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October 13, 2019

Client: Modern Energy; 6262 Eiterman Road, Dublin, Ohio 43016

Project Address: 424 S Columbia Ave, Columbus OH 43209

Subject: Electrical Schematic P.E. Review

Request was made by Modern Energy project manager to evaluate the proposed electrical drawing attached for code compliance.

The attached electrical plans are found to be acceptable for the proposed solar array.

Very truly yours,
Synergy Engineering Services

A handwritten signature in black ink, appearing to read 'Adam Sniff'.

Adam J. Sniff, P.E.
Consulting Engineer

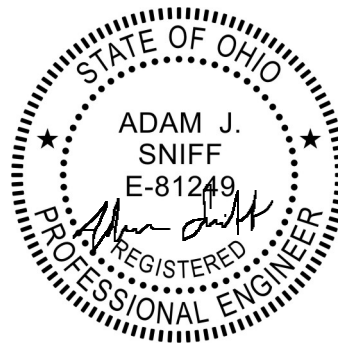
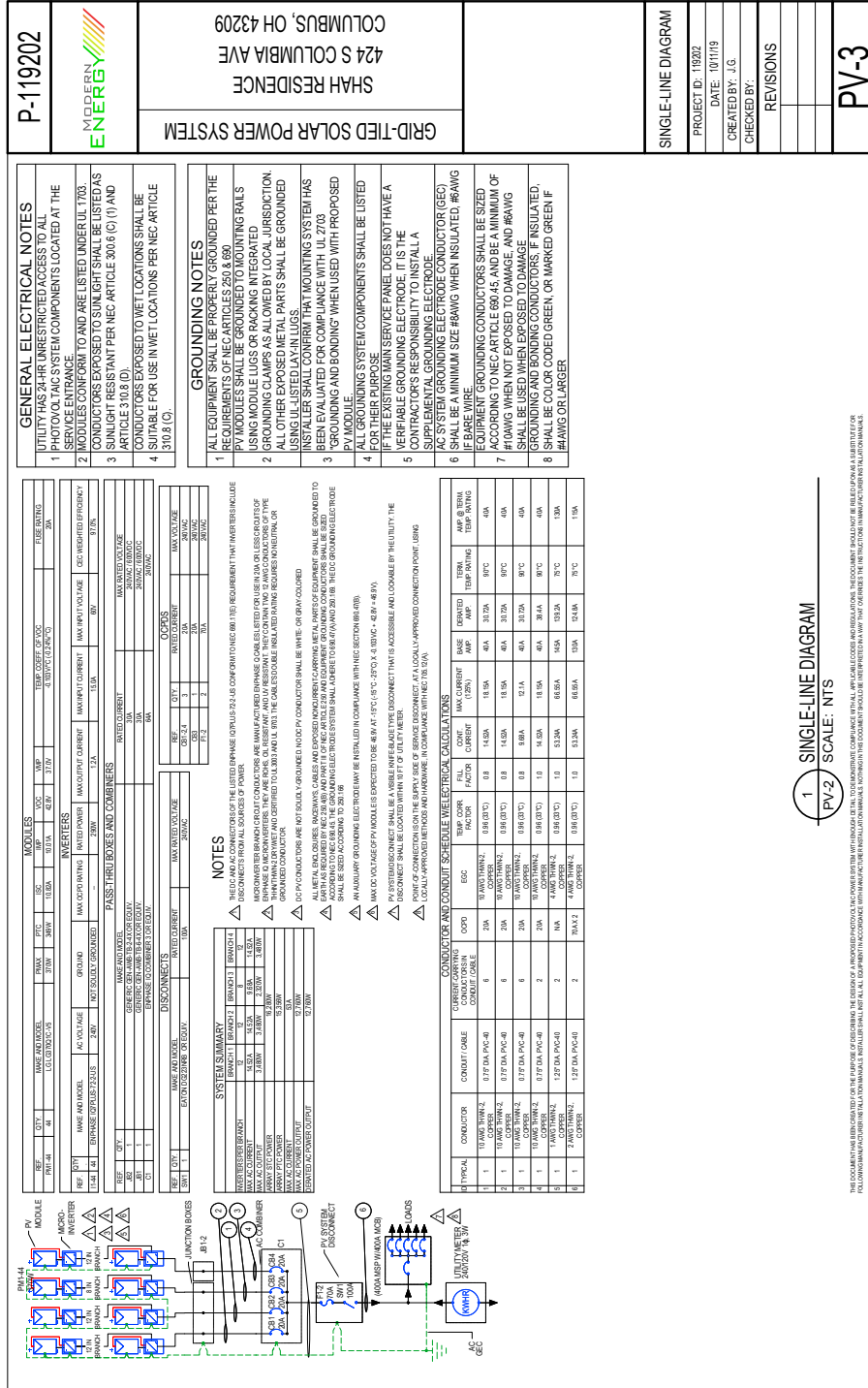


