

MONTGOMERY COUNTY HISTORIC PRESERVATION COMMISSION
STAFF REPORT

Address:	49 Elm Avenue, Takoma Park	Meeting Date:	9/21/2022
Resource:	Contributing Resource Takoma Park Historic District	Report Date:	9/14/2022
Applicant:	Eric Lindblom (Anthony Colella, Agent)	Public Notice:	9/7/2022
Review:	HAWP	Tax Credit:	n/a
Permit No.:	1004874	Staff:	Michael Kyne
Proposal:	Solar panels		

STAFF RECOMMENDATION

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

ARCHITECTURAL DESCRIPTION

SIGNIFICANCE: Contributing Resource to the Takoma Park Historic District
STYLE: Four Square/Colonial Revival
DATE: 1914

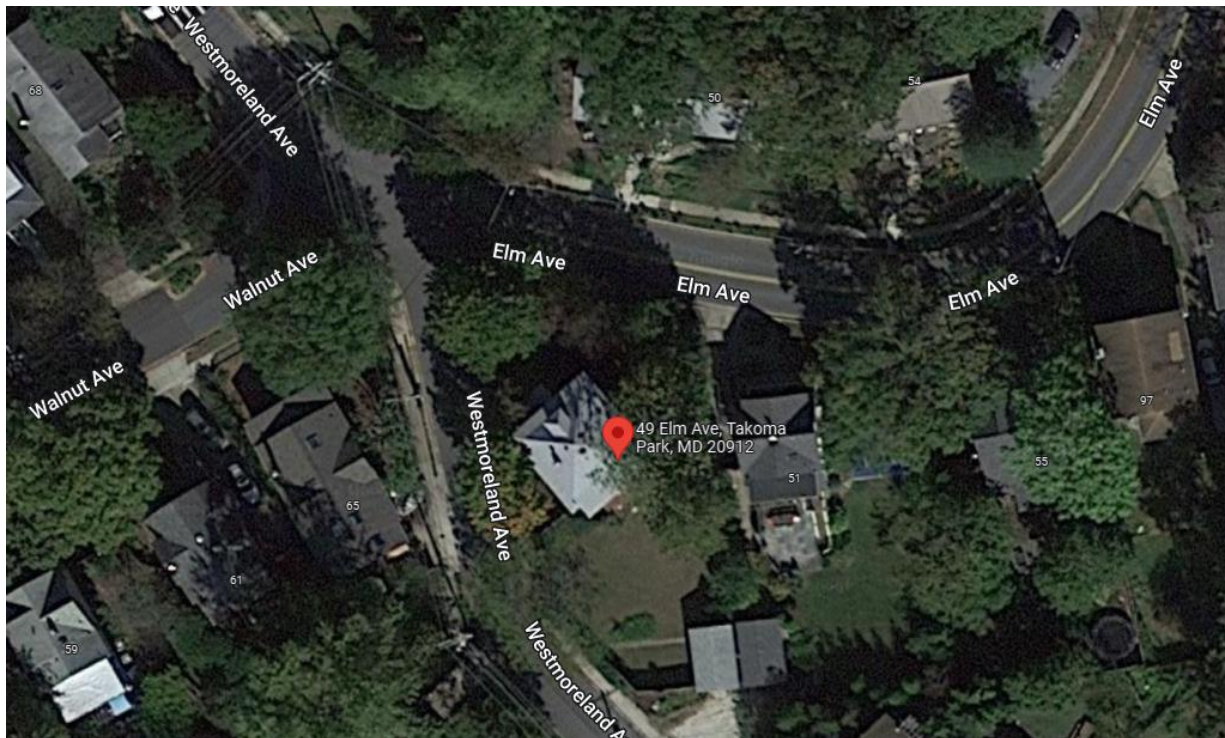


Fig. 1: Subject property, south side of Elm Avenue.

PROPOSAL

The applicant proposes to install twenty-four (24) solar panels at the subject property.

APPLICABLE GUIDELINES

When reviewing applications for solar panel installation within the Takoma Park 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 *Takoma Park Historic District (Guidelines)*, *Montgomery County Code Chapter 24A (Chapter 24A)*, the *Secretary of the Interior's Standards for Rehabilitation (Standards)*, and *Historic Preservation Commission Policy No. 20-01: ADDRESSING EMERGENCY CLIMATE MOBILIZATION THROUGH THE INSTALLATION OF ROOF-MOUNTED SOLAR PANELS*. The pertinent information in these documents is outlined below.

There are two very general, broad planning and design concepts which apply to all categories. These are:

- The design review emphasis will be restricted to changes that are all visible from the public right-of-way, irrespective of landscaping or vegetation (it is expected that the majority of new additions will be reviewed for their impact on the overall district), and
- The importance of assuring that additions and other changes to existing structures act to reinforce and continue existing streetscape, landscape, and building patterns rather than to impair the character of the historic district.

A majority of structures in the Takoma Park Historic District have been assessed as being “Contributing Resources.” While these structures may not have the same level of architectural or historical significance as Outstanding Resources or may have lost some degree of integrity, collectively, they are the basic building blocks of the Takoma Park district. However, they are more important to the overall character of the district and the streetscape due to their size, scale, and architectural character, rather than for their particular architectural features.

Contributing Resources should receive a more lenient level of design review than those structures that have been classified as Outstanding. This design review should emphasize the importance of the resource to the overall streetscape and its compatibility with existing patterns rather than focusing on a close scrutiny of architectural detailing. In general, however, changes to Contributing Resources should respect the predominant architectural style of the resource.

The *Guidelines* that pertain to this project are as follows:

- All exterior alterations, including those to architectural features and details, should be generally consistent with the predominant architectural style and period of the resource and should preserve the predominant architectural features of the resource; exact replication of existing details and features is, however, not required.
- Minor alterations to areas that do not directly front on a public right-of-way - such as vents, metal stovepipes, air conditioners, fences, skylights, etc. - should be allowed as a matter of course; alterations to areas that do not directly front on a public way-of-way which involve the replacement of or damaged to original ornamental or architectural features are discouraged, but may be considered and approved on a case-by-case basis.

- All changes and additions should respect existing environmental settings, landscaping, and patterns of open space.

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 ensure 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
 - (3) The proposal would enhance or aid in the protection, preservation and public or private utilization of the historic site or historic resource located within an historic district in a manner compatible with the historical, archeological, architectural or cultural value of the historic site or historic district in which an historic resource is located; or
 - (4) The proposal is necessary in order that unsafe conditions or health hazards be remedied; or
 - (5) The proposal is necessary in order that the owner of the subject property not be deprived of reasonable use of the property or suffer undue hardship; or
 - (6) In balancing the interests 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.
- (c) It is not the intent of this chapter to limit new construction, alteration or repairs to any 1 period or architectural style.
- (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. (Ord. No. 9-4, § 1; Ord. No. 11-59.)

Secretary of the Interior's Standards for Rehabilitation

The Secretary of the Interior defines rehabilitation as “the act or process of making possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features, which convey its historical, cultural, or architectural values.” The *Standards* are as follows:

- 2. The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.

9. New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.
10. New additions and adjacent or related new construction shall 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

On December 5, 2017, the Montgomery County Council adopted an Emergency Climate Mobilization resolution (Resolution No.: 18-974) which declared a climate emergency and charged the County Executive, Montgomery County Public Schools, and the Maryland-National Capital Park and Planning Commission to advise the Council on methods to reduce greenhouse gas emissions.

As a body established by the County Executive, it is incumbent on the Historic Preservation Commission (HPC) to undertake steps to achieve the goals of the Emergency Climate Mobilization resolution.

One method for reducing greenhouse gas emissions is to replace carbon-heavy methods of energy production, like coal and natural gas power plants, with renewable sources like wind and solar power. Current historic preservation best practice is to limit the locations solar panels may be installed to preserve the character of the building above all other considerations. Chapter 24A-8 (b) (6) of County Code establishes a balancing test for approval of a HAWP where there is an apparent conflict between the desired impact on the historic resource compared to the public benefit of the proposal. Because the widespread use of solar panels, both for hot water and for electricity production, will reduce greenhouse gases in the county, it is the position of the HPC that solar panels may be installed on all roof elevations of historic sites or historic resources located within a historic district provided:

1. The identified preferred location (on the rear of the property, building additions, accessory structures, or ground-mounted arrays) is not feasible due to resource orientation or other site limitations and;
2. The roof is not either architecturally significant or a slate or tile roof unless it can be demonstrated that the solar array will be installed without damaging the historic character of the resource or historic fabric; and
3. A Historic Area Work Permit (HAWP) is required for all work referenced in this policy.

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

The subject property is located on a corner property at the intersection of Elm Avenue (north/front) and Westmoreland Avenue (west/right). The historic house is Four Square/Colonial-style, with a low-pitched (3:12) hipped roof and asphalt shingle roofing. There is a non-original accessory structure at the rear of property, which, according to the Sanborn Fire Insurance Maps, was constructed sometime between 1927 and 1959, replacing a previous structure in the same approximate location (see *Figs. 3 & 4* below).



Fig. 2: Illustration of a low 3:12 roof pitch.

