



HISTORIC PRESERVATION COMMISSION

Marc Elrich
County Executive

Robert K. Sutton
Chairman

Date: March 4, 2022

MEMORANDUM

TO: Mitra Pedoeem
Department of Permitting Services

FROM: Dan Bruechert
Historic Preservation Section
Maryland-National Capital Park & Planning Commission Historic Area

SUBJECT: Work Permit # 979264 - Solar Panel Installation

The Montgomery County Historic Preservation Commission (HPC) has reviewed the attached application for a Historic Area Work Permit (HAWP). This application was **Approved** at the March 2, 2022 HPC meeting.

The HPC staff has reviewed and stamped the attached construction drawings.

THE BUILDING PERMIT FOR THIS PROJECT SHALL BE ISSUED CONDITIONAL UPON ADHERENCE TO THE ABOVE APPROVED HAWP CONDITIONS AND MAY REQUIRE APPROVAL BY DPS OR ANOTHER LOCAL OFFICE BEFORE WORK CAN BEGIN.

Applicant: Paul Miller
Address: 12 Montgomery Ave., Takoma Park

This HAWP approval is subject to the general condition that the applicant will obtain all other applicable Montgomery County or local government agency permits. After the issuance of these permits, the applicant must contact this Historic Preservation Office if any changes to the approved plan are made. Once work is complete the applicant will contact Dan Bruechert at 301.563.3400 or dan.bruechert@montgomeryplanning.org to schedule a follow-up site visit.





Roof-top Solar PV Addition - Miller Residence
12 Montgomery Ave., Takoma Park, MD. 20912

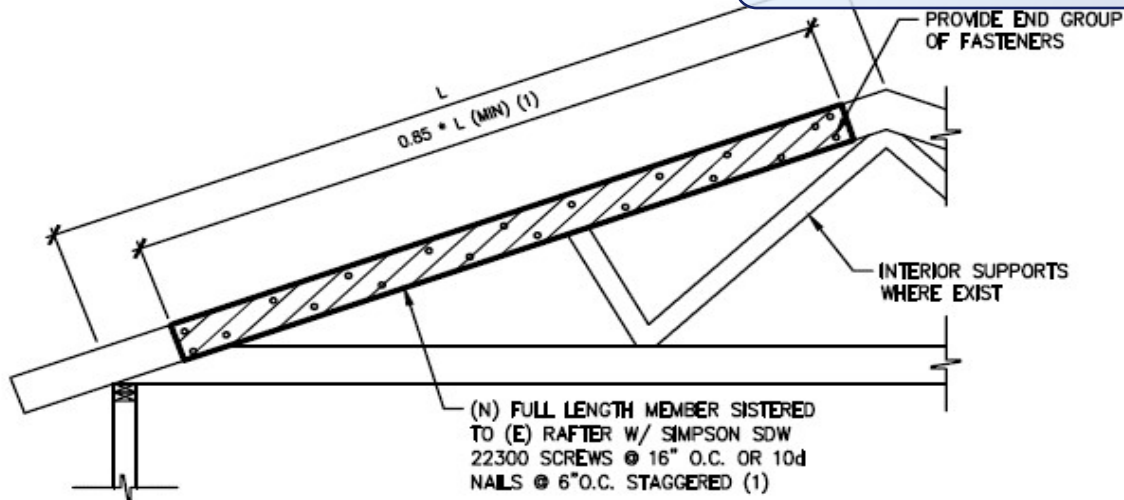
Structural Upgrade Details (Sister)

APPROVED
Montgomery County
Historic Preservation Commission

Robert H. Miller

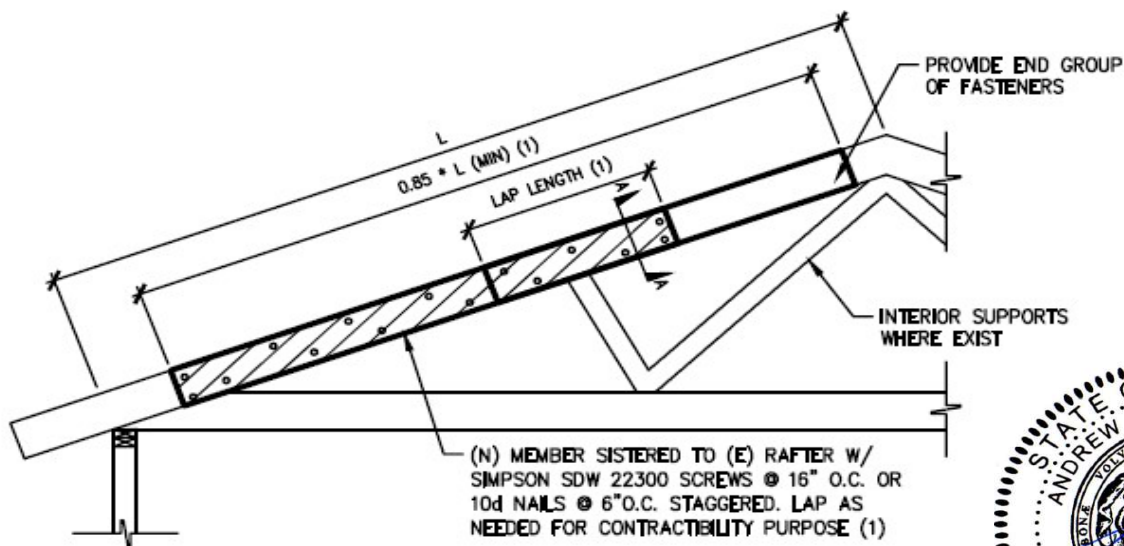
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REVIEWED
By Dan.Bruechert at 3:27 pm, Mar 04, 2022



