19 QUINCY STREET, CHEVY CHASE
[HPC CASE # 35/13-13H]
CHEVY CHASE HISTORIC DISTRICT

HISTORIC PRESERVATION COMMISSION

Isiah Leggett
County Executive

Leslie Miles
Chairperson

Date: February 19, 2013

MEMORANDUM

TO: Diane R. Schwartz Jones, Director
Department of Permitting Services

FROM: Karen Theimer Brown, Senior Planner KTB
Historic Preservation Section
Maryland-National Capital Park & Planning Commission

SUBJECT: Historic Area Work Permit #624107, for installation of solar panels

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The Montgomery County Historic Preservation Commission (HPC) has reviewed the attached application for a Historic Area Work Permit (HAWP). This application was **approved** at the February 13, 2013 meeting.

Applicant: Roger and Elizabeth Marmet

Address: 19 Quincy Street, Chevy Chase

[redacted]

DPS - #8

HISTORIC PRESERVATION COMMISSION
301/563-3400

APPLICATION FOR HISTORIC AREA WORK PERMIT

Contact Email: RMARMET@COMCAST.NET Contact Person: ROGER MARMET
Daytime Phone No.: 301 706-7127

Tax Account No.: _____

Name of Property Owner: ROGER & ELIZABETH MARMET Daytime Phone No.: _____

Address: 19 QUINCY ST CHEVY CHASE MD 20815
Street Number City State Zip Code

Contractor: SOLAR CITY Phone No.: 888-765-2489

Contractor Registration No.: MD MHIC 128948

Agent for Owner: _____ Daytime Phone No.: _____

LOCATION OF BUILDING/PREMISE

House Number: 19 Street: QUINCY ST

Town/City: CHEVY CHASE Nearest Cross Street: Brookville / Connecticut

Lot: 20 Block: 61 Subdivision: Section 2 - Chevy Chase Village

Liber: _____ Folio: _____ Parcel: _____

PART ONE: TYPE OF PERMIT ACTION AND USE

1A. CHECK ALL APPLICABLE:

☐ Construct ☐ Extend ☐ Alter/Renovate ☐ A/C ☐ Slab ☐ Room Addition ☐ Porch ☐ Deck ☐ Shed
☐ Move ☒ Install ☐ Wreck/Raze ☒ Solar ☐ Fireplace ☐ Woodburning Stove ☐ Single Family
☐ Revision ☐ Repair ☐ Revocable. ☐ Fence/Wall (complete Section 4) ☐ Other: _____

1B. Construction cost estimate: $ 1900.00

1C. If this is a revision of a previously approved active permit, see Permit # _____

PART TWO: COMPLETE FOR NEW CONSTRUCTION AND EXTEND/ADDITIONS

2A. Type of sewage disposal: 01 ☐ WSSC 02 ☐ Septic 03 ☐ Other: _____

2B. Type of water supply: 01 ☐ WSSC 02 ☐ Well 03 ☐ Other: _____

PART THREE: COMPLETE ONLY FOR FENCE/RETAINING WALL

3A. Height _____ feet _____ inches

3B. Indicate whether the fence or retaining wall is to be constructed on one of the following locations:

☐ On party line/property line ☐ Entirely on land of owner ☐ On public right of way/easement

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

Signature of owner or authorized agent — 1/22/2013 Date

Approved: ✓ For Chairperson, Historic Preservation Commission

Disapproved: _____ Signature: _____ Date: 2/19/13

Application/Permit No.: 624107 Date Filed: 1/23/13 Date Issued: _____

Edit 6/21/99

SEE REVERSE SIDE FOR INSTRUCTIONS

1

THE FOLLOWING ITEMS MUST BE COMPLETED AND THE REQUIRED DOCUMENTS MUST ACCOMPANY THIS APPLICATION.

1. **WRITTEN DESCRIPTION OF PROJECT**

   a. Description of existing structure(s) and environmental setting, including their historical features and significance:

   1925 white clapboard wood house with attached garage on Quincy ST in Chevy Chase Village.

   b. General description of project and its effect on the historic resource(s), the environmental setting, and, where applicable, the historic district:

   Install 6 solar panels on rear portion of garage roof. Panels will be on back side of house and will have no impact on front historic facade of house... limited visibility in this design location.

2. **SITE PLAN**

   Site and environmental setting, drawn to scale. You may use your plat. Your site plan must include:

   a. the scale, north arrow, and date;

   b. dimensions of all existing and proposed structures; and

   c. site features such as walkways, driveways, fences, ponds, streams, trash dumpsters, mechanical equipment, and landscaping.

3. **PLANS AND ELEVATIONS**

   You must submit 2 copies of plans and elevations in a format no larger than 11" x 17". Plans on 8 1/2" x 11" paper are preferred.

   a. *Schematic construction plans*, with marked dimensions, indicating location, size and general type of walls, window and door openings, and other fixed features of both the existing resource(s) and the proposed work.

   b. Elevations (facades), with marked dimensions, clearly indicating proposed work in relation to existing construction and, when appropriate, context. All materials and fixtures proposed for the exterior must be noted on the elevations drawings. An existing and a proposed elevation drawing of each facade affected by the proposed work is required.

4. **MATERIALS SPECIFICATIONS**

   General description of materials and manufactured items proposed for incorporation in the work of the project. This information may be included on your design drawings.

5. **PHOTOGRAPHS**

   a. Clearly labeled photographic prints of each facade of existing resource, including details of the affected portions. All labels should be placed on the front of photographs.

   b. Clearly label photographic prints of the resource as viewed from the public right-of-way and of the adjoining properties. All labels should be placed on the front of photographs.

6. **TREE SURVEY**

   If you are proposing construction adjacent to or within the dripline of any tree 6" or larger in diameter (at approximately 4 feet above the ground), you must file an accurate tree survey identifying the size, location, and species of each tree of at least that dimension.

7. **ADDRESSES OF ADJACENT AND CONFRONTING PROPERTY OWNERS**

   For **ALL** projects, provide an accurate list of adjacent and confronting property owners (not tenants), including names, addresses, and zip codes. This list should include the owners of all lots or parcels which adjoin the parcel in question, as well as the owner(s) of lot(s) or parcel(s) which lie directly across the street/highway from the parcel in question.

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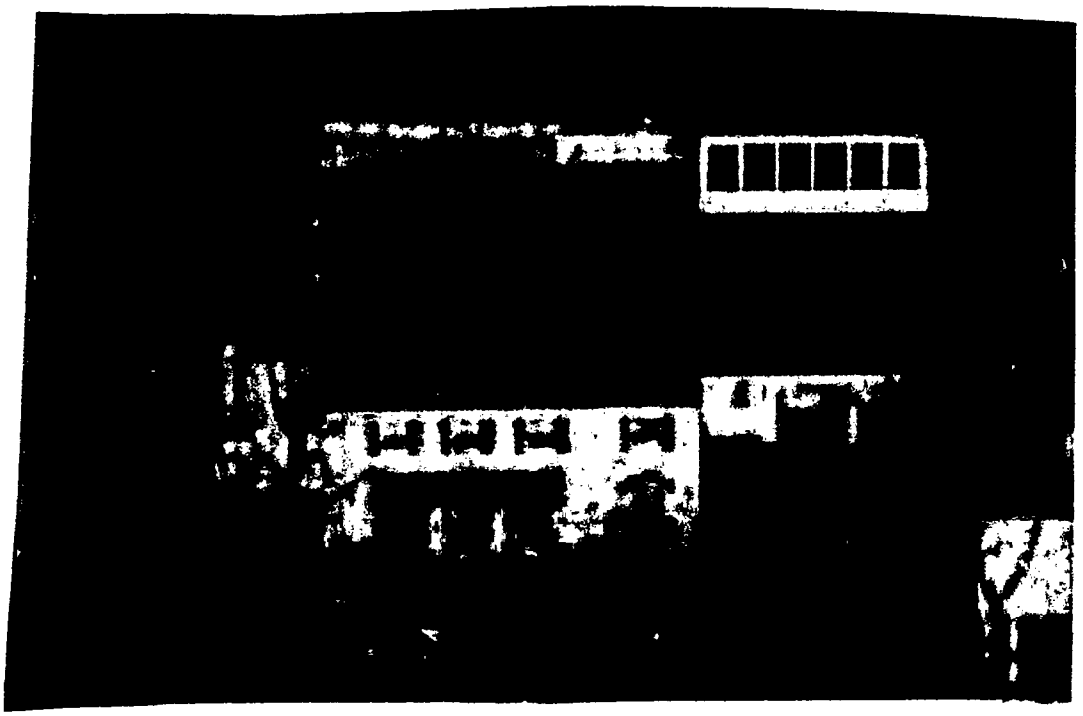
PLEASE STAY WITHIN THE GUIDES OF THE TEMPLATE, AS THIS WILL BE PHOTOCOPIED DIRECTLY ONTO MAILING LABELS.

Site Plan



Solar panels shown in purple are on rear portion of garage roof.

