MONTGOMERY COUNTY HISTORIC PRESERVATION COMMISSION STAFF REPORT

Address: 3 Hesketh Street, Chevy Chase **Meeting Date:** 9/4/2024

Resource: Contributing Resource **Report Date:** 8/28/2024

Chevy Chase Village Historic District

Applicant: Lars Jeurling **Public Notice:** 8/21/2024

(Venture Solar, Agent)

Review: Historic Area Work Permit Tax Credit: n/a

Case Number: 1074417 Staff: Laura DiPasquale

Proposal: Solar Panel Installation

STAFF RECOMMENDATION

Staff recommends that the HPC **approve** the HAWP.

ARCHITECTURAL DESCRIPTION

SIGNIFICANCE: Contributing Resource within the Chevy Chase Village Historic District

STYLE: Colonial Revival

DATE: 1908

3 Hesketh Street is a two-and-a-half story Colonial Revival single-family house in Chevy Chase Village built in 1908. The house has a hipped roof, large gable dormers, and a wrap-around porch. At least two additions append the rear, one at the right side rear built in the 1930s and one at the rear left built in 1978.



Figure 1: The subject property (shown with a yellow star) is located within the Chevy Chase Village Historic District.



Figure 2: Front (south) elevation of 3 Hesketh Street, August 2024 (Historic Preservation Office).



Figure 3: Birdseye view looking north at 3 Hesketh Street, May 2023 (Connect Explorer).

PROPOSAL

The applicant proposes to install 17 roof-mounted solar panels: five panels across the front porch roof, two panels on each side of the front gabled dormer roof, two on the left (west) side hipped roof, and three on each side of the rear gabled dormer roof. The 17 HANWHA QCELLS: Q.TRON panels will be mounted to the asphalt shingle roof with SnapNrack mounts and will cover a total of 357.33 square feet of the 2,230.79 square foot roof (Figure 5). The associated junction, solar inverter and disconnect boxes will be located towards the rear of the west elevation adjacent to existing utility panels (Figure 4).

The written scope of work also includes "Rip & Reroof" but no further details are provided. The existing roof is clad in 3-tab asphalt shingles. Staff could approve a HAWP for replacement of the shingles with new architectural shingles.

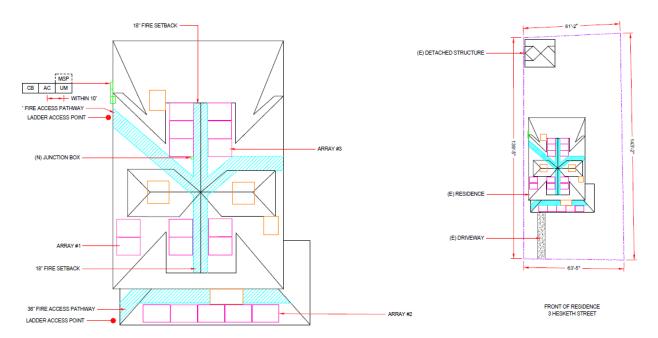


Figure 4: The roof plan (left) shows the proposed panel and equipment locations, and the site plan (right) shows the orientation of the house to the larger property.

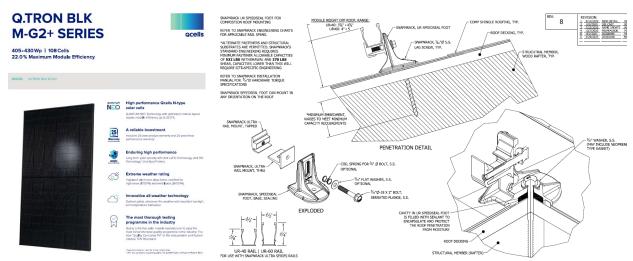


Figure 5: Specifications for the solar panels (left) and attachment details for the SnapNrack mounts (right).

APPLICABLE GUIDELINES

When reviewing alterations and new construction within the Chevy Chase Village Historic District several documents are to be utilized as guidelines to assist the Commission in developing their decision. These documents include the historic preservation review guidelines in the approved and adopted amendment for the Chevy Chase Village Historic District (*Guidelines*), *Montgomery County Code Chapter 24A* (*Chapter 24A*), the *Secretary of the Interior's Standards for Rehabilitation (Standards)*, and the HPC's *Policy No. 20-01 ADDRESSING EMERGENCY CLIMATE MOBILIZATION THROUGH THE INSTALLATION OF ROOF-MOUNTED SOLAR PANELS*. The pertinent information in these four documents is outlined below.

Chevy Chase Village Historic District Guidelines

The Guidelines state five basic policies that should be adhered to, including:

- 1. Preserving the integrity of the Chevy Chase Village Historic District. Any alterations should, at a minimum, perpetuate the ability to perceive the sense of time and place portrayed by the district.
- 2. Preserving the integrity of contributing structures. Alterations should be designed in such a way that the altered structure still contributes to the district.
- 3. Maintaining the variety of architectural styles and the tradition of architectural excellence.
- 4. Design review emphasis should be restricted to changes that will be visible from the front or side public right-of-way, or that would be visible in the absence of vegetation or landscaping.
- 5. Alterations to the portion of a property that are not visible from the public-right-of-way should be subject to a very lenient review. Most changes to the rear of the properties should be approved as a matter of course.

The *Guidelines* break down specific projects into three levels of review - Lenient, Moderate and Strict Scrutiny for Outstanding and Contributing Resources:

- "Lenient Scrutiny" means that the emphasis of the review should be on issues of general massing and scale, and compatibility with the surrounding streetscape, and should allow for a very liberal interpretation of preservation rules. Most changes should be permitted unless there are major problems with massing, scale or compatibility.
- "Moderate Scrutiny" involves a higher standard of review than "lenient scrutiny." Besides issues of massing, scale and compatibility, preserving the integrity of the resource is taken into account. Alterations should be designed so that the altered structure still contributes to the district. Use of compatible new materials, rather than the original building materials, should be permitted. Planned changes should be compatible with the structure's existing design, but should not be required to replicate its architectural style.
- "Strict Scrutiny" means that the planned changes should be reviewed to insure that the integrity of the significant exterior architectural or landscaping features and details is not compromised. However, strict scrutiny should not be "strict in theory but fatal in fact" i.e. it does not mean that there can be no changes but simply that the proposed changes should be reviewed with extra care.
 - o <u>Decks</u> should be subject to moderate scrutiny if they are visible from the public right-of-way, lenient scrutiny if they are not
 - o <u>Doors</u> should be subject to moderate scrutiny if they are visible from the public right-of-way, lenient scrutiny if they are not.
 - o <u>Exterior trim</u> (such as moldings on doors and windows) on contributing resources should be subject to moderate scrutiny if it is visible from the public right-of-way, lenient scrutiny if it

- is not. Exterior trim on Outstanding resources should be subject to strict scrutiny if it is visible from the public right-of-way.
- Roofing materials should be subject to moderate scrutiny if they are visible from the public right-of-way, lenient scrutiny if they are not. In general, materials differing from the original should be approved for contributing resources. These guidelines recognize that for outstanding resources replacement in kind is always advocated.
- o <u>Skylights</u> should be subject to strict scrutiny if visible from the public right-of-way, otherwise they should be subject to lenient scrutiny.
- <u>Windows</u> (including window replacement) should be subject to moderate scrutiny if they are visible from the public right-of-way, lenient scrutiny if they are not. Addition of compatible exterior storm windows should be encouraged, whether visible from the public-right-of-way or not. Vinyl and aluminum windows (other than storm windows) should be discouraged.

Montgomery County Code; Chapter 24A-8

- (b) The commission shall instruct the director to issue a permit, or issue a permit subject to such conditions as are found to be necessary to insure conformity with the purposes and requirements of this chapter, if it finds that:
 - (1) The proposal will not substantially alter the exterior features of an historic site or historic resource within an historic district; or
 - (2) The proposal is compatible in character and nature with the historical, archeological, architectural or cultural features of the historic site or the historic district in which an historic resource is located and would not be detrimental thereto or to the achievement of the purposes of this chapter; or
- (d) In the case of an application for work on an historic resource located within an historic district, the commission shall be lenient in its judgment of plans for structures of little historical or design significance or for plans involving new construction, unless such plans would seriously impair the historic or architectural value of surrounding historic resources or would impair the character of the historic district.

Secretary of the Interior's Standards for Rehabilitation:

- #2: The historic character of a property will be retained and preserved. The removal of distinctive materials or alteration of features, spaces, and spatial relationships that characterize a property will be avoided.
- #9: New additions, exterior alterations, or related new construction will not destroy historic materials, features, and spatial relationships that characterize the property. The new work shall be differentiated from the old and will be compatible with the historic materials, features, size, scale and proportion, and massing to protect the integrity of the property and its environment.
- #10: New additions and adjacent or related new construction will be undertaken in such a manner that, if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

Historic Preservation Commission Policy No. 20-01: Addressing Emergency Climate Mobilization Through the Installation of Roof-Mounted Solar Panels

Now, THEREFORE:

WHEREAS, Historic Area Work Permit decisions are guided by the criteria in Section 24A, The Secretary of the Interior's Standards for Rehabilitation, and pertinent guidance from applicable master plan amendments and/or site or district-specific studies;

WHEREAS, The Secretary of the Interior's Standards for Rehabilitation as interpreted by the National Park Service limit the placement of rooftop solar panels under Standards 2, 9, and 10 to less conspicuous locations;

WHEREAS, the County Council has established a Climate Emergency;

WHEREAS, the Historic Preservation is a body established by the County Executive and County Council;

WHEREAS, Section 24-8(b)(6) states, "In balancing the interest of the public in preserving the historic site or historic resource located within an historic district, with the interests of the public from the use and benefit of the alternative proposal, the general public welfare is better served by granting the permit;"

WHEREAS, the widespread use of solar panels, both for hot water and for electricity production, will reduce greenhouse gases in the county, in accordance with the aims of the Emergency Climate Mobilization resolution (Resolution No.: 18-974), it shall be the policy of the Historic Preservation Commission that:

- 1. The preferred locations for solar panel installation(s) on a designated historic site or an historic resource located within an historic district is a) on the rear of the property, b) on non-historic building additions, c) on accessory structures, or d) in ground-mounted arrays;
- 2. If it is not feasible to install solar panels in one of the identified preferred locations due to resource orientation or other site limitations; and,
- 3. The roof is determined to be neither architecturally significant, nor a character-defining feature of the resource, nor is it a slate or tile roof, that unless it can be demonstrated that the solar array will be installed without damaging the historic character of the resource or historic fabric; then
- 4. The public welfare is better served by approving a Historic Area Work Permit for solar panels on all visible side or front roof slopes under Section 24A-8(b)(6).
- 5. A Historic Area Work Permit (HAWP) is required for all work referenced in this policy.