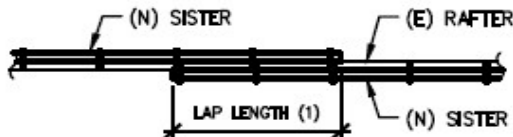
OPTION 1 - FULL LENGTH SISTER

NOTE: (1) SEE STRUCTURAL LETTER FOR ANY ADDITIONAL SPECIFICATIONS



OPTION 2 - LAPPED SISTER

NOTE: (1) SEE STRUCTURAL LETTER FOR ANY ADDITIONAL SPECIFICATIONS



SECTION A-A

NOTE: (1) SEE STRUCTURAL LETTER FOR ANY ADDITIONAL SPECIFICATIONS



Professional Certification: I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland.
License No. 49910 Expires: 9/15/22

S1

SOLAR PV SYSTEM: 5.92 kWp

MILLER RESIDENCE

12 MONTGOMERY AVE TAKOMA PARK, MD
20912

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Montgomery County
Historic Preservation Commission



REVIEWED
By Dan.Bruechert at 3:27 pm, Mar 04, 2022

PROJECT INFORMATION

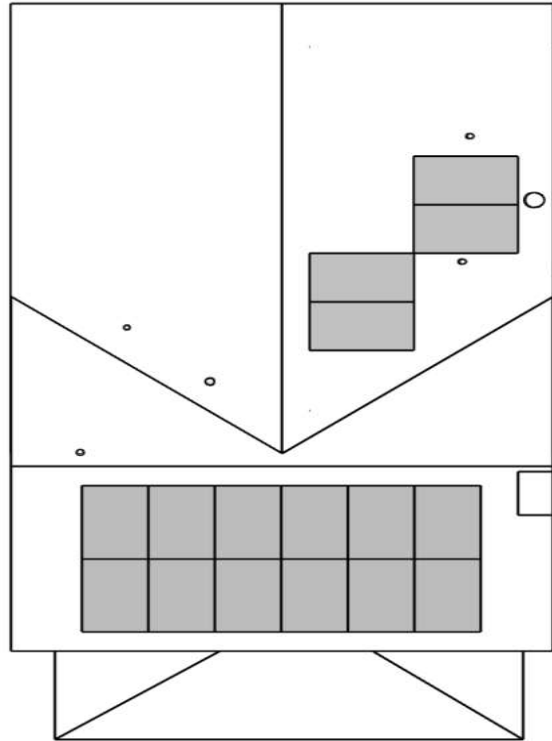
OWNER: PAUL MILLER
ADDRESS: 12 MONTGOMERY AVE
TAKOMA PARK, MD 20912

AHJ: MONTGOMERY (MD)
ADDRESS: 2425 REEDIE DRIVE, 7TH
FLOOR
WHEATON, MD 20902

ZONING: RESIDENTIAL
BUILDING CODE: IBC 2018
ELECTRICAL CODE: NEC 2017
ASCE VERSION: ASCE 7-16

SNOW LOAD: 30 PSF
WIND SPEED: 115 MPH
WIND EXPOSURE: B

DC RATING: 5.92 kW
AC RATING: 4.64 kW
RACKING: UNIRAC SM LIGHT RAIL
MODULE: (16) REC370AA
INVERTER: (16) IQ7PLUS-72-2-US



FOR PERMITTING USE ONLY

PROJECT SCOPE

THIS PROJECT INVOLVES THE INSTALLATION OF (16) REC 370 SOLAR MODULES. THE SOLAR MODULES WILL BE RACKED USING A PRE-ENGINEERED RACKING SYSTEM. THE RACKED MODULES WILL BE ELECTRICALLY CONNECTED TO (16) ENPHASE DC TO AC POWER INVERTERS, AND INTERCONNECTED TO THE LOCAL UTILITY USING MEANS AND METHODS CONSISTENT WITH THE RULES ENFORCED BY THE LOCAL UTILITY AND PERMITTING JURISDICTION.

PROJECT ADDRESS:

PAUL MILLER
12 MONTGOMERY AVE
TAKOMA PARK, MD 20912

CONTRACTOR INFO:



3600 COMMERCE DR
SUITE 601
BALTIMORE, MD 21227
(443) 955-0779

LICENSE NUMBER:

MHIC-30991

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	RACKING DATASHEET
	ANCHOR DATASHEET

GENERAL NOTES

1) THIS PHOTOVOLTAIC (PV) SYSTEM SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE (NEC) ARTICLE 690, ALL MANUFACTURERS'S LISTING AND INSTALLATION INSTRUCTIONS, AND THE RELEVANT CODES AS SPECIFIED BY THE AUTHORITY HAVING JURISDICTION (AHJ).

2) ALL SIGNAGE TO BE PLACED IN ACCORDANCE WITH LOCAL BUILDING CODE AND AS REQUIRED BY THE NEC AND AHJ.

3) PV SYSTEM CIRCUITS INSTALLED ON OR IN BUILDINGS SHALL INCLUDE A RAPID SHUTDOWN FUNCTION TO REDUCE SHOCK HAZARD FOR EMERGENCY RESPONDERS

4) THIS SYSTEM IS A UTILITY INTERACTIVE SYSTEM, AND THE PV MODULES ARE CONSIDERED NON-COMBUSTIBLE.