This silver color, metal roof is slightly sloped and panels will be positioned at angle to capture the SUN.

This rear-facing flat roof is not visible from the street

Shade portion to indicate North

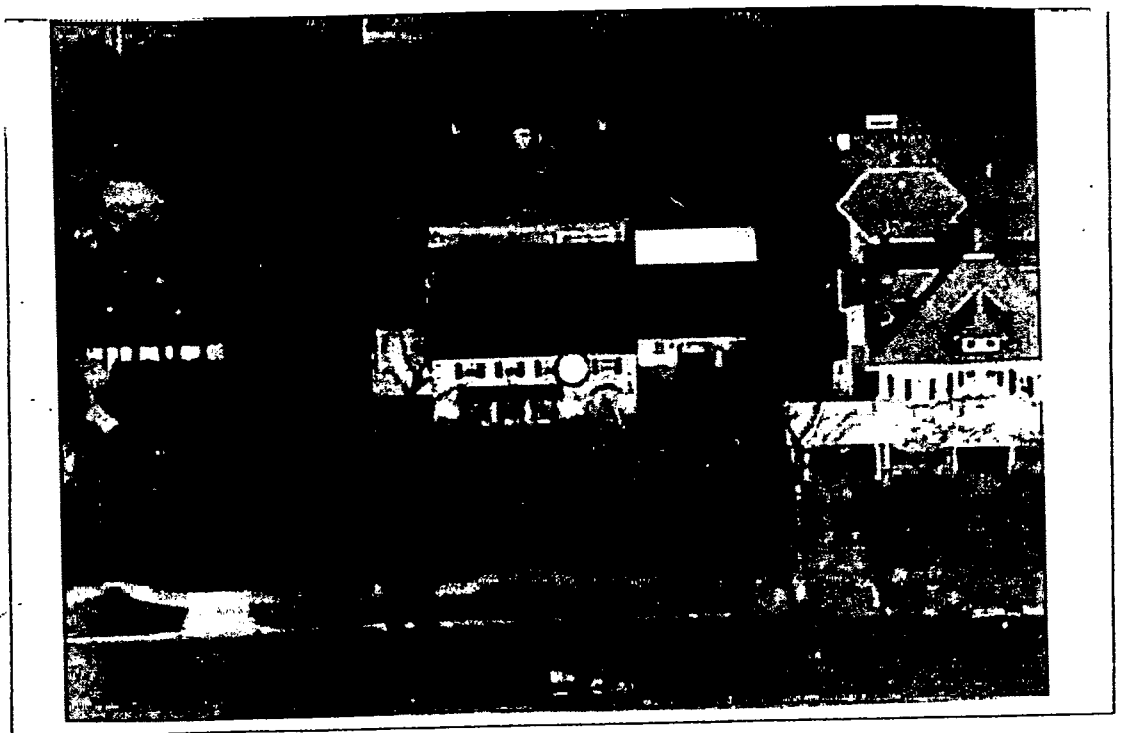
Existing Property Condition Photographs (duplicate as needed)

Detail: 19 Quincy St - front view from street

Detail: 19 Quincy St - side view from Left

Existing Property Condition Photographs (duplicate as needed)

Detail: 19 Quincy St - side view from right - garage on right



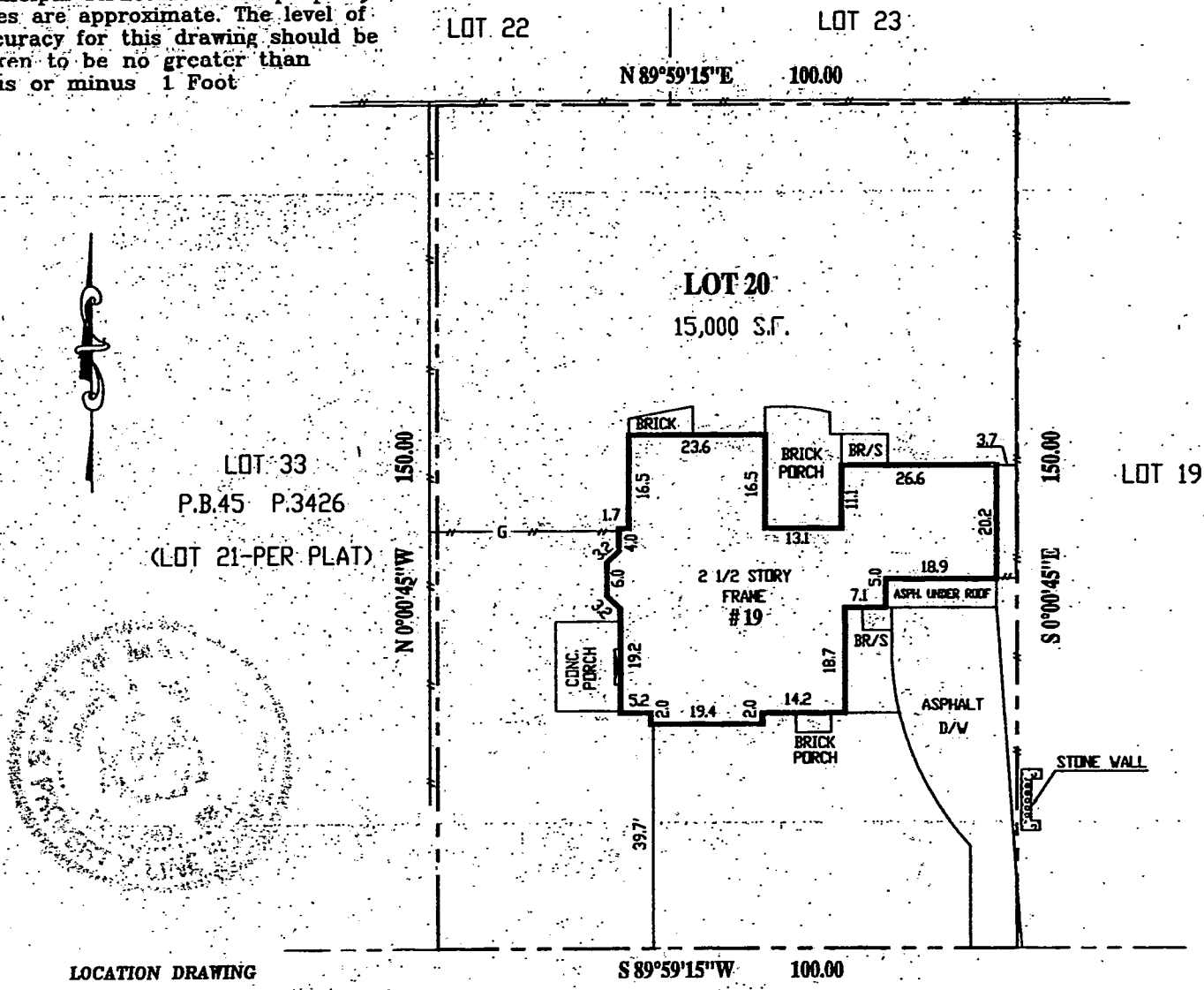
Detail: 19 Quincy St - Aerial view - silver flat metal roof at rear of garage - location of solar

agent in connection with contemplated transfer, financing or re-financing.

2. This plan is not to be relied upon for the establishment or location of fences, garages, buildings, or other existing or future improvements.
3. This plan does not provide for the accurate identification of property boundary lines, but such identification may not be required for the transfer of title or securing financing or re-financing.
4. Building line and/or Flood Zone information is taken from available sources and is subject to interpretation of originator.

Notes

1. Flood zone "C" per H.U.D. panel No. 0175 C
2. Setback distances as shown to the principal structure from property lines are approximate. The level of accuracy for this drawing should be taken to be no greater than plus or minus 1 Foot



LOCATION DRAWING

LOT 20, BLOCK 61, SECTION 2

CHEVY CHASE

MONTGOMERY COUNTY, MARYLAND

SURVEYOR'S CERTIFICATE

"THE INFORMATION SHOWN HEREON HAS BEEN BASED UPON THE RESULTS OF A FIELD INSPECTION PURSUANT TO THE DEED OR PLAT OF RECORD. EXISTING STRUCTURES SHOWN HAVE BEEN FIELD LOCATED BASED UPON MEASUREMENTS FROM PROPERTY MARKERS FOUND OR FROM EVIDENCE OF LINES OF APPARENT OCCUPATION."

