PLAN KEY	
PV-1	COVER PAGE
PV-1.1	INVERTER SPECS
PV-1.2	COMBINER SPECS
PV-1.3	PANEL SPECS
PV-2	SITE PLAN
PV-2.1	ZONING DETAIL
PV-2.2	PANEL LAYOUT
PV-3	LAYOUT DETAIL
PV-3.1	FOOTING DETAIL
PV-4	THREE LINE DIAGRAM
PV-4.1	ELECTRICAL CONT.
PV-4.2	EQUIPMENT LABELS
PV-4.3	FEMA FLOOD ZONE

HANWHA Q.PEAK DUO BLK ML-G10+ 410
410 WATT MODULE
74'' X 41.1'' X 1.26''
(SEE DATASHEET)

BILL OF MATERIALS	
MODULES	28
INVERTERS	28
COUPLING ASSEMBLY	36
ENPHASE COMBINER BOX	1
EATON 60A FUSIBLE AC DISCONNECT	3
45A FUSES	6
125A LINE TAPS	2

SYSTEM INFORMATION	
MODULE	HANWHA Q.PEAK DUO BLK ML-G10+ 410
INVERTER	ENPHASE IQ8PLUS-72-2-US
RACKING	IRONRIDGE GROUND MOUNT
SYSTEM SIZE (DC)	11.48 KW
LOCATION	30.1320072,-82.5985021

GENERAL NOTES:

THIS PV SYSTEM HAS BEEN DESIGNED TO MEET THE MINIMUM DESIGN STANDARDS FOR BUILDING AND OTHER STRUCTURES OF THE ASCE 7-22, 8TH EDITION 2023 FLORIDA RESIDENTIAL CODE, 8TH EDITION 2023 FLORIDA BUILDING CODE, 8TH EDITION 2023 FLORIDA FIRE PREVENTION CODE, NEC 2020 AND ALL LOCAL CODES & ORDINANCES.

ALL DESIGN, CALCULATIONS ARE PERFORMED BY DANIEL DUNZIK REGISTERED ARCHITECT. FLORIDA STATE STATUTE 471.003(3) PROVIDES THAT LICENSED ARCHITECTS ARE EXEMPTED FROM THE PROVISIONS OF CHAPTER 471 ENGINEERING AND NOT PRECLUDED FROM PERFORMING ENGINEERING SERVICES FOR INTEGRATED SYSTEMS AND SERVICES THAT ARE INCIDENTAL TO BUILDINGS AND STRUCTURES.

INVERTER PLACEMENT:

SYSTEM UTILIZES "ENPHASE" MICRO-INVERTERS WITH RAPID SHUTDOWN CONTROL LOCATED ON THE BACK SIDE OF EACH MODULE.

CLIMATIC & GEOGRAPHIC DESIGN CRITERIA TABLE R301.2(1)	
SPEED (MPH)	140
TOPOGRAPHIC EFFECTS	B
SPECIAL WIND REGION	NO
WIND BORNE DEBRIS ZONE	2
SEISMIC DESIGN CATEGORY	C
CLIMATE ZONE	2A
WIND EXPOSURE CATETORY	B

FBC, RESIDENTIAL 2020

TABLE R301.2.1.3

WIND SPEED CONVERSIONS[a]

V_{ult}	110	115	120	130	140	150	160	170	180	190	200
V_{asd}	85	89	93	101	108	116	124	132	139	147	155

For SI: 1 mile per hour = 0.447 m/s.

a. Linear interpolation is permitted.

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CUSTOMER INFORMATION

VICTORIA LHEUREUX - MS162993
2656 SOUTHEAST COUNTY ROAD 252
LAKE CITY, FL 32025
3866282461

PV SYSTEM INFORMATION

SYSTEM SIZE (DC): 11.48 KW
28 MODULES: HANWHA Q.PEAK DUO BLK ML-G10+ 410
28 INVERTERS: ENPHASE IQ8PLUS-72-2-US

PROJECT INFORMATION

INITIAL	DATE: 1/13/2025	DESIGNER: ZK
REV:	DATE:	DESIGNER:
REV:	DATE:	DESIGNER:

COVER PAGE

PV-1

ENPHASE.

DATA SHEET

IQ8 and IQ8+ 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.

Enphase 25 year limited warranty

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.

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

UL CERTIFIED SAFETY

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

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

IQ8SP-DS-0002-01-EN-US-2022-03-17

* Only when installed with IQ System Controller 2, meets UL 1741.
** IQ8 and IQ8Plus supports split phase, 240V installations only.

IQ8 and IQ8+ Microinverters

INPUT DATA (DC)		IQ8-60-2-US	IQ8PLUS-72-2-US
Commonly used module pairings[1]	W	235 – 350	235 – 440
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
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[2] [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**
Peak output power	VA	245	300
Max continuous output power	VA	240	290
Nominal (L-L) voltage/range[3]	V	240 / 211 – 264	
Max continuous output current	A	1.0	1.21
Nominal frequency	Hz	60	
Extended frequency range	Hz	50 – 68	
AC short circuit fault current over 3 cycles	Arms	2	
Max units per 20 A (L-L) branch circuit[4]		16	13
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
CEC weighted efficiency	%	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) No enforced DC/AC ratio. See the compatibility calculator at https://link.enphase.com/module-compatibility
(2) Maximum continuous input DC current is 10.6A (3) Nominal voltage range can be extended beyond nominal if required by the utility. (4) Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

IQ8SP-DS-0002-01-EN-US-2022-03-17

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INVERTER SPECS

PV-1.1

Data Sheet
Enphase Networking

IQ Combiner 4/4C

X-IQ-AM1-240-4C
X2-IQ-AM1-240-4C (IEEE 1547:2018)

X-IQ-AM1-240-4
X2-IQ-AM1-240-4 (IEEE 1547:2018)

The **IQ Combiner 4/4C** with IQ Gateway and integrated LTE-M1 cell modem (included only with IQ Combiner 4C) consolidates interconnection equipment into a single enclosure. It streamlines IQ Microinverters and storage installations by providing a consistent, pre-wired solution for residential applications. It offers up to four 2-pole input circuits and Eaton BR series busbar assembly.

Smart

- Includes IQ Gateway for communication and control
- Includes Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), included only with IQ Combiner 4C
- Includes solar shield to match Enphase IQ Battery aesthetics and deflect heat
- Supports Wi-Fi, Ethernet, or cellular connectivity
- Optional AC receptacle available for PLC bridge
- Provides production metering and consumption monitoring

Simple

- Mounts on single stud with centered brackets
- Supports bottom, back and side conduit entry
- Allows up to four 2-pole branch circuits for 240VAC plug-in breakers (not included)
- 80A total PV or storage branch circuits

Reliable

- Durable NRTL-certified NEMA type 3R enclosure
- Five-year limited warranty
- Two years labor reimbursement program coverage included for both the IQ Combiner SKU's
- UL listed
- X2-IQ-AM1-240-4 and X2-IQ-AM1-240-4C comply with IEEE 1547:2018 (UL 1741-SB, 3rd Ed.)

UL LISTED

To learn more about Enphase offerings, visit enphase.com
IQ-C-4-4C-DS-0103-EN-US-12-29-2022

ENPHASE.