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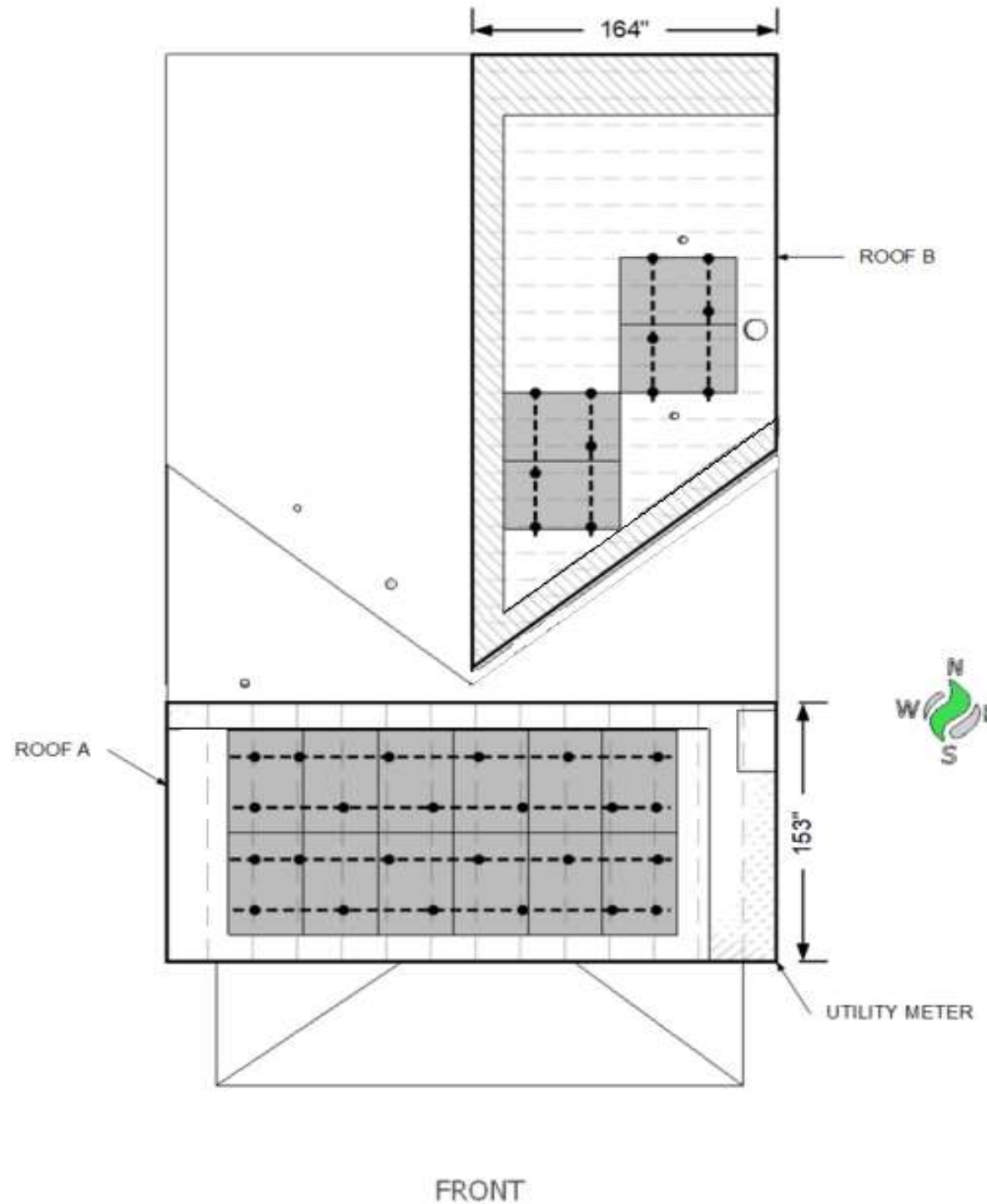
FRAMING UPGRADES REQUIRED, SEE
SPECIFICATIONS IN STRUCTURAL
CALCULATIONS PACKET.

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REV	DATE
PRELIM	12/27/2021

COVER

Z001



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 Montgomery County
 Historic Preservation Commission

Robert H. ...

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 By Dan.Bruechert at 3:27 pm, Mar 04, 2022

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


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ATTACHMENT & SITE PLAN

A001

LEGEND

	ROOF SUPPORT
	MOUNTING RAIL
	ROOF ATTACHMENT
	PV ARRAY
	FIRECODE SETBACK

INSTALLATION NOTES

- 1) ALL SOLAR MODULES SUPPORTED BY ROOF ATTACHMENTS STAGGERED AT 48" O.C. (OR AS INDICATED)
- 2) SOLAR PHOTOVOLTAIC SYSTEM INSTALLED PARALLEL TO ROOF SURFACE
- 3) SOLAR PHOTOVOLTAIC SYSTEM INSTALLED AT A MAXIMUM HEIGHT OF 6" ABOVE ROOF SURFACE (OR AS INDICATED)
- 4) ANY ROOFING PENETRATIONS SHALL HAVE PROPER FLASHING SEALANT USED TO PROVIDE WATERTIGHT ASSEMBLY



