

1507 Brick

BLOCK 1170.07 LOT 9 QUALIFICATION CODE _____ ADDRESS (SITE) 163 Walter Rd PERMIT NO. 13-2787

CONSTRUCTION PERMIT APPLICATION

Applicant Completes: Sections I, II, III (optional), IV, VI, and VII

C13-003082

I. IDENTIFICATION

1. Proposed Work Site at: 163 Walter Rd Brick, NJ

2. Name of Owner in Fee: Jones

Tel. [REDACTED] e-mail _____

Address same

3. Ownership in Fee: Public _____ Private ☒ municipality zip code _____

4. Principal Contractor: Trinity Solar Tel. (732) 780-3779 ext. 9041

Address 2211 Allenwood Rd

Wall, NJ 07719 email: Trinity.permitting@trinitysolarsystems.com

License No. OR, if new home, Builder Reg. No. 13VH01244300 Exp. Date 12-31-12

Home Improvement Contractor Registration No. or Exemption Reason (if applicable): _____

Federal Emp. ID No. 223292324 FAX: (732) 780-6671

5. Architect or Engineer _____ Contact _____

Address _____ e-mail _____

Tel. (_____) _____ FAX: (_____) _____

6. Responsible Person in Charge once Work has Begun Kevin Kura

Tel. (732) 780-3779 ext. 9041 FAX: (732) 780-6671

V. FEE SUMMARY (for office use only)

		Update	Update
1. Building	\$ <u>75</u>	☒	
2. Electrical	\$ <u>200</u>	☒	
3. Plumbing	\$ <u>50</u>	☒	
4. Fire Protection			
5. Elevator Devices			
6. Subtotal			
7. Less 20% for State Plan Review	\$		
8. Subtotal	\$		
9. State Permit Surcharge Fee			
10. Subtotal	\$ <u>43</u>		
11. Cert. of Occupancy			
12. Other			
13. TOTAL	\$ <u>368</u>		

VI. BUILDING/SITE CHARACTERISTICS

	(office use only)
1. Number of Stories	_____
2. Height of Structure	_____ ft.
3. Area - Largest Floor	_____ sq. ft.
4. New Building Area	_____ sq. ft.
5. Volume of New Structure	_____ cu. ft.
6. Max. Live Load	_____
7. Max. Occupancy Load	_____
8. If Industrialized Building: State Approved _____ HUD _____	
9. Total Land Area Disturbed	_____ sq. ft.
10. Flood Hazard Zone	_____
11. Base Flood Elevation	_____ ft.
12. Wetlands yes _____ no _____	

IIa. PROPOSED WORK

- ☐ Minor Work ☐ New Building ☐ Addition ☐ Demolition
- ☒ Repair ☐ Alteration ☐ Renovation ☐ Reconstruction
- ☐ Asbestos Abat. -Subch. 8 ☐ Lead Hazard Abatement ☐ Radon Remediation ☐ Annual Permit

IIb. SUBCODES

(Check all that apply)

- ☒ Building
- ☒ Electrical
- ☒ Plumbing
- ☐ Fire Protection
- ☐ Elevator

FOR OFFICE USE ONLY (Optional)

Est. Cost	Plans Rec'd by	Date Rec'd	Rejection Date	Approval Date	Re-viewer	Resubmission Dates Approval	Rejection	Re-viewer
<u>1791</u>		<u>MAY 23 2013</u>		<u>06/11/13</u>	<u>PER</u>			
<u>23,797</u>				<u>6/4/13</u>	<u>JS</u>			
<u>175</u>				<u>6/5/13</u>	<u>W</u>			

TOTAL COST 25,763

VII. DESCRIPTION OF BUILDING USE

A. RESIDENTIAL (primary use)

1. State Specific Use: _____
2. Use Group, Proposed: _____
3. Change in Use Group, Indicate Present: _____
4. No. of dwelling units: Total Units Income-restricted
- Gained, Sale _____
- Gained, Rental _____
- Lost, Sale _____
- Lost, Rental _____

B. NON-RESIDENTIAL (primary use)

1. State Specific Use: _____
2. Use Group, Proposed: _____
3. Change in Use Group, Indicate Present: _____

C. MIXED USE -List secondary use(s): _____

D. Construct. Classification: Present _____

Proposed _____

III. PLAN REVIEW (optional)

DO YOU WANT:

1. ☐ Partial Releases
2. ☐ Prototype Processing

IV. DOES OR WILL YOUR BUILDING CONTAIN ANY OF THE FOLLOWING?

1. ☐ Elevators/Escalators/Lifts/ Dumbwaiters/Moving Walks
2. ☐ High Pressure Boilers
3. ☐ Pressure Vessels
4. ☐ Refrigeration Systems
5. ☐ Cross-Connections/Backflow Preventers
6. ☐ Hazardous Uses/Places of Assembly
7. ☐ Sprinklers/Standpipes
8. ☐ Smoke Control Systems in Open Wells
9. ☐ Underground Storage Tanks
10. ☐ Swimming Pools, Spas and Hot Tubs
11. ☐ LPGas Tanks
12. ☐ Fire Alarm



Brick Township
401 Chambersbridge Rd
Brick, NJ 08723

Date Issued 8/27/2013
Control Number C-13-003082
Permit Number 13-2787
Permit Issue Date 7/2/2013
Certificate Number 13-2787

Certificate

Construction Code Division
(Certificate of Approval)

Identification

Work Site Location: 163 WALTER RD. Brick Township, NJ Block: 1170.07 Lot: 9 Qual: _____
Owner in Fee: JONES, BRIAN D & ANTHIE E
Owner Address: 163 WALTER RD BRICK NJ 08724
Telephone: _____
Contractor Trinity Solar
Address 2211 Allenwood Rd. Wall NJ 07719
Telephone: (732) 780-3779 Fax: (732) 780-6671
License Number or Builders Registration Number: 13VH01244300 Federal Emp. Number: 22-3292324

Home Warranty Number: _____

Type of Warranty Plan: ☐ State ☐ Private

Use Group: R-5 Construction Classification: _____

Maximum Live Load: 0 Maximum Occupancy Load: 0

Description of Work/Use: SOLAR PANELS

Certificate Comments:

☐ **Certificate of Occupancy**

This serves notice that said building or structure has been constructed in accordance with the New Jersey Uniform Construction Code and is approved for occupancy.

☒ **Certificate of Approval**

This serves notice that the work completed has been constructed or installed in accordance with the New Jersey Uniform Construction Code and is approved. If the permit was issued for minor work, this certificate was based upon what was visible at the time of inspection.

☐ **Certificate of Continued Occupancy**

This serves notice that based on a general inspection of the visible parts of the building there are no imminent hazards and the building is approved for continued occupancy.

☐ **Temporary Certificate of Compliance**

The following conditions must be met no later than or the owner will be subject to fine or order to vacate:
This certificate has an expiration date of:
Conditions to be met:

☐ **Certificate of Clearance - Lead Abatement 5:17**

This serves notice that based on written certification, lead abatement was performed as per NJAC5:17 to the following extent.

- ☐ Total removal of lead-based paint hazards in scope of work
☐ Partial or limited time period (years); see file

☐ **Certificate of Clearance - Asbestos Abatement**

This serves notice that based on written certification, asbestos abatement was performed to the following extent.

- ☐ Total removal of asbestos hazards in scope of work
☐ Partial or limited time period (years); see file

☐ **Certificate of Compliance**

This serves notice that said potentially hazardous equipment has been installed and/or maintained in accordance with the New Jersey Uniform Construction Code and is approved for use until

☐ **Temporary Certificate of Occupancy**

The following conditions must be met no later than:
or the owner will be subject to fine or order to vacate:
This certificate has an expiration date of:
Conditions to be met:

Daniel Newman Jr

Construction Official

Fee: \$0.00

Check Number: _____

Collected By: _____



CONSTRUCTION PERMIT

Date Issued 7/2/13
Control # C-13-003082
Permit # 10-2101

IDENTIFICATION Block: 1170.07 Lot: 9 Qualifier _____
Work Site Location: 163 WALTER RD. Brick Township, NJ Contractor TRINITY CONSTRUCTION INC
Address 2290 W COUNTY LINE RD. STE 202 JACKSON NJ
Owner in Fee JONES, BRIAN D & ANTHIE E Telephone: 732/8867121
163 WALTER RD. BRICK NJ 08724 Lic. No. or Bids. Reg. No. _____
Telephone: _____ Federal Employee No. 22-3507093

Is hereby granted permission to perform the following work:

- | | | |
|--|--|--|
| ☒ BUILDING | ☒ PLUMBING | ☐ LEAD HAZARD ABATEMENT |
| ☒ ELECTRICAL | ☐ FIRE PROTECTION | ☐ DEMOLITION |
| ☐ ELEVATOR DEVICES | ☐ ASBESTOS ABATEMENT
(Subchapter 8 only) | ☐ OTHER |

DESCRIPTION OF WORK:

SOLAR PANELS

Note: If construction does not commence within one (1) year of date of issuance, or if construction ceases for a period of six (6) months, this permit is void.

Estimated Cost of Work \$25,763

Daniel Newman Jr
Construction Official

Date 6/19/13

U.C.C. F170
equiv (rev 1/04)

1 WHITE - INSPECTOR

2 CANARY - OFFICE

3 PINK - TAX ASSESSOR

4 GOLD - APPLICANT

PAYMENTS (Office Use Only)

Building	\$75
Electrical	\$200
Plumbing	\$50
Fire Protection	\$0
Elevator Devices	\$0
Other	\$0.00
DCA Training Fee	\$43
CO Fee	
Other	\$0
Total	\$368
Check No.	<u>17130</u>
Cash	\$0
Credit	\$0
Collected By	

150
418

REQUIRED INSPECTIONS

Construction work must be inspected in accordance with the State Uniform Construction Code Regulations N.J.A.C. 5:23-2.18. This agency will carry out such periodic inspections during the progress of work as are necessary to insure that the work installed conforms with the requirements of the Uniform Construction Code.