IQ Combiner 4/4C

MODEL NUMBER	
IQ Combiner 4 X-IQ-AM1-240-4 X2-IQ-AM1-240-4 (IEEE 1547:2018)	IQ Combiner 4 with IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 ± 0.5%) and consumption monitoring (± 2.5%). Includes a silver solar shield to match the IQ Battery and IQ System Controller 2 and to deflect heat.
IQ Combiner 4C X-IQ-AM1-240-4C X2-IQ-AM1-240-4C (IEEE 1547:2018)	IQ Combiner 4C with IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 ± 0.5%) and consumption monitoring (± 2.5%). Includes Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), a plug-and-play industrial-grade cell modem for systems up to 60 microinverters. (Available in the US, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.) Includes a silver solar shield to match the IQ Battery and IQ System Controller and to deflect heat.
ACCESSORIES AND REPLACEMENT PARTS	(not included, order separately)
Supported microinverters	IQ6, IQ7, and IQ8. (Do not mix IQ6/7 Microinverters with IQ8)
Communications Kit COMMS-CELLMODEM-M1-06 CELLMODEM-M1-06-SP-05 CELLMODEM-M1-06-AT-05	- Includes COMMS-KIT-01 and CELLMODEM-M1-06-SP-05 with 5-year Sprint data plan - 4G based LTE-M1 cellular modem with 5-year Sprint data plan - 4G based LTE-M1 cellular modem with 5-year AT&T data plan
Circuit Breakers BRK-10A-2-240V BRK-15A-2-240V BRK-20A-2P-240V BRK-15A-2P-240V-B BRK-20A-2P-240V-B	Supports Eaton BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers. Circuit breaker, 2 pole, 10A, Eaton BR210 Circuit breaker, 2 pole, 15A, Eaton BR215 Circuit breaker, 2 pole, 20A, Eaton BR220 Circuit breaker, 2 pole, 15A, Eaton BR215B with hold down kit support Circuit breaker, 2 pole, 20A, Eaton BR220B with hold down kit support
XA-SOLARSHIELD-ES	Replacement solar shield for IQ Combiner 4/4C
XA-PLUG-120-3	Accessory receptacle for Power Line Carrier in IQ Combiner 4/4C (required for EPLC-01)
X-IQ-NA-HD-125A	Hold-down kit for Eaton circuit breaker with screws
Consumption monitoring CT (CT-200-SPLIT/CT-200-CLAMP)	A pair of 200A split core current transformers
ELECTRICAL SPECIFICATIONS	
Rating	Continuous duty
System voltage	120/240VAC, 60 Hz
Eaton BR series busbar rating	125A
Max. continuous current rating	65A
Max. continuous current rating (input from PV/storage)	64A
Max. fuse/circuit rating (output)	90A
Branch circuits (solar and/or storage)	Up to four 2-pole Eaton BR series Distributed Generation (DG) breakers only (not included)
Max. total branch circuit breaker rating (input)	80A of distributed generation/95A with IQ Gateway breaker included
IQ Gateway breaker	10A or 15A rating GE/Siemens/Eaton included
Production metering CT	200A solid core pre-installed and wired to IQ Gateway
MECHANICAL DATA	
Dimensions (WxHxD)	37.5 cm x 49.5 cm x 16.8 cm (14.75 in x 19.5 in x 6.63 in). Height is 53.5 cm (21.06 in) with mounting brackets.
Weight	7.5 kg (16.5 lbs)
Ambient temperature range	-40°C to +46°C (-40°F to 115°F)
Cooling	Natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire sizes	• 20A to 50A breaker inputs: 14 to 4 AWG copper conductors • 60A breaker branch input: 4 to 1/0 AWG copper conductors • Main lug combined output: 10 to 2/0 AWG copper conductors • Neutral and ground: 14 to 1/0 copper conductors • Always follow local code requirements for conductor sizing.
Altitude	Up to 3,000 meters (9,842 feet)
INTERNET CONNECTION OPTIONS	
Integrated Wi-Fi	IEEE 802.11b/g/n
Cellular	CELLMODEM-M1-06-SP-05, CELLMODEM-M1-06-AT-05 (4G based LTE-M1 cellular modem). Note that an Mobile Connect cellular modem is required for all Enphase Energy System installations.
Ethernet	Optional, IEEE 802.3, Cat5E (or Cat6) UTP Ethernet cable (not included)
COMPLIANCE	
Compliance, IQ Combiner	CA Rule 21 (UL 1741-SA) IEEE 1547:2018 - UL 1741-SB, 3rd Ed. (X2-IQ-AM1-240-4 and X2-IQ-AM1-240-4C) CAN/CSA C22.2 No. 107.1, Title 47 CFR, Part 15, Class B, ICES 003 Production metering: ANSI C12.20 accuracy class 0.5 (PV production) Consumption metering: accuracy class 2.5
Compliance, IQ Gateway	UL 60601-1/CANCSA 22.2 No. 61010-1

IQ-C-4-4C-DS-0103-EN-US-12-29-2022

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28 MODULES: HANWHA Q.PEAK DUO BLK ML-G10+ 410
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PROJECT INFORMATION

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REV:	DATE:	DESIGNER:
REV:	DATE:	DESIGNER:

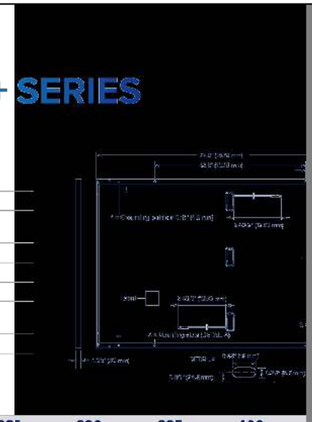
COMBINER SPECS

PV-1.2

Q.PEAK DUO BLK ML-G10+ SERIES

Mechanical Specification

Format	74.0 in × 41.1 in × 1.26 in (including frame) (1879 mm × 1045 mm × 32 mm)
Weight	48.5 lbs (22.0 kg)
Front Cover	0.13 in (3.2 mm) thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Black anodised aluminium
Cell	6 × 22 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 mm² Solar cable; (+) ≥ 49.2 in (1250 mm), (−) ≥ 49.2 in (1250 mm)
Connector	Stäubli MC4; IP68

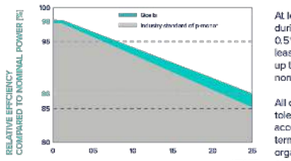


Electrical Characteristics

POWER CLASS			385	390	395	400
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC (POWER TOLERANCE +5 W / −0 W)						
Minimum — Power at MPP[1]	P_{MPP}	[W]	385	390	395	400
Minimum — Short Circuit Current[1]	I_{SC}	[A]	11.04	11.07	11.10	11.14
Minimum — Open Circuit Voltage[1]	V_{OC}	[V]	45.13	45.23	45.27	45.30
Minimum — Current at MPP	I_{MPP}	[A]	10.58	10.62	10.71	10.77
Minimum — Voltage at MPP	V_{MPP}	[V]	36.38	36.62	36.88	37.13
Minimum — Efficiency[1]	η	[%]	≥19.8	≥20.0	≥20.1	≥20.4
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT[2]						
Minimum — Power at MPP	P_{MPP}	[W]	288.3	292.2	296.0	300.1
Minimum — Short Circuit Current	I_{SC}	[A]	8.92	8.95	8.97	9.00
Minimum — Open Circuit Voltage	V_{OC}	[V]	42.64	42.82	42.89	42.92
Minimum — Current at MPP	I_{MPP}	[A]	8.35	8.41	8.45	8.51
Minimum — Voltage at MPP	V_{MPP}	[V]	34.53	34.81	35.03	35.26

[1] Measurement tolerances P_{MPP} ±3 %; I_{SC}; V_{OC} ±5 % at STC: 1000 W/m², 25 ±2 °C, AM 1.5 according to IEC 60904-3 • [2] 800 W/m², NMOT, spectrum AM 1.5

Qcells PERFORMANCE WARRANTY

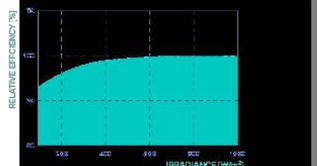


At least 98 % of nominal power during first year. Thereafter max. 0.5 % degradation per year. At least 93.5 % of nominal power up to 10 years. At least 86 % of nominal power up to 25 years.

All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Qcells sales organisation 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/m²).

