPMENT SPECIFICATIONS

SHEET NUMBER:

E2



NEC 690.13(B) label is required at each PV system disconnecting means. This will include combiner boxes, AC/DC switches & AC Disconnects.



NEC 690.31(D)(2) label is required at all areas where PV system conductors are enclosed including junction boxes, raceways, conduit bodies, pull boxes, etc.



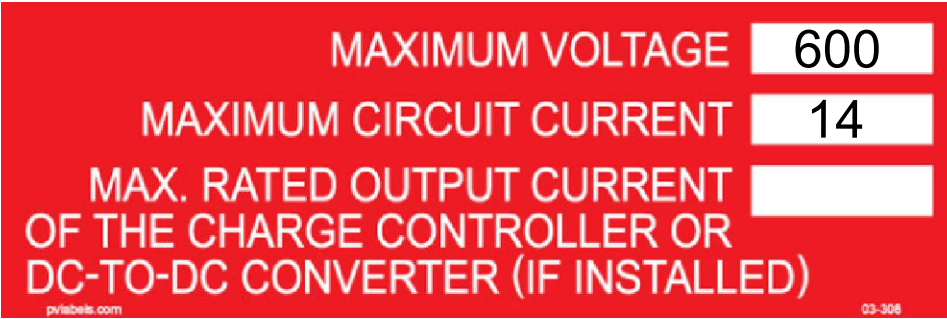
NEC 690.13(B) label is an optional addition to the previous label on systems where the line and load sides of the disconnect may be energized. This label is not required but “shall be permitted” by the NEC.



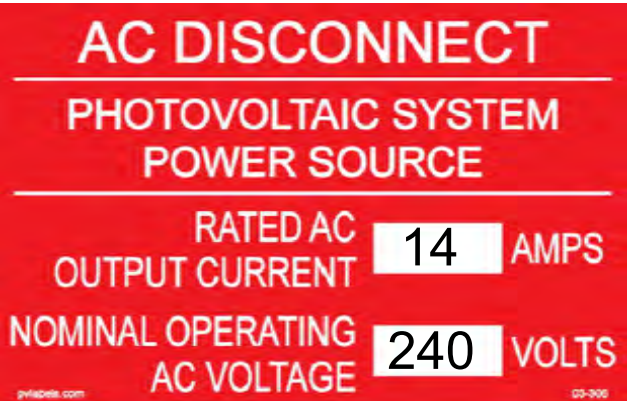
NEC 690.56(C)(2) label is required at the rapid shut down switch for the system. Typically, that is going to be the AC disconnect.



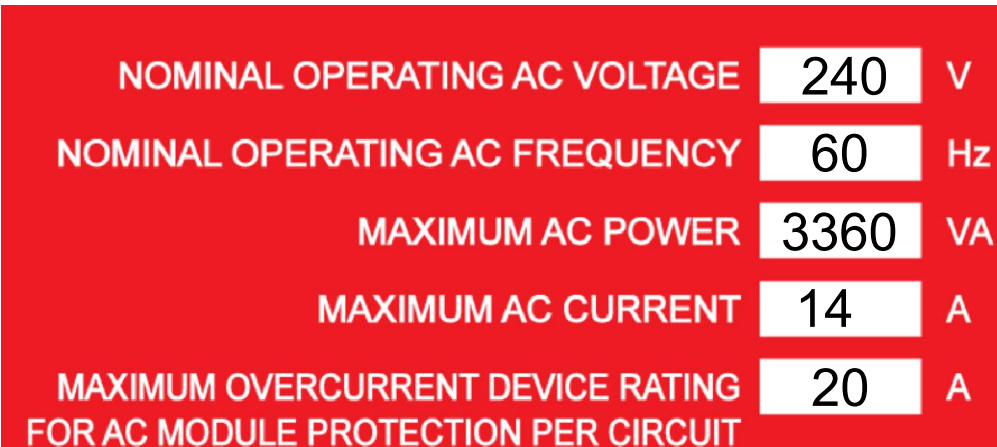
NEC 705.12(C) label is required at the main service equipment.



NEC 690.54 label is required at the point of interconnection disconnecting means, i.e. the AC disconnect.



NEC 690.54 label is required at the AC disconnecting means



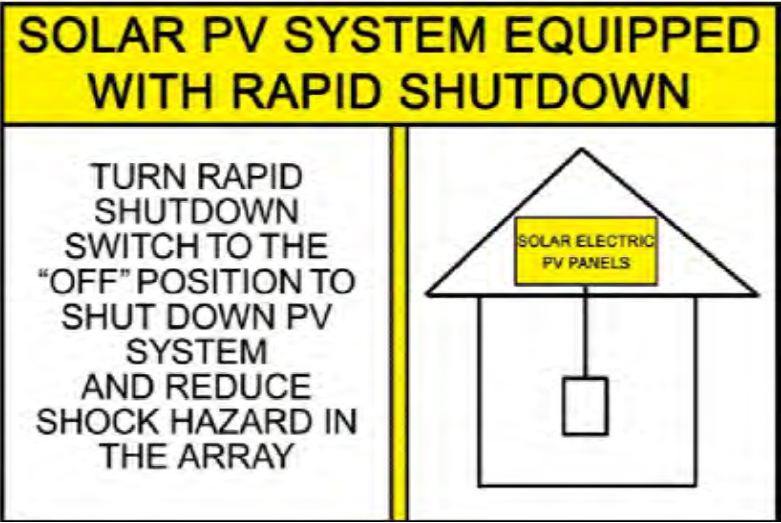
NEC 690.54 label is required at the AC disconnecting means



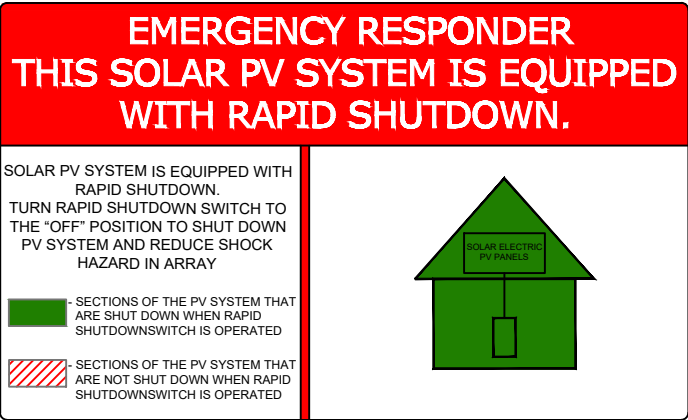
NEC 690.56(B) or NEC 705.10 label is required at every power source disconnecting means denoting location(s) of other power source(s) disconnecting means.



NEC 705.12(C) label is required at the main service equipment.



NEC 690.56(C) label is required at the service disconnecting means of the property.



NFPA 1.11.12.2.1.1 LABEL IS REQUIRED AT AC DISCONNECTING MEANS

CAUTION!
POWER TO THIS BUILDING
SUPPLIED FROM MULTIPLE SOURCES

705.10 LABEL LOCATION:
MAIN SERVICE DISCONNECT / MAIN DISTRIBUTION PANEL,
PV DISCONNECT LOCATED NO MORE THAN 3FT (1M)
FROM THE SERVICE DISCONNECT
(TEXT HEIGHT SHOULD BE A MINIMUM OF 3/8")



NFPA - 1, 11.12.2.1.5:
THIS LABEL IS REQUIRED AT MAIN DISCONNECT



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REVISION HISTORY	
02/12/2026	UPDATED LAYOUT & EQUIPMENT LOCATION

DRAWING SCALE:

N.T.S.

