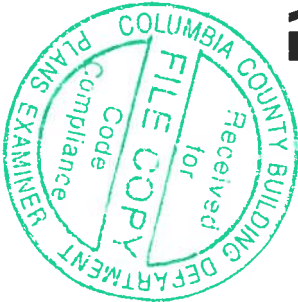


A SOLAR PV SYSTEM IMPROVEMENT FOR:  
DUFFE RESIDENCE

SOLAR IMPROVEMENT CONSTRUCTION DOCUMENTS  
FOR THE EXISTING RESIDENTIAL GRID TIED ELECTRICAL  
SYSTEM



VICINITY MAP



| INDEX                                 | SHEET DRAWING NAME                          |
|---------------------------------------|---------------------------------------------|
| CV                                    | COVERSHEET                                  |
| SLR1                                  | SOLAR SYSTEM EQUIPMENT LOCATION PLAN        |
| PVR-GM2                               | GROUND MOUNT DETAIL - SOLAR ELECTRIC        |
| SLR2                                  | ELECTRICAL 3-LINE DIAGRAM WITH CALCULATIONS |
| ----- APPENDIX -----                  |                                             |
| FSEC CERTIFICATION - SOLAR PV         |                                             |
| SOLARWORLD 290W MODULE DATA SHEET     |                                             |
| ENPHASE S280 MICROINVERTER DATA SHEET |                                             |
|                                       |                                             |
|                                       |                                             |
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950 SUNSHINE LN. ALTAMONTE SPRINGS, FL  
WWW.UMASOLAR.COM  
ENGINEERING@UMASOLAR.COM

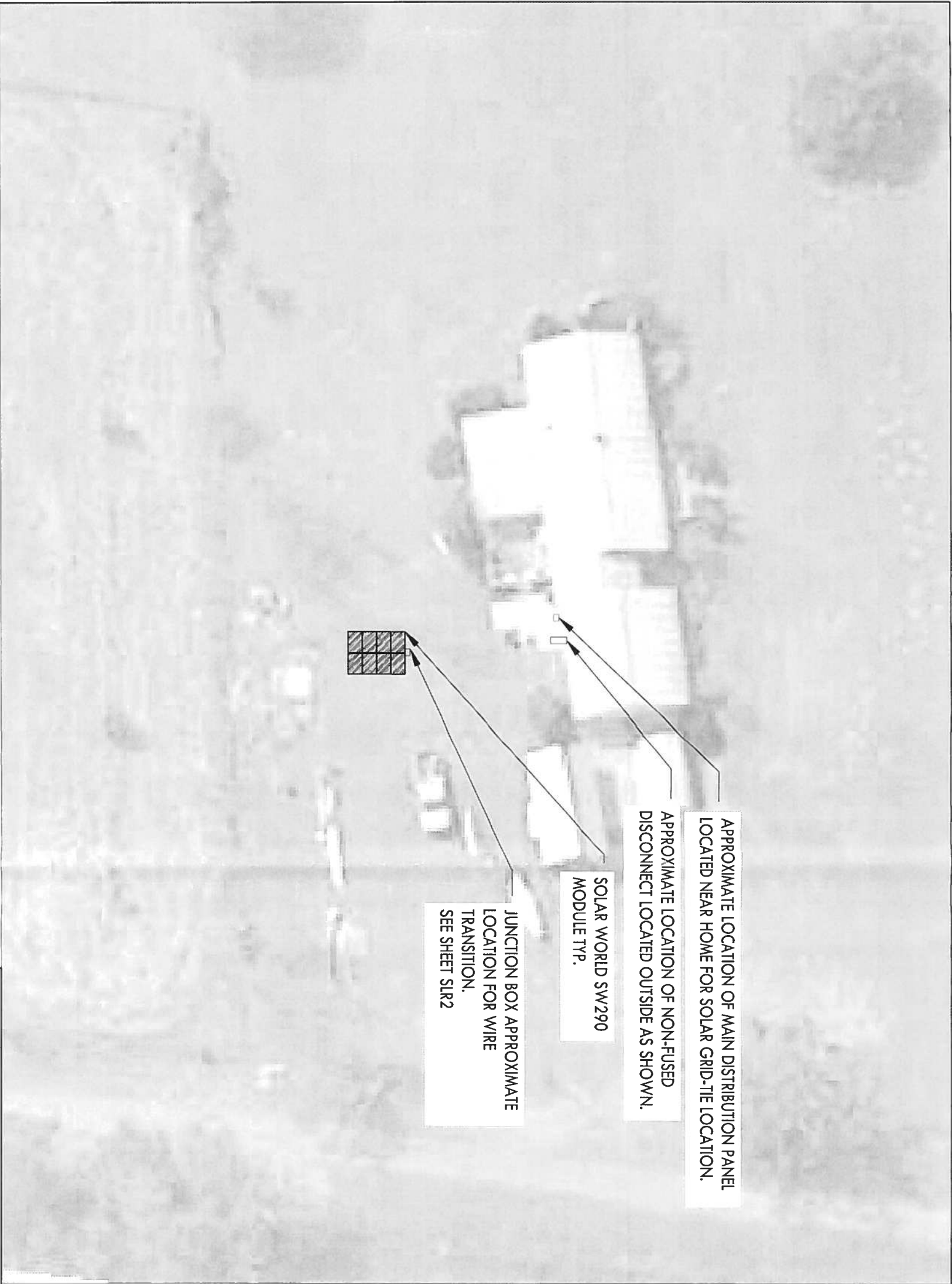
SOLAR SYSTEM RETROFIT  
PROJECT NAME: DUFFE RESIDENCE  
PROJECT ADDRESS: 379 SW LACROSSE CT  
LAKE CITY, FL 32024