Jeffrey A. Fosler

MARYLAND PROPERTY LINE SURVEYOR REG. NO. 587

REFERENCES

PLAT BK. 2

PLAT NO. 106

LIBER

FOLIO

SNIDER & ASSOCIATES
SURVEYORS – ENGINEERS
LAND PLANNING CONSULTANTS
2 Professional Drive, Suite 216
Gaithersburg, Maryland 20879
301/948-5100, Fax 301/948-1286

DATE OF LOCATIONS	SCALE: 1"= 30'
WALL CHECK:	DRAWN BY: E.M.G.
HSE. LOC.: 10-31-02	JOB NO.: 2002-6808

HAWP APPLICATION: MAILING ADDRESSES FOR NOTIFING
[Owner, Owner's Agent, Adjacent and Confronting Property Owners]

Owner's mailing address	**Owner's Agent's** mailing address
19 Quincy St Chevy Chase, MD 20815	
Adjacent and confronting Property Owners mailing addresses	
Tracy + Kathy Wellington 10 Quincy St Chevy Chase, MD 20815	Richard Paisner + Christine Weiner 21 Quincy St Chevy Chase, MD 20815
JAMES [redacted] + Nellie Worsley 11 Quincy St Chevy Chase, MD 20815	Sally Fogarty 3804 Bradley Lane Chevy Chase, MD 20815
UNKNOWN ? 3800 Bradley Lane Chevy Chase, MD 20815	

Re: 19 Quincy Street, Chevy Chase

Roger Marmet [rmarmet@comcast.net]
Sent: Wednesday, January 30, 2013 9:57 PM
To: Silver, Joshua
Cc: Brown, Karen
Attachments: IMG_4259.JPG (2 MB) ; IMG_4253.JPG (2 MB) ; tsl-spv-module-installatio~1.pdf (225 KB) ; tsm-pa05us-70638.pdf (221 KB)

Attached are four files as follow up to my application to install solar panels at our house in Chevy Chase.

The first photograph (4253) shows the rear of our house from our backyard. The other photo (4259) shows the flat roof where the solar panels will be installed. This photo is taken from on top of our sunroom roof, and is facing towards the East with our next door neighbor's house in the background.

The specifications I have received from solar city are attached. My understanding is that the panels will be mounted onto the rooftop to the roof joists beneath the metal roof. They will be mounted at an angle to catch the sun - as indicated in the drawing that I previously provided.

Please let me know if you have further information or would like more detail from Solar City. I appreciate your help.

Roger Marmet
19 Quincy Street
Chevy Chase

From: "Joshua Silver" <Joshua.Silver@montgomeryplanning.org>
To: "Roger Marmet" <rmarmet@comcast.net>
Cc: "Karen Brown" <karen.brown@montgomeryplanning.org>
Sent: Monday, January 28, 2013 1:49:06 PM
Subject: RE: 19 Quincy Street, Chevy Chase

Thank you very much. Please e-mail them to karen.brown@montgomeryplanning.org and cc me on your reply.

Josh

From: Roger Marmet [mailto:rmarmet@comcast.net]
Sent: Monday, January 28, 2013 1:47 PM
To: Silver, Joshua
Subject: Re: 19 Quincy Street, Chevy Chase

I appreciate your feedback. I will get additional photos and the specifications from Solar City before Thursday.

Thanks very much,

Roger Marmet

From: "Joshua Silver" <Joshua.Silver@montgomeryplanning.org>
To: rmarmet@comcast.net
Sent: Monday, January 28, 2013 12:54:42 PM
Subject: 19 Quincy Street, Chevy Chase

Mr. Marmet,

I am reviewing your application to install solar panels at 19 Quincy Street in Chevy Chase. I am writing to request some additional information to complete the application. If you will, please provide some information on the design of the panels - a manufacturer specification sheet, a description of how they will be mounted, and a closer photo of the roof to which the panels will be mounted (photo of the rear and side of the house). I will be recommending approval to the commission for this project, but I need additional information to support that recommendation.

Should you have any questions, please feel free to contact me via email. I would appreciate the supplemental information by Thursday, January 31st.

Thank you,

Joshua Silver, Senior Planner | Historic Preservation Section
Functional Planning and Policy Division | Montgomery County Planning Department | M-NCPPC
8787 Georgia Avenue, Suite 206 | Silver Spring MD 20910
301-563-3400 phone | 301-563-3412 fax | joshua.silver@montgomeryplanning.org | www.montgomeryplanning.org/historic/

EXPEDITIED
MONTGOMERY COUNTY HISTORIC PRESERVATION COMMISSION
STAFF REPORT

Address:	19 Quincy Street, Chevy Chase	**Meeting Date:**	2/13/2013
Resource:	Contributing Resource **Chevy Chase Historic District**	**Report Date:**	2/06/2013
		Public Notice:	1/30/13
Applicant:	Roger and Elizabeth Marmet	**Tax Credit:**	None
Review:	HAWP	**Staff:**	Karen Theimer Brown
Case Number:	35/13-13H		
PROPOSAL:	Solar panel installation		

STAFF RECOMMENDATION

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

ARCHITECTURAL DESCRIPTION

SIGNIFICANCE: Contributing Resource within the Chevy Chase Historic District
STYLE: Colonial Revival
DATE: 1916-27

PROPOSAL

The applicant is proposing to install six low-profile mounted Trina SPV solar array panels on the rear portion of the garage roof. The garage is attached to the main block of the house on the right side and the panels will be installed on the moderately sloped metal roof in the rear that is not visible from the street. The panels will be mounted to the roof joists beneath the metal roof. The panels will be mounted at an angle to maximize sunlight.

APPLICABLE GUIDELINES

Montgomery County Code; Chapter 24A

(a) The commission shall instruct the director to deny a permit if it finds, based on the evidence and information presented to or before the commission that the alteration for which the permit is sought would be inappropriate, inconsistent with or detrimental to the preservation, enhancement or ultimate protection of the historic site or historic resource within an historic district, and to the purposes of this chapter.

(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
(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.)

STAFF RECOMMENDATION

Staff recommends that the Commission **approve the HAWP application** as being consistent with Chapter 24A-8(b) (1) & (2);

(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; and

with the general condition that the applicant shall present the **3 permit sets of drawings 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 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 karen.brown@mncppc-mc.org to schedule a follow-up site visit.

[redacted]

DPS - #8

HISTORIC PRESERVATION COMMISSION
301/563-3400

APPLICATION FOR HISTORIC AREA WORK PERMIT

Contact Email: RMARMET@COMCAST.NET Contact Person: ROGER MARMET
Daytime Phone No.: 301 706-7127

Tax Account No.: _____
Name of Property Owner: ROGER & ELIZABETH MARMET Daytime Phone No.: _____
Address: 19 QUINCY ST CHEVY CHASE MD 20815
Street Number *City* *State* *Zip Code*
Contractor: SOLAR CITY Phone No.: 888-765-2489
Contractor Registration No.: MD MHIC 128948
Agent for Owner: _____ Daytime Phone No.: _____

LOCATION OF BUILDING/PREMISE

House Number: 19 Street: QUINCY ST
Town/City: CHEVY CHASE Nearest Cross Street: Brookville / Connecticut
Lot: 20 Block: 61 Subdivision: Section 2 - Chevy Chase Village
Liber: _____ Folio: _____ Parcel: _____

PART ONE: TYPE OF PERMIT ACTION AND USE

1A. CHECK ALL APPLICABLE:

☐ Construct ☐ Extend ☐ Alter/Renovate
☐ Move ☒ Install ☐ Wreck/Raze
☐ Revision ☐ Repair ☐ Revocable.

CHECK ALL APPLICABLE:

☐ A/C ☐ Slab ☐ Room Addition ☐ Porch ☐ Deck ☐ Shed
☒ Solar ☐ Fireplace ☐ Woodburning Stove ☐ Single Family
☐ Fence/Wall (complete Section 4) ☐ Other: _____

1B. Construction cost estimate: $ 1900.00

1C. If this is a revision of a previously approved active permit, see Permit # _____

PART TWO: COMPLETE FOR NEW CONSTRUCTION AND EXTEND/ADDITIONS

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3A. Height _____ feet _____ inches

3B. Indicate whether the fence or retaining wall is to be constructed on one of the following locations:

☐ On party line/property line ☐ Entirely on land of owner ☐ On public right of way/easement

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

RM
Signature of owner or authorized agent

1/22/2013
Date

Approved: _____ *For Chairperson, Historic Preservation Commission*
Disapproved: _____ Signature: _____ Date: _____
Application/Permit No.: _____ Date Filed: _____ Date Issued: _____

Edit 6/21/99

SEE REVERSE SIDE FOR INSTRUCTIONS

3

THE FOLLOWING ITEMS MUST BE COMPLETED AND THE REQUIRED DOCUMENTS MUST ACCOMPANY THIS APPLICATION.

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   b. General description of project and its effect on the historic resource(s), the environmental setting, and, where applicable, the historic district:

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   Site and environmental setting, drawn to scale. You may use your plat. Your site plan must include:

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HAWP APPLICATION: MAILING ADDRESSES FOR NOTIFING
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Adjacent and confronting Property Owners mailing addresses	
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JAMES ~~[redacted]~~ + Nellie Worsley 11 Quincy St Chevy Chase, MD 20815	Sally Fogarty 3804 Bradley Lane Chevy Chase, MD 20815
UNKNOWN ? 3800 Bradley Lane Chevy Chase, MD 20815	

agent in connection with contemplated transfer, financing or re-financing.