SHEET NAME:

SOLAR PV LABELS

SHEET NUMBER:

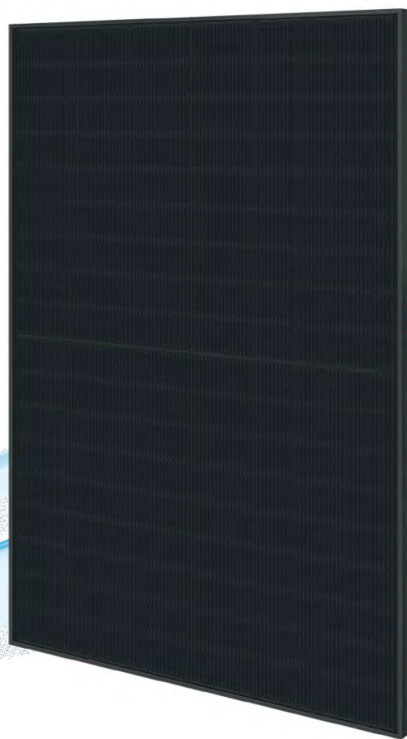
E3

HD HYUNDAI SOLAR MODULE

NF(BK) Series

Premium N-Type TOPCon Module

HIN-T430NF(BK) | HIN-T435NF(BK) | HIN-T440NF(BK)



22.53%
High Efficiency



High-End
TOPCon
Technology



Higher
Bifaciality



Long-Term
Reliability



Compatible
with Carport
Applications



For Residential
(Full Black Design)

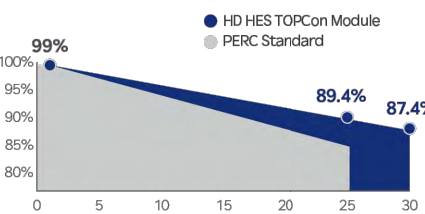
HD Hyundai's Warranty Provisions

25
YEARS

• 25-Year Product Warranty
• Materials and workmanship

30
YEARS

• 30-Year Performance Warranty
• First year degradation: 1%
• Linear warranty after initial year:
with 0.4%p annual degradation,
87.4% is guaranteed up to 30years



Certification

ISO

ISO

kiwa

kiwa

• ISO 9001 : Quality management systems
• ISO 14001 : Environmental management systems
• ISO 45001 : Occupational health and safety management systems
• UL 61730 : Photovoltaic (PV) module safety qualification (CSA)
• IEC 61701 : Salt mist corrosion testing
• IEC 62716 : Ammonia corrosion testing
• IEC 62804 : Potential Induced Degradation (PID) testing
• IEC 60068-2-68 : Sand and dust testing for environmental durability

Electrical Characteristics

		HIN-TxxxNF(BK)	HIN-T430NF(BK)	HIN-T435NF(BK)	HIN-T440NF(BK)
Item	Unit		BNPI	BNPI	BNPI
Nominal output (Pmax)	W	430	476	435	482
Open circuit voltage (Voc)	V	38.4	38.4	38.6	38.6
Short circuit current (Isc)	A	14.25	15.79	14.32	15.87
Voltage at Pmax (Vmpp)	V	31.9	31.9	32.1	32.1
Current at Pmax (Impp)	A	13.48	14.94	13.56	15.02
Module efficiency	%	22.02		22.28	
Power Class Sorting	W			0 ~ +5	
Temperature coefficient of Pmax	%/K			-0.30	
Temperature coefficient of Voc	%/K			-0.25	
Temperature coefficient of Isc	%/K			0.046	
Bifaciality	%			80%±10%	

*STC : Irradiance 1,000 W/m², cell temperature 25°C, AM=1.5 / Test uncertainty for Pmax ±3%, Voc ±3%, Isc ±3%
**The electrical properties of BNPI are measured under the irradiance corresponding to 1000 W/m² on the module front and 135 W/m² on the module rear.

Additional Power Gain from rear side					
Pmpp gain	Pmpp[W]	Vmpp[V]	Impp[A]	Voc[V]	Isc[A]
5%	458	32.30	14.18	38.80	14.97
15%	493	32.30	15.27	38.80	16.12
25%	528	32.40	16.36	38.90	17.27

*Electrical characteristics with different rear power gain (reference to 440W)

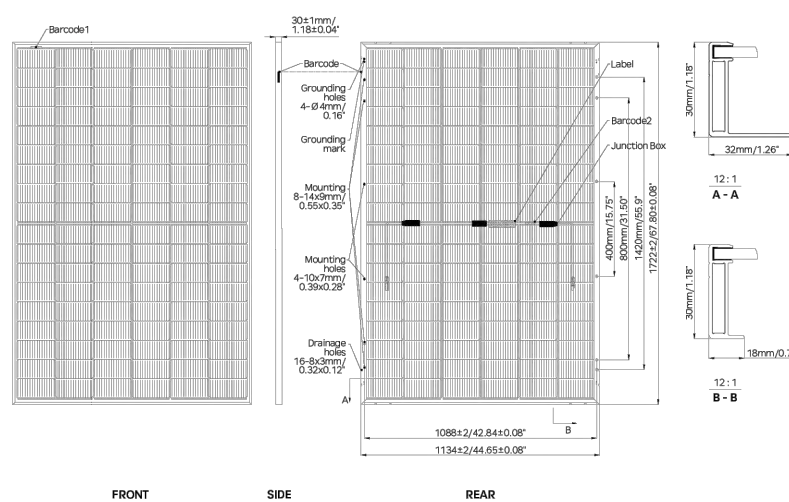
Mechanical Characteristics

Dimensions	1,722mm (L) x 1,134mm (W) x 30mm (H) (67.8in x 44.6in x 1.2in)		
Weight	24.5 kg (54.01lbs)		
Solar Cells	N-Type TOPCon, 108 (6x18) monocrystalline 16BB half-cut bifacial cells		
Output Cables	Cable : (+)1,200mm(47.2in), (-)1,200mm(47.2in) / Customized length available Connector : Staubli MC4 genuine Connector / Compatible, IP68		
Junction Box	3-part, 3 bypass diodes, IP68 rated		
Construction	Front : 2.0mm(0.08in) semi-tempered solar glass with high transmittance and anti-reflective coating Rear : 2.0mm(0.08in) semi-tempered solar glass		
Frame	Anodized aluminum alloy		

Shipping Configurations

Packing Direction	Vertical	Packing pallet weight (kg)	912
Container Size (HC)	40'	Modules Per Pallet (pcs)	36
Pallets Per Container	26	Modules Per Container (pcs)	936

Module Diagram (unit : mm)

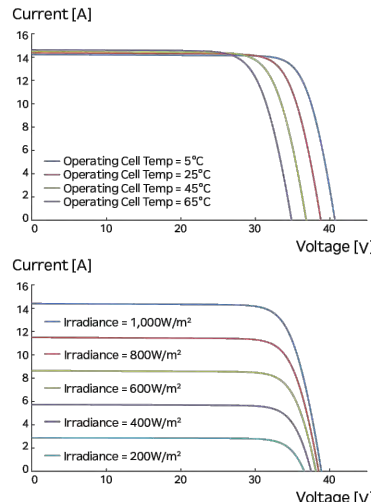


Sales & Marketing
hps.sales@hd.com

HD Hyundai Energy Solutions reserves the right to update or modify the specifications and features listed in this datasheet without prior notice. Always check the latest version of the datasheet for accurate information. Before using the product, please refer to the Installation and Operation Manual and Warranty. We retain the right of final interpretation.

HD HYUNDAI ENERGY SOLUTIONS

I-V Curves (HIN-T440NF(BK))



Module Mounting Instructions

Test Load	Mounting Direction
Uplift load ≤ 2400Pa Downforce load ≤ 5400Pa	1/6L ≤ A ≤ 1/4L; L=Module length *NOTE: 1. The crossbeam is perpendicular to the long side. This installation may cause the cell covered, so HD HES does not recommend this installation for Framed Bifacial double-glass. 2. The above described distance is from the module edge to the middle of the clamp. Clamps length ≥60mm. 3. Need two support rails below the PV module to make sure the Mechanical load. 4. The load is an empirical value of a standard module based on a standard installation mode, and the specific information shall be consulted by HD HES.



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Reviewed by:	AKM
REVISION HISTORY	

DRAWING SCALE:

N.T.S.

SHEET NAME:

SOLAR MODULE
SPECIFICATIONS

SHEET NUMBER:

APP.1



DATA SHEET



IQ8 Series Microinverters

Our newest IQ8 Microinverters are the industry's first microgrid-forming, software-defined microinverters with split-phase power conversion capability to convert DC power to AC power efficiently. The brain of the semiconductor-based microinverter is our proprietary application-specific integrated circuit (ASIC) which enables the microinverter to operate in grid-tied or off-grid modes. This chip is built in advanced 55nm technology with high speed digital logic and has super-fast response times to changing loads and grid events, alleviating constraints on battery sizing for home energy systems.



Part of the Enphase Energy System, IQ8 Series Microinverters integrate with the Enphase IQ Battery, Enphase IQ Gateway, and the Enphase App monitoring and analysis software.



Connect PV modules quickly and easily to IQ8 Series Microinverters using the included Q-DCC-2 adapter cable with plug-n-play MC4 connectors.



IQ8 Series Microinverters redefine reliability standards with more than one million cumulative hours of power-on testing, enabling an industry-leading limited warranty of up to 25 years.



IQ8 Series Microinverters are UL Listed as PV Rapid Shut Down Equipment and conform with various regulations, when installed according to manufacturer's instructions.