|                 |
|-----------------|
| DATE: 6/15/2017 |
| DRAWN BY: JAT   |
| CHKD BY: SL     |
| REC. NO. #      |
| SCALE AS NOTED  |

DRAWING #  
**CV**

SHEET 1 OF 4





APPROXIMATE LOCATION OF MAIN DISTRIBUTION PANEL  
LOCATED NEAR HOME FOR SOLAR GRID-TIE LOCATION.

APPROXIMATE LOCATION OF NON-FUSED  
DISCONNECT LOCATED OUTSIDE AS SHOWN.

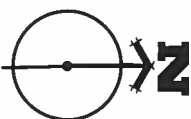
SOLAR WORLD SW290  
MODULE TYP.

JUNCTION BOX APPROXIMATE  
LOCATION FOR WIRE  
TRANSITION.  
SEE SHEET SLR2

## RESIDENTIAL GROUND MOUNT LAYOUT - PV MODULE LAYOUT AND EQUIPMENT LOCATION PLAN

SCALE: N.T.S.

GROUND MOUNT LAYOUT NOTE:  
SOLAR PANEL LAYOUT IS CONCEPTUAL, BUT AS PROVIDED, CONFORMS WITH THE REQUIREMENTS SET IN  
SHEET PVR-GM2 FOR SPECIFIED ADDRESS. CONTRACTOR MAY ADJUST PANEL LOCATION, BUT SHALL  
CONFORM TO THE REQUIREMENTS ON SHEET PVR-GM2.



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PROJECT:

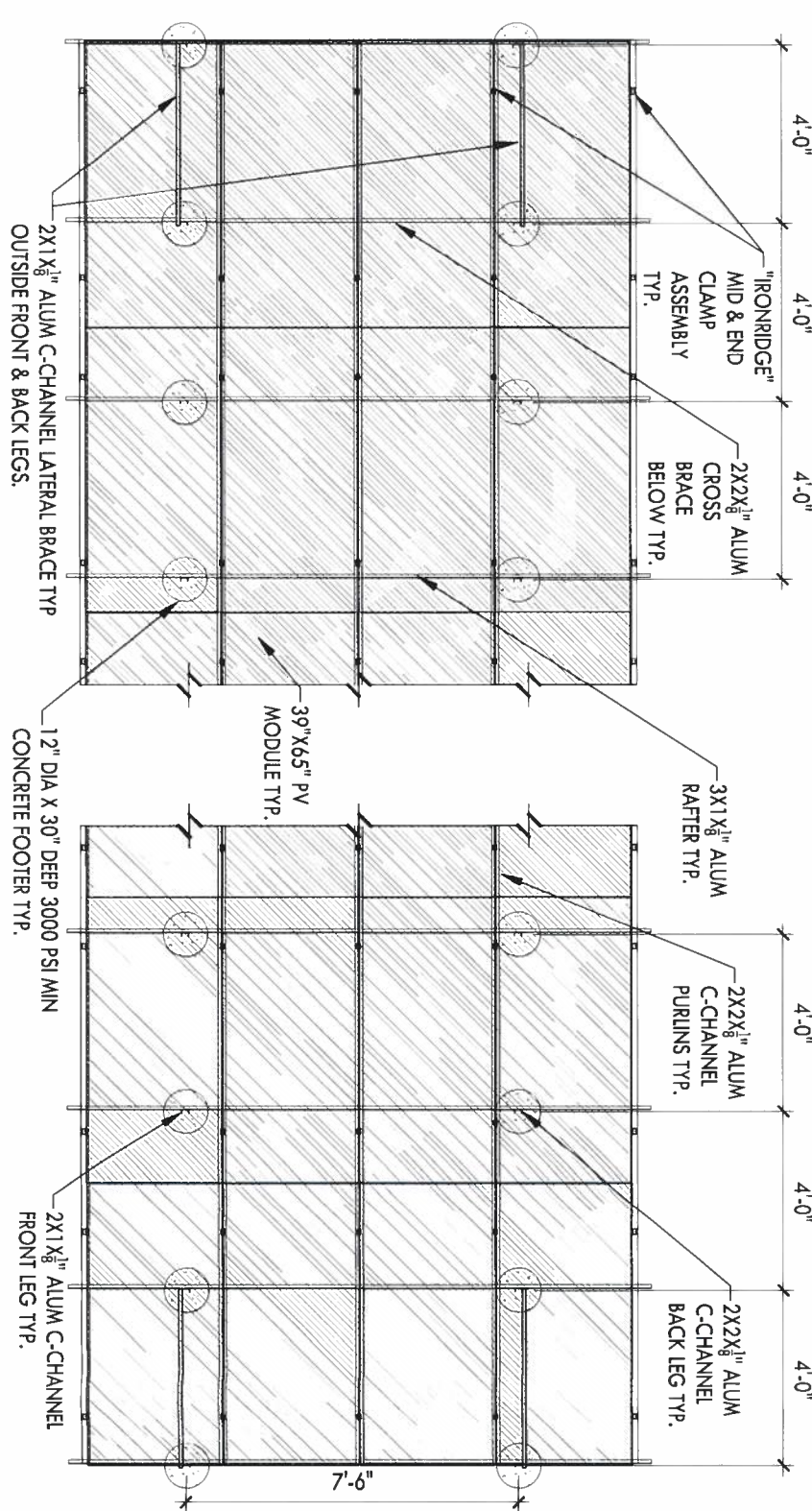
SOLAR SYSTEM RETROFIT  
PROJECT NAME: DUFFE RESIDENCE  
PROJECT ADDRESS: 379 SW LACROSSE CT  
LAKE CITY, FL 32024

|            |           |
|------------|-----------|
| DATE       | 6/15/2017 |
| DRAWN BY:  | JAT       |
| CHKD BY:   | SL        |
| REC. NO. # |           |
| SCALE      | AS NOTED  |

|              |
|--------------|
| DRAWING #    |
| SLR1         |
| SHEET 2 OF 4 |

ALUMINUM RACK FOR PHOTOVOLTAIC MODULES GEN. NOTES:

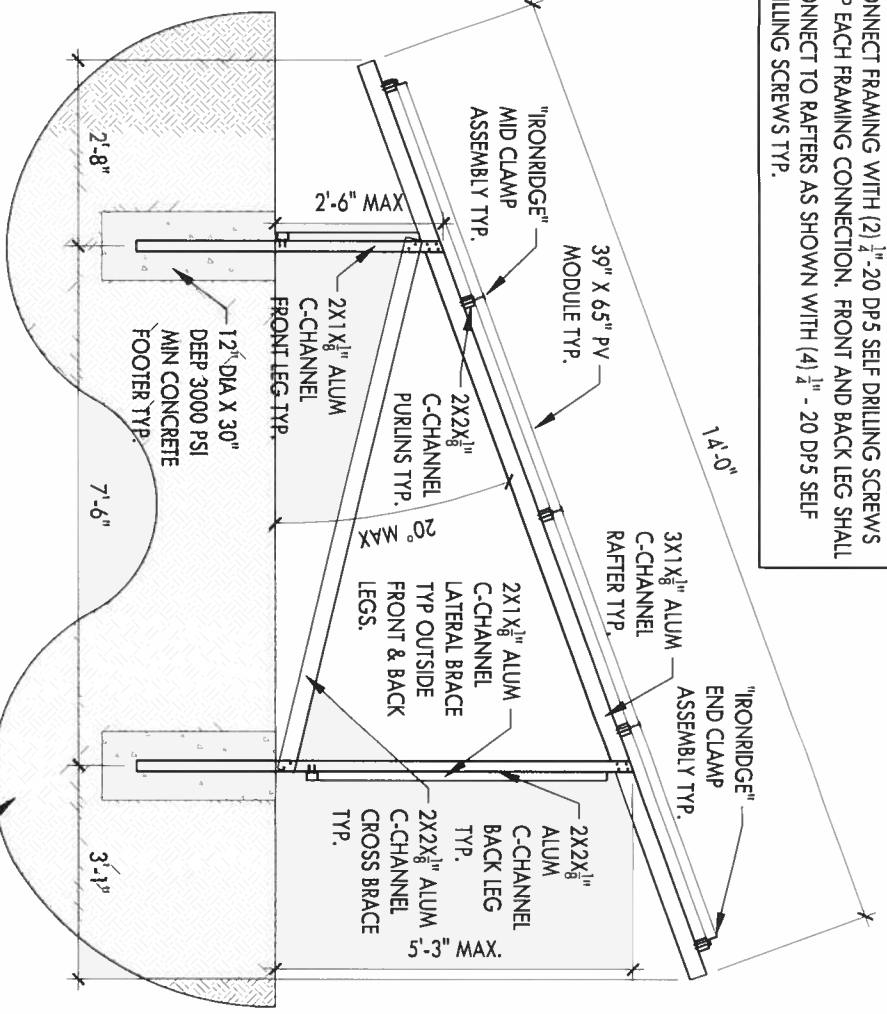
- 1. APPLICABLE CODE: ASCE 7-10 MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES COMPATIBLE WITH 2014 FLORIDA BUILDING CODE (5TH EDITION).
  - 2. ALUMINUM RACK SHOWN MAY BE SLOPED UP TO A MAXIMUM 20°
  - 3. SOIL BEARING CAPACITY ASSUMED TO BE THE FOLLOWING: UNDISTURBED COMPACTED SAND, SILTY SAND, CLAYEY SAND, SILTY GRAVEL AND CLAYEY GRAVEL WITH VERTICAL FOUNDATION PRESSURE OF 2,000 PSF AND LATERAL BEARING PRESSURE OF 150 PSF / FT BELOW NATURAL GRADE. IN THE CASE OF LOOSE SANDS, MUD, SILTS, OR ORGANIC TYPE SOILS, LARGER FOOTER SIZE WILL BE REQUIRED. CONTRACTOR SHALL NOTIFY ENGINEER TO RE-SIZE FOOTERS. SEE FBC CHAPTER 18 SECTION 1806.2 FOR ADDITIONAL DETAILS AND EXCEPTIONS.
  - 4. ALL RACK FRAME MEMBERS SHALL BE ALUMINUM 6063-T5 UNLESS NOTED OTHERWISE (Fy = 21 KSI, Fu = 27 KSI). THICKNESS OF ALL C-CHANNELS THIS SHEET ARE  $\frac{3}{8}$ " THICK MINIMUM TYP.
  - 5. CONTRACTOR /INSTALLER SHALL INSTALL ALUMINUM RACK SYSTEM WITHIN NEW OR EXISTING PROPERTY SETBACKS PER GOVERNING BUILDING DEPARTMENT.
  - 6. THIS SHEET REFLECTS STRUCTURAL DETAILS OF ALUMINUM RACK ONLY. INSTALL SOLAR PV MODULES PER MANUFACTURER RECOMMENDATIONS.
  - 7. ALL SELF DRILLING SCREWS THIS SHEET SHALL BE STAINLESS STEEL  $\frac{1}{4}$ "-20 DRILL POINT #5 UNLESS NOTED OTHERWISE AND SHALL HAVE A MINIMUM EDGE DISTANCE OF  $\frac{3}{8}$ " AND CENTER TO CENTER SPACING OF  $\frac{3}{8}$ " TYP EACH FRAMING CONNECTION.
  - 8. CONCRETE SHALL BE NORMAL WEIGHT 3000 PSI MINIMUM.
  - 9. ALL DISSIMILAR MATERIALS SHALL BE SEPARATED WITH NEOPRENE OR EQUAL.
  - 10. 4X2X0.23" 6061-T6 STRUCTURAL ALUMINUM IN LIEU OF 2X2X $\frac{3}{8}$ " C-CHANNEL PURLINS MAY BE USED.
- DESIGN CRITERIA FOR ALUMINUM RACK AND ALL CONNECTIONS THIS SHEET IS BASED ON MAIN WIND FORCE RESISTING SYSTEM (MWFRS) NOMINAL WIND SPEED UP TO 130 MPH WITH EXPOSURE "B", RISK CATEGORY I, "MONOSLOPE FREE ROOF" AND h < 15'-0" PER ASCE 7-10 "MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES" AND 2014 F.B.C. (5TH EDITION) SITE SPECIFIC ENGINEERS APPROVAL IS REQUIRED IF SITE REQUIREMENTS EXCEEDS DESIGN CRITERIA.