Figure 1. Proposed Electrical Plans



P-119202

MODERN ENERGY

SHAH RESIDENCE
424 S COLUMBIA AVE
COLUMBUS, OH 43209

GRID-TIED SOLAR POWER SYSTEM

SINGLE-LINE DIAGRAM

PROJECT ID: 119202
 DATE: 10/11/19
 CREATED BY: J.G.
 CHECKED BY:

REVISIONS

PV-3

- GENERAL ELECTRICAL NOTES**
- UTILITY HAS ZERO UNRESTRICTED ACCESS TO ALL ELECTRICAL COMPONENTS LOCATED AT THE SERVICE ENTRANCE.
 - MODULES CONFORM TO AND ARE LISTED UNDER UL 1703 CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT PER NEC ARTICLE 300.6 (C) (1) AND ARTICLE 310.8 (D).
 - CONDUCTORS EXPOSED TO WET LOCATIONS SHALL BE SUITABLE FOR USE IN WET LOCATIONS PER NEC ARTICLE 310.8 (C).
- GROUNDING NOTES**
- ALL EQUIPMENT SHALL BE PROPERLY GROUNDED PER THE FOLLOWING:
 - 1. PV MODULES SHALL BE GROUNDED TO MOUNTING RAILS USING MODULAR LUGS OR RACKING INTEGRATED GROUNDING CLAMPS AS ALLOWED BY LOCAL JURISDICTION.
 - 2. ALL OTHER EXPOSED METAL PARTS SHALL BE GROUNDED USING UL-LISTED LAY-IN LUGS.
 - 3. INSTALLER SHALL CONFIRM THAT MOUNTING SYSTEM HAS BEEN EVALUATED FOR COMPLIANCE WITH UL 7103 PER MANUFACTURER'S INSTRUCTIONS AND ALL MOUNTING AND BONDING WHEN USED WITH PROPOSED PV MODULES.
 - 4. ALL GROUNDING SYSTEM COMPONENTS SHALL BE LISTED FOR THEIR PURPOSE.
 - 5. IF THE EXISTING MAIN SERVICE PANEL DOES NOT HAVE A VERIFIABLE GROUNDING ELECTRODE, IT IS THE CONTRACTOR'S RESPONSIBILITY TO INSTALL A VERIFIABLE GROUNDING ELECTRODE.
 - 6. ALL SYSTEM GROUNDING ELECTRODE CONDUCTOR (#AWG) SHALL BE A MINIMUM SIZE #AWG WHEN INSULATED, #AWG IF BARE WIRE.
 - 7. EQUIPMENT GROUNDING CONDUCTORS SHALL BE SIZED ACCORDING TO NEC ARTICLE 690.45, AND BE A MINIMUM OF #10AWG WHEN NOT EXPOSED TO DAMAGE, AND #AWG SHALL BE SIZED ACCORDING TO NEC ARTICLE 250.122.
 - 8. SHALL BE COLOR CODED GREEN, OR MARKED GREEN IF #AWG OR LARGER.

