

PHOTOVOLTAIC ROOF MOUNT SYSTEM

17 MODULES-ROOF MOUNTED - 6.715 KW DC, 4.930 KW AC

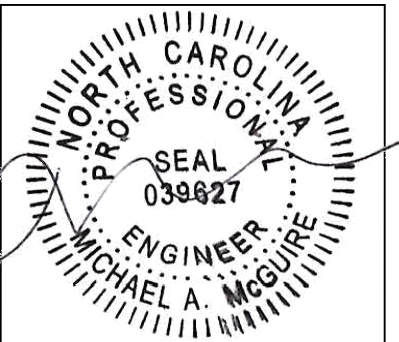
373 CHINABERRY LN, ANGIER, NC 27501



TOP TIER SOLAR SOLUTIONS

1530 CENTER PARK DR #2911,
CHARLOTTE, NC 28217,
UNITED STATES

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL DESIGN	12/12/2023	



sealed 12dec2023 mike@h2dc.com
H2DC PLLC NC CoA#: P-1703
ELECTRICAL ONLY
- NOT AN AS-BUILT DRAWING SET -

PROJECT NAME & ADDRESS

MARY BOLIN
RESIDENCE
373 CHINABERRY LN,
ANGIER, NC 27501

DRAWN BY
ESR

SHEET NAME
COVER SHEET

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-1

PROJECT DATA

PROJECT ADDRESS: 373 CHINABERRY LN, ANGIER, NC 27501

OWNER: MARY BOLIN

DESIGNER: ESR

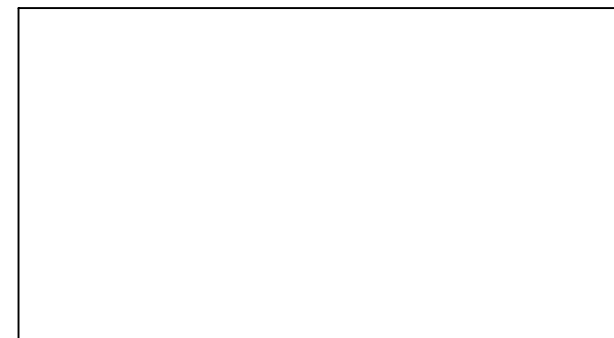
SCOPE: (E) 6.715 KW DC ROOF MOUNT SOLAR PV SYSTEM WITH (E) 17 MISSION SOLAR: MSE395SX9R 395W PV MODULES WITH (E) 17 ENPHASE IQ8PLUS-72-2-US 290W MICRO INVERTERS EQUIPPED WITH RAPID SHUTDOWN
(E) 01 ENPHASE IQ 3T BATTERY
(N) 02 ENPHASE IQ 10T BATTERIES

AUTHORITIES HAVING JURISDICTION:
BUILDING: HARNETT COUNTY
ZONING: HARNETT COUNTY
UTILITY: DUKE ENERGY PROGRESS

SHEET INDEX

PV-1 COVER SHEET
PV-2 SITE PLAN
PV-3 ELECTRICAL PLAN
PV-4 ELECTRICAL LINE DIAGRAM
PV-5 WIRING CALCULATIONS
PV-6 LABELS
PV-7 EQUIPMENT SPECIFICATIONS

SIGNATURE



GENERAL NOTES

- ALL COMPONENTS ARE UL LISTED AND CEC CERTIFIED, WHERE WARRANTED.
- THE SOLAR PV SYSTEM WILL BE INSTALLED IN ACCORDANCE WITH ARTICLE 690 OF THE NEC 2017.
- THE UTILITY INTERCONNECTION APPLICATION MUST BE APPROVED AND PV SYSTEM INSPECTED PRIOR TO PARALLEL OPERATION.
- ALL CONDUCTORS OF A CIRCUIT, INCLUDING THE EGC, MUST BE INSTALLED IN THE SAME RACEWAY, OR CABLE, OR OTHERWISE RUN WITH THE PV ARRAY CIRCUIT CONDUCTORS WHEN THEY LEAVE THE VICINITY OF THE PV ARRAY.
- WHERE METALLIC CONDUIT CONTAINING DC CONDUCTORS IS USED INSIDE THE BUILDING, IT SHALL BE IDENTIFIED AS "CAUTION: SOLAR CIRCUIT" EVERY 10FT.
- HEIGHT OF THE AC DISCONNECT SHALL NOT EXCEED 6'-7" PER NEC CODE 240.24.
- A GROUNDING ELECTRODE SYSTEM IN ACCORDANCE WITH CEC 690.47 AND 250.50 THROUGH 60 AND 250-166 SHALL BE PROVIDED. PER NEC GROUNDING ELECTRODE SYSTEM OF EXISTING BUILDING MAY BE USED AND BONDED TO THE SERVICE ENTRANCE. IF EXISTING SYSTEM IS INACCESSIBLE OR INADEQUATE A SUPPLEMENTAL GROUNDING ELECTRODE WILL BE USED AT THE INVERTER LOCATION CONSISTING OF A UL LISTED 8 FT. GROUND ROD WITH ACORN CLAMP. GROUNDING ELECTRODE CONDUCTORS SHALL BE NO LESS THAN #8 AWG AND NO LARGER THAN #6 AWG COPPER AND BONDED TO THE EXISTING GROUNDING ELECTRODE TO PROVIDE FOR A COMPLETE SYSTEM.
- PHOTOVOLTAIC MODULES ARE TO BE CONSIDERED NON-COMBUSTIBLE.
- PHOTOVOLTAIC INSTALLATION WILL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOF VENTS.
- ALL WIRING MUST BE PROPERLY SUPPORTED BY DEVICES OR MECHANICAL MEANS DESIGNED AND LISTED FOR SUCH USE. WIRING MUST BE PERMANENTLY AND COMPLETELY HELD OFF THE ROOF SURFACE.
- ALL SINAGE TO BE PLACED IN ACCORDANCE WITH THE LOCAL BUILDING CODE. IF EXPOSED TO SUNLIGHT, IT SHALL BE UV RESISTANT. ALL PLAQUES AND SINAGE WILL BE INSTALLED AS REQUIRED BY THE NEC AND AHJ.
- INVERTER(S) USED IN UNGROUNDED SYSTEM SHALL BE UL 1741 LISTED.
- THE INSTALLATION OF EQUIPMENT AND ALL ASSOCIATED WIRING AND INTERCONNECTION SHALL BE PERFORMED ONLY BY QUALIFIED PERSONS [NEC 690.4(C)]
- ALL OUTDOOR EQUIPMENT SHALL BE NEMA 3R RATED (OR BETTER), INCLUDING ALL ROOF MOUNTED TRANSITION BOXES AND SWITCHES.
- ALL EQUIPMENT SHALL BE PROPERLY GROUNDED AND BONDED IN ACCORDANCE WITH NEC ARTICLE 250.
- SYSTEM GROUNDING SHALL BE IN ACCORDANCE WITH NEC 690.41.
- PV SYSTEM CIRCUITS INSTALLED ON OR IN BUILDINGS SHALL INCLUDE A RAPID SHUTDOWN FUNCTION IN ACCORDANCE WITH NEC 690.12
- DISCONNECTING MEANS SHALL BE LOCATED IN A VISIBLE, READILY ACCESSIBLE LOCATION WITHIN THE PV SYSTEM EQUIPMENT OR A MAXIMUM OF 10 FEET AWAY FROM THE SYSTEM [NEC 690.13(A)]
- ALL WIRING METHODS SHALL BE IN ACCORDANCE WITH NEC 690.31
- WORK CLEARANCES AROUND ELECTRICAL EQUIPMENT WILL BE MAINTAINED PER NEC 110.26(A)(1), 110.26(A)(2) AND 110.26(A)(3).
- ROOFTOP MOUNTED PHOTOVOLTAIC PANELS AND MODULES SHALL BE TESTED, LISTED & IDENTIFIED IN ACCORDANCE WITH UL1703
- ELECTRICAL CONTRACTOR TO PROVIDE CONDUIT EXPANSION JOINTS AND ANCHOR CONDUIT RUNS AS REQUIRED PER NEC.
- THE ENCHARGE BATTERY AS PART OF THE ENSEMBLE SYSTEM DOES NOT EXPORT POWER TO THE GRID IN ANY STORAGE MODE.