STAFF DISCUSSION

Staff supports the proposed installation of the 17 solar panels and associated equipment as proposed and recommends approval.

The HPC and staff utilize *Policy Guidance #20-01: Solar Technology (2021)* as the baseline for their review and to articulate their findings in the review of solar technology. The policy outlines the most to least preferred locations for solar arrays. The most preferred location for solar systems is a freestanding array in the rear yard, but this location is not feasible at the subject property due to the size of the lot and existing tree canopy. The second preferred location is a roof-mounted array on an accessory or non-historic building. There is a detached garage at the rear of this property, but this location was likely dismissed owing to the structure's small, angled roof and location under the existing tree canopy. The third and fourth preferred locations are roof-mounted arrays on a non-historic addition or on the original

house, respectively. The rear roof slope of the subject house is north-facing, and the shade map shows limited annual irradiance in this area (Figure 6), leaving the original roof as the only feasible location for the installation of solar arrays. The submission materials indicate that the front panels are necessary to produce sufficient electricity to meet the home's need an ensure the project's financial viability.

Annual irradiance



Figure 6: Shade map for 3 Hesketh Street.

Staff finds that visibility of the proposed arrays may be possible from some vantages along the public right-of-way, particularly when disregarding existing trees, but that the proposed panels have a low profile, are mounted less than six inches above the roof surface, and are arranged in an orderly fashion, making them inconspicuous from the public right-of-way. The low pitch of the porch roof also mitigates potential visibility of the front-most panels. Therefore, the staff finds that the proposed panels will not adversely affect the character of the historic house or streetscape and comply with the *Policy Guidance #20-01: Solar Technology (2021)*. Staff finds that the inconspicuousness of the panels is also in keeping with guidance from the Secretary of the Interior's Standards for Rehabilitation & Guidelines for Rehabilitating Historic Buildings "Roofs" guideline which recommends "Installing mechanical and service equipment on the roof (such as heating and air-conditioning units, elevator housing, or solar panels) when required for a new use so that they are inconspicuous on the site and from the public right-of-way and do not damage or obscure character-defining features." Staff also finds that the proposed work will not destroy the historic materials, features, or spatial relationships that characterize the property and will not be detrimental to the existing streetscape, satisfying *Standards* 2 and 9, if removed in the future, the essential form and integrity of the property would be unimpaired, satisfying *Standards* 10.

One Outstanding resource, at 6 Hesketh Street, is located within the viewshed of the proposed panels. It is located across Hesketh Street approximately 100 feet to the southeast (see Figure 7).

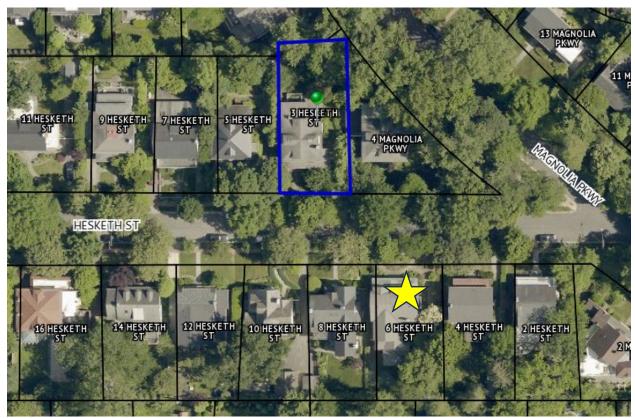


Figure 7: The subject property is outlined in blue. The starred Outstanding resource at 6 Hesketh Street is located approximately 100 feet away and within the viewshed.



Figure 8: View of 3 Hesketh from the south side of Hesketh Street.





Figure 9: Oblique view of the west side elevation of 3 Hesketh Street from Google Streetview in November 2016 (left) with arrows showing locations of proposed arrays, and the same view in August 2024 (right). Existing tree cover makes the roof difficult to photograph.

After full and fair consideration of the applicant's submission, staff finds the proposal is consistent with the Criteria for Issuance in Chapter 24A-8(b), (1), (2), and (d), having found the proposal is consistent with the *Secretary of the Interior's Standards for Rehabilitation #2*, #9, and #10, and *Chevy Chase Village Historic District Guidelines*, and the HPC's Policy No. 20-01 as outlined above.

STAFF RECOMMENDATION

Staff recommends that the Commission <u>approve</u> the HAWP under the Criteria for Issuance in Chapter 24A-8(b)(1), (2), and (d), and the *Chevy Chase Village Historic District Guidelines*, having found that the proposal will not substantially alter the exterior features of the historic resource and is compatible in character with the district and the purposes of Chapter 24A;

and with the Secretary of the Interior's Standards for Rehabilitation # 2, 9, and 10;

and with the *Historic Preservation Commission Policy No. 20-01: Addressing Emergency Climate Mobilization Through The Installation of Roof-Mounted Solar Panels;*

and with the general condition that the applicant shall present an electronic set of drawings, if applicable, to HPC staff for review and stamping prior to submission for the Montgomery County Department of Permitting Services (DPS) building permits;

and with the general condition that final project design details, not specifically delineated by the Commission, shall be approved by HPC staff or brought back to the HPC as a revised HAWP application at staff's discretion;

and with the general condition that the applicant shall notify the Historic Preservation Staff if they propose to make **any alterations** to the approved plans. Once the work is completed the applicant will contact the staff person assigned to this application at 301-495-2167 or laura.dipasquale@montgomeryplanning.org to schedule a follow-up site visit.



FOR STAFF ONLY: HAWP#_1074417 DATE ASSIGNED____



ARYLAN	
APPLICANT:	
Name: Lars Jeurling	E-mail:lars.jeurling@gmail.com_
3 Hesketh Street,	Chevy Chase, Zin: 20815
Address: 3 Hesketh Street, Daytime Phone: (301) 542-2564	E-mail: lars.jeurling@gmail.com City: Chevy Chase, Zip: 20815 Tax Account No.: 00455177
AGENT/CONTACT (if applicable):	
Name: Venture Solar	E-mail:
Address: 36 Brookside Dr.	
Daytime Phone: 347-924-5527	City: Wilmington Zip: 19804 Contractor Registration No.: 148024
LOCATION OF BUILDING/PREMISE: MIHP # of	3 Hesketh Street, Chevy Chase, Maryland 20815 Historic Property
map of the easement, and documentation from	provals / Reviews Required as part of this Application?
Building Number: 3 Street:	Hesketh Street
Town/City: Chevy Chase Neares	st Cross Street:
Lot: Block: Subdiv	vision: Parcel:
for proposed work are submitted with this a be accepted for review. Check all that apply: New Construction Deck/Porch Addition Fence Demolition Grading/Excavation Roof	Shed/Garage/Accessory Structure Solar Tree removal/planting Value Window/Door Other:
and accurate and that the construction will com	e the foregoing application, that the application is correct ply with plans reviewed and approved by all necessary his to be a condition for the issuance of this permit.

06/13/2024

HAWP APPLICATION: MAILING ADDRESSES FOR NOTIFING [Owner, Owner's Agent, Adjacent and Confronting Property Owners] Owner's mailing address 3 Hesketh Street, Chevy Chase, Maryland 20815 Owner's Agent's mailing address 36 Brookside dr. Wilmington, Delaware 19804 Adjacent and confronting Property Owners mailing addresses

Description of Property: Please describe the building and surrounding environment. Include information on significant structures, landscape features, or other significant features of the property:
Description of Work Proposed: Please give an overview of the work to be undertaken:
Installation of 7.225KW of 17 Roof mounted solar modules / Rip & Reroof

Work Item 1:	
Description of Current Condition: Residential	Proposed Work: Installation of 7.225KW of 17 Roof mounted solar modules and Rip and Reroof
Work Item 2:	
Description of Current Condition:	Proposed Work:
Work Item 3:	
Description of Current Condition:	Proposed Work:

HISTORIC AREA WORK PERMIT CHECKLIST OF APPLICATION REQUIREMENTS

	Required Attachments						
Proposed Work	I. Written Description	2. Site Plan	3. Plans/ Elevations	4. Material Specifications	5. Photographs	6. Tree Survey	7. Property Owner Addresses
New Construction	*	*	*	*	*	*	*
Additions/ Alterations	*	*	*	*	*	*	*
Demolition	*	*	*		*		*
Deck/Porch	*	*	*	*	*	*	*
Fence/Wall	*	*	*	*	*	*	*
Driveway/ Parking Area	*	*		*	*	*	*
Grading/Exc avation/Land scaing	*	*		*	*	*	*
Tree Removal	*	*		*	*	*	*
Siding/ Roof Changes	*	*	*	*	*		*
Window/ Door Changes	*	*	*	*	*		*
Masonry Repair/ Repoint	*	*	*	*	*		*
Signs	*	*	*	*	*		*

PLAN SET LEGENDS AND ABBREVIATION **EXISTING** NEW AMPERE AC ALTERNATING CURRENT DC DIRECT CURRENT **ESS ENERGY STORAGE SYSTEM** EXT **EXTERIOR** INT INTERIOR MPH MILES PER HOUR MSP MAIN SERVICE PANEL NTS NOT TO SCALE ON CENTER OC PSF POUNDS PER SQUARE FOOT PV **PHOTOVOLTAIC** SQ FT SQUARE FOOT VOLT W WATT AC AC DISCONNECT BUI **BACKUP INTERFACE** BAT BATTERY BLP BACKUP LOAD PANEL CB **COMBINER BOX** DC DC DISCONNECT GW GATEWAY INV **INVERTER** РМ PRODUCTION METER MSP MAIN SERVICE PANEL RSD RAPID SHUTDOWN DEVICE SC SYSTEM CONTROLLER SD SERVICE DISCONNECT SUB SUB PANEL TS TRANSFER SWITCH UM UTILITY METER **EXTERIOR EQUIPMENT** INTERIOR EQUIPMENT DRIVEWAY ELECTRICAL EQUIPMENT FIRE SETBACK WORKING CLEARANCE CONDUIT RUN LOAD BEARING WALL PROPERTY LINE ROOF FRAMING **ROOF OBSTRUCTIONS** MODULE RAIL