CONDUCTOR	CONDUIT (OM)	CURRENT-CARRYING CAPABILITY (A)	TEMP. RATING (°C)	TEMP. RATING (°F)	AMP. (A)	AMP. (A)	AMP. (A)	AMP. (A)	AMP. (A)	AMP. (A)	AMP. (A)	AMP. (A)	AMP. (A)
1	10 AWG THHN/2	0.75" EMT PVC-40	90	175	15	15	15	15	15	15	15	15	15
2	10 AWG THHN/2	0.75" EMT PVC-40	90	175	15	15	15	15	15	15	15	15	15
3	10 AWG THHN/2	0.75" EMT PVC-40	90	175	15	15	15	15	15	15	15	15	15
4	10 AWG THHN/2	0.75" EMT PVC-40	90	175	15	15	15	15	15	15	15	15	15
5	10 AWG THHN/2	0.75" EMT PVC-40	90	175	15	15	15	15	15	15	15	15	15
6	10 AWG THHN/2	0.75" EMT PVC-40	90	175	15	15	15	15	15	15	15	15	15
7	10 AWG THHN/2	0.75" EMT PVC-40	90	175	15	15	15	15	15	15	15	15	15
8	10 AWG THHN/2	0.75" EMT PVC-40	90	175	15	15	15	15	15	15	15	15	15
9	10 AWG THHN/2	0.75" EMT PVC-40	90	175	15	15	15	15	15	15	15	15	15
10	10 AWG THHN/2	0.75" EMT PVC-40	90	175	15	15	15	15	15	15	15	15	15
11	10 AWG THHN/2	0.75" EMT PVC-40	90	175	15	15	15	15	15	15	15	15	15
12	10 AWG THHN/2	0.75" EMT PVC-40	90	175	15	15	15	15	15	15	15	15	15
13	10 AWG THHN/2	0.75" EMT PVC-40	90	175	15	15	15	15	15	15	15	15	15
14	10 AWG THHN/2	0.75" EMT PVC-40	90	175	15	15	15	15	15	15	15	15	15
15	10 AWG THHN/2	0.75" EMT PVC-40	90	175	15	15	15	15	15	15	15	15	15
16	10 AWG THHN/2	0.75" EMT PVC-40	90	175	15	15	15	15	15	15	15	15	15
17	10 AWG THHN/2	0.75" EMT PVC-40	90	175	15	15	15	15	15	15	15	15	15
18	10 AWG THHN/2	0.75" EMT PVC-40	90	175	15	15	15	15	15	15	15	15	15
19	10 AWG THHN/2	0.75" EMT PVC-40	90	175	15	15	15	15	15	15	15	15	15
20	10 AWG THHN/2	0.75" EMT PVC-40	90	175	15	15	15	15	15	15	15	15	15
21	10 AWG THHN/2	0.75" EMT PVC-40	90	175	15	15	15	15	15	15	15	15	15
22	10 AWG THHN/2	0.75" EMT PVC-40	90	175	15	15	15	15	15	15	15	15	15
23	10 AWG THHN/2	0.75" EMT PVC-40	90	175	15	15	15	15	15	15	15	15	15
24	10 AWG THHN/2	0.75" EMT PVC-40	90	175	15	15	15	15	15	15	15	15	15
25	10 AWG THHN/2	0.75" EMT PVC-40	90	175	15	15	15	15	15	15	15	15	15
26	10 AWG THHN/2	0.75" EMT PVC-40	90	175	15	15	15	15	15	15	15	15	15
27	10 AWG THHN/2	0.75" EMT PVC-40	90	175	15	15	15	15	15	15	15	15	15
28	10 AWG THHN/2	0.75" EMT PVC-40	90	175	15	15	15	15	15	15	15	15	15
29	10 AWG THHN/2	0.75" EMT PVC-40	90	175	15	15	15	15	15	15	15	15	15
30	10 AWG THHN/2	0.75" EMT PVC-40	90	175	15	15	15	15	15	15	15	15	15