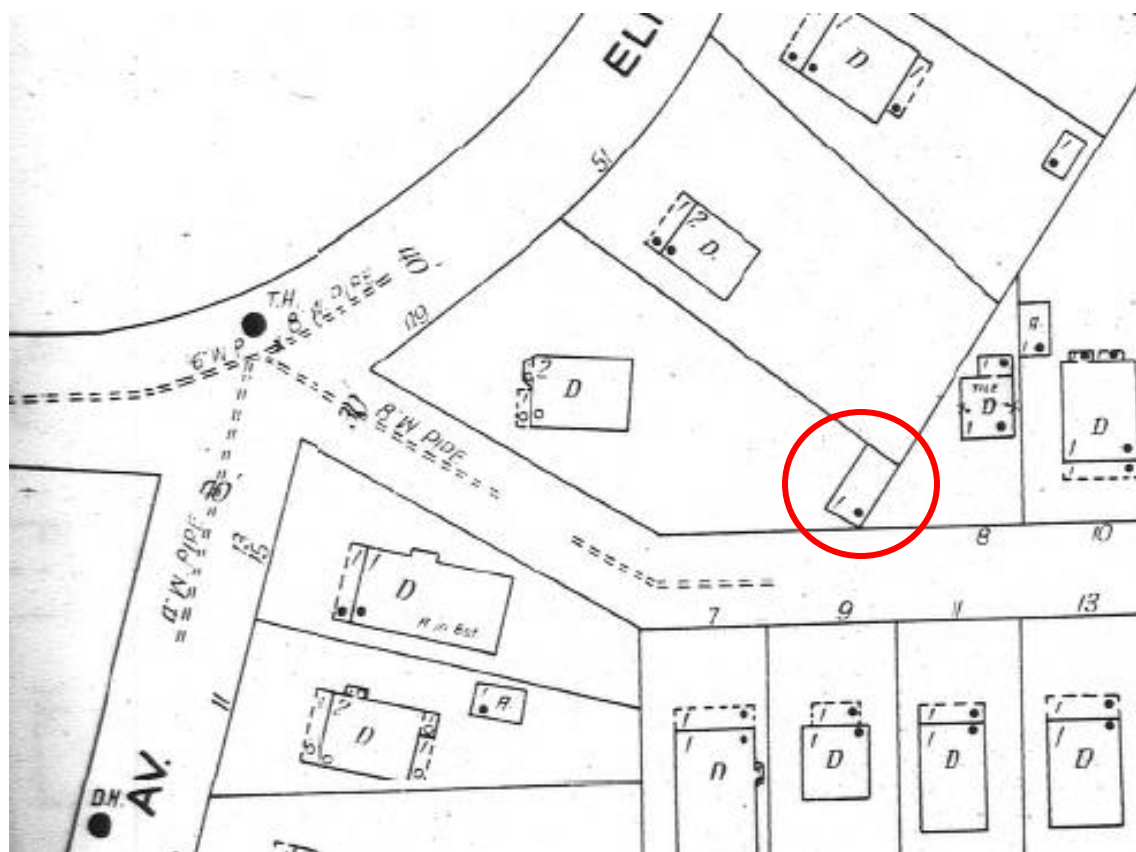


Fig. 3: 1927 Sanborn Fire Insurance Map, with previous accessory structure circled in red. Note the structure's north-south orientation.

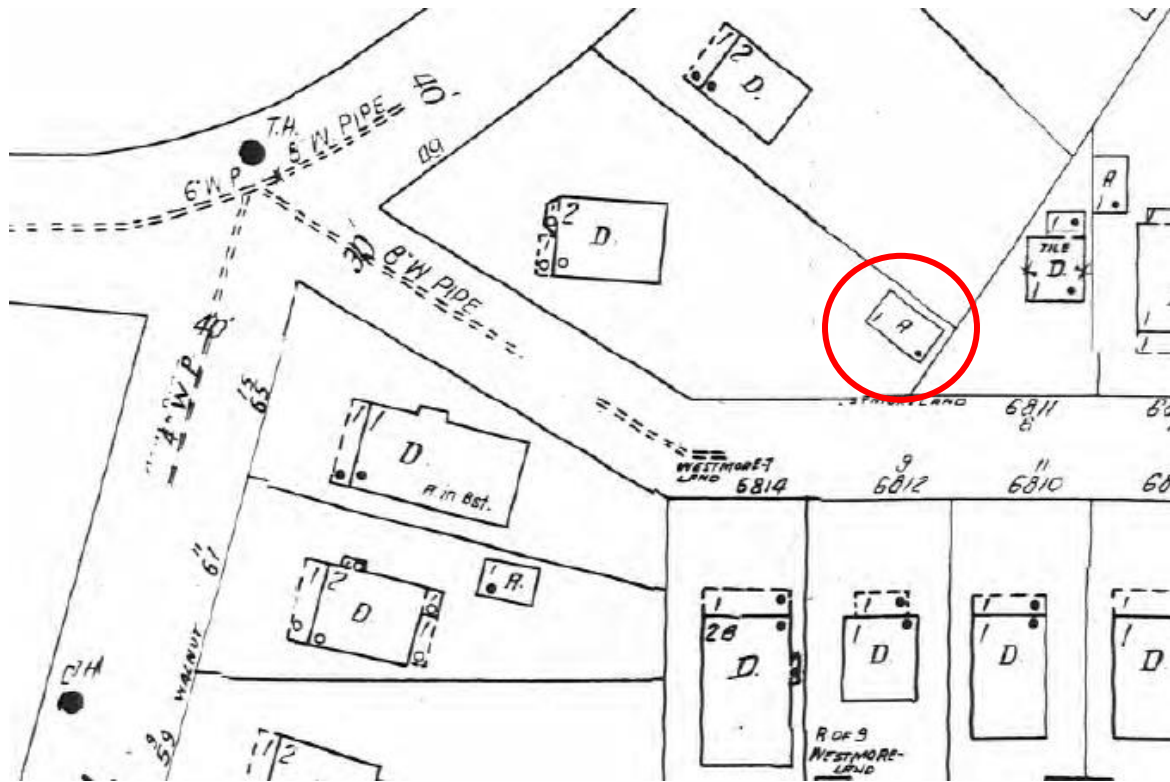


Fig. 4: 1959 Sanborn Fire Insurance Map, showing the existing accessory structure with different orientation.

The applicant proposes to install twenty-four (24) solar panels at the subject property. Five (5) panels are proposed on the west/right roof slope, nine (9) on the south/rear, and ten (10) on the detached, non-original accessory structure at the rear of the property. The proposed solar panels will be black-framed with black cells and a low profile 5" above the roof shingles.

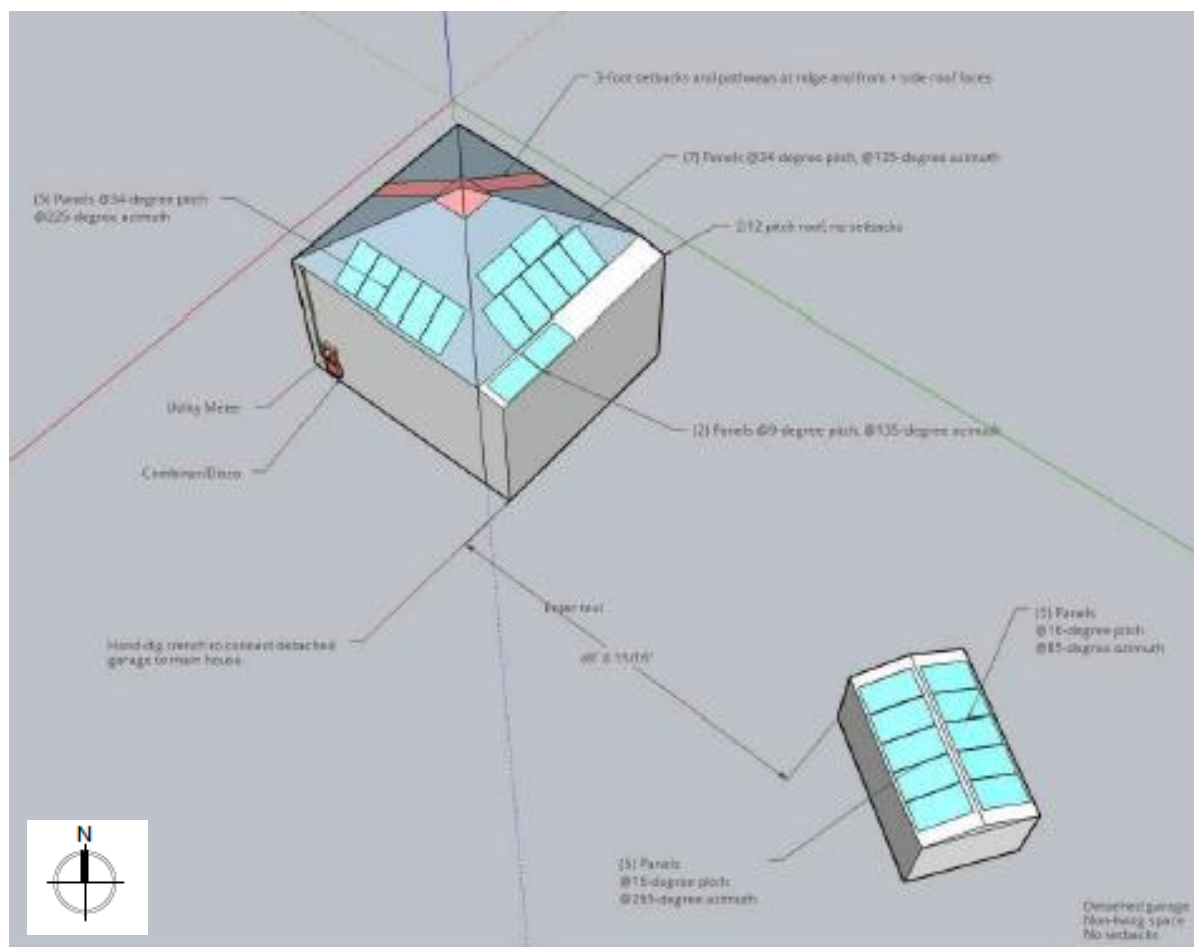


Fig. 5: Proposed solar panel locations.