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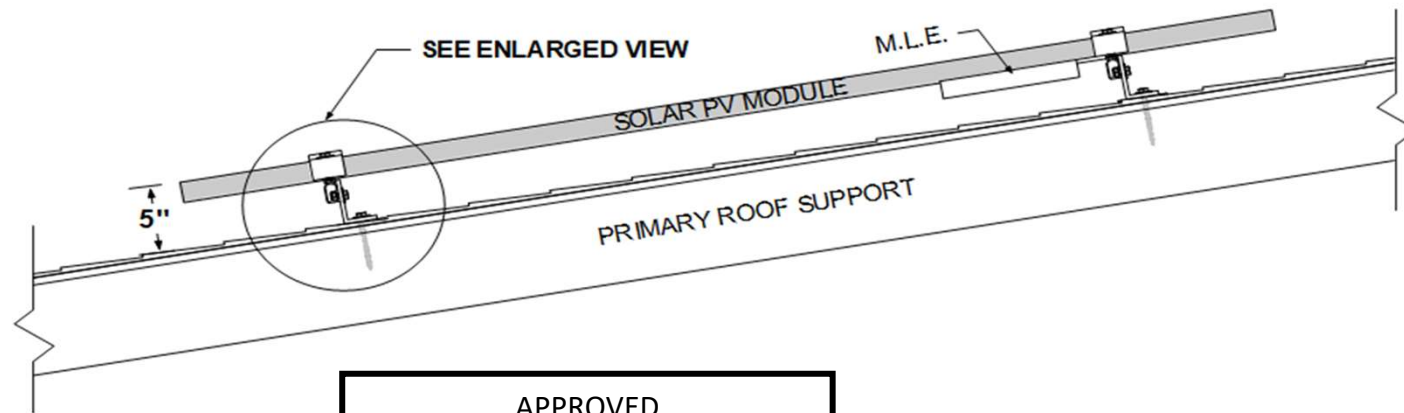
FRAMING UPGRADES REQUIRED, SEE SPECIFICATIONS IN STRUCTURAL CALCULATIONS PACKET.

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MOUNTING SYSTEM PROPERTIES	
RACKING	UNIRAC SM LIGHT RAIL
STANDOFF	QUICKBOLT
MAX. RAIL SPAN	48 IN
MIN. FASTENER DEPTH	2.50 IN
MAX. RAIL CANTILEVER	16 IN
MAX. ARRAY HEIGHT	5 IN

DEAD LOAD CALCULATION			
LOAD	QTY. OR LIN. FT.	WEIGHT PER (LB)	TOTAL LBS.
MODULES	16	43	688.00
M.L.E.'S	16	2.38	38.08
RACKING	109.2	0.81	88.43
STANDOFF	40	0.5	20.00
TOTAL ARRAY WEIGHT (LBS)			834.5
TOTAL ARRAY AREA (SQ.FT.)			301.1
DISTRIBUTED LOAD (PSF)			2.77

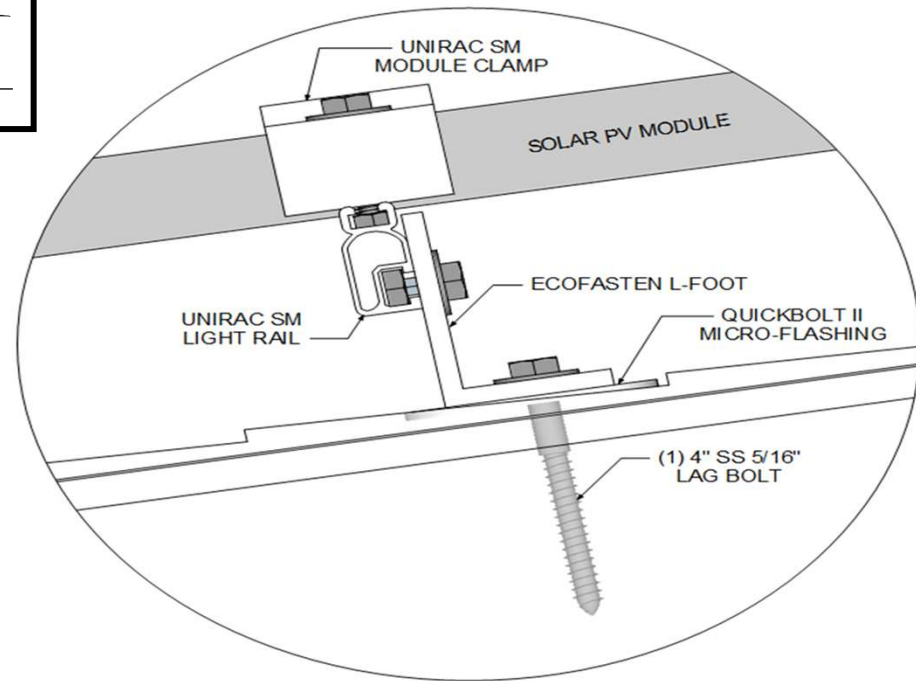
POINT LOAD CALCULATION	
TOTAL ARRAY WEIGHT (LBS)	834.51
TOTAL NUMBER OF STANDOFFS (TYP.)	40
POINT LOAD (LBS/STANDOFF)	20.86