TEMPERATURE COEFFICIENTS

Temperature Coefficient of I_{SC}	α	[%/K]	+0.04
Temperature Coefficient of P_{MPP}	γ	[%/K]	−0.34

Properties for System Design

Maximum System Voltage	V_{SYS}	[V]	1000 (IEC)/1000 (UL)
Maximum Series Fuse Rating		[A DC]	20
Max. Design Load, Push / Pull[3]		[lbs / ft²]	75 (3600 Pa) / 55 (2660 Pa)
Max. Test Load, Push / Pull[3]		[lbs / ft²]	113 (5400 Pa) / 84 (4000 Pa)

[3] See Installation Manual

Qualifications and Certificates

UL 61730, CE-compliant,
Quality Controlled PV - TÜV Rheinland,
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 Americas Inc. 400 Spectrum Center Drive, Suite 1400, Irvine, CA 92618, USA | TEL +1 949 748 59 96 | EMAIL inquiry@hanwhaqcells.com | WEB www.q-cells.com

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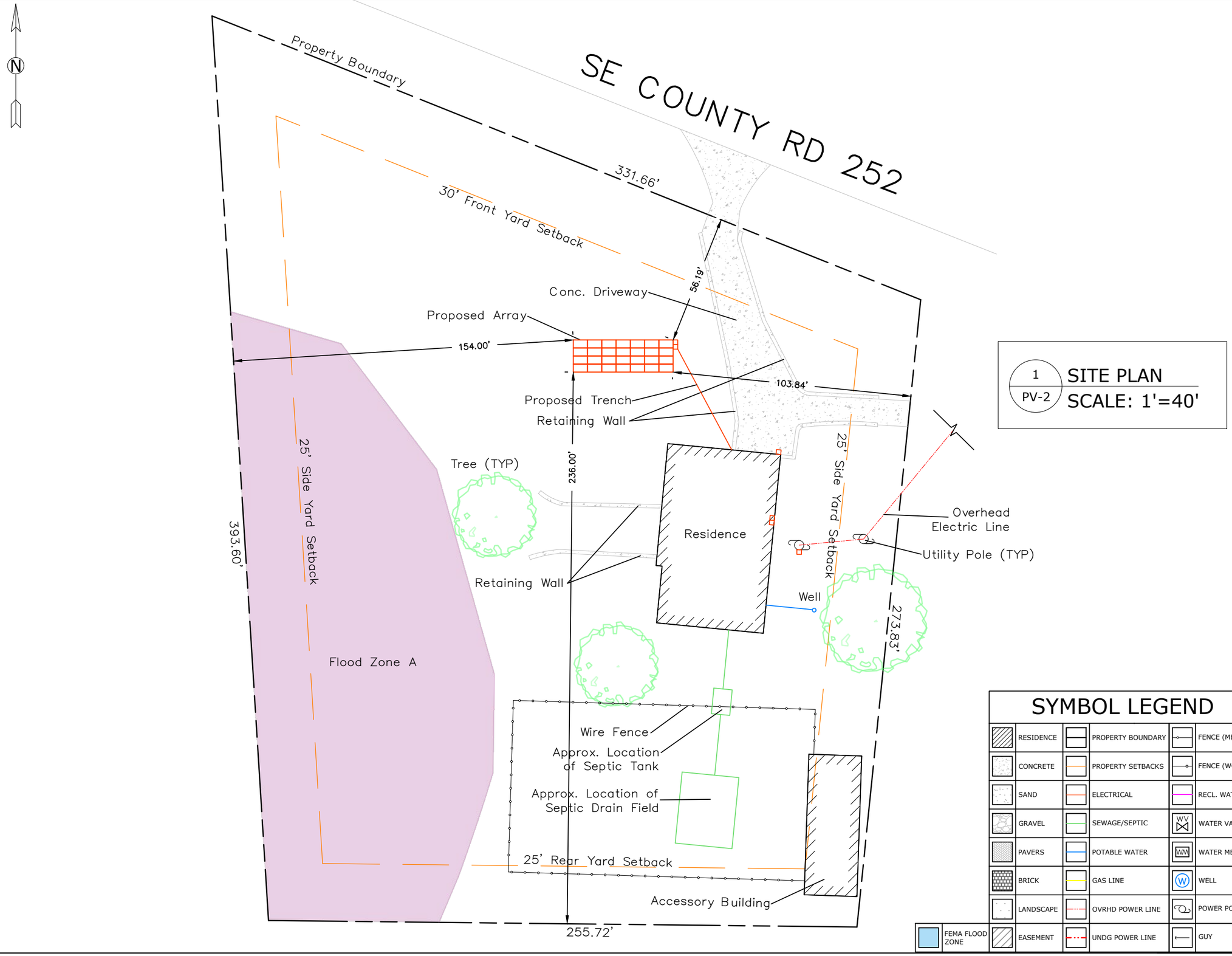
PANEL SPECS

PV-1.3



1 / PV-2 SITE PLAN
SCALE: 1'=40'

SYMBOL LEGEND

RESIDENCE	PROPERTY BOUNDARY	FENCE (METAL)
CONCRETE	PROPERTY SETBACKS	FENCE (WOOD)
SAND	ELECTRICAL	RECL. WATER
GRAVEL	SEWAGE/SEPTIC	WATER VALVE
PAVERS	POTABLE WATER	WATER METER
BRICK	GAS LINE	WELL
LANDSCAPE	OVRHD POWER LINE	POWER POLE
FEMA FLOOD ZONE	EASEMENT	UNDG POWER LINE	GUY

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SOLAR CONTRACTOR

CAMERON CHRISTENSEN
CERTIFIED SOLAR CONTRACTOR
LICENSE NUMBER: CVC57036,
5728 MAJOR BLVD. SUITE 307
ORLANDO, FL 32819

CUSTOMER INFORMATION

VICTORIA LHEUREUX - MS162993
2656 SOUTHEAST COUNTY ROAD 252
LAKE CITY, FL 32025
3866282461

PV SYSTEM INFORMATION

SYSTEM SIZE (DC): 11.48 KW
28 MODULES: HANWHA Q.PEAK DUO BLK ML-G10+ 410
28 INVERTERS: ENPHASE IQ8PLUS-72-2-US

PROJECT INFORMATION

INITIAL	DATE: 1/13/2025	DESIGNER: ZK
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SITE PLAN

PV-2

ZONING DATA	
ZONING JURISDICTION:	COUNTY OF COLUMBIA, FL
ZONING DISTRICT:	AGRICULTURAL: A-3
ZONING ORDINANCE:	Sec. 4.5
PROPOSED ACCESSORY USE:	GROUND MOUNT SOLAR ARRAY
PROPOSED USE PERMITTED:	NOT EXPRESSLY PERMITTED

PROPERTY DATA	
USE DESCRIPTION	RESIDENTIAL
ACREAGE:	1.75
SQUARE FOOTAGE:	76230.00
PRINCIPAL BUILDING:	1-STORY DWELLING
ACCESSORY STRUCTURES:	1- ACCESSORY BUILDING
PROPOSED ACCESSORY. STR.:	1 SMALL GROUND SOLAR

EXISTING LOT COVERAGE DATA		
STRUCTURE	SQFT	PERCENT
PRINCIPAL STRUCTURE	3773	4.95%
DRIVEWAY	3288	4.31%
ACCESSORY BUILDING	1402.00	1.84%

PROPOSED LOT COVERAGE DATA		
STRUCTURES	SQFT	PERCENT
GROUND SOLAR ARRAY	606.00	0.79%

PROPOSED TOTAL LOT COVERAGE DATA SUMMARY		
STRUCTURES	SQFT	PERCENT
EXISTING PRINCIPAL STRUCTURE:	3773.00	4.95%
EXISTING ACCESSORY STRUCTURES:	1402.00	1.84%
EXISTING SURFACE COVERAGE:	3288.00	4.31%
PROPOSED ACCESSORY STRUCTURES:	606.00	0.79%
PROPOSED TOTAL LOT COVERAGE:	9069.00	11.90%

AREA AND BULK REQUIREMENTS	REQUIRED	PROPOSED	COMPLIANCE
MINIMUM FRONT YARD SETBACK	30'	56.19'	YES
MINIMUM SIDE YARD SETBACK	25'	103.48'	YES
MINIMUM SIDE YARD SETBACK	25'	154.00'	YES
MINIMUM REAR YARD SETBACK	25'	236.00'	YES
MAXIMUM HEIGHT	35'	6.75'	YES
MAXIMUM BUILDING COVERAGE	20%	11.90%	YES

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MINA A. MAKAR LICENSE No PE86753 STATE OF FLORIDA PROFESSIONAL ENGINEER