Staff notes that, because the subject property is on a corner lot, all four elevations are visible from the public right-of-way – the north/front and east/left elevations from Elm Avenue, and the south/rear and west/right from Westmoreland Avenue. The accessory structure at the rear is also visible from Westmoreland Avenue. However, staff finds the proposed panels on the south/rear roof slope and accessory structure are in preferred locations, in accordance with the Commission’s solar policy.

Additionally, the proposed panels on the west/right roof slope are on a secondary elevation, and, due to the house’s low-pitched roof and the fact that the subject property slopes away from Elm Avenue, these panels will be minimally visible, at best, when viewing the property directly from its primary elevation. Staff also finds that these panels are in a simple, rectangular configuration, mitigating any visual impact from the rear and/or Westmoreland Avenue.

Staff finds that, in accordance with the *Guidelines* and *Standards #2 and #9*, the applicant’s proposal will not remove or alter character-defining features of the historic house or surrounding streetscape. Additionally, the proposed solar panels could be removed in the future without impairing the essential form and integrity of the historic property and its environment, per *Standard #10*.

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

STAFF RECOMMENDATION

Staff recommends that the Commission **approve** the HAWP application under the Criteria for Issuance in Chapter 24A-8(b)(2), (6), and (d), 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;

Historic Preservation Commission Policy No. 20-01: ADDRESSING EMERGENCY CLIMATE MOBILIZATION THROUGH THE INSTALLATION OF ROOF-MOUNTED SOLAR PANELS;

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

and with the general condition that the applicant shall present an electronic set of drawings, if applicable, to Historic Preservation Commission (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 Commission 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 301-563-3400 or michael.kyne@montgomeryplanning.org to schedule a follow-up site visit.



FOR STAFF ONLY:

HAWP# 1004874

DATE ASSIGNED _____

APPLICATION FOR HISTORIC AREA WORK PERMIT

HISTORIC PRESERVATION COMMISSION
301.563.3400

APPLICANT:

Name: Eric Lindblom
Address: 49 Elm Ave.
Daytime Phone: (301) 270-4359

E-mail: enl7@verizon.net
City: Takoma Park Zip: 20912
Tax Account No.: 01065056

AGENT/CONTACT (if applicable):

Name: Anthony Colella
Address: 6854 Distribution Dr
Daytime Phone: 434-568-7220

E-mail: permits@edge-gogreen.com
City: Beltsville Zip: 20705
DPS Customer # 1278257
Contractor Registration No.: MHIC # 126720
Moco License # 13228

LOCATION OF BUILDING/PREMISE: MIHP # of Historic Property M 37-10

Is the Property Located within an Historic District? x Yes/District Name Takoma Park Historic District
 No/Individual Site Name _____

Is there an Historic Preservation/Land Trust/Environmental Easement on the Property? If YES, include a map of the easement, and documentation from the Easement Holder supporting this application. NO

Are other Planning and/or Hearing Examiner Approvals /Reviews Required as part of this Application? (Conditional Use, Variance, Record Plat, etc.?) If YES, include information on these reviews as supplemental information.

Building Number: 49 Street: Elm Avenue
Town/City: Takoma Park Nearest Cross Street: Westmoreland Avenue
Lot: 22 Block: 18 Subdivision: 0025 Parcel: 0000

TYPE OF WORK PROPOSED: See the checklist on Page 4 to verify that all supporting items for proposed work are submitted with this application. Incomplete Applications will not be accepted for review. Check all that apply:

- | | | |
|---|--|--|
| <input type="checkbox"/> New Construction | <input type="checkbox"/> Deck/Porch | <input type="checkbox"/> Shed/Garage/Accessory Structure |
| <input type="checkbox"/> Addition | <input type="checkbox"/> Fence | <input checked="" type="checkbox"/> Solar |
| <input type="checkbox"/> Demolition | <input type="checkbox"/> Hardscape/Landscape | <input type="checkbox"/> Tree removal/planting |
| <input type="checkbox"/> Grading/Excavation | <input type="checkbox"/> Roof | <input type="checkbox"/> Window/Door |
| | | <input type="checkbox"/> Other: _____ |

I hereby certify that I have the authority to make the foregoing application, that the application is correct and accurate and that the construction will comply with plans reviewed and approved by all necessary agencies and hereby acknowledge and accept this to be a condition for the issuance of this permit.

Signature of owner or authorized agent

8-24-2022

Date

10

Adjacent and Confronting Properties:

Takoma Park, MD 20912

51 Elm Avenue

6811 Westmoreland Avenue

6812 Westmoreland Avenue

6814 Westmoreland Avenue

61 Walnut Avenue

50 Elm Avenue

Description of Property: Please describe the building and surrounding environment. Include information on significant structures, landscape features, or other significant features of the property:

2-Story Property with shingle roof. Old growth of surrounding trees with medium amount of landscaping. White siding with Brown widow shutters. White fence in the front of house, natural wood fence around the whole back side of the property, fully enclosed. Medium size detached shed in the back of property. Roofs are at a 3:12 pitch.

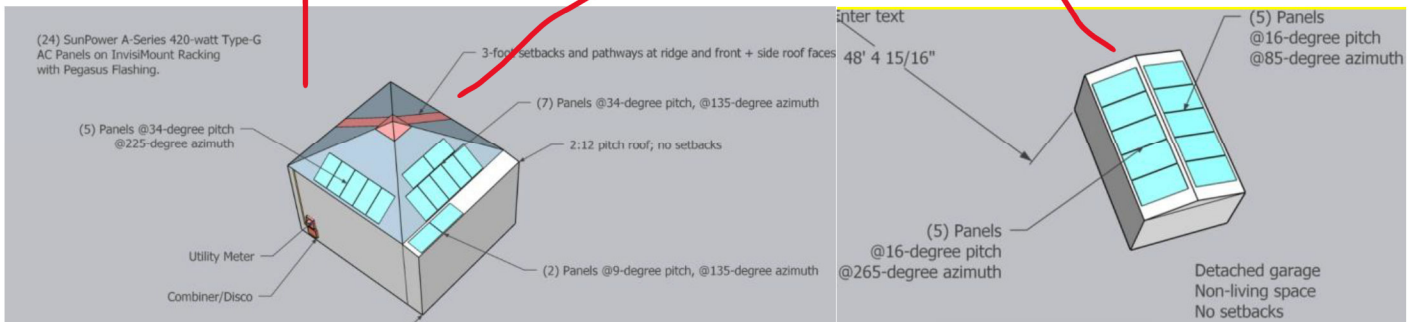
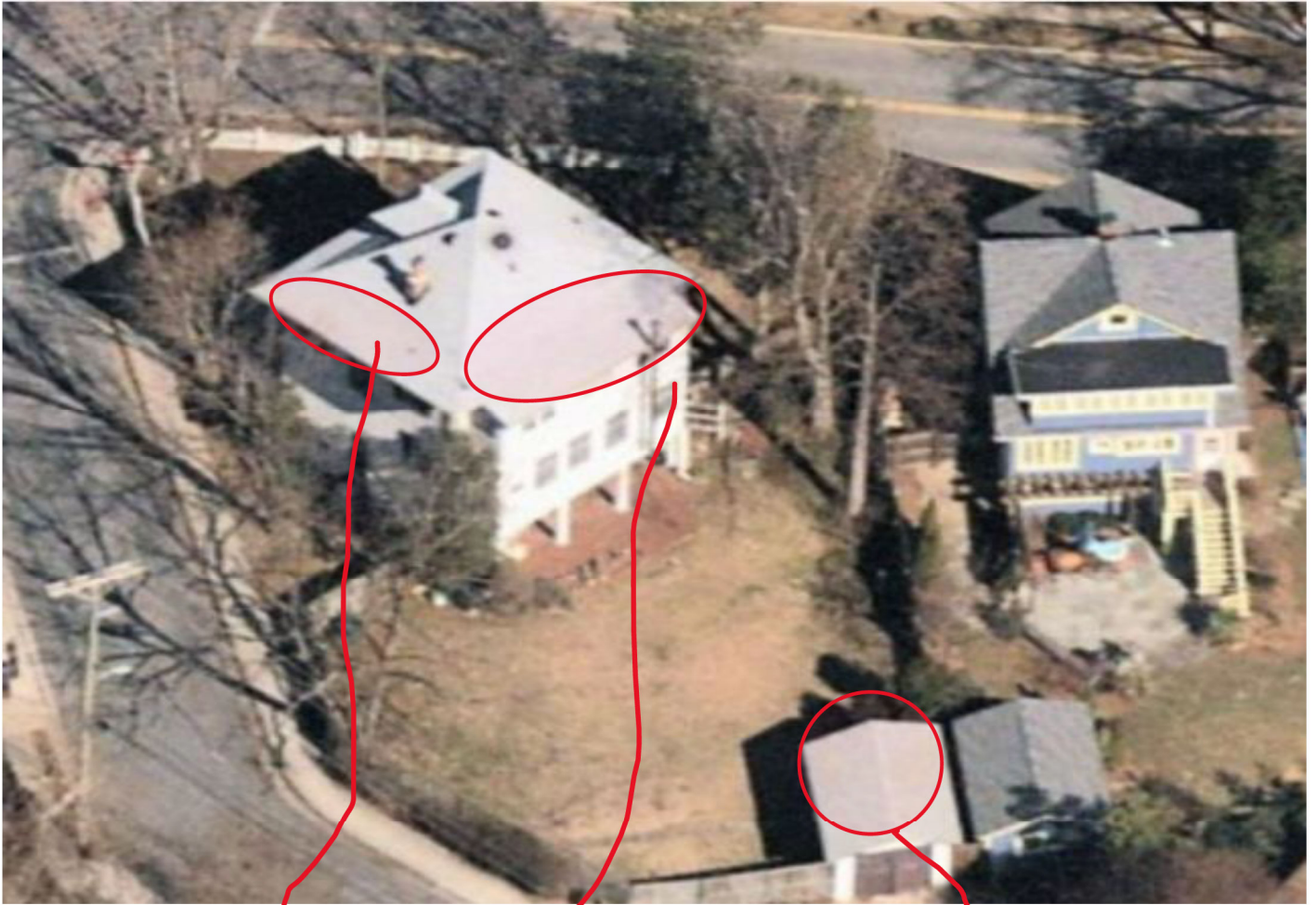
Description of Work Proposed: Please give an overview of the work to be undertaken:

Install (24) SunPower 420-watt AC solar panels to roof (None on front -- 5 panels on left, 9 panels on rear, 10 panels on detached shed at back of property, all behind fence). Panels are black-frame with black cells, and black low-profile racking held approx 5" above the shingles not easily seen from street view given the pitch of the roof. Panels will be installed more than 3' feet back from the front edge of the roof. Fence encloses the rear of the property to limit view.

Work Item 1: Solar Panels	
Description of Current Condition: Roof is gray shingle	Proposed Work: Install (24) SunPower 420-watt AC solar panels to roof (None on front -- 5 panels on left, 9 panels on rear, 10 panels on detached shed at back of property, all behind fence). Panels are black-frame with black cells, and black low-profile racking held approx 5" above the shingles not easily seen from street view given the pitch of the roof. Panels will be installed more than 3' feet back from the front edge of the roof. Fence encloses the rear of the property to limit view.
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/Excavation/ Landscaping	*	*		*	*	*	*
Tree Removal	*	*		*	*	*	*
Siding/ Roof Changes	*	*	*	*	*		*
Window/ Door Changes	*	*	*	*	*		*
Masonry Repair/ Repoint	*	*	*	*	*		*
Signs	*	*	*	*	*		*



3

A

SOLAR INDIVIDUAL PERMIT PACKAGE

ERIC LINDBLOM

10.08 kW GRID TIED PHOTOVOLTAIC SYSTEM

49 ELM AVENUE
TAKOMA PARK, MD 20912

AHJ: MONTGOMERY COUNTY
UTILITY: PEPCO

JOB NOTES

SCOPE OF WORK:

- (N) 10.08 KW PHOTOVOLTAIC SYSTEM
- (24) SUNPOWER (A-SERIES 420-WATT AC) PV MODULES
- POINT OF INTERCONNECTION AT MAIN SERVICE PANEL WITH LINE SIDE TAP



6/11/2022

I HEREBY CERTIFY THAT THIS DOCUMENT WAS
APPROVED BY ME, AND THAT I AM A DULY LICENSED
PROFESSIONAL ENGINEER UNDER THE LAWS OF THE
STATE OF MARYLAND, MEMBERS LICENSE NO. 41066
EXPIRATION DATE: 2023-09-08

CODE INFORMATION

APPLICABLE CODES, LAWS AND REGULATIONS

2018 INTERNATIONAL BUILDING CODE
2018 INTERNATIONAL EXISTING BUILDING CODE
2018 INTERNATIONAL RESIDENTIAL CODE
2018 INTERNATIONAL ENERGY CONSERVATION CODE
2019 WSSC PLUMBING & FUEL GAS CODE
2018 INTERNATIONAL MECHANICAL CODE
2017 NFPA 70 NATIONAL ELECTRICAL CODE

SATELLITE IMAGE

PROJECT LOCATION



DRAWING INDEX

PV SOLAR ARCHITECTURAL DRAWINGS

PVA-0	COVER SHEET
PVA-1	ARRAY LAYOUT

PV SOLAR STRUCTURAL DRAWINGS

PVS-1	STRUCTURAL INFORMATION AND MOUNTING DETAILS
PVS-2	STRUCTURAL CALCULATION DETAILS

PV SOLAR ELECTRICAL DRAWINGS

PVE-1	ELECTRICAL SINGLE-LINE DIAGRAM & SPECIFICATIONS
PVE-2	ELECTRICAL CALCULATIONS
PVE-3	ELECTRICAL DATA & SPECIFICATIONS
PVE-4	EQUINOX GROUNDING DETAILS
PVE-5	ELECTRICAL MODULE SPECS
PVE-6	SUNVAULT SPECS

PV SOLAR MOUNTING DRAWINGS

PVM-1	HARDWARE MOUNTING DETAILS, SPECS.
PVM-2	HARDWARE MOUNTING DETAILS, SPECS.