APPROVED
Montgomery County
Historic Preservation Commission

Paul Miller

REVIEWED
By Dan.Bruechert at 3:27 pm, Mar 04, 2022



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ASSEMBLY & LOAD CALCS

S001

ROOF PROPERTIES	ROOF LABEL:	A	B
	MATERIAL:	3-Tab Comp. Shingle	3-Tab Comp. Shingle
	PITCH:	27°	22°
	AZIMUTH:	169°	79°
	PRIMARY SUPPORT:	2x6 RAFTERS	2x8 RAFTERS
	PRIMARY SUPPORT SPACING:	24"	16"
	ROOF SPAN (RIDGE TO EAVE):	13'	14'
	MEAN ROOF HEIGHT:	25'	25'
	RACKING:	UNIRAC SM LIGHT RAIL	UNIRAC SM LIGHT RAIL
	STANDOFF:	QUICKBOLT	QUICKBOLT



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FRAMING UPGRADES REQUIRED, SEE SPECIFICATIONS IN STRUCTURAL CALCULATIONS PACKET.

- INSTALLATION NOTES**
- 1) ALL RACKING SHALL BE INSTALLED PER MANUFACTUER SPECIFICATIONS
 - 2) M.L.E.'S = MODULE LEVEL ELECTONICS (IE, POWER OPTIMIZERS, MICRO-INVERTERS, CABELS, ETC)
 - 3) USE 5/16" X 4"HEX HEAD STAINLESS STEEL LAG SCREWS

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When the AC utility source is removed from the inverter output circuits via any means, such as an AC breaker, AC disconnect or removal of the solar or main utility service meter, this equipment performs the rapid shutdown function per 690.12.

Array bonded with # 6 Bare Cu



This Array 8 Panels / Inverters
8 x 1.21 x 125% = 12.10 on 15 Amp Circuit Breaker



This Array 8 Panels / Inverters
8 x 1.21 x 125% = 12.10 on 15 Amp Circuit Breaker

All conduit sizing will be in accordance to the NEC, Chapter #9
Two Ungrounded conductors per circuit of inverters (Typ)

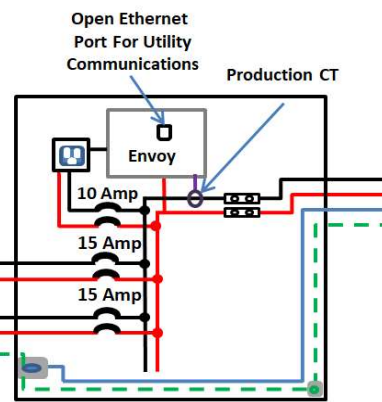
Solar Module Total
16 Modules and Inverters
DC wiring from the solar module (typ)

Enphase Micro Inverter
Ground Fault Protection is integrated within Inverter Model: IQ7PLUS - 72 - 2 - US
Max DC Volt Rating: 60 VDC
Max Power @ 40 degrees C: 295W
Nominal AC Voltage: 240V
Max AC Current: 1.21 Amps

Installation of the 1" PVC conduit (50') will have two circuits, will consist of:
(4) #10 THHN-THWN-2, phase conductors, plus (1) # 8 Ground

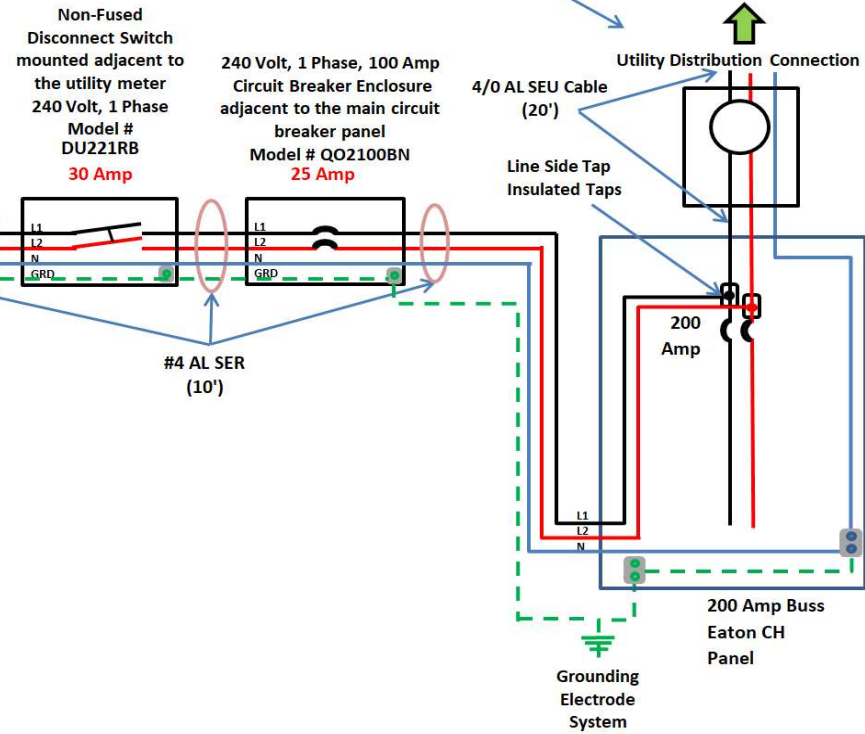
Enphase Trunk Cable (5')
(2) #12 - THHN-THWN-2 Copper Conductors
(1) #12 - THHN-THWN-2 Copper Ground

Paul Miller
12 Montgomery Ave
Takoma Park, MD 20912



Enphase IQ Combiner with circuit breakers listed below:
(2) 15 Amp, 2 pole circuit breaker as shown
(1) 10 Amp, 2-pole circuit breaker for Envoy