SCOPE OF WORK

SYSTEM SIZE: 7.225 KW DC, 7.6 KW AC

MODULE: 17 HANWHA QCELLS: Q.TRON BLK M-G2+ 425 1 TESLA: SOLAR INVERTER 7.6KW (240V) INVERTER:

RAIL: SNAPNRACK: UR-40

ATTACHMENT: SNAPNRACK: SPEEDSEAL FOOT

RAPID 7 TESLA: MCI-1 SHUTDOWN:

GENERAL NOTES

- SOLAR PHOTOVOLTAIC SYSTEM TO BE INSTALLED ON RESIDENTIAL STRUCTURE.
- OBTAIN ALL NECESSARY PERMITS AND APPROVALS FROM LOCAL AUTHORITIES AND UTILITY COMPANIES BEFORE COMMENCING
- THIS SYSTEM WILL NOT BE INTERCONNECTED UNTIL APPROVAL FROM THE LOCAL JURISDICTION AND UTILITY IS OBTAINED.
- THE SOLAR PHOTOVOLTAIC INSTALLATION SHALL NOT OBSTRUCT ANY PLUMBING, MECHANICAL OR BUILDING ROOF VENTS.
- A LADDER SHALL BE IN PLACE FOR INSPECTION IN COMPLIANCE WITH OSHA REGULATIONS.
- PROPER ACCESS AND WORKING CLEARANCE WILL BE PROVIDED AS PER SECTION 110.26 NEC.
- ALL COMPONENTS AND INSTALLATIONS SHALL MEET THE REQUIREMENTS SET FORTH BY RELEVANT INDUSTRY STANDARDS, INCLUDING IEEE AND UL. CUSTOM MADE EQUIPMENT SHALL HAVE COMPLETE TEST DATA SUBMITTED BY THE MANUFACTURER ATTESTING TO ITS SAFETY.
- MOUNTING STRUCTURES SHALL BE DESIGNED AND INSTALLED TO WITHSTAND WIND, AND SNOW LOADS AS REQUIRED BY LOCAL BUILDING CODES.
- ALL SYSTEM COMPONENTS, INCLUDING PANELS, INVERTERS, DISCONNECTS, AND CONDUITS, SHALL BE CLEARLY LABELED AND MARKED FOR IDENTIFICATION AND SAFETY.
- ALL WIRING, CONDUIT, AND CONNECTORS SHALL BE SIZED AND INSTALLED PER NEC REQUIREMENTS TO ENSURE PROPER CURRENT
- CARRYING CAPACITY AND PROTECTION.
- CODE VIOLATIONS PRESENT IN INTERCONNECTION PANEL WILL BE CORRECTED UPON INSTALLATION.
- RAPID SHUTDOWN COMMENCES UPON LOSS OF UTILITY POWER
- PROPERLY SIZED DISCONNECT SWITCHES AND OVERCURRENT PROTECTION DEVICES SHALL BE INSTALLED AT APPROPRIATE LOCATIONS TO ENSURE SAFE MAINTENANCE AND OPERATION
- ALL METALLIC EQUIPMENT SHALL BE GROUNDED

SITE INFORMATION

AHJ: MD - CHEVY CHASE TOWN

ELECTRIC UTILITY: PUTUWA (PEPCO) POTOMAC ELECTRIC POWER CO

WIND SPEED: 113 MPH **GROUND SNOW LOAD: 25 PSF**

AMBIENT TEMPERATURE: 33°C

EXTREME MINIMUM TEMPERATURE: -11°C

NO. OF FLOORS: 2 **OCCUPANCY TYPE: R3**

CONSTRUCTION TYPE: V-B

SHEET INDEX

PV01 **COVER SHEET** SITE PLAN PV02 PV03 **ROOF LAYOUT** PV04 PV05 STRING LAYOUT PV06 LINE DIAGRAM

PV07

GOVERNING CODES

(IRC 2021, IBC 2021)

(IFC 2018)

MARYLAND ELECTRICAL CODE 2020 (NEC 2020)

STATE OF MARYLAND FIRE PREVENTION CODE

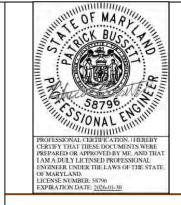
MARYLAND BUILDING PERFORMANCE STANDARD

VICINITY MAP (SCALE: NTS)



AERIAL VIEW (SCALE: NTS)





venture solar

67 West St, Brooklyn, NY 11222

www.venturehomesolar.com

(800) 203-4158

CONTRACTOR SIGNATURE

REVISION

REV	DESCRIPTION	DATE

CUSTOMER NAME:

LARS JEURLING

ADDRESS:

3 HESKETH STREET, CHEVY CHASE, MD, 20815

COORDINATES:

38.968772, -77.07985

APN:

#700455177

Solar Mounting Solutions

SHEET NAME

COVER SHEET

SHEET NUMBER

PV01

DESIGN DATE: 31-May-24

ELECTRICAL CALCULATIONS AND NOTES

P\/08 LABELS AND PLACARD

RAIL SPLICE ATTACHMENT

MSP

WITHIN 10'

CB AC UM

36" FIRE ACCESS PATHWAY -LADDER ACCESS POINT -

(N) JUNCTION BOX

ARRAY #1

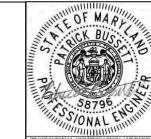
18" FIRE SETBACK

36" FIRE ACCESS PATHWAY

LADDER ACCESS POINT

18" FIRE SETBACK -

		ARRAY	DETA	<u>ILS</u>			
ARRAY	MODULES	ARRAY HEIGHT	ROOF TILT	AZIMUTH	PV AREA COVERAGE		
1	7	2-STORY	28°	270°	147.13 SQ. FT.		
2	5	1-STORY	10°	180°	105.10 SQ. FT.		
3	5	2-STORY	28°	90°	105.10 SQ. FT.		



PROFESSIONAL CERTIFICATION, HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT AMA DULLY LICENSE PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE. OF MARYLAND. LICENSE NUMBER: 58796 EXPIRATION DATE: 2026-01-30

venture solar

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67 West St, Brooklyn, NY 11222

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REVISION

REV	DESCRIPTION	DATE

CUSTOMER NAME:

LARS JEURLING

ADDRESS:

3 HESKETH STREET, CHEVY CHASE, MD, 20815

COORDINATES:

38.968772, -77.07985

APN:

#700455177



SHEET NAME

SITE PLAN

SHEET NUMBER

PV02

DESIGN DATE: 31-May-24

(E) DETACHED STRUCTURE

(E) RESIDENCE

(E) DRIVEWAY

FRONT OF RESIDENCE

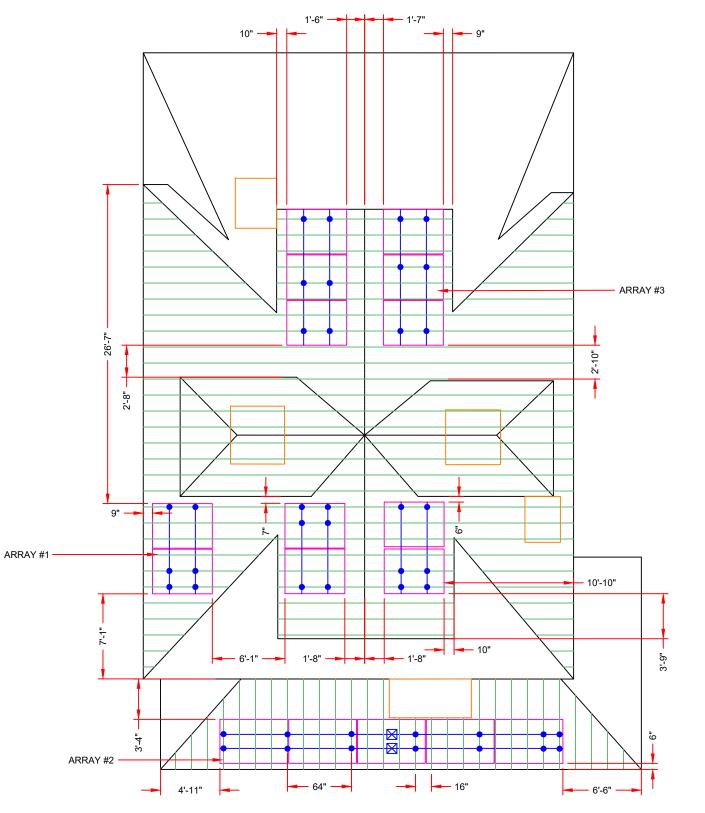
3 HESKETH STREET

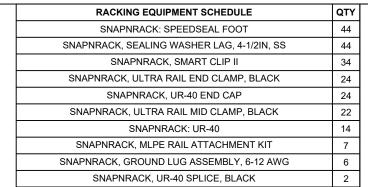
FRONT OF RESIDENCE 3 HESKETH STREET

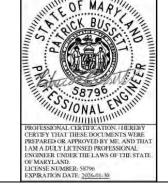
ARRAY #3

ARRAY #2

ROOF LAYOUT - SCALE: 1/8" = 1'-0"







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67 West St, Brooklyn, NY 11222

www.venturehomesolar.com

(800) 203-4158

CONTRACTOR SIGNATURE

REVISION

REV	DESCRIPTION	DATE

CUSTOMER NAME:

LARS JEURLING

ADDRESS:

3 HESKETH STREET, CHEVY CHASE, MD, 20815

COORDINATES:

38.968772, -77.07985

APN:

#700455177

Solar Mounting Solutions

SHEET NAME

ROOF LAYOUT

SHEET NUMBER

PV03 DESIGN DATE: 31-May-24

							4	ARRAY DET	AILS				ı
ARRAY	MODULES	ARRAY HEIGHT	ROOF TILT	AZIMUTH	ROOF TYPE	ROOF FRAMING	RAFTER SIZE	RAFTER SPACING	RAIL	ATTACHMENT	ATTACHMENT SPACING	ATTACHMENT CONFIGURATION	
1	7	2-STORY	28°	270°	COMP SHINGLE	TRADITIONAL/STICK FRAMING	2" x 8"	16"	SNAPNRACK: UR-40	SNAPNRACK: SPEEDSEAL FOOT	64"	STACKED	ı
2	5	1-STORY	10°	180°	COMP SHINGLE	TRADITIONAL/STICK FRAMING	2" x 8"	16"	SNAPNRACK: UR-40	SNAPNRACK: SPEEDSEAL FOOT	64"	STACKED	1
3	5	2-STORY	28°	90°	COMP SHINGLE	TRADITIONAL/STICK FRAMING	2" x 8"	16"	SNAPNRACK: UR-40	SNAPNRACK: SPEEDSEAL FOOT	64"	STACKED	