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NEW GRID-TIED PHOTOVOLTAIC

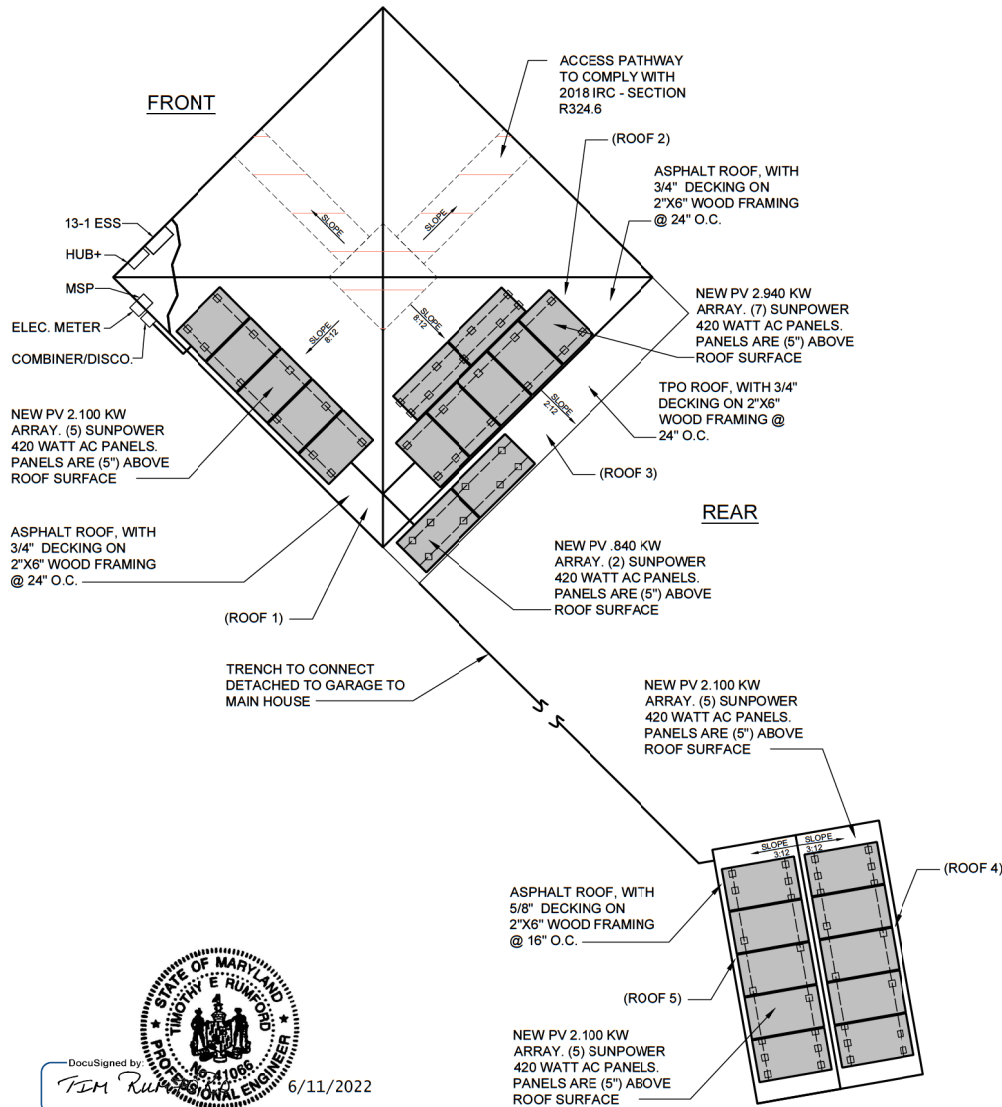
TAKOMA PARK, MD 20912

SOLAR INDIVIDUAL PERMIT PACKAGE

COVER SHEET

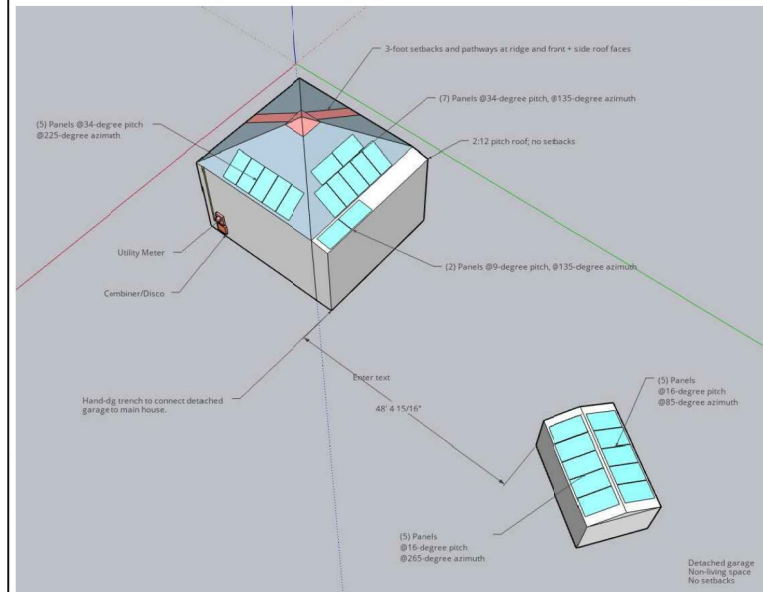
REVISION LEVEL		DATE
REV-1		DATE
DRAWN BY:		
G. COBB		
INSTALLER:		
PROJECT:	22192-01	
DATE DRAWN:	05-31-2022	
SCALE	1/4" = 1'-0"	

PVA-0



DocuSigned by
Eric Lindbloom
E70D81E087D845E... 6/11/2022

I HEREBY CERTIFY THAT THIS DOCUMENT WAS APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. MEMBERS LICENSE NO. 41066. EXPIRATION DATE: 2023-09-08



NOTE:
1. FIELD ADJUSTMENTS OF FEWER THAN 6" MAY BE ALLOWED BASED ON SITE CONDITIONS AND MEASUREMENTS.

TOTAL ROOF AREA: 948 SQ. FT.
TOTAL ARRAY AREA: 520 SQ. FT.
TOTAL PERCENTAGE OF ROOF COVERED BY SOLAR: 54.85%

ROOF	1	2	3	4	5
MODULE QTY.	5	7	2	5	5
AZIMUTH	225	135	135	85	265
PITCH	8:12	8:12	2:12	3:12	3:12

CONTRACT MODULE & QUANTITY	24 SUNPOWER 420-WATT AC PANELS
MICROINVERTER TYPE & QUANTITY	INTEGRATED WITH PANEL
ROOF TYPE	ASPHALT & TPO ROOF
ROOF ATTACHMENT QUANTITY	51
STORY HOME TYPE	2 - STORY
TOTAL ARRAY AREA	948 SQ. FT.



TABLE 1 - ARRAYS INFORMATION

	ROOF PITCH	ROOFING TYPE	ATTACHMENT TYPE	NO. OF STORIES	FRAMING TYPE (IN)	MAX RAFTER SPAN (FT.)	PENETRATION PATTERN (in.)	MAX. ATTACHMENT SPACING (in.)	MAX. RAIL OVERHANG (in.)
ROOF 1	34°	Asphalt Shingle	Pegasus L-foot	2	2x6 Truss @ 24" O.C.	7.75'	Staggered	24"	8"
ROOF 2	34°	Asphalt Shingle	Pegasus L-foot	2	2x6 Truss @ 24" O.C.	7.75'	Staggered	24"	8"
ROOF 3	9°	TPO	Pegasus L-foot	2	2x6 Truss @ 24" O.C.	7.75'	Staggered	24"	8"
ROOF 4	16°	Asphalt Shingle	Pegasus L-foot	1	2x6 Truss @ 16" O.C.	7.75'	Staggered	24"	8"
ROOF 5	16°	Asphalt Shingle	Pegasus L-foot	1	2x6 Truss @ 16" O.C.	7.75'	Staggered	24"	8"
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CHECK TABLE 2 FOR PENETRATION PATTERN GUIDE

FIG 1: ROOF 1 STRUCTURAL FRAMING DETAIL

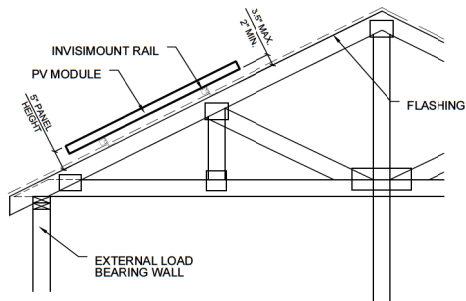
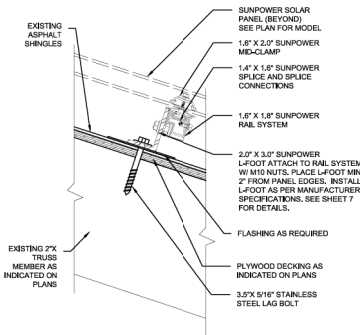
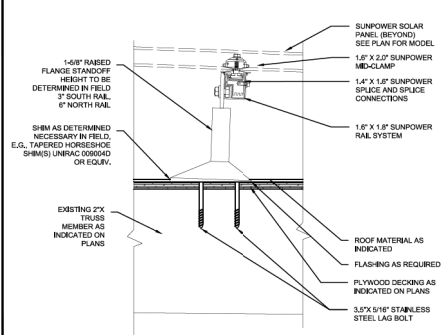


FIGURE 2: INVISIMOUNT ROOF ATTACHMENT DETAILS @ TRUSS / RAFTERS



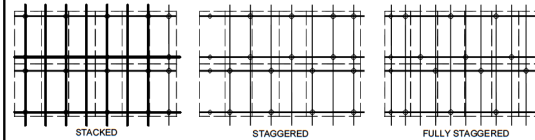
@ ASPHALT ROOF



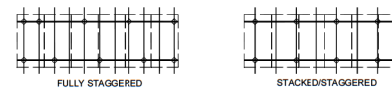
@ TPO ROOF

TABLE 2: PENETRATION GUIDE FOR INSTALL

TWO OR MORE ROWS OF MODULES

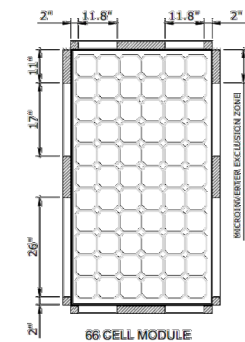


ONE ROW OF MODULES



CHECK TABLE 1 FOR MAX. PENETRATION SPACING AND PENETRATION PATTERN FOR EACH ARRAY.

FIGURE 3: MOUNTING CLAMP POSITIONING DETAILS



* RAILS SHALL BE POSITIONED IN THE NON-CROSS HATCHED REGIONS



DocuSigned by:

TIM RUMF

E70D81E087D845E...

6/11/2022


I HEREBY CERTIFY THAT THIS DOCUMENT WAS APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. MEMBERS LICENSE NO. 41066, EXPIRATION DATE: 2023-09-08

<u>Structural Analysis</u>	
Project Name:	Eric Lindblom - Montgomery County 49 Elm Avenue Takoma Park, MD 20912
Address:	
Description:	Pitched roof, 24 SunPower A-Series 420-watt Type-G AC panels. TWO STRUCTURES (1) and (2)
<u>Load/Structure Assumptions (1)</u>	
Wind Speed (mph)	Roof Wind Zone
115	3
Snow load (psf)	
30	
Roof Height (ft)	
<30	
Importance factor	
II	
Wind Exposure	
B	
<u>Present Conditions and Structure Info</u>	
(1) GARAGE: 10 Panels @ Detached garage on InvisiMount racking with Pegasus Flashing. Detached garage is 2x6 16-OC truss framing with 5/8" deck and shingle roof. (5) Panels @16-degree tilt, @85-degree azimuth (5) Panels @16-degree tilt, @265-degree azimuth	
<u>LOW PITCH ANALYSIS - 16 DEG, 10 PANELS</u>	
Pnet = Net Design Wind Pressure (psf) From ASCE 7-10, 1000 eff wind area, 7 to 27 deg, zone 3	
Down	Up
9.7	44
115 mph	
Module Areas (sf):	20.1
Wind Force (lbs), Per module:	Pnet * Area=
Down	Up
194.5	882.4
Array number of fasteners	30
Array Number of Modules:	10
Number of fasteners per module:	3.0 AVE
Force per fastener: (lbs)	
Down	Up
64.8	294.1
Pull out Force per fastener, lbs (2):	
681	5/16" x 3.5" SS Lag. Assumes worst case wood species
Design Margin (Capacity/Exposure). >2 required	
Down	Up
10.5	2.3
OK	OK
>2	
Uplift wind loads well below pull out force on fasteners. Down Force, since modules are flush, array not likely to affect forces compared to existing bare roof deflection. Uplift psf < negative snow load. Side wind loads negligible.	
<u>Snow Load</u>	
OK	Modules are flush and not likely to affect snow drift
<u>Dead Load</u>	
Module Weight (lbs)	
46.5	
2.3 psf	
OK	(negligible effect)
<u>Seismic</u>	
Seismic criteria were not considered per provisions of ASCE 7-10 Section 13.1.4	
OK	
NOTES	
(1) ASCE 7-10	
(2) NACBEP Guide on withdrawal loads for lag bolts per inch based on lag bolt size and wood type. Since wood type is not known, used the worst case which is white spruce, 227 lbs per inch for 5/16" lags. 3.5" bolt gives 3 inch penetration. 227 x 3.	