NOTES

- THE UFG AND ALL CONNECTORS OF THE LISTED EQUIPMENT SHALL BE COMPATIBLE WITH THE REQUIREMENT THAT PARTS INCLUDE THE FOLLOWING INFORMATION:
 - 1. THE EQUIPMENT SHALL BE LISTED UNDER UL 1703.
 - 2. THE EQUIPMENT SHALL BE LISTED UNDER UL 1703.
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 - 11. THE EQUIPMENT SHALL BE LISTED UNDER UL 1703.
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 - 22. THE EQUIPMENT SHALL BE LISTED UNDER UL 1703.
 - 23. THE EQUIPMENT SHALL BE LISTED UNDER UL 1703.
 - 24. THE EQUIPMENT SHALL BE LISTED UNDER UL 1703.
 - 25. THE EQUIPMENT SHALL BE LISTED UNDER UL 1703.
 - 26. THE EQUIPMENT SHALL BE LISTED UNDER UL 1703.
 - 27. THE EQUIPMENT SHALL BE LISTED UNDER UL 1703.
 - 28. THE EQUIPMENT SHALL BE LISTED UNDER UL 1703.
 - 29. THE EQUIPMENT SHALL BE LISTED UNDER UL 1703.
 - 30. THE EQUIPMENT SHALL BE LISTED UNDER UL 1703.

SYSTEM SUMMARY

BRANCH	TYPE	SIZE	LENGTH	TERMINALS
BRANCH 1	THHN	10 AWG	100'	4
BRANCH 2	THHN	10 AWG	100'	4
BRANCH 3	THHN	10 AWG	100'	4
BRANCH 4	THHN	10 AWG	100'	4
BRANCH 5	THHN	10 AWG	100'	4
BRANCH 6	THHN	10 AWG	100'	4
BRANCH 7	THHN	10 AWG	100'	4
BRANCH 8	THHN	10 AWG	100'	4
BRANCH 9	THHN	10 AWG	100'	4
BRANCH 10	THHN	10 AWG	100'	4
BRANCH 11	THHN	10 AWG	100'	4
BRANCH 12	THHN	10 AWG	100'	4
BRANCH 13	THHN	10 AWG	100'	4
BRANCH 14	THHN	10 AWG	100'	4
BRANCH 15	THHN	10 AWG	100'	4
BRANCH 16	THHN	10 AWG	100'	4
BRANCH 17	THHN	10 AWG	100'	4
BRANCH 18	THHN	10 AWG	100'	4
BRANCH 19	THHN	10 AWG	100'	4
BRANCH 20	THHN	10 AWG	100'	4
BRANCH 21	THHN	10 AWG	100'	4
BRANCH 22	THHN	10 AWG	100'	4
BRANCH 23	THHN	10 AWG	100'	4
BRANCH 24	THHN	10 AWG	100'	4
BRANCH 25	THHN	10 AWG	100'	4
BRANCH 26	THHN	10 AWG	100'	4
BRANCH 27	THHN	10 AWG	100'	4
BRANCH 28	THHN	10 AWG	100'	4
BRANCH 29	THHN	10 AWG	100'	4
BRANCH 30	THHN	10 AWG	100'	4

THIS DOCUMENT HAS BEEN PREPARED FOR THE PURPOSE OF ASSISTING THE DESIGN OF A PROPOSED PROJECT AND DOES NOT CONSTITUTE A CONTRACT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND FOR VERIFYING THE ACCURACY OF ALL INFORMATION PROVIDED BY THE CLIENT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND FOR VERIFYING THE ACCURACY OF ALL INFORMATION PROVIDED BY THE CLIENT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND FOR VERIFYING THE ACCURACY OF ALL INFORMATION PROVIDED BY THE CLIENT.