AC Disconnect within 6' of the Utility Meter



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ELECTRICAL -
LINE DIAGRAM

E001

APPROVED
Montgomery County
Historic Preservation Commission

REVIEWED
By Dan.Bruechert at 3:27 pm, Mar 04, 2022

ELECTRICAL NOTES

- 1) ALL EQUIPMENT TO BE LISTED AND LABELED FOR ITS APPLICATION
- 2) WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC
- 3) IF USED, PV POWER SOURCE BREAKER TO BE LOCATED AT BOTTOM OF BUS
- 4) LISTING AGENCY NAME AND NUMBER TO BE INDICATED ON INVERTERS AND MODULES
- 5) AC COMBINER PANELS SHALL BE LABELED AS "INVERTER AC COMBINER PANEL"
- 5) PV POWER SOURCE TO BE SUITABLE FOR BACKFEED

INTERCONNECTION	
METHOD	LINE SIDE TAP
WIRE SIZE	#4 SER
SYSTEM PROPERTIES	
FULL LOAD AMPERAGE	19.36
SOURCE VOLTAGE	240
LENGTH OF RUN (FT)	20
LOAD DUTY	CONTINUOUS
CONDUCTOR TYPE	XHHW-2
CONDUCTOR MATERIAL	ALUMINUM
CONDUCTOR LOCATION	DRY OR WET
CONDUCTOR INSULATION TEMP	90°C
AMBIENT TEMP	26-30°C
TERMINAL TEMP RATING	90°C
CIRCUIT TYPE	SINGLE PHASE 3-WIRE
QTY. OF CURRENT-CARRYING CONDUCTORS	2
CONDUCTOR REQUIREMENT	
FULL LOAD AMPS	19.36
LOAD DUTY MULTIPLIER	1.25
AMBIENT TEMP MULTIPLIER	1.00
QTY. CONDUCTORS MULTIPLIER	1.00
REQUIRED CONDUCTOR AMPACITY	24.20
TERMINAL REQUIREMENT	
FULL LOAD AMPS	19.36
LOAD DUTY MULTIPLIER	1.25
REQUIRED TERMINAL AMPACITY	24.20
CONDUCTOR SELECTION	
CONDUCTOR AMPACITY	55.00
AMBIENT TEMP DERATE	1.00
QTY. CONDUCTORS DERATE	1.00
ADJUSTED AMPACITY	55.00
SELECTED CONDUCTOR SIZE (AWG)	6
VOLTAGE DROP	
OHMS/MILFT	0.808
LENGTH OF RUN (FT)	20
REQUIRED CONDUCTOR AMPACITY	24.20
VOLTAGE DROP	0.78
VOLTS AT LOAD TERMINAL	239.22
PERCENT VOLTAGE DROP	0.33%

CALCULATION FOR PV BREAKER					
CALCULATION FOR MAIN PV BREAKER & CIRCUITS					
SYSTEM CURRENT	1.21	x	16	=	19.36 A
DESIGN AMPERAGE	19.36	x	125%	=	24.2 A
MAIN BUSS RATING	200	x	120%	=	240 A
EXISTING MAIN BREAKER					200 A
MAX SOLAR BREAKER	240	-	200	=	40 A

COMBINER TO ARRAY	
WIRE LENGTH (FT)	50
WIRE SIZE	#10 AWG
SYSTEM PROPERTIES	
FULL LOAD AMPERAGE	9.68
SOURCE VOLTAGE	240
LENGTH OF RUN (FT)	50
LOAD DUTY	CONTINUOUS
CONDUCTOR TYPE	THWN-2
CONDUCTOR MATERIAL	COPPER
CONDUCTOR LOCATION	DRY OR WET
CONDUCTOR INSULATION TEMP	90°C
DISTANCE ABOVE ROOF	ALL INTERIOR CONDUIT
AVERAGE OUTSIDE TEMP (°F)	90
TEMP ADDER (°F)	N/A
ADJUSTED AMBIENT TEMP (°F)	90
TERMINAL TEMP RATING	75°C
CIRCUIT TYPE	SINGLE PHASE 2-WIRE
QTY. OF CURRENT-CARRYING CONDUCTORS	2
ADDITIONAL CURRENT-CARRYING CONDUCTORS	2
TOTAL # OF CURRENT-CARRYING CONDUCTORS	4
CONDUCTOR REQUIREMENT	
FULL LOAD AMPS	9.68
LOAD DUTY MULTIPLIER	1.25
AMBIENT TEMP MULTIPLIER	1.04
QTY. CONDUCTORS MULTIPLIER	1.25
REQUIRED CONDUCTOR AMPACITY	15.76
TERMINAL REQUIREMENT	
FULL LOAD AMPS	9.68
LOAD DUTY MULTIPLIER	1.25
REQUIRED TERMINAL AMPACITY	12.10
CONDUCTOR SELECTION	
CONDUCTOR AMPACITY	25.00
AMBIENT TEMP DERATE	0.96
QTY. CONDUCTORS DERATE	0.80
ADJUSTED AMPACITY	19.20
SELECTED CONDUCTOR SIZE (AWG)	10
VOLTAGE DROP	
OHMS/MILFT	1.240
LENGTH OF RUN (FT)	50
REQUIRED CONDUCTOR AMPACITY	15.76
VOLTAGE DROP	1.95
VOLTS AT LOAD TERMINAL	238.05
PERCENT VOLTAGE DROP	0.82%

ELECTRICAL NOTES

- 1) ALL CONDUCTORS SHALL BE COPPER, RATED FOR 90°C AND WET 4) MODULE SUPPORT RAIL TO BE BONDED TO CONTINUOUS COPPER GEC ENVIRONMENT, UNLESS OTHERWISE NOTED. VIA WEEB LUG
- 2) ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND READILY VISIBLE.
- 3) MODULE GROUNDING CLIPS TO BE INSTALLED BETWEEN MODULE FRAME AND MODULE SUPPORT RAIL, PER MANUFACTURER'S INSTRUCTION.