Present Conditions and Structure Info			
(2) MAIN HOUSE: • (14) Panels @ Main house on InvisiMount racking with Standoffs and Pitch Pockets Main house is 2x6 24-OC framing with 3/4" deck and shingle roof; torch down at the rear addition such that (2) panels will be on standoffs. (7) Panels @34-degree tilt, @135-degree azimuth (2) Panels @8-degree tilt, @135-degree azimuth (5) Panels @34-degree tilt, @225-degree azimuth			
LOW PITCH ANALYSIS - 9 DEG, TWO PANELS			
Pnet = Net Design Wind Pressure (psf) From ASCE 7-10, 20sf eff wind area, 7 to 27 deg, zone 3			
Down	Up		
12.5	52.4		115 mph
Module Areas (sf):		20.1	
Wind Force (lbs), Per module:			Pnet * Area=
Down	Up		
250.7	1050.9		
Array number of fasteners			8
Array Number of Modules:			2
Number of fasteners per module:			4.0 AVE
Force per fastener: (lbs)			
Down	Up		
62.7	262.7		
Pull out Force per fastener, lbs (2):			
681 5/16" x 3.5" SS Lag. Assumes worst case wood species			
Design Margin (Capability/Exposure). >2 required			
Down	Up		
10.9	2.6	x margin	
OK	OK	>2	
Uplift wind loads well below pull out force on fasteners. Down Force, since modules are flush, array n likely to affect forces compared to existing bare roof deflection. Uplift psf < negative snow load. Side wind loads negligible.			

Present Conditions and Structure Info			
<p>(2) MAIN HOUSE: • (14) Panels @ Main house on InvisiMount racking with Standoffs and Pitch Pockets. Main house is 2x6 24-OC framing with 3/4" deck and shingle roof; torch down at the rear addition such that (2) panels will be on standoffs.</p> <p>(7) Panels @34-degree tilt, @135-degree azimuth</p> <p>(2) Panels @8-degree tilt, @135-degree azimuth</p> <p>(5) Panels @34-degree tilt, @225-degree azimuth</p>			
HIGH PITCH ANALYSIS - 34 DEG. 12 PANELS			
<p>Pnet = Net Design Wind Pressure (psf)</p> <p>From ASCE 7-10, 100 sf eff wind area, 27 to 45 deg, zone 3</p>			
Down	Up		
19.8	23.8		115 mph
Module Areas (sf):		20.1	
Wind Force (lbs), Per module:		Pnet * Area=	
Down	Up		
397.1	477.3		
Array number of fasteners		31	
Array Number of Modules:		12	
Number of fasteners per module:		2.6 AVE	
Force per fastener: (lbs)			
Down	Up		
153.7	184.8		
Pull out Force per fastener, lbs (2):			
681 5/16" x 3.5" SS Lag. Assumes worst case wood species			
Design Margin (Caaability/Exposure). >2 required			
Down	Up		
4.4	3.7	x margin	
OK	OK	>2	
<p>Uplift wind loads well below pull out force on fasteners. Down Force, since modules are flush, array not likely to affect forces compared to existing bare roof deflection. Uplift psf < negative snow load. Side wind loads negligible.</p>			

DocuSigned by:



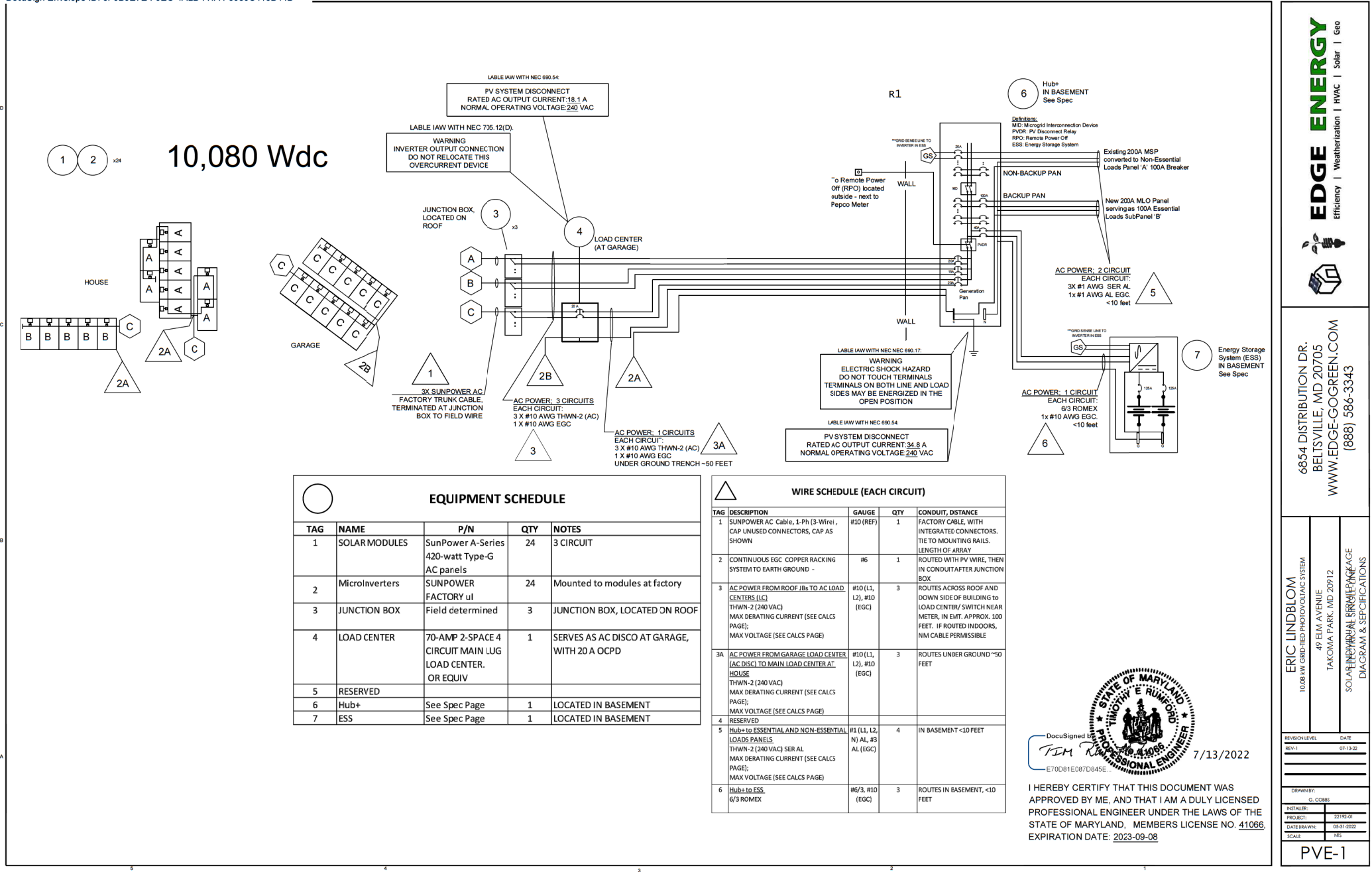
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6/11/2022

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EXPIRATION DATE: 2023-09-08



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ERIC LINDBLOM
1008 WY GRID-TIED PHOTOVOLTAIC SYSTEM
49 ELM AVENUE
TAKOMA PARK, MD 20912
SOLAR PHOTOVOLTAIC ELECTRICAL DIAGRAM & SPECIFICATIONS



DocuSigned by
TIM RUNKO
E70D81E087D045E 7/13/2022

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REVISION LEVEL	DATE
REV-1	07/13/22

DESIGNED BY:	CL COBBE
INSTALLED BY:	22176-01
PROJECT:	05-01-2022
DATE DRAWN:	YES
SCALE:	YES

PVE-1

FIGURE 1: SUNPOWER EQUINOX GROUNDING DETAILS

SunPower Proprietary

FIGURE 2: PLACARD IDENTIFYING LOCATION OF DISCONNECTS AND POWER SOURCES

420-390 W Residential AC Module

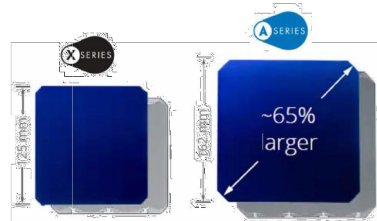
SunPower® Maxeon® Technology

Built specifically for use with the SunPower Equinox™ system, the only fully integrated solution designed, engineered, and warranted by one manufacturer.