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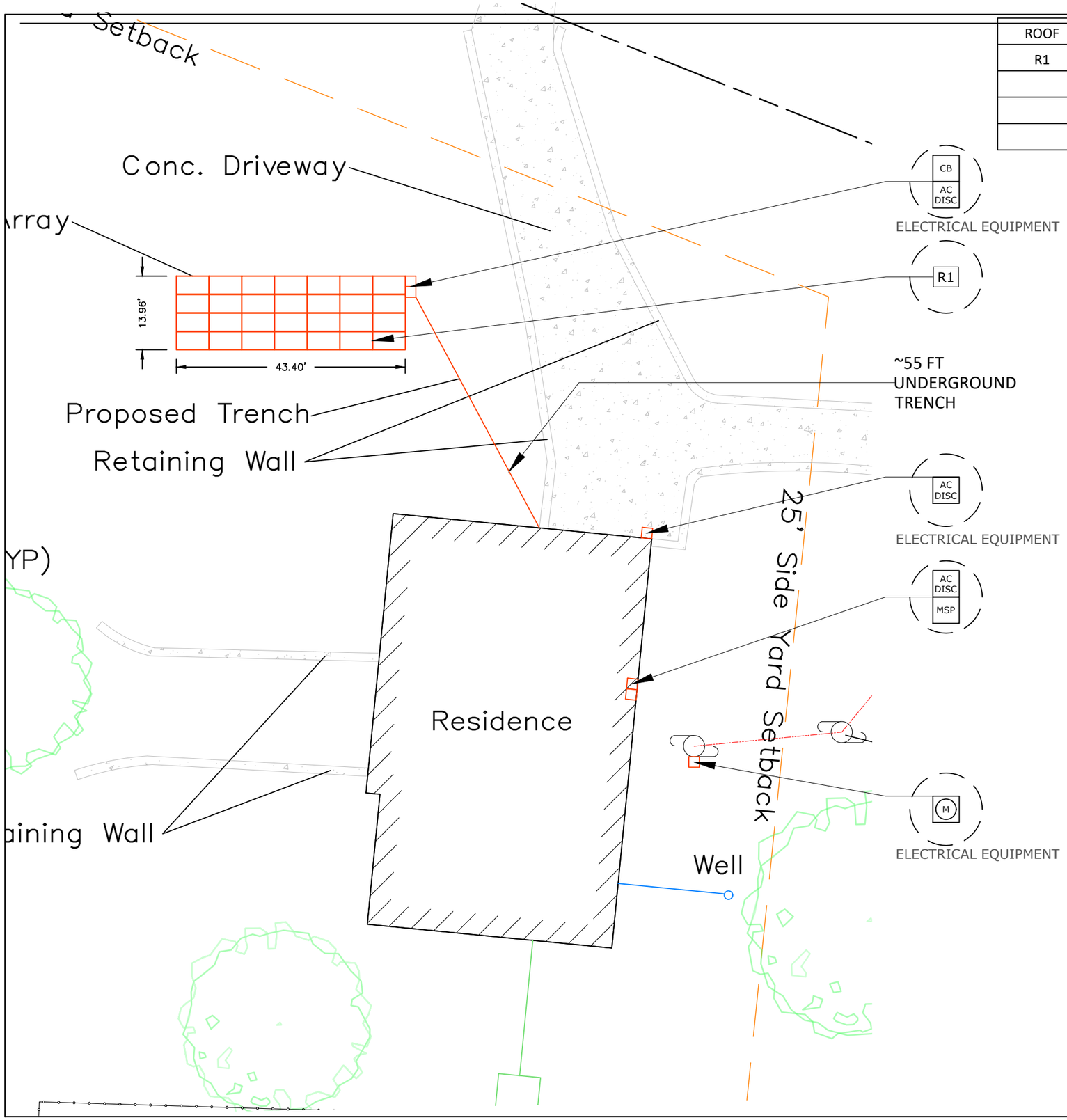
ZONING INFORMATION

PV-2.1



ROOF	PANEL COUNT	TILT	AZIMUTH	SHADING
R1	28	20°	180°	92%

1 PV-2.1 PANEL LAYOUT
SCALE: 1'=20'

N

SYMBOL LEGEND

MSP	MAIN SERVICE PANEL
SP	SUB-PANEL
M	UTILITY METER
AC DISC	AC DISCONNECT
UDC	UTILITY DISCONNECT
LC	LOAD CENTER
N3R	NEMA 3R BOX W/ ENVOY-S
CB	COMBINER BOX
	MODULE

SYMBOL LEGEND

	RESIDENCE		PROPERTY BOUNDARY		FENCE (METAL)
	CONCRETE		PROPERTY SETBACKS		FENCE (WOOD)
	SAND		ELECTRICAL		RECL. WATER
	GRAVEL		SEWAGE/SEPTIC	WV	WATER VALVE
	PAVERS		POTABLE WATER	WM	WATER METER
	BRICK		GAS LINE	W	WELL
	LANDSCAPE		OVRHD POWER LINE		POWER POLE
	EASEMENT		UNDG POWER LINE		GUY