TYPICAL ALUM PV GROUND MOUNT PLAN

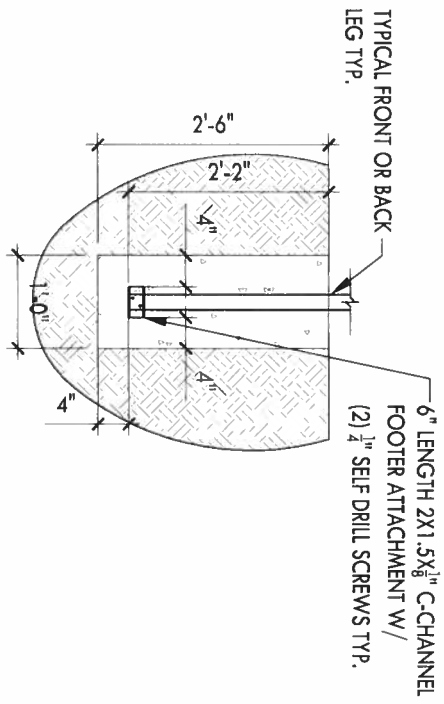
SCALE:  $\frac{1}{2}$ "=1'-0"

CONNECT FRAMING WITH (2)  $\frac{1}{4}$ "-20 DP5 SELF DRILLING SCREWS TYP EACH FRAMING CONNECTION. FRONT AND BACK LEG SHALL CONNECT TO RAFTERS AS SHOWN WITH (4)  $\frac{1}{4}$ " - 20 DP5 SELF DRILLING SCREWS TYP.



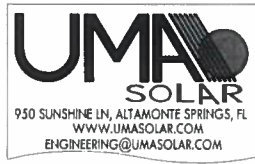
TYPICAL ALUM PV GROUND MOUNT ELEVATION

SCALE:  $\frac{3}{8}$ "=1'-0"



TYPICAL CONCRETE FOOTER CONNECTION DETAIL

SCALE:  $\frac{1}{2}$ "=1'-0"



| REV | DATE | REMARK |
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| 1   |      |        |
| 2   |      |        |
| 3   |      |        |
| 4   |      |        |
| 5   |      |        |

39" X 65" SOLAR PV ALUMINUM GROUND MOUNT SYSTEM  
PROJECT NAME: DUFFE RESIDENCE  
PROJECT ADDRESS: 379 SW LACROSSE CT  
LAKE CITY, FL 32024

|            |          |
|------------|----------|
| DATE       | 6-15-17  |
| DRAWN BY:  | JAT      |
| CHKD BY:   | JAT      |
| REC. NO. # | 29127    |
| SCALE      | AS NOTED |