SOLAR ARRAY AND

LOADING **CALCULATION**

OF MODULE

PV AREA TOTAL ARRAY

AREA TOTAL ROOF

AREA PV AREA

COVERAGE

MODULE

WEIGHT

TOTAL ARRAY

WEIGHT

OF

ATTACHMENT

POINT LOAD

DISTRIBUTED

LOAD

MAIN HOUSE

17 21.02 SQ FT

357.33 SQ FT

2230.79 SQ

16.02%

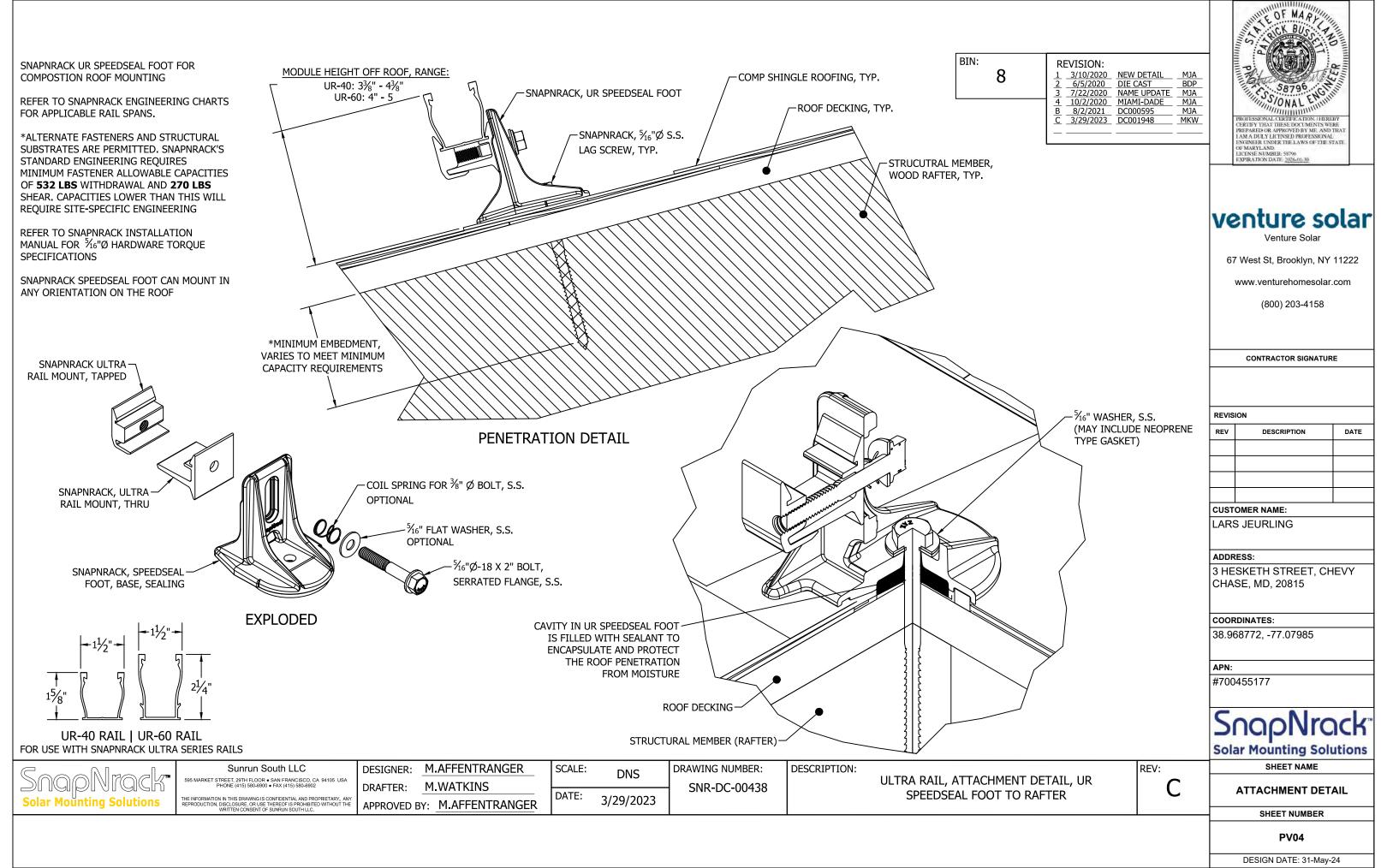
46.70 LBS

793.90 LBS

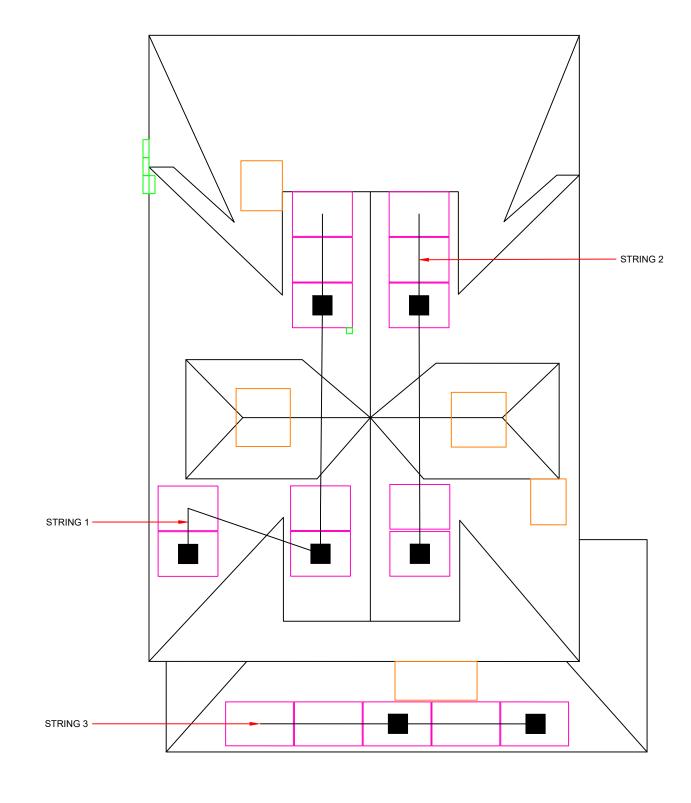
44

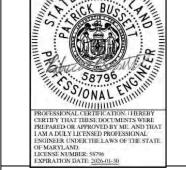
8.12 LBS

2.22 PSF









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Venture Solar

67 West St, Brooklyn, NY 11222

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CONTRACTOR SIGNATURE

REVISION

REV	DESCRIPTION	DATE

CUSTOMER NAME:

LARS JEURLING

ADDRESS:

3 HESKETH STREET, CHEVY CHASE, MD, 20815

COORDINATES:

38.968772, -77.07985

APN:

#700455177

SnapNrack's Solar Mounting Solutions

SHEET NAME

STRING LAYOUT

SHEET NUMBER

PV05

DESIGN DATE: 31-May-24

STRING 1: 7 MODULE 3 RAPID SHUTDOWN

STRING 2: 5 MODULE 2 RAPID SHUTDOWN

STRING 3: 5 MODULES 2 RAPID SHUTDOWN

ELECTRICAL EQUIPMENT SCHEDULE	Q.	TY RATING	INVERTER SPECI	FICATION	MODULE SPECI	FICATION			WIRE AND CO	NDUIT SCHEDULE		
HANWHA QCELLS: Q.TRON BLK M-G2+ 425	5 1	7 425 W	INVERTER:	TESLA: SOLAR INVERTER 7.6KW	MODULE:	HANWHA QCELLS: Q.TRON BLK M-G2+	WIRE TAG	CONDUIT	CONDUCTOR	NEUTRAL	GROUND	1
TESLA: MCI-1	 	7 -	INVERTER:	(240V)	MODULE:	425	1 1	FREE AIR	(2) 10 AWG PV WIRE, USE-2	NONE	(1) 6 AWG BARE COPPER	-
TESLA: SOLAR INVERTER 7.6KW (240V)	1	1 7,600 W	NO. OF INVERTER:	1	NO. OF MODULE:	17	2	1" EMT	(6) 10 AWG THWN-2	NONE	(1) 10 AWG THWN-2	-
EATON: DG222NRB	1	1 60 A	MAX OUTPUT POWER:	7600.00 W	MAX POWER:	425.00 W	3	1" EMT	(2) 6 AWG THWN-2	(1) 6 AWG THWN-2	(1) 8 AWG THWN-2	1
	•		MAX INPUT VOLTAGE:	600.00 V	OPEN CIRCUIT VOLTAGE:	39.03 V					<u> </u>	1
			MAX INPUT CURRENT:	13.00 A	SHORT CIRCUIT CURRENT:	13.66 A						
			NOMINAL OUTPUT VOLTAGE:	240.00 V	MAX POWER-POINT VOLTAGE:	32.74 V	1					
			MAX OUTPUT CURRENT:	32.00 A	MAX POWER-POINT CURRENT:	12.98 A	_					
			TOTAL OUTPUT CURRENT:	32.00 A	MAX FUSE RATING:	25 A]					
			TOTAL BACKFEED: MINIMUM OCPD SIZE:	40.00 A 40 A								
(E) UTILITY METER 1PH, 120/240V, 3W OVERHEAD SERVICE METER# TCA108598260 TO GRID (E) GROUNDING— ELECTRODE		200A	I SERVICE PANEL FUS BUS BAR ID FED BO	DEATON: DG2222NRB LE, LOCKABLE, BLADE, BLE AC DISCONNECT 60A, 240V, NEMA3R GROUNDING TO BE NDED WITH NEUTRAL	TESLA: SOLAR INVERTER 77 7600W INVERTER WITH INTRAPID SHUTDOWN DC DIS SWITCH	TEGRATED CONNECT	EZ SOLAR - C JUNCTION 000V, 125A,N	BOX			STRING 3: 5 MODULE 2 TESLA: MCI-1 RAPID SHUTDOWN DEVICE STRING 2: 5 MODULE 2 TESLA: MCI-1 RAPID SHUTDOWN DEVICE STRING 1: 7 MODULE 3 TESLA: MCI-1 RAPID SHUTDOWN DEVICE	Venture Solar 67 West St, Brooklyn, NY 11222 www.venturehomesolar.com (800) 203-4158 CONTRACTOR SIGNATURE REVISION REV DESCRIPTION DATE CUSTOMER NAME: LARS JEURLING ADDRESS: 3 HESKETH STREET, CHEVY CHASE, MD, 20815 COORDINATES: 38.968772, -77.07985 APN: #700455177 SOOP NTOCK Solar Mounting Solutions SHEET NAME LINE DIAGRAM SHEET NUMBER PV06