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IQ8SE-DS-0001-01-EN-US-2022-03-17

Easy to install

- Lightweight and compact with plug-n-play connectors
- Power Line Communication (PLC) between components
- Faster installation with simple two-wire cabling

High productivity and reliability

- Produce power even when the grid is down*
- More than one million cumulative hours of testing
- Class II double-insulated enclosure
- Optimized for the latest high-powered PV modules

Microgrid-forming

- Complies with the latest advanced grid support**
- Remote automatic updates for the latest grid requirements
- Configurable to support a wide range of grid profiles
- Meets CA Rule 21 (UL 1741-SA) requirements

* Only when installed with IQ System Controller 2, meets UL 1741. IQ8H-208V operates only in grid-tied mode.
** IQ8 Series Microinverters supports split phase, 240V. IQ8H-208 supports split phase, 208V only.

IQ8 Series Microinverters

INPUT DATA (DC)		IQ8-60-2-US	IQ8PLUS-72-2-US	IQ8M-72-2-US	IQ8A-72-2-US	IQ8H-240-72-2-US	IQ8H-208-72-2-US ¹
Commonly used module pairings ²	W	235 – 350	235 – 440	260 – 460	295 – 500	320 – 540+	295 – 500+
Module compatibility		60-cell/120 half-cell, 60-cell/120 half-cell, 66-cell/132 half-cell and 72-cell/144 half-cell					
MPPT voltage range	V	27 – 37	29 – 45	33 – 45	36 – 45	38 – 45	38 – 45
Operating range	V	25 – 48			25 – 58		
Min/max start voltage	V	30 / 48			30 / 58		
Max input DC voltage	V	50			60		
Max DC current ³ [module Isc]	A			15			
Overvoltage class DC port				II			
DC port backfeed current	mA			0			
PV array configuration		1x1 Ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit					
OUTPUT DATA (AC)		IQ8-60-2-US	IQ8PLUS-72-2-US	IQ8M-72-2-US	IQ8A-72-2-US	IQ8H-240-72-2-US	IQ8H-208-72-2-US ¹
Peak output power	VA	245	300	330	366	384	366
Max continuous output power	VA	240	290	325	349	380	360
Nominal (L-L) voltage/range ⁴	V	240 / 211 – 264					208 / 183 – 250
Max continuous output current	A	1.0	1.21	1.35	1.45	1.58	1.73
Nominal frequency	Hz	60					
Extended frequency range	Hz	50 – 68					
AC short circuit fault current over 3 cycles	Arms	2					4.4
Max units per 20 A (L-L) branch circuit ⁵		16	13	11	11	10	9
Total harmonic distortion		<5%					
Overvoltage class AC port		III					
AC port backfeed current	mA	30					
Power factor setting		1.0					
Grid-tied power factor (adjustable)		0.85 leading – 0.85 lagging					
Peak efficiency	%	97.5	97.6	97.6	97.6	97.6	97.4
CEC weighted efficiency	%	97	97	97	97.5	97	97
Night-time power consumption	mW	60					
MECHANICAL DATA							
Ambient temperature range		-40°C to +60°C (-40°F to +140°F)					
Relative humidity range		4% to 100% (condensing)					
DC Connector type		MC4					
Dimensions (HxWxD)		212 mm (8.3") x 175 mm (6.9") x 30.2 mm (1.2")					
Weight		1.08 kg (2.38 lbs)					
Cooling		Natural convection – no fans					
Approved for wet locations		Yes					
Pollution degree		PD3					
Enclosure		Class II double-insulated, corrosion resistant polymeric enclosure					
Environ. category / UV exposure rating		NEMA Type 6 / outdoor					
COMPLIANCE							
Certifications		CA Rule 21 (UL 1741-SA), UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC 2014, NEC 2017, and NEC 2020 section 690.12 and C22.1-2018 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according to manufacturer's instructions.					

(1) The IQ8H-208 variant will be operating in grid-tied mode only at 208V AC. (2) No enforced DC/AC ratio. See the compatibility calculator at <https://link.enphase.com/module-compatibility> (3) Maximum continuous input DC current is 10.6A (4) Nominal voltage range can be extended beyond nominal if required by the utility. (5) Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

IQ8SE-DS-0001-01-EN-US-2022-03-17



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Reviewed by:	AKM
REVISION HISTORY	

DRAWING SCALE:

N.T.S.

Sheet Name:

MICROINVERTER
SPECIFICATION

SHEET NUMBER:

APP.2

Enphase Q Cable Accessories

The **Enphase Q Cable™** and accessories are part of the latest generation Enphase IQ System™. These accessories provide simplicity, reliability, and faster installation times.



Enphase Q Cable

- Two-wire, double-insulated Enphase Q Cable is 50% lighter than the previous generation Enphase cable
- New cable numbering and plug and play connectors speed up installation and simplify wire management
- Link connectors eliminate cable waste

Field-Wireable Connectors

- Easily connect Q cables on the roof without complex wiring
- Make connections from any open connector and center feed any section of cable within branch limits
- Available in male and female connector types

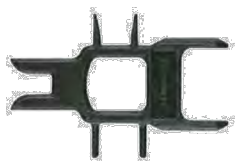
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Enphase Q Cable Accessories

CONDUCTOR SPECIFICATIONS				
Certification	UL3003 (raw cable), UL 9703 (cable assemblies), DG cable			
Flame test rating	FT4			
Compliance	RoHS, OIL RES I, CE, UV Resistant, combined UL for Canada and United States			
Conductor type	THHN/THWN-2 dry/wet			
Disconnecting means	The AC and DC bulkhead connectors have been evaluated and approved by UL for use as the load-break disconnect required by NEC 690.			
Q CABLE TYPES / ORDERING OPTIONS				
Connectorized Models	Size / Max Nominal Voltage	Connector Spacing	PV Module Orientation	Connector Count per Box
Q-12-10-240	12 AWG / 277 VAC	1.3 m (4.2 ft)	Portrait	240
Q-12-17-240	12 AWG / 277 VAC	2.0 m (6.5 ft)	Landscape (60-cell)	240
Q-12-20-200	12 AWG / 277 VAC	2.3 m (7.5 ft)	Landscape (72-cell)	200
ENPHASE Q CABLE ACCESSORIES				
Name	Model Number	Description		
Raw Q Cable	Q-12-RAW-300	300 meters of 12 AWG cable with no connectors		
Field-wireable connector (male)	Q-CONN-10M	Make connections from any open connector		
Field-wireable connector (female)	Q-CONN-10F	Make connections from any Q Cable open connector		
Cable Clip	Q-CLIP-100	Used to fasten cabling to the racking or to secure looped cabling		
Disconnect tool	Q-DISC-10	Disconnect tool for Q Cable connectors, DC connectors, and AC module mount		
Q Cable sealing caps (female)	Q-SEAL-10	One needed to cover each unused connector on the cabling		
Terminator	Q-TERM-10	Terminator cap for unused cable ends		
Enphase EN4 to MC4 adaptor ¹	ECA-EN4-S22	Connect PV module using MC4 connectors to IQ micros with EN4 (TE PV4-S SOLARLOK). 150mm/5.9" to MC4.		
Enphase EN4 non-terminated adaptor ¹	ECA-EN4-FW	For field wiring of UL certified DC connectors. EN4 (TE PV4-S SOLARLOK) to non-terminated cable. 150mm/5.9"		
Enphase EN4 to MC4 adaptor (long) ¹	ECA-EN4-S22-L	Longer adapter cable for EN4 (TE PV4-S SOLARLOK) to MC4. Use with split cell modules or PV modules with short DC cable. 600mm/23.6"		
Replacement DC Adaptor (MC4)	Q-DCC-2	DC adaptor to MC4 (max voltage 100 VDC)		
Replacement DC Adaptor (UTX)	Q-DCC-5	DC adaptor to UTX (max voltage 100 VDC)		

1. Qualified per UL subject 9703.

	TERMINATOR Terminator cap for unused cable ends, sold in packs of ten (Q-TERM-10)		SEALING CAPS Sealing caps for unused aggregator and cable connections (Q-BA-CAP-10 and Q-SEAL-10)
	DISCONNECT TOOL Plan to use at least one per installation, sold in packs of ten (Q-DISC-10)		CABLE CLIP Used to fasten cabling to the racking or to secure looped cabling, sold in packs of one hundred (Q-CLIP-100)

To learn more about Enphase offerings, visit enphase.com

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2020-06-26



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REVISION HISTORY	

DRAWING SCALE:

N.T.S.