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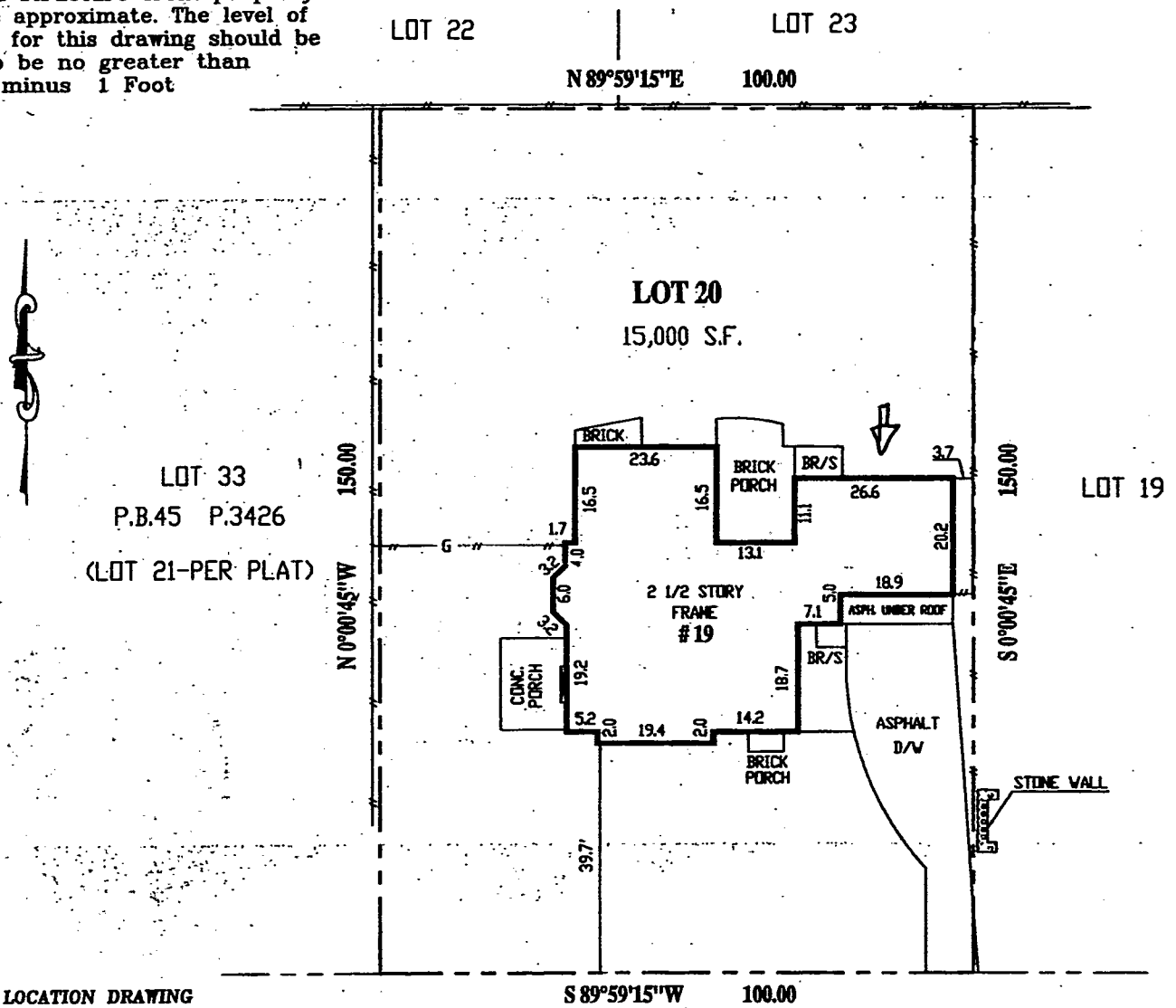
Notes

1. Flood zone "C" per H.U.D. panel No. 0175 C
2. Setback distances as shown to the principal structure from property lines are approximate. The level of accuracy for this drawing should be taken to be no greater than plus or minus 1 Foot



LOCATION DRAWING

LOT 20, BLOCK 61, SECTION 2

CHEVY CHASE

MONTGOMERY COUNTY, MARYLAND

QUINCY STREET

(60' R/W)

SURVEYOR'S CERTIFICATE

"THE INFORMATION SHOWN HEREON HAS BEEN BASED UPON THE RESULTS OF A FIELD INSPECTION PURSUANT TO THE DEED OR PLAT OF RECORD. EXISTING STRUCTURES SHOWN HAVE BEEN FIELD LOCATED BASED UPON MEASUREMENTS FROM PROPERTY MARKERS FOUND OR FROM EVIDENCE OF LINES OF APPARENT OCCUPATION."

Jeffrey A. Foster

MARYLAND PROPERTY LINE SURVEYOR REG. NO. 587

REFERENCES
PLAT BK. 2
PLAT NO. 106
LIBER
FOLIO

SNIDER & ASSOCIATES
SURVEYORS - ENGINEERS
LAND PLANNING CONSULTANTS
2 Professional Drive, Suite 216
Gaithersburg, Maryland 20879
301/948-5100, Fax 301/948-1286

DATE OF LOCATIONS	SCALE: 1"= 30'
WALL CHECK:	DRAWN BY: E.M.G.
HSE. LOC.: 10-31-02	JOB NO.: 2002-6808

Existing Property Condition Photographs (duplicate as needed)

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Detail: 19 Quincy St - side view from Left