	WIRE AND CONDUIT SCHEDULE												
WIRE TAG	CONDUIT	CONDUCTOR	CONDUCTOR NEUTRAL GROUND		AMBIENT TEMPERATURE RATING OF TEMPERATURE WIRE		WIRE AMPACITY TEMPERATURE DERATE FACTOR				OCPD	CONDUIT FILL	
1	FREE AIR	(2) 10 AWG PV WIRE, USE-2	NONE	(1) 6 AWG BARE COPPER	33°C	90°C - COPPER	40 A	0.96	1	38.40 A	25 A	FREE AIR	
2	1" EMT	(6) 10 AWG THWN-2	NONE	(1) 10 AWG THWN-2	33°C	90°C - COPPER	40 A	0.96	0.8	30.72 A	25 A	17.09%	
3	1" EMT	(2) 6 AWG THWN-2	(1) 6 AWG THWN-2	(1) 8 AWG THWN-2	33°C	75°C - COPPER	65 A	0.94	1	61.10 A	60 A	21.84%	

EQUIPMENT	QTY	OUTPUT CURRENT	TOTAL OUTPUT CURRENT	BACKFEED
TESLA: SOLAR INVERTER 7.6KW (240V)	1	32 A	32 A	40 A
		TOTAL:	32 A	40 A

STRING CALCULATIONS							
TESLA: SOLAR INVERTER 7.6KW (240V)	1	2					
NO. OF MODULE	7	5					
NOMINAL STRING VOLTAGE	296.8200 00 V	212.0100 00 V					
ARRAY CURRENT	13.66 A	13.66 A					
DC SYSTEM SIZE	722	5 W					
AC SYSTEM SIZE 7600 W							
DC/AC RATIO	0.	95					

MAIN SERVICE PANEL ALLOWABLE BACKFEED					
MAIN BREAKER RATING	200 A				
PANEL RATING	200 A				
BUS RATING	200 A				
MAIN PANEL ALLOWABLE BACKFEED = MAIN BREAKER RATING 200A ≥ 40A BACKFEED					

ELECTRICAL NOTES

- PHOTOVOLTAIC MODULES AND INVERTERS USED IN THE SYSTEM SHALL BE LISTED AND LABELED FOR THEIR
 INTENDED USE AS PER NEC 690.4 AND 690.5, ENSURING COMPLIANCE WITH INDUSTRY STANDARDS AND SAFETY
 REGULATIONS.
- ALL EQUIPMENT SHALL MEET THE MINIMUM CLEARANCES AS REQUIRED BY NEC 110.26
- JUNCTION BOXES AND PULL BOXES ARE PERMITTED TO INSTALL UNDER PV MODULES PER NEC 690.34
- ALL COMPONENTS ARE LISTED FOR THEIR PURPOSE AND RATED FOR OUTDOOR USAGE WHEN APPROPRIATE
- WIRING METHODS SHALL FOLLOW NEC GUIDELINES, INCLUDING PROPER RACEWAY SELECTION, CONDUIT SIZING, AND
 SEPARATION FROM OTHER CIRCUITS TO PREVENT DAMAGE AND MAINTAIN CIRCUIT INTEGRITY. CONDUIT AND WIRE
 SPECIFICATIONS ARE BASED ON MINIMUM CODE REQUIREMENTS AND ARE NOT MEANT TO LIMIT UP-SIZING.
- VOLTAGE DROP IS LIMITED TO 2%
- DC WIRING LIMITED TO MODULE FOOTPRINT. MICORINVERTER WIRING SYSTEM SHALL BE LOCATED AND SECURED UNDER THE ARRAY WITH SUITABLE WIRING CLIPS
- GROUNDING AND BONDING OF PV SYSTEMS SHALL COMPLY WITH NEC REQUIREMENTS. THIS INCLUDES GROUNDING

- OF METAL COMPONENTS, GROUNDING ELECTRODES, AND PROPER BONDING TO MINIMIZE ELECTRICAL HAZARDS.
- DISCONNECTING SWITCHES SHALL BE WIRED SUCH THAT WHEN THE SWITCH IS OPENED THE CONDUCTORS
 REMAINING ENERGIZED ARE CONNECTED TO THE TERMINALS MARKED "LINE SIDE" (TYPICALLY UPPER TERMINALS)
- EMERGENCY DISCONNECTS SHALL BE INSTALLED IN READILY ACCESSIBLE LOCATIONS, ENSURING SAFE AND EFFICIENT SHUTDOWN IN CASE OF EMERGENCIES.
- RAPID SHUTDOWN REQUIREMENTS SHALL BE MET, ENSURING THAT THE PV SYSTEM CAN BE DE-ENERGIZED TO A
 SPECIFIED VOLTAGE WITHIN A CERTAIN TIME FRAME, FACILITATING FIREFIGHTER SAFETY DURING EMERGENCIES.
- PROPERLY SIZED OVERCURRENT PROTECTION DEVICES SHALL BE INSTALLED TO PROTECT CONDUCTORS AND COMPONENTS. COORDINATION WITH MODULE SHORT-CIRCUIT CURRENTS AND OVERCURRENT DEVICE RATINGS SHALL BE ENSURED.
- SOURCE AND OUTPUT CIRCUITS SHALL BE APPROPRIATELY SIZED AND PROTECTED, WITH PROPER INSULATION AND LABELING TO PREVENT ANY RISK OF ELECTRICAL HAZARDS.
- LOAD-SIDE INTERCONNECTION SHALL BE IN ACCORDANCE WITH NEC 705.12(B)
- SUPPLY SIDE TAP INTERCONNECTION ACCORDING TO NEC 705.12(A) WITH SERVICE ENTRANCE CONDUCTORS IN ACCORDANCE WITH NEC 230.42

venture solar

/enture Solar

67 West St, Brooklyn, NY 11222

www.venturehomesolar.com

(800) 203-4158

CONTRACTOR SIGNATURE

REVISION

REV	DESCRIPTION	DATE

CUSTOMER NAME:

LARS JEURLING

ADDRESS:

3 HESKETH STREET, CHEVY CHASE, MD, 20815

COORDINATES:

38.968772, -77.07985

ADN:

#700455177

SnapNrack® Solar Mounting Solutions

SHEET NAME

ELECTRICAL CALCULATION AND NOTES

SHEET NUMBER

PV07

DESIGN DATE: 31-May-24

TEMPLATE V0.2.24.05.08

!WARNING

ELECTRICAL SHOCK HAZARD

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

INVERTER(S), AC/DC DISCONNECT(S), AC COMBINER PANEL (IF APPLICABLE). PER CODE(S): NEC 2020: 690.13(B)

LABEL LOCATION:

MAXIMUM SYSTEM VOLTAGE:

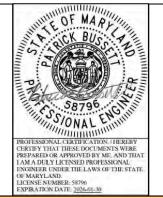
PHOTOVOLTAIC DC DISCONNECT

600 VDC

LABEL LOCATION: INVERTER(S), DC DISCONNECT(S). PER CODE(S): NEC 2020: 690.53

LABELING NOTES:

- ENSURE LABELS ALIGN WITH COMMON
 CONFIGURATIONS, ALLOWING ELECTRICIANS TO
 ADJUST PER NEC AND LOCAL CODES.
- ADHERE TO LABELING REQUIREMENTS BASED ON 2020 NEC, OSHA STANDARD 1910.145, AND ANSI Z535, FOLLOWING AHJ SPECIFICATIONS.
- MATERIALS MUST MEET AHJ REQUIREMENTS FOR DURABILITY IN THE GIVEN ENVIRONMENT (NEC 110.21(B)(3)).
- 4. LABELS SHOULD HAVE A MINIMUM 3/8" LETTER HEIGHT, WHITE ON RED BACKGROUND, REFLECTIVE, AND PERMANENTLY AFFIXED (NEC 690.31(G)).
- 5. EFFECTIVELY COMMUNICATE HAZARDS THROUGH WORDS, COLORS, AND SYMBOLS ON LABELS, COMPLYING WITH NEC ARTICLE 110.21(B).
- 6. PERMANENTLY AFFIX LABELS WITHOUT COVERING EXISTING MANUFACTURER LABELS.



venture solar

Venture Solar

67 West St, Brooklyn, NY 11222

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CONTRACTOR SIGNATURE

REVISION

ILLAIO		
REV	DESCRIPTION	DATE

CUSTOMER NAME:

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3 HESKETH STREET, CHEVY CHASE, MD, 20815

COORDINATES:

38.968772, -77.07985

ADN

#700455177

SnapNrack Solar Mounting Solutions

SHEET NAME

LABELS AND PLACARD

SHEET NUMBER

PV08

DESIGN DATE: 31-May-24

WARNING

POWER SOURCE OUTPUT CONNECTION

DO NOT RELOCATE THIS OVERCURRENT DEVICE

LABEL LOCATION:
ADJACENT TO PV BREAKER, ESS
OCPD (IF APPLICABLE).
PER CODE(S): NEC 2020:
705.12(B)(3)(2),

WARNING

DUAL POWER SUPPLY
SOURCES: UTILITY GRID
AND PV SOLAR ELECTRIC
SYSTEM

LABEL LOCATION:

UTILITY SERVICE METER AND MAIN SERVICE PANEL.
PER CODE(S): NEC 2020: 705.12(C)

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

ABEL LOCATION:

UTILITY SERVICE ENTRANCE/METER, INVERTER/DC DISCONNECT (IF APPLICABLE). INSTALLED WITHIN 3' OF RAPID SHUT DOWN SWITCH PER CODE(S): NEC 2020: 690.56(C)(2)