SHEET NAME:

ENPHASE Q.CABLE
SPECIFICATIONS

SHEET NUMBER:

APP.3



DATASHEET



X-IQ-AM1-240-5
X-IQ-AM1-240-5C

IQ Combiner 5/5C

The IQ Combiner 5/5C consolidates interconnection equipment into a single enclosure and streamlines IQ Series Microinverters and IQ Gateway installation by providing a consistent, pre-wired solution for residential applications. IQ Combiner 5/5C uses wired control communication and is compatible with IQ System Controller 3/3G and IQ Battery 5P.

The IQ Combiner 5/5C, along with IQ Series Microinverters, IQ System Controller 3/3G, and IQ Battery 5P provides you with a complete grid-agnostic Enphase Energy System.



IQ Series Microinverters

The high-powered smart grid-ready IQ Series Microinverters (IQ6, IQ7, and IQ8 Series) dramatically simplify the installation process



IQ System Controller 3/3G

Provides microgrid interconnection device (MID) functionality by automatically detecting grid failures and seamlessly transitioning the home energy system from grid power to backup power



IQ Battery 5P

Fully integrated AC battery system. Includes six field-replaceable IQ8D-BAT Microinverters



IQ Load Controller

Helps prioritize essential appliances during a grid outage to optimize energy consumption and prolong battery life



5-year
limited
warranty



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IQC-5-5C-DSH-00007-1.0-EN-US-2023-07-12

IQ Combiner 5/5C

MODEL NUMBER	
IQ Combiner 5 (X-IQ-AM1-240-5)	IQ Combiner 5 with IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSIC12.20 ±0.5%), consumption monitoring (± 2.5%) and IQ Battery monitoring (±2.5%). Includes a silver solar shield to deflect heat
IQ Combiner 5C (X-IQ-AM1-240-5C)	IQ Combiner 5C with IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 ±0.5%), consumption monitoring (±2.5%) and IQ Battery monitoring (±2.5%). Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05) ¹ . Includes a silver solar shield to deflect heat
WHAT'S IN THE BOX	
IQ Gateway printed circuit board	IQ Gateway is the platform for total energy management for comprehensive, remote maintenance and management of the Enphase IQ System
Busbar	125A busbar with support for 1 x IQ Gateway breaker and 4 x 20A breaker for installing IQ Series Microinverters and IQ Battery 5P
IQ Gateway breaker	Circuit breaker, 2-pole, 10 A/15 A
Production CT	Prewired revenue-grade solid core CT, accurate up to 0.5%
Consumption CT	Two consumption metering clamp CTs, shipped with the box, accurate up to 2.5%
IQ Battery CT	One battery metering clamp CT, shipped with the box, accurate up to 2.5%
CTRL board	Control board for wired communication with IQ System Controller 3/3G and the IQ Battery 5P
Enphase Mobile Connect (only with IQ Combiner 5C)	4G-based LTE-M1 cellular modem (CELLMODEM-M1-06-SP-05) with a 5-year T-Mobile data plan
Accessories kit	Spare control headers for CTRL board
ACCESSORIES AND REPLACEMENT PARTS (NOT INCLUDED, ORDER SEPARATELY)	
CELLMODEM-M1-06-SP-05	4G-based LTE-M1 cellular modem with a 5-year T-Mobile data plan
CELLMODEM-M1-06-AT-05	4G-based LTE-M1 cellular modem with a 5-year AT&T data plan
Circuit breakers (off-the-shelf)	Supports Eaton BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers Supports Eaton BR220B, BR230B, and BR240B circuit breakers compatible with hold-down kit
Circuit breakers (provided by Enphase)	BRK-10A-2-240V, BRK-15A-2-240V, BRK-20A-2P-240V, BRK-15A-2P-240V-B, and BRK-20A-2P-240V-B (More details in "Accessories" section)
XA-SOLARSHIELD-ES	Replacement solar shield for IQ Combiner 5/5C
XA-ENV2-PCBA-5	IQ Gateway replacement printed circuit board (PCB) for Combiner 5/5C
X-IQ-NA-HD-125A	Hold-down kit compatible with Eaton BR-B series circuit breakers (with screws)
ELECTRICAL SPECIFICATIONS	
Rating	80 A
System voltage	120/240 VAC, 60 Hz
Busbar rating	125 A
Fault current rating	10 kAIC
Maximum continuous current rating (input from PV/storage)	64 A
Branch circuits (solar and/or storage)	Up to four 2-pole Eaton BR series distributed generation (DG) breakers only (not included)
Maximum total branch circuit breaker rating (input)	80 A of distributed generation/95 A with IQ Gateway breaker included
IQ Gateway breaker	10 A or 15 A rating GE/Siemens/Eaton included
Production metering CT	200 A solid core pre-installed and wired to IQ Gateway
Consumption monitoring CT (CT-200-CLAMP)	A pair of 200 A clamp-style current transformers is included with the box
IQ Battery metering CT	200 A clamp-style current transformer for IQ Battery metering, included with the box
COMPLIANCE	
IQ Combiner	UL 1741, CAN/CSA C22.2 No. 107.1, Title 47 CFR, Part 15, Class B, ICES 003
IQ Gateway	UL 60601-1/CANCSA 22.2 No. 61010-1, IEEE 1547: 2018 (UL 1741-SB, 3 rd Ed.) IEEE 2030.5/CSIP Compliant Production metering: ANSI C12.20 accuracy class 0.5 (PV production)



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SHEET NAME:

ENPHASE COMBINER
SPECIFICATIONS

SHEET NUMBER:

APP.4



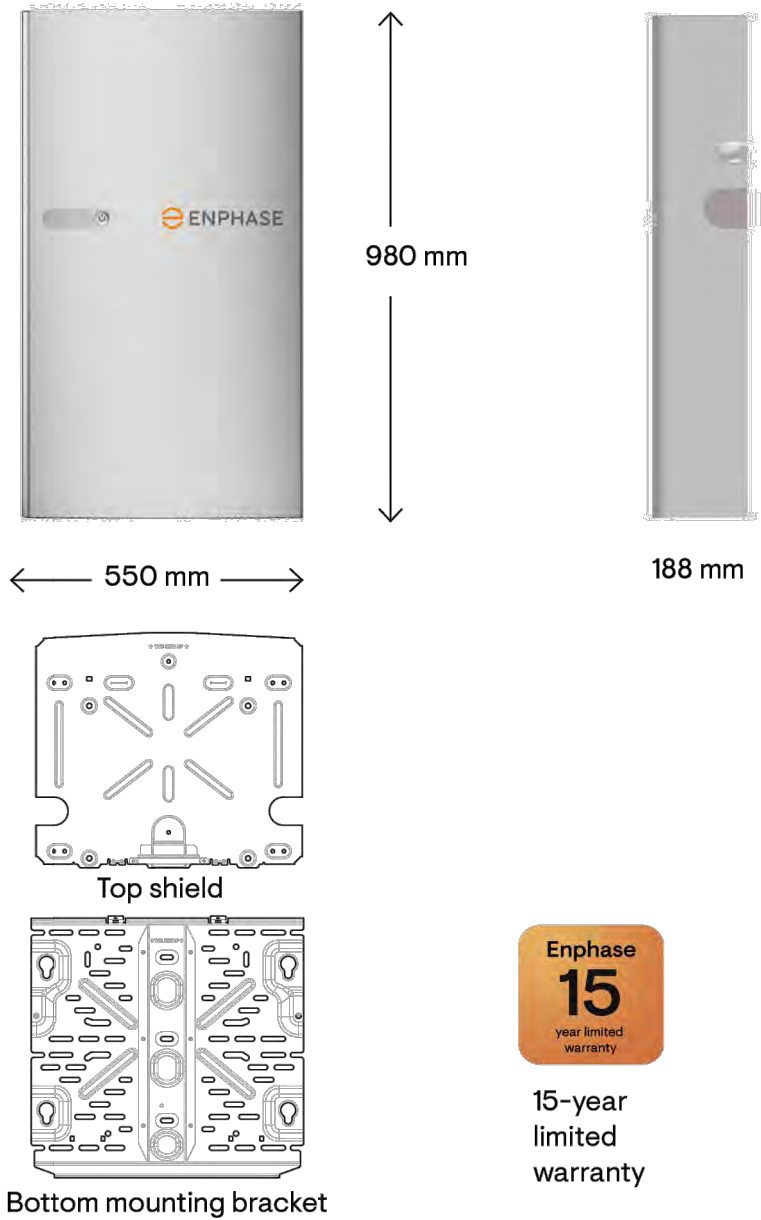
DATA SHEET NA PRELIMINARY



IQ Battery 5P

The IQ Battery 5P all-in-one AC-coupled system is powerful, reliable, simple, and safe. It has a total usable energy capacity of 5.0 kWh and includes six embedded grid-forming microinverters with a 3.84 kVA continuous power rating. It provides backup capability and installers can quickly design the right system size to meet the customer needs.