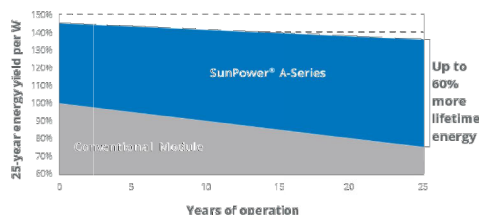
Highest Power Density Available.

SunPower's new Maxeon® Gen 5 cell is 55% larger than prior generations, delivering the most powerful cell and highest-efficiency module in residential solar. The result is more power per square meter than any commercially available solar.



Highest Lifetime Energy and Savings.

Designed to deliver 60% more energy over 25 years in real-world conditions like partial shade and high temperatures.¹



Best Reliability. Best Warranty.

With more than 25 million modules deployed around the world, SunPower technology is proven to last. That's why we stand behind our module and microinverter with the industry's best 25-year Combined Power and Product Warranty, including the highest Power Warranty in solar.



6/11/2022

A-Series: A420 | A415 | A410 | A400 | A390 SunPower® Residential AC Module

AC Electrical Data	
Inverter Model: SPWR-A4	@240 VAC
Peak Output Power	366 VA
Max. Continuous Output Power	349 VA
Nom. (L-L) Voltage/Range ¹ (V)	240 / 211–264
Max. Continuous Output Current (A)	1.45
Max. Units per 20 A (L-L) Branch Circuit ²	11
CEC Weighted Efficiency	97.0%
Nom. Frequency	60 Hz
Extended Frequency Range	47–68 Hz
AC Short-Circuit Fault Current Over 3 Cycles	5.8 A rms
Oversvoltage Class AC Port	III
AC Port Backfeed Current	18 mA
Power Factor Setting	1.0
Power Factor (adjustable)	0.7 lead. / 0.7 lag.

DC Power Data					
	A420-G-AC	A415-G-AC	A410-G-AC	A400-G-AC	A390-G-AC
Nom. Power ⁵ (P _{nom}) W	420	415	410	400	390
Power Tol.	+5/-0%				
Module Efficiency	22.5	22.3	22.0	21.5	20.9
Temp. Coef. (Power)	-0.29%/°C				
Shade Tol.	Integrated module-level max. power point tracking				

Tested Operating Conditions	
Operating Temp.	-40°F to +185°F (-40°C to +85°C)
Max. Ambient Temp.	122°F (50°C)
Max. Load	Wind: 62 psf, 3000 Pa, 305 kg/m² front & back Snow: 125 psf, 6000 Pa, 611 kg/m² front
Impact Resistance	1 inch (25 mm); diameter hail at 52 mph (23 m/s)

Mechanical Data	
Solar Cells	66 Monocrystalline Maxeon Gen 5
Front Glass	High-transmission tempered glass with anti-reflective coating
Environmental Rating	Outdoor rated
Frame	Class 1 black anodized (highest AAMA rating)
Weight	46.5 lbs (21.1 kg)
Recommended Max. Module Spacing	1.3 in. (33 mm)

1 SunPower® 415-W, 22.3% efficient, compared to a Conventional Panel on same-sized arrays (260 W, 16% efficient, approx. 1.6 m²), 7.9% more energy per watt (based on PVsyst panel ratings for avg. US climate), 0.5W/hy lower degradation rate (Jordan, et al. "Robust PV Degradation Methodology and Application," PVSC, 2018).

2 The number of hours of dataset values from websites of top manufacturers per IHS, as of January 2019.

3 A 4-run "Transformer PV Durability Initiative for Solar Modules: Part 3," PV Tech Power Magazine, 2015; Campana, Zecchi, "SunPower Module Degradation Rates," SunPower white paper, 2015.

4 Factory seal to 15474-2014 default settings. CA.R16 21 default settings profile set during commissioning.

5 See www.sunpower.com/1000WMiniInverter.aspx. 1.5, 25°C, IHL, calibration standard SCS current, LACCS-F and voltage. All DC voltage is fully compensated within the module.

6 This product is UL listed as PVFUSE and conforms with NEC 2014 and NEC 2017 690.12, and C22-1:2015 Rule 614-218 Rigid Switchlets of PV Systems, for AC and DC conductors; when installed according to manufacturer's instructions.

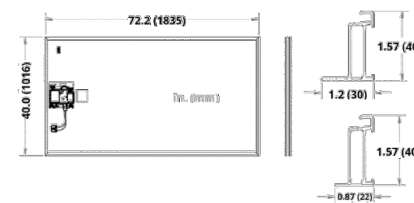
See www.sunpower.com/facts for more reference information.

For more details, see extended data sheets at www.sunpower.com/GatekeepersSpecifications. Included in this datasheet are subject to change without notice.

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Warranties, Certifications, and Compliance

Warranties	<ul style="list-style-type: none"> • 25-year limited power warranty • 25-year limited product warranty
Certifications and Compliance	<ul style="list-style-type: none"> • UL 1703 • UL 1741 / IEEE-1547 • UL 1741 AC Module (Type 2 fire rated) • UL 62109-1 / IEC 62109-2 • FCC Part 15 Class B • ICES 0003 Class B • CAN/CSA-C22.2 NO. 107.1-C1 • CA Rule 21 (UL 1741 SA)⁴ • (Includes Volt/Var and Restictive Power Priority) • UL Listed PV Rapid Shutdown Equipment⁵
Enables installation in accordance with:	<ul style="list-style-type: none"> • NEC 690.6 (AC module) • NEC 690.12 Rapid Shutdown (inside and outside the array) • NEC 690.15 AC Connectors, 690.33(A)-(E)(1)
When used with InvisiMount racking and InvisiMount accessories (UL 2703):	<ul style="list-style-type: none"> • Module grounding and bonding through InvisiMount • Class A fire rated
When used with AC module C Cables and accessories (UL 6703 and UL 2238B) ⁶ :	<ul style="list-style-type: none"> • Rated for load break disconnect
PID Test	Potential-induced degradation free



SUNPOWER®

534092 RevA

I HEREBY CERTIFY THAT THIS DOCUMENT WAS
APPROVED BY ME, AND THAT I AM A DULY LICENSED
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EXPIRATION DATE: 2023-09-08

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ERIC LINDBLOM
0.08 KW GRID-TIED PHOTOVOLTAIC SYSTEMS
49 ELM AVENUE
TAKOMA PARK, MD 20912

REVISION LEVEL	DATE
REV-1	DATE
DRAWN BY: G. COBBS	
INSTALLER:	
PROJECT:	22192-01
DATE DRAWN:	05-31-2022
SCALE:	NTS

PVE-5

Datasheet

SunPower® SunVault™ Hub+

Electrical	
Model Numbers	SV-HUB-01-A, SV-HUB-01-B
Applications	Self-supply, backup, and cost savings
Special Features	12 V jumpstart: YES / Generator control: YES / Rapid Power Off: YES
Supported Backup Configurations	<ul style="list-style-type: none"> Whole home (up to 200 A service) Partial home (up to 400 A service)
Max. Allowed Service / Disconnect Rating	200 A
Nom. Allowed Service Voltage	120 / 240 V 60 Hz, split phase
Short Circuit Rating ¹	10 kA / 22 kA ²
Overcurrent Protection Device Allowed ³	100–200 A / service entrance rated
AC Metering	Solar meter: ANSI C12.20, < 0.5% RGM Site meter: < 2%
Connectivity	Ethernet, WiFi, and cellular
Backup Transition	Seamless
Load / Generation Breakers ⁴	Refer to installation guide for available spaces
Overvoltage Category	OV IV
Pollution Degree	III
Protection Class	I
Scalability ⁵	Supports multiple storage and PV array systems in parallel

Mechanical	
Dimensions	17 w × 46 h × 6 in. d (43 × 117 × 15 cm)
Weight	80 lb (36 kg)
Mounting Options	Indoor / Outdoor
Conduit Entry	Multiple; up to 3 in.