WARNING: PHOTOVOLTAIC POWER SOURCE

LABEL LOCATION:

INTERIOR AND EXTERIOR DC CONDUIT EVERY 10 FT, AT EACH TURN, ABOVE AND BELOW PENETRATIONS, ON EVERY JB/PULL BOX CONTAINING DC CIRCUITS. PER CODE(S): NEC 2020: 690.31(D)(2)

PV SYSTEM DISCONNECT

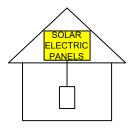
MAXIMUM AC OPERATING CURRENT: 32 AMPS NOMINAL OPERATING AC VOLTAGE: 240 VAC

LABEL LOCATION

AC DISCONNECT(S), PHOTOVOLTAIC SYSTEM POINT OF INTERCONNECTION.
PER CODE(S): NEC 2020: 690.54

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 LOCATION:

ON OR NO MORE THAT 1 M (3 FT) FROM THE SERVICE DISCONNECTING MEANS TO WHICH THE PV SYSTEMS ARE CONNECTED. PER CODE(S): NEC 2020: 690.56(C)

!\ CAUTION MULTIPLE SOURCES OF POWER FRONT OF RESIDENCE 3 HESKETH STREET PV MODULE MAIN SERVICE PANEL (INT) INVERTER AC DISCONNECT YOU ARE HERE UTILITY METER

MIN.6"x6" PLACARD TO GO ON MAIN SERVICE PANEL

PLAQUE SHALL BE ATTACHED TO THE SERVICE EQUIPMENT WITH POP-RIVETS OR SCREWS.

Q.TRON BLK M-G2+ SERIES



405-430 Wp | 108 Cells 22.0% Maximum Module Efficiency

MODEL Q.TRON BLK M-G2+





High performance Qcells N-type solar cells

Q.ANTUM NEO Technology with optimized module layout boosts module efficiency up to 22.0%.



A reliable investment

Inclusive 25-year product warranty and 25-year linear performance warranty¹.



Enduring high performance

Long-term yield security with Anti LeTID Technology, Anti PID Technology², Hot-Spot Protect.



Extreme weather rating

High-tech aluminium alloy frame, certified for high snow (8100 Pa) and wind loads (3600 Pa).



Innovative all-weather technology

Optimal yields, whatever the weather with excellent low-light and temperature behaviour.



The most thorough testing programme in the industry

Qcells is the first solar module manufacturer to pass the most comprehensive quality programme in the industry. The new "Quality Controlled PV" of the independent certification institute TÜV Rheinland.

¹ See data sheet on rear for further information.
² APT test conditions according to IEC/TS 62804-1:2015, method A (–1500 V, 96 h)

The ideal solution for:



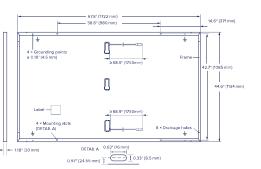




Q.TRON BLK M-G2+ SERIES

■ Mechanical Specification

Format	67.8 in × 44.6 in × 1.18 in (including frame) (1722 mm × 1134 mm × 30 mm)
Weight	46.7 lbs (21.2 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 × 18 monocrystalline Q.ANTUM NEO 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), Protection class IP67, with bypass diodes
Cable	$4 \text{mm}^2 \text{Solar cable}$; (+) $\geq 68.9 \text{in}$ (1750mm), (-) $\geq 68.9 \text{in}$ (1750mm)
Connector	Stäubli MC4; IP68



■ Electrical Characteristics

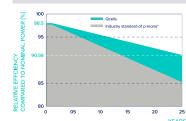
PC	OWER CLASS			405	410	415	420	425	430
MI	NIMUM PERFORMANCE AT STANDARD TEST COND	TIONS, ST	C1 (POWER 1	FOLERANCE +5 V	//-0 W)				
	Power at MPP ¹	P_{MPP}	[W]	405	410	415	420	425	430
_	Short Circuit Current¹	I _{sc}	[A]	13.33	13.41	13.49	13.58	13.66	13.74
μ	Open Circuit Voltage ¹	V _{oc}	[V]	37.91	38.19	38.47	38.75	39.03	39.32
Mini	Current at MPP	I _{MPP}	[A]	12.69	12.76	12.83	12.91	12.98	13.05
-	Voltage at MPP	V _{MPP}	[V]	31.93	32.13	32.34	32.54	32.74	32.94
	Efficiency ¹	η	[%]	≥20.7	≥21.0	≥21.3	≥21.5	≥21.8	≥22.0

MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT²

	Power at MPP	P _{MPP}	[W]	306.1	309.9	313.7	317.5	321.2	325.0
Ę	Short Circuit Current	I _{sc}	[A]	10.74	10.81	10.87	10.94	11.00	11.07
ij	Open Circuit Voltage	V _{oc}	[V]	35.96	36.23	36.50	36.77	37.04	37.31
Ξ	Current at MPP	I _{MPP}	[A]	9.98	10.04	10.10	10.15	10.21	10.27
	Voltage at MPP	V _{MPP}	[V]	30.66	30.87	31.07	31.26	31.46	31.65

 $^{1}\text{Measurement tolerances } P_{\text{MPP}} \pm 3\%; I_{\text{SC}}; V_{\text{OC}} \pm 5\% \text{ at STC}; 1000 \text{W/m}^{2}, 25 \pm 2\text{°C}, \text{AM 1.5 according to IEC 60904-3} \cdot ^{2}\text{800 W/m}^{2}, \text{NMOT, spectrum AM 1.5}$

Qcells PERFORMANCE WARRANTY



At least 98.5% of nominal powe during first year. Thereafter max. 0.33% degradation per year. At least 95.53% of nominal power up to 10 years. At least 90.58% of nominal power up to 25 years.

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



*Standard terms of guarantee for the 5 PV companies with the highest production capacity in 2021 (February 2021)

Typical module performance under low irradiance conditi
comparison to STC conditions (25°C 1000W/m²)

TEMPERATURE COEFFICIENTS							
Temperature Coefficient of I _{sc}	α	[%/K]	+0.04	Temperature Coefficient of V _{oc}	β	[%/K]	-0.24
Temperature Coefficient of P _{MPP}	γ	[%/K]	-0.30	Nominal Module Operating Temperature	NMOT	[°F]	109±5.4 (43±3°C)

■ Properties for System Design

Maximum System Voltage	$V_{\rm sys}$	[V]	1000 (IEC)/1000 (UL
Maximum Series Fuse Rating		[A DC]	2
Max. Design Load, Push/Pull ³		[lbs/ft²]	113 (5400 Pa)/50 (2400 Pa
Max. Test Load, Push/Pull ³		[lbs/ft²]	169 (8100 Pa)/75 (3600 Pa

)	PV module classification	Class II
,	Fire Rating based on ANSI/UL 61730	C / TYPE 2
)	Permitted Module Temperature	−40°F up to +185°F
\	on Continuous Duty	(-40°C up to +85°C)

■ Qualifications and Certificates

UL61730-1 & UL61730-2, CE-compliant, Quality Controlled PV - TÜV Rheinland, IEC 61215:2016, IEC 61730:2016, U.S. Patent No. 9,893,215 (solar cell

3 See Installation Manual









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 America Inc. 400 Spectrum Center Drive, Suite 1400, Irvine, CA 92618, USA | TEL +1 949 748 59 96 | EMAIL hqc-inquiry@gcells.com | WEB www.qcells.com





SOLAR INVERTER

3.8 kW | 7.6 kW

Tesla Solar Inverter completes the Tesla home solar system, converting DC power from solar to AC power for home consumption. Tesla's renowned expertise in power electronics has been combined with robust safety features and a simple installation process to produce an outstanding solar inverter that is compatible with both Solar Roof and traditional solar panels. Once installed, homeowners use the Tesla mobile app to manage their solar system and monitor energy consumption, resulting in a truly unique ecosystem experience.

KEY FEATURES

- Built on Powerwall 2 technology for exceptional efficiency and reliability
- Wi-Fi, Ethernet, and cellular connectivity with easy over-the-air updates
- Designed to integrate with Tesla Powerwall and Tesla App
- 3.8 kW and 7.6 kW models available

SOLAR INVERTER

Tesla Solar Inverter provides DC to AC conversion and integrates with the Tesla ecosystem, including Solar Panels, Solar Roof, Powerwall, and vehicle charging, to provide a seamless sustainable energy experience.

KEY FEATURES

- Integrated rapid shutdown, arc fault, and ground fault protection
- No neutral wire simplifies installation
- 2x the standard number of MPPTs for high production on complex roofs



ELECTRICAL SPECIFICATIONS

OUTPUT (AC) 3.8 kW 7.6 kW Nominal Power 3,800 W 7,600 W Maximum Apparent Power 3,328 VA at 208 V 6,656 VA at 208 V 7,680 VA at 240 V 7,680			
Maximum Apparent Power 3,328 VA at 208 V 6,656 VA at 208 3,840 VA at 240 V 7,680 VA at 240 VA at	OUTPUT (AC)	3.8 kW	7.6 kW
3,840 VA at 240 V 7,680 VA at 240 Maximum Continuous Current	Nominal Power	3,800 W	7,600 W
Breaker (Overcurrent Protection) 20 A 40 A	Maximum Apparent Power		
Nominal Power Factor	Maximum Continuous Current	16 A	32 A
THD (at Nominal Power) Nome	Breaker (Overcurrent Protection)	20 A	40 A
INPUT (DC)	Nominal Power Factor	1 - 0.85 (leading / lagging)	
MPPT 2 4 Input Connectors per MPPT 1-2 1-2-1-2 Maximum Input Voltage 600 VDC DC Input Voltage Range 60 - 550 VDC DC MPPT Voltage Range ¹ 60 - 480 VDC Maximum Current per MPPT (I _{mp}) 11 A Maximum Short Circuit	THD (at Nominal Power)	<5%	
Input Connectors per MPPT	INPUT (DC)		
Maximum Input Voltage 600 VDC DC Input Voltage Range 60 - 550 VDC DC MPPT Voltage Range¹ 60 - 480 VDC Maximum Current per MPPT (I _{mp}) 11 A Maximum Short Circuit	MPPT	2	4
DC Input Voltage Range 60 - 550 VDC DC MPPT Voltage Range¹ 60 - 480 VDC Maximum Current per MPPT (I _{mp}) 11 A	Input Connectors per MPPT	1-2	1-2-1-2
DC MPPT Voltage Range¹ 60 - 480 VDC Maximum Current per MPPT (I _{mp}) 11 A Maximum Short Circuit 11 A	Maximum Input Voltage	600	VDC
Maximum Current per MPPT (I _{mp}) 11 A Maximum Short Circuit	DC Input Voltage Range	60 - 550 VDC	
Maximum Short Circuit	DC MPPT Voltage Range ¹	60 - 480 VDC	
Maximum Short Circuit	Maximum Current per MPPT (I _{mp})	11	А
Current per MPPT (I _{sc})		15	А