VICINITY MAP



HOUSE PHOTO



CODE REFERENCES

2018 NORTH CAROLINA BUILDING CODE
2018 NORTH CAROLINA RESIDENTIAL CODE
2018 NORTH CAROLINA FIRE CODE
2017 NATIONAL ELECTRICAL CODE

PROJECT DESCRIPTION:

(E) 17 X MISSION SOLAR: MSE395SX9R 395W MONO MODULES
 ROOF MOUNTED SOLAR PHOTOVOLTAIC MODULES
 (E) DC SYSTEM SIZE: 17 x 395 = 6.715KW DC
 (E) AC SYSTEM SIZE: 17 x 290 = 4.930KW AC

EQUIPMENT SUMMARY

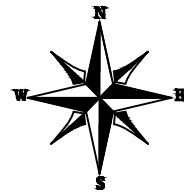
(E) 17 MISSION SOLAR: MSE395SX9R 395W MONO MODULES
 (E) 17 ENPHASE IQ8PLUS-72-2-US 290W MICRO INVERTERS
 EQUIPPED WITH RAPID SHUTDOWN

(E) 01 ENPHASE IQ 3T BATTERY

(N) 02 ENPHASE IQ 10T BATTERIES

(E) ROOF ARRAY AREA #1:- 367.88 SQ FT.

NOTE: VISIBLE, LOCKABLE, LABELED AC DISCONNECT
 LOCATED WITHIN 10' OF UTILITY METER



ROOF #1
 (E) (17) MISSION SOLAR: MSE395SX9R
 395W MONO MODULES WITH ENPHASE
 IQ8PLUS-72-2-US 290W MICRO INVERTERS
 EQUIPPED WITH RAPID SHUTDOWN
 (E) GATE (TYP.)
 (N) PV/ESS VISIBLE, LOCKABLE,
 LABELED FUSED AC DISCONNECT
 (LOCATED WITHIN 10' OF UTILITY METER)

(E) FENCE

(E) TREES

1-STORY HOUSE

(E) SHED (TYP.)

(E) DETACHED STRUCTURE (TYP.)

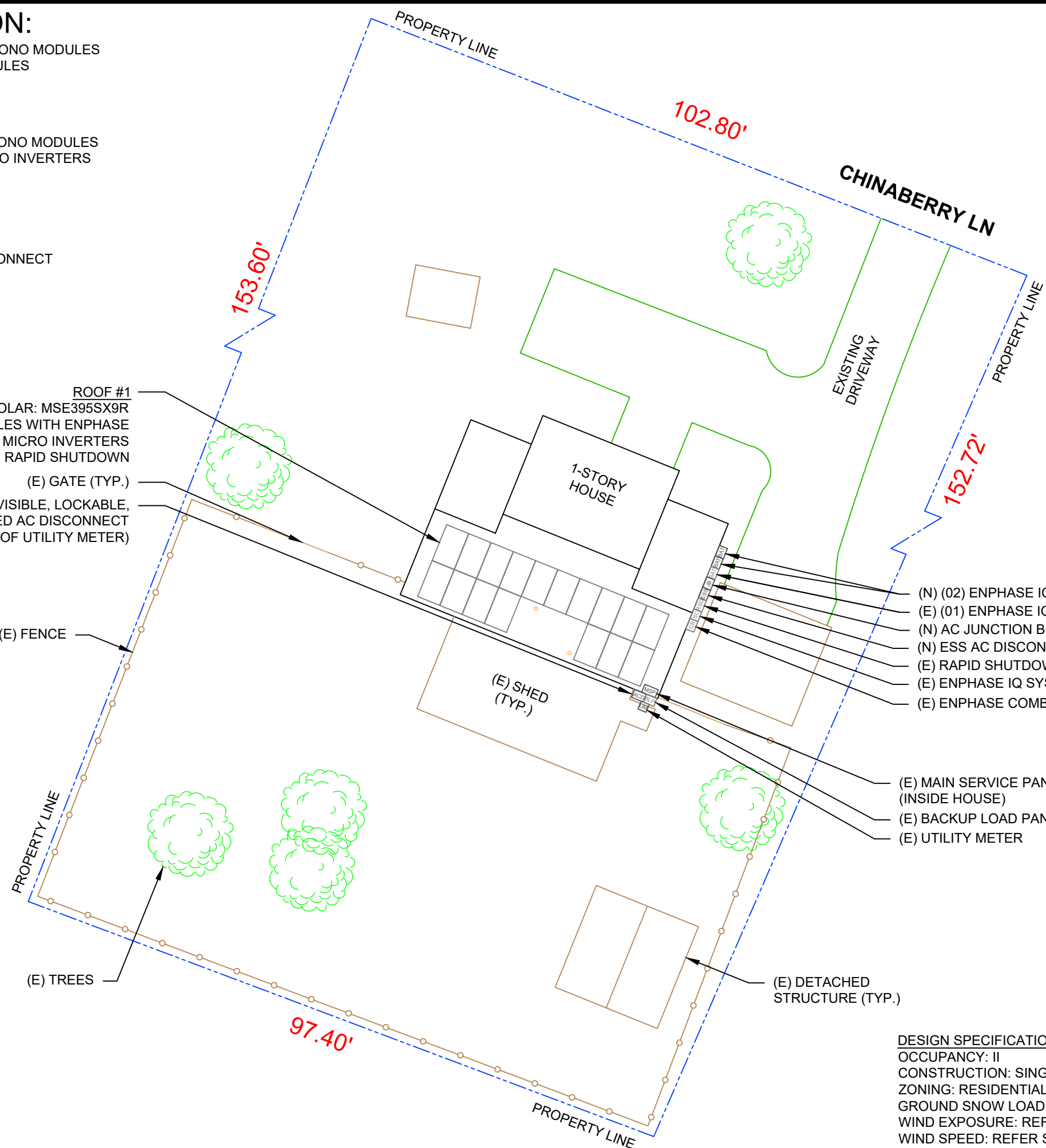
EXISTING DRIVEWAY

- (N) (02) ENPHASE IQ 10T BATTERIES
- (E) (01) ENPHASE IQ 3T BATTERY
- (N) AC JUNCTION BOX
- (N) ESS AC DISCONNECT
- (E) RAPID SHUTDOWN SWITCH
- (E) ENPHASE IQ SYSTEM CONTROLLER 2
- (E) ENPHASE COMBINER BOX