The owner or other responsible person in charge of work must notify this agency when work is ready for any required inspections specified below. Requests for inspections must be made at least 24 hours prior to the time the inspection is desired. Inspections will be performed within three business days of the time for which they are requested. The work must not proceed in a manner which will preclude the inspection until it has been made and approval granted.

☒ Required inspections for all subcodes for one- and two-family dwellings are as follows:

1. The bottom of footing trenches before placement of footings, except that in cases of pile foundations, inspections shall be made in accordance with the requirements of the building subcode.
2. Foundations and all walls up to grade level prior to back filling.
3. All structural framing, connections, wall and roof sheathing and insulation; electrical rough wiring, panel and service installation; rough plumbing. The framing inspection shall take place after the rough electrical and plumbing inspections and after the installation of the heating, ventilation and /or air conditioning duct system. The insulation inspection shall be performed after all other subcode rough inspections and prior to the installation of any interior finish material.
4. Installation of all finished materials, sealings of exterior joints, plumbing piping, trim and fixtures; electrical wiring, devices and fixtures; mechanical systems equipment.

Additional required inspections for all subcodes of construction, for other than one- and two-family dwellings, are fire suppression systems, heat producing devices and Barrier Free subcode accessibility, if applicable.

☒ Required special inspections. The applicant by accepting the permit will be deemed to have consented to these requirements: contractor must be on site with ladder for inspections rough electric and building inspections must be scheduled at the same time final electric necessary for certificate of approval

☒ A final inspection is required for each applicable subcode area before a final Certificate of Occupancy or Approval may be issued. The final inspections include the installation of all interior and exterior finish materials, sealing of exterior joints, mechanical system and other required equipment; electrical wiring, devices and fixtures; plumbing pipes, trim and fixtures; tests required by any provision of the adopted subcodes, Barrier Free accessibility, if applicable; and verification of compliance with NJAC 5:23-3.5, "Posting structures".

☒ A complete copy of released plans must be kept on the job site.

If you do not understand any of this information, please ask.



PLUMBING SUBCODE TECHNICAL SECTION



A. IDENTIFICATION--APPLICANT: COMPLETE ALL APPLICABLE INFORMATION. WHEN CHANGING CONTRACTORS, NOTIFY THIS OFFICE. CALL UTILITY DIG NO: 1-800-272-1000.

Block 1170.07 Lot 9 Qualification Code _____

Work Site Location 103 Walter Road

Rich, NJ 08724

Owner in Fee: Jones, Anthony

Tel. _____ e-mail _____

Address Barnes, Asakova

Contractor: Bode Mechanical, LLC municipally Tel. (732) 921-6094 ZIP code 07094

Address 312 Hayes Ave, Bayville, NJ, 08721 e-mail _____

Contractor License No. 8957 Exp. Date 12/31/2013

Home Improvement Contractor Registration No. or Exemption Reason (if applicable): _____

Federal Emp. ID No. 22-364063 FAX: (732) 237-3300

B. PLUMBING CHARACTERISTICS

Use Group Present Proposed _____

Building Sewer Size _____ Public Sewer _____ Private Septic _____

Water Service Size _____ Public Water _____ Private Well _____

Est. Cost of Plumbing Work \$ 175.00

JOB SUMMARY (Office Use Only)

PLAN REVIEW

☒ No Plans Required

☐ Partial - Underslab Utilities Approved

Date 4/1/13 Approved by: [Signature]

☐ Plumbing Plans Approved

Date: _____ Approved by: _____

Joint Plan Review Required: ☐ Bldg. ☐ Elec. ☐ Fire. ☐ Elev.

SUBCODE APPROVAL FOR PERMIT

Date: 6-6-13

Approved by: [Signature]

SUBCODE APPROVAL FOR CERTIFICATE

☐ CO ☐ CCO ☒ CA

Date: 7-30-13

Approved by: [Signature]

C. CERTIFICATION IN LIEU OF OATH

I hereby certify that I am the (agent of) owner of record and am authorized to make this application and perform the work listed on the application.

Applicant sign/Contractor sign and seal here: _____

Print name here: Mark Bode

☒ Licensed Plumbing Contractor ☐ Exempt Applicant

D. TECHNICAL SITE DATA

DESCRIPTION OF WORK

(1) Relocate 3" PVC

QTY. FIXTURE/EQUIPMENT

Water Closet _____

Urinal/Bidet _____

Bath Tub _____

Lavatory _____

Shower _____

Floor Drain _____

Sink _____

Dishwasher _____

Drinking Fountain _____

Washing Machine _____

Hose Bibb _____

Water Heater _____

Fuel Oil Piping _____

Gas Piping _____

LP Gas Tank _____

Steam Boiler _____

Hot Water Boiler _____

Sewer Pump _____

Interceptor/Separator _____

Backflow Preventer _____

Greasetrapp _____

Sewer Connection _____

Water Service Connection _____

Stacks _____

Other Relocate PVC

Date Received 7/2/13

Control # _____

Date Issued _____

Permit # _____

13-2787

125

Administrative Surcharge \$ _____

Minimum Fee \$ _____

State Permit Surcharge Fee \$ _____

TOTAL FEE \$ _____

1st Sst 25 John St Ltr - 1st Ltr 1st Rst



ELECTRICAL SUBCODE TECHNICAL SECTION



A. IDENTIFICATION—APPLICANT: COMPLETE ALL APPLICABLE INFORMATION. WHEN CHANGING CONTRACTORS, NOTIFY THIS OFFICE. CALL UTILITY DIG NO: 1-800-272-1000.

Block 1170.07 Lot 9 Qualification Code 163
Work Site Location Walter Rd Brick NJ

Owner in Fee: Tones

Tel. () e-mail

Address Scuse municipality zip code

Contractor: Trinity Solar Tel. (732) 780-3779 x 9041

Address 2211 Allenwood Rd. email: Trinitypermitting@trinitysolarsystems.com

Contractor License No. 15821C Exp. Date 3-31-15

Home Improvement Contractor Registration No. or Exemption Reason (if applicable):

Federal Emp. ID No. 223292324 FAX: (732) 780-6671

B. ELECTRICAL CHARACTERISTICS

Use Group Present Proposed

[] Pole/Pad # [] Temporary [] Other

Building Occupied as Utility Co.

Est. Cost of Elec. Work \$ 23,797

JOB SUMMARY (Office Use Only)

PLAN REVIEW

[] No Plans Required

[] Partial -Underslab Utilities Approved

Date: Approved by:

[] Electric Plans Approved

Date: 6-4-12 Approved by: JS

Joint Plan Review Required:

[] Bldg. [] Plumb. [] Fire. [] Elev.

SUBCODE APPROVAL for PERMIT

Date: 6-4-13 Approved by: JS

SUBCODE APPROVAL for CERTIFICATE

[] CO [] CCO [] CA

Date: 7/30/13

Approved by: JS

INSPECTIONS

Type: Rough Rais Failure Approval 7-15-13 Initial JK

Barrier-Free

Trench

Temp. Serv.

Constr. Serv.

TCO

Other

Service

Final

Barrier-Free

Temp. Cut-in-Card Date Issued

Annual Pool Inspection

Date of Grounding and Bonding

C. CERTIFICATION IN LIEU OF OATH

I hereby certify that I am the (agent of) owner of record and am authorized to make this application and perform the work listed on this application.

Applicant sign/Contractor sign and seal here:

Print name here: Kevin Kura

[X] Licensed Elec. Contractor [] Certif'd Landscape Irrigation Contr [] Exempt Applicant

D. TECHNICAL SITE DATA

DESCRIPTION OF WORK:

QTY. SIZE ITEMS

1 28 Lighting Fixtures

28 Receptacles

28 Switches in screen walls

28 Detectors

28 Light Poles

28 Motors—Fract. HP

28 Emergency & Exit Lights

28 Communications Points

28 Alarm Devices/F.A.C. Panel

28 TOTAL NUMBERS

28 Pool Permit/with UW Lights

28 Storable Pool/Spa/Hot Tub

28 KW Elec. Range/Receptacle

28 KW Elec. Water Heater

28 KW Elec. Dryer/Receptacle

28 HP Dishwasher

28 HP Garbage Disposal

28 KW Central A/C Unit

28 HP/KW Space Heater/Air Handler

28 KW Baseboard Heat

28 HP Motors 1/4 HP

28 KW Transformer/Generator

28 AMP Service

28 AMP Subpanels

28 AMP Motor Control Center

28 KW Elec. Sign/Outline Light

28 PV System

28 40A Disconn.

28 7.0 Production

28 meter

Date Received 7/2/13

Control # 13-2787

Date Issued

Permit #

FEE (Office Use Only)

\$

Administrative Surcharge \$

Minimum Fee \$

State Permit Surcharge Fee \$

TOTAL FEE \$

live TPOs



BUILDING SUBCODE TECHNICAL SECTION



A. IDENTIFICATION—APPLICANT: COMPLETE ALL APPLICABLE INFORMATION. WHEN CHANGING CONTRACTORS, NOTIFY THIS OFFICE. CALL UTILITY DIG NO: 1-800-272-1000.