SW1 - DISCONNECT (EATON DG223RRE) <div style="display: flex; justify-content: space-around; width: 100%;"> 1 2 3 4 5 </div>	MSP - MAIN SERVICE PANEL <div style="display: flex; justify-content: space-around; width: 100%;"> 5 </div>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> 1 SEE NOTE NO. 4 (SW1) PHOTOVOLTAIC 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. </div> <div style="text-align: center; margin-bottom: 5px;"> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> 2 AC SOLAR DISCONNECT (SW1) PV SYSTEM DISCONNECT <small>NEC 690.13(B)</small> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> 3 SEE NOTE NO. 5 (SW1) RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM <small>NEC 690.56(C)(3)</small> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> 4 AC DISCONNECT (SW1) MAXIMUM AC OPERATING CURRENT: 53.2A MAXIMUM AC OPERATING VOLTAGE: 240V <small>NEC 690.54</small> </div> <div style="border: 1px solid black; padding: 5px;"> 5 ANY AC ELECTRICAL PANEL THAT IS FED BY BOTH THE UTILITY AND THE PHOTOVOLTAIC SYSTEM (SW1, MSP) ! WARNING ! DUAL POWER SOURCE. SECOND SOURCE IS PHOTOVOLTAIC SYSTEM. <small>NEC 705.12(B)(3)</small> </div>	LABELING NOTES 1 ALL PV RACKS AND SERVICES REQUIRED BY 247/NEC AND 205/IFC WILL BE INSTALLED AS REQUIRED. 2 LABELS, WARNINGS AND MARKING SHALL COMPLY WITH THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AND THE STANDARD WARNINGS AND CAUTION SIGNS, USED THE STANDARD HEADER COLORS, HEADER TEXT, AND SAFETY ALERT SYMBOL ON EACH LABEL. THE ANSI STANDARD REQUIRES A HEADING THAT IS AT LEAST 50% TALLER THAN THE BODY TEXT. IN ACCORDANCE WITH NEC 110.21(B). 3 A PERMANENT PLACARD OR DIRECTORY SHALL BE INSTALLED PROVIDING THE LOCATION OF THE SERVICE DISCONNECTING MEANS AND THE PHOTOVOLTAIC SYSTEM DISCONNECTING MEANS IF NOT IN THE SAME LOCATION IN ACCORDANCE WITH NEC 690.56(B). 4 LABEL(S) WITH MARKING, "TURN RAPID SHUTDOWN SWITCH TO THE 'OFF' POSITION TO SHUT DOWN PV SYSTEM" SHALL BE LOCATED WITHIN THE "NAME ARRAY". SHALL BE LOCATED WITHIN THE LEFT OF SERVICE DISCONNECTING MEANS. THE TITLE SHALL UTILIZE CAPITALIZED LETTERS WITH A MINIMUM HEIGHT OF 3/8" IN BLACK ON A YELLOW BACKGROUND, AND REMAINING 7/8" OF THE LABEL SHALL BE A MINIMUM HEIGHT OF 3/8" IN BLACK ON WHITE BACKGROUND. 5 LABEL(S) WITH MARKING, "RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM" SHALL BE LOCATED WITHIN 3FT OF RAPID SHUTDOWN SWITCH. THE LABEL SHALL HAVE 38" TALL LETTERS AND BE REFLECTIVE WITH WHITE TEXT ON A RED BACKGROUND.	P-119202 	GRID-TIED SOLAR POWER SYSTEM SHAH RESIDENCE 424 S COLUMBIA AVE COLUMBUS, OH 43209	SAFETY LABELS <small>DOC ID: 119202-149080-1</small> <small>DATE: 10/11/19</small> <small>CREATOR: J.G.</small> <small>REVIEWER:</small> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 50%;">REVISIONS</th> <th style="width: 50%;"></th> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table>	REVISIONS								PV-4
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