- (E) MAIN SERVICE PANEL (INSIDE HOUSE)
- (E) BACKUP LOAD PANEL
- (E) UTILITY METER

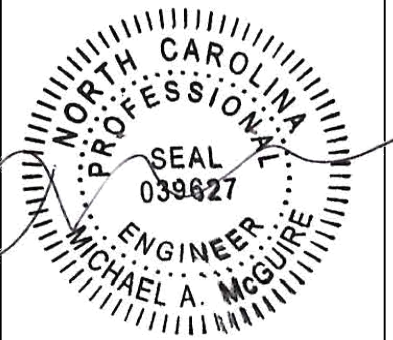
DESIGN SPECIFICATION
 OCCUPANCY: II
 CONSTRUCTION: SINGLE-FAMILY
 ZONING: RESIDENTIAL
 GROUND SNOW LOAD: REFER STRUCTURAL LETTER
 WIND EXPOSURE: REFER STRUCTURAL LETTER
 WIND SPEED: REFER STRUCTURAL LETTER

1 | **SITE PLAN**
 PV-2 | SCALE: 1/16" = 1'-0"



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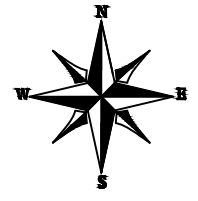
SHEET NAME
SITE PLAN

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

SHEET NUMBER
PV-2

(E) DC SYSTEM SIZE: 17 x 395 = 6.715 kW DC
 (E) AC SYSTEM SIZE: 17 x 290 = 4.930 kW AC
 (E) (17) MISSION SOLAR: MSE395SX9R 395W MONO
 MODULES WITH (E) (17) ENPHASE IQ8PLUS-72-2-US 290W
 MICRO INVERTERS EQUIPPED WITH RAPID SHUTDOWN
 LOCATED UNDER EACH PANEL (240V)

CIRCUIT LEGENDS	
	(E) CIRCUIT #1
	(E) CIRCUIT #2



BILL OF MATERIALS	
EQUIPMENT DESCRIPTION	QTY
AC JUNCTION BOX	1
BATTERY: ENPHASE IQ 10T-1P-NA BATTERY	2
AC DISCONNECT: PV/ESS FUSED AC DISCONNECT, 100A FUSED, (2) 80A FUSES 240V NEMA 3R, UL LISTED	1
AC DISCONNECT: ESS AC DISCONNECT 60A , 240V NEMA 3R, UL LISTED	1

TOP TIER
SOLAR SOLUTIONS

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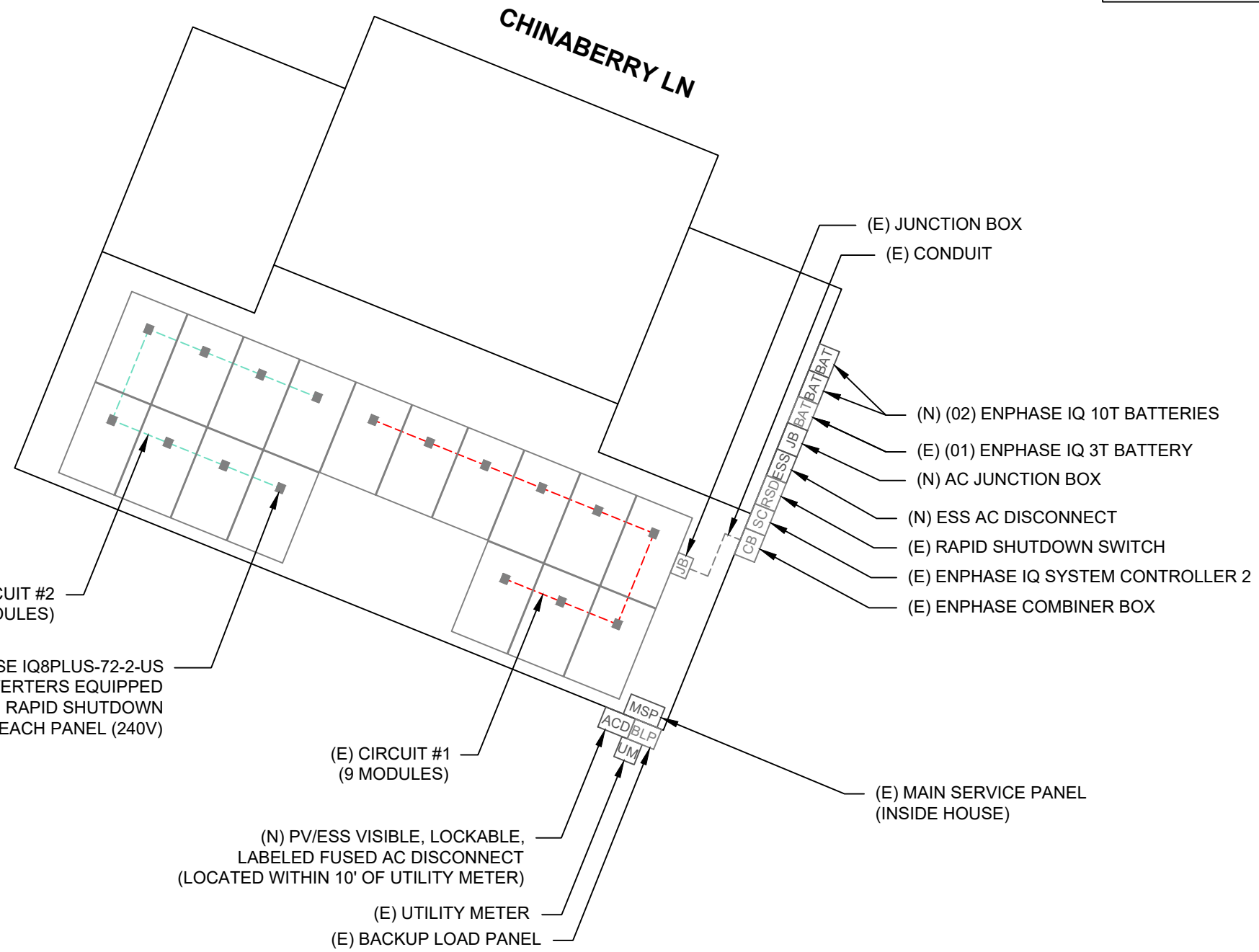
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DRAWN BY
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SHEET NAME
ELECTRICAL PLAN