Dimensions



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IQB-5P-DSH-00010-1.0-EN-US-2023-05-22

Powerful

- Provides 3.84 kVA continuous and 7.68 kVA peak power
- Doubles the available power per kWh of prior generations of IQ Battery 5P
- Includes six embedded IQ8D-BAT Microinverters

Reliable

- 15-year limited warranty
- Cools passively with no moving parts or fans
- Uses wired communication for fast and consistent connection
- Updates software and firmware remotely

Simple

- Fully integrated AC battery system
- Installs and commissions easily
- Supports Backup, Self-Consumption, and time-of-use (TOU) modes
- Offers homeowners remote monitoring and control from the Enphase App
- Field replaceable components

Safe

- Tested to meet UL 9540A, the highest industry standard for battery safety
- Uses lithium iron phosphate (LFP) chemistry for maximum safety and longevity



IQ Battery 5P

MODEL NUMBER	
IQBATTERY-5P-1P-NA	The IQ Battery 5P system with integrated IQ Microinverters and battery management system (BMS) with battery controller.
WHAT'S IN THE BOX	
IQ Battery 5P unit	IQ Battery 5P unit (B05-T02-US00-1-3)
ID cover and conduit cover	IQ Battery 5P cover with two conduit covers for left-side and right-side of the unit
Bottom mounting bracket and top shield	Bottom mounting bracket for mounting bracket on the wall. One top shield required for UL9540A
M5 seismic screws	Two M5 seismic screws for securing battery unit on bottom bracket
M4 grounding screws	Two M4 grounding screws to secure top shield on bottom wall-mount bracket
M5 ID cover grounding screws	Two M5 ID Cover grounding screws for EMI/EMC requirement
Cable ties	Six cable ties for securing field cables to the unit
CTRL connector	Spare CTRL connector without resistor for CTRL wiring
CTRL connector with resistor	Spare CTRL connector with resistor for CTRL wiring
Quick Install Guide (QIG)	QIG for instructions on IQ Battery unit installation
OPTIONAL ACCESSORIES AND REPLACEMENT PARTS	
IQ8D-BAT-RMA	IQ8D-BAT Microinverter for field replacement
B05-T02-US00-1-3-RMA	IQ Battery 5P Battery unit for field replacement
B05-CX-0550-O	IQ Battery 5P cover for field replacement
B05-PI-0550-O	IQ Battery 5P pedestal mount
B05-CP-096-O	IQ Battery 5P conduit plates for field replacement. Includes one left-side and one right-side conduit plate
B05-WB-0543-O	IQ Battery 5P wall bracket for field replacement. Includes one wall-mount bracket and one top shield
IQBATTERY-HNDL-5	IQ Battery 5P lifting handles. Includes one left-side and one right-side lifting handle
B05-ACFB-080-O	IQ Battery 5P AC filter board for field replacement
B05-BMSNA-0490-O	IQ Battery 5P BMS board for field replacement
B05-CANB-063-O	IQ Battery 5P control communication board for field replacement
B05-NICS-0524-O, B05-NUCS-0524-O	IQ Battery 5P control switch preinstalled on the wiring cover for field replacement
OUTPUT [AC]	
Rated (continuous) output power	3.84 kVA
Peak output power	7.68 kVA (3 seconds), 6.14 kVA (10 seconds)
Nominal voltage/Range	240/211-264 VAC
Nominal frequency/Range	60/57-63 Hz
Rated output current (@240 VAC)	16 A
Peak output current (@240 VAC)	32 A (3 seconds), 25.6 A (10 seconds)
Power factor (adjustable)	0.85 leading...0.85 lagging
Maximum output overcurrent protection	20 A per unit
Interconnection	Single-phase
AC round-trip efficiency ²	90%
Chemistry	Lithium iron phosphate (LFP)
Altitude	Up to 2,500 meters (8,202 feet)
Mounting	Wall-mount or pedestal-mount (sold separately)

IQ Battery 5P

BATTERY	
Total capacity	5.0 kWh
Usable capacity	5.0 kWh
DC round-trip efficiency	96%
Nominal DC voltage	76.8 V
Maximum DC voltage	86.4 V
Ambient operating temperature range (charging)	-20°C to 50°C (-4°F to 122°F) non-condensing
Ambient operating temperature range (discharging)	-20°C to 55°C (-4°F to 131°F) non-condensing
Optimum operating temperature range	0°C to 30°C (32°F to 86°F)
Chemistry	Lithium iron phosphate (LFP)
MECHANICAL DATA	
Dimensions (HxWxD)	980 mm x 550 mm x 188 mm (38.6 in x 21.7 in x 7.4 in)
Lifting weight	66.3 kg (146.1 lbs)
Total installed weight	78.9 kg (174 lbs)
Enclosure	Outdoor-NEMA 3R
IQ8D-BAT Microinverter enclosure	NEMA type 6
Cooling	Natural convection
FEATURES AND COMPLIANCE	
Compatibility	Compatible with IQ and M Series Microinverters, IQ System Controller 3/3G, IQ Combiner 5/5C, IQ Gateway for grid-tied and backup operation
Communication	Wired control communication
Services	Backup, Self-Consumption, TOU, and NEM Integrity
Monitoring	Enphase Installer Platform and Enphase App monitoring options; API integration
Compliance	CA Rule 21 (UL 1741-SA), IEEE 1547:2018 (UL 1741-SB, 3rd Ed.) CAN/CSA C22.2 No. 107.1-16 UL 9540, UL 9540A, UN 38.3, UL 1998, UL 991, NEMA Type 3R, AC156 EMI: 47 CFR, Part 15, Class B, ICES 003 Cell Module: UL 1973, UN 38.3 Inverters: UL 62109-1, IEC 62109-2
LIMITED WARRANTY	
Limited warranty	>60% capacity, up to 15 years or 6,000 cycles ³



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SHEET NAME:

ENPHASE 5P BATTERY
SPECIFICATIONS

SHEET NUMBER:

APP.5



DATASHEET



IQ System Controller 3/3G

The Enphase IQ System Controller 3/3G connects the home to grid power, the IQ Battery system, and solar PV. It provides microgrid interconnect device (MID) functionality by automatically detecting and seamlessly transitioning the home energy system from grid power to backup power in the event of a grid failure. It consolidates interconnection equipment into a single enclosure and streamlines grid-independent capabilities of PV and storage installations by providing a consistent, pre-wired solution for residential applications.



IQ Series Microinverters

The high-powered smart grid-ready IQ Series Microinverters (M Series, IQ6, IQ7, and IQ8 Series) dramatically simplify the installation process



IQ Combiner 5/5C

Consolidates PV interconnection equipment into a single enclosure and streamlines IQ Series Microinverters and IQ Gateway installation by providing a consistent, pre-wired solution for residential applications



10-year limited warranty



IQ Battery 5P

Fully integrated AC battery system. Includes six field-replaceable IQ8D-BAT microinverters



IQ Load Controller

Helps prioritize essential appliances during a grid outage to optimize energy consumption and prolong battery life

Easy to install

- Connects to service entrance¹ or main load center
- Includes neutral-forming transformer
- Mounts on single stud with centered brackets
- Provides conduit entry from the bottom, left, or right
- Includes color-coded wires for ease of wiring the System Shutdown Switch
- Integrates hold-down functionality to eliminate the need for hold-down kits and special breakers

Flexible

- Can be used for Sunlight Backup, Home Essentials Backup, or Full Energy Independence
- IQ System Controller 3 integrates with IQ Battery 5P
- IQ System Controller 3G integrates with select AC standby generators. See the [Generator integration tech brief](#) for a list of generators
- Provides a seamless transition to backup

Safe and reliable

- System Shutdown Switch can be used to disconnect PV, battery, and generator systems
- System Shutdown Switch acts as a rapid shutdown initiator of grid-forming IQ8 PV Microinverters for the safety of maintenance technicians/first responders
- 10-year limited warranty

(1) IQ System Controller 3 is not suitable for use as service equipment in Canada.