PERFORMANCE SPECIFICATIONS

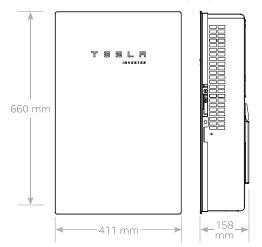
Peak Efficiency ²	97.5%	98.0%
CEC Efficiency ²	97.5	%
Allowable DC/AC Ratio	1.4	
Customer Interface	Tesla Mobile App	
Internet Connectivity	Wi-Fi (2.4 GHz, 802. Ethernet, Cellular (L	
AC Remote Metering Support	Wi-Fi (2.4 GHz, 802. RS-485	11 b/g/n),
Protections	Integrated arc fault ((AFCI), Rapid Shutde	
Supported Grid Types	60 Hz, 240 V Split Ph 60 Hz, 208 V Wye	nase
Required Number of Tesla Solar Shutdown Devices per Solar Module	See Solar Shutdown Requirements per Mo	
Warranty	12.5 years	

¹ Maximum current.

MECHANICAL SPECIFICATIONS

Dimensions	660 mm x 411 mm x 158 mm (26 in x 16 in x 6 in)
Weight	52 lb ⁴
Mounting options	Wall mount (bracket)

⁴Door and bracket can be removed for a mounting weight of 37 lb.



ENVIRONMENTAL SPECIFICATIONS

Operating Temperature ⁵	-30°C to 45°C (-22°F to 113°F)
Operating Humidity (RH)	Up to 100%, condensing
Storage Temperature	-30°C to 70°C (-22°F to 158°F)
Maximum Elevation	3000 m (9843 ft)
Environment	Indoor and outdoor rated
Enclosure Rating	Type 3R
Ingress Rating	IP55 (Wiring compartment)
Pollution Rating	PD2 for power electronics and terminal wiring compartment, PD3 for all other components
Operating Noise @ 1 m	< 40 db(A) nominal, < 50 db(A) maximum

 5 For the 7.6 kW Solar Inverter, performance may be de-rated to 6.2 kW at 240 V or 5.37 kW at 208 V when operating at temperatures greater than 45°C.

COMPLIANCE INFORMATION

Grid Certifications	UL 1741, UL 1741 SA, IEEE 1547, IEEE 1547.1
Safety Certifications	UL 1699B, UL 1741, UL 1998 (US)
Emissions	EN 61000-6-3 (Residential), FCC 47CFR15.109 (a)

T = 5 L 7 NA 2021-1-14 TESLA.COM/ENERGY

² Expected efficiency pending final CEC listing.

³ Cellular connectivity subject to network operator service coverage and signal strength.

SOLAR SHUTDOWN DEVICE

The Tesla Solar Shutdown Device is part of the PV system rapid shutdown (RSD) function in accordance with Article 690 of the applicable NEC. When paired with the Tesla Solar Inverter, the PVRSS is initiated by any loss of AC power.



ELECTRICAL SPECIFICATIONS

Nominal Input DC Current Rating (I_{MP})	12 A
Maximum Input Short Circuit Current (I _{sc})	15 A
Maximum System Voltage	600 V DC

RSD MODULE PERFORMANCE

Maximum Number of Devices per String	5
Control	Power Line Excitation
Passive State	Normally open
Maximum Power Consumption	7 W
Warranty	25 years

COMPLIANCE INFORMATION

Certifications	UL 1741 PVRSS
	PVRSA (Photovoltaic Rapid
	Shutdown Array)

PVRSS

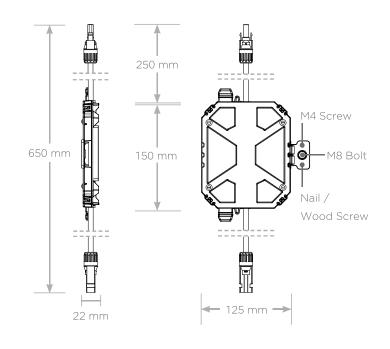
RSD Initiation Method	Loss of AC power
Compatible Equipment	Tesla Solar Inverter

ENVIRONMENTAL SPECIFICATIONS

Ambient Temperature	-40°C to 50°C (-40°F to 122°F)
Storage Temperature	-30°C to 70°C (-22°F to 158°F)
Enclosure Rating	NEMA 4 / IP65

MECHANICAL SPECIFICATIONS

Electrical Connections	MC4 Connector
Housing	Plastic
Dimensions	125 mm x 150 mm x 22 mm (5 in x 6 in x 1 in)
Weight	350 g (0.77 lb)
Mounting Options	ZEP Home Run Clip M4 Screw (#10) M8 Bolt (5/16") Nail / Wood screw



SOLAR SHUTDOWN DEVICE REQUIREMENTS PER MODULE

The following modules have been certified as part of a PV Rapid Shutdown Array (PVRSA) when installed together with the Tesla Solar Inverter and Tesla Solar Shutdown Devices. See the Tesla Solar Inverter Installation Manual for guidance on installing Tesla Solar Inverter and Solar Shutdown Devices with other modules.

Brand	Model	Required Solar Shutdown Devices
Tesla	Solar Roof V3	1 Solar Shutdown Device per 10 modules
Hanwha	Q.PEAK DUO BLK-G5	1 Solar Shutdown Device per 3 modules
Hanwha	Q.PEAK DUO BLK-G6+	1 Solar Shutdown Device per 3 modules

T = 5 L T TESLA.COM/ENERGY

Product specifications

AON

Eaton DG222NRB

Catalog Number: DG222NRB

Eaton General duty cartridge fuse safety switch, 60 A, NEMA 3R, Painted galvanized steel, Class H fuses, Fusible with neutral, Twopole, Three-wire, Category: general duty safety switch, 240 V

General specifications

Product Name Catalog Number Eaton general duty cartridge fuse safety DG222NRB

switch

UPC

782113144221

Product Length/Depth Product Height 7.35 in 14.37 in

Product Width **Product Weight**

8.4 in 10 lb

Compliances Warranty

Eaton Selling Policy 25-000, one (1) year NEC 230.62 (C) Compliant Barrier

from the date of installation of the

Product or eighteen (18) months from the date of shipment of the Product,

whichever occurs first.

Certifications

UL Listed

Catalog Notes

Maximum hp ratings apply only when dual element fuses are used. 3-Phase hp rating shown is a grounded B phase rating, UL listed.

Physical Attributes

Enclosure

NEMA 3R

Enclosure material

Painted galvanized steel

Fuse configuration

Fusible with neutral

Number Of Poles

Two-pole

Number of wires

3 Type

General duty, cartridge fused

Performance Ratings

Amperage Rating

60A

Fuse class provision

Class H fuses

Voltage rating

240V

Miscellaneous

Product Category

General duty safety switch

Resources

Catalogs

Eaton's Volume 2—Commercial Distribution

Multimedia

Switching Devices Flex Center

Double Up on Safety

Specifications and datasheets

Eaton Specification Sheet - DG222NRB



Eaton Corporation plc Eaton House 30 Pembroke Road Dublin 4, Ireland Eaton.com

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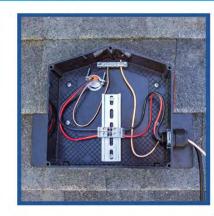
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COST EFFECTIVE

- We believe that EVERYONE should have access to affordable renewable energy
 - · Larger box at a lower cost



MORE SPACE

- Made from advanced durable polycarbonate + superior components, UL1741, Nema 3R, CSA C22.2 No. 290
 - 3 patented layers of water protection
 - 2 Weep Holes for breathability



FAST INSTALL

- Enter through 3 Side Walls
- Minimal Shingle Cutting
- Din Rail pre-installed







JB-1.2, JB-1.XL Specification Sheet

PV Junction Box for Composition/Asphalt Shingle Roofs

A. System Specifications and Ratings

Maximum Voltage: 1,000 Volts

Maximum Current: JB-1.2: 80 Amps; JB-1.XL: 120 Amps

Allowable Wire: 14 AWG – 6 AWG

- Spacing: Please maintain a spacing of at least ½" between uninsulated live parts and fittings for conduit, armored cable, and uninsulated live parts of opposite polarity.
- Enclosure Rating: Type 3R
- Roof Slope Range: 2.5 12:12
- Max Side Wall Fitting Size: 1"
- Max Floor Pass-Through Fitting Size: 1"
- Ambient Operating Conditions: (-35°C) (+75°C)
- Compliance
 - JB-1.2: UL1741, CSA C22.2 No. 290; JB-1.XL: UL1741, CSA C22.2 No. 290
 - Approved wire connectors: must conform to UL1741, CSA C22.2 No. 290



- System Marking: Interek Symbol and File #5019942
- Periodic Re-inspections: If re-inspections yield loose components, loose fasteners, or any corrosion between components, components that are found to be affected are to be replaced immediately.