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

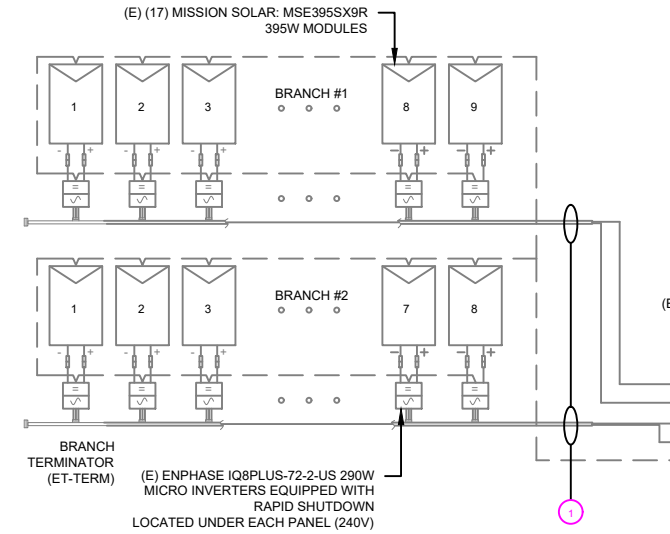
SHEET NUMBER
PV-3



LEGEND	
	- COMBINER BOX
	- AC DISCONNECT
	- BACKUP LOAD PANEL
	- UTILITY METER
	- MAIN SERVICE PANEL
	- ENPHASE IQ SYSTEM CONTROLLER 2
	- ESS AC DISCONNECT
	- ENPHASE IQ BATTERY
	- INVERTER
	- JUNCTION BOX
	- CONDUIT

(E) DC SYSTEM SIZE: 17 x 395 = 6.715KW DC
 (E) AC SYSTEM SIZE: 17 x 290 = 4.930KW AC

(E) (17) MISSION SOLAR: MSE395SX9R 395W MONO MODULES
 WITH (E) (17) ENPHASE IQ8PLUS-72-2-US 290W MICRO INVERTERS
 EQUIPPED WITH RAPID SHUTDOWN
 LOCATED UNDER EACH PANEL (240V)
 (E) (1) BRANCH CIRCUIT OF 9 MODULES AND
 (E) (1) BRANCH CIRCUIT OF 8 MODULES ARE CONNECTED IN PARALLEL

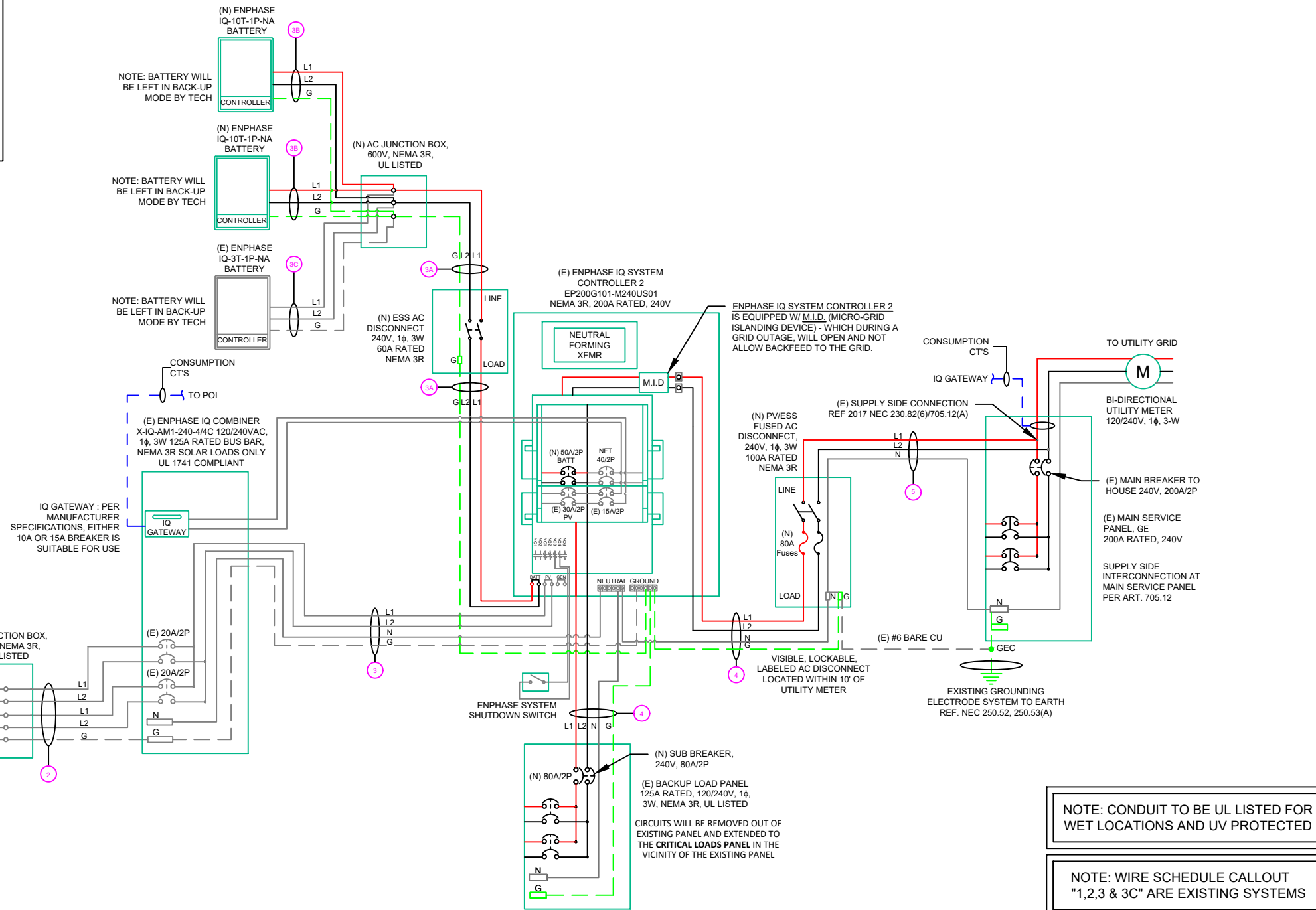


INTERCONNECTION NOTES:

1. INTERCONNECTION SIZING, LIMITATIONS AND COMPLIANCE DETERMINED IN ACCORDANCE WITH [NEC 705.12], AND [NEC 690.59].
2. GROUND FAULT PROTECTION IN ACCORDANCE WITH [NEC 215.9], [NEC 230.95].
3. ALL EQUIPMENT TO BE RATED FOR BACKFEEDING.
4. PV BREAKER TO BE POSITIONED AT THE OPPOSITE END OF THE BUSBAR RELATIVE TO THE MAIN BREAKER.