DRAWING #  
PVRGM2  
JEFFREY A. TORRES  
REGISTERED PROFESSIONAL ENGINEER  
FLORIDA  
No. 80879  
EXPIRES 12/31/2020  
VALID WITHOUT  
SURRENDER OF  
SEAL



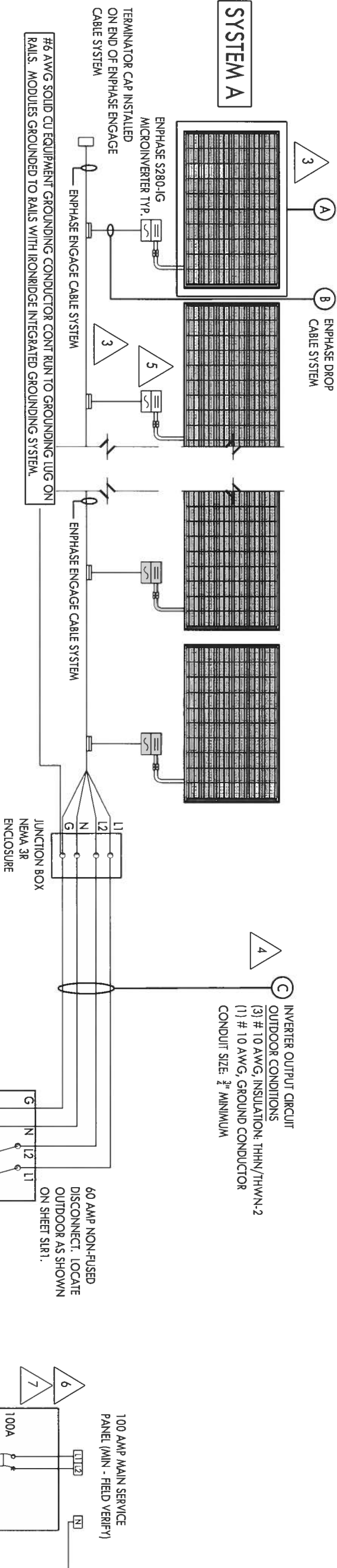
JUN 13 2017 JUN 15 2017

DO NOT SCALE DRAWINGS. CONTRACTORS SHALL VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS AND CONDITIONS ON THE JOB AND THIS OFFICE MUST BE NOTIFIED OF ANY VARIATION FROM THE DIMENSIONS AND CONDITIONS SHOWN BY THESE DRAWINGS.

| POWER TABLE: |             |         |                | SYSTEM A |  |  |              |  |  |
|--------------|-------------|---------|----------------|----------|--|--|--------------|--|--|
| DC-SIDE      | (A)         | (B)     | (C) 1ST BRANCH |          |  |  | AC-SIDE      |  |  |
| # PV MODULE  | 1           | 1       | 8              |          |  |  | INVERTER     |  |  |
| MANUF        | SOLAR WORLD |         |                |          |  |  | ENPHASE-S280 |  |  |
| MODEL        | SW290       |         |                |          |  |  | PEAK POWER   |  |  |
| POWER        | 290 Wp-dc   | 280 W   | 2240 W         |          |  |  | CONT. POWER  |  |  |
| VOC          | 39.9 VDC    | 270 W   | 2160 W         |          |  |  | VOLTAGE      |  |  |
| ISC          | 9.97 A      | 240 VAC | 240 VAC        |          |  |  | CURRENT      |  |  |
| VMP          | 31.4 VDC    | 1.13 A  | 9.04 A         |          |  |  | FREQUENCY    |  |  |
| IMP          | 9.33 AMP    | 60 HZ   | 60 HZ          |          |  |  |              |  |  |