Table 1: Typical Wire Size, Torque Loads and Ratings

	1 Conductor	2 Conductor	Torque				
	1 Conductor	2 Conductor	Туре	NM	Inch Lbs	Voltage	Current
ABB ZS6 terminal block	10-24 awg	16-24 awg	Sol/Str	0.5-0.7	6.2-8.85	600V	30 amp
ABB ZS10 terminal block	6-24 awg	12-20 awg	Sol/Str	1.0-1.6	8.85-14.16	600V	40 amp
ABB ZS16 terminal block	4-24 awg	10-20 awg	Sol/Str	1.6-2.4	14.6-21.24	600V	60 amp
ABB M6/8 terminal block	8-22 awg		Sol/Str	.08-1	8.85	600V	50 amp
Ideal 452 Red WING-NUT Wire Connector	8-18 awg		Sol/Str	Self-Torque	Self-Torque	600V	
Ideal 451 Yellow Wing-NuT Wire Connector	10-18 awg		Sol/Str	Self-Torque	Self-Torque	600V	
Ideal, In-Sure Push-In Connector	10-14 awg		Sol/Str	Self-Torque	Self-Torque	600V	
WAGO, 2204-1201	10-20 awg	16-24 awg	Sol/Str	Self-Torque	Self-Torque	600V	30 amp
WAGO, 221-612	10-20 awg	10-24 awg	Sol/Str	Self-Torque	Self-Torque	600V	30 amp
Dottie DRC75	6-12 awg		Sol/Str	Snap-In	Snap-In	100	
ESP NG-53	4-6 awg		Sol/Str		45	2000V	
	10-14 awg		Sol/Str		35		
ECD NO 717	4-6 awg		Sol/Str		45	2000V	
ESP NG-717	10-14 awg		Sol/Str		35		
Prumoll 4 E 2	4-6 awg		Sol/Str		45	2000V	
Brumall 4-5,3	10-14 awg		Sol/Str		35		

Table 2: Minimum wire-bending space for conductors through a wall opposite terminals in mm (inches)

		Wires per terminal (pole)							
Wire size	e, AWG or (mm2)	mm	1 (inch)	2 mm (i	nch) mm	3 mm (inch)		4 or More mm (inch	
14-10	(2.1-5.3)	Not S	pecified			-1		-	
8	(8.4)	38.1	(1-1/2)			-		-1	
6	(13.3)	50.8	(2)			•		-	

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SnapNrack SpeedSeal™ Foot

Patent Pending Lag Driven Sealant Solution for Ultra Rail



A New Generation of Roof Attachments

- Innovative design incorporates flashing reliability into a single roof attachment
- 100% waterproof solution
- Sealing cavity with compressible barrier secures sealant in place & fills voids

Maintain the Integrity of the Roof by Eliminating Disruption

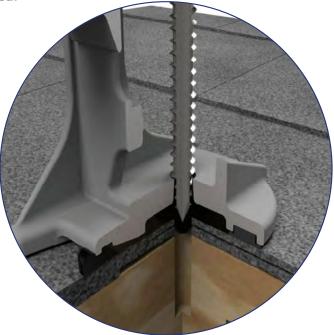
- Zero prying of shingles
- Zero removal of nails leaving holes in the roof
- Roof remains installed the way manufacturer meant it to be

Lag Driven Sealant Waterproofing

- Time Tested Roof Sealant provides lasting seal
- Sealant is compressed into cavity and lag hole as attachment is secured to rafter
- Active sealant solidifies bond if ever touched by liquid
- Technology passes UL 2582 Wind Driven Rain Test and ASTM E2140 Water Column Testing standards. Patent Pending.

Single Tool Installation

• SnapNrack was the first in the industry to develop a complete system that only requires a single tool. That tradition is continued as a ½" socket is still the only tool necessary to secure the mount as well as all other parts of the system.



Note: Sealant shown in white for illustration purpcses only

snapnrack.com

SnapNrack SpeedSeal™ Foot

Fastest Roof Attachment in Solar

- Lag straight to a structural member, no in-between components such as flashings or bases.
- Simply locate rafter, fill sealant cavity & secure to roof. *It's that simple!*

Integrated Flashings. No Questions.

- Sealant fills around lag screw keeping roof and structure sealed and intact
- No added holes from ripping up nails, staples and screws holding shingles on roof

Less Time. Less Parts. Less Tools.

- No more need for a pry bar to rip up shingles
- No more proprietary lag screws
- Single Tool installation with ½" socket

Total System SolutionOne Tool. One Warranty.

- SnapNrack Ultra Rail is a straightforward intuitive install experience on the roof without
- compromising quality, aesthetics & safety, all supported by a 25 year warranty.
- Built-in Wire Management & Aesthetically pleasing features designed for Ultra Rail result in a long-lasting quality install that installers and homeowners love.

Certifications

SnapNrack Ultra Rail System has been evaluated by Underwriters Laboratories (UL) and Listed to UL/ANSI Standard 2703 for Mechanical Loading and Fire. Additionally it is listed to UL 2582 for wind-driven rain and ASTM 2140.



877-732-2860

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SnapNrack*

UR-40 UR-60

Ultra Rail





The Ultimate Value in Rooftop Solar



Industry leading Wire Management Solutions



Mounts available for all roof types



Single Tool Installation



All SnapNrack Module Clamps & Accessories are compatible with both rail profiles

Start Installing Ultra Rail Today

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SnapNrack Ultra Rail System

A sleek, straightforward rail solution for mounting solar modules on all roof types. Ultra Rail features two rail profiles; UR-40 is a lightweight rail profile that is suitable for most geographic regions and maintains all the great features of SnapNrack rail, while UR-60 is a heavier duty rail profile that provides a larger rail channel and increased span capabilities. Both are compatible with all existing mounts, module clamps, and accessories for ease of install.

The Entire System is a Snap to Install

- New Ultra Rail Mounts include snap-in brackets for attaching rail
- Compatible with new Ultra Rail Mid Clamps & End Clamps that are one-size-fits-all universal clamping height
- Universal End Clamps & snap-in End Caps provide a clean look to the array edge



Unparalleled Wire Management

- Open rail channel provides room for running wires resulting in a long-lasting quality install
- New module clamps eliminate bolt interference in the rail channel creating more space for wire management
- Industry best wire management offering includes Junction Boxes, Universal Wire Clamps, MLPE Attachment Kits & Conduit Clamps
- System is fully bonded & listed to UL 2703 Standard

Heavy Duty UR-60 Rail

- UR-60 rail profile provides increased span capabilities for high wind speeds and snow loads
- Taller, stronger rail profile includes profile-specific rail splice and end cap
- All existing mounts, module clamps, and accessories are retained for the same great install experience



Quality. Innovative. Superior.

SnapNrack Solar Mounting Solutions are engineered to optimize material use and labor resources and improve overall installation quality and safety.

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venture solar

07/17/2024

To Whom it may concern,

 Justification of panels on the front of the house and Heat map

The front panels are essential for the solar energy project at 3 Hesketh Street, Chevy Chase, Maryland 20815. According to the Shade Report, these panels are necessary to produce sufficient electricity to meet the home's needs and ensure the project's financial viability.

Without these front panels, the generated electricity would be insufficient for the household's energy requirements, affecting the cost-effectiveness of the project.

Please see attached Shade report

Rimi, Unes Regional Operations Manager

FINAL DESIGN

Shade Report - 3 Hesketh Street Chevy Chase, MD 20815, USA

Customer Lars Jeurling

Address 3 Hesketh Street Chevy Chase, MD 20815 Designer Vipul Pradhan

Coordinates 38.968734, -77.079887 Organization Venture Solar LLC

Date 4/25/2024

Annual irradiance



Summary

Array ID	Panel count	Azimuth	Pitch	Annual TOF	Annual solar access	Annual TSRF
1	7	270°	30°	80%	90%	72%
2	5	180°	16°	95%	75%	72%
3	5	90°	30°	80%	84%	68%
			Weighted av	verage by panel count:	83.8%	70.8%

Docusigned by:

Lars Jewling

5F72611ACA314D2...

Lars Jeurling



05/23/2024

Lars Jeurling 3 Hesketh Street Chevy Chase, Maryland 20815

Re: Solar Panel Installation

Dear Mr./Ms. Jeurling,

At your request, Patrick Bussett of Venture Solar LLC (MD license #58796), has carefully reviewed the existing roof framing and the connection of the panels to the roof for the building referenced above.

The following building codes were used in conjunction with the Maryland Building Performance Standards (MBPS) and local amendments to generate pertinent design criteria:

ASCE 7-16 – Minimum Design Loads for Buildings and Other Structures

International Residential Code 2018 Edition (IRC)

National Design Specification for Wood Construction 2018 Edition (NDS)

Design Criteria: Design Gravity Load: Snow/Live Load = 30 lbs/ft², Dead Load = 12 psf

Design Wind Load: V_{ult} = 115 mph; Exposure B, Risk Category II
*Wind loads exceed seismic loads and therefore govern the design

Field observations identified the following conditions:

The new solar panels will impose an additional dead load of approximately 3 psf. The roof consists of asphalt shingles over plywood sheathing supported by 2x8 rafters at 16" o.c. The rafters are sloped at a 28° pitch and have a maximum projected horizontal span of 17'-0"±. The framing is assumed to be Douglas-Fir #2 graded or better.

The calculations determined that the existing framing has adequate capacity to support the PV panels as shown in our PV panel layout plan with no structural upgrades required. I therefore certify that this installation complies with the applicable codes and is acceptable for approval. Please feel free to contact me if you have any questions or concerns.

Best,

Patrick Bussett, PE

Lobour Bursett

Email: patrick.bussett@venturesolar.com





Municipality Letter for Proposed Construction Project

Subject Property: 3 Hesketh Street, Chevy Chase, MD 20815

Property Owner: Mr. and Mrs. Jeurling

Project Manager/Contractor: Patrick Bussett/Venture Solar

Proposed Work: Solar Panel Installation

6/13/2024

Rabbiah Sabbakhan, Director Department of Permitting Services of Montgomery County 255 Rockville Pike, 2nd floor Rockville, MD 20850

Dear Mr. Sabbakhan.

This letter is to inform your department that the above homeowner/contractor has notified Chevy Chase Village that he or she plans to apply for both county and municipal permits for the above summarized construction project. Chevy Chase Village will not issue any municipal building permit(s) for this proposed project until Montgomery County has issued all necessary county permits and the applicant has provided Chevy Chase Village with copies of county-approved and stamped plans. We have advised the homeowner/contractor that a permit from Montgomery County does not guarantee a permit from this municipality unless the project complies with all our municipal rules and regulations.

If this homeowner/contractor later applies for an amended county permit, please do not approve that application until you have received a Municipality Letter from us indicating that the homeowner/contractor has notified us of that proposed amendment to the permit.

If you have any questions about this proposed project and the municipal regulation of it by Chevy Chase Village, do not hesitate to have your staff contact my office. The Village Permitting Coordinator can be reached by phone at 301-654-7300 or by e-mail at covpermitting@montgomerycountymd.gov.

Sincerely,

Shana R. Davis-Cook

Chevy Chase Village Manager