DISCONNECT NOTES:

1. DISCONNECTING SWITCHES SHALL BE WIRED SUCH THAT WHEN THE SWITCH IS OPENED THE CONDUCTORS REMAINING LIVE ARE CONNECTED TO THE TERMINALS MARKED "LINE SIDE" (TYPICALLY THE UPPER TERMINALS)
2. AC DISCONNECT MUST BE ACCESSIBLE TO QUALIFIED UTILITY PERSONNEL, BE LOCKABLE, AND BE A VISIBLE-BREAK SWITCH
3. DISCONNECT MEANS AND THEIR LOCATION SHALL BE IN ACCORDANCE WITH [NEC 225.31] AND [NEC 225.32].



GROUNDING & GENERAL NOTES:

1. PV GROUNDING ELECTRODE SYSTEM NEEDS TO BE INSTALLED IN ACCORDANCE WITH [NEC 690.43]
2. PV INVERTER IS UNGROUNDED, TRANSFORMER-LESS TYPE.
3. DC GEC AND AC EGC TO REMAIN UNSPLICED, OR SPLICED TO EXISTING ELECTRODE
4. ANY EXISTING WIRING INVOLVED WITH PV SYSTEM CONNECTION THAT IS FOUND TO BE INADEQUATE PER CODE SHALL BE CORRECTED PRIOR TO FINAL INSPECTION.
5. JUNCTION BOX QUANTITIES, AND PLACEMENT SUBJECT TO CHANGE IN THE FIELD - JUNCTION BOX BOX DEPICTED ON ELECTRICAL DIAGRAM REPRESENT WIRE TYPE TRANSITIONS.
6. AC DISCONNECT NOTED IN EQUIPMENT SCHEDULE OPTIONAL IF OTHER AC DISCONNECTING MEANS IS LOCATED WITHIN 10' OF SERVICE DISCONNECT.
7. RACEWAYS AND CABLES EXPOSED TO SUNLIGHT ON ROOFTOPS SHOULD BE INSTALLED MORE THAN 7/8" ABOVE THE ROOF USING CONDUIT SUPPORTS.

RACKING NOTE:

1. BOND EVERY OTHER RAIL WITH #6 BARE COPPER

NOTE: CONDUIT TO BE UL LISTED FOR WET LOCATIONS AND UV PROTECTED

NOTE: WIRE SCHEDULE CALLOUT "1,2,3 & 3C" ARE EXISTING SYSTEMS

QTY	CONDUCTOR INFORMATION	CONDUIT TYPE	CONDUIT SIZE
① (4)	#12AWG - ENPHASE ENGAGE CABLE (L1 & L2 NO NEUTRAL)	N/A	N/A
(1)	#6AWG - BARE COPPER IN FREE AIR		
② (4)	#10AWG - CU, THWN-2	EMT OR LFMC	3/4"
(2)	#10AWG - CU, THWN-2 GND		
③ (1)	#10AWG - CU, THWN-2 N	EMT, LFMC OR PVC	3/4"
(1)	#10AWG - CU, THWN-2 GND		
③A (2)	#8AWG - CU, THWN-2	EMT, LFMC OR PVC	3/4"
(1)	#10AWG - CU, THWN-2 GND		
③B (2)	#10AWG - CU, THWN-2	EMT, LFMC OR PVC	3/4"
(1)	#10AWG - CU, THWN-2 GND		
③C (2)	#10AWG - CU, THWN-2	EMT, LFMC OR PVC	3/4"
(1)	#10AWG - CU, THWN-2 GND		
(2)	#4AWG - CU, THWN-2		
④ (1)	#4AWG - CU, THWN-2 N	EMT, LFMC OR PVC	1"
(1)	#6AWG - CU, THWN-2 GND		
⑤ (2)	#4AWG - CU, THWN-2	EMT, LFMC OR PVC	1"
(1)	#4AWG - CU, THWN-2 N		

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SHEET NAME

ELECTRICAL LINE DIAGRAM

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-4

AMBIENT TEMPERATURE SPECS	
RECORD LOW TEMP	-9°
AMBIENT TEMP (HIGH TEMP 2%)	38°
MODULE TEMPERATURE COEFFICIENT OF Voc	-0.259%/°C

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

AC CALCULATIONS																						
CIRCUIT ORIGIN	CIRCUIT DESTINATION	VOLTAGE (V)	FULL LOAD AMPS "FLA" (A)	FLA*1.25 (A)	OCPD SIZE (A)	NEUTRAL SIZE	GROUND SIZE	CONDUCTOR SIZE	75°C AMPACITY (A)	AMPACITY CHECK #1	AMBIENT TEMP. (°C)	TOTAL CC CONDUCTORS IN RACEWAY	90°C AMPACITY (A)	DERATION FACTOR FOR AMBIENT TEMPERATURE NEC 310.15(B)(2)(a)	DERATION FACTOR FOR CONDUCTORS PER RACEWAY NEC 310.15(B)(3)(a)	90°C AMPACITY DERATED (A)	AMPACITY CHECK #2	FEEDER LENGTH (FEET)	CONDUCTOR RESISTANCE (OHM/KFT)	VOLTAGE DROP AT FLA (%)	CONDUIT SIZE	CONDUIT FILL (%)
CIRCUIT 1	JUNCTION BOX	240	10.89	13.61	20	N/A	BARE COPPER #6 AWG	CU #12 AWG	25	PASS	38	2	30	0.91	1	27.3	PASS			0.38	N/A	#N/A
CIRCUIT 2	JUNCTION BOX	240	9.68	12.10	20	N/A	BARE COPPER #6 AWG	CU #12 AWG	25	PASS	38	2	30	0.91	1	27.3	PASS			0.30	N/A	#N/A
JUNCTION BOX	COMBINER BOX	240	10.89	13.61	20	N/A	CU #10 AWG	CU #10 AWG	35	PASS	38	4	40	0.91	0.8	29.12	PASS	25	1.24	0.281	3/4" EMT	19.79362
COMBINER BOX	SYSTEM CONTROLLER 2	240	20.57	25.71	30	CU #10 AWG	CU #10 AWG	CU #10 AWG	35	PASS	38	2	40	0.91	1	36.4	PASS	5	1.24	0.106	3/4" EMT	15.8349
SYSTEM CONTROLLER 2	ESS AC DISCONNECT	240	37.3	46.63	50	N/A	CU #10 AWG	CU #8 AWG	50	PASS	38	2	55	0.91	1	50.05	PASS	5	0.778	0.121	3/4" EMT	17.69231
ESS AC DISCONNECT	AC JUNCTION BOX	240	37.3	46.63	50	N/A	CU #10 AWG	CU #8 AWG	50	PASS	38	2	55	0.91	1	50.05	PASS	5	0.778	0.121	3/4" EMT	17.69231
AC JUNCTION BOX	ENPHASE IQ 10T BATTERY	240	16	20.00	20	N/A	CU #10 AWG	CU #10 AWG	35	PASS	38	2	40	0.91	1	36.4	PASS	5	1.24	0.083	3/4" EMT	11.87617
AC JUNCTION BOX	ENPHASE IQ 3T BATTERY	240	5.3	6.63	20	N/A	CU #10 AWG	CU #10 AWG	35	PASS	38	2	40	0.91	1	36.4	PASS	5	1.24	0.027	3/4" EMT	11.87617
SYSTEM CONTROLLER 2	BACKUP LOAD PANEL	240	80	80.00	80	CU #4 AWG	CU #6 AWG	CU #4 AWG	85	PASS	38	2	95	0.91	1	86.45	PASS	5	0.308	0.103	1" EMT	34.47917
SYSTEM CONTROLLER 2	PV/ESS AC DISCONNECT	240	57.87	72.34	80	CU #4 AWG	CU #6 AWG	CU #4 AWG	85	PASS	38	2	95	0.91	1	86.45	PASS	5	0.308	0.074	1" EMT	34.47917
PV/ESS AC DISCONNECT	MSP	240	57.87	72.34	80	CU #4 AWG	N/A	CU #4 AWG	85	PASS	38	2	95	0.91	1	86.45	PASS	5	0.308	0.074	1" EMT	28.61111