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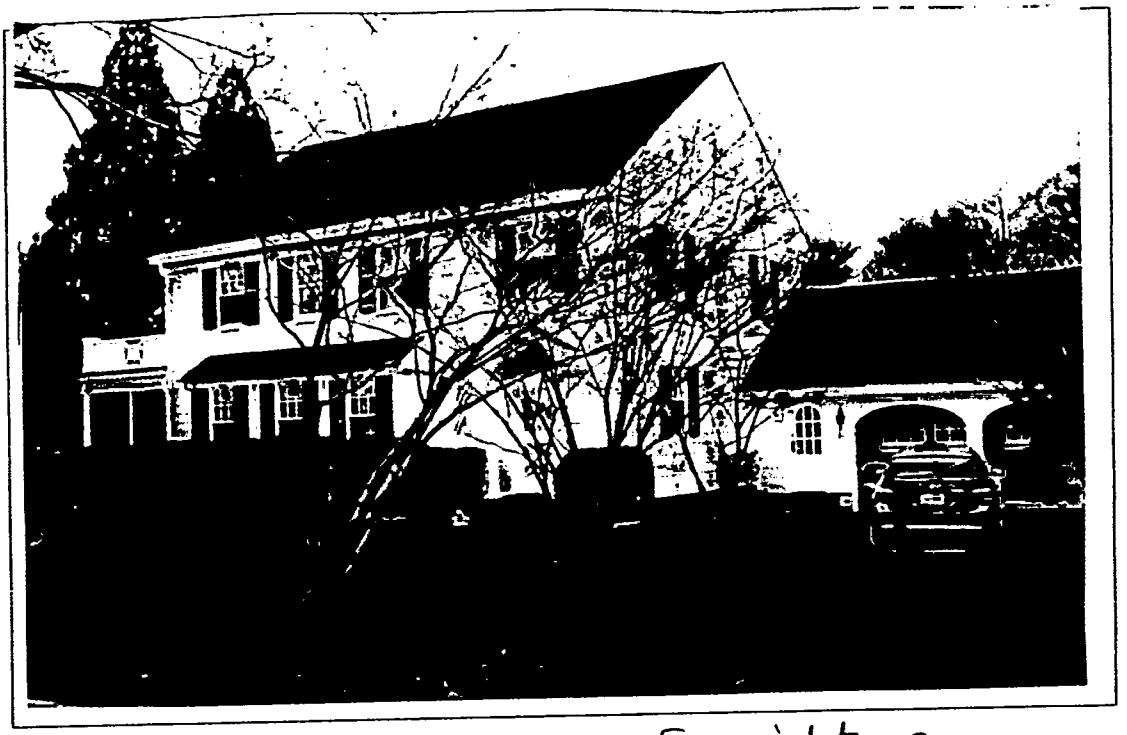
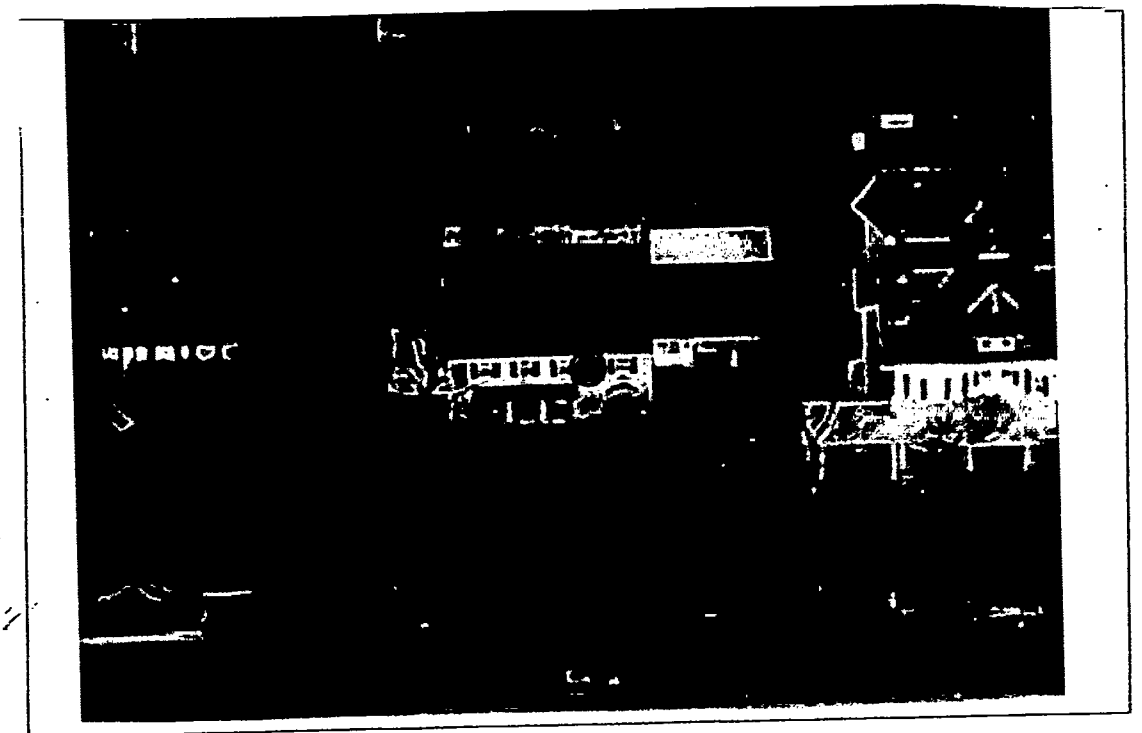
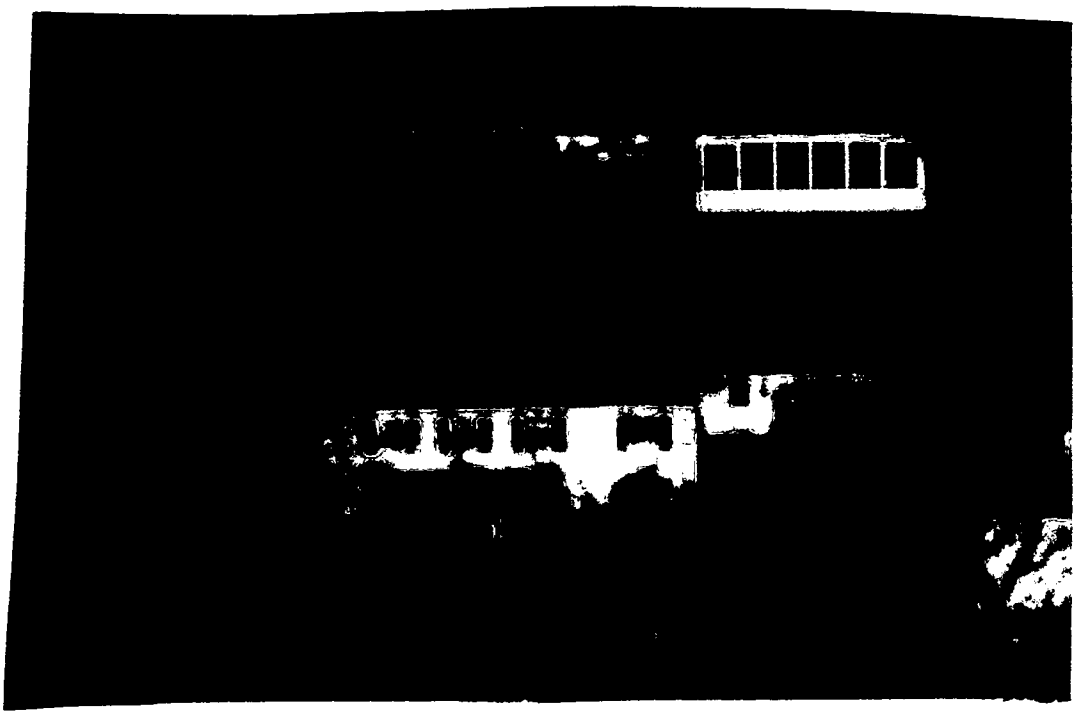


Detail: 19 Quincy St - side view from right - garage on right



Detail: 19 Quincy St - Aerial view - silver flat Metal roof at rear of garage - location of solar

Site Plan



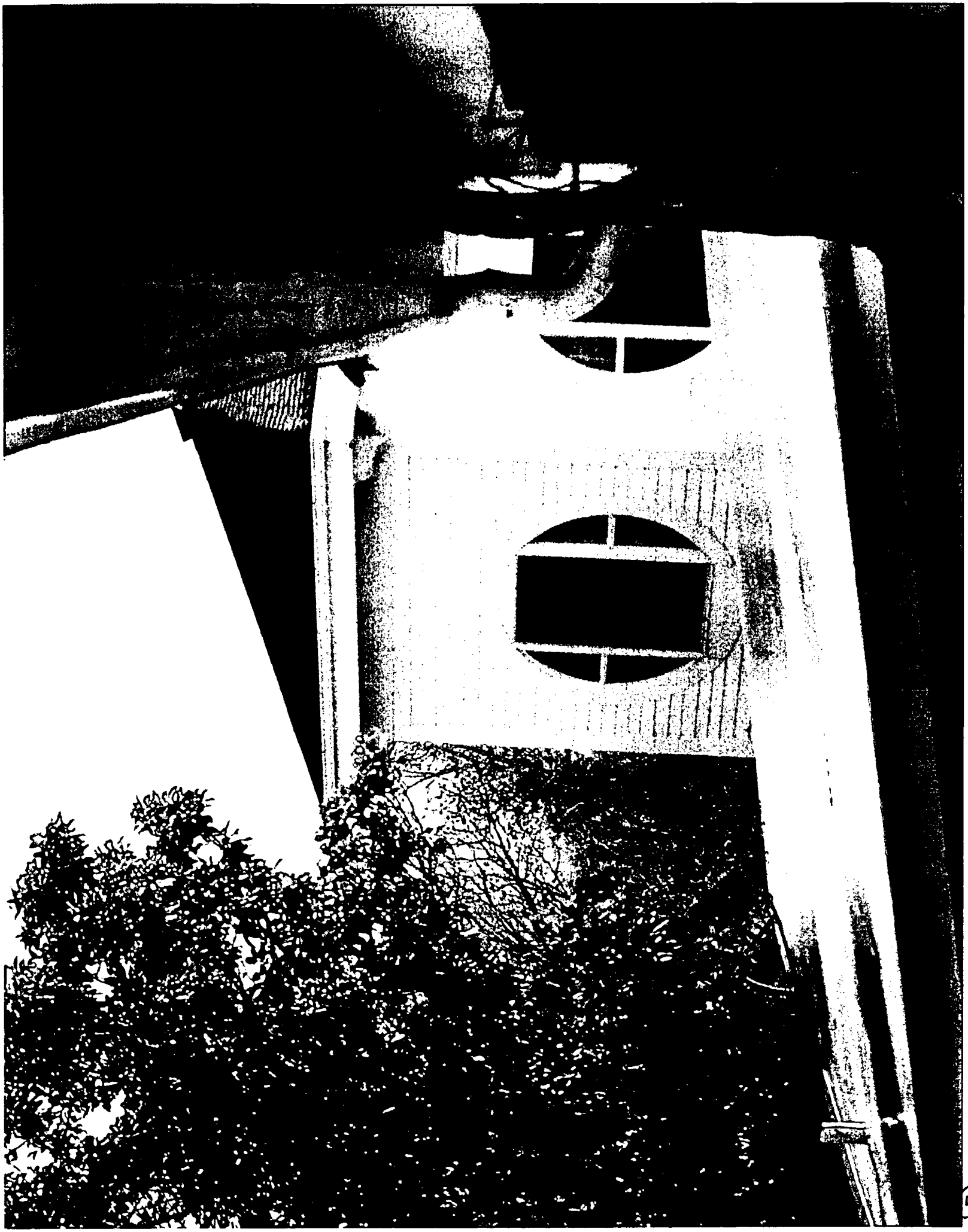
Solar panels shown in purple are on rear portion of garage roof.

This silver color, metal roof is slightly sloped and panels will be positioned at angle to capture the sun.