IQSC-3-DSH-00021-3.0-EN-US-2023-08-08

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IQ System Controller 3/3G

DATASHEET

MODEL NUMBER		DESCRIPTION
SC200D11C240US01		IQ System Controller 3 streamlines the grid-independent capabilities of PV and storage installations. Integrates hold-down capability. Supports IQ Battery 5P units up to 40 kWh (without PCS*) and 80 kWh (with PCS*). Does not support generator integration
SC200G11C240US01		IQ System Controller 3G streamlines the grid-independent capabilities of PV and storage installations. Integrates hold-down capability. Supports IQ Battery 5P units up to 20 kWh (without PCS*) and 40 kWh (with PCS*). Supports generator integration
WHAT'S IN THE BOX		
IQ System Controller 3/3G		Includes neutral-forming transformer (NFT) and microgrid interconnect device (MID)
System Shutdown Switch		Includes pre-wired red, black, orange, and purple 12 AWG wire (EP200G-NA-02-RSD)
Wall-mounting bracket		Screws provided in the accessories kit for mounting
4-pole circuit breaker		Pre installed Quad breaker (BRK-20A40A-4P-240V), 20 A-40 A, 10 kAIC, Eaton BQC220240 [†]
Accessories kit		IQ System Controller 3/3G literature kit, including labels, CTRL headers, screws, filler plates, and Quick Install Guide (QIG) (EP200G-LITKIT)
OPTIONAL ACCESSORIES AND REPLACEMENT PARTS		
CT-200-SPLIT		200 A split core current transformers for metering (accuracy: ±2.5%) [‡]
CT-200-CLAMP		200 A clamp-type current transformers for metering (accuracy: ±2.5%) [‡]
Main or load circuit breakers (order separately, as needed) [†]		- BRK-100A-2P-240V: 2-pole, 100A, 25kAIC, CSR2100N or CSR2100 - BRK-125A-2P-240V: 2-pole, 125A, 25kAIC, CSR2125N - BRK-150A-2P-240V: 2-pole, 150A, 25kAIC, CSR2150N - BRK-175A-2P-240V: 2-pole, 175A, 25kAIC, CSR2175N - BRK-200A-2P-240V: 2-pole, 200A, 25kAIC, CSR2200N - BRK-20A-2P-240V-S: 2-pole, 20 A, 10 kAIC, BR220B/BR220 - BRK-30A-2P-240V-S: 2-pole, 30 A, 10 kAIC, BR230 - BRK-40A-2P-240V-S: 2-pole, 40 A, 10 kAIC, BR240B/BR240 - BRK-60A-2P-240V: 2-pole, 60 A, 10 kAIC, BR260 - BRK-80A-2P-240V: 2-pole, 80 A, 10 kAIC, BR280
Distributed energy resource (DER) circuit breakers (order separately, as needed) [§]		
EP200G-HNDL-R1		IQ System Controller 3/3G installation handle kit (order separately)
CTRL-SC3-NA-01		Control cable, 500 ft. spool (order separately)
ALTERNATE DER CIRCUIT BREAKERS		
GE/ABB		THQL21xx (20/40/60/80 A)
Siemens		Q2xx (20/40/60/80 A)
Siemens (quad breaker)		Q24020CT2 (20/40 A)
ELECTRICAL SPECIFICATIONS		
Nominal voltage/Range (L-L)		240 V ~ ±5/±20%
Voltage measurement accuracy		±1% V nominal (±1.2V L-N and ±2.4V L-L)
Auxiliary (dry) contact for load control, excess PV control, and generator two-wire control		24 V, 1 A
Nominal frequency/Range		60 Hz/56–63 Hz
Frequency measurement accuracy		±0.1 Hz
Maximum continuous current rating		160 A
Maximum input overcurrent protection device		200 A
Maximum output overcurrent protection device		200 A
Maximum overcurrent protection device rating for generator circuit		80 A (IQ System Controller 3G only – SC200G11C240US01)
Maximum overcurrent protection device rating for storage circuit		2 x 80 A (IQ System Controller 3 – SC200D11C240US01), 1 x 80 A (IQ System Controller 3G – SC200G11C240US01)

(2) Factory installed quad breaker (Siemens or Eaton), NFT pre-wired to 40 A terminal of the quad breaker.

(3) Two units of CT-200-SPLIT or CT-200-CLAMP must be bought separately for generator integration.

(4) The IQ System Controller 3 is rated at 22 kAIC.

(5) Integrated hold-down kit support breakers (BR230/BR230/BR240) without prefilled hole.

Integrated hold-down kit also supports GE/ABB and Siemens as mentioned under section alternate DER circuit breakers.

(6) "-" indicates alternating current (AC) supply.

(*) Power Control System.

IQSC-3-DSH-00021-3.0-EN-US-2023-08-08

DATASHEET

ELECTRICAL SPECIFICATIONS		
Maximum overcurrent protection device rating for PV combiner unit		80 A
Internal busbar rating		200 A
Neutral-forming transformer (NFT)		- Breaker rating (pre-installed): 40 A between L1 and Neutral; 40 A between L2 and Neutral - Continuous rated power: 3,600 VA - Maximum continuous unbalance current: 30 A @ 120 V - Peak unbalanced current: 80 A @ 120 V for two seconds
MECHANICAL DATA		
Dimensions (WxHxD)		50 cm x 91.6 cm x 24.6 cm (19.7 in x 36 in x 9.7 in)
Weight		39.4 kg (87 lbs)
Ambient temperature range		-40°C to 50°C (-40°F to 122°F)
Cooling		Natural convection and a heat shield
Enclosure environmental rating		Outdoor, NEMA type 3R, polycarbonate construction
Maximum altitude		2500 meters (8200 feet)
WIRE SIZES		
Connections (All lugs are rated to 90°C)	Main lugs and backup load lugs	Cu/Al: 6 AWG–300 kcmil
	CSR breaker bottom wiring lugs	Cu/Al: 2 AWG–300 kcmil
AC combiner lugs, IQ Battery lugs, and generator lugs	Neutral (large lugs)	Cu/Al: 6 AWG–300 kcmil
	Neutral (small lugs)	Cu/Al: 6 AWG–300 kcmil
Neutral and ground bars	Large holes (5/16–24 UNF)	14 AWG–1/0 AWG
	Small holes (1/8–32 UNF)	14 AWG–6 AWG
COMPLIANCE		
Compliance (under progress)		UL 1741, UL 1741 SA, IEEE 1547:2018 (UL 1741-SB, 3rd Ed.), UL 1741 PCS CRD, UL 1998, UL 869A, UL 675, UL 508 [†] , UL 50E [‡] , CSA 22.2 No. 107.1, 47 CFR Part 15 Class B, ICES 003, IEC ES AC156. The IQ System Controller 3/3G is approved for use as service equipment in the United States
WARRANTY		
Limited warranty (restrictions apply)		Up to 10 years (EP200G-NA-02-RSD has a 5-year warranty)
COMPATIBILITY*		
Battery		IQ Battery 5P (IQBATTERY-5P-1P-NA)
Microinverters		IQ8, IQ7, IQ6, and M Series Microinverters [§]
IQ Combiner		IQ Combiner 5/5C (X-IQ-AMI-240-5C, X-IQ-AMI-240-5)
Communications Kit 2		COMMS-KIT-02

(7) Sections from these standards were used during the safety evaluation and included in the UL 1741 listing.

(8) For more details, refer to IQ System Controller 3/3G Quick Install Guide.

(9) M Series Microinverters can only be supported in states that have not yet adopted IEEE 1547:2018.

Enphase does not support mixing IQ8 Series Microinverters with other series on the same IQ Gateway.



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BOB VACCARO
RESIDENCE

PROJECT ADDRESS:

504 E Jones St
Savannah, GA 31401

Date:	SEE P.E. STAMP
Designed By:	RHH
Reviewed by:	AKM
REVISION HISTORY	

DRAWING SCALE:

N.T.S.