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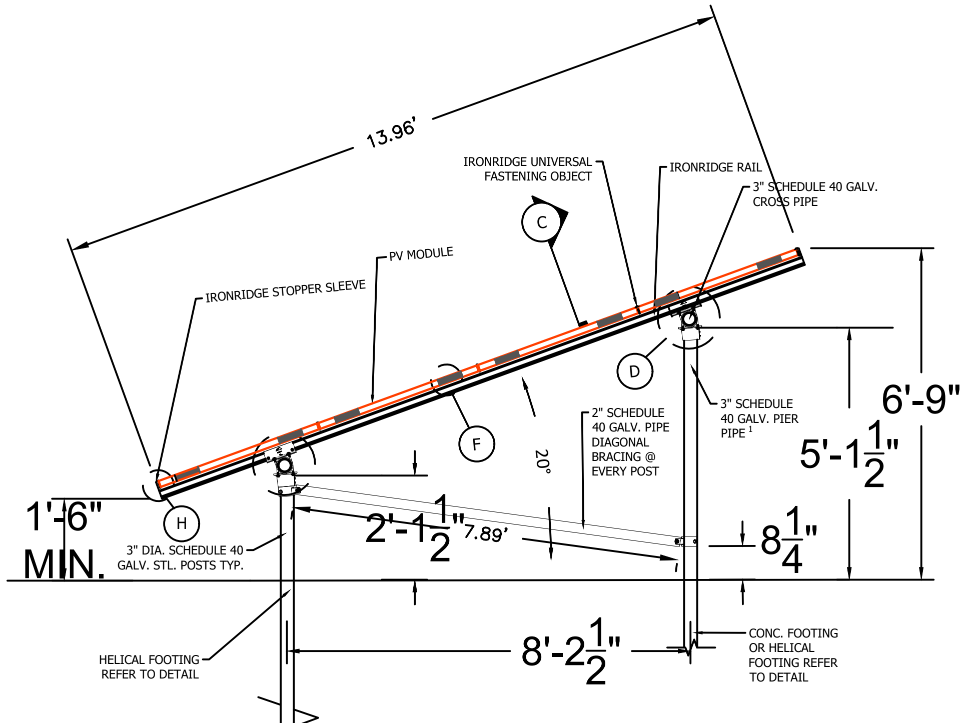
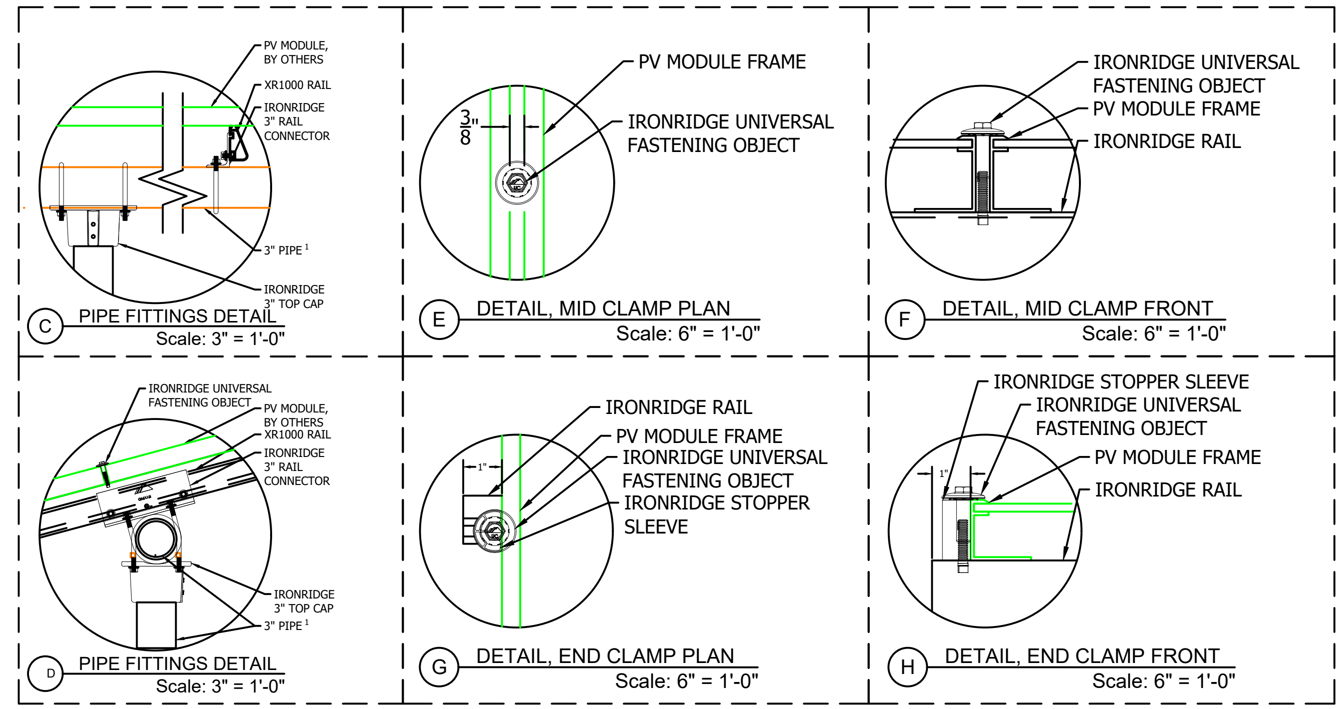
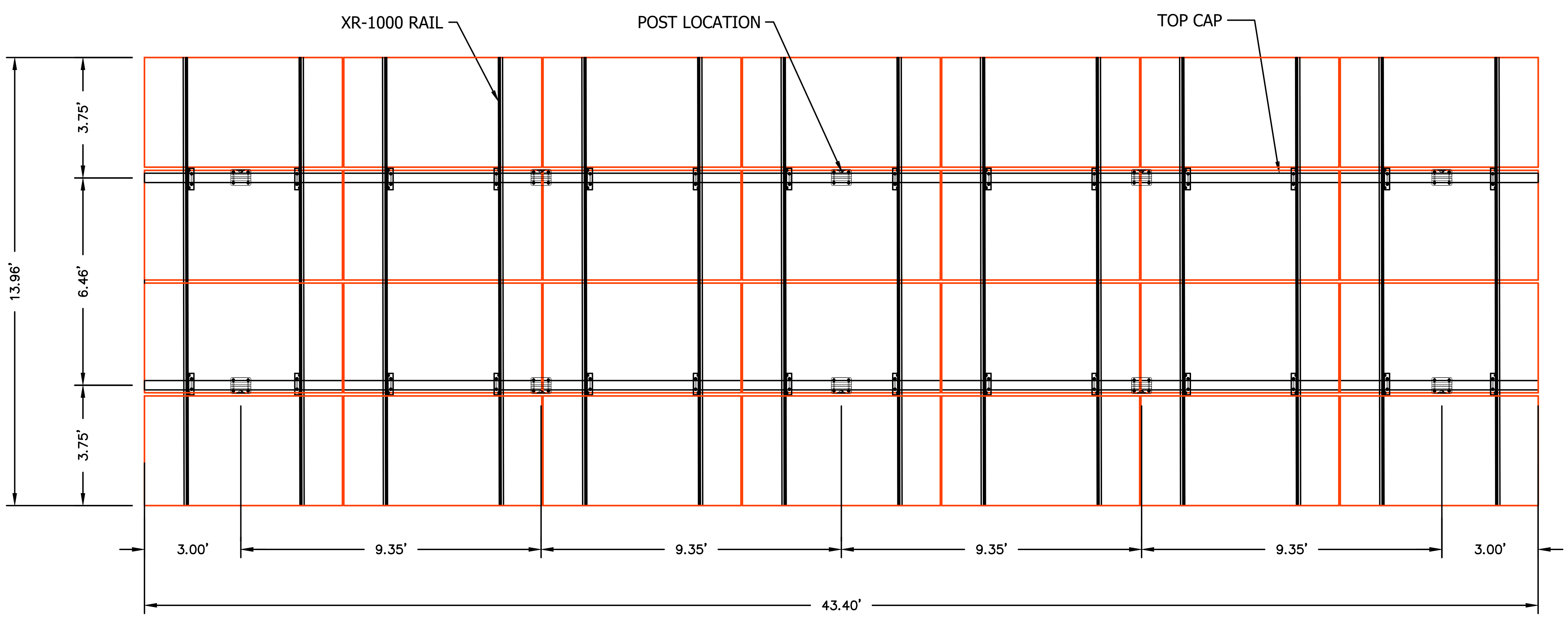
PANEL LAYOUT

PV-2.2





PIPE FITTINGS DETAIL



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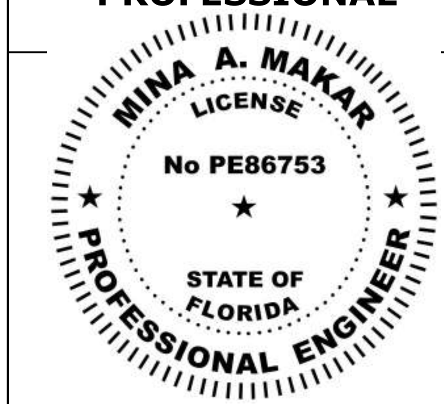

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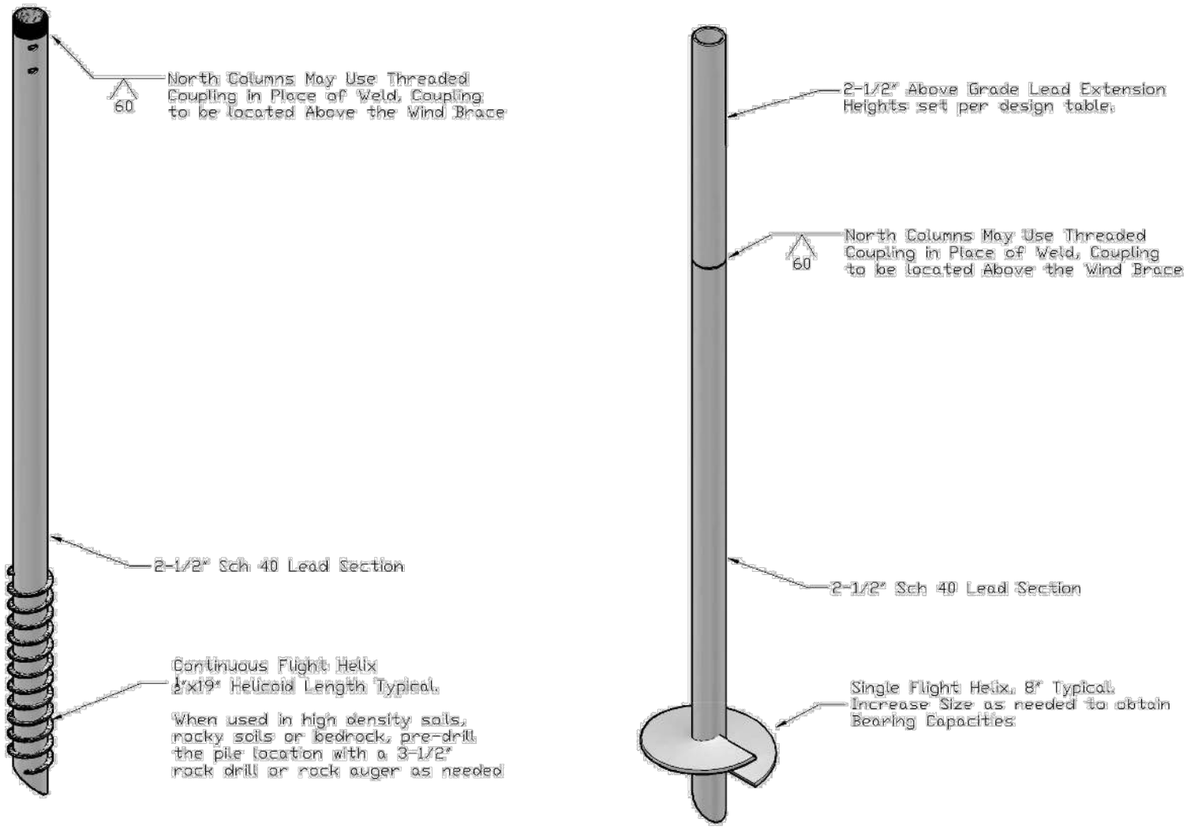
LAYOUT DETAIL

PV-3



Helical Pile Detail NOT TO SCALE

Specification Requirements:

The following material specification requirements pertain to the fabrication of the Solar Foundations USA ground mount solar support structure as indicated on these drawings.