Block 1170.02 Lot 9 Qualification Code _____

Work Site Location 163 Matter Rd

Owner's Name Jones

Tel. [REDACTED] e-mail _____

Address Same street municipally zip code

Contractor: Trinity Solar Tel. (732) 780-3779 x 9041

Address 2211 Allenwood Rd. email: Trinity.permitting@trinitysolarsystems.com

Contract License No. or Builder Registration No. 13VH01244300 Exp. Date 12-31-11

Home Improvement Contractor Registration No. or Exemption Reason (if applicable): _____

Federal Emp. ID No. 223292324 FAX: (732) 780-6671

JOB SUMMARY (Office Use Only)

PLAN REVIEW _____ Date _____ Initial _____

☐ No Plans Required _____

☒ All _____ 06/14/13

☐ Footings/Foundations _____

☐ Structural/Framework _____

☐ Exterior _____

☐ Interior _____

Joint Plan Review Required: _____

☐ Elec. ☐ Plumb. ☐ Fire ☐ Elevator _____

SUBCODE APPROVAL for PERMIT 06/14/13

Date: _____

Approved by: KEH

SUBCODE APPROVAL for CERTIFICATE

☐ CO ☐ CCO 1/15/13

Date: 08/12/13

Approved by: KEH

B. BUILDING CHARACTERISTICS

Use Group Present _____ Proposed _____

No. of Stories _____

Height of Structure _____ ft.

Area — Largest Floor _____ sq. ft.

New Bldg. Area/All Floors _____ sq. ft.

Volume of New Structure _____ cu. ft.

Max. Live Load _____

Max. Occupancy Load _____

Constr. Class Present _____ Proposed _____

If Industrialized Building: _____

State Approved _____ HUD _____

Est. Cost of Bldg. Work: _____

1. New Bldg. \$ _____

2. Rehabilitation \$ _____

3. Total (1+2) \$ 1,191

U.C.C. F110 (rev. 11/09)

C. CERTIFICATION IN LIEU OF OATH

I hereby certify that I am the (agent of) owner of record and am authorized to make this application.

Sign here:

Print name here: Thomas Pollock

D. TECHNICAL SITE DATA

DESCRIPTION OF WORK

Install Solar Panels and
Rackings on Roof

TYPE OF WORK:

☐ New Building

☐ Addition

☐ Rehabilitation

☐ Roofing

☐ Siding

☐ Fence _____ Height (exceeds 6')

☐ Sign _____ Sq. Ft.

☐ Pool

☐ Retaining Wall _____ Sq. Ft.

☐ Asbestos Abatement Subchapter 8

☐ Lead Haz. Abatement NJAC 5:17

☐ Radon Remediation

☒ Other Packing

☐ Demolition

FEE (Office Use Only)

\$ _____

Administrative Surcharge \$ _____

Minimum Fee \$ _____

State Permit Surcharge Fee \$ _____

TOTAL FEE \$ _____

For reorder call: (609) 390-1400
Allegra Marketing • Print • Mail

Date Received
Control #

7/2/13

Date Issued
Permit #

13-2787

TOWNSHIP OF BRICK

OCEAN COUNTY, NEW JERSEY
401 CHAMBERS BRIDGE ROAD, BRICK, N.J. 08723

Stephen C. Acropolis, Mayor

Township Council:

Bob Moore – President
Susan Lydecker – Vice President
Domenick Brando
John Ducey
Jim Fozman
Joseph Sangiovanni
Dan Toth



Department of Community Development & Land Use

Juan Carlos Bellu
Director

732-262-1027

Fax: 732-262-2941
www.twp.brick.nj.us

FAX CORRESPONDENCE

DATE: 8/27/13

TO FAX #: 732-780-6671

PAGES TO FOLLOW: 1

ATTENTION: Dylan

FROM: Construction Dept.

MESSAGE: ~~ATTN~~ ~~to~~ file Certificate
of approval attached.



BLOCK: 1170.07 LOT: 9 QUALIFIER: _____ SITE ADDRESS: 1630 Walter Road

IDENTIFICATION:

1. NAME OF OWNER IN FEE: SONES
COMPLETE ADDRESS: 1630 Walter Road
Bridgeport MS 38224
PHONE # [REDACTED] EMAIL: _____

2. NAME OF APPLICANT: Trinity Solar
APPLICANT ADDRESS: 2211 Aldenwood Rd.
Wool, MS 38719
PHONE # 182-180-3779 EMAIL: _____

3. RESPONSIBLE PERSON FOR WORK: Kevin Buta
PHONE # 182-180-3779 FAX# 182-180-6671

4. SIGNATURE OF APPLICANT: Thomas J. Buta

FOR OFFICE USE ONLY
FEE SUMMARY:

APPLICATION FEE: \$ 50.00
OTHER: \$ _____
TOTAL: \$ _____

REQUIRED BY APPLICANT

RESIDENTIAL: Single Family Home
COMMERCIAL: _____
EXISTING USE: Single Family Home
PROPOSED USE: Single Family Residential

BOARD APPROVAL: _____ PB _____ ZB _____
RESOLUTION #: _____
APPROVAL DATE: _____

PROJECT DESCRIPTION: (PLEASE CHECK APPLICABLE WORK & DESCRIBE)

*NEW BUILDING: _____ *ADDITION _____ *ALTERATION _____ *PORCH _____ *DECK _____

POOL: ABOVE GROUND _____ IN GROUND _____ FENCE: HEIGHT _____ TYPE _____ MATERIAL _____

HEIGHT: _____ (*IF APPLICABLE)

OTHER solar panels

DESCRIPTION: install 7 kw solar panels flat on roof panel but will add 6" to roof height

ZONING REVIEW: 7/31/13 DATE DENIED: _____ DATE APPROVED: 7/31/13 INTLS: 5628 (SEE BACK PAGE)
DATE REVIEWED: _____

OFFICE USE ONLY

ZONING REVIEW:

DATE REVIEWED: 5/31/13 DATE DENIED: ~~5/31/13~~ DATE APPROVED: ~~5/31/13~~ INTLS: 5520

[illegible]

COMMENTS:

DATE:



Brick Township
401 Chambers Bridge Rd.

Brick, NJ 08723
(732) 262-1027

Date Issued:

Application Number:

Application Date:

Project Number:

Permit Number:

Fee:

7/2/13

ZA-13-00667

05/31/2013

ZP-13-00679

\$50

Zoning Permit

Worksite **163 WALTER RD.**
Location: **Brick Township, NJ**

Block: **1170.07**

Lot: **9**

Qualifier:

Zone: **R-7.5**

Owner: **JONES, BRIAN D & ANTHIE E**
Address: **163 WALTER RD**
BRICK, NJ 08724

Applicant: **Trinity Solar**
Address: **2211 Allenwood Road**
Wall, NJ 07719

Application Approved Date: 05/31/2013

This Certifies that an application for the issuance of a Zoning Permit has been examined.

Use is: Single-Family Residential

Nonconforming Use is: _____

Work Description:

Solar Energy System - 28 photovoltaic 250W Hanwha modules, 7 KW , mounted on the roof of the house.

Upon review it was determined that the Development Application:

- ☒ Permitted by Ordinance
- ☐ Permitted by Variance approved on: _____
- ☐ Valid Nonconforming Use is established by
 - ☐ Zoning Board of Adjustment
 - ☐ Zoning Officer

Sean Kinney 20
Office of Zoning,

Michael P. Fowler, Township Planner

05/31/2013

Date

5/31/13
Date



CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

New Jersey Office of the Attorney General

Division of Consumer Affairs
Board of Examiners of Electrical Contractors
124 Halsey Street, 6th Floor, Newark, NJ 07102



JEFFREY S. CHIESA
Attorney General

ERIC T. KANEFSKY
Acting Director

Mailing Address:
P.O. Box 45006
Newark, NJ 07101
(973) 504-8410

February 8, 2013

TO WHOM IT MAY CONCERN

Our records indicate that the holder of License and Business Permit No. 15821 has applied to the Board of Examiners of Electrical Contractors for a pressure seal which has not yet been issued to him/her by the vendor.

Please accept this sealed letter as an Interim device pending the furnishing of a seal to:

Kevin A. Kura
Trinity Heating & Air, Inc.
d/b/a Trinity Solar
2211 Allenwood Road
Wall, NJ 07719

This letter will be rendered invalid **140 days** after the date of its issuance.

Sincerely,

David Freed
Acting Executive Director

DF:km

ENGINEERING PERMIT APPLICATION

RECEIVING CLERK: _____
PERMIT #: _____

BLOCK: 1170.07 LOT: 9 ADDRESS: 1630 Walter Road

IDENTIFICATION:

1. WORK SITE ADDRESS: 1630 Walter Road

2. NAME OF OWNER IN FEE: Jones

ADDRESS: 1630 Walter Rd. PHONE #: [REDACTED]

Brick, NJ 08724 FAX #: [REDACTED]

3. PRINCIPAL CONTRACTOR: Timmy Solar

ADDRESS: 2211 Alhambra Rd. PHONE #: 732 380 3779

Wall NJ 07719 FAX #: 732 380 0607

4. ARCHITECT OR ENGINEER: Richard Gordon

ADDRESS: 1060X 204 Farmville Vt PHONE #: 434 574 0138

5. RESPONSIBLE PERSON FOR WORK: Kevin Kutoa

ADDRESS: 2211 Alhambra Rd Wall, NJ 07719

PHONE #: 732 380 3779 FAX #: 732 380 0607 E-MAIL: _____

PROJECT DESCRIPTION: ☐ GRADING/CLEARING ☐ ROAD OPENING☐ SOIL REMOVAL/FILL ☐ RETAINING WALL ☐ POOL☐ BULKHEAD/DOCK ☐ DWELLING ☐ TREE REMOVAL

OTHER: 1170.07 7 km solar panels on roof not to exceed roof panel but will add 6" to roof height

ENGINEERING REVIEW:

DATE RECEIVED: _____

DATE REJECTED: _____

DATE APPROVED: _____

INITIALS: _____

FEE SUMMARY:

APPLICATION FEE: \$ _____

REVIEW FEE: \$ _____

INSPECTION FEE: \$ _____

OTHER: \$ _____

BONDS: \$ _____

TOTAL: \$ _____

SPECIAL CONDITIONS:

OCEAN COUNTY SOILS: _____

DRAINAGE EASEMENTS: _____

UTILITY EASEMENTS: _____

CONSERVATION EASEMENTS: _____

FEMA REQUIREMENTS: _____

D.E.P. PERMITS: _____

BOARD APPROVAL: ☐ PB ☐ ZB

APPLICATION NUMBER: _____

APPROVED DATE: _____

CA-20

NOT AN
ELECTRICIAN'S
OR PLUMBER'S
LICENSE

**State Of New Jersey
New Jersey Office of the Attorney General
Division of Consumer Affairs**

THIS IS TO CERTIFY THAT THE
Division of Consumer Affairs

HAS REGISTERED

Trinity Heating & Air, Inc.
Tom Pollock
2211 Allenwood Road
Wall NJ 07719

FOR PRACTICE IN NEW JERSEY AS A(N): Home Improvement Contractor

12/21/2012 TO 12/31/2013

VALID

Signature of Licensee/Registrant/Certificate Holder

13VH01244300

LICENSE/REGISTRATION/CERTIFICATION #

ACTING DIRECTOR

New Jersey Office of the Attorney General
Division of Consumer Affairs
THIS IS TO CERTIFY THAT THE
Division of Consumer Affairs
HAS REGISTERED
Trinity Heating & Air Inc
Home Improvement Contractor

NOT AN ELECTRICIAN'S OR PLUMBER'S LICENSE

12/21/2012 TO 12/31/2013

VALID

13VH01244300

LICENSE/REGISTRATION/CERTIFICATE #

SIGNATURE

ACTING DIRECTOR

PLEASE DETACH HERE
IF YOUR LICENSE/REGISTRATION/
CERTIFICATE ID CARD IS LOST
PLEASE NOTIFY:

Division of Consumer Affairs
P.O. Box 46016
Newark, NJ 07101

PLEASE DETACH HERE

**State Of New Jersey
New Jersey Office of the Attorney General
Division of Consumer Affairs**

THIS IS TO CERTIFY THAT THE
Board of Exam. of Electrical Contractors

HAS LICENSED

Trinity Heating & Air Inc/dba Trinity Solar
Kevin A Kura
800 Route 9 South
Freehold NJ 07728

FOR PRACTICE IN NEW JERSEY AS A(N): Electrical Business Permit

09/05/2012 TO 03/31/2015

VALID

Signature of Licensee/Registrant/Certificate Holder

34EB01582100

LICENSE/REGISTRATION/CERTIFICATION #

ACTING DIRECTOR

New Jersey Office of the Attorney General
Division of Consumer Affairs
THIS IS TO CERTIFY THAT THE
Board of Exam. of Electrical Contractors
HAS LICENSED
Trinity Heating & Air Inc/dba Trinity Solar
Electrical Business Permit

09/05/2012 TO 03/31/2015

VALID

34EB01582100

LICENSE/REGISTRATION/CERTIFICATE #

SIGNATURE

ACTING DIRECTOR

Optimize Engineering Co., LLC

P.O. Box 264•Farmville•VA 23901

Ph: 434.574.6138•E-mail: grichardpe@aol.com

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Richard B. Gordon, P.E.
President

April 16, 2013

Brick Building Department
Brick, NJ

TOWNSHIP OF BRICK

RELEASED FOR PERMIT

INITIAL

DATE

Building Subcode _____

Plumbing Subcode _____

Fire Subcode _____

Electrical Subcode _____

Plan Reviewer _____

Plans Released _____

Construction Official _____

Re: Solar Electric Panels Roof Structural Framing Support

To Whom It May Concern:

I hereby certify that I am a Licensed Professional Engineer in the State of New Jersey. Please note the following conclusions regarding framing structure, roof loading, and photovoltaic system size and proposed site location of installation:

1. Existing roof framing: Conventional framing Roofs 1-3 have 2x6 16" o.c. 11'-11" span (horizontal rafter projection) and Roof 4 has 2x8 16" o.c. 12' span. This existing structure is definitely capable to support all of the loads that are indicated below for this photovoltaic project.
2. Roof Loading
 - 4.33 psf dead load (modules plus all mounting hardware)
 - 21 psf snow live load (30 psf ground snow live load reference)
 - 1.5 psf roof materials
 - Exposure Category B, 115 mph wind uplift live load of 19.6 psf (wind resistance)
3. Solar Photovoltaic System size: 7.5 kw and 30 Hanwha 250 Watt Modules
4. Address of proposed installation: Residence of Anthie Jones, 163 Walters Road, Brick, NJ 08724

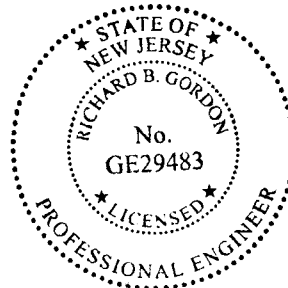
This installation design will be in general conformance to the manufacturer's specifications, and is in compliance with all applicable laws, codes, and ordinances, and specifically N.J.A.C. 5:23-6 (Rehabilitation Subcode), International Residential Code/ IRC 2009 NJ Edition, N.J.A.C. 5:23-3.21, 2011 NEC, and NJ 2009 ICC Energy Code. The spacing of the UniRac mounting brackets ANCHORAGE/FASTENING of the brackets is at a maximum of 64" o.c. along the rail and using 5/16" x 3 1/2" length lag bolts, min. 2 per rafter & min. 2" penetration, which is adequate to resist all 115 mph wind live loads including wind shear, to mount rails to rafters while alternating mounting feet between adjacent rafters between rail rows for better distribution of roof load. Rails may be attached to either of two mounting holes in the L-feet. Mounting in the lower hole for a low profile, more aesthetically pleasing installation or mount in the upper hole for a higher profile to maximize airflow under the modules to cool them more. Slide the 3/8-inch mounting bolts into the footing bolt slots. The rails will be attached to the footings with the flange nuts.

Very truly yours,

Optimize Engineering Co., LLC

Richard B. Gordon, P.E.
New Jersey P.E. License No. 29483

FILE COPY



**RAFTER STRESS CALCULATIONS FOR ANTHIE JONES, 163 WALTERS ROAD,
BRICK, NJ**

April 16, 2013

TOTAL AREA OF 4 SOLAR MODULES FOR REPRESENTATIVE AREA LOADING

SOLAR MODULE AREA, TYP.	39.1" x 58.3"	=	15.83 SQ FT
TOTAL SOLAR MODULE AREA: FOR 4 MODULES	4 x 15.83 SQ FT	=	63.32 SQ FT
INTERMODULE SPACING:	0.5"		
TOTAL SPACING AREA:	0.5" x 58.3"	=	0.202 SQ FT
TOTAL PANEL AREA, TYPICAL:	63.32 + 0.404	=	63.724 SQ FT

Page | 1

MAX SOLAR PANEL LOADING DUE TO SNOW AND DEAD LOAD (MODULES & HARDWARE)

SNOW LIVE LOAD = (0.7)(30 PSF REFERENCE GROUND SNOW LOAD)	=	21 PSF	
MODULES WEIGHT INCLUDING HARDWARE	=	4.33 PSF	
MAX TOTAL LOAD:	25.33 PSF x 63.724 SQ FT	=	1614 LB

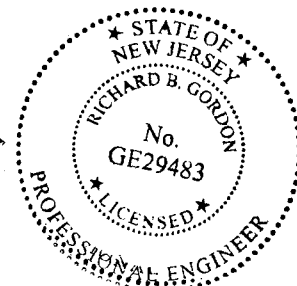
MAX LOADING PER SUPPORT (ATTACHMENT POINT) TO SNOW AND DEAD LOAD (MODULES & HARDWARE)

NUMBER OF SUPPORTS PER 4 MODULES = 4			
LOAD PER SUPPORT:	1614 LB/4	=	403 LB

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**RAFTER STRESS CALCULATIONS FOR ANTHIE JONES, 163 WALTERS ROAD,
BRICK, NJ**

April 16, 2013

MAX SOLAR PANEL LOADING DUE TO WIND UPLIFT LOADING

@ 115 MPH WIND LOAD, UPLIFT: 19.96 PSF (SEE DERIVATION EQUATION)

Page | 2

MAX TOTAL LOAD: 19.96 PSF x 63.724 SQ FT = 1271 LB

MAX LOADING PER SUPPORT DUE TO WIND UPLIFT LOADING

NUMBER OF SUPPORTS PER 4 MODULES = 4

LOAD PER SUPPORT: 1271 LB/4 = 317 LB

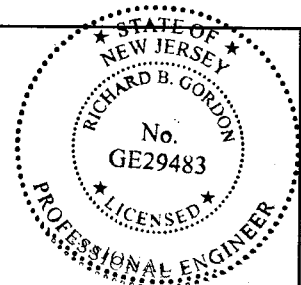
TYPICAL ROOF LUMBER

<u>Species</u>	<u>Specific Gravity</u>	<u>Lag Screw Withdraw Capacity for 5/16" dia. lb/in of thread</u>	<u>Withdrawl Capacity for 2" Of Thread</u>
Doug Fir Larch	0.5	266	532
Doug Fir Larch (North)	0.49	258	516
Doug Fir South	0.46	235	470
Engelmann Spruce			
Lodgepole Pine			
(MSR 1650 F & higher Grades)	0.46	235	470
Hem Fir	0.43	212	424
Hem Fir (North)	0.46	235	470
Southern Pine	0.55	307	614
Spruce Pine Fir	0.42	205	410