This rear-facing flat roof is not visible from the street

Shade portion to indicate North

Applicant: ROGER MARMET



Trinasolar

TRINA SOLAR LIMITED

INSTALLATION INSTRUCTION MANUAL

CRYSTALLINE SPV MODULE

REVISIONS					Changzhou Trina Solar Energy Company Limited, China	
REV	ECN / NPA	DESCRIPTION OF CHANGE	CHK'D/DATE	APP'D/DATE	TITLE:	
A	11-2007	Release to Market for 72cell Module with 125x125mm Mono crystalline	Yang XiaoWu 20th Nov 2007	Chaudary 20th Nov 2007	INSTALLATION INSTRUCTION MANUAL FOR THE CRYSTALLINESOLAR PHOTOVOLTAIC MODULE	
B	06-2008	Added 60cell Module with 156x156mm Mono and Multi Crystalline	Yang XiaoWu 12th June 2008	Chaudary 12th June 2008		
					SPECIFICATION NO: PS-M-0013	PART NO: N/A
					SPEC DRAWN BY: Chaudary	REV: B
					SHEET 1 OF 1	

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1. INTRODUCTION

Trina Solar Energy Company Limited has a long history of successful innovation within the solar industry. The company was founded in 1997 and has made significant investments in research and development, creating over 20 patents during the company' history.

The company has several fully integrated product lines including ingots, casting, wafers, Cells and Modules of Mono and Multicrystalline Silicon Solar Photovoltaic (SPV) modules and those products are also exported to overseas markets. With an experienced international management team and a strong reputation for innovation, Trina Solar is one of the leaders in China's solar energy sector and provides the highest quality SSPV modules in a range of sizes designed to meet the requirements of the most demanding energy and power users worldwide.

2. POWER MODULE

Trina Solar Photovoltaic modules consist of a series of electrically interconnected crystalline silicon solar cells. Which are permanently encapsulated between a tempered glass superstrate and substrate. The entire laminate is secured within an anodized aluminum frame for structural strength; ease of installation and to protect the cells from the most severe environmental conditions.

3. APPLICATIONS

Trina SPV modules are a highly reliable, virtually maintenance-free direct current (DC) power source, designed to operate most efficiently in sunlight. Trina series modules are ideal to power remote homes, recreational vehicles, water pumps, telecommunication systems and many other applications either with or without the use of storage batteries.

4. PERMIT

Before installing your system, contact local authorities to determine the necessary permit, installation and inspection requirements.

5. CLIMATE CONDITION

Install the Trina Solar Crystalline series modules in the following conditions:

- Ambient temperature: -20°C to +40°C.
- Operating temperature: -40°C to +85°C.
- Storage temperature: -40°C to +40°C,
- Humidity: below 85RH%
- Wind pressure: below 50.12lb / ft^2 (2400Pa).
- Corrosion resistance: Except for corrosive salt area and sulfurous area.

6. SITE SELECTION

In most applications, Trina SPV modules should be installed in a location where they will receive maximum sunlight throughout the year. In the Northern Hemisphere, the module should typically face south, and in the Southern Hemisphere, the modules should typically face north. Modules facing 30 degrees away from true South (or North) will lose approximately 10 to 15 per cent of their power output. If the module faces 60 degrees away from true South (or North), the power loss will be 20 to 30 per cent.

When choosing a site, avoid trees, buildings or obstructions, which could cast shadows on the solar photovoltaic modules especially during the winter months when the arc of the sun is lowest over the horizon. Shading causes loss of output, even though the factory fitted bypass diodes of the SPV module will minimize any such loss.

Do not install the SPV module near naked flame or flammable materials.

Do not install the SPV module in a location where it would be immersed in water or continually exposed to water from a sprinkler or fountain etc.

7. MODULE TILT ANGLE

Trina SPV modules connected in series should be installed at same orientation and angle. Different orientation or angle may cause loss of output power due to difference of amount of sunlight exposed to the module.

Trina SPV modules produce the most power when they are pointed directly at the sun. For installations where the SPV modules are attached to a permanent structure, the SPV modules should be tilted for optimum winter performance. As a rule, if the system power production is adequate in winter, it will be satisfactory during the rest of the year. The module tilt angle is measured between the solar modules and the ground (Figure 1). Optimal tilting of SPV module is almost the same as the latitude of installation location.

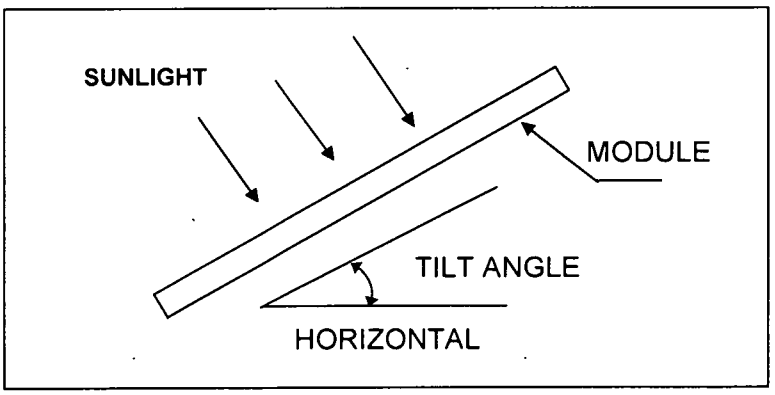


Figure 1 SPV Module Tilt Angle

8. MOUNTING AND NOTES

Systems should be installed by qualified personnel only. It involves electricity, and can be dangerous if the personnel are not familiar with the appropriate safety procedures.

The module frame is made of anodized aluminum, and therefore corrosion can occur if the module is subject to a salt water environment with contact to a rack of another type of metal (Electrolysis Corrosion). If required, PVC or stainless steel washers can be placed between the SPV module frame and support structure to prevent this type of corrosion. Module support structures that are to be used to support SPV modules at correct tilt angles should be wind and snow load rated for use by the appropriate local and civil codes prior to installation.

Trina SPV modules can be mounted as following method:
- Using corrosion-proof screws (M8) on the existing installing holes in the module frame, see drawing 2 and 4.
- Using suitable module clamps on the module frame, see drawing 2 and 4.
- Using insertion systems.

The frame of each module has 4 mounting holes (12mm*9mm) used to secure the modules to supporting structure. The module frame must be attached to a supporting structure using M8 stainless steel hardware together with spring washers and flat washers in four places symmetrical on the SPV module. The applied torque is about 8 Newton-meters.

The module clamps must not come into contact with the front glass and must not deform the frame. Avoid shadowing effects from the module clamps and the insertion systems. It is not permitted to modify the module frame under any circumstances. Recommended distance between 2 Solar modules is 5mm considering linear thermal expansion of the module frames.

Clearance between the module frame and mounting surface may be required to prevent the junction box from touching the surface, and to circulate cooling air around the back of the module.

The modules are not designed for integral mounting as part of a roof or wall. The mounting design may have an impact on the fire resistance. If the modules are to be installed on the roof or wall of a building, the fire resistance of roof covering or wall should be rated for the application. Here the standoff method or the rack method is recommended. The modules are supported parallel to surface of the building wall or roof. Clearance between the module frames and surface of the wall or roof is required to prevent wiring damage and to allow air to circulate behind the module. The recommended stand-off height is 115mm. Any slope less than 5in/ft (127mm/305mm) required to maintain a fire class rating. Do not mount SPV module in such way that the drain holes of SPV module are intended to block up.

Do not step on the module, although SPV modules are quite rugged, the glass can be broken (and the module will no longer work properly) if it is dropped or hit by tools or other objects.

9. GROUNDING

All module frames and mounting racks must be properly grounded in accordance with the National Electrical Code. Proper grounding is achieved by connecting the module frame(s) and structural members contiguously one to another using a suitable grounding conductor. The grounding conductor or strap may be copper, copper alloy, or other material acceptable for use as an electrical conductor per NEC. The grounding conductor must then make a connection to earth using a suitable earth ground electrode.

Attach a separate conductor to one of the 4mm diameter grounding holes marked 'GR' on the module frame with a bolt and nut that incorporates an external tooth washer. This is to ensure positive electrical contact with the frame.

The rack must also be grounded unless they are mechanically connected by nuts and bolts to the grounded SPV modules. The array frame shall be grounded in accordance with NEC Art250.

10. BYPASS DIODES AND BLOCKING DIODES

Partial shading of an individual module can cause a reverse voltage across the shaded SPV module. Current is then forced through the shaded area by the other modules.

When a bypass diode is wired in parallel with the series string, the forced current will flow through the diode and bypass the shaded SPV module, thereby minimizing module heating and array current losses.

In system utilizing a battery, blocking diodes are typically placed between the battery and the SPV module output to prevent battery discharge at night.

Diodes that are used as blocking diodes must: Have a Rated Average Forward Current [$I_{F(AV)}$] **above** maximum system current at highest module operating temperature. Have a Rated Repetitive Peak Reverse Voltage [V_{RRM}] **above** maximum system voltage at lowest module operating temperature.

11. WARNING AND NOTES

The SPV modules generate electricity when exposed to light. Array of many modules can cause lethal shock and burn hazards. Only authorized and trained personnel should have access to these modules. To reduce the risk of electrical shock or burns, modules maybe covered with an opaque material during installation to avoid shocks or burns. Do not touch live terminals with bare hands. Use insulated tools for electrical connections.

Use appropriate methods to mount SPV modules. Fall of modules from high place will cause death, injury or damage.

The SPV module has a pair of male and female waterproof connectors. For a series electrical connection, connect positive (+) connector of first SPV module to negative (-) connector of the following module.