FOR PERMITTING USE ONLY

APPROVED
Montgomery County
Historic Preservation Commission



REVIEWED
By Dan.Bruechert at 3:28 pm, Mar 04, 2022

PROJECT ADDRESS:

PAUL MILLER
12 MONTGOMERY AVE
TAKOMA PARK, MD 20912

CONTRACTOR INFO:



FUSION
SOLAR SERVICES

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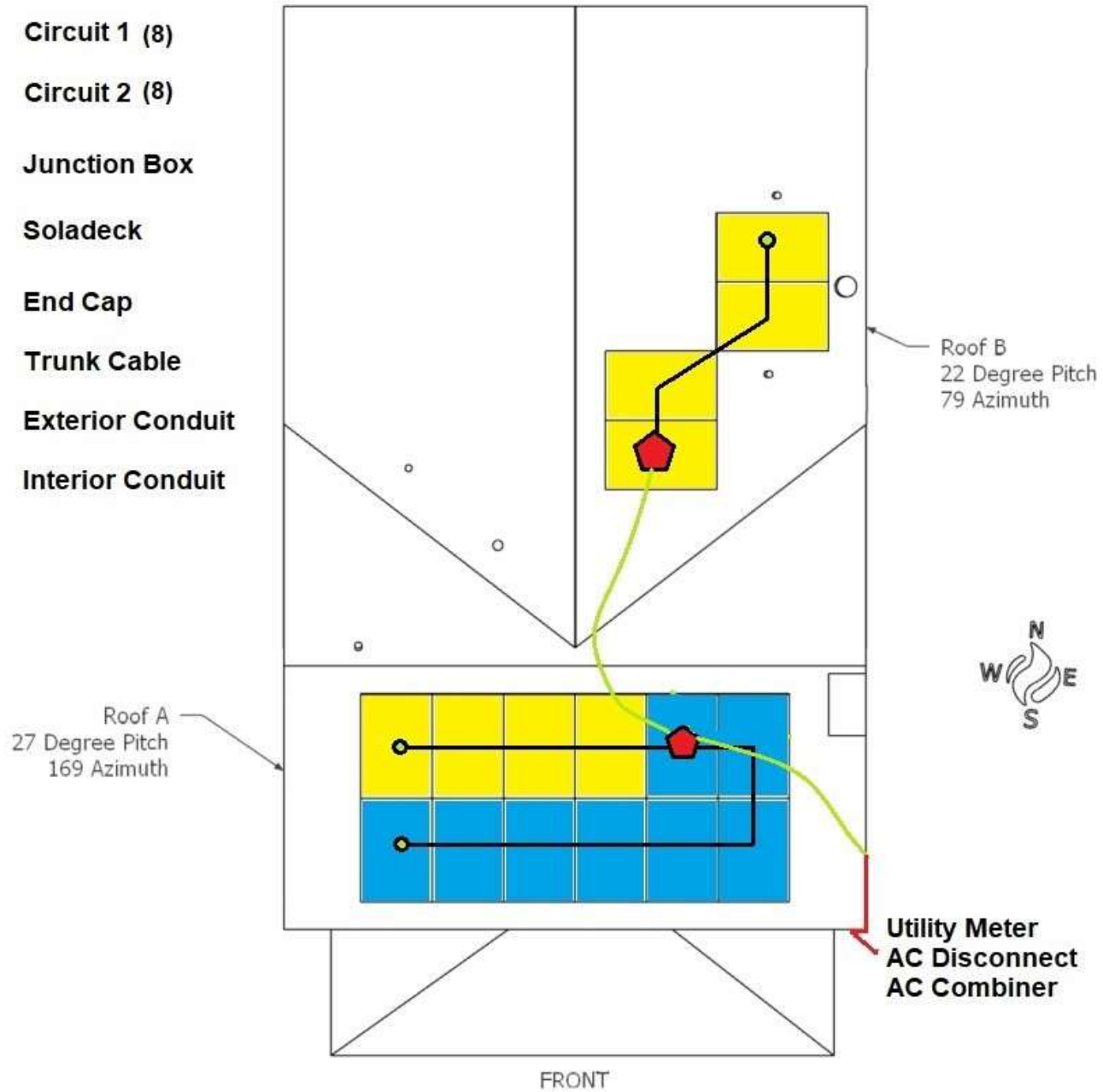
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ELECTRICAL - WIRE CALCS

E002

- Circuit 1 (8)
- Circuit 2 (8)
- Junction Box
- Soladeck
- End Cap
- Trunk Cable
- Exterior Conduit
- Interior Conduit