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**RAFTER STRESS CALCULATIONS FOR ANTHIE JONES, 163 WALTERS ROAD,
BRICK, NJ**

April 16, 2013

Spruce Pine Fir

(E=2x10**6 psi

& higher grades

Of MSR and MEL) 0.5 266 532

Page | 3

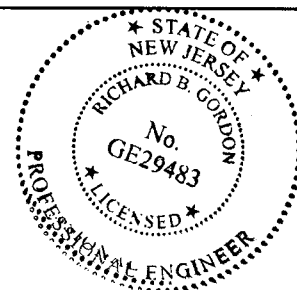
(Source: National Design Specification for Wood Construction and Universal Building Code)

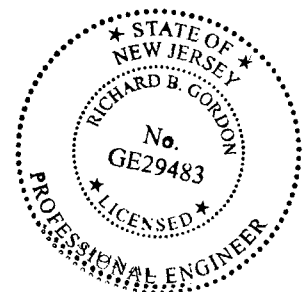
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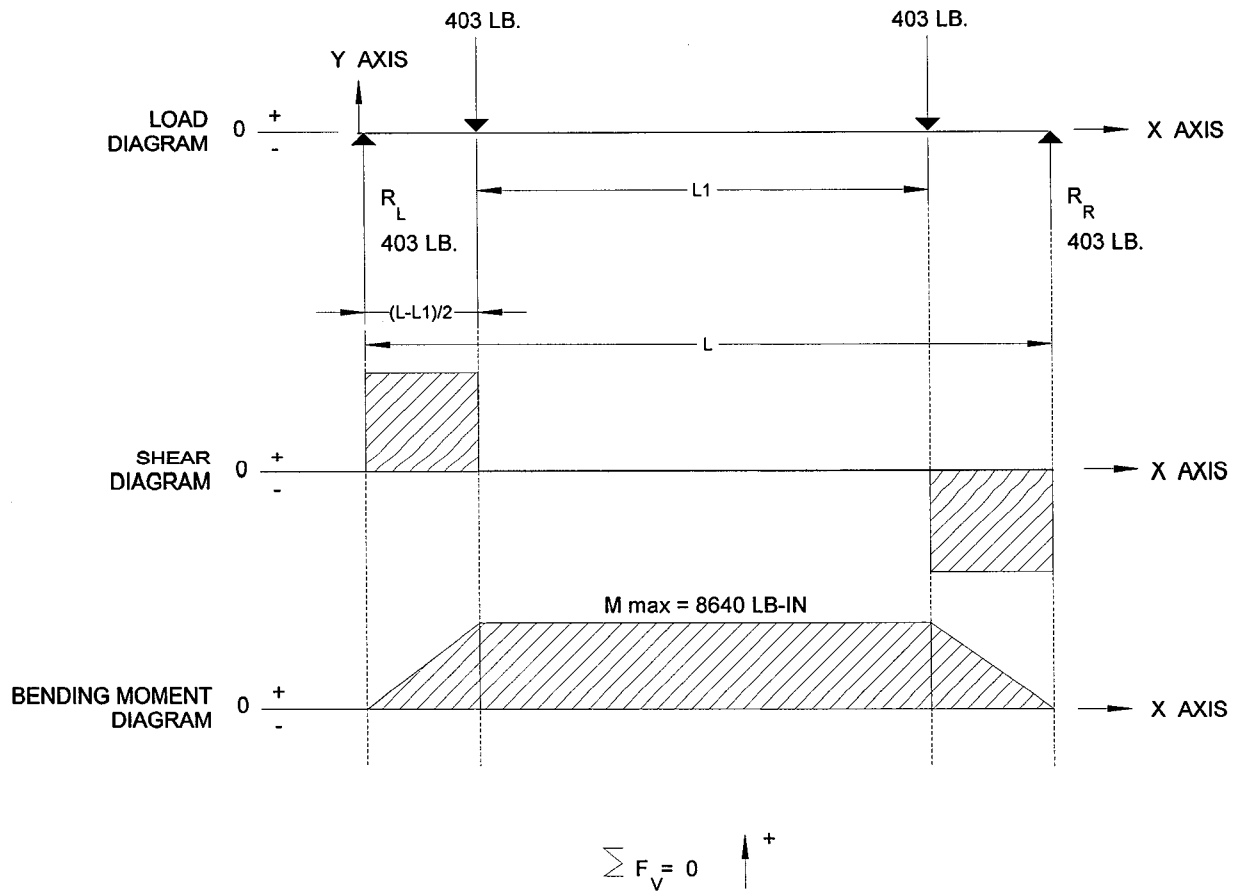
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**RAFTER STRESS CALCULATIONS FOR ANTHIE JONES, 163 WALTERS ROAD,
BRICK, NJ**

April 16, 2013



Page | 5

$$R_L + R_R = (403)2$$

DUE TO SYMMETRY, $R_L = R_R$

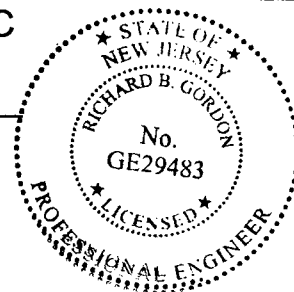
WITH DOUG FIR LARCH GRADE NO. 2, 875 LB/SQIN = MAXIMUM FLEXURAL STRESS WITH ADJUSTMENT FACTORS $\sigma = 875 \text{ LB/SQ IN}$ BECOMES,

$$\sigma = (875 \text{ LB/SQ IN})(1.15)(1.2)(1.15) = 1388 \text{ LB/SQ IN}$$

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**RAFTER STRESS CALCULATIONS FOR ANTHIE JONES, 163 WALTERS ROAD,
BRICK, NJ**

April 16, 2013

WHERE THE FACTORS 1.5 AND 1.2 ARE FOR REPETITIVE MEMBERS FACTOR (1.5) AND SNOW
LOAD DURATION FACTOR (1.5), AND THE 1.2 IS FOR SIZE ADJUSTMENT FACTOR

Page | 6

σ_b = BENDING STRESS = M/S = $M/7.56$ CU. IN. FOR 2X6 RAFTER

ASSUMING 25° PITCH OF RAFTER $\cos 25^\circ = (\text{HORIZONTAL RAFTER PROJECTION OF } 11.916') / (\text{RAFTER LENGTH ACTUAL})$

$R = 13.14$ FT

AT $L = 13.14$ FT, $L_1 = 116$ IN, $(L - L_1)/2 = 20.84$ IN

$\Sigma b = 8398/7.56 = 1110$ LB/SQ IN < 1388 LB/SQ IN GOOD.

CHECK CALCUATIONS

LOAD: 21 LB/SQ FT SNOW
 4.33 LB/SQ FT MODULES AND HARDWARE
 1 LB/SQ FT ROOF MATERIALS

TOTAL LOAD = 26.33 LB/SQ FT

2X6 16" O.C. WITH 13.14 FT RAFTER LENGTH IMPLIES LOAD AT EACH OF TWO ANCHORS OF,

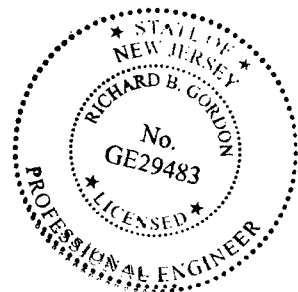
$(26.33 \text{ LB/SQ FT})(1.33 \text{ FT. O.C.})(13.14 \text{ FT})/2 \text{ ANCHORS} = 230 \text{ LB}$

$1388 \text{ LB/SQ IN} = \{[(R \text{ allowable}) - 116]/2\} (230 \text{ LB}/7.56 \text{ CU IN})$ IMPLIES $R \text{ allowed} = 207 \text{ IN}/12 \text{ IN/FT} = 17.27 \text{ FT} > 13.14 \text{ FT}$ GOOD.

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**RAFTER STRESS CALCULATIONS FOR ANTHIE JONES, 163 WALTERS ROAD,
BRICK, NJ**

April 16, 2013

ob = BENDING STRESS = $M/S = M/13.14 \text{ CU. IN. FOR } 2 \times 8 \text{ RAFTER}$

ASSUMING 25° PITCH OF RAFTER $\cos 25^\circ = (\text{HORIZONTAL RAFTER PROJECTION OF } 12')/(\text{RAFTER LENGTH ACTUAL})$

Page | 7

R = 13.24 FT

AT L = 13.24 FT, L1 = 116 IN, $(L - L1)/2 = 21.44 \text{ IN}$

$\Sigma b = 8641/13.14 = 656 \text{ LB/SQ IN} < 1388 \text{ LB/SQ IN} \quad \text{GOOD.}$

CHECK CALCULATIONS

LOAD: 21 LB/SQ FT SNOW
 4.33 LB/SQ FT MODULES AND HARDWARE
 1 LB/SQ FT ROOF MATERIALS

TOTAL LOAD = 26.33 LB/SQ FT

2X8 16" O.C. WITH 13.24 FT RAFTER LENGTH IMPLIES LOAD AT EACH OF TWO ANCHORS OF,

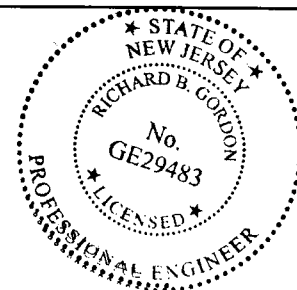
$(26.33 \text{ LB/SQ FT})(1.33 \text{ FT. O.C.})(13.24 \text{ FT})/2 \text{ ANCHORS} = 232 \text{ LB}$

$1388 \text{ LB/SQ IN} = \{[(R \text{ allowable}) - 116]/2\} (232 \text{ LB}/13.14 \text{ CU IN})$ IMPLIES R allowed = 273 IN/12 IN/FT = 22 FT > 16.73 FT GOOD.