\*\* ST.C. CELL TEMPERATURE @ 25° C, SPECTRUM AM1.5, IRRADIANCE @ 1000 W / M2

| GENERAL PHOTOVOLTAIC 3-LINE DIAGRAM SPECIFIC FLAG NOTES: |                                                                                                                                                                                                                               |   |                                                                                                                                                                                         |
|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1                                                        | OBTAIN ALL PERMITS AND APPROVALS FROM GOVERNING AGENCIES PRIOR TO THE COMMENCEMENT OF WORK                                                                                                                                    | 6 | LABEL BREAKER PER NEC 690.54, 705.12(D) AND 705.10.                                                                                                                                     |
| 2                                                        | EQUIPMENT SHALL BE INSTALLED PER THE 2011 NATIONAL ELECTRICAL CODE (NEC), ALL APPLICABLE OR GOVERNING CODES, MANUFACTURER REQUIREMENTS OF AND PER THE GOVERNING UTILITY COMPANY .                                             | 7 | PV BACKFEED CURRENT PLUS MAIN BREAKER RATING MUST BE LESS THAN OR EQUAL TO 120% OF MAIN SERVICE BUS RATING AND BREAKERS MUST BE MOUNTED AT OPPOSITE END OF MAIN BREAKER PER NEC 705.12. |
| 3                                                        | LISTING AGENT NAME AND NUMBER SHALL BE INDICATED PER NEC 110.3(B).                                                                                                                                                            | 8 | ENPHASE TRUNK CABLE SHALL BE KEPT 1" ABOVE ROOF SURFACE MINIMUM                                                                                                                         |
| 4                                                        | TO PREVENT AN INCREASE IN AC VOLTAGE LEVEL AND AVOID ANY NUISANCE FAULTS, IT IS RECOMMENDED TO SIZE CONDUCTOR FOR A TOTAL VOLTAGE DROP OF 2% OR LESS PER INVERTER MANUFACTURER. ALL CONDUCTORS SHOWN SIZED FOR AMPACITY ONLY. |   |                                                                                                                                                                                         |
| 5                                                        | LABEL DEVICE PER NEC 690.14(C)(2), AND SECURE PER NEC 690.7(D).                                                                                                                                                               |   |                                                                                                                                                                                         |



#### NEC 2011 LABELING REQUIREMENTS

### WARNING

DUAL POWER SOURCE  
SECOND SOURCE IS PV SYSTEM  
LABEL PER NEC 705.12(D)(4) - PROVIDE AT MAIN  
SERVICE PANEL OR TAP BOX LOCATION

#### PHOTOVOLTAIC AC DISCONNECT

MAXIMUM AC OPERATING CURRENT: 9.04 A  
MAXIMUM AC OPERATING VOLTAGE: 240 V  
(PER NEC 690.54 - PROVIDE AT EXTERNAL AC  
DISCONNECT OR MAIN SERVICE PANEL IF  
APPLICABLE)

### MAIN PV SYSTEM DISCONNECT

PER NEC 690.14(2) - PROVIDE AT MAIN  
SERVICE PANEL

### WARNING

DEDICATED SOLAR PANEL. DO  
NOT CONNECT LOADS  
LABEL PER NEC 110.21. PROVIDE AT NEW SUB PANEL OR SERVICE PANEL IF REQUIRED

### WARNING

ELECTRIC SHOCK HAZARD. DO NOT TOUCH  
TERMINALS. TERMINALS ON BOTH THE LINE  
AND LOAD SIDES MAY BE ENERGIZED IN THE  
OPEN POSITION  
LABEL PER NEC 690.17. PROVIDE AT MAIN SERVICE PANEL

### WARNING

INVERTER OUTPUT CONNECTION - DO NOT  
RELOCATE THIS OVERCURRENT DEVICE  
LABEL PER NEC 705-12(D)(7). PROVIDE AT MAIN SERVICE PANEL



| REV | DATE | REMARK | BY |
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PROJECT:

#### SOLAR SYSTEM RETROFIT

PROJECT NAME: DUFFE RESIDENCE  
PROJECT ADDRESS: 379 SW LACROSSE CT  
LAKE CITY, FL 32024

|            |           |
|------------|-----------|
| DATE       | 6/15/2017 |
| DRAWN BY:  | JAT       |
| CHKD BY:   | SL        |
| REC. NO. # |           |
| SCALE      | AS NOTED  |

|           |        |
|-----------|--------|
| DRAWING # | SLR2   |
| SHEET     | 4 OF 4 |