SHEET NAME:

ENPHASE IQ SYSTEM
CONTROLLER III SPECIFICATION

SHEET NUMBER:

APP.6

MecaWind v2536

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Calculations Prepared by:

Date: Jan 29, 2026

File Location: C:\Users\user\mardiengineering.com\Amjad Mardi - Engineering Folder\
Sunlight Solar\2026\Bob Vaccaro (Georgia)\MW.wnd

General:

Reference Abbreviations: T: Table, F: Figure, E: Equation, \$: Section

Wind Load Standard	= ASCE 7-22	Basic Wind Speed	= 140.0 mph
Exposure Classification	= B	Risk Category	= II
Structure Type	= Solar Panels on Roof	Basis for Wind Pressures	= ASD
MWFRS Analysis Method	= Ch 29	C&C Analysis Method	= Ch 30 Pt 1
Dynamic Type of Structure	= Rigid	Advanced Options	= False

Solar Roof Panel Inputs

Section	= MWFRS Section		
h _{ny}	= Gap between Panel & Roof (-Y)	= 29.4.4	
h _{py}	= Gap between Panel & Roof (+Y)	= 3.6000 in	
L _p	= Panel Chord Length	= 3.6000 in	
W _p	= Panel Chord Width	= 67.8000 in	
ω	= Solar Panel Angle to Roof Surface	= 44.6500 in	
N _{rows}	= Number of Rows	= 0.00 °	
N _{cols}	= Number of Columns	= 2	
S _r	= Spacing between Rows	= 2	
S _c	= Spacing between Columns	= 0.2500 in	
X _{start}	= X Distance to Corner	= 0.2500 in	
Y _{start}	= Y Distance to Corner	= 1.0000 ft	
		= 1.0000 ft	

Exposure Constants [T:26.11-1]:

α = 3-s Gust-speed exponent	= 7.500	Z _g = Nominal Ht of Boundary Layer	= 3280.000 ft
â = Reciprocal of α	= 0.133	b = 3 sec gust speed factor	= 0.840
α _m = Mean hourly Wind-Speed Exponent	= 0.222	b _m = Mean hourly Windspeed Exponent	= 0.470
c = Turbulence Intensity Factor	= 0.300	ε = Integral Length Scale Exponent	= 0.3333

Building:

Roof = Roof Type	= Gabled	Encl = Enclosure Classification	= Enclosed
IsCust = Custom Roof	= False	W = Building Width	= 22.0833 ft
L = Building Length	= 36.6700 ft	R _{Ht} = Ridge Height	= 12.761 ft
E _{Ht} = Eave Height	= 10.000 ft	Pitch = Pitch of Roof	= 3.0 :12
θ = Slope of Roof	= 14.04 °	OH = Overhang Configuration	= All Overhang
z _i = Highest Opening Elevation	= 0.0000 ft	HT _{over} = Override Mean Roof Height	= False
Ht _{man} = Mean Roof Height	= 11.381 ft	RA _{over} = Override Roof Area	= False
GC _{pi_o} = Override GC _{pi} value	= False	IsElev = Building is Elevated	= False

Gust Factor Calculation for Wind:

Gust Factor Category I Rigid Structures - Simplified Method

G₁ = Simplified: For Rigid Structures can use 0.85 = 0.85

Gust Factor Category II Rigid Structures - Complete Analysis

Z_m = Equiv Struc Height: Max(0.6•h, Z_{min}) = 30.000 ft
I_{zm} = Turbulence Intensity: c•(33/Z_m)^{1/6} [E:26.11-7] = 0.305
L_{zm} = Turbulence Integral Length Scale: l•(Z_m/33)^c [E:26.11-9] = 309.993 ft
B = Avg Structure Width Normal to Wind Direction = 22.083 ft
Q = [1/(1+0.63•[(B+h)/L_{zm}]^{0.63})]^{0.5} [E:26.11-8] = 0.930
G₂ = Detailed: 0.925•[(1+1.7•g_q•I_{zm}•Q)/(1+1.7•g_v•I_{zm})] [E:26.11-6] = 0.884

Gust Factor Used in Analysis

G = Gust Factor: Min(G₁, G₂) = 0.850

Main Wind Force Resisting System (MWFRS) Wind Calculations for Solar Panels on Roof per §29.4

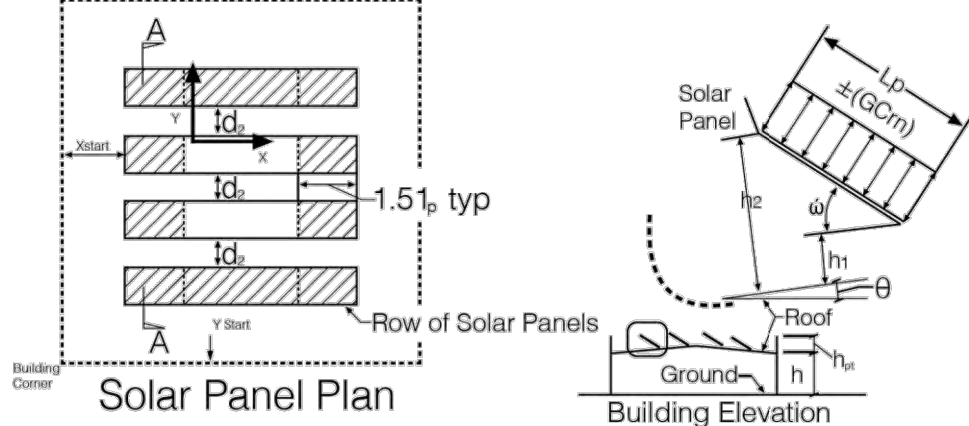
h = Mean structure height	= 11.381 ft	K _h = 2.41•(15/Z _g) ^{2/a} _{T:26.10-1}	= 0.573
K _{zt} = No Topographic Feature	= 1.000	K _d = Directionality Factor _{T:26.6-1}	= 0.85
LF = ASD Load Factor	= 0.60	K _e = Ground Elev Factor _{T:26.10-1}	= 1.000
q _h = .00256•K _h •K _{zt} •K _e •V ² •LF _{E:26.10-1}	= 17.25 psf		

Gust Factor Calculation for Wind:

Gust Factor Category I Rigid Structures - Simplified Method

G₁ = Simplified: For Rigid Structures can use 0.85 = 0.85
Gust Factor Category II Rigid Structures - Complete Analysis
Z_m = Equiv Struc Height: Max(0.6•h, Z_{min}) = 30.000 ft
I_{zm} = Turbulence Intensity: c•(33/Z_m)^{1/6} [E:26.11-7] = 0.305
L_{zm} = Turbulence Integral Length Scale: l•(Z_m/33)^c [E:26.11-9] = 309.993 ft
B = Avg Structure Width Normal to Wind Direction = 22.083 ft
Q = [1/(1+0.63•[(B+h)/L_{zm}]^{0.63})]^{0.5} [E:26.11-8] = 0.930
G₂ = Detailed: 0.925•[(1+1.7•g_q•I_{zm}•Q)/(1+1.7•g_v•I_{zm})] [E:26.11-6] = 0.884
Gust Factor Used in Analysis
G = Gust Factor: Min(G₁, G₂) = 0.850

Wind Loads on Solar Panel(s) Per §29.4.4

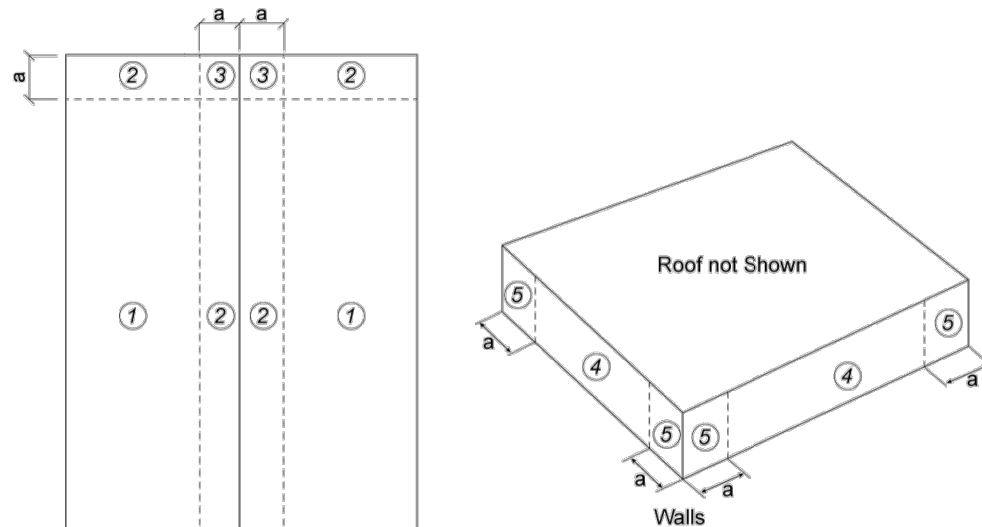


h = Mean Roof Height = 11.3806 ft
a = Width for Zone 2 and 3 determination (Per C&C Figure) = 3.0000 ft
h/2 = Width used to determine if Exposed: h/2 = 5.6903 ft
h₁ = Dist from Roof to Lower Panel Edge: Min(h_{ny}, h_{py}) = 3.6000 in
h₂ = Dist from Roof to Upper Panel Edge: Max(h_{ny}, h_{py}) = 3.6000 in
d_{1,limit} = d₁ limit for adjacent panels: 4 ft [1.2 m] = 48.0000 in
h_{pc} = Height of Parapet = 0.0000 in
ω = Solar Panel Angle to Roof Surface = 0.00 °
1.5L_p = Distance from end considered exposed: 1.5•L_p = 101.7000 in
q_h = 0.00256•K_h•K_{zt}•K_e•V²•LF _{E:26.10-1} = 17.25 psf
LF = ASD Load Factor = 0.60
θ = Roof Slope = 14.04 °
A = Area of One Panel: L_p•W_p = 21.02 ft²
Gap = Min(S_r, S_c) [S_r=0.2500 in, S_c=0.2500 in] = 0.2500 in
Y_{rup} = Solar Panel Press Equalization Factor for Gap [F:29.4-8] = 0.671
Y_{az} = Solar Panel Press Equalization Factor for H2 [F:29.4-8] = 0.535
Y_a = Solar Panel Press Equalization Factor [F:29.4-8] = 0.603
The array shall be located 2•h₂ (0.6000 ft) from roof edge, a gable ridge, or a hip ridge.