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**RAFTER STRESS CALCULATIONS FOR ANTHIE JONES, 163 WALTERS ROAD,
BRICK, NJ**

April 16, 2013

CONCLUSION

THE SOFTEST WOOD USED IN FRAMING IS SPRUCE PINE FIR.

THE WITHDRAW REQUIRED TO PULL OUT A 5/16" DIA LAG SCREW IS 410 LB.

WE HAVE CALCULATED 317 LB POSSIBLE UNDER LOAD WHEN SUBJECTED TO AN UPLIFT FORCE OF 19.6 PSF.

THIS PROVIDES A FACTOR OF SAFETY OF $410/317 = 1.29$ FOR EXPOSURE CATEGORY B AND IS AN ACCEPTABLE CONDITION.

REGARDING SNOW LIVE LOAD AND DEAD LOADING OF 403 LB RESULTANT LOAD PLACED ON RAFTER AT TWO POINTS, EXISTING 2x8 16" O.C. MAXIMUM EXISTING SPAN HORIZONTAL RAFTER PROJECTION) OF 12' IS ACCEPTABLE YIELDING A 656 LB/SQ IN CALCULATED BENDING STRESS - AN ACCEPTABLE AND CAPABLE CONDITION EXISTS YET AFTER MODULE INSTALLATION.

FOR EXISTING 2x6 16" O.C. MAXIMUM EXISTING SPAN HORIZONTAL RAFTER PROJECTION) OF 11'-11" IS ACCEPTABLE YIELDING A 1110 LB/SQ IN CALCULATED BENDING STRESS - AN ACCEPTABLE AND CAPABLE CONDITION EXISTS YET AFTER MODULE INSTALLATION.

DERIVATION EQUATION FOR WIND UPLIFT LOAD

BASIC WIND SPEED:	115 MPH
ROOF ZONE:	I
TOPOGRAPHIC FACTOR (KzL):	1.0
EXPOSURE CATEGORY:	B
WIND DIRECTIONALITY FACTOR:	0.85
GUST FACTOR (G):	1.51 @ 30' ABOVE GRADE
NET PRESSURE COEFFICIENT (UPLIFT, Cu):	-0.9
NET PRESSURE COEFFICIENT (DOWN, Cd):	1.28
IMPORTANCE FACTOR:	1.0
VELOCITY PRESSURE EXPOSURE COEFFICIENT:	0.5 @ 30' ABOVE GRADE

VELOCITY PRESSURE DUE TO WIND (qh)= $0.00256 K_z K_{zL} K_d I V^{**2}$

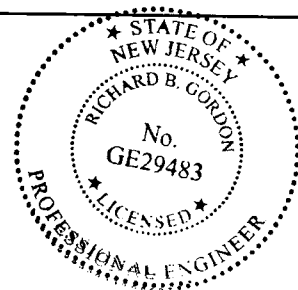
AT 95 MPH: $0.00256(0.5)(1)(0.85)(1)(115)^{**2} = 14.38$

WLu = qh g Cu = $14.38 (1.51)(-0.9) = -19.6$ PSF

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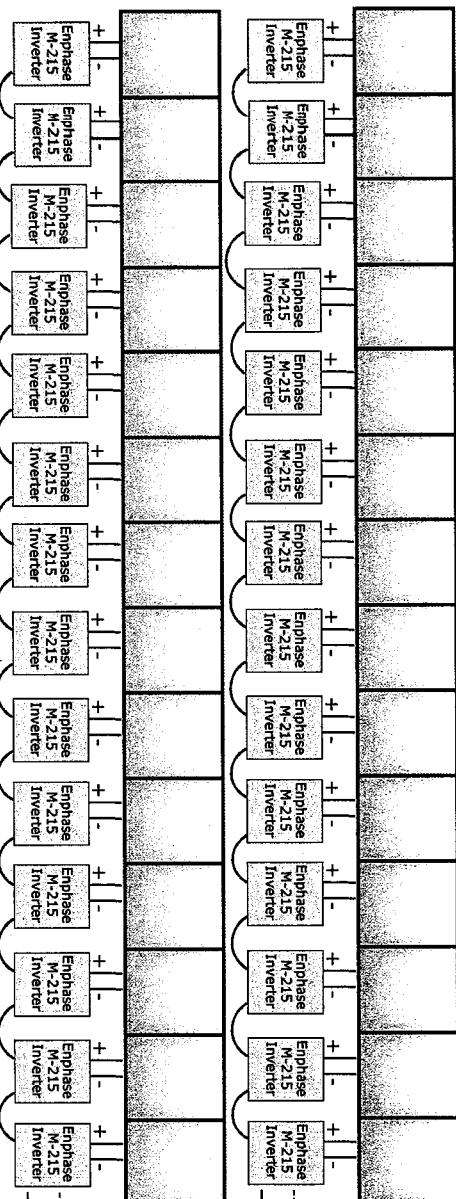


Modules to be mounted flat on roof
28 - 250W Hanwha Modules
HSL60P6-PA-O-250TW
3 Arrays

Hanwha 250W modules	
I _{mp}	8.33A
V _{mp}	30V
V _{oc}	37.4V
I _{sc}	8.89A

Existing 150A
120/240V 1Ø
Main Breaker
Loadcenter
Insulated line taps to be
installed on main feeders
NEC 690.64(A)

Inverters to be located
on roof under solar
modules



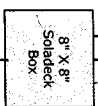
Emphase M-215 Micro Inverters
M215-60-2LL-S22/S23

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TOWNSHIP OF
RELEASED FOR PERMIT
Building Subcode INITIAL
Plumbing Subcode DATE 06/11/13
Fire Subcode JS 6-4-13
Electrical Subcode _____
Plan Reviewer _____
Plan-Released _____
Construction Official _____

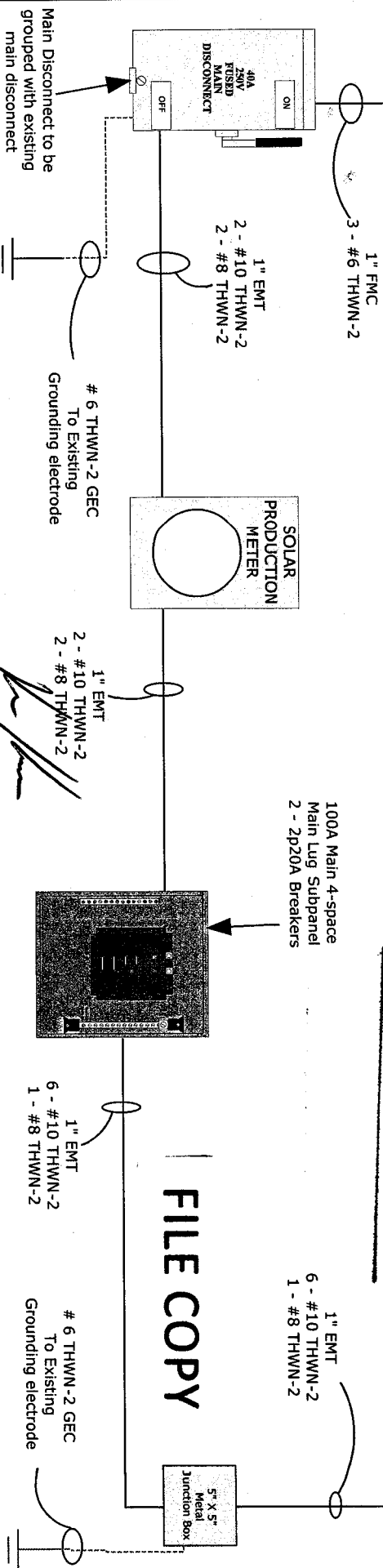
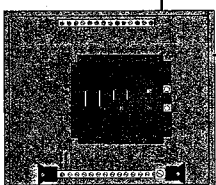
Factory Installed wires
to be connected to
junction box

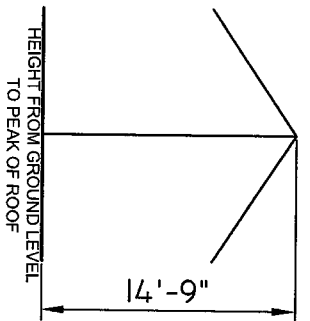
#8 Bare Copper Bonding
Conductor



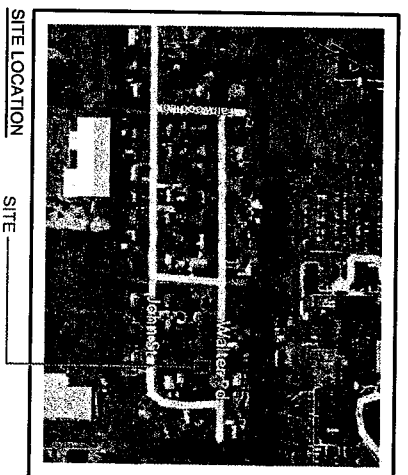
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100A Main 4-space
Main Lug Subpanel
2 - 2p20A Breakers





FRONT



SITE

PRODUCTION METER LOCATED
NEXT TO EXISTING METER

METER LOCATION

ELECT. PANEL LOCATION
(INSIDE BASEMENT)

ROOF 1
BUILDING ORIENTATION = 155°
ROOF PITCH (PANEL AREA) = 25°
ROOF 2
BUILDING ORIENTATION = 155°
ROOF PITCH (PANEL AREA) = 25°
ROOF 3
BUILDING ORIENTATION = 155°
ROOF PITCH (PANEL AREA) = 12°
ROOF 4
BUILDING ORIENTATION = 245°
ROOF PITCH (PANEL AREA) = 20°

A - RELOCATE 3" PVC

* 28 MODULES TO BE ON 28 M-215 INVERTERS

ROOF 4

BACK

Issued / Revisions		
No.	Description	Date



Project Title:

ANTHIE JONES

Project Address:

163 WALTER ROAD
BRICK, NJ 08724

Drawing Title:

PROPOSED 7KW
SOLAR SYSTEM

Drawing Information

Drawing Date: 4/9/2013
Drawn By: MLH
Checked By: GAP
Revised By: N.T.S
Scale:

System Information:

Total System Size: 7kW
Total Panel Count: 28
Panels Used: Hanwah 250w
Panel Spec #: HSL60P6-P40-250TW
Utility Company: JCP & L
Account Number: 100 017 316 355

Rev. No. Sheet

0

1/1

Trinity
SOLAR

2211 Allenwood Road
Wall, New Jersey 07719
877-797-2978
www.TrinitySolar.com

SOLARMOUNT™

Code-Compliant Installation Manual 227.3

U.S. Des. Patent No. D496,248S, D496,249S. Other patents pending.