Circuit 1 Voltage Drop	0.768
Circuit 2 Voltage Drop	0.688

NOTES APPENDIX (AS APPLICABLE FOR TO BE BUILT DRAWING SETS): (A) TOTAL AC VOLTAGE DROP NOT TO EXCEED 2% TO INTERCONNECTION < 3% FROM INVERTER(S) TO UTILITY TRANSFORMER. (B) ALL CONNECTORS 75C RATED. (C) ALL CONDUCTORS COPPER, UNLESS OTHERWISE NOTED. DUE TO HIGHER COEFFICIENT OF EXPANSION, ALUMINUM CONDUCTORS REQUIRE MORE MAINTENANCE/INSPECTION THAN COPPER CONDUCTORS. ANNUAL RETORQUEING AS WELL AS INFRARED INSPECTION, MINIMALLY. BE CAREFUL NOT TO CONNECT ALUMINUM WITH COPPER RATED CONDUCTORS OR FITTINGS DURING CONSTRUCTION, TERMINALS SHOULD BE DUAL RATED. MATERIAL FOR NEUTRAL AND EGG SHOULD BE THE SAME IN A GIVEN SEGMENT. (D) OUTDOOR EQUIPMENT NEMA3R. (E) ALL CONDUCTORS FOR PV & ESS SYSTEMS MUST BE PROTECTED FROM ACCESS BY A FENCE OR SUITABLE COVER, OR OUT OF REACH. (F) PROPERTY LINES, BOUNDARIES AND ALL OTHER EXTERIOR MEASUREMENTS ARE FOR REFERENCE ONLY, AND MUST BE VERIFIED BY A LICENSED SURVEYOR OR CIVIL ENGINEER. (G) ENERGY STORAGE SYSTEMS ARE REQUIRED TO BE INSTALLED IN LOCATIONS AND CONTAINERS IN COMPLIANCE WITH THEIR LISTING REQUIREMENTS. (H) IF TRAVEL ACROSS A ROOF IS LIMITED TO FIRE SETBACK AREAS, FALL RESTRAINT SYSTEMS MAY BE REQUIRED. (I) NO PVC ALLOWED ON ROOF OR IN ATTIC. (J) MC4 CONNECTORS MAY NOT BE JOINED WITH 'MC4 COMPATIBLE' CONNECTORS. (K) FOR COMMERCIAL SYSTEMS - UNDER MODULE WIRE MANAGEMENT SYSTEMS ARE REQUIRED, RACEWAY FILL MUST NOT EXCEED 40% REFER TO LOCAL REGULATIONS FOR EXCEPTIONS. (L) TAP CONNECTION IN PANEL MUST NOT VIOLATE CONDITIONS OF ACCEPTABILITY FROM PANEL MANUFACTURER'S NRTL LISTING, OR FIELD LABEL REQUIRED. (M) PV WIRES MAY NOT BE LAID DIRECTLY ON ROOF, WIRE MANAGEMENT SUCH AS SNAKE TRAY, ETC. MUST BE USED 40% FILL MAX. (N) TY WRAPS FOR WIRE MANAGEMENT MUST BE STRUCTURAL (S21) UL APPROVED, OR SUN BUNDLER OR EQUAL. (O) DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK. CONDUIT ROUTING, WHEN INDICATED, IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL OFFSETS, DROPS, AND RISES OF RUNS. THE CONTRACTOR SHALL ALLOW IN HIS PRICE FOR ROUTING OF CONDUIT TO AVOID OBSTRUCTIONS. (P) BURIED CONDUITS UNDER AREAS SUBJECT TO VEHICLE TRAFFIC REQUIRE MIN 24" COVER. (Q) SOLAREGE INVERTERS MAY BE EQUIPPED WITH OCPD ON DC LINES, IF NOT EXTERNAL OCPD MAY BE REQUIRED FOR STRINGS NUMBERING 3 OR MORE. (R) BATTERIES MUST BE IN AN APPROVED BATTERY ENCLOSURE (SPECIFIED BY THE BATTERY MANUFACTURER), SUITABLE FOR THE LOCATION. (S) NM-B OR PAPER INSULATED CONDUCTORS MAY NOT BE USED EXTERIOR. INSTEAD USE THWN-2 OR EQUAL IN EMT CONDUIT. (T) FOR MULTIPLE BATTERIES/INVERTERS SHARING A COMMON DC BUS, OCPD PROTECTION IS REQUIRED ON BOTH SIDES OF THE BUS AND AT INVERTERS DUE TO 2 WAY CURRENTS. (U) THE DEVELOPER IS REQUIRED TO CONFIRM EXISTING ELECTRICAL SERVICE SIZE FROM THE UTILITY, AND MAY NOT RELY SOLELY ON EXISTING BREAKER SIZES. (V) CONNECTING TO UTILITY EQUIPMENT REQUIRES PRIOR UTILITY CONSENT. (W) ALL CONNECTIONS MADE FOR FLOATING SOLAR INSTALLATIONS, ABOVE A BODY OF WATER, MUST BE SUBMERSIBLE COMPLIANT. (X) WHEN BUILDING PV SYSTEMS WITH POWER LINE COMMUNICATIONS FOR RSD SOLUTIONS, FOLLOWING MANUFACTURERS INSTRUCTIONS ON CONDUCTOR AND CONDUIT SPACING IS PARAMOUNT, OR HAZARD MAY RESULT. (Y) NOTIFY ELECTRICAL ENGINEER WHO'S SEAL IS ON THIS DRAWING PRIOR TO ANY AND ALL CHANGES IN DESIGN.