Do not short the positive and the negative. Do not disconnect under load. Be sure connector no gap between the insulators. In case there is a gap, a fire and/or an electrical shock may occur.

Artificially concentrated sunlight shall not be directed on the SPV module. The electrical characteristics are indicated value of Pmax under standard test conditions (Irradiance of 1000W/m^2, AM 1.5 spectrum, and cell temperature of 25°C).

Under normal conditions, a solar photovoltaic module is likely to experience conditions that produce more current and/or voltage than reported at standard test conditions. Accordingly the value of Isc and Voc marked on this module should be multiplied by a factor of 1.25 when determining component voltage ratings, conductor current ratings, fuse sizes, and sizes of controls connected to the SPV output. Refer to Section 690-8 of the National Electrical Code for an additional multiplying factor of 1.25 which may also be applicable.

The installation in Canada shall be in accordance with CSA C22.1, Safety Standard for Electrical Installations, Canadian Electrical Code, Part 1.

12. MODULE WIRING

Each module has two #12 AWG type standard 90°C sunlight resistant output cables each terminated with plug & ply connectors. This cable is suitable for applications where wiring is exposed to the direct rays of the Sun. We recommend that all wiring and electrical connections comply with the National Electrical Code (NEC).

For field connections, use the minimum No. #12 AWG copper wires insulated for a minimum of 90°C and Sunlight resistant as well.

The minimum and maximum outer cable diameters of the cable are 5 to 7mm. Refer to table 1 for the maximum electrical rating of series fuse.

13. MAINTENANCE

Under most weather conditions, normal rainfall is sufficient to keep the SPV module glass surface clean. If dirt build-up becomes excessive, clean the glass only with a soft cloth using mild detergent and water. USE CAUTION WHEN CLEANING THE BACK SURFACE OF THE MODULE TO AVOID PENETRATING THE SUBSTRATE MATERIALS. SPV Modules that are mounted flat (0° tilt angle) should be cleaned more often, as they will not "self clean" as effectively as modules mounted at a 15° tilt or greater. Once a year, check the tightness of terminal screws and the general condition of the wiring. Also, check to be sure that mounting hardware is tight. Loose connections will result in damage for array.

Changed SPV module must be the same kind and type. Do not touch live parts of cables and connectors. Use appropriate safety equipment (insulated tools, insulating gloves, etc.), when touching them.

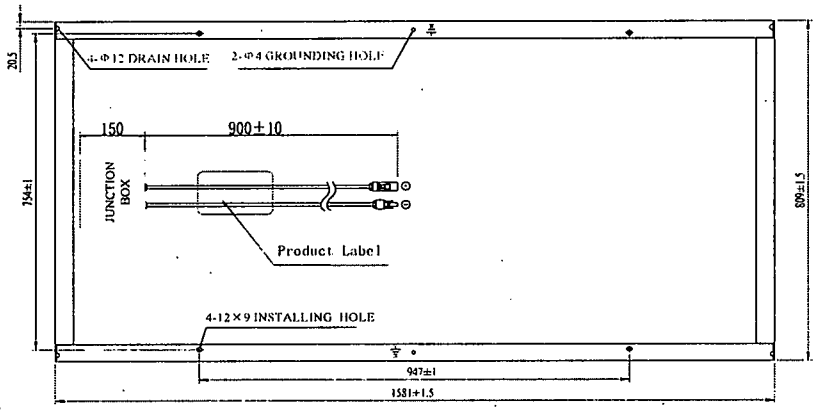
Cover the front surface of the SPV module by an opaque or other material when repairing. The SPV modules when exposed to sunlight generate high voltage and are dangerous.

14. SPECIFICATIONS: Table 1: Electrical and Mechanical Specifications.

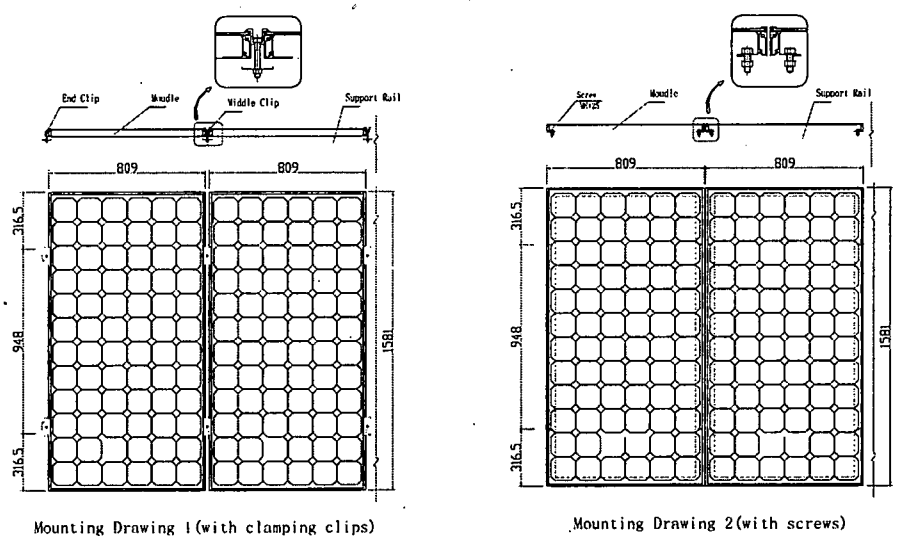
Module Series		Model	Dimensions (mm)	Weight (kg)	Electrical Performance @ STC					Max- System Voltage (VDC)	Max- Series Fuse (A)
					Max- Power P_m(W)	Max- Power Voltage V_{Pm}(V)	Max- Power Current I_{Pm}(A)	Open- Circuit Voltage V_{OC}(V)	Short- Circuit Current I_{SC}(A)		
72pcs 125×125mm Monocrystalline Silicon SPV Module		TSM-160D	1581×809×40	15.60	160±3%	34.90	4.60	42.8	5.15	UL1703: 600VDC & IEC61215/IEC61730:1000VDC	7.0
		TSM-165D			165±3%	35.60	4.65	43.2	5.20		
		TSM-170D			170±3%	35.80	4.75	43.6	5.25		
		TSM-175D			175±3%	36.20	4.85	43.9	5.30		
		TSM-180D			180±3%	36.80	4.90	44.2	5.35		
		TSM-185D			185±3%	37.50	4.95	44.5	5.40		
60pcs 156×156mm	Monocrystalline Silicon SPV Module	TSM-200D	1650×992×46	19.50	200±3%	28.7	6.97	36.0	7.75		11.0
		TSM-210D			210±3%	29.2	7.19	36.4	7.86		
		TSM-220D			220±3%	29.8	7.39	36.8	8.00		
		TSM-230D			230±3%	30.0	7.66	37.0	8.18		
		TSM-240D			240±3%	30.6	7.84	37.5	8.38		
	Multicrystalline Silicon SPV Module	TSM-200P			200±3%	28.7	6.97	36.0	7.75		
		TSM-210P			210±3%	29.2	7.19	36.4	7.86		
		TSM-220P			220±3%	29.8	7.39	36.8	8.00		
		TSM-230P			230±3%	30.0	7.66	37.0	8.18		

Notes

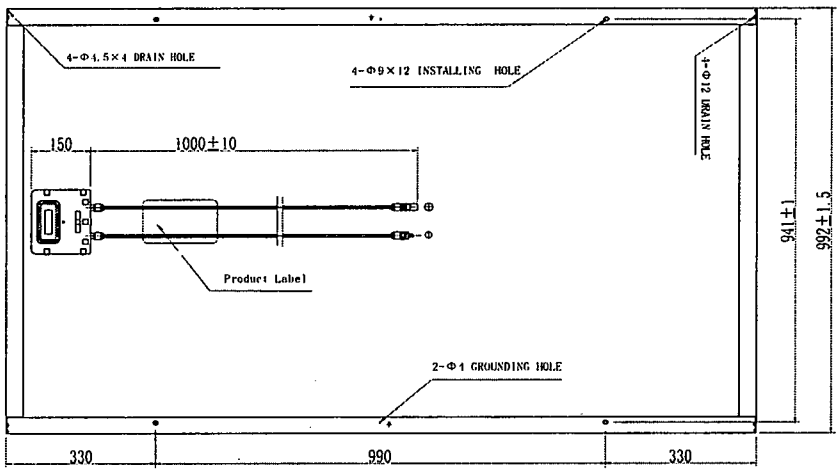
1. Standard Test Condition(STC) of Irradiance of 1000W/m², AM1.5 Solar Spectrum & 25 cell temperature
2. Nominal Operating Cell Temperature (NOCT):47±2
3. The tolerance of Voltage and Current within ±10%
4. Temperature coefficient of Current is 0.05%/°K, Temperature coefficient of Voltage is -0.35%/°K.
5. See SPV Module drawing for mounting and grounding holes locations