Unirac Code-Compliant Installation Manual

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Part I. Procedure to Determine the Design Wind Load	3
Part II. Procedure to Select Rail Span and Rail Type	10
Part III. Installing SolarMount	
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[3.2.] Installing SolarMount with top mounting clamps	15
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[3.4.] Installing SolarMount with grounding clips and lugs	25

 **UNIRAC®**
A HILTI GROUP COMPANY

Unirac welcomes input concerning the accuracy and user-friendliness of this publication. Please write to publications@unirac.com.

Pub 110616-1cc
June 2011

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Part I. Procedure to Determine the Design Wind Load

[1.1.] Using the Simplified Method - ASCE 7-05

The procedure to determine Design Wind Load is specified by the American Society of Civil Engineers and referenced in the International Building Code 2009. For purposes of this document, the values, equations and procedures used in this document reference ASCE 7-05, Minimum Design Loads for Buildings and Other Structures. **Please refer to ASCE 7-05 if you have any questions about the definitions or procedures presented in this manual.** Unirac uses Method 1, the Simplified Method, for calculating the Design Wind Load for pressures on components and cladding in this document.

The method described in this document is valid for flush, no tilt, SolarMount Series applications on either roofs or walls. Flush is defined as panels parallel to the surface (or with no more than 3" difference between ends of assembly) with no more than 10" space between the roof surface, and the bottom of the PV panels.

This method is not approved for open structure calculations. **Applications of these procedures is subject to the following ASCE 7-05 limitations:**

1. The building height must be less than 60 feet, $h < 60$. See note for determining h in the next section. For installations on structures greater than 60 feet, contact your local Unirac Distributor.
2. The building must be enclosed, not an open or partially enclosed structure, for example a carport.
3. The building is regular shaped with no unusual geometrical irregularity in spatial form, for example a geodesic dome.
4. The building is not in an extreme geographic location such as a narrow canyon or steep cliff.
5. The building has a flat or gable roof with a pitch less than 45 degrees or a hip roof with a pitch less than 27 degrees.
6. If your installation does not conform to these requirements please contact your local Unirac distributor or a local professional engineer.

If your installation is outside the United States or does not meet all of these limitations, consult a local professional engineer or your local building authority. Consult ASCE 7-05

for more clarification on the use of Method I. Lower design wind loads may be obtained by applying Method II from ASCE 7-05. Consult with a licensed engineer if you want to use Method II procedures.

The equation for determining the Design Wind Load for components and cladding is:

$$p_{net} \text{ (psf)} = \lambda K_{zt} I p_{net30}$$

$$p_{net} \text{ (psf)} = \text{Design Wind Load}$$

λ = adjustment factor for building height and exposure category

K_{zt} = Topographic Factor at mean roof height, h (ft)

I = Importance Factor

p_{net30} (psf) = net design wind pressure for Exposure B, at height = 30 feet, $I = 1.0$

You will also need to know the following information:

Basic Wind Speed = V (mph), the largest 3 second gust of wind in the last 50 years.

h (ft) = total roof height for flat roof buildings or mean roof height for pitched roof buildings

Roof Pitch (degrees)

This manual will help you determine:

Effective Wind Area (sf) = minimum total continuous area of modules being installed (Step 2)

Roof Zone = the area of the roof you are installing the pv system according to Step 3.

Roof Zone Dimension = a (ft) (Step 3)

Exposure Category (Step 6)

[1.2.] Procedure to Calculate Total Design Wind

The procedure for determining the Design Wind Load can be broken into steps that include looking up several values in different tables. Table 5 has been provided as a worksheet for the following 9 steps (page 8)

Step 1: Determine Basic Wind Speed, V (mph)

Determine the **Basic Wind Speed**, V (mph) by consulting your local building department or locating your installation on the maps in Figure 1, page 4.

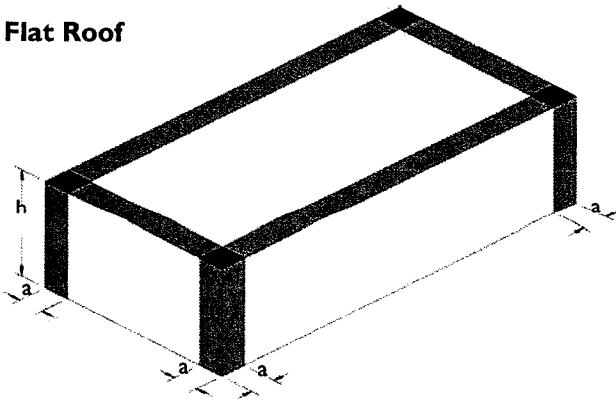
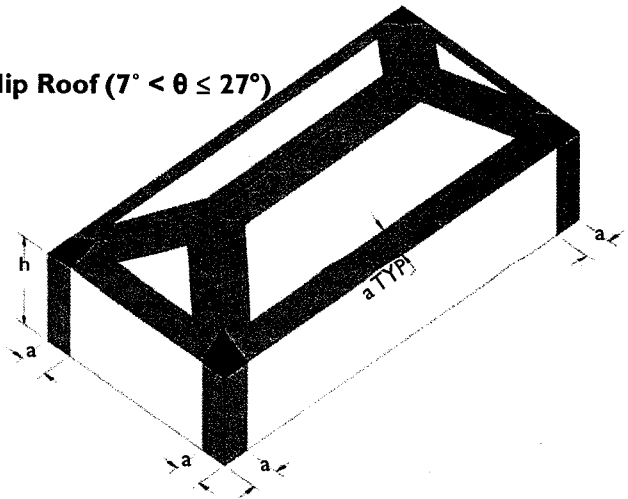
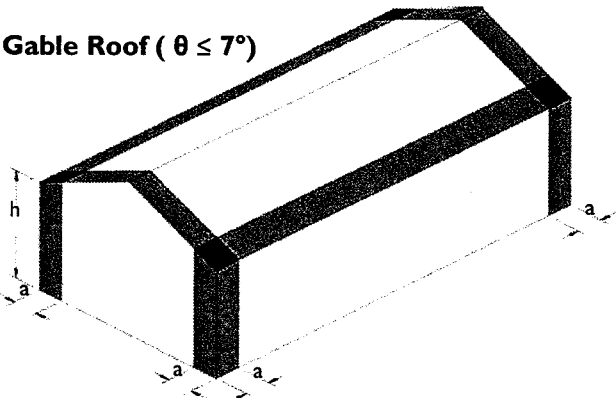
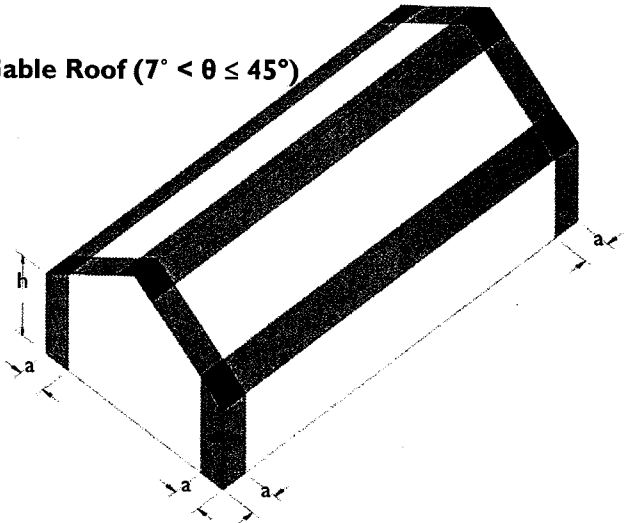
Step 2: Determining Effective Wind Area

Determine the smallest area of continuous modules you will be installing. This is the smallest area tributary (contributing load) to a support or to a simple-span of rail. That area is the Effective Wind Area, the total area of the fewest number of modules on a run of rails. If the smallest area of continuous modules exceeds 100 sq ft, use 100 sq ft (See Table 2). If less, round down to values available in Table 2.

Step 3: Determine Roof Zone (continued)

Using *Roof Zone Dimension Length, a*, determine the roof zone locations according to your roof type, gable, hip or monoslope. Determine in which roof zone your pv system is located, Zone 1, 2, or 3 according to Figure 2.

Figure 2. Enclosed buildings, wall and roofs

Flat Roof**Hip Roof ($7^\circ < \theta \leq 27^\circ$)****Gable Roof ($\theta \leq 7^\circ$)****Gable Roof ($7^\circ < \theta \leq 45^\circ$)**

 Interior Zones
Roofs - Zone 1/Walls - Zone 4

 End Zones
Roofs - Zone 2/Walls - Zone 5

 Corner Zones
Roofs - Zone 3

Source: ASCE/SEI 7-05, *Minimum Design Loads for Buildings and Other Structures*, Chapter 6, p. 41.