1. Solar Foundation aluminum rails shall conform to ASTM B221.
2. Structural steel tubing shall be ASTM A500 Grade C.
3. Steel pipe for piles shall conform to ASTM A500 Grade C.
4. Steel pile extensions shall be ASTM A53 Grade B.
5. Fabricated steel plate for column cap assemblies, bracing clamps, etc. shall be ASTM A36 or A1011.
6. Steel bolts for cap fasteners shall conform to SAE J429 Grade 5. All other bolts shall conform to SAE J429 Grade 2 or better.
7. Steel U-bolts shall conform to ASTM 1018.
8. USS flat steel washers shall conform to ASTM F844 and nuts for steel connections shall conform to ASTM A563 Grade A.
9. All field welding shall conform to AWS D1.1/D1.1M -Structural Welding Code requirements.
10. All steel shall be hot-dip galvanized per ASTM A123 or A153 after all fabrication has been completed.

Installation Requirements:

1. The minimum average installation torque required to obtain the required indicated capacities and the minimum installation depth shown on the plans shall be satisfied prior to termination of the installation. The installation torque shall be an average of the installation torques indicated during the last 1 foot of installation.

2. The torsional strength rating of the torque anchor shall not be exceeded during the installation. If the torsional strength limit of the anchor has been reached, but the anchor has not reached the target depth, perform the following:

   2.1. If the torsional strength limit is achieved prior to reaching the target depth, the installation may be acceptable if reviewed and approved by the engineer and/or owner.
   2.2. The installer may remove the torque anchor and install a new one with smaller diameter helical plate.
   2.3. If using a continuous flight pile, pre-drill the pile location with a 3-1/2" rock auger or rock drill as needed.

3. If the target depth is achieved, but the torsional requirement has not been met the installer may do one of the following:

   3.1. Install the torque anchor deeper to obtain the required capacity
   3.2. Remove the torque anchor and install a new one with a larger diameter helical plate or one with multiple helical plates.
   3.3. Reduce the load capacity on the individual torque anchor by providing additional torque anchors at a reduced spacing.

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FOOTING DETAIL

PV-3.1

PV MODULE RATINGS	
MODULE MAKE	HANWHA
MODEL	HANWHA Q.PEAK DUO BLK ML-G10+ 410
MAX POWER	410W
OPEN CIRCUIT VOLTAGE	45.37V
MPP VOLTAGE	37.64V
SHORT CIRCUIT CURRENT	11.2A
MPP CURRENT	10.89A
NUMBER OF MODULES	30
UL1703 COMPLIANT	YES

SUB PANEL BREAKER SIZE	# OF MODULES	PV BREAKER PER BRANCH
	UP TO 13	20A

INVERTER RATINGS	
INVERTER MAKE	ENPHASE
MODEL	IQ8PLUS-72-2-US
MAX OUTPUT POWER	290W
OPEN DC VOLTAGE	60V
NOMINAL AC VOLTAGE	240V
MAX AC CURRENT	1.21A
CEC INVERTER EFFICIENCY	97%
NUMBER OF INVERTERS	30
UL1703 COMPLIANT	YES

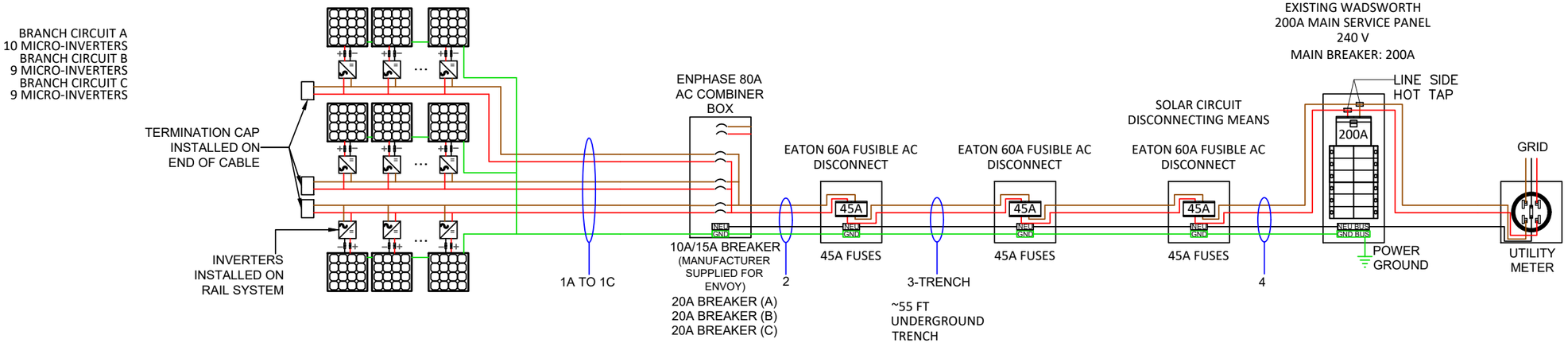
THIS SOLAR PHOTOVOLTAIC SYSTEM COMPLIES WITH THE 2023 FLORIDA BUILDING CODE AND THE 2020 NATIONAL ELECTRICAL CODE

VOLTAGE DROP CALCULATIONS

FORMULA USED PER NEC HANDBOOK 215.2(A)(4) WHERE APPLICABLE

WIRE RUN	V_{mp}	I_{mp}	R	L (FT)	V_o	% V_o	WIRE SIZE
BRANCH TO LOAD CENTER	240.00	12.1	1.98	79.00	3.785	1.58%	12 AWG
LOAD CENTER TO AC DISCONNECT	240.00	45.375	0.491	3.00	0.134	0.06%	06 AWG
AC DISCONNECT TO AC DISCONNECT	240.00	45.375	0.491	55.00	2.451	1.02%	06 AWG
AC DISCONNECT TO INTERCONNECTION	240.00	45.375	0.491	10.00	0.446	0.19%	06 AWG

28 HANWHA Q.PEAK DUO BLK ML-G10+ 410 410W MODULES PAIRED WITH
28 ENPHASE IQ8PLUS-72-2-US MICRO-INVERTERS



Wire Tag	Conduit	Wire Qty	Wire Gauge	Wire Type	Temp. Rating	Wire Ampacity (A)	Temp. Derate	Conduit Fill Derate	Derated Ampacity (A)	Inverter Qty	NOC (A)	NEC Correction	Design Current (A)	Ground Size	Ground Wire Type
1A	OPEN AIR	2	12 AWG	TRUNK CABLE	90°C	30	0.96	1	28.80	10	1.21	1.25	15.13	08 AWG	THWN-2
1B	OPEN AIR	2	12 AWG	TRUNK CABLE	90°C	30	0.96	1	28.80	9	1.21	1.25	13.61	08 AWG	THWN-2
1C	OPEN AIR	2	12 AWG	TRUNK CABLE	90°C	30	0.96	1	28.80	9	1.21	1.25	13.61	08 AWG	THWN-2
2	1” PVC	3+G	06 AWG	THWN-2	75°C	65	0.96	1	62.40	28	1.21	1.25	42.35	08 AWG	THWN-2
3-TRENCH	1” PVC	3+G	06 AWG	THWN-2	75°C	65	0.96	1	62.40	28	1.21	1.25	42.35	08 AWG	THWN-2
4	1” PVC	3+G	06 AWG	THWN-2	75°C	65	0.96	1	62.40	28	1.21	1.25	42.35	08 AWG	THWN-2

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ELECTRICAL

PV-4

ELECTRICAL NOTES:

1. ALL CALCULATIONS FOR VOC, VMAX, IMP AND ISC HAVE BEEN CALCULATED USING THE MANUFACTURED STRING CALCULATOR BASED ON ASHRAE 2% HIGH AND EXTREME MINIMUM TEMPERATURE COEFFICIENTS.
2. THE ENTIRE ARRAY IS BONDED ACCORDING TO (NEC 690.46 - 250.120 PARAGRAPH C). THE GROUND IS CARRIED AWAY FROM THE GROUNDING LUG USING #6 BARE COPPER WIRE OR #8 THWN-2 COPPER WIRE.
3. THIS SYSTEM COMPLIES WITH NEC 2017
4. BRANCH CIRCUIT CALCULATION FOR WIRE TAG 1 DISPLAYS THE LARGEST BRANCH CIRCUIT IN SYSTEM. OTHER BRANCH CIRCUITS SHALL HAVE LOWER DESIGN CURRENT THAN THE ONE SHOWN. IN ADDITION, VOLTAGE DROP CALCULATIONS FROM PANELS TO THE COMBINER BOX SHALL BE SHOWN IN A SIMILAR FASHION
5. ALL CONDUCTORS ARE SIZED BASED ON NEC 2017 ARTICLE 310
6. ALL EQUIPMENT INSTALLED IS RATED AT 75°C
7. INVERTER NOC (NOMINAL OPEN CURRENT) OBTAINED FROM EQUIPMENT DATASHEET
8. CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLYING WITH ALL LOCAL AND NATIONAL CODE REQUIREMENTS.
9. EACH MODULE MUST BE GROUNDED ACCORDING TO USER INSTRUCTIONS
10. ALL EQUIPMENT SHALL BE LISTED PER NEC 690.4(B)
11. PER NEC 690.13, 690.15, PROVIDE A WARNING SIGN AT ALL LOCATIONS WHERE TERMINALS OF THE DISCONNECTING MEANS MAY BE ENERGIZED IN THE OPEN POSITION> SIGN SHALL READ *WARNING - ELECTRIC SHOCK HAZARD - DO NOT TOUCH TERMINALS - OR EQUIVALENT.
12. PER NEC 705.10, PROVIDE A PERMANENT PLAQUE OR DIRECTORY SHOWING ALL ELECTRIC POWER SOURCES ON THE PREMISES AT SERVICE ENTRANCE.
13. INTERCONNECTION METHOD SHALL COMPLY WITH NEC 705.12
14. AND OPTION FOR A SINGLE CIRCUIT BRANCH TO BE SPLIT INTO TWO SUB-CIRCUIT BRANCHES IS ACCEPTABLE.
15. ALL CONDUCTORS MUST BE COPPER.
16. NEUTRAL AND EQUIPMENT GROUNDING CONDUCTOR BONDED AS PER NEC 250.24(C).
17. EQUIPMENT GROUNDING CONDUCTOR IS CONNECTED TO A GROUNDING ELECTRODE SYSTEM PER 250.54(D).
18. FUSES FOR PV DISCONNECT HAVE AIC RATINGS OF 200KA AC AND 20KA DC.
19. SUPPLY SIDE CONNECTION SHALL BE MADE USING ILSCO INSULATION PIERCING CONNECTORS (IPC). MAKE, MODEL, AND RATING OF INTERCONNECTION CAN BE SEEN ON TABLE 1 BELOW.
20. METHOD OF INTERCONNECTION CAN BE SEEN IN FIGURE 1.
21. UTILITY HAS 24-HR UNRESTRICTED ACCESS TO ALL PHOTOVOLTAIC SYSTEM COMPONENTS LOCATED AT THE SERVICE ENTRANCE.
22. WORKING CLEARANCES AROUND THE EXISTING AND NEW ELECTRICAL EQUIPMENT WILL BE MAINTAINED IN ACCORDANCE WITH NEC ARTICLE 110.26.
23. CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT PER NEC ARTICLE 300.6 (C)(1) AND ARTICLE 310.8 (D).
24. CONDUCTORS EXPOSED TO WET LOCATIONS SHALL BE SUITABLE FOR USE IN WET LOCATIONS PER NEC ARTICLE 310.10 (C).
25. TOTAL AREA OF ALL CONDUCTORS, SPLICES, AND TAPS INSTALLED AT ANY CROSS SECTION OF THE WIRING DOES NOT EXCEED 75% OF THE CROSS SECTIONAL AREA OF THE SPACE. NEC 312.8(A)(2).
26. SYSTEM IS CONSIDERED AN AC MODULE SYSTEM. NO DC CONDUCTORS ARE PRESENT IN CONDUIT, COMBINER, JUNCTION BOX, DISCONNECT. AND COMPLIES WITH 690.6 - NO DC DISCONNECT AND ASSOCIATED DC LABELING ARE REQUIRED.
27. SYSTEM COMPLIES WITH 690.12 RAPID SHUTDOWN AND ASSOCIATED LABELING AS PER 690.56(C). AC VOLTAGE AND SYSTEM OPERATING CURRENT SHALL BE PROVIDED 690.52.
28. CONDUCTORS IN CONDUIT ARE AC CONDUCTORS BRANCH CIRCUITS AND NOT PV SOURCE CIRCUITS. 690.6.
29. ALL GROUNDING SHALL COMPLY WITH 690.47(A) IN THAT THE AC MODULES WILL COMPLY WITH 250.64.
30. NO TERMINALS SHALL BE ENERGIZED IN THE OPEN POSITION IN THIS AC MODULE SYSTEM 690.13, 690.15, 690.6.
31. WHERE APPLICABLE: INTERCONNECTION SHALL COMPLY WITH 705.12(A) OR 705.12(B)
32. ALL WARNING SIGN(S) OR LABEL(S) SHALL COMPLY WITH 2017 NEC ARTICLE 110.21(B). LABEL WARNINGS SHALL ADEQUATELY WARN OF THE HAZARD. LABELS SHALL BE PERMANENTLY AFFIXED TO THE EQUIPMENT, AND LABELS REQUIRED SHALL BE SUITABLE FOR THE ENVIRONMENT.
33. PV POWER CIRCUIT LABELS SHALL APPEAR ON EVERY SECTION OF THE WIRING SYSTEM THAT IS SEPARATED BY ENCLOSURES, WALLS, PARTITIONS, CEILINGS, OR FLOORS.

TABLE 1:

MAKE	MODEL	VOLTAGE RATING	CONDUCTOR RANGE MAIN	CONDUCTOR RANGE TAP
ILSCO	IPC 4006	600 V	4/0-4 AWG	6-14 AWG
ILSCO	IPC 4020	600 V	4/0-2 AWG	2/0-6 AWG

INSTRUCTIONS FOR LINE TAPS

FIGURE 1:

1. ADJUST THE CONNECTOR NUT TO SUITABLE LOCATION
2. PUT THE BRANCH WIRE INTO THE CAP SHEATH FULLY
3. INSERT THE MAIN WIRE, IF THERE ARE TWO LAYS OF INSULATED LAY IN THE MAIN CABLE, SHOULD STRIP A CERTAIN LENGTH OF THE FIRST INSULATED LAY FROM INSERTED END
4. TURN THE NUT BY HAND, AND FIX THE CONNECTOR IN SUITABLE LOCATION.
5. SCREW THE NUT WITH THE SLEEVE SPANNER.
6. SCREW THE NUT CONTINUALLY UNTIL THE TOP PART IS CRACKED AND DROPPED DOWN