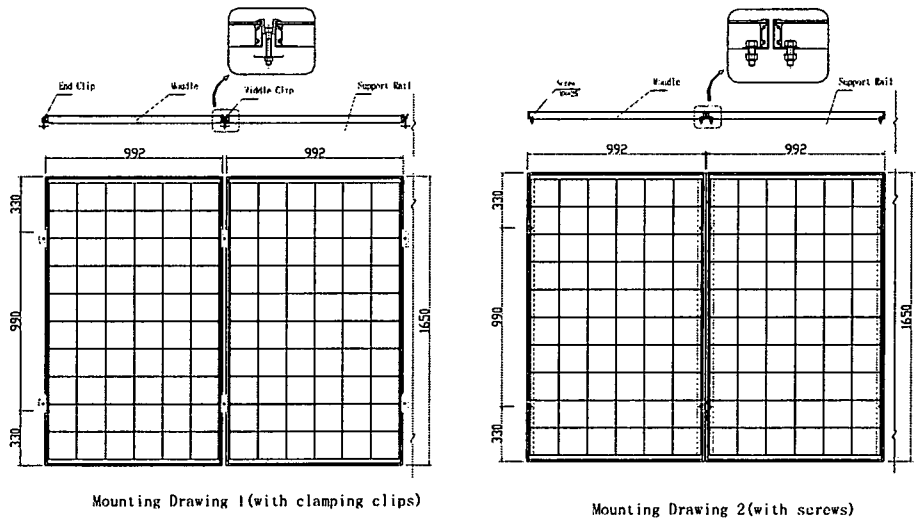
Drawing 1 Back view of 6*12-125 SPV Module



Drawing 2 Mounting drawing for 6*12-125 SPV Module (with clamping clips and screws)

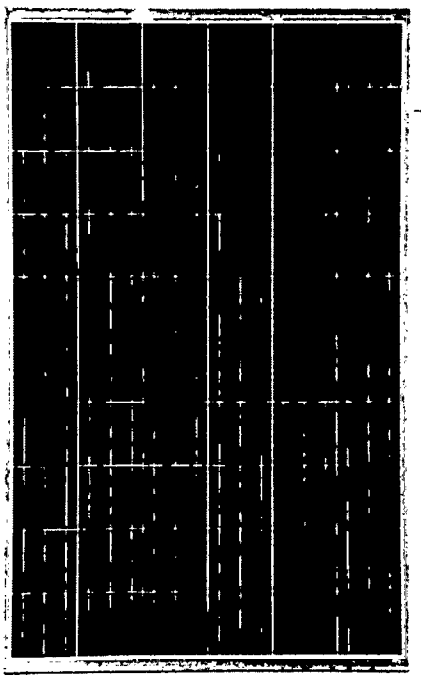


Drawing 3 Back view of 6*10-156 SPV Module



Drawing 4 Mounting drawing for 6*10-156 SPV Module (with clamping clips and screws)

Mono Multi Solutions



TSM-PC05
TSM-PA05
THE UNIVERSAL SOLUTION

15.0%
MAX EFFICIENCY

245W
MAX POWER OUTPUT

10 YEAR
PRODUCT WARRANTY

25 YEAR
LINEAR POWER WARRANTY

Module can bear snow loads up to **5400Pa** and wind loads up to **2400Pa**

Guaranteed power output
0~+3%

High performance under low light conditions
Cloudy days, mornings and evenings

Independently certified by international certification bodies
IEC61215, IEC61730, UL1703, TUV Safety Class II, CE

Manufactured according to International Quality and Environment Management System Standards
ISO9001, ISO14001

Founded in 1997, Trina Solar is a vertically integrated PV manufacturer, involved in the production of ingots, wafers and cells to the assembly of high quality modules using both mono and multicrystalline technologies. As of July 2011, the Company has already achieved an annualized nameplate module capacity of approximately 1.9GW. Trina Solar's wide range of products are used in residential, commercial, industrial and public utility applications throughout the world.

Only by matching an efficient cost-structure with proven performance will we as an industry achieve grid parity. And at Trina Solar, we have both.

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Trinasolar
The power behind the panel

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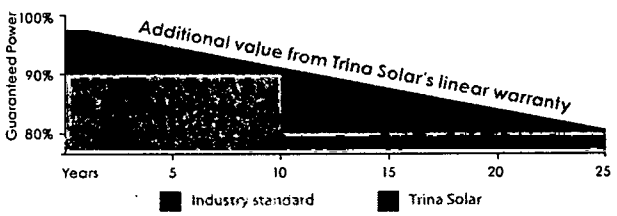
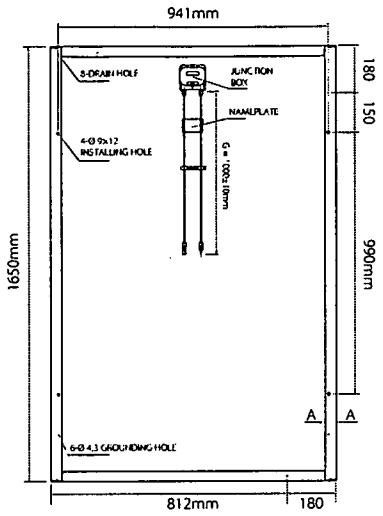
10 Year Product Warranty • 25 Year Linear Power Warranty

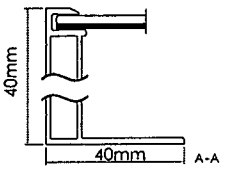


TSM-PC05 / TSM-PA05 THE UNIVERSAL SOLUTION

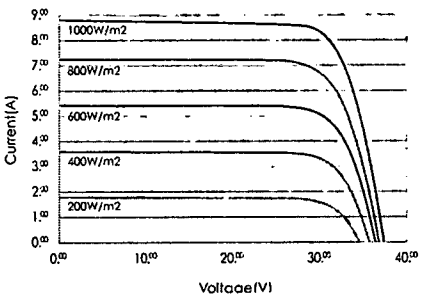
DIMENSIONS OF PV MODULE TSM-PC/PA 05



Back View



I-V CURVES OF PV MODULE TSM-230 PC/PA 05



Average efficiency reduction of 4.5% at 200W/m² according to EN 60904-1.

ELECTRICAL DATA @ STC	TSM-225 PC/PA05	TSM-230 PC/PA05	TSM-235 PC/PA05	TSM-240 PC/PA05	TSM-245 PC/PA05
Peak Power Watts-P_{MAX} (Wp)	225	230	235	240	245
Power Output Tolerance-P_{MAX} (%)	0/+3	0/+3	0/+3	0/+3	0/+3
Maximum Power Voltage-V_{MP} (V)	29.4	29.8	30.1	30.4	30.7
Maximum Power Current-I_{MPP} (A)	7.66	7.72	7.81	7.89	7.98
Open Circuit Voltage-Voc (V)	36.9	37.0	37.1	37.2	37.3
Short Circuit Current-Isc (A)	8.20	8.26	8.31	8.37	8.47
Module Efficiency η_m (%)	13.7	14.1	14.4	14.7	15.0

Values at Standard Test Conditions STC (Air Mass AM1.5, Irradiance 1000W/m², Cell Temperature 25°C).

ELECTRICAL DATA @ NOCT	TSM-225 PC/PA05	TSM-230 PC/PA05	TSM-235 PC/PA05	TSM-240 PC/PA05	TSM-245 PC/PA05
Maximum Power (W)	164	168	172	175	178
Maximum Power Voltage (V)	26.9	27.1	27.4	27.7	27.8
Maximum Power Current (A)	6.12	6.20	6.27	6.32	6.41
Open Circuit Voltage (V)	33.8	33.9	34.0	34.1	34.2
Short Circuit Current (A)	6.62	6.68	6.70	6.75	6.83

NOCT: Irradiance at 800W/m², Ambient Temperature 20°C, Wind Speed 1M/s.

MECHANICAL DATA	
Solar cells	Multicrystalline 156 × 156mm (6 inches)
Cell orientation	60 cells (6 × 10)
Module dimension	1650 × 992 × 40mm (64.95 × 39.05 × 1.57 inches)
Weight	19.5kg (43.0 lb)
Glass	High transparancy solar glass 3.2mm (0.13 inches)
Frame	Anodized aluminium alloy
J-Box	IP 65 rated
Cables / Connector	Photovoltaic Technology cable 4.0mm² (0.006 inches²), 1000mm (39.4 inches), MC4 / H4

TEMPERATURE RATINGS	
Nominal Operating Cell Temperature (NOCT)	46°C (±2°C)
Temperature Coefficient of P_{MAX}	- 0.43%/°C
Temperature Coefficient of Voc	- 0.32%/°C
Temperature Coefficient of Isc	0.047%/°C

MAXIMUM RATINGS	
Operational Temperature	-40~+85°C
Maximum System Voltage	1000V DC(IEC)/ 600V DC(UL)
Max Series Fuse Rating	15A

WARRANTY

10 year workmanship warranty

25 year linear performance warranty

(Please refer to product warranty for details)

PACKAGING CONFIGURATION

Modules per box: 24 pcs

Modules per 40' container: 672 pcs

CERTIFICATION

TSM_EN_Feb_2012

Trinasolar
The power behind the panel