INSTALLATION NOTES:

IQ 10T BATTERY/IQ SYSTEM CONTROLLER MOUNTING NOTES:

1. THERE MUST BE NO HIGHLY FLAMMABLE OR EXPLOSIVE MATERIALS NEARBY.
2. THE AMBIENT TEMPERATURE SHOULD BE WITHIN THE RANGE OF 5 ~ 131°F (-15 ~ 55°C)
3. THE IQ/ENPOWER HOUSING IS NEMA TYPE 3R AND CAN BE INSTALLED INDOORS OR OUTDOORS. THE TERMINAL BLOCKS ACCEPTS COPPER CONDUCTORS OF NO. 12 - 8 AWG.
4. MAINTAIN AT LEAST THREE FEET OF CLEARANCE IN FRONT OF EACH PRODUCT. ALLOW AT LEAST 15CM (SIX INCHES) CLEARANCE ON TOP AND BOTTOM OF THE PRODUCT SO THAT THE VENTS ON THE TOP AND BOTTOM OF THE UNITS ARE NOT BLOCKED FOR AIR CIRCULATION.
5. UP TO TWO IQ 10T (OR SIX IQ 3T) UNITS CAN BE DAISY CHAINED ON ONE CIRCUIT. FOR INSTALLATIONS WITH MORE THAN THIS NUMBER OF UNITS, THERE MUST BE A SEPARATE COMBINER PANEL, SUBPANEL, OR CIRCUIT COMBINER WITH OVER CURRENT PROTECTION TO COMBINE THE DAISY CHAINED CIRCUITS, AND YOU MUST RUN ONLY ONE CIRCUIT FOR ALL THE IQ UNITS TO THE ENPOWER (OR TO ENPHASE IQ COMBINER FOR GRID-TIED-ONLY INSTALLATIONS).

AC DISCONNECT INSTALL NOTES:

1. INSTALL AN AC DISCONNECT THAT CAN BREAK THE MAXIMUM RATED CURRENT OF THE BRANCH CIRCUIT UNDER LOAD. THE AC DISCONNECT MUST BE INSTALLED IN LINE-OF-SIGHT OF IQ, PER NEC 2017 706.7(A).
2. EACH IQ UNIT IS SUITABLE FOR USE WITH UP TO NO. 8 AWG WIRES ON A MAXIMUM 40 A BRANCH CIRCUIT. IF MORE THAN 32 A OF IQ BATTERIES (CORRESPONDING TO A 40 A BRANCH CIRCUIT) ARE INSTALLED, A SEPARATE SUBPANEL MUST BE INSTALLED BETWEEN THE IQ UNITS AND ENPOWER TO COMBINE THE ENPOWER CIRCUITS TOGETHER. ALL CIRCUIT BREAKERS IN THE SUBPANEL MUST BE SUITABLE FOR BACK-FEEDING, PER NEC 408.36(D).
3. VERIFY THAT AC VOLTAGE AT THE SITE IS WITHIN RANGE: SINGLE-PHASE L1 TO L2 VOLTAGE MUST MEASURE BETWEEN 211 AND 264 VAC, WHILE L-N SHOULD MEASURE BETWEEN 106 AND 132 VAC.

RECOMMENDED:

1. THE BUILDING SHOULD BE DESIGNED TO WITHSTAND EARTHQUAKES.
2. THE WATERPROOF AND PROPERLY VENTILATED AREA IS RECOMMENDED. (IP55)
3. INSTALL THE PRODUCT OUT OF REACH OF CHILDREN AND ANIMALS.

ELECTRICAL NOTES

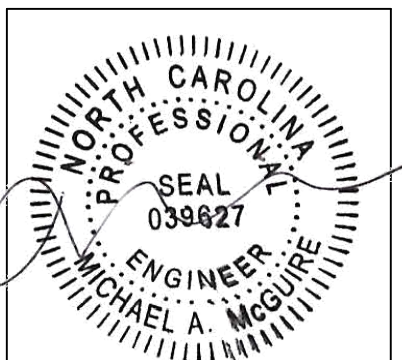
1. ALL EQUIPMENT TO BE LISTED BY UL OR OTHER NRTL, AND LABELED FOR ITS APPLICATION.
2. ALL CONDUCTORS SHALL BE COPPER, RATED FOR 600 V AND 90 DEGREE C WET ENVIRONMENT.
3. WIRING, CONDUIT, AND RACEWAYS MOUNTED ON ROOFTOPS SHALL BE ROUTED DIRECTLY TO, AND LOCATED AS CLOSE AS POSSIBLE TO THE NEAREST RIDGE,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



TOP TIER SOLAR SOLUTIONS

1530 CENTER PARK DR #2911,
CHARLOTTE, NC 28217,
UNITED STATES

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL DESIGN	12/12/2023	



sealed 12dec2023 mike@h2dc.com
H2DC PLLC NC CoA#: P-1703
ELECTRICAL ONLY
- NOT AN AS-BUILT DRAWING SET -

PROJECT NAME & ADDRESS

MARY BOLIN
RESIDENCE

373 CHINABERRY LN,
ANGIER, NC 27501

DRAWN BY
ESR

SHEET NAME
WIRING CALCULATIONS

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

SHEET NUMBER
PV-5

⚠ WARNING

ELECTRIC SHOCK HAZARD

TERMINALS ON THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

LABEL- 1:
 LABEL LOCATION:
 AC DISCONNECT
 CODE REF: NEC 690.13(B)

⚠ WARNING TRI POWER SOURCE
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM
THIRD SOURCE IS BATTERY SYSTEM

LABEL- 2:
 LABEL LOCATION:
 UTILITY METER
 MAIN SERVICE PANEL
 SUBPANEL
 CODE REF: NEC 705.12(C) & NEC 690.59

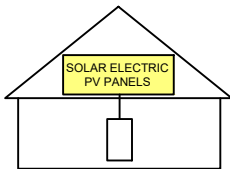
⚠ WARNING

TURN OFF PHOTOVOLTAIC AC DISCONNECT PRIOR TO WORKING INSIDE PANEL

LABEL- 3:
 LABEL LOCATION:
 MAIN SERVICE PANEL
 SUBPANEL
 MAIN SERVICE DISCONNECT
 COMBINER
 CODE REF: NEC 110.27(C) & OSHA 1910.145 (f) (7)

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

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



LABEL- 4:
 LABEL LOCATION:
 AC DISCONNECT
 CODE REF: [NEC 690.56(C)(1)(A)]

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

LABEL- 5:
 LABEL LOCATION:
 AC DISCONNECT
 CODE REF: NEC 690.56(C)(2)

PHOTOVOLTAIC

AC DISCONNECT

LABEL- 6:
 LABEL LOCATION:
 AC DISCONNECT
 CODE REF: NEC 690.13(B)