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ELECTRICAL

PV-4.1

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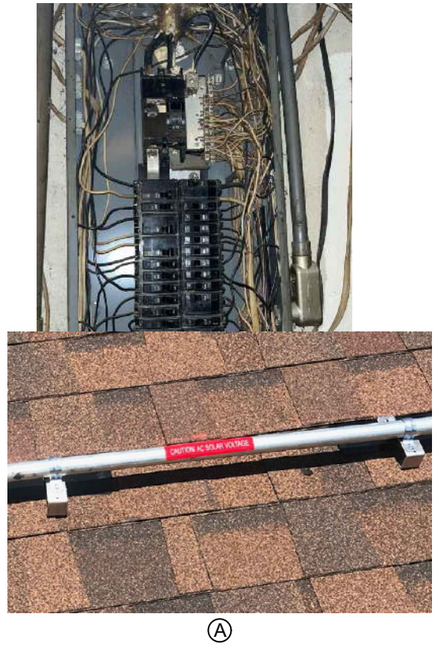
TAG	LABEL	QUANTITY	LOCATION	NOTE
Ⓐ	**CAUTION** AC SOLAR VOLTAGE	12	AC CONDUITS	1 AT EVERY SEPARATION BY ENCLOSURES / WALLS / PARTITIONS / CEILINGS / FLOORS OR NO MORE THAN 10'
Ⓑ	WARNING: PHOTOVOLTAIC POWER SOURCE PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN	1	COMBINER BOX	1 AT ANY COMBINER BOX
Ⓒ	**WARNING** ELECTRICAL SHOCK HAZARD TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION	1	JUNCTION BOX	1 AT ANY JUNCTION BOX
Ⓓ	PHOTOVOLTAIC SYSTEM AC DISCONNECT RATED AC OUTPUT CURRENT A NOMINAL OPERATING AC VOLTAGE 240 V **CAUTION** POWER TO THIS SERVICE IS ALSO SUPPLIED FROM ON-SITE SOLAR GENERATION AC SYSTEM DISCONNECT **WARNING** ELECTRICAL SHOCK HAZARD TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM	1	AC DISCONNECT	1 OF EACH AT FUSED AC DISCONNECT COMPLETE VOLTAGE AND CURRENT VALUES ON DISCONNECT LABEL
Ⓔ	PV METER	1	PV METER SOCKET	1 AT PV METER SOCKET AND ONE DIRECTORY PLACARD
Ⓕ	**WARNING** DUAL POWER SUPPLY SECOND SOURCE IS PHOTOVOLTAIC SYSTEM REVENUE METER	1	UTILITY METER	1 AT UTILITY METER AND ONE DIRECTORY PLACARD
Ⓖ	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 **WARNING** DUAL POWER SUPPLY SECOND SOURCE IS PHOTOVOLTAIC SYSTEM	1	INTERCONNECTION POINT	1 OF EACH AT BUILDING INTERCONNECTION POINT AND ONE DIRECTORY PLACARD
	WARNING POWER SOURCE OUTPUT CONNECTION. DO NOT RELOCATE THIS OVERCURRENT DEVICE	1	BACKFEED PANEL	
Ⓗ	NOMINAL OPERATING AC VOLTAGE : 240V NOMINAL OPERATING AC FREQUENCY : 60HZ MAXIMUM AC POWER : VA MAXIMUM AC CURRENT : A MAXIMUM OVERCURRENT DEVICE RATING FOR AC MODULE PROTECTION : 20A	1	AC CURRENT PV MODULES	

EXAMPLES



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Ⓒ

Ⓓ

Ⓕ

Ⓖ BACKFEED

momentum SOLAR

PRO CUSTOM SOLAR LLC D.B.A. MOMENTUM SOLAR
3096 HAMILTON BLVD, S. PLAINFIELD, NJ 07080
(732) 902-6224
MOMENTUMSOLAR.COM

PROFESSIONAL

MINA A. MAKAR
LICENSE
No PE86753
STATE OF FLORIDA
PROFESSIONAL ENGINEER

Digitally signed by Mina A Makar.
Reason : This item has been electronically signed and sealed by [Mina A. Makar, PE 86753, COA # 33404] on the Date and Time Stamp shown using a digital signature.
Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies
Date: 2025.02.13 09:02:15 -05:00

SOLAR CONTRACTOR

CAMERON CHRISTENSEN
CERTIFIED SOLAR CONTRACTOR
LICENSE NUMBER: CVC57036.
MOMENTUM SOLAR
5728 MAJOR BLVD, SUITE 307
ORLANDO, FL 32819

CUSTOMER INFORMATION

VICTORIA LHEUREUX - MS162993
2656 SOUTHEAST COUNTY ROAD 252
LAKE CITY, FL 32025
3866282461

PV SYSTEM INFORMATION

SYSTEM SIZE (DC): 11.48 KW
28 MODULES: HANWHA Q.PEAK DUO BLK ML-G10+ 410
28 INVERTERS: ENPHASE IQ8PLUS-72-2-US

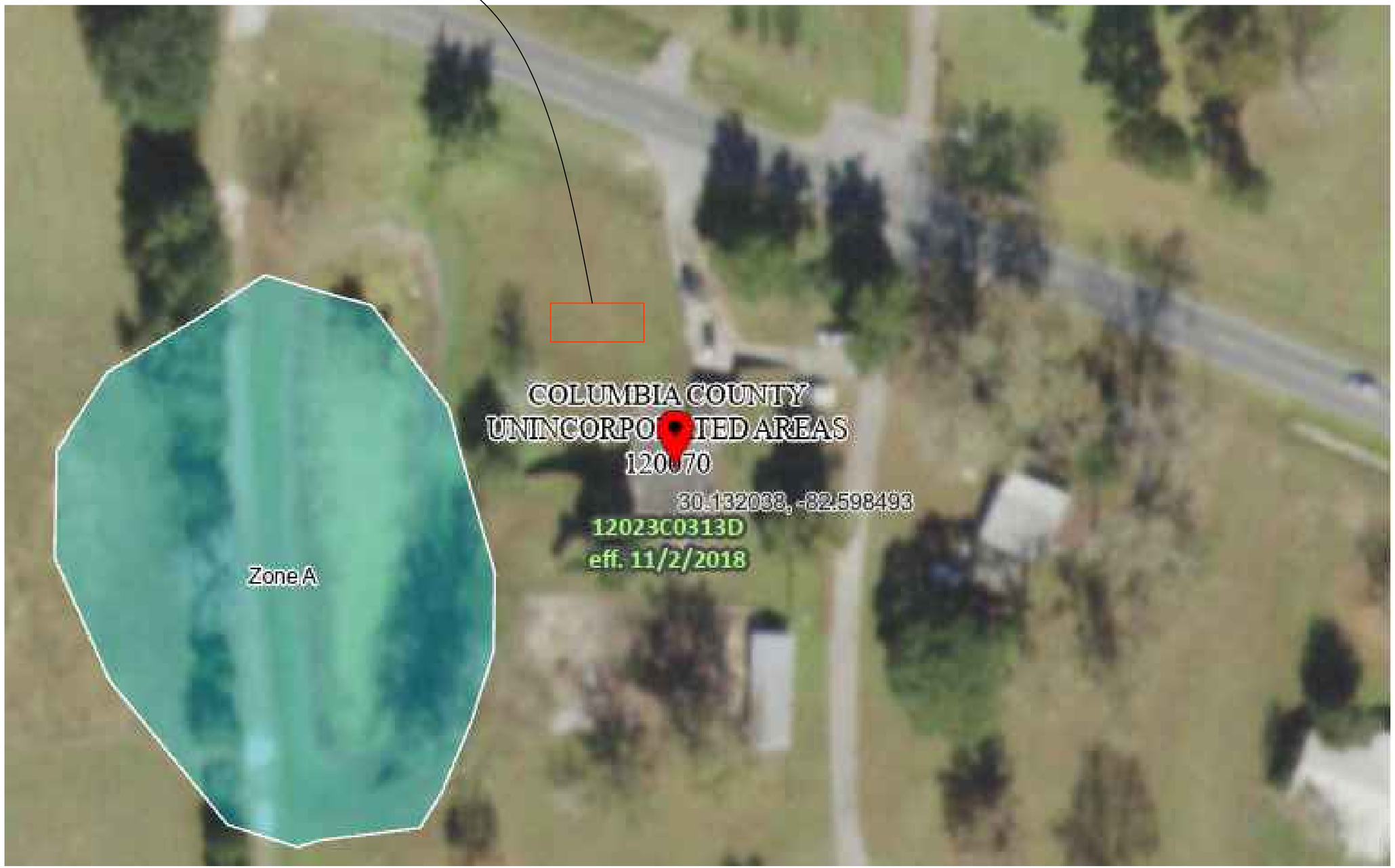
PROJECT INFORMATION

INITIAL	DATE: 1/13/2025	DESIGNER: ZK
REV:	DATE:	DESIGNER:
REV:	DATE:	DESIGNER:

EQUIPMENT LABELS

PV-4.2

PROPOSED ARRAY LOCATION



PROPOSED ARRAY LOCATION IS OUTSIDE FEMA FLOOD ZONES A & AE

momentum SOLAR

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PROJECT INFORMATION

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REV:	DATE:	DESIGNER:
REV:	DATE:	DESIGNER:

FEMA FLOOD ZONE

PV-4.3