Step 4: Determine Net Design Wind Pressure, p_{net30} (psf)

Using the *Effective Wind Area* (Step 2), *Roof Zone Location* (Step 3), and *Basic Wind Speed* (Step 1), look up the appropriate *Net Design Wind Pressure* in Table 2, page 6. Use the *Effective Wind Area* value in the table which is smaller than the value calculated in Step 2. If the installation is located on a roof overhang, use Table 3, page 7.

Both downforce and uplift pressures must be considered in overall design. Refer to Section II, Step 1 for applying downforce and uplift pressures. Positive values are acting toward the surface. Negative values are acting away from the surface.

Table 3. p_{net30} (psf) Roof Overhang

	Zone	Effective Wind Area (sf)	Basic Wind Speed, V (mph)							
			90	100	110	120	130	140	150	170
Roof 0 to 7 degrees	2	10	-21.0	-25.9	-31.4	-37.3	-43.8	-50.8	-58.3	-74.9
	2	20	-20.6	-25.5	-30.8	-36.7	-43.0	-49.9	-57.3	-73.6
	2	50	-20.1	-24.9	-30.1	-35.8	-42.0	-48.7	-55.9	-71.8
	2	100	-19.8	-24.4	-29.5	-35.1	-41.2	-47.8	-54.9	-70.5
	3	10	-34.6	-42.7	-51.6	-61.5	-72.1	-83.7	-96.0	-123.4
	3	20	-27.1	-33.5	-40.5	-48.3	-56.6	-65.7	-75.4	-96.8
	3	50	-17.3	-21.4	-25.9	-30.8	-36.1	-41.9	-48.1	-61.8
	3	100	-10.0	-12.2	-14.8	-17.6	-20.6	-23.9	-27.4	-35.2
Roof > 7 to 27 degrees	2	10	-27.2	-33.5	-40.6	-48.3	-56.7	-65.7	-75.5	-96.9
	2	20	-27.2	-33.5	-40.6	-48.3	-56.7	-65.7	-75.5	-96.9
	2	50	-27.2	-33.5	-40.6	-48.3	-56.7	-65.7	-75.5	-96.9
	2	100	-27.2	-33.5	-40.6	-48.3	-56.7	-65.7	-75.5	-96.9
	3	10	-45.7	-56.4	-68.3	-81.2	-95.3	-110.6	-126.9	-163.0
	3	20	-41.2	-50.9	-61.6	-73.3	-86.0	-99.8	-114.5	-147.1
	3	50	-35.3	-43.6	-52.8	-62.8	-73.7	-85.5	-98.1	-126.1
	3	100	-30.9	-38.1	-46.1	-54.9	-64.4	-74.7	-85.8	-110.1
Roof > 27 to 45 degrees	2	10	-24.7	-30.5	-36.9	-43.9	-51.5	-59.8	-68.6	-88.1
	2	20	-24.0	-29.6	-35.8	-42.6	-50.0	-58.0	-66.5	-85.5
	2	50	-23.0	-28.4	-34.3	-40.8	-47.9	-55.6	-63.8	-82.0
	2	100	-22.2	-27.4	-33.2	-39.5	-46.4	-53.8	-61.7	-79.3
	3	10	-24.7	-30.5	-36.9	-43.9	-51.5	-59.8	-68.6	-88.1
	3	20	-24.0	-29.6	-35.8	-42.6	-50.0	-58.0	-66.5	-85.5
	3	50	-23.0	-28.4	-34.3	-40.8	-47.9	-55.6	-63.8	-82.0
	3	100	-22.2	-27.4	-33.2	-39.5	-46.4	-53.8	-61.7	-79.3

Source: ASCE/SEI 7-05, Minimum Design Loads for Buildings and Other Structures, Chapter 6, p. 44.

Step 5: Determine the Topographic Factor, K_{zt}

For the purposes of this code compliance document, the Topographic Factor, K_{zt} , is taken as equal to one (1), meaning, the installation is surrounded by level ground (less than 10% slope). If the installation is not surrounded by level ground, please consult ASCE 7-05, Section 6.5.7 and the local building authority to determine the Topographic Factor.

Step 6: Determine Exposure Category (B, C, D)

Determine the Exposure Category by using the following definitions for Surface Roughness Categories.

The ASCE/SEI 7-05 defines wind surface roughness categories as follows:

SURFACE ROUGHNESS B: is urban and suburban areas, wooded areas, or other terrain with numerous closely spaced obstructions having the size of single family dwellings.

SURFACE ROUGHNESS C: has open terrain with scattered obstructions having heights generally less than 30 feet. This category includes flat open country, grasslands, and all water surfaces in hurricane prone regions.

SURFACE ROUGHNESS D: has flat, unobstructed areas and water surfaces outside hurricane prone regions. This category includes smooth mud flats, salt flats, and unbroken ice.

Also see ASCE 7-05 pages 287-291 for further explanation and explanatory photographs, and confirm your selection with the local building authority.

Table 6. Occupancy Category Importance Factor

Category	Category Description	Building Type Examples	Non-Hurricane Prone Regions and Hurricane Prone Regions with Basic Wind Speed, $V = 85-100$ mph, and Alaska	Hurricane Prone Regions with Basic Wind Speed, $V > 100$ mph
I	Buildings and other structures that represent a low hazard to human life in the event of failure, including, but limited to:	- Agricultural facilities - Certain Temporary facilities - Minor Storage facilities	0.87	0.77
II	All buildings and other structures except those listed in Occupancy Categories I, III, and IV.		I	I
III	Buildings and other structures that represent a substantial hazard to human life in the event of a failure, including, but not limited to:	- Buildings where more than 300 people congregate - Schools with a capacity more than 250 - Day Cares with a capacity more than 150 - Buildings for colleges with a capacity more than 500 - Health Care facilities with a capacity more than 50 or more resident patients - Jails and Detention Facilities - Power Generating Stations - Water and Sewage Treatment Facilities - Telecommunication Centers - Buildings that manufacture or house hazardous materials	1.15	1.15
IV	Buildings and other structures designated as essential facilities, including, but not limited to:	- Hospitals and other health care facilities having surgery or emergency treatment - Fire, rescue, ambulance and police stations - Designated earthquake, hurricane, or other emergency shelters - Designated emergency preparedness communication, and operation centers - Power generating stations and other public utility facilities required in an emergency - Ancillary structures required for operation of Occupancy Category IV structures - Aviation control towers, air traffic control centers, and emergency aircraft hangars - Water storage facilities and pump structures required to maintain water pressure for fire suppression - Buildings and other structures having critical national defense functions	1.15	1.15

Source: IBC 2009, Table 1604.5, Occupancy Category of Buildings and other structures, p. 281; ASCE/SEI 7-05, Minimum Design Loads for Buildings and Other Structures, Table 6-1, p. 77

Table 7. ASCE 7 ASD Load Combinations

Description	Variable	Downforce Case 1	Downforce Case 2	Downforce Case 3	Uplift	units
Dead Load	D	1.0 x	1.0 x	1.0 x	0.6 x	psf
Snow Load	S	1.0 x + _____		0.75 x + _____		psf
Design Wind Load	P _{net}		1.0 x + _____	0.75 x + _____	1.0 x -	psf
Total Design Load	P					psf

Note: Table to be filled out or attached for evaluation.

Step 2: Determine the Distributed Load on the rail, w (plf)

Determine the *Distributed Load*, w (plf), by multiplying the module length, B (ft), by the *Total Design Load*, P (psf) and dividing by two. Use the maximum absolute value of the three downforce cases and the Uplift Case. We assume each module is supported by two rails.

$$w = PB/2$$

w = Distributed Load (pounds per linear foot, plf)

B = Module Length Perpendicular to Rails (ft)

P = Total Design Pressure (pounds per square foot, psf)

Step 3: Determine Rail Span/ L-Foot Spacing

Using the *distributed load*, w , from Part II, **Step 2**, look up the *allowable spans*, L , for each Unirac rail type, SolarMount (SM) and SolarMount Heavy Duty (HD).

The L-Foot SolarMount Series Rail Span Table uses a single L-foot connection to the roof, wall or stand-off. Please refer to the **Part III** for more installation information.

Table 8. L-Foot SolarMount Series Rail Span

SM - SolarMount HD - SolarMount Heavy Duty

Span (ft)	Distributed Load (pounds/linear foot)															
	20	25	30	40	50	60	80	100	120	140	160	180	200	220	240	260
2	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM
2.5	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	HD	HD	HD
3	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	HD	HD	HD	HD	HD
3.5	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	HD	HD	HD	HD		
4	SM	SM	SM	SM	SM	SM	SM	SM	SM	HD	HD	HD	HD			
4.5	SM	SM	SM	SM	SM	SM	SM	SM	HD	HD	HD					
5	SM	SM	SM	SM	SM	SM	SM	SM	HD	HD	HD					
5.5	SM	SM	SM	SM	SM	SM	SM	HD	HD	HD						
6	SM	SM	SM	SM	SM	SM	SM	HD	HD							
6.5	SM	SM	SM	SM	SM	SM	SM	HD								
7	SM	SM	SM	SM	SM	SM	HD	HD								
7.5	SM	SM	SM	SM	SM	SM	HD	HD								
8	SM	SM	SM	SM	SM	SM	HD	HD								
8.5	SM	SM	SM	SM	SM	SM	HD									
9	SM	SM	SM	SM	HD	HD	HD									
9.5	SM	SM	SM	SM	HD	HD	HD									
10	SM	SM	SM	HD	HD	HD	HD									
10.5	SM	SM	SM	HD	HD	HD										
11	SM	SM	HD	HD	HD	HD										
11.5	SM	HD	HD	HD	HD	HD										
12	SM	HD	HD	HD	HD	HD										