MAIN PHOTOVOLTAIC SYSTEM DISCONNECT

LABEL- 7:
 LABEL LOCATION:
 MAIN SERVICE DISCONNECT (ONLY IF MAIN SERVICE DISCONNECT IS PRESENT)
 CODE REF: NEC 690.13(B)

ESS AC DISCONNECT

NOMINAL OPERATING AC VOLATGE **240 V**

RATED AC OUTPUT CURRENT **37.30 A**

LABEL- 8:
 LABEL LOCATION:
 ESS AC DISCONNECT
 CODE REF: NEC 690.54

PV/ESS AC DISCONNECT

NOMINAL OPERATING AC VOLATGE **240 V**

RATED AC OUTPUT CURRENT **57.87A**

LABEL- 9:
 LABEL LOCATION:
 PV/ESS AC DISCONNECT
 CODE REF: NEC 690.54

⚠ WARNING

ELECTRIC SHOCK HAZARD

DO NOT TOUCH TERMINALS
 TERMINALS ON BOTH LINE & LOAD SIDES MAY BE ENERGIZED IN OPEN POSITION
 DO NOT DISCONNECT FUSES UNDER LOAD

THE DC CONDUCTORS OF THIS PHOTOVOLTAIC SYSTEM ARE UNGROUNDED AND MAY BE ENERGIZED

PHOTOVOLTAIC SYSTEM DC DISCONNECT

AUTHORIZED PERSONNEL ONLY

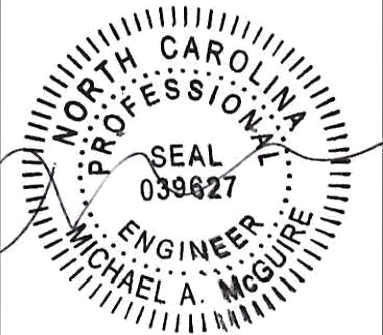
Note: WARNING labels must resemble format in example above with over-sized WARNING, exclamation point in triangle, colors, etc.



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sealed 12dec2023 mike@h2dc.com
 H2DC PLLC NC CoA#: P-1703
 ELECTRICAL ONLY
 - NOT AN AS-BUILT DRAWING SET -

PROJECT NAME & ADDRESS

MARY BOLIN RESIDENCE

**373 CHINABERRY LN,
 ANGIER, NC 27501**

DRAWN BY
ESR

SHEET NAME
LABELS

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

SHEET NUMBER
PV-6

IQ Battery 10T

The **IQ Battery 10T** all-in-one AC-coupled storage system is reliable, smart, simple, and safe. It is comprised of three base IQ Battery 3T storage units, has a total usable energy capacity of 10.08 kWh and twelve embedded grid-forming microinverters with 3.84 kW power rating. It provides backup capability and installers can quickly design the right system size to meet the needs of both new and retrofit solar customers.



Reliable

- Proven high reliability IQ Series Microinverters
- 10-years limited warranty, extendable to 15-years¹
- Three independent IQ Battery base units
- Twelve embedded IQ8X-BAT Microinverters
- Passive cooling (no moving parts/fans)
- UL listed
- Meets CA Rule 21 (UL 1741-SA) and IEEE 1547:2018 (UL 1741-SB, 3rd Ed.)

Smart

- Grid-forming capability for backup operation
- Remote software and firmware upgrade
- Mobile app-based monitoring and control
- Support for self consumption
- Utility time of use (TOU) optimization

Simple

- Fully integrated AC battery system
- Quick and easy plug-and-play installation
- Interconnects with standard household AC wiring

Safe

- Safety tested battery cells and module
- Lithium iron phosphate (LFP) chemistry for maximum safety and longevity

1. Terms and conditions apply.

To learn more about Enphase offerings, visit enphase.com
IQB-10T-DS-0110-EN-US-12-23-2022



IQ Battery 10T

MODEL NUMBER	
ENCHARGE-10T-1P-NA	IQ Battery 10T with integrated IQ Series Microinverters and battery management unit (BMU). Includes: - Three IQ Battery 3T base units (B03-T01-US00-1-3) - One IQ Battery 10T cover kit with cover, wall mounting bracket, and interconnect cable for wiring between batteries (B10T-C-1290-O)
OUTPUT (AC)	
	@ 240VAC ²
Rated (continuous) output power	3.84 kVA
Peak output power	5.76 kVA (10 seconds)
Nominal voltage / range	240/211 – 264VAC
Nominal frequency / range	60/57 – 63 Hz
Rated output current	16A
Peak output current	24.6A (10 seconds)
Power factor (adjustable)	0.85 leading ... 0.85 lagging
Maximum units per 20A branch circuit	1 unit (single-phase)
Interconnection	Single-phase
Maximum AC short circuit fault current over 3 cycles	69.6 Arms
Round trip efficiency ³	89%
BATTERY	
Total capacity	10.5 kWh
Usable capacity	10.08 kWh
Round trip efficiency	96%
Nominal DC voltage	67.2V
Maximum DC voltage	75.6V
Ambient operating temperature range	-15°C to 55°C (5°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 (WxHxD)	1283 mm x 775 mm x 188 mm (50.5 in x 30.5 in x 7.4 in)
Weight	Three individual 40.5 kg (89.3 lbs) base units plus 22.1 kg (48.7 lbs) cover and mounting bracket; total 143.6 kg (316.5 lbs)
Enclosure	Outdoor – NEMA type 3R
IQ8X-BAT microinverter enclosure	NEMA type 6
Cooling	Natural convection – No fans
Altitude	Up to 2,500 meters (8,200 feet)
Mounting	Wall mount
FEATURES AND COMPLIANCE	
Compatibility	Compatible with grid-tied PV systems. Compatible with M215/M250 and IQ Series Microinverters, IQ System Controller, and IQ Gateway for backup operation.
Communication	Wireless 2.4 GHz
Services	Backup, self-consumption, TOU, Demand Charge, NEM Integrity
Monitoring	Enphase Installer App monitoring options; API integration
Compliance	CA Rule 21 (UL 1741-SA), IEEE 1547:2018 (UL 1741-SB, 3 rd Ed.) CAN/CSA C22.2 No. 107.1-16 UL9540, UL9540A ⁴ , 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	>70% capacity, up to 10-years or 4,000 cycles ⁵ , extendable to 15-years ¹

1. Terms and conditions apply.
2. Supported in both grid-connected and backup operation.
3. AC to Battery to AC at 50% power rating.
4. When installed with Wall Mount SKUs (B10T-AWM-1280-O & B10T-MWM-1280-O). See [IQ Battery 3T/10T Installation Guide](#) for details.
5. Whichever occurs first. Restrictions apply.

To learn more about Enphase offerings, visit enphase.com

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IQB-10T-DS-0110-EN-US-12-23-2022



TOP TIER
SOLAR SOLUTIONS

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RESIDENCE

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DRAWN BY

ESR

SHEET NAME
EQUIPMENT
SPECIFICATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER

PV-7