Solar Panel Exposure Criteria:

A panel is considered 'Exposed' if it meets the following criteria:
The distance d₁ to roof edge > 0.5h and at least one of these is met:

- 1) The distance to adjacent solar array d₁ is > 2•h₂
- 2) The distance to adjacent panel d₁ > 2•h₂



Wind Pressures For Solar Panel(s) [§29.4.4] All wind pressures include a Load Factor (LF) of 0.6								
Zone	Exposed	Y _{rup}	Y _{down}	GC _p Fig	GC _{p uplift}	GC _{p down}	P _{up lift} psf	P _{down} psf
1	Yes	1.500	1.000	F:30.3-2B	-1.672	0.526	-22.18	4.65
2	Yes	1.500	1.000	F:30.3-2B	-2.278	0.526	-30.22	4.65
3	Yes	1.500	1.000	F:30.3-2B	-3.019	0.526	-40.05	4.65
1_OH	Yes	1.500	1.000	F:30.3-2B/F:30.3-1	-2.615	0.000	-34.69	0.00
2_OH	Yes	1.500	1.000	F:30.3-2B/F:30.3-1	-3.221	0.000	-42.73	0.00
3_OH	Yes	1.500	1.000	F:30.3-2B/F:30.3-1	-3.962	0.000	-52.56	0.00
1	No	1.000	1.000	F:30.3-2B	-1.672	0.526	-14.79	4.65
2	No	1.000	1.000	F:30.3-2B	-2.278	0.526	-20.15	4.65
3	No	1.000	1.000	F:30.3-2B	-3.019	0.526	-26.70	4.65
1_OH	No	1.000	1.000	F:30.3-2B/F:30.3-1	-2.615	0.000	-23.13	0.00
2_OH	No	1.000	1.000	F:30.3-2B/F:30.3-1	-3.221	0.000	-28.49	0.00
3_OH	No	1.000	1.000	F:30.3-2B/F:30.3-1	-3.962	0.000	-35.04	0.00

Notes:
Zone = Zone based upon 'GCP Fig'
Y_{rup} = Uplift Factor per E:29.4-7
GC_p = Nominal press coeff per 'GCP Fig'
P_{down} = Wind Pressure: q_s•K_e•GC_{p down}•Y_{rup}•GA _{E:29.4-7}
+Press = Pressure Acting Toward Surface
• Origin of X/Y system is at the geometric center of the building
• The array shall be located 2•h₂ (0.6000 ft) from roof edge, a gable ridge, or a hip ridge.
• The roof shall be designed for both of the following:
1) The case where solar collectors are present. Solar panel loads applied simultaneously with roof wind pressures per normal roof design without those roof pressures applied to sections of the roof where solar panels are not covering roof.
2) Case where solar arrays have been removed.

Exposed = Exposed panel per E:29.4-7
Y_{down} = Down force Factor per E:29.4-7
P_{up lift} = Wind Pressure: q_s•K_e•GC_{p uplift}•Y_{rup}•GA _{E:29.4-7}
Area = Zone Area based upon one panel: 21.02 ft²
-Press = Pressure Acting Away from Surface



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BOB VACCARO
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PROJECT ADDRESS:

504 E Jones St
Savannah, GA 31401

Date:	SEE P.E. STAMP
Designed By:	RHH
Reviewed by:	AKM
REVISION HISTORY	

DRAWING SCALE:

N.T.S.

SHEET NAME:

WIND SIMULATION

SHEET NUMBER:

APP.7

SnapNrack UltraFoot Deck

CHEMLINK M-1 SEALANT



Total Quality. Assured.

130 Derry Court
York, Pennsylvania 17406

Telephone: 717-764-7700
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TEST REPORT FOR SNR SOLAR LLC. DBA SNAPNRACK

Report No.: S1170.01-109-18 R1

Date: 01/21/25

Revision 1: 02/04/25

REPORT ISSUED TO:

SNR SOLAR LLC. DBA SNAPNRACK

775 Fiero Lane, Suite 200

San Luis Obispo, California 93401

UPPER HALF

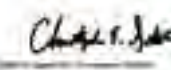
SCOPE

Architectural Testing, Inc. (an Intertek company) dba Intertek Building & Construction (B&C) was contracted by SNR Solar LLC. dba SnapNrack to perform TAS 100(A) testing in accordance with Miami-Dade County requirements on their UltraFoot, Deck, in rafter and deck mounted configurations (Specimen A & B). Results obtained are tested values and were secured by using the designated test method(s). Testing was conducted at the Intertek B&C test facility in York, Pennsylvania.

For INTERTEK B&C:

COMPLETED BY: Christopher E. Sartalis

TITLE: Technician – Product Testing

SIGNATURE: 

DATE: 02/04/25

CES/mas

REVIEWED BY: Tanya A. Dolby, P.E.

TITLE: Engineering Manager – Engineering Services

SIGNATURE: 

DATE: 02/04/25

2025.02.06 09:41:48 -05'00'



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Version: 06/05/24 Page 2 of 18 RT-R-AMER-Test-7808



DEPARTMENT OF REGULATORY AND ECONOMIC RESOURCES (RER)
BOARD AND CODE ADMINISTRATION DIVISION
NOTICE OF ACCEPTANCE (NOA)

MIAMI-DADE COUNTY
PRODUCT CONTROL SECTION
11805 SW 26 Street, Room 208
Miami, Florida 33175-2474
T (786) 315-2590 F (786) 315-2599
www.miamidade.gov/economy

Chem Link, Inc.
392 E. Lyon Street
Schoolcraft, MI. 49087

SCOPE:
This NOA is being issued under the applicable rules and regulations governing the use of construction materials. The documentation submitted has been reviewed and accepted by Miami-Dade County RER - Product Control Section to be used in Miami Dade County and other areas where allowed by the Authority Having Jurisdiction (AHJ).

This NOA shall not be valid after the expiration date stated below. The Miami-Dade County Product Control Section (in Miami-Dade County) and/or the AHJ (in areas other than Miami-Dade County) reserve the right to have this product or material tested for quality assurance purposes. If this product or material fails to perform in the accepted manner, the manufacturer will incur the expense of such testing and the AHJ may immediately revoke, modify, or suspend the use of such product or material within their jurisdiction. RER reserves the right to revoke this acceptance, if it is determined by Miami-Dade County Product Control Section that this product or material fails to meet the requirements of the applicable building code.

This product is approved as described herein, and has been designed to comply with the Florida Building Code including the High Velocity Hurricane Zone of the Florida Building Code.

DESCRIPTION: M-1

LABELING: Each unit shall bear a permanent label with the manufacturer's name or logo, city, state and following statement: "Miami-Dade County Product Control Approved", unless otherwise noted herein.

RENEWAL of this NOA shall be considered after a renewal application has been filed and there has been no change in the applicable building code negatively affecting the performance of this product.

TERMINATION of this NOA will occur after the expiration date or if there has been a revision or change in the materials, use, and/or manufacture of the product or process. Misuse of this NOA as an endorsement of any product, for sales, advertising or any other purposes shall automatically terminate this NOA. Failure to comply with any section of this NOA shall be cause for termination and removal of NOA.

ADVERTISEMENT: The NOA number preceded by the words Miami-Dade County, Florida, and followed by the expiration date may be displayed in advertising literature. If any portion of the NOA is displayed, then it shall be done in its entirety.

INSPECTION: A copy of this entire NOA shall be provided to the user by the manufacturer or its distributors and shall be available for inspection at the job site at the request of the Building Official.

This NOA renews NOA# 19-0709.02 and consists of pages 1 through 3.
The submitted documentation was reviewed by Alex Tigera.



09/12/24



NOA No.: 23-1016.04
Expiration Date: 09/19/29
Approval Date: 09/12/24
Page 1 of 3



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REVISION HISTORY	

DRAWING SCALE:

N.T.S.

SHEET NAME:

PRODUCT APPROVALS

SHEET NUMBER:

APP.8