Environmental	
Ambient Operating Temp.	–4°F to 122°F (–20°C to 50°C)
Shelf Ambient Temp.	–22°F to 140°F (–30°C to 60°C)
Humidity	0–95%, condensing
Enclosure Type / Ingress Rating	NEMA Type 3R / IP54
Max. Elevation	6560 ft (2000 m)
Environment	Indoor / Outdoor

1 Higher short circuit rating is compatible with external suitable rated equipment.
 2 Tested at 6 kW, 25°C conditions.
 3 Extended exposure reduces battery performance.
 4 Two enclosures for 26 kWh.
 5 Additional hardware details in installation guide.
 Some parameters can vary depending on site-specific conditions.
 See the *SunVault Storage Installation Guide* for guidelines. See www.sunpower.com/facts for additional reference information.
 For more details, see extended datasheet www.sunpower.com/datasheets. Specifications included in this datasheet are subject to change without notice.
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Datasheet

SunPower® SunVault™ Energy Storage System (ESS): SunVault 13 and SunVault 26

Performance		
	SunVault 13	SunVault 26
Model Number	SV-BASE13-12-0 or SV-BASE13-12-A	SV-BASE13-12-A and SV-ENERGY13-12-A
DC Rated Energy	13 kWh (128 Ah)	26 kWh (256 Ah)
Max. Usable Energy ¹ (DC)	12 kWh (118 Ah)	24 kWh (236 Ah)
Individual DC Breaker Rating	125 A / two pole	
Nom. Internal Battery Voltage	51.2 V	
Nom. AC Voltage (L–N–L)	120 / 240 VAC 60 Hz, split phase	
CFC Weighted RTE Efficiency ²	> 86%	
Max. Backup Discharge Power (cont./5 min./10 sec.)	6.8 kW / 7.5 kW / 8.5 kW	
Max. AC Continuous Backup Output Current	28.5 A	
Max. AC Output Fault Current	35 A	
Max. Short Circuit Rating	10 kA	
AC Overcurrent Protection Device	40 A / two pole	
Max. Split-Phase Imbalance L–N	4800 W	
Power Factor (full-rated power)	± 0.85	
Battery Cell Chemistry	Lithium iron phosphate (LiFePO ₄)	
Overvoltage Category	II	
Pollution Degree	III	
Protection Class	I	
Max. Continuous Charge Power (Grid tied / Backup)	6.4 kW	
Max. Continuous Discharge Power (Grid tied)	6.0 kW	
Max. AC Continuous Output Current (Grid tied)	27 A	

Environmental	
Seismic Rating	IEEE 698-2005, AC-156
Environmental Rating	Indoor and outdoor rated
Acoustic Noise Level	< 50 dBA @ 1 m distance, 86°F (30°C)
Recommended Operating Temp.	32°F to 36°F (0°C to 30°C)
Ambient Operating Temp.	14°F to 113°F (–10°C to 45°C)
Shelf Ambient Temp. ³	–4°F to 113°F (–20°C to 45°C)
Initial Energy Reserve	30%
Humidity	0–95% condensing
Enclosure Type / Ingress Rating	NEMA Type 3R / IP54
Max. Elevation	6560 ft (2000 m)

Warranties, Certifications, and Compliance	
Warranty	10 years
Certifications and Compliance	<ul style="list-style-type: none"> FCC Part 15 Subclass B IEEE 1547 UL 1642 UL 1973 UL 1741 UL 1741 SA (C7 Rule 21) UL 9540 UN 38.3

Mechanical	
User Interface	MobileApp, LED Panel
Dimensions	64.5 h × 26 w × 14.8 in. d (164 × 66 × 38 cm) ⁴
Weight	<ul style="list-style-type: none"> SV-BASE13: 270 lb (122.5 kg) w/inverter; 528 lb (239.5 kg) fully assembled SV-ENERGY13: 400 lb (181.4 kg) fully assembled
Mounting Options	Wall or floor ⁵

1 Some energy reserved for internal consumption.
 2 Tested at 6 kW, 25°C conditions.
 3 Extended exposure reduces battery performance.
 4 Two enclosures for 26 kWh.
 5 Additional hardware details in installation guide.
 Some parameters can vary depending on site-specific conditions.

See the *SunVault Storage Installation Guide* for guidelines. See www.sunpower.com/facts for additional reference information. Specifications included in this datasheet are subject to change without notice. © 2020 SunPower Corporation. All Rights Reserved. SUNPOWER, the SUNPOWER logo, and SUNVAULT are trademarks or registered trademarks of SunPower Corporation in the U.S. and other countries as well. 1-800-SUNPOWER.

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 (888) 586-3343

ERIC LINDBLOM 1006 KW GRID-TIED PHOTOVOLTAIC SYSTEM	REVISION LEVEL	DATE
49 ELM AVENUE TAKOMA PARK, MD 20912	REV-1	DATE
SOLAR INDIVIDUAL PERMIT PACKAGE SUNVAULT SPECS.		
	DESIGNED BY:	G. COBBE
	INITIALS:	2/17/20
	PROJECT:	5637-002
	DATE DRAWN:	1/26/2020
	SCALE:	1/8"

PVE-6



SunPower® InvisiMount™ | Residential Mounting System



The seal is circular with a double-lined border. The outer ring contains the text "STATE OF MARYLAND" at the top and "PROFESSIONAL ENGINEER" at the bottom, separated by two stars. The inner ring contains the name "TIMOTHY E. RUFFORD" at the top and "No. 41086" at the bottom. In the center of the seal is the coat of arms of the State of Maryland, featuring a shield with a ship, a figure holding a bow, and a figure holding a sword, with a sun rising behind them.



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Roof Attachment Hardware Warranties	
	Refer to roof attachment hardware manufacturer's documentation

sunpower.com
Document #509506 Rev B

Standoffs & Flashings Installation Manual 907.2



[1] Installer responsibility



The installer is solely responsible for:

- Complying with all applicable local or national building codes, including any that may supersede this manual;
- Ensuring that Unirac and other products are appropriate for the particular installation and the installation environment;
- Ensuring that the roof, its rafters, connections, and other structural support members can support the array under building live load conditions;
- Using only Unirac parts and installer-supplied parts as specified by Unirac (substitution of parts may void the warranty);
- Maintaining the waterproof integrity of the roof; and
- Ensuring safe installation of all electrical aspects of the PV array.

UNIRAC®

DocuSigned by:

TIM RUMBLE

E70D081E087D845E



6/11/2022

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Unirac welcomes input concerning the accuracy and user-friendliness of this publication. It is requested that you submit comments to the following address:

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Pub 090615-6ii
June 2009

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Unirac Installation Manual

UNIRAC Installation Manual 907.2

Standoffs & Flashings

Standoffs: 3-, 4-, 6-, and 7-inch lengths in each type

	Shaft O.D.	Use	Components
Raised flange zinc-plated steel	1 5/8"	Use only with SolarMount standard or HD rails. Secure to rafter with 2 lag screws at opposite corners, orienting the flange parallel to the rails.	<ul style="list-style-type: none"> • Welded standoff • 2 lags, 5/16" x 3 1/2" (zinc)
Flat top 1-piece zinc-plated steel	1 5/8"	Use with SunFrame, SolarMount standard, or SolarMount HD rails. Secure to rafter with 2 lag screws at opposite corners. Secure L-foot or installer-supplied strut directly to standoff with standoff hardware.	<ul style="list-style-type: none"> • Welded standoff • Bolt, 3/8" x 1 1/4" • Lock washer, 3/8" • 2 lags, 5/16" x 3 1/2" (zinc)
Flat top 2-piece aluminum	1 5/8"	Use with SunFrame, SolarMount standard, or SolarMount HD rails. Secure to rafter with 2 lag screws. Secure L-foot or installer-supplied strut directly to standoff with standoff hardware. Especially convenient when installing over a tile roof because flashing can be precisely fitted over secured base prior to installation of shaft.	<ul style="list-style-type: none"> • Shaft • Base assembly • Bolt, 3/8" x 1 1/4" Flange Head • Lock washer, 3/8" • 2 lags, 5/16" x 3 1/2" (zinc) • EPDM Washer

* A lag-bolt removal credit is available wherever an installer prefers to substitute a different lag bolt. The installer is solely responsible for determining whether lags are adequate to handle live and dead loads under wind conditions at the installation site. Wind loads and lag pullout capacities are addressed in Code-Compliant installation manual for SolarMount (Installation Manual 227) and SunFrame (Installation Manual 809).

Flashings for all current standoffs (1 5/8" O.D. shaft)
(see illustrations, p. 3)

	Part no.*	Dimensions
Collared, galvanized	990101	8.75" x 12.5"
Collared, aluminum	990102	8.75" x 12.5"
Collared, soft aluminum	990103	18" x 18"

*Packs of 12 flashings.

Flashings for other uses (1/2" - 1 1/8" O.D. shaft)

	Part no.	Dimensions
Collared, galvanized	990109	8.75" x 12.5"

Flashing refers to thin, continuous pieces of sheet metal or other impervious material installed to prevent the passage of water into a structure from an angle or joint.

Flashing generally operates on the principal that, for water to penetrate a joint, it must work itself upward against the force of gravity or in the case of wind-driven rain, it would have to follow a tortuous path during which the driving force will be dissipated.

Unirac offers flashings to be used specifically with Unirac standoffs. These flashings are collared, thereby eliminating the need for the use of sealant between standoff and flashing. The flashing slides over the standoff, under the shingle above, and over the shingle below.

The following installation instruction provides an explanation of planning and installation of three different applications.



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49 ELM AVENUE
TAKOMA PARK, MD 20912
SOLAR INDIVIDUAL PERMIT PACKAGE
HARDWARE MOUNTING DETAILS, SPEC.

REVISION LEVEL DATE
REV-1 DATE
DRAWN BY: G. COBBE
INITIALS: 2012-01
PROJECT: 5037-002
SCALE: NTS

PVM-2