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STRING & CONDUIT LAYOUT

E003

APPROVED
Montgomery County
Historic Preservation Commission



REVIEWED
By Dan.Bruechert at 3:28 pm, Mar 04, 2022

SOLAR MODULE RATINGS		
REC 370 Specifications		
Length:	67.75	in
Width:	40	in
Thickness:	1.18	in
Weight:	43	lbs
I _{mp} :	9.66	A
V _{mp} :	38.3	V
V _{oc} :	44.9	V
I _{sc} :	10.21	A
OCPD:	25	A
P _{max} :	370	W
V _{max} :	1000	V
Temp. Coefficient:	-0.24	%V _{oc} /°C

INVERTER 1 RATINGS		
IQ7PLUS-72-2-US Specifications		
Max # Per String:	13	
I _{max} (ac):	1.21	A
V _{max} (dc):	60	V
P _{max} :	290	W
Nom. AC Voltage:	240	V
OCPD:	20	A
Weight (Optimizer):	2.38	lbs
I _{max} (Input):	15	A
P _{max} (dc) Input:	N/A	V

WARNING: PHOTOVOLTAIC POWER SOURCE

LABEL TO BE INSTALLED AT EXPOSED RACEWAYS, CABLE TRAYS, AND OTHER WIRING METHODS; SPACED AT MAXIMUM 10FT SECTION OR WHERE SEPARATED BY ENCLOSURES, WALLS, PARTITIONS, CEILINGS, OR FLOORS.

LETTERS AT LEAST 3/8 INCH; WHITE ON RED BACKGROUND; REFLECTIVE

PHOTOVOLTAIC DC DISCONNECT

LABEL TO BE INSTALLED AT EACH DC DISCONNECTING MEANS

PHOTOVOLTAIC AC DISCONNECT

LABEL TO BE INSTALLED AT EACH AC DISCONNECTING MEANS

PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN

LABEL TO BE INSTALLED AT RAPID SHUTDOWN SWITCH

LETTERS AT LEAST 3/8 INCH; WHITE ON RED BACKGROUND; REFLECTIVE

SOLAR PV SYSTEM DISCONNECT

RATED AC OUTPUT CURRENT: 19.36 A

NOMINAL OPERATING AC VOLTAGE: 240 V

LABEL TO BE INSTALLED AT AN ACCESSIBLE LOCATION AT THE DISCONNECTING MEANS AS A POWER SOURCE

WARNING

ELECTRICAL SHOCK HAZARD

DO NOT TOUCH TERMINALS! TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

LABEL TO BE INSTALLED AT EACH DISCONNECTING MEANS FOR PHOTOVOLTAIC EQUIPMENT

WARNING

ELECTRICAL SHOCK HAZARD

IF GROUND FAULT IS INDICATED NORMALLY GROUNDED CONDUCTORS MAY BE UNGROUNDED AND ENERGIZED

LABEL TO BE INSTALLED AT EACH DISCONNECTING MEANS FOR PHOTOVOLTAIC EQUIPMENT

WARNING

DUAL POWER SOURCE SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

WARNING

INVERTER OUTPUT CONNECTION. DO NOT RELOCATE THIS OVERCURRENT DEVICE

INTERACTIVE PHOTOVOLTAIC SYSTEM CONNECTED

LABEL TO BE INSTALLED AT UTILITY METER

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EQUIP. RATINGS & SIGNAGE

E004

APPROVED
Montgomery County
Historic Preservation Commission

REVIEWED
By Dan.Bruechert at 3:28 pm, Mar 04, 2022

SIGNAGE NOTES

- 1) ALL PLAQUES AND LABELS SHALL HAVE A RED BACKGROUND (OR AS SHOWN HERE)
- 2) ALL LETTERING SHALL BE WHITE AND HAVE A MINIMUM HEIGHT OF 3/8" (OR AS SHOWN HERE)
- 3) FONT SHALL BE ARIAL (OR SIMILAR) AND ALL LETTERING SHALL BE CAPITALIZED
- 4) ALL PLAQUES AND LABELS SHALL BE OF A MATERIAL SUITABLE FOR THE ENVIRONMENT INSTALLED

MAJOR COMPONENTS

PRODUCT	QTY
REC 370w Black	16
EnPhase IQ7+ Microinverter	16

RACKING COMPONENTS

PRODUCT	QTY
14' Light Rail DRK (315168D)	12
Unirac Bnd Splice Bar Serrated Drk	4
Small Endclamps 30-32mm (302021D)	16
Unirac SM BND Midclamp BC SS	24
QuickBolt 3in Microflashing	40
EcoFasten L-102-3 L Foot Black	40
Lay-in ground lug	4

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INTERCONNECTION COMPONENTS

PRODUCT	QTY
B-Tap 4/0-10	2
100 Amp MBE Surface mount	1
2 pole, 25 amp QO breaker	1
30 Amp Nema3r Non-fused disco	1

BALANCE OF INVERTER SYSTEM

PRODUCT	QTY
Enphase AC Combiner with IQ Envoy	1
2 pole, 15 amp BR breaker	2
Enphase IQ Trunk Cable Landscape	16
Enphase Terminator Cap	3

MISCELLANEOUS

PRODUCT	QTY
Lumina Salesperson Yard Sign	1
6x6x4 PVC Junction Box	
Soladeck	2
SolaTrim Critter Guards	2

MANUALLY ADD PARTS HERE

PRODUCT	QTY

INSTALL LEAD SIGNATURE: _____
 DATE: _____

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BILL OF MATERIALS

X001